

# Artificial Intelligence in Retirement Planning and Management

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**T**he Society of Actuaries (SOA) has focused a lot of attention on how artificial intelligence (AI) is influencing retirement planning, investing and management. SOA projects include a comprehensive report entitled *Artificial Intelligence in Investment and Retirement* and two calls for essays.<sup>1,2</sup>

The comprehensive report covers how AI is shaping the fields of investment and retirement planning by enhancing data-driven decision making, improving efficiency and automating complex processes. With advancements in reinforcement learning and large language models (LLMs), AI applications also are expanding in portfolio management, sentiment analysis, risk assessment and personalized financial planning. As AI adop-

tion grows, it is important to consider both its benefits and challenges to support responsible and effective implementation.

This article includes a summary of the SOA report, which provides an overview of AI applications in the investment and retirement sectors, offering insights for professionals who are exploring ways to leverage AI while managing associated risks. It also includes a summary of the author's essay "Can Artificial Intelligence/ Large Language Models Help Me with Retirement Planning? An Individual Perspective." The essay demonstrates the traps in trying to use an LLM to build a retirement plan. This article considers issues from the perspectives of different stakeholders and users as well as references a variety of research.

## AT A GLANCE

- As adoption of artificial intelligence (AI) grows for retirement planning and management, it is important to consider both its benefits and challenges to support responsible and effective implementation.
- Potential retirement planning applications of AI for individuals include budgeting and tracking finances as well as personalizing retirement education. AI can provide retirement plan sponsors with insight into participant behavior and preferences.
- Guidance should be developed for how individuals can obtain quality information generated by AI, how to best use that information and what information to avoid using.

## Introduction and Context

Benefit managers can't afford to ignore the topics of AI and LLMs. Hardly a day goes by without a feature story about the latest reverberation from the expanding use of AI tools in a variety of settings. The pace of use (and misuse) of these tools, such as ChatGPT, has been explosive and shows no sign of abating. Many experts would argue that we are on the cusp of a permanent paradigm shift in teaching, academics and the overall application of technology.

There is reason to think that AI will significantly impact the nature and extent of work of actuaries, financial planners, advisors, attorneys and other retirement professionals. Recent technological developments, such as advances in quantum computing, reinforce this impression.

**TABLE**

**Applications of AI in Retirement Planning and Investments by Stakeholder**

Stakeholder	Application
Individual	<ul style="list-style-type: none"> <li>• Budgeting and keeping track of finances, including income, spending, assets and liabilities. Artificial intelligence (AI) can make these tasks easier to perform and understand.</li> <li>• Improving retirement education by personalizing choice and customizing education. AI can write to style and needs and potentially identify areas where individuals have immediate need.</li> <li>• Personalized nudges, such as reminders to schedule medical appointments</li> <li>• Reminders to buy and renew insurance, pay premiums and file claims properly</li> <li>• Organized comparisons of insurance and financial products</li> </ul>
Defined Contribution (DC) Plan Sponsor	<ul style="list-style-type: none"> <li>• Insight into participant behavior and preferences</li> <li>• Managing autoenrollment</li> <li>• Encouraging desired participant behavior</li> </ul>
Defined Benefit (DB) Plan Sponsor	<ul style="list-style-type: none"> <li>• Asset modeling, including options that align assets with long-term liabilities</li> <li>• Asset modeling illustration</li> <li>• Real-time risk monitoring</li> <li>• Portfolio optimization</li> </ul> <p>Note: Stochastic modeling and deterministic forecasts have been used for DB assets for many years. AI increases the capability of working with these models, the data used to drive them and the options for reporting.</p>
Advisors	<ul style="list-style-type: none"> <li>• Assessment of client preferences and risk profiling</li> <li>• Portfolio optimization</li> <li>• Client reporting and administration of the relationship</li> <li>• Compliance implementation</li> </ul> <p>Note: New applications are being found regularly, and it is critical to keep track of applications and manage them.</p>
Researchers	<ul style="list-style-type: none"> <li>• Identification of population trends, including demographic trends and changing attitudes</li> <li>• Policy impact analysis</li> <li>• Market scenario analysis</li> </ul>

Source: Author's summary of table from *Artificial Intelligence in Investment and Retirement*, Society of Actuaries.

