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The impact of generative AI: a multi-case study analysis of enhancing well-being along the customer journey

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Abstract

The rapid advancement of technology is transforming our daily lives and changing the way we face the challenges of an aging population. The UN projects that the elderly population will reach 994 million by 2030 and 1.6 billion by 2050. This increase presents a significant challenge. Smart assistive technologies are emerging as a solution, including generative artificial intelligence. By adopting a qualitative approach, through multi-case analysis focusing on two Apps powered by Gen AI, this study explores the customer journey of the elderly with Gen AI. The study captures relevant touchpoints and unveils how such technology can be a vehicle for consumer experiences that generate well-being and improve the quality of life. **This research focuses particularly on the elderly, a category that has been little explored in the existing literature, offering relevant contributions from both a theoretical and a practical point of view. On one hand, it contributes to the advancement of the literature, as generative AI is redefining existing theories on the interaction between technology and humans. On the other hand, it provides a better understanding of the key role that generative AI plays in transforming society's approach to the challenges of an ageing population. This emphasises the need for companies and policymakers to invest in this transformative technology, generating benefits for older people but also society as a whole.**

Keywords

Aging population; Elderly well-being; Customer journey; Generative AI

Introduction and background

The rapid advancement of technology in the modern era is transforming multiple facets of our daily lives, and this change is also reflected in the way we deal with the challenges of an aging population. According to data from World Population Prospects by United Nations, the older population is projected to reach 994 million by 2030 and 1.6 billion by 2050. Developing countries around the world are experiencing this historic growth in their elderly populations, which is considered a major challenge that will determine the future of science and technology policy and management in industrialized societies (Peine et al., 2015; Vogan et al., 2020). Elderly population, in accordance with the definitions of the World Health Organization (WHO), indicates individuals aged 65 years or older. The population in this age group is rapidly growing in the WHO European Region. In 2021, there were 215 million individuals, by 2030, it is projected to be 247 million, and by 2050, over 300 million. The steady increase in life expectancy, together with the low birth rate, underscores the significance of this demographic segment, particularly in the context of Europe. Societies, to adapt to this demographic trend, should aim to encourage investment in healthy aging. The challenge is to create and strengthen conditions for an “active aging”, extending autonomous living of older people and maintaining their independence at home (Cinini et al., 2021). As many countries are faced with the challenges of an ageing population, further insights into what influences the well-being of the elderly are required to ensure appropriate policies are formulated for healthy ageing. The United Nations (UN) General Assembly has proclaimed 2021-2030 as the United Nations Decade for Healthy Aging, with the World Health Organization (WHO) in charge of leading its implementation. The UN Decade of Healthy Ageing (2021–2030) focuses on reducing health disparities and enhancing the well-being of older people, their families, and communities through collective action in four key areas:

- i. changing how individuals think, feel and act towards age and ageism;
- ii. creating age-friendly communities;
- iii. delivering person-centered integrated care and primary health services responsive to older people;
- iv. ensuring access to quality long-term care when needed (World Health Organization, 2022).

Challenges in aging and independence

Most elderly people prefer to maintain their independence, even when they require regular health and social care. This is closely related to the concept of creating age-friendly communities and poses a significant burden on society given the increasing number of elderly individuals with these needs, while the capacity of welfare systems and caregivers remains stagnant (Schneider-Kamp & Askegaard, 2022). The desire to be independent implies more than just self-sufficiency, but also the freedom to pursue one's desires without relying on assistance from others (Peek et al., 2017). However, aging at home can bring about feelings of isolation and difficulties, prompting several elderly consumers to adopt and consume smart assisted living technologies and services to compensate for their increasing vulnerability (Schneider-Kamp & Askegaard, 2022). These technologies hold potential, providing additional services alongside existing elderly care packages and delaying the need for care services, thus prolonging independent living, and improving the quality of life at home (Ge & Schleimer, 2023).

