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The healthy aging and service firms: the promise of smart technologies

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Abstract

Purpose – The world is getting older but healthier, making the over-65s healthy aging the only age-based growth segment in developed countries. This article offers a new perspective on healthy aging consumers and examines how service firms can use smart technologies, such as intelligent automation (IA), artificial intelligence (AI), and service robots, to improve their customer experience (CX).

Design/methodology/approach – This conceptual article draws insights from the literature on healthy aging in consumer behavior, psychology, and medicine, amongst others, and the literature in service management and marketing on technology.

Findings – This article first demonstrates the attractiveness of the healthy over-65s segment to service firms. Second, it addresses the previously overlooked healthy aging segment in consumer research, connecting it to the evolving physical, cognitive, and socio-emotional responses of older adults in service settings. Third, it advances how service firms can use smart technologies to improve the healthy aging's CX in the contexts of hedonic and utilitarian services delivered in physical and digital service environments.

Practical implications – This paper focuses service firms on their fastest-growing segment, that is, healthy older consumers. It provides recommendations on how service firms can use smart technologies to serve this segment better.

Originality/value – This article opens a new stream of service research on healthy aging and technology.

Keywords Healthy aging, Customer experience, Smart technology, Artificial intelligence, GenAI, Service robots

Paper type Research paper

1. Introduction

The United Nations (UN) declared the years from 2021 to 2031 the "Decade of Healthy Aging" (UN, 2021), and a global initiative led by the World Health Organization (WHO) aims

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to improve the lives of older people, their families, and communities. The WHO defines healthy aging as "the process of developing and maintaining the *functional ability* that enables well-being in older age" (WHO, 2015, p. 28). This perspective transcends the mere absence of disease and disability, adopting a holistic view that encompasses physical, cognitive, and socio-emotional well-being (WHO, 2022). *Functional ability* is not only influenced by individuals' intrinsic capacity but also by their environment, which can either enhance or impede their functional capabilities (UN, 2021). Services, ranging from hedonic (e.g. restaurants, cruise ships, and spas) to utilitarian (e.g. healthcare, financial, and ridesharing) and their service environments (also referred to as "servicescapes" throughout this article), whether physical or digital, play an important role in the well-being of healthy older adults.

In this paper, we focus on healthy over-65s who live independent lives and continue to consume as they have always done. However, many in this group have a diverse range of needs related to healthy aging, such as gradual sensory decline (e.g. vision, hearing, and taste) and reduced physical abilities, mobility and endurance (e.g. Bateson, 2024; Haynes *et al.*, 2020; McIntyre *et al.*, 2021). Here, smart technologies can be used to enhance the service experience (also referred to as "customer experience" or "CX" in the remainder of this article) of the healthy aging and generate significant market opportunities for service firms.

The most notable recent advancements in technology are spearheaded by intelligent automation (IA), artificial intelligence (AI), and service robots, and their integration and combination with generative AI (GenAI) and agentic AI (collectively referred to as "smart service technologies" and "smart technologies" in the remainder of this article). IA refers to computer-based intelligent programs enabling the automation of knowledge work across industries (Bornet *et al.*, 2021). Service robots are "system-based, autonomous, and adaptable interfaces that interact, communicate, and deliver service to an organization's customers" (Wirtz *et al.*, 2018, p. 909). AI is regarded as any type of machine intelligence that mimics human intelligence (Huang and Rust, 2018), with agentic AI being the latest development in GenAI's abilities to autonomous serve and support customers (c.f., Bornet *et al.*, 2025). These technologies each can contribute in unique ways to improve the CXs of healthy aging customers and better meet their needs and preferences. As the market grows for services tailored to this segment, there is a surge in the need for the development of new technological solutions. In this article, we explore how service firms can use smart technologies to address the healthy over 65s' changing needs.

In this conceptual article, we followed an interdisciplinary approach by drawing on the literature from several fields including demography, services marketing and consumer behavior related to aging, the psychology and sensory science of healthy aging, as well as smart service technologies. We used a theory synthesis approach by conceptually integrating multiple theoretical perspectives (see Jaakkola, 2020) from these literature and make the following contributions.

First, we explain the growth of the over-65s population and why healthy aging is important for service firms. In fact, healthy older adults are the only growth market in developed countries.

Second, we introduce the over-65 healthy aging consumer group that has so far been neglected and describe it through changes in physical, cognitive, and social-emotional capacities. As such, we bring a new perspective on aging to service research.

Third, we connect healthy aging with smart service technologies and propose how they can help service firms to improve their CXs. Specifically, we advance how these technologies can be harnessed to shape the physical, cognitive, and social-emotional responses of healthy agers to improve their CXs in hedonic and utilitarian services delivered in physical and virtual service environments.

2. The healthy aging of the world

2.1 Why is the world aging so fast?

According to the UN, in 2023 there were 782 million people over the age of 65 on the planet. Their medium forecast is that it will rise to 1.7 billion in the next 30 years and to 2.4 billion

by the turn of the century. The numbers are growing but their share of the population is growing faster, that is, from 10% of the global population today to 22% by 2,100. The UN says that the bulk of the older people in the world today live in the developed world. The European numbers show an increase of the over-65s by 36% in the next 30 years to 202 million. By then, the over-65s will be 29% of the total population, and by 2035, the over-65s market will be bigger than that of the under-25s. In the USA, the over-65s will double by 2035, adding 60 million consumers. The over-65s Chinese market will peak in 2058 at 430 million, up 111% from 2023 (UN Department of Economic and Social Affairs, Population Division, 2024).

The aging of the population is caused by two forces: fertility and life expectancy. First, fertility is falling, reducing the number of young people. It has fallen globally from 5.4 children per female in 1950 to 2.3 today (UN Department of Economic and Social Affairs, Population Division, 2024). Today, 66% of the global population lives in countries where the fertility rate is below the replacement level of 2.1.

Second, life expectancy is increasing; it rose by 8.4 years—from 64.9 years in 1995 to 73.3 years in 2024. The UN forecast is that it will further rise by 4.1 years–77.4 years in the next 30 years (UN Department of Economic and Social Affairs, Population Division, 2024). Over the years, life expectancy improvements have been fueled by different age groups. From 1850 to 1900, 62% of all improvements in life expectancy came from the under-15 age group as there were massive reductions in child mortality. Only three percent of the improvement came from those over 65. In the years 1990–2007, 79% of the improvement came from the over-65s. Medical science has increasingly focused on this group. Indeed, 42% of the total improvement came from the over-80 age group (Christensen *et al.*, 2009). The UN estimates in their latest 2024 forecasts that by 2053 half of all deaths will occur above the age of 80.

In general, the years of added life are *good* years. The UN combines data on death and diseases and computes a "healthy aging span". The results show that as life expectancy goes up, those extra years are predominantly healthy years. The global picture shows that between 1990 and 2016, global life expectancy went up by 7.4 years and 85% of the added years were healthy years. The figures for most countries are similar. For example, life expectancy in the UK went up by over five years and nearly 90% of them were healthy years. Even China, with a large 12.4-year increase in life expectancy, had eight years of that without disability (Chernew *et al.*, 2016).

2.2 Healthy aging – the last growth market

The growth in number of the over-65s is reflected in the expenditure numbers. The over-65s are expected to account for nearly 60% of all consumption growth in Western Europe and generate nearly half of the spending growth in the USA this decade (McKinsey Global Institute, 2016). This is important because they will be the only growth market in many parts of the world—notably, all other age-based segment markets will be in decline (Dattani *et al.*, 2024).

There are two generic strategies for firms to serve this market. The first is to develop and provide services that target the health of the individual and encourage health-promoting behaviors such as a nutritious diet, regular exercise, proper sleep hygiene, and medical care. These services and well-being initiatives support older adults meeting their own basic needs including mobility, building and sustaining relationships, learning, growing, making decisions, and contributing to society (Beard *et al.*, 2016).

The second strategy is the focus of this article. It takes the individual as given and instead focuses on either mitigating aging-related challenges or improving the CX to better fit the changing needs of healthy older adults (c.f., Bateson, 2021). With a focus on CX and the service environment, examples of smart technologies and service adaptations are detailed in this article.

3. Understanding the healthy aging

In this section, we first discuss healthy aging. Next, we provide a non-exhaustive overview of changes in the physical, cognitive, and socio-emotional capacity for the healthy over-65s and their service experiences. Finally, we introduce the healthy aging framework and relate it to services and smart technologies.

3.1 Healthy aging

The WHO (2022) defines aging as the cumulation of a wide variety of molecular and cellular damage. This leads to a gradual decrease in physical and mental capacity. It increases the risk of disease and ultimately leads to death. We age all our lives. For example, the lenses in our eyes grow throughout our lives. They thicken, harden, and yellow. This leads inevitably to changes in the functioning of our eyes. These aging-related changes in functional capacity are neither linear nor consistent. They cumulate to the point where they start to interfere with the ability to live a normal, independent life (WHO, 2022).

Healthy aging is about living a better life and delaying the impairment in functional capacity. It focuses on enabling individuals to lead active, independent, and fulfilling lives by minimizing the effects of age-related health issues, supporting functional capacity (i.e. *physical*, *cognitive*, and *socio-emotional capacities*), and improving the overall quality of life (Ebner *et al.*, 2006).

3.2 Physical capacity

In this section, we discuss how sensory decline in vision, hearing, smell, taste, balance and pain might influence mobility, activity, and aging healthily. For the healthy aging, these changes are gradual and only have a minor impact on their independence and quality of life.

Vision changes through life. A few common changes for older adults include losing the ability to see up close, having trouble distinguishing colors, such as blue from black, and needing more time to adjust to changing levels of light (National Institute on Aging, 2025). All are due to physical changes in the eye, particularly in the lenses and pupils, and are some of the most common effects of aging. In service environments, older adults often encounter challenges with reading small or standard-sized text on menus and instructions, particularly in low-light conditions.

Age-related *hearing* loss often develops gradually, affecting approximately half of individuals in the United States over age 75. Aging alone is not always the cause. Exposure to loud noises earlier in life is often more important (Zhao *et al.*, 2010). Symptoms include muffled speech, difficulty understanding words in noisy environments, and challenges hearing certain consonants, which may lead to increased TV or radio volume, requests for clearer communication, and avoidance of social settings (Ding *et al.*, 2019; Jarma Arroyo *et al.*, 2024; Peelle and Wingfield, 2016). High background noise in servicescapes, such as bars, exacerbates these challenges. For example, a study done in New York found that during happy hours, fewer than 10% of bars maintained noise levels conducive to conversation, even for those with normal hearing (Farber and Wang, 2017). Such environments can impair judgment of drink strength and highlight the need for quiet zones to support the healthy aging.

A person's *sense of smell* may decline gradually over time, especially after the age of 70. While advancing age plays a role in the loss of smell, other factors that are more common with age, such as neurological disorders and medication use, may have a more pronounced effect on olfactory function (Rawal *et al.*, 2016). True age-related olfactory decline appears to be much more gradual and less prevalent among healthy seniors without other risk factors.

