ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Weissenfels, Silke; Nissen, Anika; Smolnik, Stefan

Article — Published Version

Advancing digital health in information systems research: Insights from a text mining analysis

Electronic Markets

Provided in Cooperation with:
Springer Nature

Suggested Citation: Weissenfels, Silke; Nissen, Anika; Smolnik, Stefan (2025) : Advancing digital health in information systems research: Insights from a text mining analysis, Electronic Markets, ISSN 1422-8890, Springer, Berlin, Heidelberg, Vol. 35, Iss. 1, https://doi.org/10.1007/s12525-025-00768-w

This Version is available at:
https://hdl.handle.net/10419/323625

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

http://creativecommons.org/licenses/by/4.0/

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

Electronic Markets (2025) 35:23
https://doi.org/10.1007/s12525-025-00768-w

RESEARCH PAPER

Advancing digital health in information systems research: Insights from a text mining analysis

Silke Weissenfels[1] · Anika Nissen[1] · Stefan Smolnik[1]

Received: 13 October 2024 / Accepted: 3 February 2025
© The Author(s) 2025

Abstract
The advancement and adoption of digital health technologies promise improved healthcare outcomes globally. However, numerous challenges hinder their widespread adoption. Existing IS research offers a plethora of works addressing these challenges, making it difficult to navigate the jungle of health IS research. Thus, we need a structured overview identifying the current knowledge state. Using a text mining approach, we analyze 484 papers from leading IS journals to synthesize health topics across digital health technologies. Our study uncovers key health topics and trends, traces their evolution over time, and identifies knowledge gaps within current IS literature. Our findings underscore the importance of emerging technologies and additional stakeholders in context-sensitive healthcare. We propose a research agenda to extend the scope of health-related IS research and suggest avenues for future exploration. We advocate for IS researchers to collaborate more closely with related fields to stay at the forefront of advancements.

Keywords Health IT · E-health · Digital health · Text mining · Topic modeling

JEL classification I10

Introduction

Health information technologies (HIT) hold great promise for advancing healthcare significantly (Alotaibi & Federico, 2017; Chen et al., 2019; Haux, 2006; World Health Organization, 2024a). Yet, investments, spending, and competition for quality in the healthcare market are driven by the expectations of profitable growth (Ciriello Pother et al., 2024; Ghandour et al., 2022). Furthermore, the implementation and adoption of digital health technologies still fall short of expectations (Park, 2016; Rivard & Lapointe, 2012). As a result, the analysis of digital health has become a major interest for information systems (IS) scholars, with attention to the impact of healthcare markets' digital transformation (Agarwal et al., 2010; Chen et al., 2019; Chiasson & Davidson, 2004; Fichman et al., 2011; Kohli & Tan, 2016).

Thus, there is still an urgent need to support the overarching vision in healthcare—to enhance global health and well-being—by accelerating the advancement and adoption of accessible, affordable, and scalable digital health solutions, as advocated by the World Health Organization (WHO) (Health, Digital & Innovation, 2021). This vision is formulated to prevent, detect, and respond better to epidemics and pandemics and to develop an infrastructure and applications that enable countries to utilize health data for promoting well-being. This noble goal has put significant pressure on the healthcare market and its stakeholders, including organizations, institutions, providers, practitioners, and societies to undergo transformation (Kehr et al., 2023; MobiHealthNews, 2023; Park, 2016; Teisberg et al., 2020). Additionally, several challenges are hindering the large-scale adoption of technologies in healthcare, including data privacy concerns (Angst & Agarwal, 2009; Li et al., 2014) and a lack of technological

Responsible Editor: Doug Vogel

✉ Silke Weissenfels
silke.weissenfels@fernuni-hagen.de

Anika Nissen
anika.nissen@fernuni-hagen.de

Stefan Smolnik
stefan.smolnik@fernuni-hagen.de

[1] FernUniversität in Hagen, Fakultät Für Wirtschaftswissenschaft, Lehrstuhl Für Betriebswirtschaftslehre, Insb. Betriebliche Anwendungssysteme, Universitätsstraße 41, 58097 Hagen, Germany

Published online: 08 March 2025

literacy (Chan, 2021; Fox & Connolly, 2018). This contrast is in contradiction with the abundant number of technologies introduced in the last decade. Examples comprise electronic health records (EHR) (Eden et al., 2022; Kohli & Tan, 2016; Oborn et al., 2011), decision support systems and analytics for physicians, hospital management, or patients (Oztekin et al., 2010; Sutton et al., 2020; Varshney, 2014), as well as technologies to promote personal health (Benbunan-Fich, 2019; Lupton, 2013) and to foster personalized medicine (Guo et al., 2023; Shraideh & Schreieck, 2021).

IS research has to play a major role in healthcare in explaining technology implementation (Burton-Jones & Volkoff, 2017; Mishra et al., 2012; Rivard & Lapointe, 2012; Strong et al., 2014; Venkatesh et al., 2011), technology acceptance (Bhattacherjee & Hikmet, 2007; Walter & Lopez, 2008; Wu et al., 2011; Yi et al., 2006), and fostering technological innovations (Cho et al., 2007; Hanseth & Bygstad, 2015; Singh et al., 2015). Beyond these traditional IS themes, digital health offers a myriad of critical topics that health-related IS research must address. For instance, providing improved healthcare through establishing robust health IS infrastructure in developing countries or rural regions has laggardly started and yields several challenges that cannot be addressed with traditional IS theories only (Goh et al., 2016; Srivastava & Shainesh, 2015; Venkatesh et al., 2016). Furthermore, IS researchers tackle challenges in technology adoption in healthcare due to governance mechanisms (Tarafdar & Gordon, 2007; Urbaczewski & Lee, 2020; Xue et al., 2008), difficulties in trust-building (Bansal et al., 2010; Leimeister et al., 2005; Song & Zahedi, 2007; Zahedi & Song, 2008), and a lack of interoperability and integrity of digital innovations into the existing IT infrastructure (Aanestad & Jensen, 2011; Kohli & Tan, 2016). These examples demonstrate the diversity of health-related IS research. However, there is still a need to transform the healthcare sector by enhancing efficiency, improving care quality, and optimizing resource allocation and workload through standardization of technological advancements (e.g., through artificial intelligence (AI)) (Abdel-Karim et al., 2023; Berente et al., 2021).

Accordingly, IS and health-related disciplines need to work together to deal with the fast-paced innovations in healthcare. Yet, multidisciplinary research remains marginalized, i.e., IS research on health topics is largely disconnected from related works in medicine, computer science, or health informatics (Chen et al., 2019; Fichman et al., 2011; Oborn et al., 2011). Consequently, elemental health topics and stakeholders may be underrepresented in core IS literature, resulting in significant knowledge gaps. Although there have been earlier efforts to analyze the intellectual structure of health IS research (Chen et al., 2019), it remains challenging to keep track of the wealth of research conducted by IS researchers. Against this backdrop, a comprehensive synthesis of health-related IS publications offers a valuable overview, enabling the identification of knowledge gaps and trends to guide future research. Additionally, such an overview helps health IS researchers navigate existing knowledge more effectively and connect their work to related studies published in core IS outlets. Ultimately, we propose that advancing health-related IS research requires an in-depth analysis of the major topics explored in core IS journals (i.e., AIS senior scholars' basket of eleven). Therefore, our research objectives aim to (1) identify the primary research streams and topics characterizing health-related IS research in core journals, (2) analyze their evolution over time, and (3) propose future research directions in digital health technologies.

To assess health studies in the core IS journals as holistically as possible, we conducted a literature review to identify a set of 484 papers for analysis. To derive the core topics, we utilize a text mining approach with topic modeling to ensure non-biased topics, statistically based on the language and concepts used in the papers. Through this, we contribute to the body of knowledge by providing an overview of the critical health topics accomplished in core IS journals. Finally, we discuss the identified topics and contribute to the IS discipline by outlining existing knowledge gaps and highlighting pressing healthcare issues, thereby establishing a research agenda. Our paper is structured as follows: First, we cover the relevant concepts and definitions related to digital health and associated technologies. Second, we present our method and data analysis. Third, we describe our results on the current state of knowledge. Eventually, we discuss future research areas and directions and conclude our analysis with our work's limitations.

Background

Over the past decade, a multitude of technological solutions in the health context have been analyzed in literature. However, as of now, there is still conceptual ambiguity in the introduced terms. Thus, this section briefly presents how digital health, health IT, technologies, and systems are conceptualized in our understanding and related to each other.

The digital health challenge

When investigating digital health research, one is challenged with questioning what health is and what is understood as digital health. Starting with this dilemma, Oh et al. (2005) raised doubts about the health definition, and whether it is a state attained through treatment or a clearly defined condition, such as the absence of disease and total well-being. They could not resolve if health is a care process or seen as an outcome (Oh et al., 2005). Expanding these thoughts, the WHO states that health is "a state of complete physical,

mental, and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 2024b). Now, when turning to digital health, this umbrella term spans technological solutions such as health IT and e-health, and further includes, e.g., "the Internet of Things, advanced computing, big data analytics, artificial intelligence including machine learning, and robotics" (Health, Digital & Innovation, 2021, p. 11). Scholars describe digital health as technologies enabling individuals' well-being, communities, and populations (Fatehi et al., 2020). Lowery (2020) highlights technology- and data-driven approaches, asserting that digital health revolutionizes healthcare delivery and management by enabling continuous patient health monitoring beyond clinic visits, instead of relying on sporadic health information collection.

Digital health gained attention in 2021 within medical informatics research (Fornazin et al., 2021), impacting IS users by enhancing well-being and fitness while causing technostress (Grehling & Maier, 2021). The focus on mental, physical, and social dimensions of digital health provides new perspectives on the individual rather than on specific technologies, promoting the person-centered approach advocated by the WHO (Grehling & Maier, 2021). To conclude, digital health can be defined as improving healthcare, healthcare delivery, and well-being for individuals and the public. In this frame, digital health technologies are acknowledged to (1) promote person-centered health, (2) foster disease prevention, and (3) strengthen public health resilience (World Health Organization Headquarters, 2018). Digital health technological solutions can be roughly categorized into Health IT and E-Health applications, each of which is introduced in the following.

Health IT

Health IT primarily focuses on the tools and systems, both software and hardware, that store, share, and analyze health information (The Office of the National Coordinator for Health Information Technology [ONC], 2024). Therefore, it advances the use of information in healthcare by supporting health organizations and professionals in their daily practice, fulfilling clinical guidelines, and enhancing medical decision-making and care quality.

Studying the literature, we identified five major key players of health IT: electronic health records (EHR), personal health records (PHR), e-prescription, clinical information systems (CIS), and clinical decision support systems (CDSS). **EHR** stores the medical history of patients used for diagnosis, treatment, and multidisciplinary care to replace paper-based records (Eden et al., 2022; Kohli & Tan, 2016; Oborn et al., 2011). While EHR is administered by healthcare professionals, **PHR** is defined as a health information repository and controlled by the health-conscious individual or patient (Archer et al., 2011; Lafky et al., 2006). Furthermore, **e-prescription** allows direct communication between physicians and pharmacies (ONC, 2024). Providing an overview of clinical data is maintained by **CIS** which are defined as "computer-supported applications with a relatively large and long-term database containing clinical data that are used to assist in the management of patient care" (Blum, 1986, p. 791), allowing gathering and storage from diverse sources. In a similar vein, traditional **CDSS** include patient information matched with clinical knowledge to provide decision-support for physicians or provide medication-related alternations (Osheroff et al., 2012; Phansalkar et al., 2010; Sutton et al., 2020).

E-health

In contrast to health IT, **e-health** includes using the Internet and communication technologies to deliver healthcare services, including online health information and education, facilitating better health outcomes (World Health Organization - Regional Office for the Eastern Mediterranean, 2024). Thus, e-health emphasizes health information delivery and services to promote users' health and extend healthcare beyond traditional boundaries (Eysenbach, 2001). E-health may enhance diagnostic or therapeutic interventions and strengthen communication, for instance, through telemedicine, online health communities (OHCs), m-health, or the Internet of (medical) Things (IoT).

Telemedicine can be subsumed to e-health as it refers to IT use by physicians to remotely connect with patients or colleagues using an online platform (Chau & Hu, 2002; Paul, 2006; Srivastava & Shainesh, 2015). The rapid growth of **OHCs** in recent years has sparked significant interest. OHCs enable the web-based sharing of (health) information, experiences, and emotions about health topics to support other members (Fan et al., 2018; Wright, 2002) and can improve health outcomes (individual and economic). **M-health** empowers users and supports medical and public health practices by enabling healthier behavior, disease monitoring, and self-management (Executive Board, 2017). It overcomes temporal and spatial constraints, offering distinct benefits such as (a) positive health outcomes through user interaction with their health information (Fox & Connolly, 2018; Ghose et al., 2022; Martínez-Pérez et al., 2013), (b) the substitution of offline visits (Ghose et al., 2022), (c) improved management of chronic diseases and emergencies (Varshney, 2014), and (d) enhanced healthcare coverage, including real-time patient monitoring at home, physical and health statistics activity tracking, and seamless health information accessibility and sharing (Benbunan-Fich, 2019; Fox & Connolly, 2018; Varshney, 2014; Wu et al., 2011). These technologies shift care from reactive interventions to proactive prevention, driving healthier behavior (Gopinath

et al., 2022). Extending this, **IoT** applications create continuous data and real-time connectivity while monitoring individuals' (or patients') health and contribute to big data in healthcare (Tu et al., 2009; Wang et al., 2018). Big data advances clinical decision-making to provide physicians with intelligently filtered information to refine diagnosis and treatment quality, providing alerts, reminders, and summarizing guidelines, medical reports, and recommendations (Berner, 2007).

In conclusion, health IT aims to advance medical care and reduce costs in clinical and professional settings by optimizing information use for medical decision-making, mainly for healthcare professionals (Esmaeilzadeh et al., 2010). In contrast, e-health focuses on providing healthcare information and services, usually through a website, app, or digital platform, for diagnosis, prevention, and data management, serving health-conscious individuals, patients, and healthcare professionals alike (Esmaeilzadeh et al., 2010). **Health analytics** enhances the accuracy of medical decision-making by extending traditional CDSS (Oesterreich et al., 2020; Ologeanu-Taddei et al., 2019). As a bridge between health IT and e-health, health analytics is based on algorithms to automate subtasks such as data gathering, evaluation, filtering, and generating clinical recommendations (Pumplun et al., 2023). Predictive analytics hold significant opportunities from an organizational standpoint because of their ability to enhance value-based care quality and support clinical processes (Lin et al., 2017; Son et al., 2020). These capabilities include enabling early disease detection and facilitating pattern analysis (Wang et al., 2018). However, while big data holds significant potential in biomedical research and personalized medicine, both application cases have rarely been considered in IS research. Figure 1 offers an overview of the digital health solutions presented, illustrating how they relate to each other.

When looking at this overview, the question arises of how far these technologies are covered by IS research. It also stands to question which of these technologies and their impact on multiple stakeholders require further research or need to be extended with recent developments in, for instance, AI.

Method

Data collection To identify major streams in IS core literature, we broadly searched for the term "health" in the AIS senior scholar's basket of eleven (i.e., we included the journals Decision Support Systems, Information & Management, Information Systems Research, MIS Quarterly, European Journal of Information Systems, Journal of the AIS, Journal of Management Information Systems, Information Systems Journal, Journal of Information Technology, Information & Organization, and Journal of Strategic Information Systems). The primary reason for limiting the source selection to the 11 premier journals of the IS discipline is to achieve our paper's objective of providing a broad and historical overview of how digital health research evolved. This approach enables us to identify current gaps and highlight potential for future research. That said, it is impossible for a single paper to be all-inclusive which is why we decided to target the major contributions made over time in the IS discipline. Typically, major contributions are found in the leading journals (Webster & Watson, 2002).

