Bridging the Digital Divide in Telehealth: exploring Technological Acceptance and User Experience across Silent Generation, Baby Boomers, and Generation X

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Abstract
Digital-Health has emerged as a transformative force in healthcare delivery, yet disparities in its adoption persist across various age groups. This study investigates how the Silent Generation, Baby Boomers, and Generation X engage with digital health services, aiming to bridge the digital divide and enhance User Experience (UX). Through qualitative research involving 26 semi-structured interviews with individuals from these age groups, the study identifies specific challenges and opportunities they encounter with a focus on telehealth. The results reveal key barriers to adoption and highlight strategies to enhance the user experience. The findings offer actionable recommendations for optimizing accessibility and usability, providing novel insights into the challenges and opportunities inherent in the design and delivery of new digital-health services with a focus on telehealth. This research contributes original perspectives on how to bridge the digital divide in telehealth, with implications for practitioners and future research in the field.

Keywords: Telehealth, digital divide, User Experience, Technology Acceptance, Generational cohorts, Silver Economy

1. Introduction

The adoption and diffusion of technology and digital innovations are among the most pertinent emerging topics for contemporary and future societies. Kraus et al. (2023) identified 17 emerging themes, notably including the 'Adoption and Diffusion of Technology and Innovation' and 'Digital Innovations in the Service Sector'. In this context the Covid-19 pandemic has accelerated the digitalization of the healthcare sector (Lee & Yoon, 2021; Verma & Gustaffsson, 2020) and simultaneously highlighted not only the growing potential of the Silver Economy, but also the lack of attention and knowledge regarding the living and consumption needs of those within it (Colurcio et al., 2022). The Silver Economy, estimated at USD 3.7 trillion in Europe and projected to reach USD 5.7 trillion by 2025 (Interreg Europe, 2023), focuses on the aging population, primarily those aged 50 and above (Marcucci et al., 2021). This demographic shift presents significant challenges for social and public policies, emphasizing the role of remote assistance systems and new technologies in management and marketing (Xiong & Zuo, 2022). Digital services have become integral to daily life, leading to discussions on cyber-wellness (Putnam & Pulcher, 2007). The rise of telemedicine and telehealth, particularly during and after the COVID-19 pandemic, was crucial in maintaining patient care while observing social distancing (Burton, 2021). The use of telemedicine surged during the pandemic (Sinuraya et al., 2022) and continues to enhance healthcare access in remote or underserved areas, extending specialist care to a broader population (Jackson, 2017;

Burton, 2021). Despite the many advantages of telehealth, resistance among some patients persists, often due to factors such as incompetence, indifference, ignorance, or technophobia among older adults towards these technologies (Lupton, 2013). For telehealth services to be effectively utilized by older individuals, they must be designed with usability in mind, tailored to their specific needs. It has been demonstrated that as users age, product design must be adjusted accordingly (Lorenz & Oppermann, 2009). While existing literature has primarily focused on device usability, it is now essential to assess User Experience (UX). Although usability and UX are related, they are distinct concepts. Understanding why users adopt or reject new technology is key (Vrellis et al., 2020). The main challenge lies in designing features that are not only useful and easy to use but also address all dimensions of UX, which is crucial for technology acceptance (Widjaja et al., 2022; Mlekus et al., 2020). Numerous studies have addressed the gray digital divide (Borg et al., 2019; Cuervo & Menéndez, 2006), but there is a lack of focus on the Silent Generation, Baby Boomers, and Generation X, which comprise the Silver Economy of today and tomorrow; a comparison between different generational cohorts is recommended (Cuervo & Menéndez, 2006). This study addresses two key aspects: first, it explores technological acceptance across three generational cohorts that are integral to the silver economy. Second, it examines the healthcare sector, which, despite significant digital advancements, still raises many unanswered questions and research opportunities (Kraus et al., 2021). This leads to the following research questions:

RQ1: '*How does digitalization of health services affect choice and access to telehealth among Silents, Baby Boomers, and Generation X?'*

RQ2: '*How do differences in the digital divide and User Experience affect the acceptance of telehealth services among Silents, Baby Boomers, and Generation X'?*

