

# ARTIFICIAL INTELLIGENCE AS A SUPPORT FOR AN AGING SOCIETY

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**Abstract:** Artificial intelligence (AI) is the use of digital technology to create systems that can perform tasks that typically require human intervention. It mimics human thinking but processes information more quickly and accurately. AI allows older people to manage daily tasks more easily, without complicated technologies. It is necessary to encourage the safe and thoughtful use of AI, which enables greater autonomy and better integration of older adults into the digital society. Older adults can use AI for simpler tasks, such as translating texts, helping to write messages, or finding recipes, while for more important decisions, especially health or financial ones, they should always consult with experts.

**Keywords:** elderly, learning, work, artificial intelligence, technology.

## 1. INTRODUCTION

Artificial intelligence (hereinafter referred to as AI), especially generative AI, brings a new dimension to our lives, primarily in the sense that we need to know how to use it. Some people are more skilled at using new technologies, others less so, which is particularly evident in the older population. The fact is that AI can already replace certain cognitive tasks, especially those that are more routine. Therefore, it is very beneficial for people to know how to use these technologies, as it can make them more productive. Work that might have been a bit boring and time-consuming can be replaced with these technologies—if we know how to use them, of course—and this frees up time for other, more interesting and meaningful

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work. AI has great potential to improve the quality of life for older adults, especially those over 65. Its use can solve many challenges they face, such as loneliness, health problems, and loss of independence.

## **2. THE IMPORTANCE OF ARTIFICIAL INTELLIGENCE FOR CONTEMPORARY SOCIETY**

The emergence of AI and its growing influence on many sectors of society requires an assessment of its impact on sustainable development. The rapid development of AI must be supported by appropriate policies and regulations. Otherwise, this would create gaps in the transparency, accountability, security, and ethical standards of AI-based technology, which could harm the development and sustainable use of AI. Furthermore, there is a lack of research evaluating the medium- and long-term impacts of AI. Therefore, it is essential to strengthen the global discussion on the use of AI and to develop the necessary regulatory insight and oversight of AI-based technologies. This can accelerate the achievement of sustainable development goals (e.g., optimizing energy consumption, improving access to healthcare services). Without regulation, however, it can reinforce inequalities and increase the digital divide (Vinuesa et al., 2019).

Due to growing expectations for artificial intelligence, academic research is facing complex questions focused on human-centered, responsible, and trustworthy technology embedded in society and culture. Several academic discussions, public consultations, and impact studies are available, revealing key aspects of the changing human-machine ecosystem. Contributing to these studies, hundreds of related academic sources on AI-driven decisions and valuable AI are summarized below. More specifically, the focus of this literature review is on sociocultural filters, a taxonomy of human-machine decisions, and value-based AI perspectives. For better understanding, it is proposed that stakeholders be invited to a comprehensive survey on next-generation AI, which explores issues that go beyond technology (Feher & Zelenkauskaite, 2020). Of course, the key to all of this is the human-centered, inclusive, and responsible use of AI. Jobin, Lenca, & Vayen (2019) state that in the past five years, private companies, research institutions, and public sector organizations have issued principles and guidelines for ethical AI, but

there is an ongoing debate about what "ethical AI" actually means and what ethical requirements, technical standards, and best practices are needed to achieve it. To explore whether a global consensus is forming on these issues, we mapped and analyzed the current body of principles and guidelines on ethical AI. The results reveal a global convergence emerging around five ethical principles (transparency, justice and fairness, non-maleficence, responsibility, and privacy), with significant differences in how these principles are interpreted; why they are considered important; to which issue, domain, or actor they apply; and how they should be implemented. Our findings highlight the importance of connecting efforts to develop guidelines with substantive ethical analysis and appropriate implementation strategies. There are, however, differences in how countries and organizations understand and implement these principles. Kelley et al. (2019) add that with the increasing influence and use of artificial intelligence (AI) and its transformative potential becoming more and more apparent, many questions have arisen regarding the economic, political, social, and ethical implications of its use. Public opinion plays an important role in these discussions, as it influences the adoption of products, commercial development, research funding, and regulation. They believe that AI will have a significant impact on society, accompanied by strong support for the responsible development and use of AI, and they also define public opinion on AI with four key themes (exciting, useful, worrying, and futuristic), the prevalence of which differentiates the response to AI in different countries. A survey of more than ten thousand respondents from 8 countries showed mixed feelings of enthusiasm and usefulness, but also concern and fear. Therefore, they emphasize that public opinion has a very important influence on the adoption of legislation and investments in AI.

