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Possibilities and challenges of AI utilization in dementia insurance Products: Evidence from Japan

Japan faces an aging population and a sharp increase in dementia patients. Consequently, private dementia insurance has emerged as an important solution, though its market share remains limited. Advances in artificial intelligence (AI) now enable non-invasive early detection of dementia, indicating a possible shift from traditional "post-guarantee" models to "prevention-support" insurance. However, social acceptance of AI-based insurance products remains largely underexplored.

This study applies an extended Unified Theory of Acceptance and Use of Technology (UTAUT) model, incorporating trust as a key construct. Based on a preliminary survey of 133 insurance subscribers, data were analyzed using multiple regression analysis. The results show that social influence and trust are the strongest positive predictors of behavioral intention to use. Effort expectancy also had a positive effect, while performance expectancy showed a negative impact. This suggests that overly high expectations for AI performance might hinder adoption.

These findings offer practical implications for insurance providers, indicating that fostering trust and promoting social acceptance may be more effective strategies than merely emphasizing technical performance. Moreover, the study contributes to existing literature by extending the UTAUT model and providing fresh insights into user acceptance of AI-driven insurance services.

Keywords: dementia insurance, Artificial Intelligence, UTAUT model, social acceptance, technology acceptance

Introduction

Japan is experiencing population aging at an unprecedented rate. As of October 1, 2024, the country's total population was approximately 123.8 million, of whom 36.243 million were aged 65 and older, accounting for 29.3% of the population.[1] Against this demographic backdrop, the number of people living with dementia is rapidly increasing. The Cabinet Office projected that the number of older adults with dementia would reach approximately 7 million by 2025, implying that roughly one in five individuals aged 65 or older may have dementia.[2] In this context, dementia is increasingly recognized as a structural risk not only for the medical and long-term care sectors but also for families and society. It also results in economic losses from caregiving-related job resignations, substantial mental and physical burdens on families, and rising social security expenditures associated with medical and long-term care costs.

To address such risks, private dementia insurance has garnered attention. However, its penetration remains limited, with a household subscription rate of only 7.6% as of 2024. This figure is remarkably low compared with other disease-related insurance products, such as cancer insurance. This limited uptake appears to reflect a combination of factors, including insufficient societal understanding of dementia, high premiums, and strict enrollment conditions.

Since the late 2010s, AI technologies such as voice analytics and natural language processing have been increasingly explored for early dementia screening in medical research.[3] Such approaches may create new value by enabling non-invasive and convenient screening, and they suggest a potential shift in dementia insurance from conventional post-compensation coverage toward prevention-oriented support.

In parallel, academic and practical interest in artificial intelligence (AI) in insurance has expanded across underwriting, pricing, claims handling, customer interaction, and regulatory governance. Bibliometric and systematic reviews in Insurtech suggest that AI—together with related technologies such as blockchain—has become a central theme in insurance innovation research. Nevertheless, empirical evidence on consumers' acceptance of AI-enabled insurance products remains limited, particularly in sensitive and ethics-intensive contexts such as dementia-related insurance products in aging societies.[4][5] Despite these advances, the acceptability of AI-enabled dementia insurance products remains unclear and involves technological, ethical, and institutional challenges.

Accordingly, this study empirically examines the social acceptability of an AI-enabled dementia insurance model that incorporates early screening using voice data. To this end, we adopt

1. Statistics Bureau of Japan, Population Estimates (as of October 1, 2024) , https://www.stat.go.jp/english/data/jinsui/2024np/index.html (11.05.2026)
2. *Cabinet Office*, White Paper on Aging Society, 2017, https://www8.cao.go.jp/kourei/english/annualreport/2017/2017pdf_e.html (11.05.2026)
3. de la Fuente Garcia S., Ritchie C. W., Luz S., *Artificial Intelligence, Speech, and Language Processing Approaches to Monitoring Alzheimer's Disease: A Systematic Review*, "Journal of Alzheimer's Disease", 2020 No 4
4. Cosma S., Rimo G., *Redefining Insurance through Technology: Achievements and Perspectives in Insurtech*, "Research in International Business and Finance", 2024
5. Owens E., Sheehan B., Mullins M., Cunneen M., Ressel J., Castignani G., *Explainable Artificial Intelligence (XAI) in Insurance*, "Risks", 2022 No 12

an extended Unified Theory of Acceptance and Use of Technology (UTAUT) framework, placing particular emphasis on trustworthiness. While prior research has acknowledged the importance of trust-related perceptions, such perceptions have not been systematically verified in the specific context of AI-driven insurance products. We therefore analyze how perceived convenience (effort expectancy), anticipated outcomes (performance expectancy), social influence, facilitating conditions, and trustworthiness shape subscribers' behavioral intention to use AI-enabled dementia insurance products. By clarifying the psychological and social mechanisms underpinning adoption in an aging society, this study offers practical insights for designing insurance products that balance technological performance with trust building, social acceptance, and appropriate expectation management.