The search was conducted on May 11, 2023, without any restrictions on the time of publication up until that date. A total of 558 papers resulted from this first step. We then systematically filtered papers that did not include health in their title or abstract, which reduced the number of potential papers to 495. Finally, some papers did not provide an

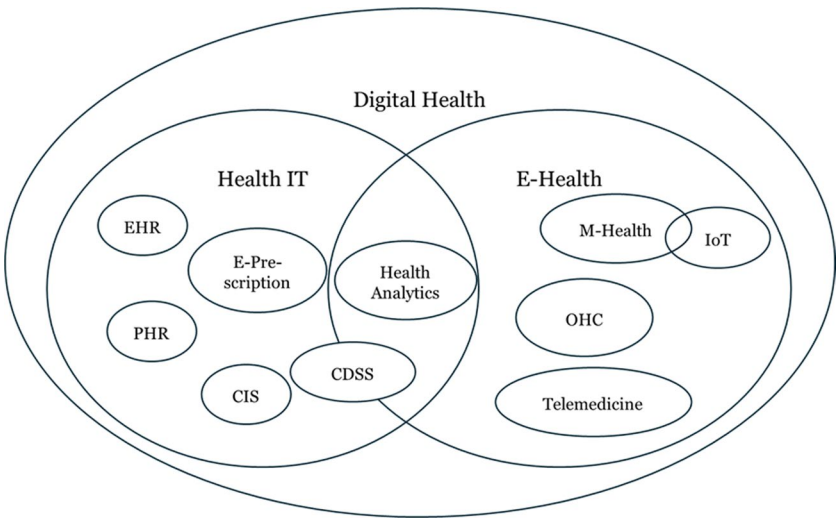


Fig. 1 Overview of digital health technologies

abstract due to which we used a final set of $n = 484$ papers for our text mining analyses.

Data pre-processing The abstracts from the collected papers were analyzed using Juypter Notebooks (*the data and code can be viewed here: https://github.com/AnikaNissen/EM-health-in-IS-research*). More precisely, we used the scikit-learn toolbox for python. In the first step, we transformed the abstracts using the Term Frequency Inverse Document Frequency (TF-IDF) algorithm using 2000 max_features, and the stopword list from the English dictionary included in the scikit-learn library. Based on this, we then calculated the topics present in the literature using non-negative matrix factorization (NMF). NMF has shown to outperform the more traditional latent dirichlet algorithm (LDA) frequently used in topic modeling by resulting in more accurate and better interpretable topics (Athukorala & Mohotti, 2022; Chen et al., 2019; Egger & Yu, 2022; Zoya et al., 2021). To select an accurate number of topics, we calculated the coherence score C_v for $1 < n < 50$ number of topics. The higher the C_v coherence, the smaller the overlap between identified topics. The typical threshold upon which acceptable coherence is present is 0.50 (McLevey, 2021). According to the resulting coherence scores depicted in Fig. 2, we therefore selected $n = 10$ *topics* with a score of $C\_v = 0.6456$. In topic modeling, each paper has a certain probability of belonging to one of the NMF topics. In each case, the topic with the highest probability was assigned to each paper because the other topics' probability was usually neglectable. For example, the paper by Ben-Assuli et al. (2023) has a weight of 0.223 for the topic "data-driven healthcare decision-making," but only 0.006 for the topic on "health IT: adoption & care" and the topic on "trust in online communities," and 0 for the remaining topics. In the paper, the authors develop prediction models to prevent hospital readmissions of patients, so the assigned topic appears to be suitable.

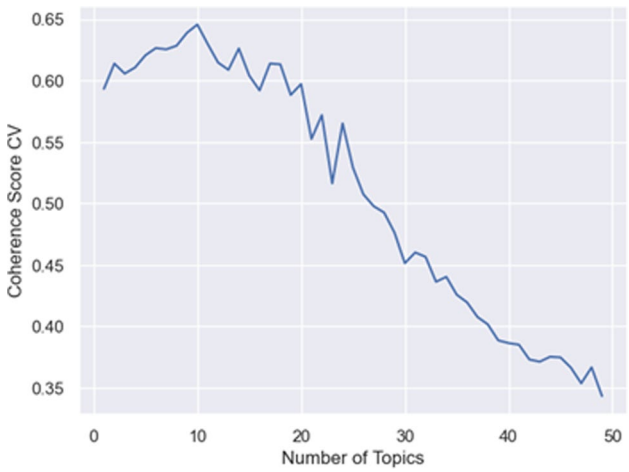


Fig. 2 C_v Coherence score for $1 < n < 50$ topics

Data analysis Following the suggestions by Thomas et al. (2011), text mining is highly accurate when it comes to assigning thesaurus terms to article titles and abstracts. However, blindly relying on the topic modeling results that draw on unsupervised learning can lead to unreliable results due to ambiguity in terms depending on the context they are used in. We used the NMF topics as a starting point from which interpretable topics are to be derived, and studies are to be analyzed. We extracted the top-cited papers for each NMF topic to generate more interpretable themes (i.e., derived topics). That is, two experts, working in academia for over four years and investigating health-related topics in IS among others, were independently assigned to appropriate topic labels for each NMF topic. Each expert first looked at the NMF topic terms to get a first impression and then read the abstracts from the top cited papers associated with that topic to define the derived topic. Based on this, both experts discussed cases where there were differences between the labeling of the derived topic. Once consensus was reached, the topic labels were finalized. Table 1 shows an example of how the abstract was clustered by NMF and how the derived topic is named.

To get an overview of all derived topics, Fig. 3 displays the top ten keywords of each NMF topic and the respective derived topic by the two experts.

Results

We carefully analyzed each derived topic to ensure the rigor of our analysis and offer a deep assessment of the current knowledge state of health-related IS research. The results are presented in three subsections: (1) a descriptive analysis that shows which topics emerged, how the topics are covered in premier IS journals, and how well they are cited; (2) a thematic analysis, in that we analyze the associated key papers and analyze the key research goals and outcomes covered by each topic; and (3) a comparative analysis to contrast the similarities and differences between the identified topics with regard to the investigated stakeholder group and technology.

Descriptive analysis

To synthesize our results, we considered the articles for our topics in the AIS senior scholar's basket of eleven as representative of our subjects. We used the frequency of topics in these articles as an indicator of where the IS community is currently focusing its research efforts.

Table 1 Example of the topic derivation

Abstract	NMF topic terms	Derived topic
"A big data analytics-enabled transformation model based on practice-based view is developed, which reveals the causal relationships among big data analytics capabilities, IT-enabled transformation practices, benefit dimensions, and business values. This model was then tested in healthcare setting. By analyzing big data implementation cases, we sought to understand how big data analytics capabilities transform organizational practices, thereby generating potential benefits. In addition to conceptually defining four big data analytics capabilities, the model offers a strategic view of big data analytics. Three significant path-to-value chains were identified for healthcare organizations by applying the model, which provides practical insights for managers"(Wang et al., 2018)	Patient/patients, healthcare, decision, data, model, care, medical, based, models	Data-driven healthcare decision-making

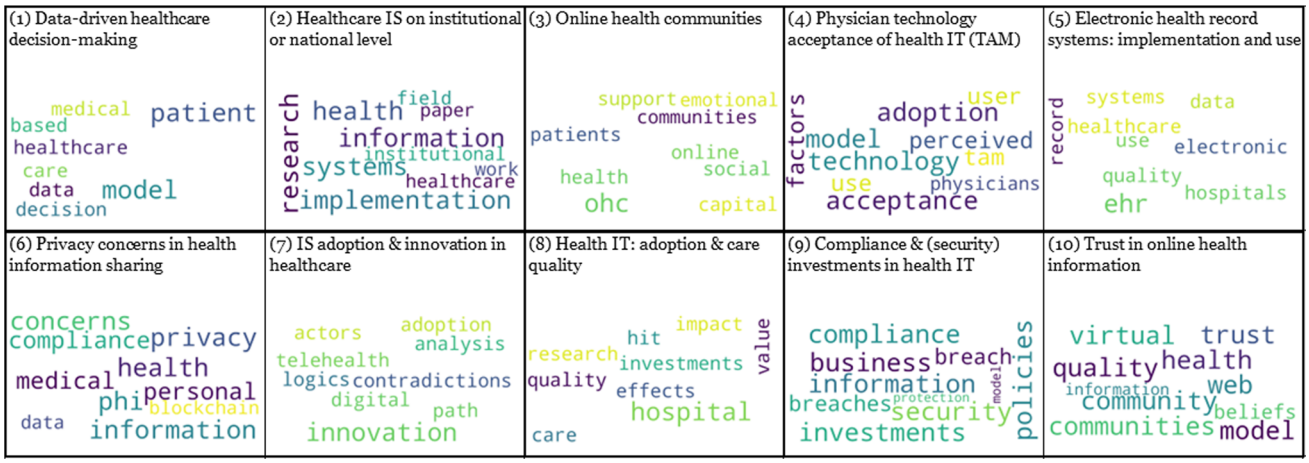


Fig. 3 NMF topic term word clouds and derived topics

Given the tremendous advancements in big data, data analytics, machine learning, and AI in recent years, it is of little surprise that the topic "data-driven healthcare decision-making" takes the greatest share of all identified topics (137 papers). The IS community's interest in 'healthcare IS on institutional or national level' manifests in 95 papers on this subject, while "online health communities" rank third (64 papers) in terms of publications. Accordingly, our results demonstrate that out of the 484 publications, especially the Decision Support System Journal (129 papers), Information & Management (63 papers), and Information Systems Research (53 papers) seem to welcome health-related work. Figure 4 depicts an overview of the topics, their prevalence in IS literature, and their distribution across the included journals.

Moreover, the IS discipline significantly contributes to technology adoption and its barriers. Therefore, it is not surprising that the average topic citations compared with the published publications among the 10 major topics in IS core journals reveals that the 42 papers on "physician technology acceptance of health IT (TAM)" ranks highest, with an average of 127 citations per publication. This is followed by 19 papers on "trust in online health information," averaging 122 citations per publication, and 27 papers on "privacy concerns in health information sharing" ranking, which rank third with an average of 79 citations per publication Fig 5.

Thematic analysis

We examine the key papers, exploring their content, research goals, and outcomes while tracing their evolution over time and identifying related exemplary research through a detailed thematic analysis.

Topic	Decision Support Systems	Information & Management	Information Systems Research	MIS Quarterly	European Journal of Information Systems	Journal of the AIS	Journal of Management Information Systems	Information Systems Journal	Journal of Information Technology	Information & Organization	Journal of Strategic Information Systems	Sum
Data-driven healthcare decision-making	78	10	12	15	5	8	7		1		1	137
Healthcare IS on institutional or national level	4	10	5	9	10	13	1	10	17	13	3	95
Online health communities	10	14	11	9	3	4	7	5		1		64
Physician technology acceptance of health IT (TAM)	12	14	2		8	2	2		1	1		42
Electronic health record systems: implementation and use	5	5	9	2	2	2	3	1	1			30
Privacy concerns in health information sharing	5	4	2	1	6	4	1	2	1	1		27
IS adoption & innovation in healthcare	2		1	3	5	3	2	1	2	4	1	24
Health IT: adoption & care quality	4	1	6	4	1	2	3	1		1		23
Compliance & (security) investments in health IT	6	1	2	3		1	3	3			4	23
Trust in online health information	3	4	1	2	4	1	4					19
Sum	**129**	**63**	**51**	**48**	**44**	**40**	**33**	**23**	**23**	**21**	**9**	**484**

Fig. 4 Topic distribution (across journals)

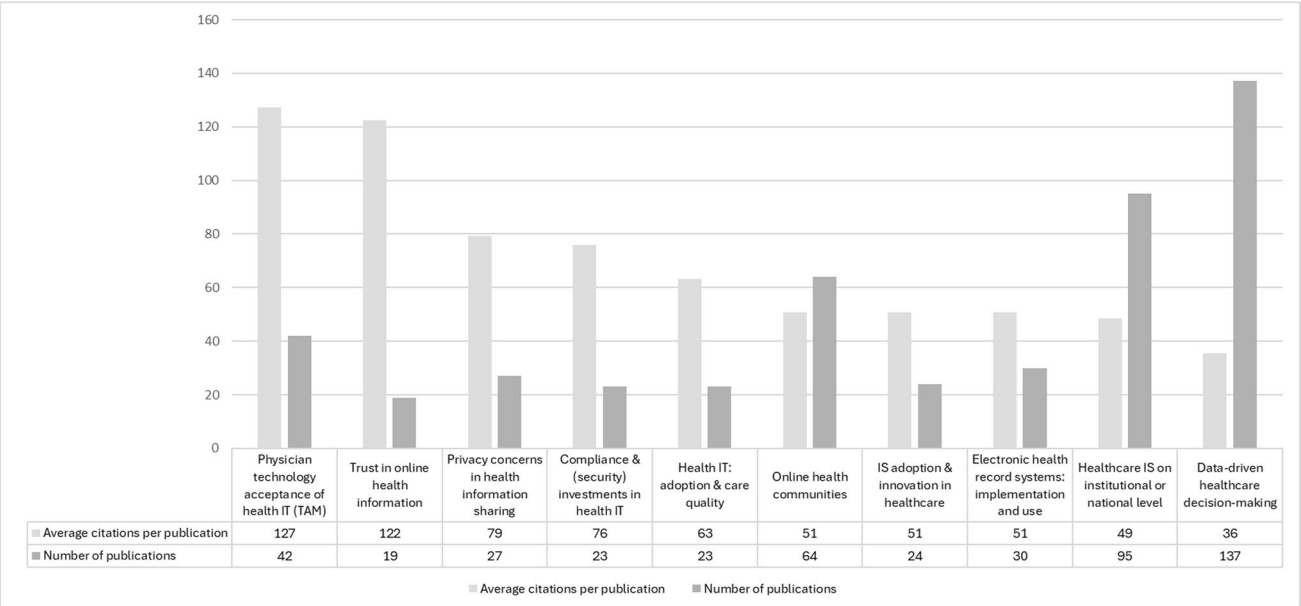


Fig. 5 Comparison of average citation per publication and number of publications

Data-driven healthcare decision-making

Health organizations increasingly use analytics to make faster and more precise decisions, resulting in improved care quality as shown in topic cluster 1 "data-driven healthcare decision-making." On the one hand, big data analytics impacts the transformation of (professional) practices in healthcare organizations and personalized care (Wang et al., 2018) and the administrative tasks reduction through autonomous healthcare agents (Corchado et al., 2008). On the

other hand, they optimize time management and, therefore, enhance patient care (Corchado, 2008). Moreover, health IS analyzing patient demographics, visit characteristics, payer type, and hospital characteristics impact patient readmission risk significantly (Bardhan et al., 2014). Studies in this cluster also propose research agendas for mobile health that support decision-making and provide emergency care for healthcare professionals (Varshney, 2014). More recent studies on this topic utilize machine learning and data analytics, e.g., to develop a fall prevention tool for elderly people (Yu et al., 2024), predict medical events that require hospitalization for chronically ill patients (Ben-Assuli et al., 2023), or forecast the readmission risks, allowing to make different medical decisions to mitigate this risk (Todd et al., 2022). The first papers in "data-driven healthcare decision-making" emerged in the early 2000s, but they were only in the range of one to two papers per year up until 2007. The peak phases were in 2013 (15 papers), and ongoing since 2020 (16 papers) up until today with more than 10 published papers each year. These findings underscore the importance of leveraging systems that support data-driven healthcare decision-making to improve care quality, optimize healthcare workflows, and enhance communication between patients and healthcare professionals. When connecting our brief historical analysis with recent advancements in AI research, this topic will likely blossom further in the next years.