The study investigates how digitalization influences user behavior and the acceptance of telehealth services across different generational cohorts. Adopting a qualitative method could be possible to capture the real experience of the selected generations with the final aims to understand how the digital transformation of healthcare services affects the telehealth choices of Silents, Baby Boomers, and Generation X, focusing on the impact of digital competence and user satisfaction. By examining the specific barriers and incentives these generations face, the research seeks to shed light on how the digital divide affects access to telehealth, ultimately providing insights to help service providers optimize user experience and communication, thereby generating value for users and organizations in enhance specific public initiatives to overcome possible barriers. In the context of marketing, understanding these dynamics is essential to develop strategies that effectively address the diverse needs of different generations, thereby improving the delivery of digital services and products in the health sector. This study begins with an introduction to situate the research within the broader literature, followed by a literature review to highlight existing research and gaps. The methodology section details the research design, data collection, and analysis. Findings are then presented, followed by a discussion of their implications, limitations, and finally, the paper concludes with recommendations for future research.

2. Literature review

E-health: focus on telehealth and telemedicine

Telemedicine is defined as "the exchange of information at a distance, encompassing a variety of practical applications, including the transmission of images such as X-rays, telephone counseling of patients via computer protocols, or more comprehensive activities such as surgical procedures and remote consultations" (Lewtas, 2001, p.1745), or "the use of electronic information and communication technologies to provide and support health care when distance separates the participants" (Institute of Medicine Committee on Evaluating Clinical Applications of Telemedicine, 1996). Telemedicine involves the use of digital technologies to monitor one's medical condition at home, reducing visits and face-to-face communication with healthcare professionals (Lupton, 2013). Unlike telemedicine, which is specifically defined as the remote delivery of medical services by a physician, telehealth is a broader term that encompasses telemedicine as well as a range of non-physician services, such as telenursing and telepharmacy (Weinstein et al., 2014). The telemedicine and telehealth industry saw significant growth during and after the COVID-19 pandemic (Jackson, 2022), as digital healthcare proved essential in maintaining social distance and patient care (Burton, 2021). Consequently, the number of people using telemedicine services increased during the pandemic (Sinuraya et al., 2022). Telemedicine is divided into clinical-oriented and patient-oriented technologies, the latter often referred to as telehealthcare (Rubeis et al., 2018; Bauer, 2001). Telemedicine and telehealth are increasingly being used to improve access to healthcare, particularly in remote, rural, or underserved areas, thereby extending specialist care and facilitating greater accessibility (Jackson, 2017; Burton, 2021). Indeed, several potential benefits of telemedicine have been identified, including improved access to information, provision of remote care previously unavailable, enhanced access to services, increased remote care delivery, quality control of screening programs, and reduced healthcare costs (Hjelm, 2005). A primary application of telehealth is telemonitoring, which allows for remote observation of a patient's medical data (Rubeis et al., 2018; Hjelm, 2005) through medical devices such as pacemakers and electronic bracelets (Rubeis et al., 2018). Recent years have seen an increase in mobile telemetry devices, such as smartphones and tablets. The use of these mobile devices to monitor one's health status is referred to as m-Health (Rubeis et al., 2018). In terms of communication, telehealth enables patients to interact with healthcare professionals via telephone, videophone, email, or text messages (Rubeis et al., 2018). Despite the numerous benefits telehealth can offer, there remains some patient resistance to the use of digital health devices for self-care, often justified by factors such as incompetence, indifference, ignorance, or technophobia among older adults (Lupton, 2013). Although many people have access to the Internet, most online information is not written or designed to meet users' needs (Hilkifer et al., 2019). In this context, the current literature has paid limited attention to the needs of the older population, focusing primarily on theological characteristics (Madanian et al., 2023) or exclusive physiological needs (Frishammar et al., 2023), while neglecting the potential digital divide among them (Xiong and Zuo, 2022). In telehealth, the accessibility and usability of digital products continue to be challenges and often obstacles for many people (Hilkifer et al., 2019). Usability is a fundamental characteristic of any technology, and intuitive usability is particularly important when users lack a high degree of technological expertise or when guidance or training cannot be provided (Lorenz & Oppermann, 2009). Furthermore, it cannot be assumed that older adults, especially those belonging to the

Silent Generation, have an innate understanding of new technologies (Lorenz & Oppermann, 2009).