The greatest fear associated with AI is caused by the fact that AI developers and innovators do not have a sufficient level of awareness of how AI specifically intrudes on the privacy and rights of individuals. Therefore, we need comprehensive legislation, such as the EU's GDPR directive, which represents a revolution in the field of data protection. The essential difference from the previous state is that the automated use of an individual's data is allowed under GDPR only and exclusively when the individual in question explicitly agrees to it. The goal of it all is

responsibility, transparency, and clarity (24ur.com, 2019). An important finding is that companies using AI achieve higher productivity and revenue. A lack of preparedness for digital transformation itself can cause a digital divide between leading and lagging companies.

The European Parliament (2022) states, among other things, that AI is a powerful tool but limited—it requires regulation that prevents discrimination and strengthens the protection of human rights. Therefore, it recommends an approach based on risk, transparency, and human oversight.

In conclusion, AI is today reshaping the economy, culture, politics, and ethics. It can accelerate sustainable development and economic growth, but at the same time, it brings dangers—the digital divide, discrimination, and abuse. Therefore, what we have outlined in this section is necessary: ethical frameworks, responsible use, appropriate legislation, and public trust.

### **3. OLDER ADULTS AND MODERN TECHNOLOGY: RESEARCH**

Kovačič (2020) emphasized that digital literacy is becoming essential for older adults to stay connected with modern technologies and information. He believes that digital training increases the independence of older adults and provides easier access to health and social services. Preventing digital exclusion is crucial for maintaining the social inclusion of older adults in modern society.

Digital skills allow older adults to stay informed and involved in social and professional life, according to Anderson (2019), and learning to use technologies reduces the feeling of loneliness and provides older adults with access to various resources and sources of help. He found that there is a need for greater efforts to close the technological gaps between generations, especially in the case of older adults who did not grow up with technology.

Below, I present just a few authors who have dealt with this area. Schreurs (2019) focused his research on the importance of digital literacy for the social participation of older adults. He emphasized that better digital literacy allows older adults to be more involved in social activities, increase their access to information, and improve their overall quality of

life. He notes that digital literacy is crucial for reducing social isolation, as older adults become more self-sufficient in using the internet for communication, shopping, and accessing public services. Demetriou (2021) researched the role of digital technologies in the inclusion of older adults in social life. She found that the use of ICT not only increases social inclusion but also stimulates intellectual activity and improves memory skills. Older adults who regularly use digital technologies showed greater self-confidence and adapted more easily to modern changes in society, such as online shopping, e-health, and virtual social interactions. Gulli (2020) researched how information and communication technologies (ICT) contribute to active aging. Her research showed that the use of ICT helps improve the physical and mental health of older adults, as it allows them access to exercise programs, monitoring of their health status, and participation in virtual support groups. The author concludes that digital technologies enable older adults to remain active and independent while reducing the risk of loneliness. In her research, McGarry (2018) dealt with how digital connectivity helps older adults maintain independence and cognitive abilities. She found that digital technology increases the sense of control over older adults' lives, provides better access to social networks, and improves mental health. She also emphasizes the importance of training programs for older adults on the use of new technologies to reduce their fear of using digital devices. Smith (2022) researched how information and communication technologies promote active aging. He emphasizes that the use of ICT allows older adults greater participation in social and cultural activities while also helping to maintain physical activity and health. Smith finds that technology can reduce the feeling of loneliness and increase life satisfaction, especially if older adults are adequately trained in the use of these tools.

All the mentioned research shows how digital technologies help older adults maintain social inclusion, lead active lives, and improve their overall health, which is of key importance for their well-being after retirement.