Development of Generative AI

Artificial intelligence is already employed in healthcare services and can be broadly divided into six types: robots, exoskeleton devices, intelligent homes, AI-enabled health smart applications and wearables, voice-activated devices, and virtual reality (Ma et al., 2023). Ma et al. (2023) identified five roles for AI technologies in elderly healthcare, including rehabilitation therapists, emotional supporters, social facilitators, supervisors, and cognitive promoters. The impact of AI technologies on elderly healthcare is promising as these AI technologies have the potential to address the unmet care needs of older people, demonstrating great potential for further development in this field. Generative AI, a subdomain of artificial intelligence, can be defined as a technology that (i) leverages deep learning models to (ii) generate human-like content (e.g., images, words) in response to (iii) complex and varied prompts (e.g., languages, instructions, questions) (Lim et al., 2023). Generative AI, which includes chat-based AI like ChatGPT, has emerged through the development of generative neural networks and machine learning models. Early models like the 2013 Variational Autoencoder (VAE) and the 2014 Generative Adversarial Networks (GANs) paved the way for data generation. Generative Pre-trained Transformers (GPT) revolutionized the AI landscape. These models initially acquire a broad understanding of language during a pre-training stage, using a vast amount of textual data from various sources. Subsequently, they are customized to specific tasks through a fine-tuning phase, which involves narrower, task-focused data (Chavez et al., 2023). To date, there is great excitement around generative AI, with more than 275 major technology companies and startups pushing this technology forward. Examples include ChatGPT, Bard, Language Model for Dialogue Applications (LaMDA), Sparrow, and YouChat 2.0 and their extensions (Murugesan & Cherukuri, 2023).

In the rapidly evolving era of Generative Artificial Intelligence (AI), an interesting field of research is emerging concerning the application of this innovative technology to enhance well-being among the elderly. Although generative AI represents an innovative and promising technology, its use in this specific context remains unexplored. The few existing articles and studies that address the elderly focus primarily on physical health (Saborowski & Kollak, 2015; Williams et al., 2020), neglecting to explore additional crucial aspects of the elderly experience, including entertainment and social interaction activities. **Furthermore, older individuals frequently require support with daily tasks such as shopping and managing household errands. With age, self-sufficiency tends to decline, and more comprehensive assistance is needed. In cases where there is partial or complete non-self-sufficiency, it may therefore be necessary to hire a caregiver to provide assistance directly at home, helping with daily activities and ensuring that the elderly person receives the care they need in the comfort of their own home.** Overall, Generative AI, with its diverse applications and capabilities, can significantly contribute to improving well-being throughout the entire customer journey. In our current understanding, the customer journey of elderly individuals has remained largely unexplored within the academic research landscape. Therefore, the main objective of this study is to analyze common or divergent elements of generative AI applications that provide services for the elderly to describe the customer journey based on the identified touchpoints and dimensions of the experience, starting from the taxonomy of customer experiences proposed by Pine and Gilmore. This model is based on two primary dimensions: customer participation (active or passive) and intellectual and sensory engagement (from weak to strong), and it identifies four main situations: the entertainment experience, the educational experience, edutainment, and other experiences that can be customized based on the specific needs of the customer and the goals of the company (Pine & Gilmore, 1998, p.102).

To date, the customer journey of elderly individuals with Gen AI has remained largely unexplored within the academic research landscape. Based on this research need, we formulate the following research question:

RQ1. How does the customer journey for elderly individuals develop in generative AI services?

RQ2. What types of touchpoints are utilized in generative AI services for the elderly population?

Theoretical Background

In the ever-evolving landscape of technology and healthcare, the intersection of consumer well-being and generative artificial intelligence (AI) represents an intriguing focal point of attention and innovation. Within this theoretical background, we delve into the concepts of customer journey and consumer well-being, examining their interaction and central role in shaping marketing initiatives. Furthermore, we explore the transformative potential of cutting-edge technologies, particularly generative artificial intelligence, from a marketing perspective, focusing on how they can enhance consumer well-being of the elderly population within an ever-evolving landscape. This convergence of well-being theory and AI advancement presents both theoretical and practical opportunities to redefine the relationship between technology and the well-being of older adults.