Outside of professional settings, retirees and those nearing retirement could significantly feel the reach of these tools. For example, AI tools may change how investment advice is delivered, asset allocation and general planning. At the same time, though, these tools may create new risks that expose retirees in ways that they have not and could not have prepared for.

The topics of technology and AI were included in SOA's *2024 Retirement Risk Survey* for the first time, and the survey shows that few seniors are currently trying to use AI. However, AI is built into many systems, and the user may be unaware of the traps it creates.

AI and technology are increasingly affecting every aspect of life while demographics are also changing, the population is aging, and retirement planning and management are becoming more important. In addition, financial literacy is a major problem in the United States.

**Insights From Retirement Planning and Investments Report**

The SOA report serves as a resource for financial professionals and technology experts interested in AI's role in investment and retirement planning. It is intended to provide an understanding of the following.

- How AI may be applied in investment and retirement planning, including portfolio optimization, sentiment analysis, risk management and personalized financial guidance
- The fundamental principles of AI technologies, such as LLMs and reinforcement learning, with a focus on their relevance to financial decision making
- The risks that may arise from AI applications, including biases, cybersecurity threats, ethical considerations and regulatory compliance, along with potential strategies for mitigating them
- Real-world examples illustrating AI-driven solutions in financial services, such as reinforcement learning for retirement savings, chatbot development and AI-assisted portfolio management
- Considerations for integrating AI while promoting transparency, fairness and accountability

The sections of this report of most detailed interest to benefit managers for direct use are the more practical

issues, including risks, real-world examples, fairness and accountability.

### Uses and Benefits of AI for Retirement Industry Stakeholders

All stakeholders in the retirement industry share the same needs: to carefully manage AI and test use cases as well as watch out for *hallucinations* (incorrect or made-up information). Potential benefits of AI are related to the ability to quickly write meeting documentation in different formats and styles, make appointments, summarize and reorganize data, and efficiently conduct administrative tasks. All options depend on the user's ability to write the correct prompts. Most tools are subject to risks, and many open new possibilities of fraud, impersonation and more. Specific uses are highly varied depending on the nature of the function and the needs of the user.

The table on page 10 shows how various retirement industry stakeholders may use AI.

For those with a more technical background, Section 3 of the SOA report provides an overview of AI methodologies, including data processing, model training and reinforcement learning, and involves some technical discussions. Section 5 is also intended for technical readers, since it explores AI-driven solutions with practical case studies, including reinforcement learning for retirement savings, chatbot development for financial insights and AI-assisted portfolio management. In addition, most of the appendices are designed strictly for technical readers, offering in-depth discussions on advanced AI methodologies and implementation details.

### Using an LLM for Retirement Planning

I wrote an essay entitled “Can Artificial Intelligence/ Large Language Models Help Me with Retirement Planning? An Individual Perspective” to test the ability of AI to build a retirement plan for an individual.<sup>3,4</sup>

The purpose of the essay was to test the use of LLMs by asking when a hypothetical individual could retire based on the information entered. I conducted a conversation with an early version of ChatGPT,<sup>5</sup> and I concluded that the tool made very clear errors. However, the average person might not recognize those mistakes and could get trapped into thinking that they

### Financial Literacy and Knowledge About Retirement Planning

When considering how artificial intelligence (AI) could help or hurt retirement planning, it's important to understand the current challenges related to financial literacy and retirement in the United States, including the following.

- Many people do not understand how compound interest works or the time value of money.
- Many do not understand how various types of investments work or what a mutual fund is.
- Financially fragile individuals often plan expenses paycheck to paycheck or for less than a year.
- People commonly decide to retire without a longer term financial analysis.
- For some individuals, retirement planning is very focused on the short term and predictable cash flows.
- Some individuals do not plan for risks but rather say that they will deal with them when they happen.
- These gaps have existed for a long time, but the situation does not seem to be improving.
- Household finance is not something that is routinely taught to young people as a basic life skill.