1. Literature review

1.1 Research on dementia insurance and risk perception

With the advancement of Japan's aging society, interest in dementia has increased, as well as insurance products addressing this concern. The Japanese government's National Framework (2019) emphasizes that dementia insurance should be designed not only for medical compensation but also primarily for life support and the reduction of family burden.[6] According to the Life Insurance Culture Center, although the necessity of dementia coverage becomes apparent with age, the actual subscription rate remains low.[7]

Furthermore, the Organisation for Economic Co-operation and Development's (OECD) financial literacy survey of adults indicated that older age groups tend to have a limited understanding of risks that may affect their insurance choices.[8] Kadoya et al. demonstrated that a low understanding of dementia insurance is a factor influencing product preference and willingness to subscribe.[9]

1.2 Research on AI in diagnosis and its acceptability in medical and insurance fields

Recent advancements in AI technologies have brought innovation to medical diagnosis and insurance operations. Luz et al.[10] and de la Fuente Garcia et al.[11] demonstrated the utility of linguistic approaches for the early detection of dementia through voice analysis. Additionally, AI-powered diagnostic support may help address physician shortages and contribute to more standardized diagnostic practices in aging societies.

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6. Cabinet Office, *National Framework for Promotion of Dementia Policies*, Government of Japan, 2019, https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000076236.html (11.05.2026)
7. Japan Institute of Life Insurance, *National Field Survey on Life Insurance*, 2023, https://www.jili.or.jp/files/about/2023_katsudo_Eng_all.pdf (11.05.2026)
8. *OECD*, OECD/INFE 2020 International Survey of Adult Financial Literacy, 2020, https://www.oecd.org/en/publications/2020/06/oecd-infe-2020-international-survey-of-adult-financial-literacy_bbad9b27.html (11.05.2026)
9. Kadoya Y., Rabbani N., Khan M. S. R., *Insurance Literacy among Older People in Japan: The Role of Socio-Economic Status,* "Journal of Consumer Affairs", 2022 No. 2, pp. 788–805
10. de la Fuente Garcia S., Ritchie C. W., Luz S., *Artificial Intelligence*, op. cit.
11. de la Fuente Garcia S., Ritchie C. W., Luz S., *Artificial Intelligence*, op. cit.

Longoni et al. further showed that trust in AI-based medical judgments strongly influences intention to use, empirically demonstrating a preference for "human vs. AI" as a decision-maker.[12]

Beyond general technology acceptance, the literature on "trustworthy AI" emphasizes that transparency, accountability, privacy protection, and fairness are essential conditions for the adoption of AI in health-related domains. In particular, health insurance and data-driven decision systems require strong governance frameworks to mitigate risks such as discrimination, misuse of personal data, and opacity in automated decisions. These discussions suggest that trust-related perceptions are not merely individual attitudes but are shaped by institutional and ethical arrangements surrounding AI deployment.[13][14] Such insights are directly relevant to AI-mediated insurance application and screening processes, where users may be sensitive to privacy and ethical concerns.

Recent studies on AI-enabled insurance advisory services also highlight the importance of human-centric design and responsible AI principles. This stream of research argues that the perceived legitimacy of AI advice depends on explainability, user control, and safeguards that reduce psychological discomfort and uncertainty in decision-making.[15] These considerations are particularly relevant to dementia insurance, where consumers may be especially cautious about the consequences of errors and the handling of sensitive personal information.