Healthcare IS on institutional or national level

The second most represented topic cluster "healthcare IS on institutional or national level" is permeated with heterogeneous topics and objectives. Research in this cluster has often been directed toward a national level providing insights into different contexts to apply and enhance IS theories or open up research agendas (Fichman et al., 2011). For instance, Braa et al. (2007) demonstrate how the challenges in implementing health IS in developing countries cannot be explained by existing theories. The authors show how local differences must be met with a certain degree of flexibility, while still adhering to general standards (Braa et al., 2007). Likewise, we found strategies addressing the implementation challenges of a large-scale IS infrastructure such as EHR (Aanestad & Jensen, 2011). Especially on a national level, the existing institutional logic can be detrimental to the diffusion of health IT (Currie & Guah, 2007). Further research identifies the success factors for mobile technologies in healthcare as part of daily work practices (Chatterjee et al., 2009) and indicates a strong human agency by showing how doctors shape EHR use on an institutional level (Jensen et al., 2009). When looking at the topic distribution over time, only sporadic publications are seen before 2000. This topic cluster experienced two publication spikes within a single year in 2007 and 2019 (each with 10 papers). In contrast to our first topic cluster, this topic does not seem to have a constant increasing trend over the years, which makes it uncertain how papers that fall into this topic cluster will fare.

Online health communities

Emphasizing the user's perspective, studies identify several health- and IT-related factors that impact users' online health information search, e.g., on websites or social media (Xiao et al., 2014). While there was a research call to explore, e.g., the role of social media in healthcare back in 2011 (Fichman et al., 2011), several authors have followed this call in recent years. In our topic analysis, topic cluster 3 "online health communities" emerges as the third most researched topic in IS. In OHCs, private and public knowledge is shared, allowing users to perceive personal benefits, such as learning from others to enhance their health (Yan et al., 2016). These communities provide social support, positively impacting the mental health of patients with chronic disease (Yan & Tan, 2014). OHCs also help balance health disparities, for example, when urban supporters advise rural users (Goh et al., 2016). While OHCs are primarily used by patients, healthcare professionals and physicians also participate. Patients are motivated to use OHCs when they perceive personal benefits from sharing information (Yan et al., 2016); however, the social and economic benefits of OHCs participation for physicians remain uncertain. Guo et al. (2017) found that physicians engage in OHCs if they can enlarge their professional capital. In this line, physicians' response speed in OHCs is directly related to patient satisfaction (Yang et al., 2015). Research that falls into this topic started in 2013 (two papers) with the maximum number of publications in 2019 (10 papers), 2020 (10 papers), and 2022 (14 papers). Therefore, this topic seems to have gained attention specifically in recent years and may fare well in the following years due to the growing popularity of social media and the changing demographics of patients requiring OHCs.

Physician technology acceptance of health IT (TAM)

Not only OHCs but also any kind of health technologies must be adopted and accepted by users to impact care quality and health improvements which is reflected in our topic cluster 4: "physician technology acceptance of health IT (TAM)." Physicians perceive technology as useful if they expect immediate tangible results or if the technology enlarges their image (Yi et al., 2006). Similarly, Walter and Lopez (2008) investigate that physicians perceive a higher threat to professional autonomy with a negative effect on the intention to use health IT, particularly in knowledge-intensive fields (e.g., CDSS). Other researchers emphasize that enabling and inhibiting perceptions play a crucial role

in health IT use (Bhattacherjee & Hikmet, 2007). Specifically, the perceived threat has a strong influence on physicians' resistance to change (Bhattacherjee & Hikmet, 2007). Simultaneously, in telemedicine studies, perceived usefulness is the most significant impact factor on physicians' attitudes and use intentions (Chau & Hu, 2002; Hu et al., 1999). In contrast, personal innovativeness (Wu et al., 2011) and enabling factors for the initial IT understanding are essential antecedents, while perceived usefulness and compatibility may be of higher importance for more experienced users (Moores, 2012). Given that technology acceptance research has highly penetrated IS literature, this topic is the fourth most present topic in health-related IS research. When looking at the topic distribution over time, the interest in "physician technology acceptance of health IT (TAM)" started in 2006 (with four papers), and the range extends from one to four publications per year. Given that no specific trend can be seen in the data, it is uncertain how this topic cluster will evolve over the coming years. Nevertheless, researchers interested in this cluster may be advised to think beyond classical acceptance theory to better understand and explain physicians' acceptance of health technologies.

Electronic health record systems: Implementation and use

One specific health IT that has especially received attention in IS are EHR systems. That is, EHR implementation and use offers multiple research questions discussed in topic cluster 5 "electronic health record systems: implementation and use." For instance, Strong et al. (2014) affirm that health professionals perceive EHR affordances (i.e., what EHR enabled them to do or restricted them from doing) and the organizational outcomes that arise from the aggregation of individual-level outcomes. In this line, EHR acceptance can be significantly dependent on the physicians' professional identity (care providers and community) (Mishra et al., 2012). Thereby, EHR leads to both reinforcement and deterioration of physicians' identity, which further impacts its acceptance (Mishra et al., 2012). Generally, the effectiveness of EHR implementation depends on the context, accuracy, and consistency with which professionals work with the EHR (Burton-Jones & Volkoff, 2017). The reliance on an EHR system also depends on the physician's position. For instance, while central doctors give useful face-to-face advice and do not rely on such systems, rural doctors usually trust and rely on EHR systems to enhance their performance (Venkatesh et al., 2011). Although EHR systems are specific health IT systems, it is interesting to see they rank 5th in the most prevalent topics. Historic distribution shows that the first paper of this cluster was published in 2007, and most papers were published since 2011 (one to five papers each year). Given that some countries like Germany have only recently pushed EHR to the market, and healthcare providers are still struggling to adopt this technology, more research on EHR implementation and acceptance is required.

Privacy concerns in health information sharing

One of the most forward-pressing topics of our time is the question of "privacy concerns in health information sharing." Research on this topic outlines several key findings and future agendas within the privacy and compliance field. For instance, Angst and Agarwal (2009) demonstrate in their study that privacy concerns about using EHR can be weakened through appropriate message framing for using EHR. Similarly, patients' perceived privacy control and trust in governing information exchange are major drivers for a standalone PHR (Li et al., 2014). Fox and Connolly (2018) argue that the deepening of the m-health digital divide among older adults arises from perceived inability and reluctance to adopt this technology, caused by a strong desire for privacy, risk perception, and mistrust. Likewise, informational and emotional support significantly influence health information sharing online, while the perceived benefits and risks of information disclosure are determined by the user's health condition (Xing Zhang et al., 2018). On the contrary, Kordzadeh and Warren (2017) analyze that sharing in communities depends on the outcome and barriers without any relation to emotional involvement. Healthcare executives, however, find counterintuitive workarounds if privacy compliances hinder healthcare delivery (Parks et al., 2017). Given the increasing threats of hacker attacks on healthcare providers, privacy concerns may even increase in the future. This is supported by the historical distribution, showing that this topic reached its peak with five papers in 2022, and will likely gain increased attention in the coming years.

IS adoption & innovation in healthcare

Despite potential risks and privacy concerns, technological innovations must be adopted if their advantages are to be leveraged in healthcare. Thus, the adoption and innovations' nature are investigated in "IS adoption & innovation in healthcare." Primarily flexibility and IS competencies have been shown to positively influence the innovation and adoption of health IS. Similarly, flexibility in innovation standards within healthcare is crucial for adapting to the dynamics of healthcare requirements. Hanseth and Bygstad (2015) suggest that standardization should be simple, flexible, from bottom-up-driven, and, particularly in the early stage of (health) innovation standardization, might not necessarily be the right solution. Likewise, process innovations in administrative clinical healthcare practices, like the development and implementation of, e.g., EHR or administrative healthcare process order entry, benefit from IS competencies within the organization (Tarafdar & Gordon, 2007). A study

about telehealth in rural settings reveals that innovation processes cannot be entirely planned and predetermined, and tensions must be managed when they arise (Singh et al., 2015). These findings affirm the importance of understanding past actions and context in healthcare for successful technological innovations (Singh et al., 2015), and the results underscore the need for flexibility and attentiveness to unpredictable outcomes. Lastly, barriers to the diffusion of health innovations are conflicting financial support and diminishing enthusiasm (Cho et al., 2007). The interaction of organizational dynamics in the context of adoption and innovation is regularly taken up by researchers also beyond the health domain. Related papers in this topic cluster were predominantly published in the years 2007 (five papers), 2015 (five papers), and 2023 (four papers).

Health IT: Adoption & care quality

Another adoption lens on health technology is covered in the identified topic cluster 8 "health IT: adoption & care quality" which directly addresses the interest of healthcare organizations in working with technologies to enhance healthcare delivery. The implementation of health IT can have both positive and negative effects on care quality. For instance, Goh et al. (2011) assert that clinical professionals positively change their routines due to the interaction with electronic clinic documentation. In contrast, healthcare workers experience technostress triggered by health IT implementation influencing work practices and satisfaction (Califf et al., 2020). Yet, most studies in this topic cluster argue that using health IT improves health service delivery, enhances process quality (Bardhan & Thouin, 2013), advances patient coordination through computerized provider order entry (Romanow et al., 2018), and increases allocative efficiency for nursing home patients (Yeow & Goh, 2015). Research projects in this topic cluster are constantly taking place at a moderate level but still have the potential for further expansion. We see only a few fluctuations from 2011 to 2023 between one to four - papers per year. Given that health IT directly influences diverse stakeholders, healthcare professionals and institutions are still struggling to deliver efficient healthcare.

Compliance & (security) investments in health IT

In healthcare, it is essential to meet not only professional standards but also legal and ethical standards. This ensures comprehensive compliance, preserving ethical principles in care. "Compliance & (security) investments in health IT" as a topic also emerges within the realm of digital health. Hedström et al. (2011) analyze conflicts between security practices, arising from professional values and physicians' identity, such as high-quality care, spending time with patients, and granting patients privacy, which can result in ineffective control-based compliance models. In a similar vein, members of various occupational communities within a healthcare organization respond to and represent IS security differently, influenced by communication processes among them (Vaast, 2007). Turning attention to investments in healthcare security indicates that proactive investments prove to be cost-effective; however, these investments in security are more vulnerable to external regulatory pressures (Kwon et al., 2014). Finally, Stahl et al. (2012) prove in their study of information security policies in the UK healthcare sector that fostering compliance with information security is crucial for strengthening vulnerable areas and weak links. Moreover, the security policy should be perceived as honest, transparent, and fair (Stahl et al., 2012). Publications in this topic cluster have been consistent since 2011 with one to four papers per year. The future of healthcare compliance and security is challenging, as healthcare moves away from being entirely hospital-based, and new technologies for diagnosis and treatment, personalized medicine, and digital therapeutics lead to new challenges in the compliance and security domain.

Trust in online health information

While information privacy and security investments each are their own topic, they can have a significant impact on users' trust. Our final topic cluster 10, "trust in online health information," addresses trust perceptions, albeit only for online health information. Disclosure of health information depends, for example, on users' perceived trust and privacy concerns. Fan et al. (2018) propose that cognitive trust in OHCs is grounded in meaningful advice, while affective trust forms emotional bonds that foster information adoption and closeness. Trust in using health infomediaries evolves over time, with information quality serving as the primary factor in trust building, followed by satisfaction (Zahedi & Song, 2008). When regularly using infomediaries, information quality emerges as the predominant factor in shaping trust (Song & Zahedi, 2007). Additionally, the intention to use health infomediaries and the belief in their integrity are shaped by perceptions of infomediaries' ability and benevolence as well as by environmental factors (Song & Zahedi, 2007). These results reveal the importance of context-specifics for trust in health infomediaries. Besides trust, successful web-based healthcare services must consider factors such as perceived sensitivity of health information, individual personality traits, and health status, all of which influence users' concerns (Bansal et al., 2010). Even though trust has been highly recognized within healthcare discussions, this topic cluster contains the smallest number of publications. Contributions around "trust in online health information" are continuously published at a low annual level (one to two publications)

starting in 2004 but with a 3-year publication break between 2014 and 2016. Finally, we briefly visualize and summarize our topic-related results, the evolution, the research goals, and the key authors (Table 2).

Comparative analysis

To reveal considerable similarities and differences between the topic clusters (summarized in Table 3) we conduct a

Table 2 Topic evolution, research goals, and exemplary research

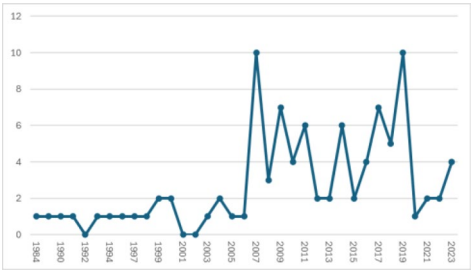
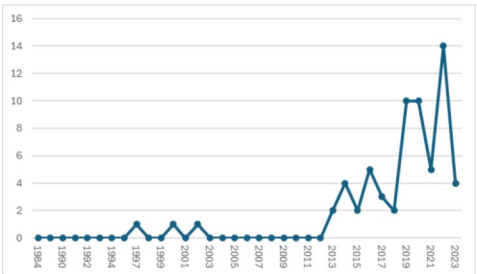
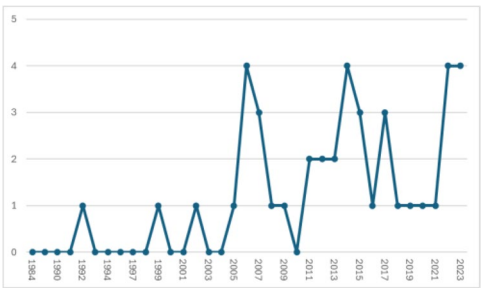
Topic evolution	Research goals	Exemplary research
(1) Data-driven healthcare decision-making 	• Optimizing administrative efficiency • Improving decision-making • Enhancing care quality	Bardhan et al. (2014) Ben-Assuli et al. (2023) Corchado et al. (2008) Dag et al. (2016) Todd et al. (2022) Varshney (2014) Wang et al. (2018) Wu et al. (2016) Yu et al. (2024) Zolbanin et al. (2015)
(2) Healthcare IS on institutional or national level 	• Identifying challenges for large-scale health IT implementation • Providing strategies for national- level health IT diffusion • Analyzing IS success factors for mobile work in healthcare	Aanestad and Jensen (2016) Braa et al. (2007) Burton-Jones et al. (2020) Chatterjee et al. (2009) Currie and Seddon (2014) Fichman et al. (2011) Holeman and Barrett (2017) Klecun et al. (2019) Thiebes et al. (2023)
(3) Online health communities 	• Sharing and searching for online health information • Investigating drivers for participation • Balancing health disparities	Goh et al. (2016) Guo et al. (2017) Mirzaei and Esmaeilzadeh (2021) Jiang et al. (2022) Yan and Tan (2017) Yan et al. (2016) Yang et al. (2015) Xiao et al. (2014) Zhang et al. (2019) Zhou et al. (2023)
(4) Physician technology acceptance of health IT (TAM) 	• Studying barriers to physicians' adoption behavior • Considering physicians' individuality and profession as influencing factors • Highlighting the (perceived) usefulness of technologies	Bhattacherjee and Hikmet (2007) Chau and Hu (2002) Johnson et al. (2014) Sherer et al. (2016) Tong et al. (2017) Venkatraman et al. (2022) Walter and Lopez (2008) Wu et al. (2011) Xiong and Zuo (2023) Yang et al. (2013)

Table 2 (Continued)