Three generational cohorts - three different attitude toward technology

Generational cohort (GC) theory aims to understand and categorize individuals based on their membership in a specific generational cohort (Inglehart, 1977; Benckendorff & Moscardo, 2013). Generational cohorts refer to groups of individuals born within the same period, who possess shared life experiences, values, and traits influenced by the historical, social, and cultural contexts prevalent during their formative years (Xiang & Abouelyazid, 2020). According to GC theory, each generation develops unique characteristics shaped by significant events and the availability of resources, such as technologies, during their formative years. These factors create a collective awareness, resulting in shared values and behavior patterns within each cohort (Heller, 1993; Armah & Li, 2023). Strauss and Howe (1991) classified generational cohorts by age: the Silent Generation (1925-1942), Baby Boomers (1943-1960), and Generation X (1961-1981). These cohorts show different attitudes toward technology, highlighting the need for tailored technological and communication strategies (Agrawal, 2022; Badillo et al., 2019). The Silent Generation, born between 1925 and 1945, is shaped by historical events like the Great Depression and World War II, leading to a pragmatic and conservative outlook (Lissitsa et al., 2022). Despite increased Internet use (Cotten, 2021), they remain less engaged with technology (Ling, 2008). Baby Boomers (1946-1964) are noted for their strong work ethic, loyalty, and preference for face-to-face communication. Although less tech-savvy, they value high-quality, personalized care and have substantial financial resources, making them active in adopting new trends (Yang & Jolly, 2008; Xiang & Abouelyazid, 2020). They also see themselves as key decision-makers in health matters for their families (Alkire et al., 2020). Generation X (1965-1980) is known for its independence and adaptability, with higher tech proficiency and a preference for efficiency and convenience. This cohort, having widely used computers (Elkins et al., 2007), is more receptive to alternative healthcare methods and generally enjoys higher incomes and active lifestyles (Xiang & Abouelyazid, 2020; Marjanen et al., 2016).

The role of User Experience in Technology Acceptance

Usability and user experience (UX), though closely related, represent distinct concepts. According to ISO standards, usability is defined as "the extent to which a user can effectively, efficiently, and satisfactorily use a product to achieve specific goals" (ISO 9241-11), while UX is described as "a person’s perceptions and responses resulting from the use or anticipated use of a product, system, or service" and encompasses "all aspects of the user's experience when interacting with the product, service, environment, or facility" (ISO 9241-210). Understanding why new technologies are adopted or rejected is essential (Vrellis et al., 2020). The challenge lies in developing features that are both functional and user-friendly. Factors such as technology acceptance and UX significantly influence this process (Widjaja et al., 2022; Mlekus et al., 2020). Introduced by Norman in 1995, the concept of UX focuses on human-computer interaction, covering a broad range of interactions from the user interface (UI) to usability (Norman et al., 1995; Berni & Borgianni, 2021). While UI and UX are often conflated, they differ in scope: UI design involves "the iterative decisions leading to a successful implementation of an interactive

tool," whereas UX refers to "the iterative decisions leading to a successful outcome with the interactive tool, as well as a productive and satisfying process to achieve this outcome" (Roth, 2017, p.1). UX encompasses elements such as usefulness, usability, reliability, and quality (Widjaja et al., 2022; Zarour & Alharbi, 2017). Although interfaces are used, the experience of interactions ultimately determines the success of an interactive product (Norman, 1988). Thus, UX is a critical element in technology development and should be designed with careful consideration of user needs (Widjaja et al., 2022). In terms of technology acceptance, UX is particularly significant, with extensive research highlighting its influence on technology adoption and usage (Mlekus et al., 2020; Widjaja et al., 2022; Venkatesh et al., 2003; Davis, 1986; Hornbaek & Hertzum, 2017). The Unified Theory of Acceptance and Use of Technology (UTAUT) considers several factors that can indirectly relate to aspects of UX (Venkatesh, 2003). Venkatesh's model (2003) identifies four primary constructs that influence the acceptance and use of technology: performance expectancy, effort expectancy, social influence, and facilitating conditions. While performance expectancy refers to the belief that using technology will enhance job performance, effort expectancy is closely aligned with the perceived ease of use, an element central to UX. Social influence concerns the degree to which individuals perceive that important others believe they should use the technology, and facilitating conditions encompass the resources and support available to use the technology effectively. Subsequent models and recent research (Fleury & Chaniaud, 2024; Gelderblom et al., 2010; Mlekus et al., 2020; Mahlke, 2008; Tcha-Tokey et al. 2018) have delved deeper into the impact of UX on technology adoption, integrating facets of UX like user satisfaction, interface design, and emotional engagement to provide a more holistic understanding of the factors influencing technology acceptance and use. Mlekus et al. (2020) extended Venkatesh and Bala's (2008) TAM model with user experience characteristics, developing the TAM UX model, and found that technology-intrinsic characteristics (output quality, perspicuity, reliability, and novelty) were significant predictors. Fleury & Chaniaud (2024) developed the Multi-User Acceptance Model (MAM), which incorporates user experience (UX) considerations. This model emphasizes the importance of collaboration and co-monitoring, particularly in e-health contexts. It highlights that the quality of interactions and the representation of other users significantly influence technology acceptance. For instance, users expect other participants on a platform, such as doctors or patients in telemedicine, to have the necessary computer skills (Fleury & Chaniaud, 2024). MAM proposes measuring expectations of other users in terms of their suitability and relational aspects, to determine their impact on perceived usefulness and overall user experience. This shift highlights the growing recognition of the importance of UX in the development and deployment of new technologies, emphasizing the need to design with the user in mind to enhance adoption and sustained use, particularly among the elderly. According to Gelderblom et al. (2010), the physical context plays a significant role in the ease of use of mobile devices. The physical limitations of the usage environment, the device, and the elderly user can negatively impact the user experience. For example, screen size, memory capacity, storage space, and input and output functionalities are more limited in certain devices, such as mobile ones (Gelderblom et al., 2010). Additionally, sound quality may be poor and voice recognition restricted, increasing interaction difficulties (Gelderblom et al., 2010). For the elderly, the effects of aging, such as reduced hearing, impaired vision, and loss of manual dexterity, further amplify these physical limitations,