The sense of smell is closely related to our *sense of taste*. When we cannot smell, food may taste bland (Schiffman, 1997). We may even lose interest in eating (Sergi *et al.*, 2017). This may happen at any age, and both virus infections and taking medications may result in a—often temporary—loss of smell, taste, and appetite (Risso *et al.*, 2020; Schiffman and Zervakis, 2002). Accordingly, restaurants attracting healthy older adults will get more satisfied guests if

they adapt the food served to older consumers' taste and smell preferences. Many over-65s use flavor enhancers such as salt, spices, and sauces to overcome taste loss. Restaurants can easily provide such enhancers on the tables. This will improve the nutrition of older consumers and encourage socialization.

Imbalance and related incidence of falls increase with age. The balance decline is gradual at first but causes problems later in life as frailty approaches, typically at around 80–85 years. Some 13% of older adults self-reported imbalance from ages 65 to 69, while this proportion increased to 46% in those aged 85 and older (Osoba *et al.*, 2019). The slowness in recovery from a loss of balance increases the risk of falling (Staring *et al.*, 2024). However, healthy aging with good balance is possible. Balance maintenance is an acquired motor skill and improves with fitness throughout life. Maintenance of postural control can be learned. Exercise is essential for maintaining postural stability and balance (Brech *et al.*, 2022). In a service context, much can be done in adjusting the servicescape to respond to the changing capacities of older adults. Slippery or uneven flooring, steep staircases, and the absence of handrails increase the risk of falls. Additionally, clutter significantly contributes to fall incidents, underscoring the importance of maintaining clear floors. Properly arranged furniture is essential for ensuring unobstructed access and movement.

Chronic pain may also limit the activity of individuals at any age. While it is correct that pain on average increases with age, it is also important to remember that pain is often linked to lifestyle throughout a long life. There is huge variation across individuals. Chronic pain experienced in later life is not an inevitable consequence of aging. That said, some painful illnesses, like rheumatoid arthritis become more prevalent with age. It can lead to joint destruction and muscle weakness that can make it difficult to tightly grip an object (e.g. holding a coffee cup) and do fine motor work (e.g. buttoning a shirt) (Petrie, 2023). Service firms need to be aware of this when, for example, choosing cutlery and crockery in a restaurant context. They can still be stylish but should be chosen with sensitivity.

3.3 Cognitive capacity

Cognitive abilities among older consumers vary significantly, with some individuals showing little to no decline well into their frailty years. The general narrative among marketers around aging often focuses on cognitive decline, particularly in memory and decision-making. The reality of the healthy aging over-65s looks quite different. There is a large heterogeneity in abilities within the same age group (Bone, 1991; Loos and Ekström, 2014; Lowsky *et al.*, 2014; Szmigin and Carrigan, 2001; WHO, 2015). A range of factors contribute to this heterogeneity and overall health (Wahlin *et al.*, 2006). These include genetics but are largely determined by diverse lifestyle choices (e.g. nutrition, exercise, and social engagement). Generally, healthy aging is improved by higher levels of education (Habib *et al.*, 2007), intellectual stimulation, and a flexible attitude toward aging (Schaie, 2005). These factors not only seem to delay cognitive decline but also help explain why many older adults today perform better cognitively than those of previous generations.

The relationship between cognitive capacity and consumer decision making is being explored only now. Sound *decision-making* is maintained well into the 80s. For example, research has shown that older consumers can adhere to decision rules, avoid cognitive biases such as framing, and resist the fallacy of sunk costs, and show virtually no decline in these decision-making abilities up to the age of 85 (Del Missier *et al.*, 2020). In fact, in some respects older individuals can outperform their younger counterparts. The accumulated life experiences of older consumers can often compensate for potential age-related decline, sometimes enabling them to make more informed and better decisions than younger consumers (Gluck, 2024).

Memory, a cognitive function commonly associated with decline in old age, is more nuanced in healthy aging. While certain aspects of memory, such as episodic and semantic information generation may decline (Devitt *et al.*, 2017), healthy aging adults typically retain

robust memory performances long-term (Castel, 2005) as well as the ability to learn new information (Musiélak *et al.*, 2006). This retention of memory-related cognitive performance is especially true for information that is personally relevant and emotionally meaningful (Thoma and Wechsler, 2021). Memory of brands seems to last. That is, while some memory functions may weaken, others remain strong and adaptable or become even more meaningful, with memories being linked to the growing wealth of knowledge, experiences, and associations acquired by the healthy aging (Yoon *et al.*, 2009).

One notable group within the healthy aging is the so-called "super agers," a term used to describe the fortunate share of individuals—estimated to be around 10% of the aging population—who show no significant decline in memory even into their late 80s (Sun *et al.*, 2016). These super agers challenge the conventional assumption about the aging population, demonstrating that at least a good share of the healthy aging can and will maintain exceptional cognitive abilities for much longer than they retain their physical abilities.

3.4 Socio-emotional capacity

As individuals age, they face a variety of emotional and social challenges that can impact their overall well-being and quality of life. Key factors that help mitigate these challenges are meaningful relationships, emotion regulation and underlying factors such as an individual's optimism, self-efficacy and a perception of control.

Meaningful relationships are central to a fulfilling life (Waldinger and Schulz, 2023). With age, social networks often narrow due to the loss of life-long partners and friends. Physical challenges may make social interactions more difficult (Charles and Carstensen, 2010). Loneliness is a prevalent issue among older adults and has been recognized as a critical societal concern. This is evidenced by the establishment of the Ministry of Loneliness in the UK (Lara *et al.*, 2019).

Evidence underscores the importance of strong social connections in enhancing the quality of life of older people. For example, a meta-analysis of 19 studies found that low social participation and higher levels of loneliness increased the risk of developing dementia (Lara *et al.*, 2019). Loneliness has also been shown to be a significant risk factor in heart disease (Valtorta *et al.*, 2016). These studies suggest that social interactions not only provide emotional support but also physical well-being. Both physical and digital service environments can be designed to facilitate social interactions and support.

Emotion regulation is a mostly intrinsically motivated factor that influences healthy aging (Gross *et al.*, 2011). This internal process plays a critical role in helping consumers navigate the emotional challenges of aging by building resilience and emotional stability. Emotion regulation operates in both directions: it can be used to down-regulate negative emotions, such as controlling the impulse to vent anger when denied a desired service, and to up-regulate positive emotions, like cultivating happiness over small gains when larger ones were anticipated (Gross, 2015). Socio-emotional selectivity theory argues that emotional regulation improves with age, as older adults become more selective in using their emotional energy (Carstensen *et al.*, 1999).

Finally, socio-emotional well-being can come from different underlying factors. These include *optimism*, *self-efficacy*, and *control*. Optimism provides confidence about the future that might foster several psychological and cognitive mechanisms that support healthy aging, including better self-regulation, day-to-day stress management, goal engagement (from a motivational perspective), and the ability to cope with challenges and adjust goals when deemed necessary (Rasmussen *et al.*, 2013). Self-efficacy is defined as the belief in one's ability to accomplish a task or succeed in specific situations (Ben-Ami *et al.*, 2014; Briley *et al.*, 2017). Self-efficacy, often reinforced by strong social relationships, is linked to healthier behaviors such as increased physical activity and reduced smoking (Berkman and Krishna, 2014). Control is a broader concept that suggests that there is an underlying need to feel in control of a situation. It is perceptual and includes the sense that something is predictable

and/or can be changed. Feeling in control within a service experience has been shown to influence satisfaction (Hui and Bateson, 1991). Optimism, self-efficacy, and control are part of well-being, and service processes and environments can be designed to support these (e.g. Hui and Bateson, 1991).

3.5 Healthy aging framework

In the previous sections, we discussed the three contributing factors to a person's functional age: physical, cognitive, and socio-emotional capacity. These elements are crucial in realizing an individual's goals and values, and thereby allowing healthy aging. What older adults value differs from person to person. However, extant research has identified some commonalities among seniors, including independence and autonomy, positive relationships with others, stimulation and enjoyment, security, and potential for personal growth (e.g. Ward *et al.*, 2012; WHO, 2015).

In this section, we introduce the healthy aging framework (see Figure 1) that captures the interconnectedness of one's functional age, adopted personal healthy aging strategies, and the facilitating or hindering role of the environment and services in achieving healthy aging. We base our framework on the previous work by WHO (2015) and McKinsey Health Institute (Ahlawat *et al.*, 2023) and discuss it before we focus on smart service technologies and opportunities the service sector holds in serving the healthy aging better.

As shown in Figure 1, individuals have an active role in maintaining and promoting their physical and cognitive health, and their socio-emotional well-being. Researchers have identified several personal strategies or lifestyle interventions that have a positive impact on healthy aging (e.g. Abud *et al.*, 2022). For example, frequent physical activity, a healthy and balanced diet, sleep hygiene and prevention and management of health conditions (e.g. early detection of osteoporosis or hearing loss) contribute to *physical capacity* (e.g. mobility and sensory capabilities). Mental stimulation (e.g. engaging in cognitive games) and participation in life-long and wide-learning opportunities contribute to *cognitive capacity* (e.g. memory and decision-making; Schaie, 2005). Furthermore, deepening relationships, taking over meaningful community roles and responsibilities, and mindfulness and spirituality contribute to socio-emotional capacity (e.g. connectedness and relationships, and emotion-regulation; Waldinger and Schulz, 2023).

The external environment and servicescapes also play a critical role in supporting and enhancing the functional capacities of healthy older adults. We identified several areas that hold transformative potential in extending the span of healthy life. First among them is the "*basic needs infrastructure*" (WHO, 2007), which includes the design of age-friendly environments (e.g. accessible and affordable housing, and inclusive public places), mobility (e.g. public transportation), as well as ensuring reliable access to nutritious food and clean water, among others.

Second, we highlight the importance of quality "*healthcare and social security*" systems (WHO, 2015), which are essential in enabling older adults to manage age-related health conditions effectively. The accessibility of healthcare services, particularly for chronic illnesses such as cardiovascular diseases and diabetes, must be ensured regardless of socioeconomic status or geographic location. Additionally, financial security (e.g. stable national economic conditions) and physical safety (e.g. low crime rates) facilitate older individuals in performing daily activities and maintaining independence.

Third, "*communities and society*" at large play a critical role, particularly for enhanced socio-emotional well-being. A sense of belonging, social inclusion, accessibility to community spaces, and opportunities to contribute, and meaningful civic participation help combat loneliness and isolation, fostering emotional resilience (Dewhurst *et al.*, 2022). It is in this area that service firms can be actively involved, too. Many communities are built around the servicescapes created by firms which should reduce barriers to participation (e.g. minimizing noise in community areas).