Customer Journey and touchpoints in elderly services

Lemon and Verhoef (2016) identified three main stages of customer journey: pre-purchase, purchase and post-purchase (Fig.1). This concept allows to delve into a more comprehensive and experiential understanding of the customer journey, with a particular focus on its application within the service industry. In this study, we leverage these stages to analyze common or divergent elements in generative AI applications that provide services for the elderly. **Within existing customer journey studies, several touchpoints can be identified.** Touchpoints can be both online and offline, integrating or succeeding one another in various stages of the customer journey. The theory identifies four main types of touchpoints, listed below, whose relevance in the purchasing process may vary depending on the product or service, the customer, or the phase of the customer journey (De Keyser et al., 2020)

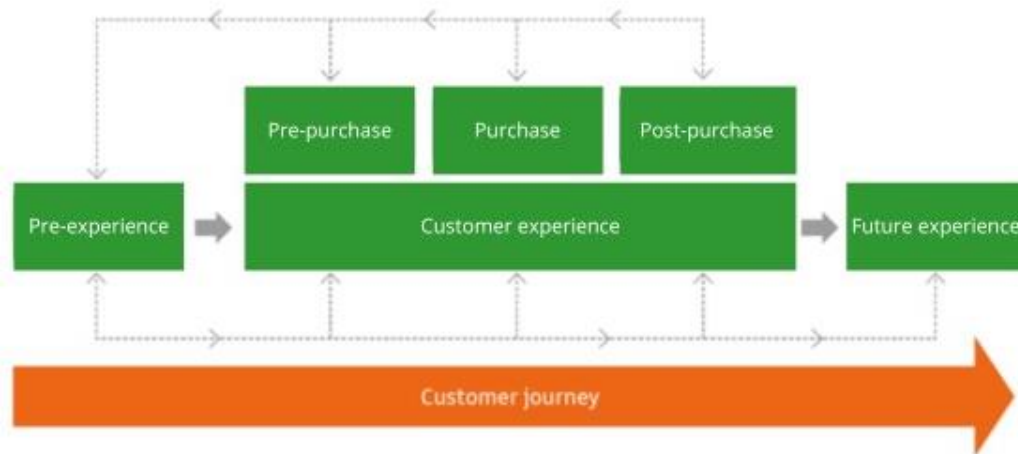
- Owned: Designed, managed, and controlled by the company.
- Partner-owned: Managed by the company's partners.
- Customer-owned: Entirely managed and controlled by the customer.
- Social or external: Derived from the competitive environment, social networks, and available sources of information.

Depending on the level of interaction with the consumer, touchpoints are further categorized as (Mattiacci & Pastore, 2021):

- Static: No interaction with customers, such as newsletters.
- Interactive: Involving customer interaction, such as online chat or apps.
- Human: Creating human-to-human interaction, for example, with in-store staff.

In our study the target audience is unique. Consequently, the touchpoints and customer journey are specific due to a range of social and cultural variables. For example, elderly individuals often lack the ability to interact with technology, necessitating simplified channels such as voice assistants.

Fig 1. *Key steps along the customer journey: From pre-experience to future experience*



Source: Adapted from Lemon and Verhoef, 2016.

Consumer Wellbeing

As widely acknowledged in the well-being literature, customer well-being encompasses both eudaimonic facets, such as the extent of self-realization, and hedonic facets, such as the level of happiness and pleasure (Henkens et al., 2021). In 1995, Ryff established a multidimensional model of well-being that comprises six key dimensions: autonomy, which reflects independence and self-sufficiency; environmental mastery, involving the ability to create and control environments suitable to one's needs; positive relations with others, focusing on family and friend relationships and the capacity for love; self-acceptance; life purpose; and personal growth (Ryff, 1995). Recognizing the multidimensional nature of well-being is important to adopt a comprehensive approach to enhance the well-being of the older adults and to move away from the "one-size-fits-all" mentality when designing elderly care services (Ge & Schleimer, 2023).