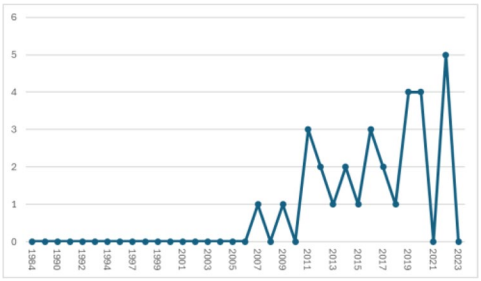
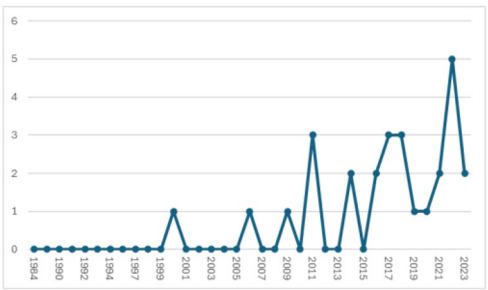
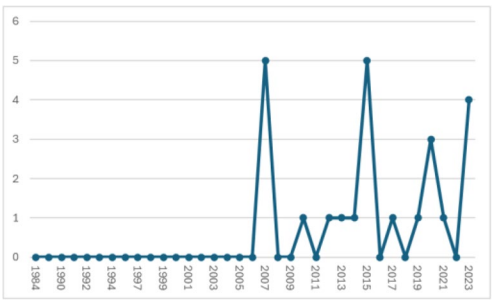
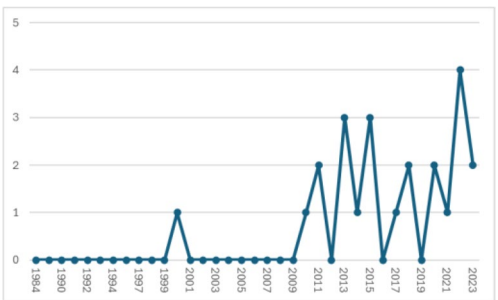
Topic evolution	Research goals	Exemplary research
(5) Electronic health record systems: implementation and use 	• Working with EHR depends on affordances • Relying on EHR can enhance (individual) performance • Affecting physicians' identity through EHR use	Burton-Jones and Volkoff (2017) Huerta et al. (2013) Kim and Kwon (2019) Kohli and Tan (2016) Mishra et al. (2012) Piri (2020) Politi et al. (2022) Strong et al. (2014) Venkatesh et al. (2011)
(6) Privacy concerns in health information sharing 	• Sharing health information is influenced by emotional support • Reducing concerns through appropriate messaging • Disclosing health information depends on users' health condition	Chad Anderson et al. (2023) Chen et al. (2016) Angst and Agarwal (2009) Fox and Connolly (2018) Kordzadeh and Warren (2017) Sadeghi et al. (2022) Li et al. (2014) Zhang et al. (2018) Parks et al. (2017)
(7) IS adoption & innovation in healthcare 	• Adapting to health-specific requirements when implementing health IS • Leveraging organizational IS competences • Considering context to understand successful innovations	Bernardi and Exworthy (2020) Cho et al. (2007) Hanseth and Bygstad (2015) Oborn et al. (2021) Ologeanu-Taddei et al. (2023) Singh et al. (2015) Spaulding et al. (2013) Tarafdar and Gordon (2007)
(8) Health IT: adoption & care quality 	• Adjusting routines through IT implementation • Improving health care delivery and process quality • Experiencing negative impacts on users of health IT	Abouzahra et al. (2024) Bardhan and Thouin (2013) Califf et al. (2020) Cheng et al. (2023) Goh et al. (2011) Kane and Labianca (2011) Romanow et al. (2018) Yeow and Goh (2015)

Table 2 (Continued)

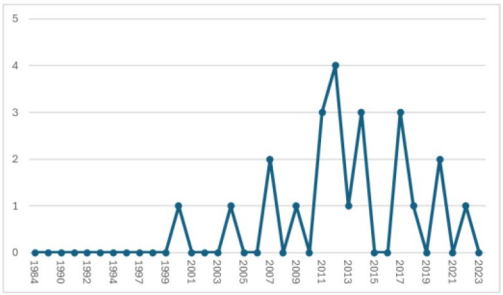
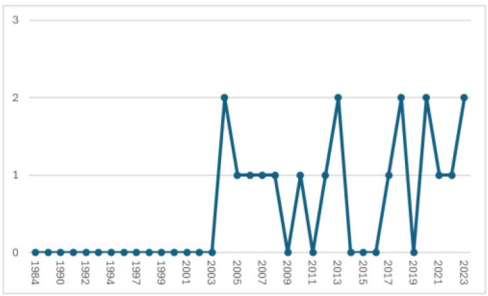
Topic evolution	Research goals	Exemplary research
(9) Compliance & (security) investments in health IT 	• Fostering compliance by addressing vulnerable areas • Arising conflicts triggered by security practices • Debilitating investments in healthcare security through regulations	Angst et al. (2017) Devaraj and Kohli (2000) Hedström et al. (2011) Stahl et al. (2012) Kwon and Johnson (2014) Sarkar et al. (2020) Vaast (2007) Yoo et al. (2020)
(10) Trust in online health information 	• Evolving trust through emotional bonds and meaningful advice • Improving information quality for trust-building • Acknowledging individual and environmental factors	Akter et al. (2013) Bansal et al. (2010) Fan et al. (2018) Leimeister et al. (2005) Song and Zahedi (2007) Zahedi and Song (2008) Wu et al. (2021)

Table 3 Similarities and differences between topic clusters

	Digital health technologies										Target stakeholder group					
	EHR	PHR	E-Prescription	CIS	CDSS	Health Analytics	M-Health	IoT	OHC	Telemedicine	Physicians	medical/clinical professionals	Patients	health-conscious individuals	Organizational (Hospital) Manager	(Public) Health Institutions
(1) Data-driven healthcare decision-making				■	■	■	■	■			■	■	■		■	
(2) Healthcare IS on institutional or national level	■								■	■	■					■
(3) Online health communities									■	■	■		■	■	■	
(4) Physician technology acceptance of health IT (TAM)	■			■		■	■	■		■	■	■			■	■
(5) Electronic health record systems: implementation and use	■	■			■						■	■			■	■
(6) Privacy concerns in health information sharing	■	■					■		■		■	■	■	■	■	■
(7) IS adoption & innovation in healthcare			■	■			■			■	■	■	■		■	■
(8) Health IT: adoption & care quality				■	■					■	■	■	■		■	■
(9) Compliance & (security) investments in health IT	■	■		■							■	■			■	■
(10) Trust in online health information							■		■	■	■	■		■		

comparative examination of selected empirical cases, analyzing the dominant foci addressed by health IS researchers (Pickvance, 2001; Tilly, 1985). Our analysis of the ten identified topics in core IS journals reveals that telemedicine is the most frequently studied digital health technology, followed by EHR, and m-health. At the same time, e-prescription ranks the lowest, followed by health analytics. From the topic cluster perspective, "physician technology acceptance of health IT (TAM)" encompasses a diverse range of technologies, including EHR, CIS, health analytics, m-health, IoT, and telemedicine. In contrast, research under "online health communities" predominantly focuses on OHCs and telemedicine. Overall, health-related IS research in core journals primarily targets physicians and organizational stakeholders, such as hospital managers. Studies

involving health-conscious individuals and patients are notably less present in health-related IS research. From the topic cluster perspective, "privacy concerns in health information sharing" addresses all identified stakeholders, while "IS adoption & innovation in healthcare" excludes health-conscious individuals. The cluster "healthcare IS on institutional or national level" considers only physicians and public health institutions, leaving out patients and health-conscious individuals entirely.

This trend may be attributed to the influence of scholarly communities and thought leaders, particularly in the health-related IS field, who often prioritize technology users (e.g., physicians) and organizational settings. This emphasis aligns with the IS and management, the primary reference discipline for health IS (Chen et al., 2019), directing attention toward mainstream themes. Conversely, emerging technologies in healthcare receive limited attention in core IS journals. Research on these technologies is often complex and fragmented across related disciplines, such as health informatics, medicine, and computer science. Addressing these emerging technologies requires fostering interdisciplinary collaboration to uncover and develop distinctive research directions (Benbya et al., 2020; Chen et al., 2019; Fichman et al., 2011).

Discussion

We analyzed the current state of knowledge in health-related IS research by identifying major research streams and topics and their evolution in core journals. As digital health solutions evolve, so do their research topics. Understanding the state of knowledge and its evolution helps to expand and renew it systematically. Since there has been no recent text mining analysis of health-related IS core journals and the connection between the identified topics and digital health technologies, our study addresses an important research gap.

The current state of knowledge and topics evolution We identified topics of significant and continuously growing relevance, such as "data-driven healthcare decision-making," however, with a low range across all topics and the lowest average citation per publication. In contrast, some topics appear to have reached a certain saturation within IS research, such as "healthcare IS on institutional or national level" and "physician technology acceptance of health IT (TAM)." Some topics were almost constantly in focus, such as "compliance & (security) investments in health IT" and "trust in online health information." Certain topics are notably prevalent in specific countries. For instance, "electronic health record systems: implementation and use" is particularly relevant in Germany, where EHR has been recently introduced to the market. Furthermore, the range of digital health technologies varies significantly depending on the context or geographical factors, such as in developing countries and emerging markets. Eventually, topics that likely lead to increasing interest in the future are "privacy concerns in health information sharing in the future," "health IT: adoption & care quality," "IS adoption & innovation in healthcare," and "online health communities."

The connection between topics and digital health technologies The topics we identified are not isolated but are deeply interwoven, connected, and shaped by researchers, their experiences, and the technologies themselves. We argue that research topics and digital health technologies should be considered collectively, rather than separately. By mapping the landscape of digital health technologies onto our identified topics, we uncover their nuanced impact, similarities, and differences in the current state of knowledge (Table 3). Our analysis contributes to expanding knowledge by analyzing the patterns of thematic development and connectedness. Telemedicine emerges as of focal interest in IS research, strongly connected with several topics: "healthcare IS on institutional or national level," "online health communities," "physician technology acceptance of health IT (TAM)," "IS adoption & innovation in healthcare," "health IT: adoption & care quality," and "trust in online health information." Similarly, EHR have garnered global attention, encompassing various issues and topics: "healthcare IS on institutional or national level," "physician technology acceptance of health IT (TAM)," "electronic health record systems: implementation and use," "privacy concerns in health information sharing," and "compliance & (security) investments in health IT."

In contrast, digital health technologies, like PHR, e-prescription, CDSS, and health analytics are associated with more heterogeneous and less interconnected topics. The prominence of EHR research can be attributed to its critical role in informing clinical care, whereas PHR narrower scope has attracted less attention from IS researchers. Likewise, e-prescription remains a peripheral topic in IS literature. Surprisingly, IoT is not deeply interwoven and seems underexplored, despite being fundamental for many digital health technologies. Our literature analysis finds that although computerized applications for clinical decision support were promoted decades ago, early CDSS were predominantly rule-based expert systems. These systems failed to adapt to the fast-paced advancements in healthcare, such as the influx of complex and vast health data from sources like sensors, genomics, and imaging. Although CDSS and health analytics are intertwined, we believe there has been a conceptual shift and evolution with increasing emphasis on harnessing advanced analytics to drive informed, data-centric decision-making in healthcare.

To advance digital health through IS research and strengthen robust intellectual discourse, we highlight emerging areas of interest that warrant deeper exploration. We emphasize

the need to move beyond traditional IS artifacts and implementation studies. We can confirm that health-related issues are not always addressed consistently and comprehensively (Ostern et al., 2021) in core IS journals. By exploring emerging technologies, raising critical questions, and addressing the growing complexity of health, healthcare, and IS research, the scholarly community can continue to evolve and make meaningful contributions (Benbya et al., 2020; Chen et al., 2019). By examining the current state of knowledge and publication trends within each topic cluster, we can now provide a comprehensive overview of these topics. This perspective aims to accelerate the advancement of digital health technologies and establish clear research directions for health-related IS studies. We identified some "white spots" in health-related IS research and, in line with other research (Chen et al., 2019; Chiasson & Davidson, 2004; Fichman et al., 2011; Oesterreich et al., 2020), see opportunities to expand research endeavor in the realm of digital health. Moreover, we emphasize the need to put healthcare supported through digital health in the foreground for IS research ("Health Information Technology," 2018).

Future research opportunities

Our findings underscore the need to move from focusing on organizational IT and perspectives (Chen et al., 2019) to value-based healthcare (Teisberg et al., 2020) and adopting an interaction perspective with contextual acknowledgment (Chiasson & Davidson, 2004). We specifically identified discrepancies in health-related IS research based on our analysis: (1) particularly, emerging technologies, such as health analytics, are characterized by a lack of overlap with other identified topics and citations, and (2) crucial stakeholders are underrepresented such as patients and health-conscious individuals. To fill these "white spots," we advocate for broader engagement and multidisciplinary knowledge-building, particularly in understanding context-sensitive healthcare. While IS research has shown high involvement in "data-driven healthcare decision-making," researchers should also consider the expanding array of emerging technologies in healthcare that seems to be currently driven by other disciplines, including medicine, computer science, and health informatics (Chen et al., 2019; Fichman et al., 2011; Oborn et al., 2011). As a result, emerging topics seem to be addressed only marginally within core IS literature, leading to notable knowledge gaps. Against this backdrop, the dynamics in healthcare and the increasing importance of global health as a substantial challenge of our times calls for broadening IS boundaries (Chen et al., 2019; Chiasson & Davidson, 2004; Sarker et al., 2019). To support the transformation of the healthcare market and guide IS scholars in their future research endeavors, we develop a research agenda (aligned with our research question) informed by the identified "white spots" of our analysis.

Encouraging in-depth explorations of emerging technologies in healthcare

Embracing our topic cluster "data-driven healthcare decision-making" and its potential, we consider AI, which facilitates detecting patterns and offering guidance in decision-making under uncertain conditions (Berente et al., 2021; Jussupow et al., 2022). Albeit the promising predictive opportunities for future events (Cohen et al., 2014; Lin et al., 2017), tensions between algorithms and human control arise (Liang & Xue, 2022) offering an important starting point for further research. Similarly, the use of AI, particularly in healthcare, triggers discussions on and pursuing solutions related to ethical AI (Cohen et al., 2014; Trocin et al., 2023). Healthcare market investments combined with research endeavors in personalized medicine, driven by patient characteristics like genetics and lifestyle, improve disease detection, diagnosis, treatment tailoring, and prevention (Chan & Ginsburg, 2011; Mathur & Sutton, 2017). Nonetheless, it is important to note that personalized medicine, supported by digital twins, is currently receiving limited attention from IS researchers. Similar knowledge gaps in health-related IS research are visible when analyzing digital twins in healthcare, augmented by IoT and data analytics, enabling simulations for healthcare intervention, e.g., the effects of medication or for performing surgeries (Björnsson et al., 2019; Fuller et al., 2020).

A promising alternative in evidence-based interventions is digital therapeutics (DTx), such as prescribed apps. These interventions offer selective treatments, e.g., for chronic and rare conditions or mental disorders, and have a proven clinical benefit (Dang et al., 2020; Fürstenau et al., 2023; Huh et al., 2022). The DTx's scope can also be expanded to virtual reality (Huh et al., 2022). Extended realities create medical procedure simulations, e.g., surgeries (Desselle et al., 2020; Javaid & Haleem, 2020) used for training purposes to reduce errors (Samadbeik et al., 2018), decrease pain perception (Javaid & Haleem, 2020), and provide (mental) treatment (Freeman et al., 2017; Javaid & Haleem, 2020). Conversely, with the healthcare sector facing workforce shortages, social robots assist in (mental) health interventions and elderly care, promoting physical activity and cognitive exercises (Carros et al., 2020; Guemghar et al., 2022; Scoglio et al., 2019). Identically, innovations in healthcare turn up with virtual patients and immersive medical education scenarios reduce risks in training (Kononowicz et al., 2019), while the emergence of the metaverse offers potential for therapeutic mental health counseling (Turan Akdag et al., 2023).