Zhang et al.indicated that AI chatbots in online insurance application processes can positively influence behavioral intention by enhancing perceived convenience and reassurance, underscoring the importance of interface design and user psychology.[16] Furthermore, Jarek and Mazurek discussed the potential for AI to influence the entire marketing process and promote personalization in insurance, highlighting the strategic significance of AI adoption in the insurance industry.[17] Earlier studies have outlined broad use cases of AI in the insurance sector (e.g., underwriting, claims handling, and customer service), providing a foundational background for the present study.[18] A systematic evolutionary review of AI in banking, financial services, and insurance (BFSI) documents sustained, expanding applications across the sector, underscoring the importance of governance and responsible deployment.[19]

12. Longoni C., Cian L., Giebelhausen M., *AI-Based Medical Diagnosis: A Human vs. AI Decision-Maker Perspective*, "Journal of the American Medical Association", 2019 No 14
13. Ho C. W., Ali J., Caals K., *Ensuring Trustworthy Use of Artificial Intelligence and Big Data Analytics in Health Insurance*, "Bulletin of the World Health Organization", 2020 No 4
14. Owens E., Sheehan B., Mullins M., Cunneen M., Ressel J., Castignani G., *Explainable Artificial Intelligence (XAI) in Insurance*, op. cit.
15. Pisoni G., Díaz-Rodríguez N., *Responsible and Human Centric AI-Based Insurance Advisors*, "Information Processing & Management", 2023 No 3
16. Zhang T., Li J., Wang X., *The Impact of AI Chatbots on Online Insurance Purchase Intention: The Mediating Role of Perceived Convenience and Trust*, "Journal of Research in Interactive Marketing", 2022 No 2
17. Jarek K., Mazurek G., *Marketing and Artificial Intelligence*, "Central European Business Review", 2019 No. 2
18. Kumar N., Srivastava J. D., Bisht H., *Artificial Intelligence in Insurance Sector*, "Journal of the Gujarat Research Society", 2019 No. 7, pp. 79–91
19. Kumar N., Srivastava J. D., Bisht H., *Artificial Intelligence*, op. cit.

In addition, research on insurer-side innovation suggests that technology-enabled change spans multiple insurance value-chain activities and requires organizational alignment to translate digital initiatives into service innovation.[20]

1.3 Research on customer experience and insurance preference

In recent insurance marketing, the user experience (UX) design that emphasizes the "customer journey" is important. Lemon and Verhoef[21] and Rawson et al.[22] empirically demonstrated the impact of consistency and personalization at customer touchpoints on purchasing behavior. Okuda and Yokota also presented that introducing the UX design to insurance sales promotes trust acquisition and behavioral change.[23] These findings apply to the development of AI-powered dementia insurance.

1.4 Positioning of the study

From the aforementioned prior research, AI can effectively support medical diagnosis and insurance contracts, and consumer trust and perceived convenience influence behavioral intention. However, in the specific context of AI-powered dementia insurance, the following aspects remain unclear and lack systematic empirical research.

Beyond basic factors such as "perceived usefulness" and "perceived ease of use" in traditional Technology Acceptance Model (TAM), comprehensive research that systematically verifies the compound impact of multiple psychological and environmental factors on the intention to use AI-powered dementia insurance is limited. These factors include performance expectancy, effort expectancy, and social influence (facilitating conditions from the UTAUT model) and trustworthiness, which has increasingly become an important challenge to AI. Existing research primarily focuses on individual factors and acceptance in broader contexts, such as general medical AI and online insurance applications. Knowledge clarifying the interactions and relative influence of these factors in the specific domain of dementia insurance is insufficient, particularly within the context of specific diseases involving complex psychological and ethical aspects.

In AI technology, particularly in medical diagnosis, the trustworthiness of users becomes an extremely crucial factor due to its "black-box nature" and ethical concerns. Although previous studies suggest that gaining trust in AI influences behavioral intention, only a few empirical analyses used an extended UTAUT model to clarify how trustworthiness relates to other UTAUT model constructs (e.g., performance expectancy and effort expectancy) and influences the final behavioral intention in the specific product and service context of AI-powered dementia insurance.

Performance expectancy (usefulness) is assumed to have a positive impact in technology acceptance research. However, excessive expectations in highly advanced technologies like AI

20. Lanfranchi D., Grassi L., *Examining Insurance Companies' Use of Technology for Innovation*, "The Geneva Papers on Risk and Insurance – Issues and Practice", 2022 No. 3
21. Lemon K. N., Verhoef P. C., *Understanding Customer Experience Throughout the Customer Journey*, "Journal of Marketing", 2016 No 6
22. Rawson A., Duncan E., Jones C., *The Truth About Customer Experience*, "Harvard Business Review", 2013 No 9
23. 奥田 琢馬ほか. ユーザーエクスペリエンスデザインの活用による理想的な保険営業スタイルの実現. Fujitsu : 技術情報誌. 66(3)=388:2015.5,p.69–75. https://ndlsearch.ndl.go.jp/books/R000000004--I026421971(11.05.2026)

could create a gap with reality and conversely inhibit behavioral intention. Nevertheless, this potential negative impact or the importance of expectation setting has not been verified, particularly in the domain of dementia insurance, where users face high psychological hurdles.

