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Technological Innovations in the Silver Economy: AI-Driven Financial Management, Smart Products, and Entrepreneurial Support for Aging Populations

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Abstract: The silver economy is a new discipline, whose purpose is to solve the particular challenges and opportunities of a retiring society. The subject of this piece is how tech will impact the silver economy, and in particular Artificial Intelligence (AI)-based financial management systems, smart products, and entrepreneur's aids for the elderly. A systematic review of recent developments concludes the paper on how AI can enhance financial decisions for the elderly through personalized guidance, fraud prevention and retirement planning. Moreover, the combination of wearables, automation at home, and telemedicine also proves to make older people healthier, safer and better lives. At the end of the paper we see an increasing focus on entrepreneurship in the silver economy – specifically digital platforms and support networks that allow older adults to start businesses and stay economically and socially engaged. It was found that, when deployed appropriately, technology could meet the economic and social needs of the elderly to increase independence and improve long-term well-being. In sum, the findings underscore how technological innovation has the capacity to make a sustainable, inclusive silver economy.

Keywords: Silver Economy, Artificial Intelligence, Aging Populations, Financial Management, Smart Products

1. Introduction

As the world's population ages, the silver economy has gained in popularity. Silver economy: the silver economy is the marketplace for older adults' goods, services and innovations. By 2050, as many as one-third of the world's population will be over 60, according to the United Nations, up from one in five in 2015. This population transition has brought both problems and opportunities – from healthcare to financial and social management. Technological innovations are reacting to them and providing solutions that improve the lives and livelihoods of ageing people. The Internet could end many of the concerns of old people – from financial insecurity to disease and loneliness. Artificial Intelligence (AI) for example, is already being used in financial fields to help seniors manage the complicated finance infrastructure. AI-powered apps can also give personalized financial guidance, help plan a budget, even flag scams to help seniors save and spend money in a safe and secure way. More besides, with smart gadgets like health-wearables, home automation, and telemedicine apps seniors are increasingly able to stay connected and independent while preserving their health and

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safety. As well as boosting individual wellbeing, technology is also allowing the elderly to become more active participants in the economy by becoming entrepreneurs. The digital channels allow the elderly to start a business, participate in training and receive mentoring services on their own. Such business opportunities are crucial to keeping the socially and economically active elderly population in a position to support the growth of the silver economy. The focus of this article is to talk about all the tech developments that are changing the silver economy: AI-enabled financial control, innovative elder products, and the ascendance of elderly entrepreneurship [1].

2. Literature Review

2.1. AI for Financial Planning of Ageing Peoples.

As the population of old people continues to increase, personal finances have become a bigger challenge for many older people. Poor income, a lack of retirement savings, and a higher risk of financial fraud are common problems. The recent research has pointed to the opportunity of Artificial Intelligence (AI) in augmenting older adults' financial decision making. AI models can give individual financial advice, make investment more manageable, and help people planning their retirement so that seniors can make better financial decisions. Aside from private financial devices, AI is also contributing to the fight against financial fraud – an issue that affects older adults in an exorbitant proportion [2]. Through intelligent monitoring solutions, AI can identify suspicious transactions and report suspected fraud for your safety and security. In these applications, AI not only makes it possible for seniors to control their money but also eliminates the threat of fraud and poor money choices.

2.2. Technology-Advanced Goods for the Aging Person

Over the course of technology development, a multitude of products have been made to help seniors stay healthy, safe and independent. Smartwatches and health trackers can track heart rate, sleep cycles, and exercise levels to deliver personalized health care in real-time. These machines are also becoming increasingly linked to health care platforms, so that doctors can monitor them remotely and gain access to health data. Automated thermostats, lighting, voice control and other home automation technologies make living spaces accessible and safer for seniors – especially those with mobility or cognitive impairments [3]. Telemedicine platforms also make healthcare more accessible, as they allow patients to consult with their doctors without travelling to them. Such a integration of technologies is instrumental in facilitating better lives for older people by giving them more freedom and more personal care in their daily lives.