However, despite their significant potential, we recognize the challenges posed by these emerging technologies (Coorey et al., 2022; Venkatesh et al., 2022). These include ethical concerns, such as the implications of equating patients with machines (Safi et al., 2018), issues of data integration and privacy (Laubenbacher et al., 2024), biases in algorithms (Huang et al., 2022), and broader privacy concerns (Angulo et al., 2020). Similarly, challenges arise in clinical implementation and data governance (Venkatesh et al., 2022), as well as human oversights. For instance, there is a need to revise and adapt patient-informed consent processes (Braun, 2021) and establish new terminologies to differentiate between humans and machines (Lupton, 2021). Building thereupon, we call for research (Table 4) into:

Incorporating additional stakeholders in context-sensitive healthcare

Digital health technologies are frequently promoted as strategic solutions, often influenced by economic considerations and driven by organizational and other powerful stakeholders in the healthcare market (Kumar et al., 2020; Mishra et al., 2012; Park, 2016). While disruptive technologies in healthcare can be unfolded through IS theories (Kankanhalli et al., 2016), we advocate for a more comprehensive assessment of additional stakeholders and perspectives in context-sensitive healthcare in IS research. This encompasses (1) the distinctiveness of health professionals' work practices (Yeow & Goh, 2015), (2) addressing patient characteristics and needs (Kumar et al., 2020; Romanow et al., 2012),

Table 4 Future directions for encouraging in-depth explorations of emerging technologies in healthcare

Opportunities for advancing digital health	Guiding research directions	Exemplary research questions for future research
AI	Designing explainable AI for physicians' decision-making	• How could ethical concerns and shared responsibilities be addressed to work with data-driven decision-making and AI in clinical settings, e.g., for triage or palliative medicine? • To what extent can AI optimize a patient's journey, e.g., from remote screening, and diagnosis to treatment and aftercare? • What are integral quality criteria for ensuring safe and trustworthy AI in digital health?
Personalized medicine	Integrating personalized medicine into clinical workflows	• How can physicians and patients actively participate in the design process of personalized medicine? • How can multi-omics data (e.g., genomics, proteomics, metabolomics) be integrated to provide a comprehensive understanding of individual health? • How can EHR and other clinical data sources be leveraged to support personalized treatment decisions?
Digital twins	Tackling challenges associated with digital twins	• How can accurate data with real-time synchronization be acquired and integrated (e.g., constant data streaming, interoperability, standardized data)? • How can data biases and discrimination in digital twins be limited to promote precision health across the entire population? • What are the impacts of using digital twins on patient outcomes, including accuracy of diagnosis, treatment efficacy, and patient safety?
DTx	Addressing the potential related to DTx	• How can user-centered design be incorporated into the development of DTx? • To what extent do patients change their behavior using DTx? • How can it be possible to overcome inaccessibility for groups that most need DTx?
Social robots/virtual patients	Determining key enablers for social robot interventions and virtual patients	• How can a strong interaction between humans and robots be established (e.g., emotion, sharing, assistance, trust)? • How can social robots be designed for attention-sensitive assistance (such as detecting human attention and adapting their behavior accordingly)? • How can virtual patient models be developed to reflect accurately the characteristics of real patients?

(3) health-conscious individuals and the role of real-time monitoring (Lupton, 2013; Swan, 2013), and (4) the conceptualization of value-based care (Moreira & Crispim, 2024; Teisberg et al., 2020).

Digital health technologies add complexity to clinical decision-making. We observe the implications of shifting physicians' roles and an understanding of the dialectic between technology use, responsibility, and patient care (Jussupow et al., 2022; Liang & Xue, 2022; Markus, 2015; Mishra et al., 2012) are underexplored within in the IS domain. Conflicts emerge from ethical obligations, compliance requirements, financial goals, and the pursuit of the best patient outcomes (Kohli & Tan, 2016; Liang & Xue, 2022; Mishra et al., 2012). While patients should play an active role in healthcare as informed consumers (Payton et al., 2011), their demands are rarely taken into account, therefore, hindering their co-creation of value-based care (Balta et al., 2021; Teisberg et al., 2020). Patients are still predominantly viewed as passive recipients of care (George & Kohnke, 2018). Furthermore, there is also a pressing need for m-health-based psychological interventions (Luo et al., 2024), which are not yet fully explored or effectively implemented. Improving health literacy through technology remains a critical avenue to empower patients and improve outcomes (Fitzpatrick, 2023). At the same time, we observe a growing interest in IS research in chronic disease, prevention, and their impact on patients (Anderson & Agarwal, 2011; Jiang & Cameron, 2020; Savoli et al., 2020; Son et al., 2020), a trend further stimulated by a special issue call (Bardhan et al., 2020).

For health-conscious individuals, wearables and self-quantification play a pivotal role in self-care, enhancing well-being, and fulfilling psychological needs, particularly in fitness (James et al., 2022; Lupton, 2013; Swan, 2013) and occupational health contexts (Roossien et al., 2021). Similarly, analytics and AI applications in sports contribute to performance monitoring and injury prevention (Li & Xu, 2021; Ramkumar et al., 2022). Finally, digital health technologies enable ambient assisted living (AAL) to support healthy aging (Alberdi Aramendi et al., 2018; Cicirelli et al., 2021). We contend that stakeholders in health-related IS research are often examined in isolation, despite the wealth of possibilities and complex, non-trivial questions addressing the empowerment of patients, and health-conscious individuals through digital health solutions. We summarize our proposed health-related topics where IS researchers can contribute their expertise through the following research directions (Table 5):

Table 5 Future directions for incorporating additional stakeholders in context-sensitive healthcare

Opportunities for advancing digital health	Guiding research directions	Exemplary research questions for future research
Context-sensitive healthcare	Incorporating stakeholders' characteristics, priorities, and interactions	• How can patient feedback be considered in the iterative design process of digital health technologies to enhance usability and effectiveness? • How can individual barriers, such as health literacy, be addressed to enhance technological accessibility and usability across stakeholders? • How can digital access, inclusion, and user confidence be increased in healthcare?
(Value-based) data-driven care	Developing comprehensive and data-oriented solutions	• What are the critical features of platforms that support value-based care initiatives (data sharing, care coordination, and patient engagement)? • How can evidence-based results and patient-reported outcomes be integrated into the evaluation of health technologies? • How can the transformation to monitoring the patient across the continuum of treatment, as well as inpatient and outpatient care and therapies (patient-centric approach) be realized?
Empowerment	Enhancing patients' health and health-conscious individuals' outcomes	• How can patient empowerment be meaningfully integrated into clinical workflows and systems? • How can future development of technology-based psychological interventions incorporate personalized and novel content of different patient types? • How can multiple data, systems, and content, including physiological signals be multidisciplinary connected (e.g., in fitness/sport/AAL)?

Conclusion and limitations

Digital health represents an emerging field of study and innovation with significant potential for IS research. These advancements offer substantial benefits to patients, health-conscious individuals, healthcare professionals, and multiple stakeholders within the healthcare market. To explore this potential and the landscape of health-related IS research, we used text mining to analyze 484 papers from core IS journals. Our analysis identifies key research streams and topics, traces their evolution, and maps significant digital health technologies. Based on these findings, we provide a robust foundation to address knowledge gaps and propose directions for future research endeavors in health-related IS.

Acknowledging the transformative potential of digital health technologies, we emphasize that IS research is well-positioned to advance health-related research. By addressing (1) fast-paced innovations in emerging healthcare technologies, (2) expanding perspectives and integrating additional stakeholders in context-sensitive healthcare, and (3) fostering collaboration, the health-related IS community could significantly contribute to advancing digital health, shaping global health, and driving innovation in an interconnected healthcare landscape. This comprehensive approach is crucial for improving (health) outcomes and addressing economic market considerations.

As with any research, our study has limitations, including constraints in data collection (such as journal selection), the chosen methodology, and potential biases in topic labeling due to subjective judgments and interpretation. As a result, the generalizability of our findings is limited. Specifically, our data on health IS is limited to the core IS journals. Although we aimed for objectivity, the topic extraction could be interpreted differently, for instance, if the most recent instead of the most cited works were considered. Finally, our comparative analysis seeks to uncover general patterns, acknowledging that the compared objects are not identical but commensurable (Pickvance, 2001). While offering valuable insights, this approach is not a substitute for detailed analysis, as it emphasizes general patterns and connections rather than the specific or unique, such analysis inherently simplifies and omits much of reality's complexity.

Nonetheless, we believe that our results offer an extensive analysis of the current state of knowledge in health-related IS research while proposing future research directions. We offer research implications by uncovering key insights into thematic areas (topic clusters) within core IS journals, analyzing the evolution and distribution of these themes alongside digital health technologies, and highlighting their dynamic interactions. We show a multidimensional view of the knowledge structure in health-related IS research by presenting the findings from a descriptive analysis, thematic, and comparative perspective. By identifying past and present research trends, knowledge gaps, and "white spots," we outline valuable insights for researchers to prepare for emerging challenges. Researchers can use our findings to position their study and justify the contribution of their research project, as well as choose the best IS publication outlet. Targeting both specialized and general scholars, we provide practical guidance on how health-related IS research can adapt to and capture the fast-paced transformation of healthcare. By addressing the knowledge gaps, we can foster a deeper understanding of the healthcare industry and support the development of holistic solutions by involving additional stakeholders.

Our work emphasizes the importance of a multidisciplinary approach, encouraging collaboration across disciplines to address underexplored areas and enhance the integration of novel technologies. This approach not only advances the IS domain but also fosters its alignment with broader health-related IS research, providing a foundation for future work directions.

Funding Open Access funding enabled and organized by Projekt DEAL.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Aanestad, M., & Jensen, T. B. (2011). Building nation-wide information infrastructures in healthcare through modular implementation strategies. *The Journal of Strategic Information Systems, 20*(2), 161–176. https://doi.org/10.1016/j.jsis.2011.03.006

Aanestad, M., & Jensen, T. B. (2016). Collective mindfulness in post-implementation IS adaptation processes. *Information and Organization, 26*(1–2), 13–27. https://doi.org/10.1016/j.infoandorg.2016.02.001

Abdel-Karim, B., Pfeuffer, N., Carl, K., & Hinz, O. (2023). How AI-based systems can induce reflections: The case of AI-augmented diagnostic work. *MIS Quarterly, 47*(4), 1395–1424. https://doi.org/10.25300/MISQ/2022/16773

Abouzahra, M., Guenter, D., & Tan, J. (2024). Exploring physicians' continuous use of clinical decision support systems. *European*

Journal of Information Systems, 33(2), 123–144. https://doi.org/10.1080/0960085X.2022.2119172

Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2010). Research commentary—The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research, 21*(4), 796–809. https://doi.org/10.1287/isre.1100.0327

Akter, S., D'Ambra, J., & Ray, P. (2013). Development and validation of an instrument to measure user perceived service quality of mHealth. *Information & Management, 50*(4), 181–195. https://doi.org/10.1016/j.im.2013.03.001

Alberdi Aramendi, A., Weakley, A., Aztiria Goenaga, A., Schmitter-Edgecombe, M., & Cook, D. J. (2018). Automatic assessment of functional health decline in older adults based on smart home data. *Journal of Biomedical Informatics, 81*, 119–130. https://doi.org/10.1016/j.jbi.2018.03.009

Alotaibi, Y. K., & Federico, F. (2017). The impact of health information technology on patient safety. *Saudi Medical Journal, 38*(12), 1173–1180. https://doi.org/10.15537/smj.2017.12.20631

Anderson, C. L., & Agarwal, R. (2011). The digitization of healthcare: Boundary risks, emotion, and consumer willingness to disclose personal health information. *Information Systems Research, 22*(3), 469–490. https://doi.org/10.1287/isre.1100.0335

Anderson, C., Baskerville, R., & Kaul, M. (2023). Managing compliance with privacy regulations through translation guardrails: A health information exchange case study. *Information and Organization, 33*(1), 100455. https://doi.org/10.1016/j.infoandorg.2023.100455

Angst, C. M., & Agarwal, R. (2009). Adoption of electronic health records in the presence of privacy concerns: The elaboration likelihood model and individual persuasion. *MIS Quarterly, 33*(2), 339–370.

Angst, C., Block, E., D'Arcy, J., & Kelley, K. (2017). When do IT security investments matter? Accounting for the influence of institutional factors in the context of healthcare data breaches. *MIS Quarterly*, *41*, 893–916. https://doi.org/10.25300/MISQ/2017/41.3.10

Angulo, C., Gonzalez-Abril, L., Raya, C., & Ortega, J. A. (2020). A proposal to evolving towards digital twins in healthcare. In I. Rojas, O. Valenzuela, F. Rojas, L. J. Herrera, & F. Ortuño (Eds.), *Springer eBook Collection: Vol. 12108, Bioinformatics and Biomedical Engineering: 8th International Work-Conference, IWBBIO 2020, Granada, Spain, May 6–8, 2020, Proceedings* (1st ed. 2020, pp. 418–426). Springer International Publishing; Imprint Springer. https://doi.org/10.1007/978-3-030-45385-5_37

Archer, N., Fevrier-Thomas, U., Lokker, C., McKibbon, K. A., & Straus, S. E. (2011). Personal health records: A scoping review. *Journal of the American Medical Informatics Association: JAMIA, 18*(4), 515–522. https://doi.org/10.1136/amiajnl-2011-000105

Athukorala, S., & Mohotti, W. (2022). An effective short-text topic modelling with neighbourhood assistance-driven NMF in Twitter. *Social Network Analysis and Mining, 12*, 1–15. https://doi.org/10.1007/s13278-022-00898-5

Balta, M., Valsecchi, R., Papadopoulos, T., & Bourne, D. J. (2021). Digitalization and co-creation of healthcare value: A case study in Occupational Health. *Technological Forecasting and Social Change, 168*, 120785. https://doi.org/10.1016/j.techfore.2021.120785

Bansal, G., Zahedi, F., & Gefen, D. (2010). The impact of personal dispositions on information sensitivity, privacy concern and trust in disclosing health information online. *Decision Support Systems, 49*, 138–150. https://doi.org/10.1016/j.dss.2010.01.010

Bardhan, I., Chen, H., & Karahanna, E. (2020). Connecting systems, data, and people: A multidisciplinary research roadmap for chronic disease management. *MIS Quarterly, 44*(1), 185–200. https://doi.org/10.25300/MISQ/2020/14644

Bardhan, I., Oh, J., Zheng, Z., & Kirksey, K. (2014). Predictive analytics for readmission of patients with congestive heart failure. *Information Systems Research, 26*(1), 19–39. https://doi.org/10.1287/isre.2014.0553

Bardhan, I., & Thouin, M. (2013). Health information technology and its impact on the quality and cost of healthcare delivery. *Decision Support Systems, 55*(2), 438–449. https://doi.org/10.1016/j.dss.2012.10.003

Ben-Assuli, O., Heart, T., Klempfner, R., & Padman, R. (2023). Human-machine collaboration for feature selection and integration to improve congestive Heart failure risk prediction. *Decision Support Systems, 172*, 113982. https://doi.org/10.1016/j.dss.2023.113982

Benbunan-Fich, R. (2019). An affordance lens for wearable information systems. *European Journal of Information Systems, 28*(3), 256–271. https://doi.org/10.1080/0960085X.2018.1512945

Benbya, H., Ning, N., Tanriverdi, H., & Yoo, Y. (2020). Complexity and information systems research in the emerging digital world. *MIS Quarterly*, *44*(1). https://doi.org/10.25300/MISQ/2020/13304

Berente, N., Gu, B., Recker, J., & Santhanam, R. (2021). Special issue editor's comments: Managing artificial intelligence. *MIS Quarterly, 45*(3), 1433–1450.