Households that are interested can find a plethora of information about retirement on the internet, in magazines and books, in information from their employers, from friends and more. They also may access many calculators and support tools targeted at different questions. The quality of this information varies, however, and some of it seeks to advance a particular point of view or support the use of a product or approach. Some of the information is also wrong and misleading. This leaves individuals not knowing which information is helpful or what to believe when they find conflicting information.



## SOA Essays on AI and Technology

The Society of Actuaries (SOA) issued two calls for essays on the theme of the impact of AI on retirement professionals and retirees. According to the SOA, “The objective was to gather a variety of perspectives and experiences with AI and LLM in different retirement settings—both now and in the future. It is the goal of this collection to spur thoughts for future research and set the stage for upcoming efforts.”

These essays are available at [www.soa.org/resources/research-reports/2024/ai-retirement-risks-essays](http://www.soa.org/resources/research-reports/2024/ai-retirement-risks-essays) and [www.soa.org/research/opportunities/second-round-impact-ai](http://www.soa.org/research/opportunities/second-round-impact-ai).

### The following 2024 essays are important of benefits managers for the reasons noted.

- “Artificial Intelligence and Retirement Planning” by John Cutler, J.D.: Overview of the topics.
- “Artificial Intelligence as a Partner for Retirement Professionals: What Are the Issues?” by Anna M. Rappaport, FSA, MAAA: Discussion of practical topics with regard to use of AI to promote efficiency and systems to avoid risk.
- “The Impact of Artificial Intelligence on Financial Decisions for Retirees” by Mark Dennis, DBA, CFP: Overview of how to integrate AI into financial wellness programs. It should be remembered that since AI is evolving so quickly, these ideas are strong, but more will have developed.
- “Pick a Payout Using AI” by John Blocher, FSA, MAAA: Focuses on retirement payouts, an area of significant current interest.

### Other 2024 essays include the following.

- “The Retirement Reckoning—When Family Ties Clash with Financial Realities” by Stefanos Orfanos, FSA, CERA\*
- “Can Artificial Intelligence Help Me with Retirement Planning: An Individual Perspective” by Anna M. Rappaport, FSA, MAAA\*
- “A Retiree’s Guide to Artificial Intelligence Risks and Mitigating Those Risks” by Gregory Whittaker, FSA, FASSA\*

### The following three essays were published in 2025.

- “The Unseen Revolution of Artificial Intelligence in Shaping the Future of Retirement Planning” by Niranjana Rajendran.\*
- “The Demographic Divide: An Analysis of Canadian Fraud Loss Patterns” by Michael Kummer
- “Souls and Silicon: On Aging and Artificial Companionship” by Stefanos Orfanos, FSA, CERA

*\*Denotes prize-winning essays.*

had enough money, which is a major problem.

This information is important to benefit managers because my experience clearly points out the traps in using AI for planning and calculations and the need for management and caution.

ChatGPT and other LLMs make it easy to build a story, and they respond to questions immediately—It is much easier and faster to get information using ChatGPT than us-

ing a conventional internet search. As mentioned earlier, prompt writing skills are vital to generating a reasonable conversation with an LLM like ChatGPT. Users also need to be able to make a judgment about the accuracy of the conversation. Answers usually appear to have reasonable content, but they could be incomplete or wrong.

I conducted several conversations with ChatGPT to try to understand what types of retirement planning

answers it would give me. This led to the following question, and the subsequent exchange demonstrates the pitfalls of using an LLM for retirement planning. (See “ChatGPT Conversation About Retirement Planning.”)

### Author’s Commentary

The calculation and write-up for this example were grossly incorrect and included several major errors or approximations, including the following.

- Ignored expenses: ChatGPT seemed to assume that Susie had saved all her income and that she had additional income that would cover expenses in retirement or that there would be no expenses. The output included a category for expenses that did not give useful information on average retirement expenses.
- Provided an inadequate answer to the retirement age question: The first sentence of the two-sentence response made sense, listing some factors that influence retirement age, but it was not complete. The second sentence made no sense in response to the retirement age question.
- Ignored Social Security income: ChatGPT ignored the fact that Susie would most likely receive income from Social Security.
- Assumed Susie's earnings were the same in all years that she worked.
- Ignored that invested money earned, investment income and the interest rate needed to be considered in the calculation.
- Assigned her a life expectancy, but it is unclear how it arrived at the value or what was done with the information.
- Output included a category for assumptions but did not include mention of many of the assumptions needed for an actuarial calculation.