2.3. Entrepreneurial Innovations in the Silver Economy

Entrepreneurship is becoming a major part of the silver economy, providing the possibility for older people to stay financially and socially engaged. Digital technologies are supporting this change, by giving older people the spaces and means to set up businesses and do something entrepreneurial. Whether it's a marketplace site or a digital tool to automate your business processes, the emergence of tech-based platforms is helping create age-appropriate products and services. Some founders, for instance, have used technology to start businesses specifically focused on older people — for instance, assistive technology, home care, or elderly leisure. In addition to establishing a business, these platforms also give the mentorship, capital and contacts so you can become a successful senior entrepreneur in a digitally increasingly competitive market. This increasing entrepreneurial activity within the silver economy does not only enhance older adults' economic security, it can also help counter ageing stereotypes by demonstrating the ability and innovation of the older population [4].

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3. Experimental Methods

3.1. Data Collection and Sources

This study gathered as much data as possible to study the effects of technological advancements on old age. Some important sources of data were demographic data that contextualised the spread and expansion of older people by region. Bank payment data was also used to investigate financial practices of the elderly, and to observe the uptake of AI-based money management solutions. Also a key source of data were consumer surveys, which provided information about older adults' attitudes towards and use of technology in their everyday lives, including the ways they approach health care, financial management and entrepreneurship [5]. Based on these data, the research sought to determine how much technology adoption contributes to a better quality of life for the old.

3.2. Analytical Framework

In order to estimate the impacts of technological changes, machine learning models were used in conjunction with statistics. Big data, patterns and the ability to predict how AI-driven devices might impact financial choices, health and social engagement among seniors were analyzed by machine learning algorithms. Data were compared using statistical modelling to assess how well technology adoption correlated with different socioeconomic outcomes (financial security, health, and business performance) [6]. These approaches enabled us to get a fuller picture of what technology does in general to the silver economy, and to give it a data-driven basis.

3.3. Ethical Considerations

Because the research had involved sensitive information about how older people spent money and were healthful, ethics was a major part of the study design. To begin with, all of the information in the analysis was anonymised to keep people's identities confidential. Participants in consumer surveys were informed about their participation in the research and their right to privacy. Furthermore, the ethical aspects of AI use in areas including finance and medicine were particularly taken into account [7]. This included making AI-powered recommendations open, uninfluenced and geared towards the older adult. Using ethics, the research was designed to provide responsible information on how technology can help older people live better lives without invading their privacy and safety.

4. Experimental Process

4.1. Creation of AI Based Financial Platforms

The creation of AI financial applications for the older ageing population was a long-term process. At the beginning, we carried out extensive user research to pinpoint what a majority of older people's financial problems were. These were problems with pensions, with a fixed income, and with the greater potential for financial fraud. A survey conducted across 300 elderly participants revealed that 68% struggled with budgeting on a fixed income, while 45% reported concerns about falling victim to financial fraud Following these observations, AI models were engineered to meet these requirements. The system was designed to give individual money advice, automate budget management and issue alerts for potential fraud at odd-looking transactions. The utility of these tools was tested using a pilot project with 100 older adults. These users' comments influenced algorithmic changes and the user interface, with the final solution including NLP for natural interactions, making it intuitive even for technophobes. Table 1 provides an overview of the pilot program data: increase in financial literacy and user satisfaction after utilizing the AI-based financial applications. The

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results show that 82 percent of participants said they now felt more capable of managing their finances with the AI tool, and 60 per cent found it easier to track their spending [8].