making the use of digital devices more challenging and highlighting the importance of well-designed UX (Gelderblom et al., 2010). Therefore, to promote technology adoption among the elderly, it is essential to consider and enhance UX, tailoring devices and interfaces to the specific needs of this age group.

Methodology

A qualitative approach was selected to address the research questions, aiming to understand phenomena from participants' perspectives within their natural context (Hernández et al., 2010). This method focuses on analyzing narratives and experiences to identify emergent themes and produce descriptions and typologies of how individuals perceive their social world (Banyai & Glover, 2012). In this case, the qualitative approach allows for an in-depth understanding of a concrete reality by analyzing the perspectives of Silent, Baby Boomers and Gen X patients. Reaching an elderly sample is challenging due to certain difficulties and resistances; therefore, a convenience sampling method was used for the study. Italy, with the third-largest elderly population globally (Statista, 2023), was chosen for its substantial and growing senior demographic, despite the influence of younger generations on institutions and healthcare (Istat, 2022). This made Italy an ideal setting to achieve the research objectives. Initially, Silent, Baby Boomers, and Gen X individuals were contacted and consented to participate in interviews. Appointments were scheduled in convenient settings for each participant. Semi-structured interviews were conducted, documenting personal insights and specific health conditions to provide contextually relevant results. The final sample comprised 26 participants, with interviews held face-to-face between November 2022 and March 2024, either at participants' homes or other comfortable locations. To ensure privacy, interviews were recorded for analysis, with an average duration of 45 minutes due to the potential fatigue and difficulties experienced by older participants.

Interview	Gender	Age	Pathologies
Int.1	M	60	High blood pressure
Int.2	F	76	Hypertension
Int.3	M	68	None
Int.4	M	61	None
Int.5	M	74	Hearing problems
Int.6	F	65	None
Int.7	M	86	Invalid
Int.8	M	78	Dementia
Int.9	F	84	None
Int.10	F	70	Hashimoto's thyroiditis, widespread arthrosis, advanced osteoporosis, rhizoarthrosis, irritable colon, diverticula, high cholesterol, plantar fasciitis
Int.11	F	77	None
Int.12	F	83	Hashimoto's thyroiditis
Int.13	F	75	High Cholesterol
Int.14	M	65	None

Int.15	M	67	Diabet. hearing problems
Int.16	F	87	Intestinal polycystosis, Thyroid, high blood pressure
Int.17	M	92	Heart disease, depression, vision and hearing problems
Int.18	M	71	High Cholesterol
Int.19	M	89	Heart disease, vision problems
Int.20	F	88	Dementia, hearing problems
Int.21	F	80	Hearing problems
Int.22	F	48	None
Int.23	F	56	None
Int.24	F	58	None
Int.25	F	52	None
int.26	F	52	None

Table 1. Socio-demographic characteristics and pathologies of interviewees

The final stage of the analysis involved coding the interviews. Given that elderly participants often struggled with articulating their responses clearly, a manual analysis approach was adopted rather than utilizing software. The coding process followed the guidelines established by Gioia et al. (2013). Initially, an open coding analysis was performed to address the first research question. This was followed by a coded retrieval phase, aimed at answering the second research question by defining significant categories and dimensions relevant to the various generational cohorts.