Based on my research, it is my opinion that ChatGPT should not be used for calculations unless there is a reliable way to check the results. This question and response clearly confirmed that,



### ChatGPT Exchange About Retirement Planning

#### **Prompt**

Susie is 60 years old and earns \$125,000 a year. She started working at age 23 and has worked all but four years before turning age 60. She owns a \$300,000 house without a mortgage and has investment accounts of \$150,000.

When can she retire?

#### **ChatGPT Answer**

Determining when someone can retire involves considering various factors, including their financial situation, lifestyle and retirement goals. In Susie's case, we can make some assumptions and calculations based on the information provided.

#### **Financial Assets**

Susie earns \$125,000 a year.

She has a \$300,000 house without a mortgage.

She has investment accounts of \$150,000.

#### **Work History**

Susie started working at age 23.

She has worked all but four years before turning 60.

#### **Assumptions**

We'll assume that Susie's current expenses are manageable with her income and assets.

We'll assume a life expectancy of around 85 years old for planning purposes.

Now, let's make some basic calculations to get an idea of Susie's retirement readiness.

#### **Savings**

Susie's total financial assets:  
 $\$125,000 \text{ (annual income)} * (60 - 23 - 4) + \$150,000 \text{ (investment accounts)} = \$2,550,000$

#### **Expenses**

Without details on Susie's annual expenses, it's challenging to estimate her retirement needs accurately.

However, she has a paid-off house, which is a significant asset.

#### **Retirement Age**

The age at which Susie can retire depends on her desired retirement lifestyle, expenses and how much she has saved. A common rule of thumb is the 4% rule, which suggests that if Susie can live on 4% of her savings annually, she could potentially retire.

#### **Example**

If Susie can live on \$102,000 (4% of \$2,550,000) per year, she might be able to retire comfortably.

Keep in mind that these are simplified calculations, and it's highly recommended for Susie to consult with a financial advisor who can provide a more accurate analysis based on her specific situation, expenses and goals. Factors such as inflation, health care costs, and unexpected expenses should also be considered in retirement planning.

and this would make ChatGPT calculations unsuitable for use by individuals who are trying to plan on their own. I strongly recommend against using them without good quality control.

I developed additional examples, and the system made relatively rational comments but ended up each time sending the user to an advisor.

The essay reached the following conclusions.

- The existence of AI tools expands the resources available to individuals to support retirement planning, but it does not change the gaps in financial literacy and the lack of knowledge about this important subject.
- A great deal of information about retirement planning was already available prior to AI, but many users did not understand what would be useful to them or how to use it well.
- AI increases the amount of information available and changes its format. Some of the new information is completely wrong, but much is useful. It is important to develop some guidance for how individuals can use the information to get useful results, as well as what information they should not use.

More research and experimentation are needed to identify the steps that should be included in such guidance and how AI can help. Good questions for this AI research may include the following.

- Can it help individuals identify areas to explore when seeking retirement housing?
- Would it be effective in helping individuals understand different types of housing options and what they offer?
- Would it help individuals understand how to evaluate housing options?
- Would it help individuals understand different methods of using assets to produce income in retirement?
- Would it help individuals think through the pros and cons of retiring at different ages?

Here is another related question: Could individuals be provided with prompt series that would help them understand and design prompts? Alternatively, would it be better to build collections of prompt series on specific topics that build on the basic tools?

Individuals would need to take particular care when using AI for calculations. As indicated in the discussion above, cal-

culations can go completely wrong. This is not unique to AI. Earlier SOA Research Institute research comparing software packages also showed that different software packages can produce a wide variety of results. Determining whether AI can assist the individual trying to do such calculations in finding the right tool or in comparing results will require more research.

Traditional tools seem to offer a much better approach to calculations, but there is a long way to go to help individuals understand what will be most helpful.