## 4. THE IMPORTANCE OF ARTIFICIAL INTELLIGENCE FOR THE LIVES OF OLDER ADULTS

Artificial intelligence is very important for older adults because it can make their daily lives easier, for example, with voice assistants, smart reminders, and personalized health solutions. With AI, they can access information more quickly and stay connected with family and society. In addition, it can help with the early recognition of health problems, thus contributing to greater safety and quality of life.

Requena et al. (2024) find that population aging is a global phenomenon that presents major challenges for healthcare and social welfare systems. The following summarizes some authors who address this area.

The World Health Organization (WHO) estimates that by 2050, one in six people will be 60 or older, which will double the current proportion of older adults (Organización Mundial de la Salud, 2021). This shift means an increase in life expectancy and a growing demand for care models that prioritize the autonomy and quality of life of older adults. In this context, the traditional association of old age with disease or dependency is gradually changing, especially as older adults reach an advanced age while maintaining a high level of functionality and well-being. Thus, the current "active aging" paradigm emphasizes the importance of maximizing opportunities for health, participation, and security, and promotes a view of aging focused on personal development and independence (Lopez-Lopez & Sanchez, 2020).

At the same time, active aging requires tools that can support this comprehensive approach and help with health monitoring and management without compromising autonomy. New technologies, especially environmental sensors and wearable devices, have proven to be very promising solutions in this area (Pramanik et al., 2018). Initially, the use of sensors was limited to detecting emergencies and monitoring health events in highly dependent older adults, such as falls or incidents related to dementia. However, technological advances have significantly expanded these applications, which now also benefit healthy and active older adults. Modern sensors enable continuous, non-invasive monitoring of physical, social, and cognitive activity parameters, providing data that improves the understanding of practices that contribute to maintaining independence and quality of life in old age (Kaye et al., 2011).

Artificial intelligence (AI) is increasingly being used in various healthcare services due to its increased efficiency and accuracy, according to Wong et al. (2025). With the aging population, AI-based health technologies could become a powerful tool in the healthcare of older adults to address growing, complex, and demanding healthcare needs. The purpose of the study was to investigate the perspectives and acceptability of using AI-driven health technologies among older adults and the potential challenges they face in their implementation. The findings of the research could lead to the design of more acceptable and user-friendly AI-based health technologies (ibid.).

The number of older adults is increasing, and many of the care needs of older adults are not met adequately or fairly (Matheer et al., 2015; Rahman et al., 2022; Lin & Liu, 2024; Miller et al., 2023). New technologies have the potential to improve the health and care of older adults. A variety of AI products have been proposed or developed for older adults along with new technologies such as remote sensors, robotics, and decision support algorithms (Velazquez-Diaz et al., 2023; Bargiotas et al., 2023; Lee et al., 2022; Dosso et al., 2022; Xie et al., 2020; Borna et al., 2020; Wang et al., 2024; Baig et al., 2019), such as the use of machine learning to predict the risk of falls and robotics or avatars to improve social inclusion (Lee et al.; Dosso et al.; Xie et al., 2020).

In addition, the integration of sensors with advanced technologies such as the Internet of Things (IoT) and artificial intelligence (AI) has further expanded their use, enabling environmental monitoring at home in ways that adapt to the daily routines of older adults (González et al., 2016). These technologies capture data on daily activities and offer the possibility of proactively assessing changes in behavior and functional health. Unlike traditional monitoring models that focus on reactive interventions, this approach allows for the anticipation of health problems and the tailoring of personalized interventions to meet the changing needs of older adults (Naccarelli et al., 2022; Dorado-Chaparro et al., 2021). By analyzing patterns of physical, social, and cognitive activity, AI can help identify practices and metrics related to maintaining functionality in autonomous older adults, thereby optimizing preventive approaches in this life stage (Reiman in Väyrynen, 2018).

Within the framework of active aging, the use of these technologies provides benefits that go beyond health monitoring (Othaganont et al.,

2002; Cicirelli et al., 2021). By capturing data that reflects the daily lives of older adults, these tools offer a comprehensive view of well-being and identify practices that contribute to both physical health and personal development (Alahi et al., 2023). The ability of these devices to analyze indicators of autonomy and adaptability is essential for promoting healthy and fulfilling aging. In particular, cognitive and social activities, such as interacting with others or engaging in intellectual activities, play a key role in maintaining autonomy and reducing the risk of cognitive decline (Rashidi and Mihailidis, 2013).