Findings

From the interviews conducted, six main dimensions emerged that reflect the acceptance of technology among participants: Facilitating Conditions, Social Value, Habit, Performance Expectancy, Voluntariness of use, and Perceived Trust. These dimensions were analyzed and were classified as follows:

- Facilitating Conditions (FC): refers to the availability of resources and supports needed to use the technology (Venkatesh et al., 2003).
- Social value (SV): refers to the experience of enhancing a social relationship by using technology devices (Park et al. 2012).
- Habit (HAB): refers to the frequency and consistency of technology use in daily life (Rahimi et al., 2018).
- Performance Expectancy (PE): relates to the perception of how much technology can improve personal or work performance (Venkatesh et al., 2003).
- Voluntariness of use (VU): describes the degree of perceived freedom or obligation in the use of technology (Venkatesh et al., 2003).
- Perceived Trust (PT): pertains to the user's confidence in the technology and its ability to operate safely and reliably (Dahlberg et al., 2003).

These dimensions predominantly align with the TAM (Davis, 1986) and UTAUT model (Venkatesh et al., 2003), which include constructs such as Facilitating Conditions and Performance Expectancy. However, other dimensions identified relate to other models: for example, Perceived Trust is added in the Trust Enhanced TAM model (Dahlberg et al., 2003), while Habit has been widely incorporated in various models of technology acceptance, including the aforementioned TAM, which, moreover, is remarkably

prevalent in studies of telehealth (Rahimi et al., 2018). Social value is another construct that has been previously added to TAM in the literature to extend the model (Rahimi et al., 2018; Young & Lee, 2018). These dimensions will be further illustrated in Table 2, which presents relevant quotes from the interviews and the corresponding dimensions that emerged from the analysis.

Dimensions	Silent	Baby Boomers	Gen X
Facilitating conditions (FC)	Int.19 “Until a few years ago I used to use my mobile phone. Not any more because I can't see the keys and I can' hear. even just watching TV is tiring for me”	Int.11 "I asked my nephew Simone if he could book me to make this visit. I couldn't do it because I don't have a computer, I don't have anything, I had to ask"	Int.22 'It certainly depends on the device and the service, it may be the economic size, the quality, but on some things I also know that I don't have much autonomy of choice, take the health services if there are no places even by mail it gives me problems, in fact it is often worse because I stay waiting and then they give me an appointment that because of work commitments I can’t wait”
Social value (SV)	Int.21 [...] it helps me to be with my family [...]. With the phone I can hear my friends more”	Int.13 “My brother lives in Germany, so I do video calls with him [...], now with everything that’s happened it's been four or five years since we've seen each other, at least by phone we can”	Int.22 “I don't think sociality it could influence me in adoption, maybe more in choosing the model or type of service, seeing online reviews and things like that”

	Int.12 “I use WhatsApp, because we exchange, even with the gym group or friends with relatives we also have to send a message by video, with my son we talk every day”	Int. 2 “I got news from my Argentine family and their photos on Facebook, I got goosebumps, [...], I saw my cousin's children and grandchildren for the first time, I heard them on the phone, I also sent photos of our family, he also had not seen my daughters and grandchildren for a long time” Int.6 “The telephone to communicate with people I care about, that's why it's useful”	
Performance Expectancy (PE)	Int.7 “Regarding health, for example, I use Google. if I tell him my head hurts he will advise me what to do and then call the doctor"	Int.2 “These technologies can help elderly people, such as getting groceries brought home, calling a doctor to come to the house, are things certainly useful” Int.1 “I am equipped with a wrist blood pressure monitor because my blood pressure is a little high, so I keep it under control at all times. I keep it with me on my wrist and it saves the data by downloading and storing them on the app automatically”	Int.22 “I think it have to be fast, quality, and functionalities for example with my mobile phone sometimes I enlarge the font size for example. It has to take good pictures, they are part of us now, I manage the bank, so yes, functionalities.”
Voluntariness to use (VU)	Int.9 “I would have liked to buy a smartphone, but I can't use it on my own. I am afraid of making some mistakes. But I would like to learn how to use	Int.6 “The telephone [...] It’s useful. I couldn't stay without hearing from relatives”	Int.22 “I already use it, of course it is my choice, but if I need for my health I think I can do it, I have done it, maybe it's better to accept”