### AI, Technology and Retirement Risks

As previously mentioned, AI and technology are one of three new topic areas included in the *SOA 2024 Retirement Risk Survey Series*.<sup>6</sup> The forthcoming report explores which technology is being used and how. It provides data on how technology is playing an increasingly important role in everyday life, including providing information and assistance with financial planning and retirement readiness. Since technology changes so rapidly, many individuals may find it difficult to keep up with new tools and options available. The 2024 survey analyzed (1) preretiree and retiree use of technology, both in general and specifically for financial and retirement planning purposes; (2) the perceived risks associated with those technological platforms; and (3) precautionary measures taken to address potential online risks.

Key findings include the following.

- Smartphones are consistently the most commonly used type of technology across all age groups and income levels. Overall, 95% of preretirees and 92% of retirees use a smartphone daily.
- A higher number of preretirees (46%) are actively using AI when compared with retirees (26%). When diving into those results deeper, use of AI also varies by age group and income level. It tends to be more prevalent for younger individuals and those with higher incomes.
- Among the technological platforms commonly used for financial and retirement planning that were included in this survey, online banking is the most commonly used (over 60% of respondents) and, compared with other tools, the lowest percentage of respondents (50%) perceived online banking as having high/moderate perceived risk.

- Many respondents use various technological platforms as tools in planning for retirement. Some of these tools may be the default tool provided by financial institutions (e.g., online banking), while others require more proactive use by individuals (e.g., social media platforms).
- Almost all respondents—99% of preretirees and 98% of retirees—use at least one type of online security protection, with strong passwords being most prevalent. While many respondents use some protection, less than 50% use more proactive measures, such as reporting phishing emails and using identity theft protection.

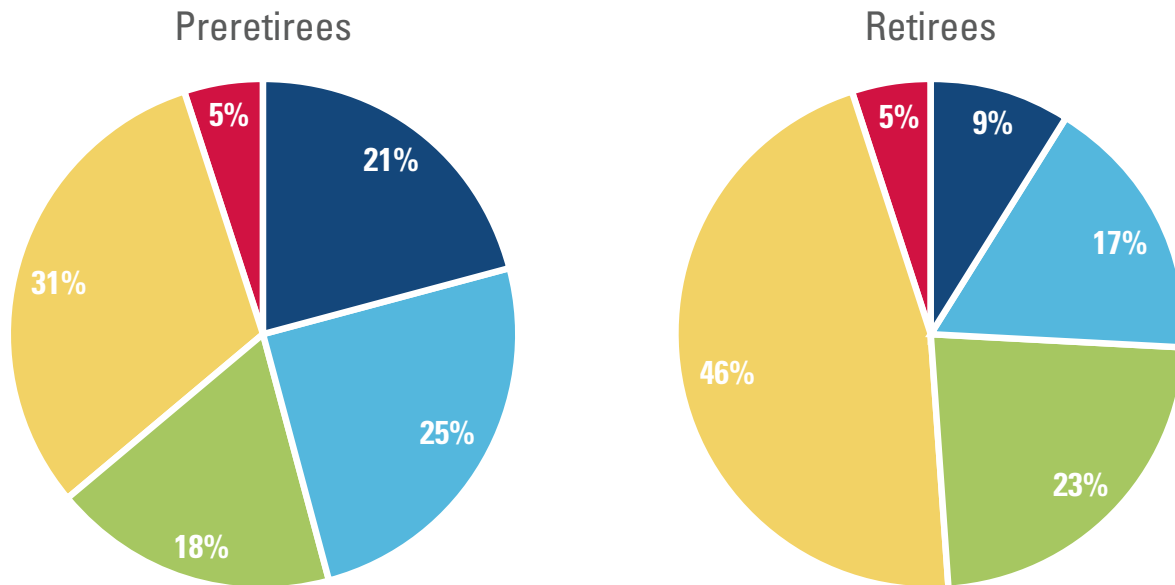
**Use of AI**

Survey respondents were asked if they are currently using AI (e.g., ChatGPT, roboadvisors, Amazon AI) or anticipate using it in the future. It is important to note that the responses collected as part of this survey likely do not consider unknown influences of AI. For example, many online searches or interactions may be fully generated by AI, but users may not be aware of that fact. With the ever-increasing prevalence of AI, this could be a point of additional future research.