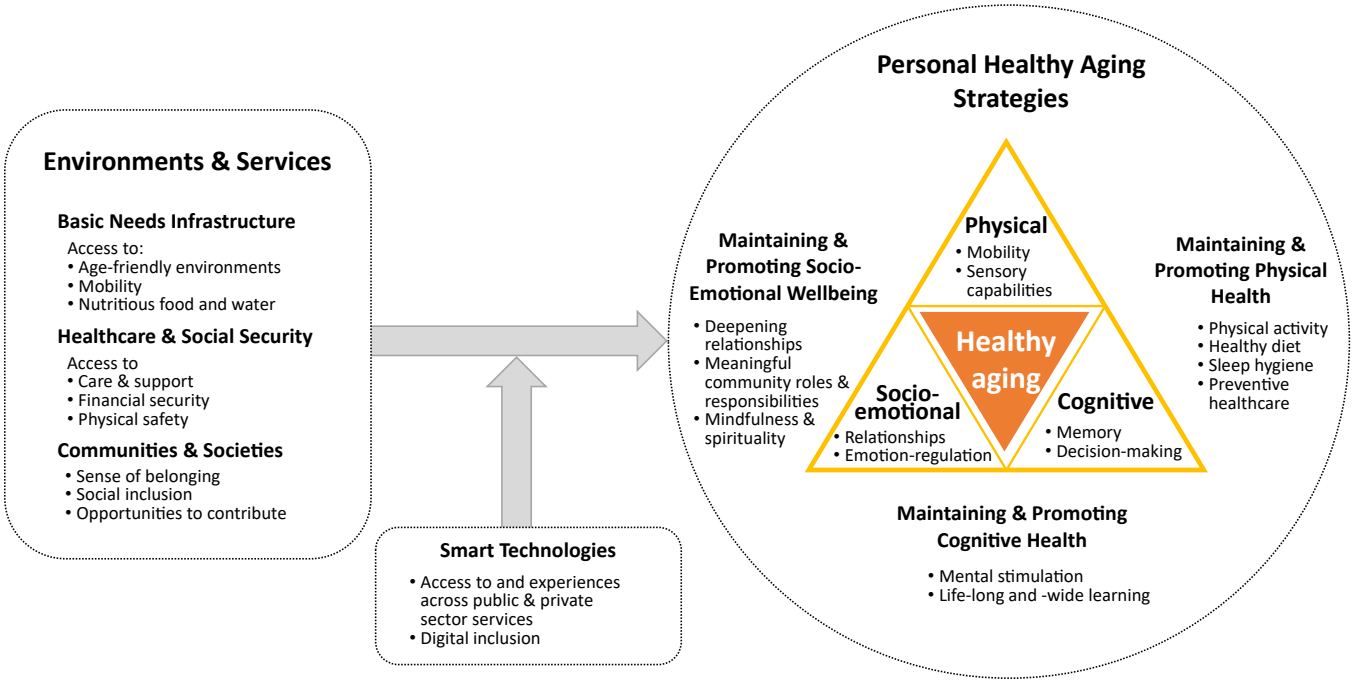

Figure 1. Healthy aging framework. Source: Figure created by the authors

Finally, we see "*smart technologies*" as a moderating factor relevant to and reflected in all the environmental factors and personal healthy aging strategies. Technology can act as a barrier or a facilitator and has a strong impact on the accessibility and inclusiveness of various public and private sector services and can affect the experiences of older adults across these services. When thoughtfully designed, technological innovations hold great potential in promoting autonomy and enhancing the well-being of the aging population by facilitating access to public and private sector services and assuring digital inclusion. Their promise in helping service firms to deliver better CXs to the healthy aging is discussed next.

4. How can smart technologies help firms to service the healthy aging better?

Smart service technologies offer exciting opportunities for innovative solutions and novel designs principles tailored to the healthy aging population to mitigate aging-related challenges (Parra *et al.*, 2014). In this section, we propose how service firms can use smart technologies to enhance the healthy aging's CX in the contexts of hedonic and utilitarian services delivered across physical and digital service environments.

4.1 Enhancing hedonic and utilitarian value

When discussing the value of technology in service, let alone that of technology for healthy aging, it is essential to recognize the two primary value propositions that underpin any type of service offering: hedonic and utilitarian value. Hedonic services prioritize the enjoyment derived from the experience itself, such as a visit to a restaurant, spa or sporting event, where the act of engaging with the service and its service environment is the central appeal (Hightower *et al.*, 2002). For hedonic services, the focus is on enhancing customers' emotional and experiential satisfaction of their service encounters (Zomerdijk and Voss, 2010).

In contrast, utilitarian services focus on delivering a specific outcome (e.g. shipping a parcel or making an online payment). Customers seek to achieve their goal (e.g. the parcel being delivered, or money being transferred) as conveniently as possible, minimizing time, effort, and hassle along the way (Berry *et al.*, 2002). Despite these differences, hedonic and utilitarian service objectives often overlap and complement one another (Alba and Williams, 2013). For example, to enjoy a spa visit (a hedonic core service), a customer may first need to complete the task of making a reservation (an outcome-oriented, utilitarian aspect of the same core spa service). To enhance the CX of services for healthy aging, smart service technologies need to support hedonic, utilitarian, and often a combination of both types of service value propositions.

In hedonic services, the role of technology focuses on making every aspect of a service experience more pleasurable and positive. For example, this is achieved by using technology to connect customers with other customers, adding fun, enjoyable, and rewarding elements to make a rich CX (Ponsignon, 2023), or by facilitating real-time interactions between creators and viewers in live-streaming services (Giertz *et al.*, 2022).

In utilitarian services, the role of technology looks quite different. Instead of focusing on the hedonic aspects of the CX, the focus lies on streamlining service experiences to reduce time and effort and thereby making the firm "easy to do business with." For example, cloud storage providers use technology to enable customers to intelligently and automatically move data from and to their personal smart devices, allowing them access to their photos, files, and documents from anywhere conveniently and seamlessly (Jaakkola and Alexander, 2024). Similarly, immersive virtual viewing technology simplifies the real estate process by allowing future home buyers to view and shortlist offers remotely, taking out the hassle of scheduling in-person meetings to get moving (Chen and Yao, 2022).

As illustrated in Figure 2, the effects of aging can impact service outcomes by diminishing the enjoyment of hedonic aspects (e.g. hearing loss reduces the pleasure of a social dining experience) and the convenience of utilitarian aspects of services (e.g. vision deterioration impairs the ability to read small print). Together, these mean that the level of enjoyment and

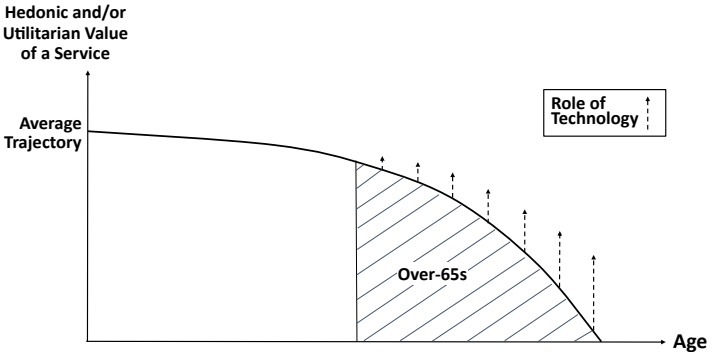

Figure 2. Role of smart technologies. Source: Figure created by the authors

convenience declines, and the hassle factor increases as customers age. This is shown by the solid line in Figure 2. As further illustrated by the dotted upward arrows of increasing lengths, we propose that the role of technology in effectively delivering services to the aging population will be twofold: (1) enhancing enjoyment and/or (2) improving convenience; and will be of increasing importance as customers age.

4.2 Improving the CX in physical and digital servicescapes

In addition to enhancing hedonic and utilitarian value, a key distinction in how smart technologies can support healthy over-65s is the spatial dimension of services and their environments. The literature categorizes services into physical services (e.g. carrying baggage to a hotel's guest by means of a physical service robot) and digital services (e.g. making a banking transaction with the help of a virtual AI concierge on an app; Liu *et al.*, 2024). More recently the term "phygital" has been introduced to describe services that fall in-between these categories (Mele and Russo-Spena, 2025). The distinction between physical and digital services captures implications for the design, implementation, and use of smart service technologies in these different service environments. Given these differences, we examine the potential role of smart service technologies in supporting healthy aging across both physical and digital services, while contrasting how these technologies enhance hedonic and utilitarian value of services in the following sections. See Table 1 for an overview of the potential roles technologies can play.

4.3 Improving the physical, cognitive, and social-emotional CX

The service literature identifies four central dimensions of CXs (Huang *et al.*, 2021): sensory, cognitive, affective, and conative experiences. These can be aligned with the three dimensions of our healthy aging framework in that sensory experiences relate mostly to *physical abilities*, cognitive and conative experiences relate to various *cognitive perceptions* of service value and quality, and affective experiences relate to *socio-emotional responses.*

4.3.1 Physical CX. The physical dimension of CX has received much attention in the literature because aging is often associated with declining physical abilities and senses. Servicescape technologies aim to mitigate service failures resulting from these limitations. However, in the context of healthy aging, the focus shifts from merely compensating for deficits to preventing them as well. Technologies in this domain assist older adults in maintaining their physical experiences by minimizing physical strain and preventing fatigue, while also offering adaptable interactions.

Service robots, for example, are versatile in that they help aging customers navigate through retail stores at their own pace and convenience (Belanche *et al.*, 2021), or seat them,

Table 1. Technology-enhanced CX for the healthy aging

Technology as value enhancer	Hedonic value	Utilitarian value
Services and their service environments	*Objectives*: Enhance enjoyment, increase fun, and happiness	*Objectives*: Improve convenience, reduce time, effort, and hassle
• Physical	*Common roles:* Enhancing, facilitating, socializing, and engaging *Primary focus:* Enhancing socio-emotional well-being *Examples:* • Sensory aids (e.g. personalized audio settings and noise-cancelling environments at a restaurant) • Social interaction technologies (e.g. social companion robots)	*Common roles:* Guiding, assisting, enabling, and monitoring *Primary focus:* Supporting physical capacity *Examples:* • Assistive devices (e.g. service robots for wayfinding, audio guides, hearing aids, and smart carts carrying shopping items) • Mobility aids (e.g. intelligent automation of slowing down escalators)
• Digital	*Common roles:* Personalizing, optimizing, socializing and entertaining *Primary focus:* Enhancing socio-emotional well-being *Examples:* • Personalized experiences (e.g. adaptive algorithmic online content curation) • Social connectivity tools (e.g. video chats, screen-sharing, and synchronized viewing sessions for groups)	*Common roles:* Fail-safing, de-risking, integrating and educating *Primary focus:* Promoting cognitive capacity *Examples:* • Accessibility features (e.g. customizable font size and contrast settings, easy language and suitable default settings) • AI concierge systems (e.g. daily-life organizers, automated re-stocking, reminders, search, and support agents)

Source(s): Table created by the authors

take orders, and even serve meals at restaurants (Pitardi *et al.*, 2024). Similarly, intelligent automation can be used to sense the presence of slow-walking older customers and reduce the speed of escalators to prevent the risk of injury (Xing *et al.*, 2020). In outdoor spaces, augmented reality technology taps into the potential of improving CX by allowing customers to experience physical and even unfamiliar spaces in age-friendly and safe ways (Rauschnabel, 2021). Yet other examples can be found in the fashion, luxury, and hospitality industries, where smart technology is used to enhance physical CX, such as trying on clothes through augmented reality technology (Holmqvist *et al.*, 2020).