Bernardi, R., & Exworthy, M. (2020). Clinical managers' identity at the crossroad of multiple institutional logics in it innovation: The case study of a health care organization in England. *Information Systems Journal, 30*(3), 566–595. https://doi.org/10.1111/isj.12267

Berner, E. S. (Ed.). (2007). *Health informatics. Clinical Decision Support Systems: Theory and Practice* (2nd ed. 2007). Springer New York.

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

Björnsson, B., Borrebaeck, C., Elander, N., Gasslander, T., Gawel, D. R., Gustafsson, M., Jörnsten, R., Lee, E. J., Li, X [Xinxiu], Lilja, S., Martínez-Enguita, D., Matussek, A., Sandström, P., Schäfer, S., Stenmarker, M., Sun, X. F., Sysoev, O., Zhang, H [Huan], Benson, M., & on behalf of the Swedish Digital Twin Consortium (2019). Digital twins to personalize medicine. *Genome Medicine*, *12*(1), 4. https://doi.org/10.1186/s13073-019-0701-3

Blum, B. I. (1986). Clinical information systems—A review. *Western Journal of Medicine, 145*(6), 791–797.

Braa, J., Hanseth, O., Heywood, A., Mohammed, W., & Shaw, V. (2007). Developing health information systems in developing countries: The flexible standards strategy. *MIS Quarterly, 31*, 381–402. https://doi.org/10.2307/25148796

Braun, M. (2021). Represent me: Please! Towards an ethics of digital twins in medicine. *Journal of Medical Ethics.* Advance online publication. https://doi.org/10.1136/medethics-2020-106134

Burton-Jones, A., Akhlaghpour, S., Ayre, S., Barde, P., Staib, A., & Sullivan, C. (2020). Changing the conversation on evaluating digital transformation in healthcare: Insights from an institutional analysis. *Information and Organization, 30*(1), 100255. https://doi.org/10.1016/j.infoandorg.2019.100255

Burton-Jones, A., & Volkoff, O. (2017). How can we develop contextualized theories of effective use? A demonstration in the context of community-care electronic health records. *Information Systems Research, 28*(3), 468–489. https://doi.org/10.1287/isre.2017.0702

Califf, C., Sarker, S., & Sarker, S. (2020). The bright and dark sides of technostress: A mixed-methods study involving healthcare

IT. *MIS Quarterly, 44*, 809–856. https://doi.org/10.25300/MISQ/2020/14818

Carros, F., Meurer, J., Löffler, D., Unbehaun, D., Matthies, S., Koch, I., Wieching, R., Randall, D., Hassenzahl, M., & Wulf, V. (2020). Exploring human-robot interaction with the elderly. In R. Bernhaupt (Ed.), *ACM Digital Library, Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1–12). Association for Computing Machinery. https://doi.org/10.1145/3313831.3376402

Chan, I. S., & Ginsburg, G. S. (2011). Personalized medicine: Progress and promise. *Annual Review of Genomics and Human Genetics, 12*(Volume 12, 2011), 217–244. https://doi.org/10.1146/annurev-genom-082410-101446

Chan, J. (2021). Exploring digital health care: eHealth, mHealth, and librarian opportunities. *Journal of the Medical Library Association*, *109*. https://doi.org/10.5195/jmla.2021.1180

Chatterjee, S., Chakraborty, S., Sarker, S., Sarker, S., & Lau, F. Y. (2009). Examining the success factors for mobile work in healthcare: A deductive study. *Decision Support Systems, 46*(3), 620–633. https://doi.org/10.1016/j.dss.2008.11.003

Chau, P. Y., & Hu, P.J.-H. (2002). Investigating healthcare professionals' decisions to accept telemedicine technology: An empirical test of competing theories. *Information & Management, 39*(4), 297–311. https://doi.org/10.1016/S0378-7206(01)00098-2

Chen, L., Baird, A., & Straub, D. (2019). An analysis of the evolving intellectual structure of health information systems research in the information systems discipline. *Journal of the Association for Information Systems*, *20*(8). https://doi.org/10.17705/1jais.00561

Chen, L., Li, X., Yang, Y., Kurniawati, H., Sheng, Q. Z., Hu, H.-Y., & Huang, N. (2016). Personal health indexing based on medical examinations: A data mining approach. *Decision Support Systems, 81*, 54–65. https://doi.org/10.1016/j.dss.2015.10.008

Chen, Y., Zhang, H., Liu, R., Ye, Z., & Lin, J. (2019). Experimental explorations on short text topic mining between LDA and NMF based schemes. *Knowledge-Based Systems, 163*, 1–13. https://doi.org/10.1016/j.knosys.2018.08.011

Cheng, N., Li, H., & Bang, Y. (2023). Pay-for-performance schemes and hospital HIT adoption. *Decision Support Systems, 164*, 113868. https://doi.org/10.1016/j.dss.2022.113868

Chiasson, M. W., & Davidson, E. (2004). Pushing the contextual envelope: Developing and diffusing IS theory for health information systems research. *Information and Organization, 14*(3), 155–188. https://doi.org/10.1016/j.infoandorg.2004.02.001

Cho, S., Mathiassen, L., & Robey, D. (2007). Dialectics of resilience: A multi–level analysis of a telehealth innovation. *JIT, 22*, 24–35. https://doi.org/10.1057/palgrave.jit.2000088

Cicirelli, G., Marani, R., Petitti, A., Milella, A., & D'Orazio, T. (2021). Ambient assisted living: A review of technologies, methodologies and future perspectives for healthy aging of population. *Sensors, 21*(10), 3549. https://doi.org/10.3390/s21103549

Ciriello Pother, K., Glover, B., Nelson, R., Sapletal, S., Stoll, J., & Shehata, A. (2024, August 14). *Innovation: Pushing the deal market to adapt and evolve: 2024 Healthcare and Life Sciences Investment Outlook*. Retrieved August 14, 2024, from https://kpmg.com/us/en/articles/2024/healthcare-life-sciences-investment-outlook.html

Cohen, I. G., Amarasingham, R., Shah, A., Xie, B., & Lo, B. (2014). The legal and ethical concerns that arise from using complex predictive analytics in health care. *Health Affairs (Project Hope), 33*(7), 1139–1147. https://doi.org/10.1377/hlthaff.2014.0048

Coorey, G., Figtree, G. A., Fletcher, D. F., Snelson, V. J., Vernon, S. T., Winlaw, D., Grieve, S. M., McEwan, A., Yang, J. Y. H., Qian, P., O'Brien, K., Orchard, J., Kim, J., Patel, S., & Redfern, J. (2022). The health digital twin to tackle cardiovascular disease-A review of an emerging interdisciplinary field. *Npj Digital Medicine, 5*(1), 126. https://doi.org/10.1038/s41746-022-00640-7

Corchado, J. M., Bajo, J., de Paz, Y., & Tapia, D. I. (2008). Intelligent environment for monitoring Alzheimer patients, agent technology for health care. *Decision Support Systems, 44*(2), 382–396. https://doi.org/10.1016/j.dss.2007.04.008

Currie, W. L., & Guah, M. W. (2007). Conflicting institutional logics: A national programme for IT in the organisational field of healthcare. *Journal of Information Technology, 22*(3), 235–247. https://doi.org/10.1057/palgrave.jit.2000102

Currie, W. L., & Seddon, J. J. (2014). A cross-national analysis of eHealth in the European Union: Some policy and research directions. *Information & Management, 51*(6), 783–797. https://doi.org/10.1016/j.im.2014.04.004

Dag, A., Topuz, K., Oztekin, A., Bulur, S., & Megahed, F. M. (2016). A probabilistic data-driven framework for scoring the preoperative recipient-donor heart transplant survival. *Decision Support Systems, 86*, 1–12. https://doi.org/10.1016/j.dss.2016.02.007

Dang, A., Arora, D., & Rane, P. (2020). Role of digital therapeutics and the changing future of healthcare. *Journal of Family Medicine and Primary Care, 9*(5), 2207–2213. https://doi.org/10.4103/jfmpc.jfmpc_105_20

Desselle, M. R., Brown, R. A., James, A. R., Midwinter, M. J., Powell, S. K., & Woodruff, M. A. (2020). Augmented and virtual reality in surgery. *Computing in Science & Engineering, 22*(3), 18–26. https://doi.org/10.1109/MCSE.2020.2972822

Devaraj, S., & Kohli, R. (2000). Information technology payoff in the health-care industry: A longitudinal study. *Journal of Management Information Systems, 16*(4), 41–67. https://doi.org/10.1080/07421222.2000.11518265

Eden, R., Burton-Jones, A., Ballantine, C., Donovan, R., McKavanagh, D., Staib, A., & Sullivan, C. (2022). The digital transformation journey of a large Australian hospital: A teaching case. *Communications of the Association for Information Systems, 51*, 842–865. https://doi.org/10.17705/1CAIS.05134

Egger, R., & Yu, J. (2022). A topic modeling comparison between LDA, NMF, Top2Vec, and BERTopic to Demystify Twitter posts. *Frontiers in Sociology, 7*, 886498. https://doi.org/10.3389/fsoc.2022.886498

Esmaeilzadeh, P., Sambasivan, M., & Kumar, N. (2010). The challenges and issues regarding e-health and health information technology trends in the healthcare sector. In M. Zaman, Y. Liang, S. Siddiqui, T. Wang, V. Liu, & C. Lu (Eds.), *SpringerLink Bücher: Vol. 113, E-business Technology and Strategy: International Conference, CETS 2010, Ottawa, Canada, September 29–30, 2010. Proceedings* (pp. 23–37). Springer. https://doi.org/10.1007/978-3-642-16397-5_2

Executive Board, 1. (2017). *Mhealth: Use of appropriate digital technologies for public health: Report by the Director-General*. World Health Organization. Retrieved April 9, 2024, from https://iris.who.int/handle/10665/274134

Eysenbach, G. (2001). What is e-health? *Journal of Medical Internet Research, 3*(2), E20. https://doi.org/10.2196/jmir.3.2.e20

Fan, H., Lederman, R., Rowe, F., & Matook, S. (2018). Online health communities: How do community members build the trust required to adopt information and form close relationships? *European Journal of Information Systems, 27*(1), 62–89. https://doi.org/10.1080/0960085X.2017.1390187

Fatehi, F., Samadbeik, M., & Kazemi, A. (2020). What is digital health? Review of definitions. *Studies in Health Technology and Informatics, 275*, 67–71. https://doi.org/10.3233/SHTI200696

Fichman, R. G., Kohli, R., & Krishnan, R. (2011). Editorial overview—The role of information systems in healthcare: Current research and future trends. *Information Systems Research, 22*(3), 419–428. https://doi.org/10.1287/isre.1110.0382

Fitzpatrick, P. J. (2023). Improving health literacy using the power of digital communications to achieve better health outcomes for patients and practitioners. *Frontiers in Digital Health, 5*, 1264780. https://doi.org/10.3389/fdgth.2023.1264780

Fornazin, M., Penteado, B. E., Costa de Castro, L., & Luís Freire de Castro Silva, S. (2021). From medical informatics to digital health: A bibliometric analysis of the research field. *AMCIS 2021 Proceedings,* 18.

Fox, G., & Connolly, R. (2018). Mobile health technology adoption across generations: Narrowing the digital divide. *Information Systems Journal, 28*(6), 995–1019. https://doi.org/10.1111/isj.12179

Freeman, D., Reeve, S., Robinson, A., Ehlers, A., Clark, D., Spanlang, B., & Slater, M. (2017). Virtual reality in the assessment, understanding, and treatment of mental health disorders. *Psychological Medicine, 47*(14), 2393–2400. https://doi.org/10.1017/S0033291717000040X

Fuller, A., Fan, Z., Day, C., & Barlow, C. (2020). Digital twin: Enabling technologies, challenges and open research. *IEEE Access, 8*, 108952–108971. https://doi.org/10.1109/ACCESS.2020.2998358

Fürstenau, D., Gersch, M., & Schreiter, S. (2023). Digital therapeutics (DTx). *Business & Information Systems Engineering, 65*(3), 349–360. https://doi.org/10.1007/s12599-023-00804-z

George, J., & Kohnke, E. (2018). Personal health record systems as boundary objects. *Communications of the Association for Information Systems*, *42*. https://doi.org/10.17705/1CAIS.04202

Ghandour, Z., Siciliani, L., & Straume, O. R. (2022). Investment and quality competition in healthcare markets. *Journal of Health Economics, 82*, 102588. https://doi.org/10.1016/j.jhealeco.2022.102588

Ghose, A., Guo, X., Li, B., & Dang, Y. (2022). Empowering patients using smart mobile health platforms: Evidence of a randomized field experiment. *MIS Quarterly, 46*(1), 151–192. https://doi.org/10.25300/MISQ/2022/16201

Goh, J. M., Gao, G., & Agarwal, R. (2011). Evolving work routines: Adaptive routinization of information technology in healthcare. *Information Systems Research, 22*(3), 565–585. https://doi.org/10.1287/isre.1110.0365

Goh, J. M., Gao, G., & Agarwal, R. (2016). The creation of social value: Can an online health community reduce rural-urban health disparities? *MIS Quarterly, 40*(1), 247–263. https://doi.org/10.25300/MISQ/2016/40.1.11

Gopinath, K., Selvam, G., & Narayanamurthy, G. (2022). Determinants of the adoption of wearable devices for health and fitness: A meta-analytical study. *Communications of the Association for Information Systems, 50*(1), 445–450. https://doi.org/10.17705/1CAIS.05019

Grehling, J., & Maier, C. (2021). Digital health: A systematic literature review and future research directions. *ECIS 2021 Research Papers*, 85.

Guemghar, I., de Oliveira, P., Padilha, P., Abdel-Baki, A., Jutras-Aswad, D., Paquette, J., & Pomey, M.-P. (2022). Social robot interventions in mental health care and their outcomes, barriers, and facilitators: Scoping review. *JMIR Mental Health, 9*(4), e36094. https://doi.org/10.2196/36094

Guo, S., Guo, X., Fang, Y., & Vogel, D. (2017). How doctors gain social and economic returns in online health-care communities: A professional capital perspective. *Journal of Management Information Systems, 34*(2), 487–519. https://doi.org/10.1080/07421222.2017.1334480

Guo, T., Bardhan, I., & Wen, W. (2023). Preventive care now or pay later? A personalized medicine approach for healthcare management. *ICIS 2023 Proceedings*, 26.