## 5. CONCLUSION

Artificial intelligence has the real potential to support independent, safe, and dignified aging at home, relieve caregivers, and improve the management of chronic diseases. It currently brings the most value in three areas: (1) fall prevention and monitoring of functional status (motion analysis, wearable and environmental sensors, risk prediction), (2) support for chronic diseases (personalized reminders, early detection of deterioration, therapy adjustment), and (3) cognitive and social support (conversational agents, reminders, structured calls, digital monitoring in dementia). However, the benefits are not "automatic": they are realized only if the systems are easy to use, integrated into real workflows, well-evaluated, and supervised by trained people.

A few more important findings from the field of health among older adults and its regulation with the help of AI.

AI devices can monitor vital signs such as heart rate, blood pressure, and blood sugar levels. This allows for early detection of problems and better prevention. AI applications can design personalized exercise programs that are suitable for an individual's age and physical condition. Smart medication dispensers and AI reminders ensure that older adults do not forget to take their medications. AI aids are designed to help maintain physical and mental fitness (e.g., interactive games that stimulate memory and cognitive functions).

We, therefore, find that smart technologies, such as smart speakers and lighting systems, facilitate daily tasks and reduce the need for assistance. With the help of AI, we can improve mobility assistance. AI, integrated into robots and smart wheelchairs, can help older adults move

around the home and outside of it, giving them greater freedom and independence. AI can also be very helpful to older adults in using digital platforms, such as social networks and video calls. However, we must be aware that many older adults do not have enough knowledge to use advanced technology, so it is crucial to provide adequate training and support.

The biggest risks are privacy and data protection, model biases (which can harm the most vulnerable), false alarms (which undermine trust), insufficient clinical validation, and the delegation of human tasks to technology where it is not ethical or safe. Especially in dementia, a clear framework is needed for informed consent, transparent use, and the possibility of "opting out" of the technology without penalizing the user.

The economics of AI solutions are promising, but savings (fewer falls, fewer hospitalizations, more effective care) only appear when the following are ensured: interoperability with existing systems, staff training, model maintenance (updating with new data), and clearly defined outcomes (e.g., reduction in falls, improvement in quality of life, less burden on caregivers). Without this, projects can remain at the pilot level and not survive the transition into practice.

From the perspective of policy and practice design, five clear directions emerge:

*Human-in-the-loop:* AI should support, not replace, clinical judgment and the relational component of care. Critical decisions must remain under human control.

*Co-design with older adults and caregivers:* User needs (autonomy, clarity, low cognitive burden) should shape the goals, interfaces, and implementation method—not the other way around.

*Measurement and transparency:* Before implementation, define target indicators (outcomes, costs, satisfaction), and after implementation, regularly publish results and manage false alarms.

*Privacy and fairness by default:* Minimal data collection, local processing, encryption, access control, regular bias reviews, and corrections for underrepresented groups (e.g., the very old, people with multiple illnesses, low digital literacy).

*Gradual implementation and maintenance:* Start with one well-defined use case (e.g., fall management), provide support to users and staff, then expand to new functionalities. Models must be maintained (tuning, updates), otherwise, accuracy deteriorates over time.

Research gaps remain in large, representative, and independent studies of effectiveness in a real-world environment, in the standardization of outcomes (so that solutions can be compared), in explaining models (so that decisions are understandable to users and professionals), and in evidence of long-term social connectedness.

Artificial intelligence is not a magic wand; it is a powerful tool if used responsibly. When technology is truly aligned with the needs of older adults, integrated into care pathways, transparent, and safe, it can contribute to greater independence, increased safety, a better care experience, and a reduced burden on caregivers. The key to this is thoughtful implementation: small, well-measured steps, a strong emphasis on user experience, and continuous human oversight and ethical management. Older adults can use it for simpler tasks, such as translating texts, helping to write messages, or finding recipes, while for more important decisions, especially health or financial ones, they should always consult with experts.