There are smart sensory aids that provide lighting (e.g. at tables), restaurant menus with adjustable font-size and contrasts (Cohen *et al.*, 2023), and noise cancellation technology that helps make an out-of-home service environment (e.g. a restaurant) more enjoyable for healthy older adults with reduced sight or hearing. Voice assistants can eliminate difficulties with reading small fonts or operating fiddly buttons, answer questions, and turn on the music and TV in hotel rooms and thereby providing relief for older adults with declining motor and sensory skills (Schlomann *et al.*, 2021). These smart technologies, through functions such as fail-safing, de-risking, assisting, enabling, training and monitoring, primarily support the healthy aging CX by fulfilling their basic needs–one of the valued functional abilities highlighted in Figure 1.

4.3.2 Cognitive CX. Cognitive experiences have received growing attention in recent years, though less so in relation to aging populations. As individuals age, concerns about declining cognitive functions often lead to the development of technologies designed to

assist comprehension and decision-making. In the context of healthy aging, however, the focus shifts from compensating for cognitive decline toward educating, supporting, and empowering individuals to maintain their independence and autonomy. Smart technologies, for example, offer personalized solutions that guide, educate, and assist older adults in managing daily tasks and making informed decisions. For instance, a smart home can tailor services for users and provide healthy older adults with a more comfortable and secure independent life (Abou Allaban *et al.*, 2020) and enable them to live longer at home (Tipaldi and Natter, 2022).

Emerging technologies and services are designed to actively support, motivate, and safeguard older adults. Helping them maintain healthy habits—such as choosing stairs over elevators, staying active outdoors, and moving more frequently—and avoid risky behaviors, like prolonged sitting, dehydration, and insufficient sleep. For example, AI built into wearable devices helps customers track progress, receive location-aware information, and provide assistive functions that can help them achieve their desired outcomes (Nahavandi *et al.*, 2022) and increase their physical activity (Farivar *et al.*, 2020). Likewise, digital food photography technology, powered by AI systems, helps users keep track of dietary intake, and make more informed and healthier food choices (McClung *et al.*, 2017). AI-based personalized nutrition services can tailor dietary advice (Li *et al.*, 2024). When combined with healthcare services, digital twin models of customers enable service providers to deliver more accurate and effective responses to their needs (Liu *et al.*, 2019). Such cloud-based, health-oriented services can be used to monitor, diagnose, and predict the health of individuals using wearable smart devices (e.g. smart watches).

Interactive platforms, educational apps, and personalized services can help users navigate complex information and enhance their literacy in areas like healthy living, financial planning, and overall self-management. These technologies not only ensure that aging customers remain independent but also enhance the utility of engaging with service firms. Other examples of technologies focus on improving accessibility and ensuring seamless functionality by minimizing risks and incorporating fail-safes for reliability (e.g. using software to adapt the digital interfaces and tools to age-related limitations, such as blocking unnecessary content from websites and showing less cluttered app interfaces for better usability). These smart technologies improve the cognitive CX through functions such as guiding, assisting, educating, motivating, personalizing, liberating, and protecting, which help older adults' abilities to learn, grow, and make informed decisions, while also empowering them to contribute to their communities and society.

4.3.3 Socio-emotional CX. Affective experiences have only recently received attention in relation to the interplay of technology and healthy aging. Traditional technology acceptance models have primarily emphasized functional aspects, such as the usefulness and effortlessness of technologies, to explain the adoption and continued use of technology-driven services. However, in the context of healthy aging and with the growing emphasis on human-centered design, there is a notable shift in researching the affective responses to modern technology, such as service robots, avatars, and other AI systems (e.g. chatbots). Rather than focusing solely on utility, technology now aims to evoke positive emotions, foster joy, and cultivate a sense of belonging (e.g. Čaić *et al.*, 2018; Liu *et al.*, 2024).

Smart technology serves various purposes related to personalizing and socializing CX. For example, movie, music and book libraries are available on digital platforms (e.g. Netflix, Spotify, and Kindle) that allow personalized settings for movie subtitles (e.g. speed and font size), and audio settings for music (e.g. using "sound adaptation" to boost the necessary frequencies; Trabucchi *et al.*, 2017). GenAI systems increasingly serve socio-emotional purposes, such as facilitating the exploration of enjoyable content (e.g. games, history, and storytelling), creation of contemporary media content (e.g. music, image and video creation), and even emulation of companionship (e.g. conversing about personal experiences, books, and topics of interest). Another example of technological facilitation of the social CX dimension are automated compilations of customers' personal memories which, with the help of spatial

computing devices, can be vividly re-experienced for customers' reminiscence and enjoyment.

More tangibly, voice assistants improve communications, thereby assisting health care services, monitoring, and medication management, but also contribute to enjoyable leisure time (Schlomann *et al.*, 2021). Robots and AI are also capable of invoking affective experiences (e.g. perceived social belonging), which help enhance the hedonic value of services and socio-emotional CX (Huang *et al.*, 2021).

These technologies enhance the socio-emotional CX through functions such as personalizing, socializing, fostering a sense of belonging, integrating, and providing entertainment. They are building and maintaining meaningful social relationships, while also enhancing older adults' feeling of contribution within their communities. However, while AI technology can potentially ease the feeling of loneliness by simulating interaction, it cannot replicate the depth or authenticity of human relationships (Wirtz and Stock-Homburg, 2025). Overused and as a substitute for real human contact, there is a risk of further isolation and an increased feeling of loneliness.

Table 2 summarizes our discussion on the role smart technologies can play in enhancing the physical, cognitive, and social-emotional CX dimensions.

5. Theoretical implications

After explaining the growth of the over-65 population and why healthy aging is important for service firms, we introduce healthy aging and connect it with smart service technologies and propose how they can help firms serve healthy older adults better. Thereby, we theoretically contribute to service research by (1) bringing in a new perspective on aging, and (2) connecting healthy aging with smart service technologies.

5.1 Bringing a new perspective on aging into service research

In this paper, we advance that healthy aging adults represent the only growth market in developed countries and are a critical segment that has often been overlooked. By highlighting the significant diversity in physical, cognitive, and social-emotional capacity among older consumers, we offer a new perspective on aging within service research. We present a healthy aging perspective that acknowledges the heterogeneity in aging experiences and adopts a more holistic view, encompassing physical, cognitive, and socio-emotional well-being. Additionally, we propose a conceptual framework for healthy aging with its key aspects, including smart technologies that can either facilitate or hinder healthy aging (see Figure 1).

Finally, in the contemporary service literature, the aging market is predominantly defined by chronological age (e.g. Pantano *et al.*, 2022; Tipaldi and Natter, 2022). Individuals aged 65 and above are frequently categorized as "old". This makes sampling easy but does not always make sense as there is high heterogeneity among older adults in terms of their physical, cognitive, and socio-emotional capacity (Lowski *et al.*, 2014; WHO, 2015). In fact, one of the few studies in service research that explores alternative conceptualizations of age suggests that chronological age (actual years lived) is consistently inferior compared to cognitive age and how individuals feel and behave (Kuppelwieser and Klaus, 2021).

That is, while chronological age may serve as a useful control variable, it offers limited explanatory power in understanding preferences and behaviors. As the over-65s are highly heterogeneous (Kotschy *et al.*, 2024), there are strong arguments for moving away from solely using chronological age when we aim to predict older consumers' preferences and behaviors in service settings. Therefore, we advocate a shift from viewing age chronologically to assessing it functionally (also referred to as "biological age"), while dismantling outdated stereotypes about aging. Contrary to the conventional image of older individuals as warm and friendly yet frail and cognitively impaired (Cuddy *et al.*, 2005), we emphasize the diversity of aging (e.g. Bateson, 2024; Bone, 1991; Loos and Ekström, 2014; Kotschy *et al.*, 2024; Szmigin and

Table 2. Potential roles of technology in improving the CX of the healthy aging

CX dimensions	CX inputs and determinants	Role of technology	Examples of technology-enhanced CX
Physical experience	• Language • Physical appearance • Kinesics	• Fail-safing • De-risking	• Intelligent automation and environmental sensors that reduce the speed of escalators to prevent the risk of injury • Prevent physical exhaustion through exoskeletons, service robots and other smart devices
	• Vision • Hearing	• Assisting • Enabling	• Restaurant menus with adjustable font-sizes and contrasts • Screen readers and audio guides help communicate content in easy and clear language • Larger and brighter screens on credit card machines • Apps with appropriate color contrasts to enhance readability • Augmented reality (AR) glasses enhancing visual clarity (e.g. magnifying objects in a person's environment)
		• Training	• Fitness trackers and smart sports equipment help train muscles
		• Monitoring	• Physical health and fitness trackers (e.g. smart watches and other wearables) • Emergency response systems (e.g. satellite SOS signals)
Cognitive experience	• Utility • Autonomy • Interactivity • Courtesy	• Guiding • Assisting • Assuring	• Smart shopping lists provide cues of information for time-lagged purchase decisions (e.g. at a store) • Smart devices track inventory and alert about or automate re-stocking purchases • Smart home technology intelligently automates repetitive tasks around the home (e.g. setting thermostats when away, or at day and night when at home) • Real-time feedback systems for communication and confirmation from service personnel
	• Literacy	• Educating • Motivating	• AI concierge systems help improve user awareness and proficiency (e.g. healthy eating and financial decisions) • Chatbots educate on topics such as health, finances, diets, workouts and navigation)
		• Personalizing	• Tailoring experiences to consumers' changing needs (e.g. playback speed for videos and subtitles)
	• Approach/ resistance	• Liberating • Protecting	• Fall or crash detection technology gives a sense of security and maintains autonomy in life • Content blockers for removing distracting web contents

(*continued*)

Table 2. Continued

CX dimensions	CX inputs and determinants	Role of technology	Examples of technology-enhanced CX
Socio-emotional experience	• Enjoyment • Novelty • Empathy • Trust	• Personalizing • Socializing • Belonging • Integrating	• Companion robots (e.g. Paro) provide comfort and companionship through a personalized approach (e.g. remembering names, and adapting responses for emotionally supportive experience) • Hyperlocal social networking service (e.g. for neighborhood communities)
		• Entertaining	• Immersive (viewing) technologies allow users to have novel experiences from the comfort of their homes

Source(s): Table created by the authors

Carrigan, 2001), considering its positive, neutral, and negative aspects. Aging can bring wealth, wisdom and emotional stability, while also, eventually leading to sensory and cognitive decline. It is important for service research on older consumers to consider the heterogeneity of the over-65s.