	it. I would need someone to help me"		
Perceived Trust (PT)	Int.19 "I am afraid (of being scammed on the Internet). I hear the bad stories on the news every day and they scare me"	Int.6"[...] sometimes I go into some sites where there are things that are not clear to me and so I prefer to leave that page rather than risk"	Int.23 "Trust is a big problem"
Habit (HAB)	Int.12 "Here's one thing, on the computer, for example, I subscribe to Repubblica online. So in the morning I read the newspaper, I watch the press review on television, it gives me the front pages of a bit of all the newspapers for various opinions. But then there's Repubblica, which I've been following since it almost came out. I'm very fond of it, and I also have it on my computer, online, and I read it in the morning"	Int.5"[...] the mobile phone, I can't live without it anymore. If I leave the house and forget it I go back to get it, it's my company, nowadays you can't be without it because otherwise you feel lost. [...] I take my blood pressure every day because I have to keep it under control, and these blood pressure devices help me"	Int.23 "I am used to using them, i.e. they are not new to me. For example my father, he's 90 years old, I told him to install Whatsapp and no, absolutely not. For us it's normal, this as well as accessing e-mail"
	Int.7 "[...] I have a robot and he cleans all the dust in my house. I remove the big stuff with the broom and the small pieces he removes, he goes around me and is like a company"		

Table 2. Technology acceptance dimensions emerged from interviews

In the second part of the results, the focus shifts to UX dimensions that emerged from the interviews. The identified dimensions include Usability, Usefulness, Functionality, Service Response Time, Privacy and Fun (Table 3). While many of these dimensions have been utilized in existing models, the classification used here is primarily based on the Zarour & Alharbi's framework (2017), which covers gathered UX dimensions, aspect categories, aspects, and measurement methods. Specifically, Usability, as defined by ISO 9241-11, measures how effectively, efficiently, and satisfactorily users can achieve their goals. Based on some current research (Hassenzahl, 2004; Santoso & Schrepp, 2018; Mortazavi et al., 2024; Widjaja et al., 2022) Usefulness and Functionality are typical pragmatic dimensions of UX: Usefulness pertains to the extent to which a product or

system effectively fulfils its intended purpose, providing value to the user (Mahlke, 2005), while Functionality describes the ability of a product to perform its intended functions and achieve the user's objectives, ensuring that the system operates as expected (Mcnamara, 2005). Service Response Time refers to the duration an organization takes to deliver a meaningful outcome to the user, particularly focusing on the efficiency and effectiveness of the underlying technology (Tung & Yuan, 2007; Zarour & Alharbi, 2017). Privacy is a hedonic dimension that encompasses the user's sense of security and trust in a product, closely linked to how well the product safeguards user data and maintains trustworthiness (Zarour & Alharbi, 2017; Swallow et al., 2005). Lastly, Fun, underscores the emotional and enjoyable aspects of user interaction (Zarour & Alharbi, 2017; Mahlke, 2005).

Dimensions	Silent	Baby Boomers	Gen X
Usability	Int.21 “I don't know how to use the touch screen well”	int.5 “everything is written very small, I don't even understand the words sometimes”	Int.24 “I would like these technologies to be more intuitive for our generation but I wouldn't know how”
	Int.19 “Until a few years ago I used to use my mobile phone. Not any more because I can't see and I can't hear”		Int.25 “I would like it to be more usable with simple and clear steps”
	int.9 “They wouldn't let me take an exam because the online booking was missing. I could not book online because I am not able to do it”.		
Usefulness	Int.9 “Regarding health, for example, I use Google. If I tell him my head hurts he will advise me what to do and then call the doctor”	Int. 1 “In terms of health, I consider technological aids important because, for example, I am equipped with a wrist blood pressure monitor because my blood pressure is a bit high, so I keep it under control at all times.”	Int.25 “It is useful for personal culture, sharing with multiple subjects, of various ages”
		Int.5 “To see the solution if something hurts I look on the internet [...]. Even for doctor's prescriptions, you	