Hanseth, O., & Bygstad, B. (2015). Flexible generification: ICT standardization strategies and service innovation in health care. *European Journal of Information Systems, 24*(6), 645–663. https://doi.org/10.1057/ejis.2015.1

Haux, R. (2006). Health information systems - Past, present, future. *International Journal of Medical Informatics, 75*(3–4), 268–281. https://doi.org/10.1016/j.ijmedinf.2005.08.002

Health, Digital & Innovation. (2021, August 18). Global strategy on digital health 2020–2025. *World Health Organization*. Retrieved February 25, 2024, from https://www.who.int/publications/i/item/9789240020924

Health Information Technology. (2018, June 21). *MIS Quarterly*. Retrieved July 4, 2024, from https://www.misqresearchcurations.org/blog/2018/6/20/health-information-technology

Hedström, K., Kolkowska, E., Karlsson, F., & Allen, J. P. (2011). Value conflicts for information security management. *The Journal of Strategic Information Systems, 20*(4), 373–384. https://doi.org/10.1016/j.jsis.2011.06.001

Holeman, I., & Barrett, M. (2017). Insights from an ICT4D Initiative in Kenya's immunization program: Designing for the emergence of sociomaterial practices. *Journal of the Association for Information Systems, 18*(12), 900–930. https://doi.org/10.17705/1jais.00476

Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems, 16*(2), 91–112. https://doi.org/10.1080/07421222.1999.11518247

Huang, P.-H., Kim, K.-H., & Schermer, M. (2022). Ethical issues of digital twins for personalized health care service: Preliminary mapping study. *Journal of Medical Internet Research, 24*(1), e33081. https://doi.org/10.2196/33081

Huerta, T. R., Thompson, M. A., Ford, E. W., & Ford, W. F. (2013). Electronic health record implementation and hospitals' total factor productivity. *Decision Support Systems, 55*(2), 450–458. https://doi.org/10.1016/j.dss.2012.10.004

Huh, K. Y., Oh, J., Lee, S., & Yu, K.-S. (2022). Clinical evaluation of digital therapeutics: Present and future. *Healthc Inform Res, 28*(3), 188–197. https://doi.org/10.4258/hir.2022.28.3.188

James, T. L., Bélanger, F., & Lowry, P. B. (2022). The mediating role of fitness technology enablement of psychological need satisfaction and frustration on the relationship between goals for fitness technology use and use outcomes. *Journal of the Association for Information Systems, 23*(4), 913–965. https://doi.org/10.17705/1jais.00745

Javaid, M., & Haleem, A. (2020). Virtual reality applications toward medical field. *Clinical Epidemiology and Global Health, 8*(2), 600–605. https://doi.org/10.1016/j.cegh.2019.12.010

Jensen, T. B., Kjærgaard, A., & Svejvig, P. (2009). Using institutional theory with sensemaking theory: A case study of information system implementation in healthcare. *Journal of Information Technology, 24*(4), 343–353. https://doi.org/10.1057/jit.2009.11

Jiang, J., & Cameron, A.-F. (2020). IT-enabled self-monitoring for chronic disease self-management: An interdisciplinary review. *MIS Quarterly, 44*(1), 451–508. https://doi.org/10.25300/MISQ/2020/15108

Jiang, S., Liu, X., & Chi, X. (2022). Effect of writing style on social support in online health communities: A theoretical linguistic analysis framework. *Information & Management, 59*(6), 103683. https://doi.org/10.1016/j.im.2022.103683

Johnson, M. P., Zheng, K., & Padman, R. (2014). Modeling the longitudinality of user acceptance of technology with an evidence-adaptive clinical decision support system. *Decision Support Systems, 57*, 444–453. https://doi.org/10.1016/j.dss.2012.10.049

Jussupow, E., Spohrer, K., & Heinzl, A. (2022). Identity threats as a reason for resistance to artificial intelligence: Survey study with medical students and professionals. *JMIR Formative Research, 6*(3), e28750. https://doi.org/10.2196/28750

Kane, G. C., & Labianca, G. (2011). IS avoidance in health-care groups: A multilevel investigation. *Information Systems Research, 22*(3), 504–522. https://doi.org/10.1287/isre.1100.0314

Kankanhalli, A., Hahn, J., Tan, S., & Gao, G. (2016). Big data and analytics in healthcare: Introduction to the special section. *Information Systems Frontiers, 18*(2), 233–235. https://doi.org/10.1007/s10796-016-9641-2

Kehr, J., Muinde, J. V. S., & Prince, R. J. (2023). Health for all? Pasts, presents and futures of aspirations for universal healthcare. *Social Science & Medicine, 319*, 115660. https://doi.org/10.1016/j.socscimed.2023.115660

Kim, S. H., & Kwon, J. (2019). How do EHRs and a meaningful use initiative affect breaches of patient information? *Information Systems Research, 30*(4), 1184–1202. https://doi.org/10.1287/isre.2019.0858

Klecun, E., Zhou, Y., Kankanhalli, A., Wee, Y. H., & Hibberd, R. (2019). The dynamics of institutional pressures and stakeholder behavior in national electronic health record implementations: A tale of two countries. *Journal of Information Technology, 34*(4), 292–332. https://doi.org/10.1177/0268396218822478

Kohli, R., & Tan, S. (2016). Electronic Health records: How can IS researchers contribute to transforming healthcare? *MIS Quarterly, 40*, 553–573. https://doi.org/10.25300/MISQ/2016/40.3.02

Kononowicz, A. A., Woodham, L. A., Edelbring, S., Stathakarou, N., Davies, D., Saxena, N., Tudor Car, L., Carlstedt-Duke, J., Car, J., & Zary, N. (2019). Virtual patient simulations in health professions education: Systematic review and meta-analysis by the digital health education collaboration. *Journal of Medical Internet Research, 21*(7), e14676. https://doi.org/10.2196/14676

Kordzadeh, N., & Warren, J. (2017). Communicating personal health information in virtual health communities: An integration of privacy calculus model and affective commitment. *Journal of the Association for Information Systems, 18*, 45–81. https://doi.org/10.17705/1jais.00446

Kumar, M., Singh, J. B., Chandwani, R., & Gupta, A. (2020). "Context" in healthcare information technology resistance: A systematic review of extant literature and agenda for future research. *International Journal of Information Management, 51*, 102044. https://doi.org/10.1016/j.ijinfomgt.2019.102044

Kwon, J., & Johnson, M. E. (2014). Proactive versus reactive security investments in the healthcare sector. *MIS Quarterly, 38*(2), 451–472. https://doi.org/10.25300/MISQ/2014/38.2.06

Lafky, D. B., Tulu, B., & Horan, T. (2006). A user-driven approach to personal health records. *Communications of the Association for Information Systems, 46*, 1028–1041.

Laubenbacher, R., Mehrad, B., Shmulevich, I., & Trayanova, N. (2024). Digital twins in medicine. *Nature Computational Science, 4*(3), 184–191. https://doi.org/10.1038/s43588-024-00607-6

Leimeister, J. M., Ebner, W., & Krcmar, H. (2005). Design, implementation, and evaluation of trust-supporting components in virtual communities for patients. *Journal of Management Information Systems, 21*(4), 101–131. https://doi.org/10.1080/07421222.2005.11045825

Li, B., & Xu, X. (2021). Application of artificial intelligence in basketball sport. *Journal of Education Health and Sport, 11*(7), 54–67. https://doi.org/10.12775/JEHS.2021.11.07.005

Li, H., Gupta, A., Zhang, J., & Sarathy, R. (2014). Examining the decision to use standalone personal health record systems as a trust-enabled fair social contract. *Decision Support Systems, 57*, 376–386. https://doi.org/10.1016/j.dss.2012.10.043

Liang, H., & Xue, Y. (2022). Save face or save life: Physicians' dilemma in using clinical decision support systems. *Information Systems Research, 33*(2), 737–758. https://doi.org/10.1287/isre.2021.1082

Lin, Y.-K., Chen, H., Brown, R. A., Li, S.-H., & Yang, H.-J. (2017). Healthcare predictive analytics for risk profiling in chronic care: A Bayesian multitask learning approach. *MIS Quarterly, 41*(2), 473–495. https://doi.org/10.25300/MISQ/2017/41.2.07

Lowery, C. (2020). What is digital health and what do I need to know about it? *Obstetrics and Gynecology Clinics of North America, 47*(2), 215–225. https://doi.org/10.1016/j.ogc.2020.02.011

Luo, M., Yue, Y., Du, N., Xiao, Y., Chen, C., & Huan, Z. (2024). Needs for mobile and internet-based psychological intervention in patients with self-injury and suicide-related behaviors: A qualitative systematic review. *BMC Psychiatry, 24*(1), 26. https://doi.org/10.1186/s12888-023-05477-2

Lupton, D. (2013). Quantifying the body: Monitoring and measuring health in the age of mHealth technologies. *Critical Public Health, 23*(4), 393–403. https://doi.org/10.1080/09581596.2013.794931

Lupton, D. (2021). Language matters: The 'digital twin' metaphor in health and medicine. *Journal of Medical Ethics, 47*(6), 409. https://doi.org/10.1136/medethics-2021-107517

Markus, M. (2015). New games, new rules, new scoreboards: The potential consequences of big data. *Journal of Information Technology*, *30*. https://doi.org/10.1057/jit.2014.28

Martínez-Pérez, B., La Torre-Díez, I. de, & López-Coronado, M. (2013). Mobile health applications for the most prevalent conditions by the World Health Organization: Review and analysis. *Journal of Medical Internet Research*, *15*(6), e120. https://doi.org/10.2196/jmir.2600

Mathur, S., & Sutton, J. (2017). Personalized medicine could transform healthcare. *Biomedical Reports, 7*(1), 3–5. https://doi.org/10.3892/br.2017.922

McLevey, J. (2021). *Doing computational social science: A practical introduction*. SAGE Publications Ltd.

Mirzaei, T., & Esmaeilzadeh, P. (2021). Engagement in online health communities: Channel expansion and social exchanges. *Information & Management, 58*(1), 103404. https://doi.org/10.1016/j.im.2020.103404

Mishra, A. N., Anderson, C., Angst, C. M., & Agarwal, R. (2012). Electronic health records assimilation and physician identity evolution: An identity theory perspective. *Information Systems Research*, *23*(3-part-1), 738–760. https://doi.org/10.1287/isre.1110.0407

MobiHealthNews. (2023). *Contributed: 100 years and the status quo remains the same*. Retrieved March 29, 2024 from https://www.mobihealthnews.com/news/contributed-100-years-and-status-quo-remains-same

Moores, T. T. (2012). Towards an integrated model of IT acceptance in healthcare. *Decision Support Systems, 53*(3), 507–516. https://doi.org/10.1016/j.dss.2012.04.014

Moreira, A., & Crispim, J. (2024). The importance of the health information systems in value-based healthcare initiatives: A scoping review. *Procedia Computer Science, 239*, 1476–1482. https://doi.org/10.1016/j.procs.2024.06.321

Oborn, E., Barrett, M., & Davidson, E. (2011). Unity in diversity: Electronic patient record use in multidisciplinary practice. *Information Systems Research, 22*(3), 547–564. https://doi.org/10.1287/isre.1110.0372

Oborn, E., Pilosof, N. P., Hinings, B., & Zimlichman, E. (2021). Institutional logics and innovation in times of crisis: Telemedicine as digital 'PPE.' *Information and Organization, 31*(1), 100340. https://doi.org/10.1016/j.infoandorg.2021.100340

Oesterreich, T. D., Fitte, C., Behne, A., & Teuteberg, F. (2020). Understanding the role of predictive and prescriptive analytics in healthcare: A multi-stakeholder approach. In *Proceedings of the 28th European Conference on Information Systems (ECIS), An Online AIS Conference*, June 15–17, 2020.

The Office of the National Coordinator for Health Information Technology (ONC). (2024, April 9). *What is Health IT?* Retrieved April 10, 24, from| HealthIT.gov. https://www.healthit.gov/faq/what-health-it

Oh, H., Rizo, C., Enkin, M., & Jadad, A. (2005). What is eHealth (3): A systematic review of published definitions. *Journal of Medical Internet Research, 7*(1), e1. https://doi.org/10.2196/jmir.7.1.e1

Ologeanu-Taddei, R., Guthrie, C., & Jensen, T. B. (2023). Digital transformation of professional healthcare practices: Fitness seeking across a rugged value landscape. *European Journal of Information Systems, 32*(3), 354–371. https://doi.org/10.1080/0960085X.2023.2165978

Ologeanu-Taddei, R., Wessel, L., & Bourdon, I. (2019). Persistent paradoxes in pluralistic organizations: A case study of continued use of shadow-IT in a French hospital. *ICIS 2019 Proceedings*, 16.

Osheroff, J., Teich, J. M., Levick, D. L., Saldaña, L., Velasco, F., Sittig, D. F., Rogers, K., & Jenders, R. (2012). *Improving outcomes with clinical decision support: An implementer's guide (Second edition)*. HIMSS Publishing, an imprint of Taylor and Francis.

Ostern, N., Perscheid, G., Reelitz, C., & Moormann, J. (2021). Keeping pace with the healthcare transformation: A literature review and research agenda for a new decade of health information systems research. *Electronic Markets, 31*(4), 901–921. https://doi.org/10.1007/s12525-021-00484-1

Oztekin, A., Pajouh, F. M., Delen, D., & Swim, L. K. (2010). An RFID network design methodology for asset tracking in healthcare. *Decision Support Systems, 49*(1), 100–109. https://doi.org/10.1016/j.dss.2010.01.007

Park, H.-A. (2016). Are we ready for the fourth industrial revolution? *Yearbook of Medical Informatics, 1*, 1–3. https://doi.org/10.15265/IY-2016-052

Parks, R., Xu, H., Chu, C.-H., & Lowry, P. B. (2017). Examining the intended and unintended consequences of organisational privacy safeguards. *European Journal of Information Systems, 26*(1), 37–65. https://doi.org/10.1057/s41303-016-0001-6

Paul, D. (2006). Collaborative activities in virtual settings: A knowledge management perspective of telemedicine. *Journal of Management Information Systems, 22*(4), 143–176. https://doi.org/10.2753/MIS0742-1222220406

Payton, F., Pare, G., Le Rouge, C., & Reddy, M. (2011). Health care IT: Process, people, patients and interdisciplinary considerations. *Journal of the Association for Information Systems*, *12*(2), I–XIII. https://doi.org/10.17705/1jais.00259

Phansalkar, S., Edworthy, J., Hellier, E., Seger, D. L., Schedlbauer, A., Avery, A. J., & Bates, D. W. (2010). A review of human factors principles for the design and implementation of medication safety alerts in clinical information systems. *Journal of the American Medical Informatics Association : JAMIA, 17*(5), 493–501. https://doi.org/10.1136/jamia.2010.005264

Pickvance, C. G. (2001). Four varieties of comparative analysis. *Journal of Housing and the Built Environment*, *16*(1), 7–28.

Piri, S. (2020). Missing care: A framework to address the issue of frequent missing values; The case of a clinical decision support system for Parkinson's disease. *Decision Support Systems, 136*, 113339. https://doi.org/10.1016/j.dss.2020.113339

Politi, L., Codish, S., Sagy, I., & Fink, L. (2022). Substitution and complementarity in the use of health information exchange and electronic medical records. *European Journal of Information Systems, 31*(2), 188–206. https://doi.org/10.1080/0960085X.2020.1850185

Pumplun, L., Peters, F., Gawlitza, J. F., & Buxmann, P. (2023). Bringing machine learning systems into clinical practice: A design science approach to explainable machine learning-based clinical decision support systems. *Journal of the Association for Information Systems, 24*(4), 953–979. https://doi.org/10.17705/1jais.00820

Ramkumar, P. N., Luu, B. C., Haeberle, H. S., Karnuta, J. M., Nwachukwu, B. U., & Williams, R. J. (2022). Sports medicine and artificial intelligence: A primer. *The American Journal of Sports Medicine, 50*(4), 1166–1174. https://doi.org/10.1177/0363546521100864

Rivard, S., & Lapointe, L. (2012). Information technology implementers' responses to user resistance: Nature and effects. *MIS Quarterly, 36*(3), 897–920. https://doi.org/10.2307/41703485

Romanow, D., Cho, S., & Straub, D. (2012). Editor's comments: Riding the wave: Past trends and future directions for health IT research. *MIS Quarterly, 36*(3), iii. https://doi.org/10.2307/41703474

Romanow, D., Rai, A., & Keil, M. (2018). CPOE-enabled coordination: Appropriation for deep structure use and impacts on patient outcomes. *MIS Quarterly, 42*, 189–212. https://doi.org/10.25300/MISQ/2018/13275

Roossien, C. C., de Jong, M., Bonvanie, A. M., & Maeckelberghe, E. L. M. (2021). Ethics in design and implementation of technologies for workplace health promotion: A call for discussion. *Frontiers in Digital Health, 3*, 644539. https://doi.org/10.3389/fdgth.2021.644539

Sadeghi R., J. K., Prybutok, V. R., & Sauser, B. (2022). Theoretical and practical applications of blockchain in healthcare information management. *Information & Management*, *59*(6), 103649. https://doi.org/10.1016/j.im.2022.103649

Safi, S., Thiessen, T., & Schmailzl, K. J. (2018). Acceptance and resistance of new digital technologies in medicine: Qualitative study. *JMIR Research Protocols, 7*(12), e11072. https://doi.org/10.2196/11072

Samadbeik, M., Yaaghobi, D., Bastani, P., Abhari, S., Rezaee, R., & Garavand, A. (2018). The applications of virtual reality technology in medical groups teaching. *Journal of Advances in Medical Education & Professionalism, 6*(3), 123–129.