5.2 Connecting healthy aging with smart service technologies

We contribute to service research by highlighting how technology can promote healthy aging and unlock new market opportunities. Smart technologies enable innovative solutions tailored to healthy older adults and address their unique challenges in service contexts. Specifically, we explore how smart technologies can assist individuals experiencing physical, cognitive, and social-emotional changes associated with aging in hedonic and utilitarian services (Berry *et al.*, 2002; Hightower *et al.*, 2002), and physical and digital service environments (Liu *et al.*, 2024).

Building on this foundation, we propose ways for service firms to leverage smart technologies in addressing the varying needs of healthy older adults. We introduce a framework of technology-enhanced CX for the healthy aging (see Table 1). This extends prior service literature, which has predominantly focused on the role of technology in improving utilitarian service convenience such as in-store technologies in retailing (Pantano *et al.*, 2022) and service robots in elderly care (Čaić *et al.*, 2018). Hedonic experiences and the enhancement of socio-emotional well-being, by contrast, have been less explored. Our contribution lies in offering examples of how technology can enrich these experiences by enhancing both enjoyment and convenience, ultimately improving their overall CX.

Additionally, by emphasizing the heterogeneity in aging, our approach caters to the increasingly diverse needs of these customers. Studies using multiple measures of frailty have shown just how heterogeneous healthy aging can be. Frailty does rise with age. However, the top 10% of ninety-year-olds have the same frailty index as the median 50-year-old (Kotsky *et al.*, 2024). For example, some individuals over 65 have hearing difficulties, others have vision impairments, and still others may have neither, or both. The answer to servicing such heterogeneous customers is adaptive personalization. Smart technologies can help personalize services to each customer's specific needs.

Technology enhances customer experiences by addressing physical, cognitive, and social-emotional dimensions of aging. Emerging service technologies, designed to support, motivate, and protect older adults, can encourage healthy habits. Smart technologies equipped with sensors and digital interfaces can improve service experiences by simplifying tasks such as reading small fonts, controlling lights, and music in restaurants and apps. Interactive platforms, educational apps, and service robots help users access and navigate complex

information with ease. The examples discussed throughout this article demonstrate how technology can empower healthy aging customers to remain independent and engaged with service offerings.

Furthermore, we discuss how technology can assist healthy older adults by increasing enjoyment and reducing fatigue, contributing to the service literature by shifting the focus from compensating for cognitive decline to empowering individuals to maintain autonomy and independence. Traditional technology acceptance models have largely emphasized functionality and to a lesser extent the affective responses to technology (Wirtz *et al.*, 2018). Beyond utility, we emphasize how technology can evoke positive emotions, foster joy, and create a sense of belonging. Through personalization, socialization, entertainment, and a sense of contribution, these technologies help older adults build and maintain meaningful social relationships within their communities.

6. Managerial implications

6.1 The healthy aging as an attractive market

As the global population continues to age, the only growth market lies within the demographic of the over-65s. Within this demographic, there is a significant emerging market comprised of healthy aging individuals, who can live independently and make independent consumption choices. Their minds and bodies are aging but with the correct adaptations to service processes and servicescapes they can shop and consume as they have always done.

Because of healthy aging, they are able to consume later in life and they increasingly have the financial means to do so. In fact, many consumers over the age of 65 are closer to their desired financial and social states than at earlier points in life (Freund, 2024). Furthermore, many healthy older adults are choosing to work beyond the traditional retirement age. Collectively, these factors contribute to the formation of an appealing market segment with substantial purchasing power.

Furthermore, individuals want to age "in place", in a predictable environment, and in their home that they know, and in a community that is supportive, where facilities are accessible, and the people on the street are familiar (Pani-Harreman *et al.*, 2021). Services and associated servicescapes play a crucial role in creating such an environment. We live in a world curated by service firms. By adapting these services, firms can not only enhance customers' satisfaction but also improve their well-being. Well-being has been linked to both overall health and longevity (Rahman *et al.*, 2024). That is, by enhancing enjoyment and convenience, services enabled by smart technologies offer significant market potential and create opportunities to serve long-living, health-conscious customers with diverse needs.

6.2 Using technology to future-proof services

Service firms are under pressure to adopt smart technologies, and the needs of the healthy aging represent an additional demand. The challenge here becomes to utilize existing technologies in new ways and design multi-purpose, multi-use service technologies that serve the diverse needs of all customers, aging customers included. Credit card machines with bigger, brighter screens are appreciated by everybody but especially the over-65s. Larger font faces on menus and more lighting on them benefit anyone, of any age, with a sight problem. Making services "easier to use" has special benefits for healthy aging. However, all groups may appreciate the new processes and systems, and technology allows cost-effective personalization (Wirtz *et al.*, 2023a).

Firms are already adapting. Apple recently got Food and Drug Administration (FDA) approval for the Earpod Pros (Apple, 2024). They can now be utilized to administer remote hearing tests and function as hearing aids, with the app amplifying the necessary frequencies to restore hearing to that of a typical 25-year-old.

Furthermore, older people are already "hacking" different services to build what they need. They are using Deliveroo instead of charity meal services. Alarm systems are being adapted to

monitor falls. Mobile phones are used as flashlights and magnifying glasses. Service firms can learn from their healthy older customers on how to better adapt their processes, technologies, and service environments to serve this segment better.

6.3 The threat of ageism

Ageism is a natural cognitive phenomenon. The human brain abstracts to cope with the vast amount of information it processes. It creates scripts to capture the complexity of experiences. It creates stereotypes to help to process the diversity of people. These stereotypes can assist in recognizing and processing information, but they can also be emotionally loaded and lead to prejudiced attitudes. This is the heart of racism, sexism, sectarianism, and all the other ".isms".

Ageism can hurt service firms in two ways. First, it presents a substantial risk to a firm's reputation and can lead to legal issues. Second, it acts as a barrier to understanding and effectively serving older consumers. While "chronological age is one of the most common methods" for segmentation (Bone, 1991, p. 20), it "has been shown to be a poor discriminator of older consumers" (Szmigin and Carrigan, 2001, p. 24) as alone, it provides limited insights into an individual's needs and motivations (Loos and Ekström, 2014). To act upon ageism is to create awareness of such discrimination and build values of inclusion and diversity deep into a service firm's culture (Van Dalen *et al.*, 2010).

Segmentation is essential for firms to effectively tailor marketing and services to the unique needs, preferences and behaviors of each segment. Treating all individuals above 65 years of age as one single segment is not wise. We need to consider heterogeneity. While sensory decline is a reality of aging, the timing and extent vary significantly across individuals. The aging market is vast, diverse and rapidly expanding, making it imperative for service firms to rethink how they serve and do research on this crucial group.

7. Laying out the future research agenda

Table 3 summarizes promising areas for further research, which are discussed in the following sections.

7.1 Understanding the changing demands of healthy aging consumers

The recognition of healthy aging consumers as a viable market opportunity will shift the focus of service firms' market research efforts to understanding their evolving needs and demands. To validate the theoretical propositions in this paper and gain a deeper understanding of aging consumers, research is needed to investigate functional age and its diversity, and all the possible changes in senses, bodies, and minds. It ensures that service firms become aware of the opportunities and risks of value creation and value destruction when serving aging consumers (Čaić *et al.*, 2018).

In connection with this, research will be needed to determine the effectiveness of existing metrics and marketing analytics in measuring the success of services provided to aging customers. A simple example would be that response times are increasing with customer age. Hence, bigger intervals between intentions and actions can be expected but do not indicate poor conversion metrics. Likewise, service support interactions with aging customers may take longer due to issues in their sensory decline (e.g. hearing), which could lead to support staff receiving worse scores in terms of time taken to serve customers, yet, they are no indication of the perceived quality of the interaction.

7.2 Managing and designing services

We anticipate that in the coming years and decades, there will be a shift towards the healthy-aging consumer market. To be successful, service firms will need to commit resources and implement innovation strategies that allow them to design offerings tailored for the healthy

Table 3. Directions for future research

Research topics	Grand challenges	Sample research questions
Understanding the changing demands of healthy aging consumers		
• Market research	Understand the changing needs and demands of healthy aging consumers	• How can we understand and research functional age and its diversity? • What are the implications of changing consumer demands for service firms?
• Metrics and marketing analytics	Measuring the success of services provided to aging healthy customers	• What existing metrics are valid and reliable in capturing aspects of service performance for healthy aging customers? • How do metrics need to be adapted to capture the unique differences of this emerging segment?
Managing and designing services		
• Service design	Design principles for services targeted at healthy aging customers	• What are human-aging-centric design principles for smart technologies for the healthy aging? • How does the ideal servicescape design for the healthy aging look like?
• Transition and empowerment	Transformation of tasks, processes and roles in firms' workforces	• How do we motivate and enable frontline service employees to become effective teachers of technologies to healthy older adults?
Communication and adoption of services		
• Communication and technology adoption	Debunk age-related stereotypes	• How should companies communicate choices related to age-inclusive technologies given that neither younger nor healthy older consumers want to be targeted as "old" or "elderly"? • How can technologies for aging consumers be communicated without triggering negative stereotypes? • How visible should age-inclusiveness be made when marketing new age-optimized technologies?
• Technology implementation and adoption	Technology adoption drivers and barriers	• How are smart technologies for the healthy aging perceived by aging consumers? • What are the drivers and barriers to technology adoption for aging consumers? How do these factors differ for consumers of varying ages?
Inclusion, equality and ethics		
• Diversity and inclusion	Reduce inequalities and address the heterogeneity of aging consumers	• How can smart technologies help address the problem of heterogeneity in aging? • How do we harness the knowledge and wisdom of older adults (e.g. through peer-to-peer services and volunteering)?

(*continued*)

Table 3. Continued

Research topics	Grand challenges	Sample research questions
• Corporate social and digital responsibility	Private, fair and ethical promotion of aging consumers' health and well-being	• How can services and technologies facilitate the healthy aging's health and well-being? • What guidelines and policies are needed to ensure the fair and responsible marketing to and serving of the healthy aging?

Source(s): Table created by the authors

aging. This necessitates a focus on long-term customer relationships (Huang and Rust, 2017), but also a reassessment of design principles to accommodate the needs of aging customers. Whereas a plethora of research has established knowledge on these factors for the general population, new studies are needed to understand the human-aging-centered design principles, fostering inclusivity (e.g. barrier-free servicescapes), personalization (e.g. customizable features), simplicity (e.g. intuitive interfaces), safety (e.g. security features) and independence (e.g. empowerment in informed decision-making). Importantly, as the transition towards aging-friendly servicescapes will be dominated by the integration of flexible, scalable and smart service technologies, future research is needed to understand and mitigate potential challenges related to serving aging consumers across an increasingly diverse range of service experiences, involving caring and feeling (Huang and Rust, 2024).