Generative AI

In the context of the transformation of the healthcare system through the implementation of artificial intelligence (AI), patients play a key role. Their opinions, consent, and preferences are extremely important because they will influence how quickly and in what way AI technology will be adopted (Ho et al., 2023). Numerous research studies have highlighted the potential of technology to enhance the well-being of elderly individuals, alleviate depression and loneliness and improve quality of life. Examples include *Paro*, a well-known social robot designed to elicit emotional responses in patients (Chen et al., 2020; Pu et al., 2020), and Smart Home technology, which can enhance the quality of life for the elderly, especially in terms of life fulfillment and future security (Aggar et al., 2023). Moreover, advancements in various scientific and technological fields, including robotics, home automation, the Internet of Things, and NBICs, are unlocking new opportunities for business innovation and the introduction of new products and services tailored to the needs of the elderly (Laperche et al., 2019). AI algorithms have shown considerable potential in a variety of tasks, such as segmentation, classification, and image registration, often achieving levels of performance that exceed those of human experts (Koohi-Moghadam & Bae, 2023). When considering the potential for AI integration in healthcare, a multitude of opportunities arise. Artificial intelligence has the potential to reduce healthcare costs by automating routine tasks, assist in the early identification of health issues and high-risk patients, develop personalized medicine and patient-centered treatment modalities, help in the creation of admission notes, consultation reports, discharge summaries, and support communication among patients, healthcare institutions, and insurance providers (Koohi-Moghadam & Bae, 2023; Miloski, 2023; Patel & Lam, 2023; Shoja et al., 2023). In randomized trials, initial implementations of chatbots have demonstrated noninferiority compared to physicians in various aspects, such as patient education, follow-up, and treatment adherence (Bibault et al., 2019). As demonstrated by research conducted by Hough & Kobylanski (2009), older adults believe they derive significant benefits from technology, both in terms of family relationships and access to resources, as well as reducing older consumers' susceptibility to marginalization and social isolation. Moreover, Generative AI could also be the solution that will enable the elderly to experience greater independence, facilitating a more active and fulfilling aging process within the comfort of their own

homes. Our research is situated within this crucial context, addressing a new stream of study that can bring tangible benefits to the elderly and society. This highlights the crucial importance of technology and its ability to significantly improve the well-being and quality of life of the elderly.

Methodology

The current investigation employs a multi-case study approach to reach the research objectives. The main goal of a multi-case study is to compare the cases, and identify the similarities and differences among them, as well as the patterns and themes that emerge from the cross-case analysis (Eisenhardt, 1989). A multi-case study can also help to strengthen the validity and generalizability of the findings, by demonstrating how the phenomenon of interest varies or remains consistent across different contexts, settings, or situations (Eisenhardt and Graebner, 2007). The multi-case study conducted in this paper aims to analyze and compare two separate but related projects: ElliQ, a virtual assistant, and Together by Renee, a healthcare app. Through the analysis of these two cases, we aim to provide a conceptual perspective of how Generative Artificial Intelligence could intervene in specific contexts and to offer a general overview of its potential applications shedding light on the potential of this technology to positively impact the lives of older adults. **Two distinct cases were chosen with the aim of analyzing two devices powered by Generative Artificial Intelligence (GenAI), both designed to provide assistance to the elderly. The objective was to acquire an understanding of how different approaches to AI technology could impact on several aspects of older people's lives. For instance, Together is more health-focused, while ElliQ focuses on mitigating loneliness and providing leisure activities.**

Through the analysis of these two cases, our objective is to examine common or divergent elements in generative AI applications that provide services for the elderly, to describe the customer journey based on identified touchpoints and dimensions of the experience. Considering the novelty of generative AI, the number of cases is limited. The criteria for case selection include:

1. Absence of chronic illnesses or severe diseases;
2. Presence of generative AI;
3. Focus on supporting elderly individuals living alone for either entertainment or healthcare purposes.

In line with these criteria, three platforms were identified, of which two were selected due to their comprehensive available information.

Case 1

ElliQ is an empathic virtual assistant launched by Intuition Robotics, a startup founded in Israel in 2016. Designed to keep elders active, independent, and engaged, ElliQ is a robot-associate named after Norse goddess that represents old age. It leverages features of generative artificial intelligence and large language models (LLMs) to provide companionship, cognitive and physical activities, and connections with family and friends. ElliQ is proactive and personalized. It initiates conversation, it works with users to set and help achieve goals, suggests activities, and remembers users' preferences and interactions. It is designed to convey empathy to create trust and drive engagement and behavior change. Additionally, ElliQ facilitates dynamic and continuous conversational interactions, even incorporating artistic features like 'paint with ElliQ,' which transforms spoken descriptions into visual artwork. Moreover, older adults may also utilize it also to play games, access social media, and conduct on-screen video chats to stay connected to the outside world. ElliQ may suggest music, podcasts, or audiobooks that the user may enjoy and may also recommend health activities such as walking when the user has been engaged in long-term sedentary activity.