## REFERENCES AND SOURCES

1. Alahi, E., Sukkuea, A., Tina, F.W., Nag, A., Kurdthongmee, W., Suwannarat, K. and others (2023) Integration of Internet of Things-enabled technologies and artificial progress and future trends. *Sensors*. 23: 1–36. doi: 10.3390/s23115206
2. Baig, M.M., Afifi, S., GholamHosseini, H., Mirza, F. A systematic review of wearable sensors and Internet of Things-based applications for monitoring older adults—with an emphasis on the aging population and independent living. *J Med Syst*. 2019;43(8): 233. doi: 10.1007/s10916-019-1365-7
3. Bargiotas, I., Wang, D., Mantilla, J. and others (2023). Fall prevention: using machine learning to predict future falls in individuals without a history of falls. *J Neurol*. 270(2): 618–631. doi: 10.1007/s00415-022-11251-3
4. Borna, S., Maniaci, M.J., Haider, C.R. and others (2024). Artificial intelligence support for informal patient caregivers: a systematic review. *Bioengineering (Basel)*. 11(5): 483. doi: 10.3390/bioengineering11050483
5. Cicirelli, G, Marani, R, Petitti, A, Milella, A, and D'orazio, T. (2021). Environmental care: a review of technologies,

- methodologies, and future perspectives for a healthy aging population. *Sensors*. 21: 1–22. doi: 10.3390/s211103549
6. Dorado-Chaparro, J, Ruiz Fernandez, J, Romero-Santofimia, MJ, Bolaños-Peño, C, Unzueta-Irurtia, L, García-Perea, MG, et al. (2021) Healthy and active aging. *Sensors*. 21: 1–40. doi: 10.3390/s21237938
  7. Dosso, J.A., Bandari, E., Malhotra, A. and others (2022). Towards emotionally-aligned social robots for dementia: perspectives of care partners and persons with dementia. *Alzheimer's Dement*. 18(Suppl 2):e059261. doi: 10.1002/alz.059261
  8. Feher, K. & Zelenkauskaitė, A. (2020). AI in society and culture: Decision making and values. arXiv. Retrieved from <https://arxiv.org/abs/2005.02777>
  9. González, I., Fontecha, J., Hervás, R. and Bravo, J. (2016). Assessing temporal gait events from a single accelerometer using a measurement space filtering idea. *J Med Syst*. 40: 1–10. doi: 10.1007/s10916-016-0612-4
  10. Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. arXiv. Retrieved from <https://arxiv.org/abs/1906.11668>
  11. Kaye, J.A., Maxwell, S.A., Mattek, N., Hayes, T.L., Dodge, H., Pavel, M. and others (2011). Intelligent systems for assessing aging changes: a home-based, non-intrusive, and continuous assessment of aging. *J Gerontol B Psychol Sci Soc Sci*. 66B:i180–90. doi: 10.1093/geronb/gbq095
  12. Kelley, P. G., Yang, Y., Heldreth, C., Moessner, C., Sedley, A., Kramm, A., Newman, D. T., & Woodruff, A. (2019). Exciting, useful, worrying, futuristic: Public perception of artificial intelligence in 8 countries. arXiv. Retrieved from <https://arxiv.org/abs/2001.00081>
  13. Lee, H., Chung, M.A., Kim, H., Nam, E.W. (2022). The effect of cognitive function healthcare using artificial intelligence robots in older adults: a systematic review and meta-analysis. *JMIR Aging*. 5(2): e38896. doi: 10.2196/38896
  14. Lin, Z., Liu, H. (2024). Race/ethnicity, fertility, and gender differences in unmet care needs among older adults in the United States. *Gerontologist*. 64(4): gnad094. doi: 10.1093/geront/gnad094