		used to have to go to the doctor's office, stand in line, take the number, but now you can get them online too"	
Functionality	Int.9 "I use Google. If I tell him my head hurts he will advise me what to do and then call the doctor"	Int.1 "When I go to the gym, I always use a heart rate monitor for the sporting activity I do [...] the technical support allows you to understand when I'm in aerobic and when I'm in anaerobic. [...] On a health level I think the technological supports are important because for example I have a wrist blood pressure monitor [...] I keep it with me on my wrist and it saves the data by downloading and storing them on the app automatically" Int.2 "Making phone calls, make appointments"	Int.24 "I only use it to view podcasts, whatsapp [...]. I keep my phone always on in case of emergency for my son who lives away from home"
Service Response Time	Int.12 "I do my checks, tests and so on, once a year. Then where I go they send, they are connected with a company, and they send the reports online. So I get the report without the need for me to go back there and print it out"	Int.5 "Even for example for health if I have something, they can look it up on the internet, of course then I have to call the doctor but sometimes you always find occupation, but in the meantime the internet tells you what you might have"	Int.24 "If I have to do anything on the computer I take so long that I lose patience and do something else"
Privacy		Int.4: "In general, the whole issue of online privacy has always made me hesitant.	Int.26 "For how we use devices today, I think it's important to know especially the

		I'm uncomfortable with the idea of my data being shared or easily accessible to others. Some technologies feel too invasive from a privacy standpoint."	safety hazards we're facing"
Fun	Int.20 "I only use technology for practical purposes. [...] I use it for sympathy and pastime"		Int.24 "Most of the time the phone is active just for fun, that is, to listen to music via YouTube"

Table 3. UX Dimension emerged from interviews

Discussion

On the base of our data, and answering to our RQs, we could posit that the differences in digital divide and UX dimensions among the three generational cohorts significantly affect their acceptance of telehealth services. Regarding the first research question, notable differences among the three cohorts were observed. The disparity between the Silent cohort and the other two is particularly striking. Digital literacy and technology use are highly subjective, influenced by various factors such as economic resources, personal needs and desires, social and employment status, and digital skills (Zaid et al., 2022). The interviews revealed that not all participants felt adequately educated about the use of technological tools and technology in general. Consequently, many may be unaware of the extensive range of applications and possibilities that technology offers. Their limited knowledge and skills prevent them from recognizing the diverse needs that technology can address. Greater proficiency was found among individuals who engaged with technology due to professional requirements and were thus more cognizant of the potential of these tools. The findings suggest that more comprehensive education and training in technology use are crucial today. Addressing the digital divide should be a top priority, especially in a post-pandemic context where technology increasingly permeates daily life. Identifying needs is inherently subjective and influenced by how individuals interact with the tools or services they use. Additionally, age can affect one's usage and knowledge of technological innovations. The interviews indicated that younger individuals tend to use technology more frequently, consistently, and in a broader range of applications. Individuals from the Baby Boomer generation demonstrate a greater proficiency in managing various digital services. This proficiency may stem from their responsibility in caring for elderly family members, their curiosity about the digital environments navigated by their children and, in some cases, their grandchildren, or their professional exposure to digital transformation. Furthermore, when faced with challenges, Baby Boomers are more likely to seek assistance through established support channels, such as healthcare facilities or emergency service telephone numbers. Their ability to rely on traditional support mechanisms, such as call centers, helps mitigate their digital skill deficits or the challenges associated with aging. The examination of digital divide and UX dimensions in relation to telehealth services also reveals significant differences among the Silent Generation, Baby Boomers, and Generation X, influencing their acceptance and use of these services. Usability issues are notably pronounced among the Silent Generation, who face challenges