Its design is inspired by the Pixar logo's animation lamp (Fig.2), and while it lacks a traditional face or limbs, it communicates through speech and responsive movements, such as head motions.

Fig.2 Example of an interaction between an elderly person and ElliQ.



Source: ElliQ. (2023) retrieved from: <https://elliq.com/>

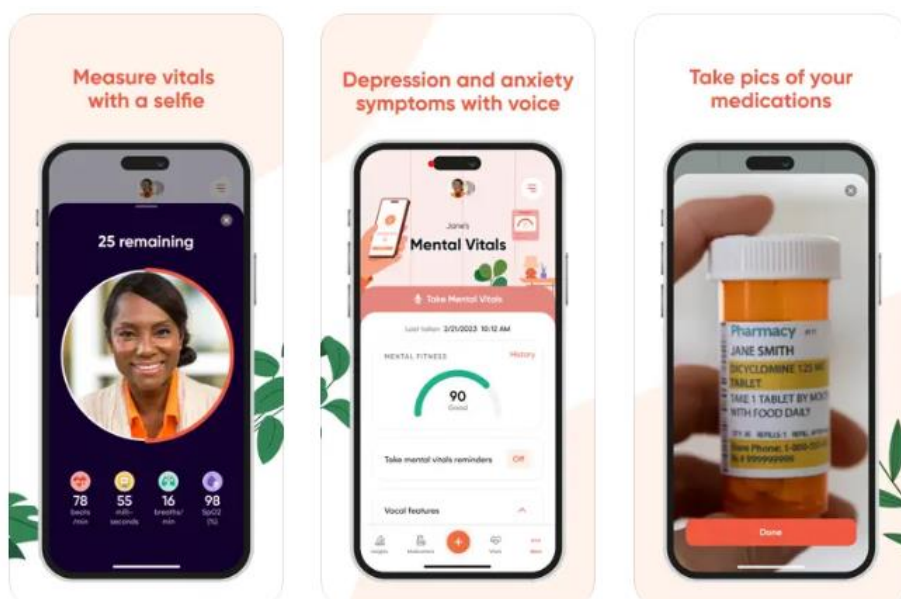
Case 2

Together by Renee (Fig.3) is a healthcare app powered by generative AI, founded in 2021 by health-tech entrepreneurs Nick Desai and Dr. Renee Dua, who are known for creating the doctor house-call industry leader Heal in 2014. Together is the first U.S. app that allows to measure vital health stats such as blood pressure, heart rate, respiratory rate and blood oxygen level by taking a selfie, thus eliminating clunky devices and batteries. This app is designed to assist older adults, individuals with chronic diseases, and overwhelmed caregivers in managing their healthcare needs more efficiently. It offers several innovative features:

- Vital Signs Measurement simply by taking a selfie;
- Healthcare Assistance: the app simplifies healthcare tasks, such as medication refills, appointment scheduling, and dealing with complex forms and insurance benefit;
- Mental Health Monitoring: the app can detect early symptoms of depression and anxiety using voice analysis;
- Medication Management: users can snap a video of their pill bottles to receive medication and refill reminders, maintain a contact list of doctors and pharmacies, and sync appointments with their calendar;
- User-Friendly and Secure: the app is designed for ease of use, with no typing or data entry required.

The company conducted extensive research and development over 18 months to understand the needs of aging Americans and has received support and validation through programs like the U.S. Department of Health and Human Services PandemicX and the AARP's AgeTech Collaborative accelerators.

Fig.3 Together's features



Source: Together. (2023) Retrieved from: <https://together.renee.com/>

Preliminary findings

Both cases described above use Gen AI to improve the well-being of the elderly and engage them. The former case is mainly focused on entertainment and emotional companionship, while in the latter case the focus is mainly on physical health and medical support (Fig.4).