Sarkar, S., Vance, A., Ramesh, B., Demestihas, M., & Wu, D. T. (2020). The influence of professional subculture on information security policy violations: A field study in a healthcare context. *Information Systems Research, 31*(4), 1240–1259. https://doi.org/10.1287/isre.2020.0941

Sarker, S., Chatterjee, S., Xiao, X., & Elbanna, A. (2019). The sociotechnical axis of cohesion for the IS discipline: Its historical legacy and its continued relevance. *MIS Quarterly, 43*(3), 695–719.

Savoli, A., Barki, H., & Paré, G. (2020). Examining how chronically ill patients' reactions to and effective use of information technology can influence how well they self-manage their illness. *MIS Quarterly, 44*(1), 351–389.

Scoglio, A. A. J., Reilly, E. D., Gorman, J. A., & Drebing, C. E. (2019). Use of social robots in mental health and well-being research: Systematic review. *Journal of Medical Internet Research, 21*(7), e13322. https://doi.org/10.2196/13322

Sherer, S. A., Meyerhoefer, C. D., & Peng, L. (2016). Applying institutional theory to the adoption of electronic health records in the U.S. *Information & Management, 53*(5), 570–580. https://doi.org/10.1016/j.im.2016.01.002

Shraideh, M., & Schreieck, M. (2021). Requirement for transferring value from proteomics research to personalized medicine: Insights from the current tool landscape. *ECIS 2021 Research Papers*, 153.

Singh, R., Mathiassen, L., & Mishra, A. (2015). Organizational path constitution in technological innovation: Evidence from rural telehealth. *MIS Quarterly, 39*, 643–665. https://doi.org/10.25300/MISQ/2015/39.3.06

Son, J., Brennan, P. F., & Zhou, S. (2020). A data analytics framework for smart asthma management based on remote health information systems with Bluetooth-enabled personal inhalers. *MIS Quarterly*, *44*(1b), 285–303. https://misq.umn.edu/a-data-analytics-framework-for-smart-asthma-management-based-on-remote-health-information-systems-with-bluetooth-enabled-personal-inhalers-1978.html

Song, J., & Zahedi, F. M. (2007). Trust in health infomediaries. *Decision Support Systems, 43*(2), 390–407. https://doi.org/10.1016/j.dss.2006.11.011

Spaulding, T. J., Furukawa, M. F., Raghu, T. S., & Vinze, A. (2013). Event sequence modeling of IT adoption in healthcare. *Decision Support Systems, 55*(2), 428–437. https://doi.org/10.1016/j.dss.2012.10.002

Srivastava, S. C., & Shainesh, G. (2015). Briding the service divide through digitally enabled service innovations: Evidence from Indian Healthcare Service Providers. *MIS Quarterly, 39*(1), 245-A19.

Stahl, B. C., Doherty, N. F., & Shaw, M. (2012). Information security policies in the UK healthcare sector: A critical evaluation. *Information Systems Journal, 22*(1), 77–94. https://doi.org/10.1111/j.1365-2575.2011.00378.x

Strong, D., Volkoff, O., Johnson, S., Pelletier, L., Tulu, B., BAr-On, I., Trudel, J., & Garber, L. (2014). A theory of organization-EHR affordance actualization. *Journal of the Association of Information Systems*, *15*. https://doi.org/10.17705/1jais.00353

Sutton, R. T., Pincock, D., Baumgart, D. C., Sadowski, D. C., Fedorak, R. N., & Kroeker, K. I. (2020). An overview of clinical decision support systems: Benefits, risks, and strategies for success. *Npj Digital Medicine, 3*, 17. https://doi.org/10.1038/s41746-020-0221-y

Swan, M. (2013). The quantified self: Fundamental disruption in big data science and biological discovery. *Big Data, 1*(2), 85–99. https://doi.org/10.1089/big.2012.0002

Tarafdar, M., & Gordon, S. R. (2007). Understanding the influence of information systems competencies on process innovation: A resource-based view. *The Journal of Strategic Information Systems, 16*(4), 353–392. https://doi.org/10.1016/j.jsis.2007.09.001

Teisberg, E., Wallace, S., & O'Hara, S. (2020). Defining and implementing value-based health care: A strategic framework. *Academic Medicine, 95*(5), 682–685. https://doi.org/10.1097/ACM.0000000000003122

Thiebes, S., Gao, F., Briggs, R. O., Schmidt-Kraepelin, M., & Sunyaev, A. (2023). Design concerns for multiorganizational, multistakeholder collaboration: A study in the healthcare industry. *Journal of Management Information Systems, 40*(1), 239–270. https://doi.org/10.1080/07421222.2023.2172771

Thomas, J., McNaught, J., & Ananiadou, S. (2011). Applications of text mining within systematic reviews. *Research Synthesis Methods, 2*(1), 1–14. https://doi.org/10.1002/jrsm.27

Tilly, C. (1985). *Big structures, large processes, huge comparisons*. Russell Sage Foundation.

Todd, J., Gepp, A., Stern, S., & Vanstone, B. J. (2022). Improving decision making in the management of hospital readmissions using modern survival analysis techniques. *Decision Support Systems, 156*, 113747. https://doi.org/10.1016/j.dss.2022.113747

Tong, Y., Tan, C.-H., & Teo, H.-H. (2017). Direct and indirect information system use: A multimethod exploration of social power antecedents in healthcare. *Information Systems Research, 28*(4), 690–710. https://doi.org/10.1287/isre.2017.0708

Trocin, C., Mikalef, P., Papamitsiou, Z., & Conboy, K. (2023). Responsible AI for digital health: A synthesis and a research agenda. *Information Systems Frontiers, 25*(6), 2139–2157. https://doi.org/10.1007/s10796-021-10146-4

Tu, Y.-J., Zhou, W., & Piramuthu, S. (2009). Identifying RFID-embedded objects in pervasive healthcare applications. *Decision Support Systems, 46*(2), 586–593. https://doi.org/10.1016/j.dss.2008.10.001

Turan Akdag, M., Jacquemin, P., & Wahl, N. (2023). Visit your therapist in metaverse - Designing a virtual environment for mental health counselling. *ICIS 2023 Proceedings*, 1.

Urbaczewski, A., & Lee, Y. J. (2020). Information technology and the pandemic: A preliminary multinational analysis of the impact of mobile tracking technology on the COVID-19 contagion control. *European Journal of Information Systems, 29*(4), 405–414. https://doi.org/10.1080/0960085X.2020.1802358

Vaast, E. (2007). Danger is in the eye of the beholders: Social representations of information systems security in healthcare. *The Journal of Strategic Information Systems, 16*(2), 130–152. https://doi.org/10.1016/j.jsis.2007.05.003

Varshney, U. (2014). Mobile health: Four emerging themes of research. *Decision Support Systems, 66*, 20–35. https://doi.org/10.1016/j.dss.2014.06.001

Venkatesh, K. P., Raza, M. M., & Kvedar, J. C. (2022). Health digital twins as tools for precision medicine: Considerations for computation, implementation, and regulation. *Npj Digital Medicine, 5*(1), 150. https://doi.org/10.1038/s41746-022-00694-7

Venkatesh, V., Rai, A., Sykes, T. A., & Aljafari, R. (2016). Combating infant mortality in rural India: Evidence from a field study of eHealth kiosk implementations. *MIS Quarterly, 40*(2), 353–380. https://doi.org/10.25300/MISQ/2016/40.2.04

Venkatesh, V., Zhang, X., & Sykes, T. A. (2011). "Doctors do too little technology": A longitudinal field study of an electronic healthcare system implementation. *Information Systems Research, 22*(3), 523–546. https://doi.org/10.1287/isre.1110.0383

Venkatraman, S., Sundarraj, R. P., & Seethamraju, R. (2022). Exploring health-analytics adoption in Indian private healthcare organizations: An institutional-theoretic perspective. *Information and Organization, 32*(3), 100430. https://doi.org/10.1016/j.infoandorg.2022.100430

Walter, Z., & Lopez, M. S. (2008). Physician acceptance of information technologies: Role of perceived threat to professional autonomy. *Decision Support Systems, 46*(1), 206–215. https://doi.org/10.1016/j.dss.2008.06.004

Wang, Y., Kung, L., Wang, W. Y. C., & Cegielski, C. G. (2018). An integrated big data analytics-enabled transformation model: Application to health care. *Information & Management, 55*(1), 64–79. https://doi.org/10.1016/j.im.2017.04.001

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, *26*(2), xiii–xxiii.

World Health Organization. (2024a). *Health Information Systems*. Retrieved April 10, 2024, from https://www.who.int/activities/integratingrehabilitation-into-health-systems/information

World Health Organization. (2024b). *Constitution of the World Health Organization*. Retrieved April 12, 2024, from https://www.who.int/about/accountability/governance/constitution

World Health Organization - Regional Office for the Eastern Mediterranean. (2024). *WHO EMRO | eHealth | Health topics*. Retrieved April 11, 2024, from https://www.emro.who.int/health-topics/ehealth/

World Health Organization Headquarters. (2018, January 1). WHA71.7 Digital health. *World Health Organization*. Retrieved April 12, 2024, from https://www.who.int/publications/i/item/10665-279505

Wright, K. (2002). Social support within an on-line cancer community: An assessment of emotional support, perceptions of advantages and disadvantages, and motives for using the community from a communication perspective. *Journal of Applied Communication Research, 30*(3), 195–209. https://doi.org/10.1080/00909880216586

Wu, H., Deng, Z., Wang, B., & Wang, H. (2021). How online health community participation affects physicians' performance in hospitals: Empirical evidence from China. *Information & Management, 58*(6), 103443. https://doi.org/10.1016/j.im.2021.103443

Wu, I.-L., Li, J.-Y., & Fu, C.-Y. (2011). The adoption of mobile healthcare by hospital's professionals: An integrative perspective. *Decision Support Systems, 51*(3), 587–596. https://doi.org/10.1016/j.dss.2011.03.003

Wu, J., Li, H., Cheng, S., & Lin, Z. (2016). The promising future of healthcare services: When big data analytics meets wearable technology. *Information & Management, 53*(8), 1020–1033. https://doi.org/10.1016/j.im.2016.07.003

Xiao, N., Sharman, R., Rao, H. R., & Upadhyaya, S. (2014). Factors influencing online health information search: An empirical analysis of a national cancer-related survey. *Decision Support Systems, 57*, 417–427. https://doi.org/10.1016/j.dss.2012.10.047

Xiong, J., & Zuo, M. (2023). Factors influencing health care professionals' adoption of mobile platform of medical and senior care in China. *Information & Management, 60*(5), 103798. https://doi.org/10.1016/j.im.2023.103798

Xue, Y., Liang, H., & Boulton, W. R. (2008). Information technology governance in information technology investment decision processes: The impact of investment characteristics, external environment, and internal context. *MIS Quarterly, 32*(1), 67–96. https://doi.org/10.2307/25148829

Yan, L., & Tan, Y. (2014). Feeling blue? Go online: An empirical study of social support among patients. *Information Systems Research, 25*(4), 690–709. https://doi.org/10.1287/isre.2014.0538

Yan, L., & Tan, Y. (2017). The consensus effect in online health-care communities. *Journal of Management Information Systems, 34*(1), 11–39. https://doi.org/10.1080/07421222.2017.1296742

Yan, Z., Wang, T., Chen, Y., & Zhang, H. (2016). Knowledge sharing in online health communities: A social exchange theory perspective. *Information & Management, 53*(5), 643–653.

Yang, H., Guo, X., & Wu, T. (2015). Exploring the influence of the online physician service delivery process on patient satisfaction. *Decision Support Systems, 78*, 113–121. https://doi.org/10.1016/j.dss.2015.05.006

Yang, Z., Kankanhalli, A., Ng, B.-Y., & Lim, J. T. Y. (2013). Analyzing the enabling factors for the organizational decision to adopt healthcare information systems. *Decision Support Systems, 55*(3), 764–776. https://doi.org/10.1016/j.dss.2013.03.002

Yeow, A., & Goh, K. H. (2015). Work harder or work smarter? information technology and resource allocation in healthcare processes. *Mis Quarterly, 39*(4), 763–786. https://doi.org/10.25300/MISQ/2015/39.4.2

Yi, M. Y., Jackson, J. D., Park, J. S., & Probst, J. C. (2006). Understanding information technology acceptance by individual professionals: Toward an integrative view. *Information & Management, 43*(3), 350–363. https://doi.org/10.1016/j.im.2005.08.006

Yoo, C. W., Huang, C. D., & Goo, J. (2020). Task support of electronic patient care report (ePCR) systems in emergency medical services: An elaboration likelihood model lens. *Information & Management, 57*(6), 103336. https://doi.org/10.1016/j.im.2020.103336

Yu, S., Chai, Y., Samtani, S., Liu, H., & Chen, H. (2024). Motion sensor-based fall prevention for senior care: A hidden Markov model with generative adversarial network approach. *Information Systems Research, 35*(1), 1–15. https://doi.org/10.1287/isre.2023.1203

Zahedi, F., & Song, J. (2008). Dynamics of trust revision: Using health infomediaries. *Journal of Management Information Systems, 24*(4), 225–248. https://doi.org/10.2753/MIS0742-1222240409

Zhang, X., Guo, X., Lai, K., & Yi, W. (2019). How does online interactional unfairness matter for patient–doctor relationship quality in online health consultation? The contingencies of professional seniority and disease severity. *European Journal of Information Systems, 28*(3), 336–354. https://doi.org/10.1080/0960085X.2018.1547354

Zhang, X., Liu, S., Chen, X., Wang, L., Gao, B., & Zhu, Q. (2018). Health information privacy concerns, antecedents, and information disclosure intention in online health communities. *Information & Management, 55*(4), 482–493. https://doi.org/10.1016/j.im.2017.11.003

Zhou, J., Zhang, Q., Zhou, S., Li, X., & Zhang, X. (2023). Unintended emotional effects of online health communities: A text mining-supported empirical study. *MIS Quarterly, 47*(1), 195–226. https://doi.org/10.25300/misq/2022/17018

Zolbanin, H. M., Delen, D., & Hassan Zadeh, A. (2015). Predicting overall survivability in comorbidity of cancers: A data mining approach. *Decision Support Systems, 74*, 150–161. https://doi.org/10.1016/j.dss.2015.04.003

Zoya, S., Latif, F. S., & Latif, R. (2021). Analyzing LDA and NMF topic models for Urdu tweets via automatic labeling. *IEEE Access, 9*, 127531–127547. https://doi.org/10.1109/ACCESS.2021.3112620

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.