with small text and complex interfaces. This cohort's difficulties with touch screen technology and intricate digital tools impact their overall engagement with telehealth services. In contrast, Baby Boomers and Generation X exhibit a better grasp of technology, although they still encounter usability obstacles when systems are not user-friendly. The difference in usability directly affects the ease with which these groups access and utilize telehealth services, with less intuitive designs potentially deterring use among the Silent Generation. Usefulness is a universally recognized factor, yet its perception varies across generations. The Silent Generation primarily values telehealth for essential functions, such as managing health conditions. Baby Boomers view technology as a practical tool for health management and personal tasks, reflecting its significant utility in their lives. Generation X, on the other hand, acknowledges the broad benefits of telehealth services across various aspects of daily life, indicating a high level of acceptance and integration of these services. Functionality emerges as a crucial dimension, especially for Generation X, who leverage technology efficiently for both professional and personal purposes. Baby Boomers also demonstrate effective use, albeit within a more constrained scope. For the Silent Generation, functionality is often limited to basic tasks, which may restrict their engagement with more advanced telehealth features. This variation in functionality influences how readily each cohort adopts and integrates telehealth services into their routines. Service Response Time is highly valued, with the Silent Generation particularly appreciating prompt and efficient service delivery. This cohort’s preference for quick response times underscores the importance of efficient service in fostering acceptance. Baby Boomers and Generation X also prioritize fast responses, though they may experience frustration with delays, impacting their overall satisfaction and continued use of telehealth services. Privacy concerns are especially significant for the Silent Generation, who express discomfort with data security and potential privacy breaches. This heightened sensitivity necessitates robust privacy protections and clear communication to build trust and encourage adoption. Both Baby Boomers and Generation X are generally more comfortable with privacy aspects, though ongoing attention to data security remains important for maintaining their trust and engagement with telehealth services. Fun and enjoyment in technology use are less emphasized among the Silent Generation, who typically approach technology with a focus on functionality rather than leisure. Conversely, Baby Boomers and Generation X incorporate technology into both practical and recreational activities, which can enhance their overall experience and acceptance of telehealth services.

Research and managerial implications

The implications of this research are significant for both academic and managerial spheres, with a particular emphasis on marketing. From an academic perspective, the study contributes to the existing literature on telehealth by exploring generational differences in the acceptance of new digital health technologies. These findings provide a foundation for further research on how psychological and socio-cultural factors influence the adoption of such technologies across different age groups and to test the founded dimensions. From a managerial perspective, the results are crucial for developing targeted marketing strategies. Tailoring telehealth solutions to address these varying needs, by improving usability, ensuring functionality, providing timely service, safeguarding privacy, and considering the role of enjoyment, can enhance acceptance and integration across all age

groups. Understanding the preferences and resistance of different generations enables managers to tailor promotional campaigns and communication messages, thereby optimizing engagement and the adoption of telemedicine services. For instance, strategies that emphasize ease of use and security may be more effective for older generations, while a focus on innovation and convenience could resonate more with younger demographics. During the interviews, it was noted that respondents never mentioned specific brands other than big tech bigwigs offering first-mover technological solutions, thus highlighting the possible revenue barriers that service providers might face and the need to develop strategies focused on these dimensions could offer an important strategic leverage. Integrating these insights into marketing practices can enhance telemedicine adoption, providing a competitive advantage in the digital healthcare sector.

Limitations and future research

This study has several limitations that should be acknowledged. Firstly, the sample is exclusively Italian, which may limit the generalizability of the findings to other cultural and geographic contexts. Additionally, the process of interviewing older adults, particularly those from the Silent Generation, may present challenges such as cognitive decline, reluctance to engage with technology, or difficulties in articulating their experiences with digital health services. In addition to the cultural and geographic limitations, the study's reliance on self-reported data may introduce bias, as participants might overestimate or underestimate their comfort and proficiency with digital technologies. Future research should explore the perspectives of digital healthcare and telehealth product designers and developers. By interviewing these professionals, valuable insights can be gained into the challenges and opportunities they face in creating solutions tailored to the specific needs of these generational cohorts. A deeper understanding of the design and development processes behind digital health technologies will contribute to optimizing user experiences and delivering greater value to both users and the organizations that provide these services.

Conclusion

This study explored the impact of digitalization on the acceptance and use of telehealth services among the Silent Generation, Baby Boomers, and Generation X. Our findings reveal significant differences in digital literacy, technology use, and User Experience (UX) perceptions across these cohorts, highlighting the need for tailored approaches in the development and implementation of telehealth services. The Silent Generation faces pronounced challenges with technology, particularly in terms of usability and privacy concerns, which hinder their engagement with telehealth. Baby Boomers, while more proficient, still encounter obstacles that require careful consideration in design and support mechanisms. Generation X, being the most tech-savvy, integrates technology more seamlessly into their lives but also demands higher standards of functionality and efficiency. To enhance the adoption of telehealth services across these age groups, it is essential to address the specific barriers identified, such as improving usability, ensuring robust privacy protections, and tailoring functionalities to meet the diverse needs of each cohort. By doing so, service providers can better align their offerings with user expectations, ultimately fostering greater acceptance and integration of telehealth services in the evolving healthcare landscape.

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