7.3 Communication and adoption of services

Navigating the transition towards age-optimized services and technologies requires effectively communicating their benefits to customers. In this regard, a critical concern is how to achieve this without reinforcing negative stereotypes. Technologies may undergo simple refitting to meet the aging consumers' needs, yet framing adaptations appropriately remains a challenge as people generally do not like to be viewed as "old" and requiring "age-appropriate" solutions. Most of us like to feel young and age denial seems "stronger than ever with a deep-seated need to be increasingly youthful" (Szmigin and Carrigan, 2001, p. 23). Further research is needed to address the balance between marketing communication that generalizes product features and those that highlight specific benefits for aging consumers. This challenge intersects with the extensively studied area of consumer technology adoption in services (e.g. Flavián *et al.*, 2022; Frank *et al.*, 2023). However, the existing AI adoption literature overlooks the unique value of technology for the healthy aging. Future studies will be valuable in investigating the drivers and barriers to technology adoption among healthy aging older adults, and how these factors may differ across age groups.

7.4 Inclusion, equality, and ethics

Another promising avenue for future research lies in embracing the diversity of the growing segment of healthy aging consumers. First, inclusive research that actively involves these individuals can tap into their valuable knowledge and wisdom. Second, such research is essential for reducing inequalities (Jacobsen *et al.*, 2025) and addressing the inherent heterogeneity of aging consumers, ensuring future service designs meet their diverse needs.

Finally, the large-scale application of smart service technologies for aging customers can carry serious ethical, fairness and privacy risks (Wirtz *et al.*, 2023b). This is why researchers work towards frameworks that help ensure the responsible integration of these technologies into service sectors that align the firms' profit-orientation with the UN Sustainable Development Goals (e.g. Alkire *et al.*, 2024). Further research will be needed to validate

existing and future frameworks and support regulation to ensure the ethical, fair and responsible serving of aging consumers.

7.5 Beyond the scope of healthy aging consumers

Beyond the scope of the addressed conceptualization of healthy aging consumers lies a backdrop of research avenues related to those consumers who eventually need assistance to live at home or have already moved into assisted-care facilities. Understanding the impact of services tailored to healthy aging consumers will likely create a vast potential for these other living conditions, for which future studies are needed. For example, research investigating the synergies of AI concierges (Liu *et al.*, 2024), digital health and fitness services (Patrício *et al.*, 2020), service robots (Čaić *et al.*, 2018), and intelligent home automation systems and services for helping aging individuals to manage their health proactively and remain living at home longer will become of increasing value to the aging service research community.

References

Abou Allaban, A., Wang, M. and Padır, T. (2020), "A systematic review of robotics research in support of in-home care for older adults", *Information*, Vol. 11 No. 2, p. 75, doi: 10.3390/info11020075.

Abud, T., Kounidas, G., Martin, K.R., Werth, M., Cooper, K. and Myint, P.K. (2022), "Determinants of healthy ageing: a systematic review of contemporary literature", *Aging Clinical and Experimental Research*, Vol. 34 No. 6, pp. 1215-1223, doi: 10.1007/s40520-021-02049-w.

Ahlawat, H., Darcovich, A., Dewhurst, M., Feehan, E., Hediger, V. and Maud, M. (2023), "Age is just a number: how older adults view healthy aging", *McKinsey Health Institute*, available at: https://www.mckinsey.com/mhi/our-insights/age-is-just-a-number-how-older-adults-view-healthy-aging (accessed 14 February 2025).

Alba, J.W. and Williams, E.F. (2013), "Pleasure principles: a review of research on hedonic consumption", *Journal of Consumer Psychology*, Vol. 23 No. 1, pp. 2-18, doi: 10.1016/j.jcps.2012.07.003.

Alkire, L., Bilgihan, A., Bui, M., Buoye, A.J., Dogan, S. and Kim, S. (2024), "Raise: leveraging responsible AI for service excellence", *Journal of Service Management*, Vol. 35 No. 4, pp. 490-511, doi: 10.1108/JOSM-11-2023-0448.

Apple (2024), "AirPods pro 2 - hearing health", *Apple*, available at: https://www.apple.com/airpods-pro/hearing-health/ (accessed 15 February 2025).

Bateson, J. (2021), "Researcher or respondent: a personal commentary on ageing and the Servicescape", *Journal of Services Marketing*, Vol. 35 No. 1, pp. 7-13, doi: 10.1108/jsm-07-2020-0266.

Bateson, J. (2024), "How much do we really know about old service consumers?", *18th International Research Conference in Service Management*, Porquerolles Island.

Beard, J.R., Officer, A., De Carvalho, I.A., Sadana, R., Pot, A.M., Michel, J.-P., Lloyd-Sherlock, P., Epping-Jordan, J.E., Peeters, G.M.E.E.G. Mahanani, W.R., Thiyagarajan, J.A. and Chatterji, S. (2016), "The World report on ageing and health: a policy framework for healthy ageing", *The Lancet*, Vol. 387, 10033, pp. 2145-2154, doi: 10.1016/S0140-6736(15)00516-4.

Belanche, D., Casaló, L.V., Schepers, J. and Flavián, C. (2021), "Examining the effects of robots' physical appearance, warmth, and competence in frontline services: the humanness-value-loyalty model", *Psychology and Marketing*, Vol. 38 No. 12, pp. 2357-2376, doi: 10.1002/mar.21532.

Ben-Ami, M., Hornik, J., Eden, D. and Kaplan, O. (2014), "Boosting consumers' self-efficacy by repositioning the self", *European Journal of Marketing*, Vol. 48 Nos 11/12, pp. 1914-1938, doi: 10.1108/EJM-09-2010-0502.

Berkman, L.F. and Krishna, A. (2014), "Social network epidemiology", in Berkman, L.F., Kawachi, I. and Glymour, M.M. (Eds), *Social Epidemiology*, Oxford University Press, pp. 234-289, doi: 10.1093/med/9780195377903.003.0007.

Berry, L.L., Seiders, K. and Grewal, D. (2002), "Understanding service convenience", *Journal of Marketing*, Vol. 66 No. 3, pp. 1-17, doi: 10.1509/jmkg.66.3.1.18505.

Bone, P.F. (1991), "Identifying mature segments", *Journal of Consumer Marketing*, Vol. 8 No. 4, pp. 19-32, doi: 10.1108/07363769110035126.

Bornet, P., Barkin, I. and Wirtz, J. (2021), *Welcome to the World of Hyperautomation: Learn How to Harness Artificial Intelligence to Boost Business & Make Our World More Human*, World Scientific, doi: 10.1142/12239.

Bornet, P., Wirtz, J., Davenport, T.H., De Cremer, D., Evergreen, B., Fersht, P., Gohel, R. and Khiyara, S. (2025), "Agentic artificial intelligence: harnessing AI agents to reinvent business, work, and life", ISBN-13

Brech, G.C., Bobbio, T.G., Cabral, K.D.N., Coutinho, P.M., Castro, L.R.D., Mochizuki, L., Soares-Junior, J.M., Baracat, E.C., Leme, L.E.G. Greve, J.M.D. and Alonso, A.C. (2022), "Changes in postural balance associated with a woman's aging process", *Clinics*, Vol. 77, 100041, doi: 10.1016/j.clinsp.2022.100041.

Briley, D.A., Rudd, M. and Aaker, J. (2017), "Cultivating optimism: how to frame your future during a health challenge", *Journal of Consumer Research*, Vol. 44 No. 4, pp. 895-915, doi: 10.1093/jcr/ucx075.

Čaić, M., Odekerken-Schröder, G. and Mahr, D. (2018), "Service robots: value co-creation and co-destruction in elderly care networks", *Journal of Service Management*, Vol. 29 No. 2, pp. 178-205, doi: 10.1108/JOSM-07-2017-0179.

Carstensen, L.L., Isaacowitz, D.M. and Charles, S.T. (1999), "Taking time seriously: a theory of socioemotional selectivity", *American Psychologist*, Vol. 54 No. 3, pp. 165-181, doi: 10.1037//0003-066x.54.3.165.

Castel, A.D. (2005), "Memory for grocery prices in younger and older adults: the role of schematic support", *Psychology and Aging*, Vol. 20 No. 4, pp. 718-721, doi: 10.1037/0882-7974.20.4.718.

Charles, S. and Carstensen, L.L. (2010), "Social and emotional aging", *Annual Review of Psychology*, Vol. 61 No. 1, pp. 383-409, doi: 10.1146/annurev.psych.093008.100448.

Chen, C. and Yao, M.Z. (2022), "Strategic use of immersive media and narrative message in virtual marketing: understanding the roles of telepresence and transportation", *Psychology and Marketing*, Vol. 39 No. 3, pp. 524-542, doi: 10.1002/mar.21630.

Chernew, M., Cutler, D., Ghosh, K. and Landrum, M.B. (2016), "Understanding the improvement in disability free life expectancy in the U.S. elderly population", Working Paper No. w22306, National Bureau of Economic Research, Cambridge, MA, doi: 10.3386/w22306.

Christensen, K., Doblhammer, G., Rau, R. and Vaupel, J.W. (2009), "Ageing populations: the challenges ahead", *The Lancet*, Vol. 374 No. 9696, pp. 1196-1208, doi: 10.1016/S0140-6736(09)61460-4.

Cohen, A.H., Fresneda, J.E. and Anderson, R.E. (2023), "How inaccessible retail websites affect blind and low vision consumers: their perceptions and responses", *Journal of Service Theory and Practice*, Vol. 33 No. 3, pp. 329-351, doi: 10.1108/JSTP-08-2021-0167.

Cuddy, A.J.C., Norton, M.I. and Fiske, S.T. (2005), "This old stereotype: the pervasiveness and persistence of the elderly stereotype", *Journal of Social Issues*, Vol. 61 No. 2, pp. 267-285, doi: 10.1111/j.1540-4560.2005.00405.x.

Dattani, S., Rodes-Guirao, L., Ritchie, H., Ortiz-Ospina, E. and Roser, M. (2024), "Life expectancy", *Our World in Data*, pp. 3845-3847, doi: 10.1007/978-3-031-17299-1_1643, available at: https://ourworldindata.org/life-expectancy (accessed 15 February 2025).

Del Missier, F., Hansson, P., Parker, A.M., Bruine De Bruin, W. and Mäntylä, T. (2020), "Decision-making competence in older adults: a rosy view from a longitudinal investigation", *Psychology and Aging*, Vol. 35 No. 4, pp. 553-564, doi: 10.1037/pag0000443.

Devitt, A.L., Addis, D.R. and Schacter, D.L. (2017), "Episodic and semantic content of memory and imagination: a multilevel analysis", *Memory and Cognition*, Vol. 45 No. 7, pp. 1078-1094, doi: 10.3758/s13421-017-0716-1.

Dewhurst, M., Linzer, K., Maud, M. and Sandler, C. (2022), "Living longer in better health: six shifts needed for healthy aging", *McKinsey Health Institute*, available at: https://www.mckinsey.com/mhi/our-insights/living-longer-in-better-health-six-shifts-needed-for-healthy-aging (accessed 14 February 2025).