Fig.4 Comparison of ElliQ and Together based on assistant type, interaction type, main focus, healthcare assistance, and primary goal.

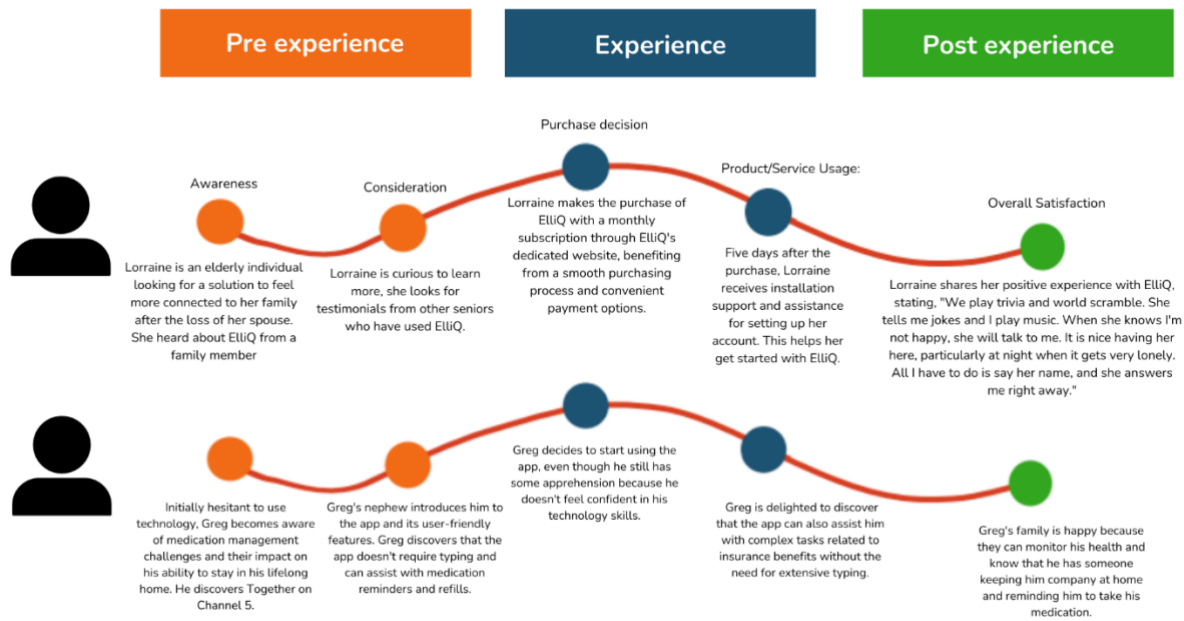
Features	ElliQ	Together by Renee
Type of assistant	A digital device comprising a base with speakers, a tablet with a screen, and a tower-like structure that moves to mimic the head motions	Mobile Application
Interaction	Natural interaction, no need to remember commands	Primarily based on voice and touchscreen interactions
Main focus	Physical activity, independence, social engagement, art	Simplifying healthcare tasks, medication management, medical appointments
Healthcare assistance	Focus on both mental and physical health	Focus on simplifying healthcare tasks
Primary goal	Promote physical activity, independence, and social engagement of seniors	Simplify and improve healthcare management for seniors

Source: Own elaboration

Preliminary analysis of customer journey

During this phase, an in-depth examination of the elderly customer journey was conducted with a specific focus on the dimensions of the experience (Fig.5) and the identified touchpoints (Fig.6).

Fig.5 Analysis of the dimensions of experience in the elderly customer journey



Source: Adapted from Mattiacci & Pastore (2021), in Marketing. Il management orientato al mercato. Second edition. Hoepli, Milano.