The figure breaks down the responses by preretiree and retiree respondents. Preretirees are significantly more likely to be using AI, while retirees are more likely to believe they do not need AI.

**FIGURE**

**Use of Artificial Intelligence by Preretirees and Retirees**



- I am using AI whenever I can and hope to use it more.
- I am aware of AI but am concerned about the challenges in using it, so I am watching and experimenting.
- I am trying to learn about AI but am not using it and do not know if I ever will.
- I have enough technology and do not need AI.
- I do not know what AI is.

Source: Society of Actuaries Research Institute. 2024 Retirement Risk Survey Series.

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In addition to the aggregate survey responses above, interesting takeaways from various population breakouts from the data include the following.

- Preretirees at higher income levels are more likely to be actively using AI. Specifically, 29% of preretirees with incomes over \$100,000 are using AI whenever they can and hope to use it more, compared with 18% of those making \$50,000-\$100,000 annually and 8% of those making less than \$50,000 annually.
- For both preretirees and retirees, age also contributed to AI usage with those at younger ages more likely to be actively using AI or open to using it in the future. Specifically, 27% of preretirees ages 45-54 use AI and will continue to do so, compared with only 4% of preretirees ages 75-80.

## Conclusion and Areas for Future Research


The rapid advancement of various forms of AI and technology, both in everyday life and as an aid in financial and retirement planning, comes with both great opportunity and increased risk. The SOA research report, essays and consumer research offer a revealing picture of what benefit managers need to deal with today. The research approaches provide perspectives on different things that are changing and how they interact. For example, the population is changing, companies are moving from defined benefit (DB) to defined contribution (DC) plans, the decisions employees need to make are changing and the technology they can use are all changing at the same time. Benefit managers also need to re-

member that the environment they see today is not the reality they will face tomorrow. This is a time of challenge and opportunity for benefit managers and stakeholders. These studies are the start of a research exploration of technology use for retirement planning and management.

Other issues that could be explored include the following.

- Challenges faced in using the evolving technology
- How challenges differ depending on limitations, such as changes in cognition, dexterity, hearing and other functional abilities
- The evolution of AI and how it is used needs to be managed and can create both value and problems.

Benefit managers have special challenges in effectively serving participants who are experiencing declines in cognition, dexterity, hearing and other functional abilities. Call centers and automated systems to provide participant service or online banking are not designed to be effective for individuals with limitations.

Benefit managers likely must recognize that they have no choice other than to use AI and that AI offers promises, challenges and risks. Some of the challenges facing them today include how to capitalize on this opportunity, learn regularly as it changes, and use it to improve their benefits and services. 

## Endnotes

1. [www.soa.org/resources/research-reports/2025/ai-investment-retirement-risks/](http://www.soa.org/resources/research-reports/2025/ai-investment-retirement-risks/)
2. [www.soa.org/resources/research-reports/2024/ai-retirement-risks-essays](http://www.soa.org/resources/research-reports/2024/ai-retirement-risks-essays) and [www.soa.org/research/opportunities/second-round-impact-ai](http://www.soa.org/research/opportunities/second-round-impact-ai).
3. [www.soa.org/4a43ea/globalassets/assets/files/resources/research-report/2024/ai-retirement-risk-essays/ai-retirement-risks-essays-2-rappaport.pdf](http://www.soa.org/4a43ea/globalassets/assets/files/resources/research-report/2024/ai-retirement-risk-essays/ai-retirement-risks-essays-2-rappaport.pdf)
4. This essay focuses on the individual. A second essay focuses on the professional involved in supporting retirement processes and planning. The research fed both reports.
5. ChatGPT 3.5 was used for these conversations.
6. These topics are included in 2024 Society of Actuaries (SOA) *Retirement Risk Survey*. The report is forthcoming. The questionnaire for the survey included a total of 2,012 survey responses were obtained (1,007 preretirees and 1,005 retirees, including oversamples) from individuals ages 45 to 80. The survey was managed by Deloitte and used Dynata's online consumer panel, with field work performed in late August/early September 2024. The sample data are weighted by age, education, gender, income and race/ethnicity to match targets obtained from the March 2024 *Current Population Survey (CPS)* for individuals ages 45-80. See the survey report for more details.