15. López-López, R. and Sánchez, M. (2020). The institutional paradigm of active aging in Europe (2002–2015). *Gerontologist*. 60: 406–15. doi: 10.1093/geront/gnz094
16. 24ur.com. (2019, May 15). How artificial intelligence is changing society. Retrieved from <https://www.24ur.com/novice/slovenija/kako-umetna-inteligenca-spreminja-druzbo.html>
- European Parliament. (2022). Report on artificial intelligence in the digital age (AIDA). European Parliament. Retrieved from [https://www.europarl.europa.eu/doceo/document/TA-9-2022-0140\\_SL.html](https://www.europarl.europa.eu/doceo/document/TA-9-2022-0140_SL.html)
17. Mather, M., Jacobsen, L.A., Pollard, K.M. (2015). Aging in the United States. *Population Bulletin*. Volume 70, No. 2. Population Reference Bureau. Retrieved from <https://www.prb.org/wp-content/uploads/2016/01/aging-us-population-bulletin-1.pdf>
18. Miller, K.E.M., Ornstein, K.A., Coe, N.B. (2023). Rural differences in the use of family and formal care for older adults with disabilities. *J Am Geriatr Soc*.71(9): 2865–2870. doi: 10.1111/jgs.18376
19. Naccarelli, R., Casaccia, S. and Revel, G.M. (2022). The problem of monitoring the activity of older people in multi-resident scenarios: an innovative and non-invasive measurement system based on wearable devices and PIR sensors. *Sensors*. 22: 1–23. doi: 10.3390/s22093472
20. Organización Mundial de la Salud. Aging and health. (2021). Retrieved from <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
- Othaganont, P., Sinthuvorakan, C. and Jensupakarn, P. (2002). Daily practice of satisfied Thai elders. *J Transcult Nurs*. 13: 24–9. doi: 10.1177/104365960201300105
21. Pramanik, P., Pal, S. and Choudhury, P. (2018). Beyond automation: the cognitive Internet of Things. *Artificial intelligence brings meaning to the Internet of Things*. *Lecture Notes on Data Eng Commun Technol*. 14: 1–37. doi: 10.1007/978-3-319-70688-7\_1
22. Rahman, M.M., Rosenberg, M., Flores, G. and others (2022). A systematic review and meta-analysis of unmet needs for healthcare and long-term care among older adults. *Health Econ Rev*. 12(1): 60. doi: 10.1186/s13561-022-00398-4

23. Rashidi, P. and Mihailidis, A. (2013). A survey of ambient assisted living tools for older adults. *IEEE J Biomed Heal Informatics*. 17: 579–90. doi: 10.1109/JBHI.2012.2234129
24. Reiman, A. and Väyrynen, S. (2018). Holistic well-being and sustainable organizations—a review and reasoned claims. *Int J Sustain Eng*. 11: 321–9. doi: 10.1080/19397038.2018.1474397
25. Requena, C., Plaza-Carmona, M., lvarez-Merino, P., Lopez-Fernandez, V. (2024). Technological applications to improve independence in the daily activities of older adults: a systematic review. Retrieved from [https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1476916/full?utm\\_source=chatgpt.com](https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1476916/full?utm_source=chatgpt.com)
26. Velazquez-Diaz, D., Arco, J.E., Ortiz, A. and others (2023). The use of artificial intelligence in the recognition and diagnosis of frailty syndrome in older adults: a scope review. *J Med Internet Res*. 25: e47346. doi: 10.2196/47346
27. Xie, B., Tao, C., Li, J., Hilsabeck, R.C., Aguirre, A. (2020). Artificial intelligence for caregivers of people with Alzheimer's disease and related dementias: a systematic review of the literature. *JMIR Med Inform*. 8(8): e18189. doi: 10.2196/18189
28. Wang, K., Ghafurian, M., Chumachenko, D. and others (2024). The use of artificial intelligence in active living with the assistance of an aging population in a real environment with commercial devices—a scope review. *Comput Biol Med*. 173: 108340. doi: 10.1016/j.combiomed.2024.108340
29. Wong, A.K.C., Lee, J.H.T, Zhao, Y., Lu, Q., Yang, S., Hui, V.C.C. (2025). Exploring the perspectives of older adults and the adoption of artificial intelligence-driven health technologies: a qualitative study. *JMIR Aging* 2025; 8: e66778. doi: 10.2196/66778

Paper received: 09.09.2025.

Paper approved: 23.02.2026.