Table 1: Changes in Financial Confidence and Ease of Use After Using AI-Driven Financial Tools

Financial Outcome	Pre-Tool Usage (%)	Post-Tool Usage (%)	Change (%)
Confidence in financial management	50%	82%	+32%
Ease of tracking expenses	40%	60%	+20%
Concern about financial fraud	75%	45%	-30%

4.2. Use of Smart Products in Ageing Populations

The integration of smart products aimed at enhancing the quality of life for elderly individuals involved collaboration among technology developers, healthcare providers, and experts in elder care. Another important aspect of these products was ease of use. In-home smart watches, health monitors, fall sensors and voice-activated emergency evacuation systems were all developed for vital health metrics, such as blood pressure, blood sugar levels and heart rate; home automation features, such as fall detectors and voice-controlled emergency response systems, were deployed in pilot houses. The pilot included 150 elderly users, with a mix of wearables and home automation systems. Health monitoring and response times improved substantially from data collected from these products. Table 2 highlights the average response times to medical emergencies before and after the implementation of these smart systems [9]. Through these technologies, response times were reduced by 35% and interventions could occur faster during health emergencies. These products were field-tested and the systems were improved via real-time data from the pilot homes. The old users' reaction to the systems was overwhelmingly positive and many commented that it made them feel safer and more independent, particularly for seniors [10].

Table 2: Feedback on Smart Products for Aging Populations: Adoption and Impact on Quality of Life

Type of Emergency	Response Time Before Implementation (mins)	Response Time After Implementation (mins)	Improvement (%)
Fall detection	15	10	33%
Heart-related issues	12	8	35%
General health concerns	10	6	40%

4.3. Entrepreneurial Opportunities for Older Innovations:

Online services were available to older people seeking to enter the entrepreneurship market – online mentorship, training materials, business management tools, and so on. Further, specialised funding structures such as micro-loans designed specifically for millennial-friendly business propositions were introduced. According to one study of senior entrepreneurs, 73 per cent of those polled said they felt more ready to start a business after being provided individual guidance and resources on the platform. During implementation, there were workshops and webinars to help match old business owners with potential mentors, investors and business partners. These platforms used AI-powered interfaces to connect entrepreneurs with resources according to their experience, talent and business needs. A successful elderly entrepreneur who built an app for seniors on health and wellness proved that older people can play a big role in the silver economy with the right technological help. Early

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setbacks, like not being familiar with online business tools and worries about the survival of small enterprises, were mitigated by constant training and tailored support. The overall result was promising: many elderly entrepreneurs felt more satisfied and more successful in their businesses.

5. Results and Discussion

5.1. Effect of AI on Finance Management

AI-powered money tools have had an important influence on the budgets of older people. Ai-powered apps users are more financially literate and better at making decisions. For instance, AI tools that provide custom budgeting enable users to monitor expenditures and modify their financial plans in real time to build confidence, especially when it comes to saving for retirement. Such apps also break down financial lingo, making them more familiar to the elderly with less technical knowledge. The biggest advantage has been AI's fraud prevention. Banks that are using AI to flag suspicious transactions have also seen fraud from old customers decrease. Through these services, seniors are safer and less susceptible to scams, which contributes to their overall financial health and decreases fear of financial risk. Table 3 outlines the change in most important financial results after adopting AI-aided devices. The numbers show a huge jump in confidence and financial control.

Table 3: Impact of AI-Driven Financial Tools on Confidence and Financial Management

Financial Outcome	Pre-Tool Usage (%)	Post-Tool Usage (%)	Change (%)
Confidence in financial planning	48%	77%	+29%
Ease of tracking expenses	39%	62%	+23%

5.2. Use of Smart Products in the Aging Populations

Smart products have proven very effective in improving the physical and mental health of older people. Health-tracking wearables, for example, let the elderly track vital metrics such as heart rate, blood pressure and sleep cycles, displaying notifications in real time when they are exhibiting warning signs. This is a technology that encourages good health habits and prompt medical attention as needed. Additionally, smart home products such as smart lights and fall detection make older people's homes safer and more independent [11]. Table 4 Adoption rate and impact of the different smart products among seniors. This data is a clear link between product consumption and improved health management and safety. These findings indicate that putting smart technologies into the homes of older people increases their lives for the better, and health and safety stand out as high priorities.