Ding, T., Yan, A. and Liu, K. (2019), "What is noise-induced hearing loss?", *British Journal of Hospital Medicine*, Vol. 80 No. 9, pp. 525-529, doi: 10.12968/hmed.2019.80.9.525.

Ebner, N.C., Freund, A.M. and Baltes, P.B. (2006), "Developmental changes in personal goal orientation from young to late adulthood: from striving for gains to maintenance and prevention of losses", *Psychology and Aging*, Vol. 21 No. 4, pp. 664-678, doi: 10.1037/0882-7974.21.4.664.

Farber, G.S. and Wang, L.M. (2017), "Analyses of crowd-sourced sound levels of restaurants and bars in New York City", *Proceedings of Meetings on Acoustics*, Vol. 31 No. 1, pp. 1-15, doi: 10.1121/2.0000674.

Farivar, S., Abouzahra, M. and Ghasemaghaei, M. (2020), "Wearable device adoption among older adults: a mixed-methods study", *International Journal of Information Management*, Vol. 55, 102209, doi: 10.1016/j.ijinfomgt.2020.102209.

Flavián, C., Pérez-Rueda, A., Belanche, D. and Casaló, L.V. (2022), "Intention to use analytical artificial intelligence (AI) in services – the effect of technology readiness and awareness", *Journal of Service Management*, Vol. 33 No. 2, pp. 293-320, doi: 10.1108/JOSM-10-2020-0378.

Frank, D., Chrysochou, P. and Mitkidis, P. (2023), "The paradox of technology: negativity bias in consumer adoption of innovative technologies", *Psychology and Marketing*, Vol. 40 No. 3, pp. 554-566, doi: 10.1002/mar.21740.

Freund, A.M. (2024), "Goals in old age: what we want when we are old and why it matters", *Current Opinion in Psychology*, Vol. 57, 101803, doi: 10.1016/j.copsyc.2024.101803.

Giertz, J.N., Weiger, W.H., Törhönen, M. and Hamari, J. (2022), "Content versus community focus in live streaming services: how to drive engagement in synchronous social media", *Journal of Service Management*, Vol. 33 No. 1, pp. 33-58, doi: 10.1108/JOSM-12-2020-0439.

Gluck, J. (2024), "Wisdom and ageing", *Opinion in Psychology*, Vol. 55, 101742, doi: 10.1016/j.copsyc.2023.101742.

Gross, J.J. (2015), "Emotion regulation: current status and future prospects", *Psychological Inquiry*, Vol. 26 No. 1, pp. 1-26, doi: 10.1080/1047840X.2014.940781.

Gross, J.J., Sheppes, G. and Urry, H.L. (2011), "Cognition and emotion lecture at the 2010 SPSP emotion preconference: emotion generation and emotion regulation: a distinction we should make (carefully)", *Cognition and Emotion*, Vol. 25 No. 5, pp. 765-781, doi: 10.1080/02699931.2011.555753.

Habib, R., Nyberg, L. and Nilsson, L.-G. (2007), "Cognitive and non-cognitive factors contributing to the longitudinal identification of successful older adults in the Betula Study", *Aging, Neuropsychology, and Cognition*, Vol. 14 No. 3, pp. 257-273, doi: 10.1080/13825580600582412.

Haynes, E.M.K., Neubauer, N.A., Cornett, K.M.D., O'Connor, B.P., Jones, G.R. and Jakobi, J.M. (2020), "Age and sex-related decline of muscle strength across the adult lifespan: a scoping review of aggregated data", *Applied Physiology Nutrition and Metabolism*, Vol. 45 No. 11, pp. 1185-1196, doi: 10.1139/apnm-2020-0081.

Hightower, R., Brady, M.K. and Baker, T.L. (2002), "Investigating the role of the physical environment in hedonic service consumption: an exploratory study of sporting events", *Journal of Business Research*, Vol. 55 No. 9, pp. 697-707, doi: 10.1016/S0148-2963(00)00211-3.

Holmqvist, J., Wirtz, J. and Fritze, M.P. (2020), "Luxury in the digital age: a multi-actor service encounter perspective", *Journal of Business Research*, Vol. 121, pp. 747-756, doi: 10.1016/j.jbusres.2020.05.038.

Huang, M.H. and Rust, R.T. (2017), "Technology-driven service strategy", *Journal of the Academy of Marketing Science*, Vol. 45 No. 6, pp. 906-924, doi: 10.1007/s11747-017-0545-6.

Huang, M.H. and Rust, R.T. (2018), "Artificial intelligence in service", *Journal of Service Research*, Vol. 21 No. 2, pp. 155-172, doi: 10.1177/1094670517752459.

Huang, M.H. and Rust, R.T. (2024), "The caring machine: feeling AI for customer care", *Journal of Marketing*, Vol. 8 No. 8, pp. 1-23, doi: 10.1177/00222429231224748.

Huang, D., Chen, Q., Huang, J., Kong, S. and Li, Z. (2021), "Customer-robot interactions: understanding customer experience with service robots", *International Journal of Hospitality Management*, Vol. 99, 103078, doi: 10.1016/j.ijhm.2021.103078.

Hui, M.K.M. and Bateson, J.E.G. (1991), "Perceived control and the effects of crowding and consumer choice on the service experience", *Journal of Consumer Research*, Vol. 18 No. 2, pp. 174-184, doi: 10.1086/209250.

Jaakkola, E. (2020), "Designing conceptual articles: four approaches", *AMS Review*, Vol. 10 No. 1, pp. 18-26, doi: 10.1007/s13162-020-00161-0.

Jaakkola, E. and Alexander, M. (2024), "Understanding and managing engagement journeys", *Journal of Service Management*, Vol. 35 No. 3, pp. 357-380, doi: 10.1108/JOSM-02-2024-0066.

Jacobsen, L.F., Frank, D.A., Søndergaard, H.A. and Peschel, A.O. (2025), "From diversity to distinction: exploring the role of diversity and inclusion related to consumer perceptions of company innovativeness and attractiveness", *Journal of Business Research*, Vol. 189, 115184, doi: 10.1016/j.jbusres.2025.115184.

Jarma Arroyo, S.E., Glade, R. and Seo, H.-S. (2024), "Impacts of hearing loss on social dining: perceptions and acceptance of food and eating environments, and engagements", *Food Quality and Preference*, Vol. 120, 105265, doi: 10.1016/j.foodqual.2024.105265.

Kotschy, R., Bloom, D.E. and Scott, A.J. (2024), "On the limits of chronological age", National Bureau of Economic Research, Working Paper No. 33124.

Kuppelwieser, V. and Klaus, P. (2021), "Guest editorial: age is a construct, not a characteristic", *Journal of Services Marketing*, Vol. 35 No. 1, pp. 1-6, doi: 10.1108/JSM-11-2020-0440.

Lara, E., Martín-María, N., De La Torre-Luque, A., Koyanagi, A., Vancampfort, D., Izquierdo, A. and Miret, M. (2019), "Does loneliness contribute to mild cognitive impairment and dementia? A systematic review and meta-analysis of longitudinal studies", *Ageing Research Reviews*, Vol. 52, pp. 7-16, doi: 10.1016/j.arr.2019.03.002.

Li, M., Li, L., Tao, X., Xie, Z., Xie, Q. and Yuan, J. (2024), "Boosting healthiness exposure in category-constrained meal recommendation using nutritional standards", *ACM Transactions on Intelligent Systems and Technology*, Vol. 15 No. 4, pp. 1-28, doi: 10.1145/3643859.

Liu, Y., Zhang, L., Yang, Y., Zhou, L., Ren, L., Wang, F., Liu, R., Pang, Z. and Deen, M.J. (2019), "A novel cloud-based framework for the elderly healthcare services using digital twin", *IEEE Access*, Vol. 7, pp. 49088-49101, doi: 10.1109/ACCESS.2019.2909828.

Liu, S.Q., Vakeel, K.A., Smith, N.A., Alavipour, R.S., Wei, C. and Wirtz, J. (2024), "AI concierge in the customer journey: what is it and how can it add value to the customer?", *Journal of Service Management*, Vol. 35 No. 6, pp. 136-158, doi: 10.1108/JOSM-12-2023-0523.

Loos, E. and Ekström, M. (2014), "Visually representing the generation of older consumers as a diverse audience: towards a multidimensional market segmentation typology", *Participations*, Vol. 11 No. 2, pp. 258-273.

Lowsky, D.J., Olshansky, S.J., Bhattacharya, J. and Goldman, D.P. (2014), "Heterogeneity in healthy aging", *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, Vol. 69 No. 6, pp. 640-649, doi: 10.1093/gerona/glt162.

McClung, H.L., Champagne, C.M., Allen, H.R., McGraw, S.M., Young, A.J., Montain, S.J. and Crombie, A.P. (2017), "Digital food photography technology improves efficiency and feasibility of dietary intake assessments in large populations eating ad libitum in collective dining facilities", *Appetite*, Vol. 116, pp. 389-394, doi: 10.1016/j.appet.2017.05.025.

McIntyre, S., Nagi, S.S., McGlone, F. and Olausson, H. (2021), "The effects of ageing on tactile function in humans", *Neuroscience*, Vol. 464, pp. 53-58, doi: 10.1016/j.neuroscience.2021.02.015.

McKinsey Global Institute (2016), *Urban World: the Global Consumers to Watch*, McKinsey & Company.

Mele, C. and Tiziana Russo-Spena, T. (2025), "Agencement of onlife and phygital: smart tech–enabled value co-creation practices", *Journal of Service Management*, Vol. 36 No. 2, pp. 217-240, doi: 10.1108/JOSM-03-2023-0113.

Musiélak, C., Chasseigne, G. and Mullet, E. (2006), "The learning of linear and nonlinear functions in younger and older adults", *Experimental Aging Research*, Vol. 32 No. 3, pp. 317-339, doi: 10.1080/03610730600699126.

Nahavandi, D., Alizadehsani, R., Khosravi, A. and Acharya, U.R. (2022), "Application of artificial intelligence in wearable devices: opportunities and challenges", *Computer Methods and Programs in Biomedicine*, Vol. 213, 106541, doi: 10.1016/j.cmpb.2021.106541.

National Institute on Aging (2025), "Aging and your eyes", available at: https://www.nia.nih.gov/health/vision-and-vision-loss/aging-and-your-eyes (accessed 13 March 2025).

Osoba, M.Y., Rao, A.K., Agrawal, S.K. and Lalwani, A.K. (2019), "Balance and gait in the elderly: a contemporary review", *Laryngoscope Investigative Otolaryngology*, Vol. 4, pp. 143-153, doi: 10.1002/lio2.252.