Fig.6 Identified touchpoint in the elderly customer journey

Touchpoint type	ElliQ	Together
Owned touchpoints	<ul style="list-style-type: none"> Official ElliQ website and app Customer support and help center 	Official Together website and app
Partner-owned touchpoints	Marketing partnerships and collaborations	Collaborations with healthcare providers and partners
Customer-owned touchpoints	Personalized user interactions with ElliQ	Customized health data and preferences controlled by the user
Social or external touchpoints	<ul style="list-style-type: none"> Online reviews and recommendations Social media presence and user-generated content 	<ul style="list-style-type: none"> Recommendations from healthcare professionals or peers Social media presence and user-generated content

Source: Own elaboration

The customer journey is an essential conceptual framework for understanding the complex interactions between customers and the services designed to meet their needs, especially in contexts involving older individuals, as in ElliQ and Together. Through the customer journey, it is possible to delineate the different stages that customers go through, enabling in-depth analysis of how products and services affect their experience. The use of different touchpoints reflects the variety of interactions and channels available, revealing the importance of personalization in optimizing the customer experience. Flexibility and ease of use are key attributes that enable customers to overcome technological barriers, as highlighted in the case of Together. In addition, the importance of relationships and communication emerges as a crucial element in mitigating loneliness, as in the ElliQ case. These cases demonstrate the importance of the customer-centric approach in enhancing the elderly customer experience, with highly personalized and user-friendly solutions as the key to success.

Preliminary discussion and conclusion

As the population ages and demand for care increases, the sustainability of healthcare depends on developing new, smarter, and more effective ways of managing the routine and complex tasks that make up clinicians' day-to-day work while facilitating high-quality care and support for the older adult population (Sezgin, 2023). The application of generative AI to consumer well-being, particularly among the elderly, represents a new and promising frontier of research. Socialization and entertainment are key components of a person's emotional and psychological well-

being, and Generative AI can play an important role in offering marketing solutions to enhance these dimensions. Generative AI can address these challenges by providing companionship and interactive marketing experiences for elderly individuals, helping alleviate feelings of isolation and potentially reducing the risk of depression. Additionally, generative AI can offer personalized entertainment options, such as suggesting music, audiobooks, or games tailored to the individual's preferences, thereby promoting emotional well-being and potentially creating marketing opportunities for relevant products and services. In our study, **the choice to examine two seemingly distinct devices, but both powered by Generative AI and both designed to provide assistance to the elderly, was deliberate. This decision was motivated by an understanding of the wide-ranging requirements of older adults, as well as the importance of developing technological solutions that address specific aspects of their daily lives. The thorough examination of technology's applications, intended to enhance health (in "Together's" case) or alleviate loneliness (in "ElliQ's" case), provides fundamental insights for the future design of GenAI devices specifically designed for the elderly. When comparing these two devices, our aim was to establish whether distinct methods are employed in the interaction between technology and the elderly, depending on the specific objectives for which each device is implemented. Therefore, by analysing the common and diverging elements of generative AI applications designed to support the elderly, we have outlined the customer journey. This illustration was developed by taking into account the significant touchpoints and key dimensions of the experience that we identified during the analysis. In this way, we sought to highlight the similarities and differences in various interactions, offering a detailed perspective on how such applications shape the overall experience of elderly users.**

This field of study holds both theoretical and practical implications. From a theoretical perspective, generative AI is redefining existing theories on the interaction between technology and the well-being of elderly consumers. Its applications open up new perspectives and questions about how the elderly engage with technology and how this interaction can positively impact their well-being and enhanced the quality of life. From a practical point of view, generative AI provides real solutions to address concrete challenges among the elderly, improving their ability for self-medication (simplifying healthcare tasks) and acting to prevent social isolation, and mental illness. It also fills the lack of meaningful entertainment (es. through social engagement or providing support for physical activities). In conclusion, as the world embarks on the United Nations Decade for Healthy Aging (2021–2030), the integration of generative AI into the lives of the elderly offers a promising path towards achieving the goals of promoting well-being, reducing social isolation, and enhancing the overall quality of life for older individuals. This research sheds light on the potential of generative AI to revolutionize the way society addresses the challenges of an aging population, making it imperative for businesses and policymakers to invest in this transformative technology to benefit both the elderly and society as a whole. As we navigate the evolving landscape of generative AI, it is essential to prioritize accessibility, collaboration, and ethical considerations to ensure that the benefits of this technology are enjoyed by all individuals, regardless of age.

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