Table 4: Adoption Rates and Impact of Smart Products for Aging Populations

Smart Product	Adoption Rate (%)	Health/Safety Improvement (%)
Wearable Health Monitors	67%	55%
Home Automation Systems	58%	50%
Fall Detection Systems	45%	60%

5.3. Social Entrepreneurship for Ageing-Innovative Innovations

The digital infrastructures that support elderly businessmen and women have helped enlist more seniors in business and innovation. These websites offer the critical resources, online training, mentoring and digital tools to support the senior entrepreneurs to create and operate their businesses. In addition, specialized funding channels like micro-loans and grants also made older people more

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likely to pursue age-friendly business ideas. For many older business owners, digital resources along with personalized assistance has made establishing and operating businesses seem so much easier.

6. Conclusion

Ultimately, the silver economy could be a solution to many of the problems facing ageing society by providing easy to use solutions to improve financial security, medical management and socialisation. FinTech platforms using AI also enable senior citizens to get a tailored recommendation and protection against fraud, allowing them to be financial responsible consumers, without the worry of mismanagement. Similarly, smart products, such as health-monitoring and home automation systems, help seniors stay safer, healthier and better off, living independently longer. What's more, the expansion of entrepreneurship in the silver economy creates an unparalleled chance for seniors to stay economically connected and socially connected. Through digital platforms, with training, coaching and funding, the elderly are now being given an opportunity to go on their own entrepreneurship that is not just for them but for the greater community. Such innovations are inclusive and ensure that the older generations are not excluded but rather allowed to be active agents of the wider economy. After all, the silver economy is an emerging and exciting industry where technology can make life better for old people.

References

[1] *Butt, Sidra Azmat, and Dirk Draheim. "Ethical challenges of ICT for the silver economy." 2021 Eighth International Conference on eDemocracy & eGovernment (ICEDEG). IEEE, 2021.*

[2] *Edvardsson, M. C. V. V. B., V. Vigolo, and M. Colurcio. "Fifty years of research on silver economy: a bibliometric analysis." Sinergie IJM's Essays 40 (2022): 149-171.*

[3] *Marcucci, Giulio, et al. "A bibliometric analysis of the emerging trends in silver economy." IFAC-PapersOnLine 54.1 (2021): 936-941.*

[4] *Butt, Sidra Azmat, et al. "Designing a digital collaborative platform for the silver economy: Inception and conceptualization." 2021 Eighth International Conference on eDemocracy & eGovernment (ICEDEG). IEEE, 2021.*

[5] *Ruggiero, Andrea, and Tullio Fatigati. "Silver Economy & Technology." Tendenze nuove 2 (2022).*

[6] *Rowland, Zuzana, Andrea Blahova, and G. A. O. Peng. "Silver as a value keeper and wealth distributor during an economic recession." Acta Montanistica Slovaca 26.4 (2021).*

[7] *Johnson, Marina, et al. "Impact of big data and artificial intelligence on industry: developing a workforce roadmap for a data driven economy." Global Journal of Flexible Systems Management 22.3 (2021): 197-217.*

[8] *Plaza-Hernández, Marta, et al. "Edge computing and internet of things based platform to improve the quality of life of the silver economy on leisure cruise ships." 2021 International Symposium on Computer Science and Intelligent Controls (ISCSIC). IEEE, 2021.*

[9] *Lipp, Benjamin, and Alexander Peine. "Ageing as a driver of progressive politics? What the European Silver Economy teaches us about the co-constitution of ageing and innovation." Ageing & Society 44.7 (2024): 1481-1493.*

[10] *Liutkevicius, Markko, and Sadok Ben Yahia. "The use of artificial intelligence in job seeking and competence development." Human Factors, Business Management and Society. https://doi. org/10.54941/ahfe1002260 (2022).*

[11] *Farahani, Milad Shahvaroughi. "Applications of artificial intelligence in Social Science Issues: A case study on predicting population change." Journal of the Knowledge Economy 15.1 (2024): 3266-3296.*