Pani-Harreman, K.E., Bours, G.J.J.W., Zander, I., Kempen, G.I.J.M. and van Duren, J.M.A. (2021), "Definitions, key themes and aspects of 'ageing in place': a scoping review", *Ageing and Society*, Vol. 41 No. 9, pp. 2026-2059, doi: 10.1017/S0144686X20000094.

Pantano, E., Viassone, M., Boardman, R. and Dennis, C. (2022), "Inclusive or exclusive? Investigating how retail technology can reduce old consumers' barriers to shopping", *Journal of Retailing and Consumer Services*, Vol. 68, 103074, doi: 10.1016/j.jretconser.2022.103074.

Parra, C., Silveira, P., Far, I.K., Daniel, F., De Bruin, E.D., Cernuzzi, L., D'Andrea, V. and Casati, F. (2014), "Information technology for active ageing: a review of theory and practice", *Foundations and Trends in Human–Computer Interaction*, Vol. 7 No. 4, pp. 351-448, doi: 10.1561/1100000053.

Patrício, L., Sangiorgi, D., Mahr, D., Čaić, M., Kalantari, S. and Sundar, S. (2020), "Leveraging service design for healthcare transformation: toward people-centered, integrated, and technology-enabled healthcare systems", *Journal of Service Management*, Vol. 31 No. 5, pp. 889-909, doi: 10.1108/JOSM-11-2019-0332.

Peelle, J.E. and Wingfield, A. (2016), "The neural consequences of age-related hearing loss", *Trends in Neurosciences*, Vol. 39 No. 7, pp. 486-497, doi: 10.1016/j.tins.2016.05.001.

Petrie, T. (2023), "Rheumatoid arthritis in hands: symptoms and treatments", *Verywell Health*, Vol. 13 December, available at: https://www.verywellhealth.com/symptoms-of-rheumatoid-arthritis-in-hands-5095823 (accessed 15 February 2025).

Pitardi, V., Wirtz, J., Paluch, S. and Kunz, W.H. (2024), "Metaperception benefits of service robots in uncomfortable service encounters", *Tourism Management*, Vol. 105, 104939, doi: 10.1016/j.tourman.2024.104939.

Ponsignon, F. (2023), "Making the customer experience journey more hedonic in a traditionally utilitarian service context: a case study", *Journal of Service Management*, Vol. 34 No. 2, pp. 294-315, doi: 10.1108/JOSM-03-2021-0096.

Rahman, M.H.A., Finsterwalder, J. and Kuppelwieser, V.G. (2024), "Ageing and wellbeing co-creation: systematic literature review and future avenues for Transformative Service Researchers", *The Service Industries Journal*, published online first, pp. 1-30, doi: 10.1080/02642069.2024.2363934.

Rasmussen, N.H., Smith, S.A., Maxson, J.A., Bernard, M.E., Cha, S.S., Agerter, D.C. and Shah, N.D. (2013), "Association of HbA1c with emotion regulation, intolerance of uncertainty, and purpose in life in type 2 diabetes mellitus", *Primary Care Diabetes*, Vol. 7 No. 3, pp. 213-221, doi: 10.1016/j.pcd.2013.04.006.

Rauschnabel, P.A. (2021), "Augmented reality is eating the real-world! The substitution of physical products by holograms", *International Journal of Information Management*, Vol. 57, 102279, doi: 10.1016/j.ijinfomgt.2020.102279.

Rawal, S., Hoffman, H.J., Bainbridge, K.E., Huedo-Medina, T.B. and Duffy, V.B. (2016), "Prevalence and risk factors of self-reported smell and taste alterations: results from the 2011-2012 US national health and nutrition examination survey (NHANES)", *Chemical Senses*, Vol. 41 No. 1, pp. 69-76, doi: 10.1093/chemse/bjv057.

Risso, D., Drayna, D. and Morini, G. (2020), "Alteration and, reduction taste loss: main causes and potential implications on dietary habits", *Nutrients*, Vol. 12 No. 11, p. 3284, doi: 10.3390/nu12113284.

Schaie, K.W. (2005), *Developmental Influences on Adult Intelligence*, Oxford Academic Press, Oxford.

Schiffman, S. (1997), "Taste and smell loss in normal aging and disease", *Journal of the American Medical Association*, Vol. 278 No. 16, pp. 1357-1362, doi: 10.1001/jama.1997.03550160077042.

Schiffman, S. and Zervakis, J. (2002), "Taste and smell perception in the elderly: effect of medications and disease", *Advances in Food and Nutrition Research*, Vol. 44, pp. 247-346, doi: 10.1016/s1043-4526(02)44006-5.

Schlomann, A., Wahl, H.-W., Zentel, P., Heyl, V., Knapp, L., Opfermann, C., Krämer, T. and Rietz, C. (2021), "Potential and pitfalls of digital voice assistants in older adults with and without intellectual disabilities: relevance of participatory design elements and ecologically valid field studies", *Frontiers in Psychology*, Vol. 12, 684012, doi: 10.3389/fpsyg.2021.684012.

Sergi, G., Bano, G., Pizzato, S., Veronese, N. and Manzato, E. (2017), "Taste loss in the elderly: possible implications for dietary habits", *Critical Reviews in Food Science and Nutrition*, Vol. 57 No. 17, pp. 3684-3689, doi: 10.1080/10408398.2016.1160208.

Staring, W.H.A., Zandvliet, S., De Kam, D., Solis-Escalante, T., Geurts, A.C.H. and Weerdesteyn, V. (2024), "Age-related changes in muscle coordination patterns of stepping responses to recover from loss of balance", *Experimental Gerontology*, Vol. 191, 112424, doi: 10.1016/j.exger.2024.112424.

Sun, F.W., Stepanovic, M.R., Andreano, J., Barrett, L.F., Touroutoglou, A. and Dickerson, B.C. (2016), "Youthful brains in older adults: preserved neuroanatomy in the default mode and salience networks contributes to youthful memory in superaging", *Journal of Neuroscience*, Vol. 36 No. 37, pp. 9659-9668, doi: 10.1523/JNEUROSCI.1492-16.2016.

Szmigin, I. and Carrigan, M. (2001), "Learning to love the older consumer", *Journal of Consumer Behaviour*, Vol. 1 No. 1, pp. 22-34, doi: 10.1002/cb.51.

Thoma, D. and Wechsler, J. (2021), "Older and more personal: stronger links between brand-name recall and brand-related autobiographical memories in older consumers", *Psychology and Marketing*, Vol. 38 No. 9, pp. 1384-1392, doi: 10.1002/mar.21533.

Tipaldi, P. and Natter, M. (2022), "Older adults' decisions on smart home systems: better put an age tag on it", *Psychology and Marketing*, Vol. 39 No. 9, pp. 1747-1761, doi: 10.1002/mar.21698.

Trabucchi, D., Pellizzoni, E., Buganza, T. and Verganti, R. (2017), "Interplay between technology and meaning: how music majors reacted?", *Creativity and Innovation Management*, Vol. 26 No. 4, pp. 327-338, doi: 10.1111/caim.12234.

United Nations (UN) (2021), "Decade of healthy aging", available at: https://www.decadeofhealthyageing.org (accessed 15 February 2025).

United Nations Department of Economic and Social Affairs, Population Division (2024), "World population prospects 2024: summary of results (UN DESA/POP/2024/TR/NO. 9)".

Valtorta, N.K., Kanaan, M., Gilbody, S., Ronzi, S. and Hanratty, B. (2016), "Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies", *Heart*, Vol. 102 No. 13, pp. 1009-1016, doi: 10.1136/heartjnl-2015-308790.

Van Dalen, H.P., Henkens, K. and Schippers, J. (2010), "Productivity of older workers: perceptions of employers and employees", *Population and Development Review*, Vol. 36 No. 2, pp. 309-330, doi: 10.1111/j.1728-4457.2010.00331.x.

Wahlin, Å., MacDonald, S.W.S., De Frias, C.M., Nilsson, L.-G. and Dixon, R.A. (2006), "How do health and biological age influence chronological age and sex differences in cognitive aging: moderating, mediating, or both?", *Psychology and Aging*, Vol. 21 No. 2, pp. 318-332, doi: 10.1037/0882-7974.21.2.318.

Waldinger, R.J. and Schulz, M.S. (2023), *The Good Life: Lessons from the World's Longest Scientific Study of Happiness*, Simon & Schuster, New York.

Ward, E., Barnes, M. and Gahagan, B. (2012), *Well-Being in Old Age: Findings from Participatory Research*, University of Brighton/Age Concern Brighton.

Wirtz, J., Patterson, P.G., Kunz, W.H., Gruber, T., Lu, V.N., Paluch, S. and Martins, A. (2018), "Brave new world: service robots in the frontline", *Journal of Service Management*, Vol. 29 No. 5, pp. 907-931, doi: 10.1108/JOSM-04-2018-0119.

Wirtz, J., Hofmeister, J., Chew, P.Y.P. and Ding, X.D. (2023a), "Digital service technologies, service robots, AI, and the strategic pathways to cost-effective service excellence", *Service Industries Journal*, Vol. 43 Nos 15-16, pp. 1173-1196, doi: 10.1080/02642069.2023.2226596.

Wirtz, J., Kunz, W.H., Hartley, N. and Tarbit, J. (2023b), "Corporate digital responsibility in service firms and their ecosystems", *Journal of Service Research*, Vol. 26 No. 2, pp. 173-190, doi: 10.1177/10946705221130467.

Wirtz, J. and Stock-Homburg, R. (2025), "Generative AI meets service robots", *Journal of Service Research*, Vol. Forthcoming.

World Health Organization (WHO) (2007), *Global Age-Friendly Cities: A Guide*, World Health Organization, France, available at: https://www.who.int/publications/i/item/9789241547307 (accessed 3 March 2025).

World Health Organization (WHO) (2015), *World Report on Ageing and Health*, World Health Organization, Geneva, available at: https://www.who.int/publications/i/item/9789241565042 (accessed 15 February 2025).

World Health Organization (WHO) (2022), *Ageing and Health*, World Health Organization, Geneva, available at: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health (accessed 15 February 2025).

Xing, Y., Chen, S., Zhu, S. and Lu, J. (2020), "Analysis factors that influence escalator-related injuries in metro stations based on Bayesian networks: a case study in China", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 2, p. 481, doi: 10.3390/ijerph17020481.

Yoon, C., Cole, C.A. and Lee, M.P. (2009), "Consumer decision making and aging: current knowledge and future directions", *Journal of Consumer Psychology*, Vol. 19 No. 1, pp. 2-16, doi: 10.1016/j.jcps.2008.12.002.

Zhao, F., Manchaiah, V.K.C., French, D. and Price, S.M. (2010), "Music exposure and hearing disorders: an overview", *International Journal of Audiology*, Vol. 49 No. 1, pp. 54-64, doi: 10.3109/14992020903202520.

Zomerdijk, L.G. and Voss, C.A. (2010), "Service design for experience-centric services", *Journal of Service Research*, Vol. 13 No. 1, pp. 67-82, doi: 10.1177/1094670509351960.

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