Accordingly, this study aims to bridge these gaps in prior research by employing an extended UTAUT model that incorporates the trustworthiness construct. Thus, we can systematically clarify the factors influencing the intention to use AI-powered dementia insurance among insurance subscribers, thereby holding theoretical and practical significance.

2. Background review of dementia insurance and AI

2.1 Current status and challenges of the dementia insurance market

The prevalence of dementia in Japan is increasing every year, with estimates indicating that over 7 million elderly individuals will develop dementia by 2025 and nearly 8 million by 2050. Private dementia insurance is seen as one solution to address this serious social issue. However, the subscription rate remains remarkably low at 7.6% as of 2024.

This low subscription rate is attributed to a combination of challenges. First, awareness of the economic risks associated with dementia is insufficient because dementia has a slow progression and low initial medical costs. Second, existing product designs deviate from customer needs. Many dementia insurance policies are lump-sum payment types, providing insufficient coverage for ongoing care burdens. Third, high premiums and strict enrollment conditions pose barriers, with little incentive for younger generations to subscribe early.

This situation signifies that insurance is not fully fulfilling its role as a social safety net; thus, new insurance models must be established.

2.2 Evolution and redefinition of the social role of dementia insurance

Conventional insurance products have primarily focused on a "post-facto compensation model," emphasizing economic coverage after the onset of an illness. However, for diseases with a long-term and life-support nature, such as dementia, prevention and support from the pre-onset stage must be incorporated.

Therefore, dementia insurance is required to offer comprehensive support functions beyond financial compensation, including prevention, early detection, and preparation for caregiving. This requirement should serve as part of an institutional foundation to maintain the quality of life of the elderly and prevent social losses, such as caregiving-related job resignations and mental stress on families.

Thus, dementia insurance needs to be redefined as a prevention-support type insurance product that responds to social challenges beyond the scope of traditional life insurance.

2.3 Potential for transformation of insurance models through AI technology

Recent AI technological advancements, including voice analysis and natural language processing, are enabling the early detection and improved prediction accuracy of dementia in the medical field. Particularly, acoustic approaches to detecting signs of dementia from free conversation are

groundbreaking in terms of non-invasiveness, convenience, and continuity of diagnosis. They can serve as a means of early intervention and risk assessment when linked with insurance.

Furthermore, AI enables the automation of contract processes and individualized risk assessment, leading to relaxed enrollment conditions and flexible premium design. This feature resolves current barriers, such as enrollment restrictions and pricing issues, thus promoting broader insurance penetration.

Moreover, by incorporating AI screening results into contract terms, insurance evolves from coverage to preventive medical support. Thus, dementia insurance acquires value as a new social infrastructure serving as a nexus for medical care, nursing care, and life support.

3. Theoretical framework and hypotheses

3.1 Existing technology acceptability theories

Theories such as reasoned action theory, TAM, and theory of planned behavior have been proposed in the past to explain the process through which new technologies are accepted by consumers and become established behaviors. Among them, TAM has been widely used as a representative model for analyzing information technology acceptance behavior, centering on two concepts: perceived usefulness and perceived ease of use. These constructs were originally introduced by Davis in the Technology Acceptance Model.[24]

Subsequently, Venkatesh et al. proposed the UTAUT to overcome the limitations of previous models, integrating eight major acceptance theories.[25] This model explains the influence of four constructs, namely, performance expectancy, effort expectancy, social influence, and facilitating conditions, on behavioral intention and actual behavior.

Accordingly, this study adopts the UTAUT model as its foundational theory to analyze consumer acceptance of AI utilization in dementia insurance. Furthermore, this study incorporates trustworthiness (Trust) as an exogenous variable, considering its importance in online medical applications studies. The purpose is to understand the behavioral intention of AI-powered dementia insurance from a multifaceted perspective.

3.2 Hypothesized model of the study

Figure 1 shows the hypothesized model adopted in this study, illustrating the structural relationships between psychological factors leading to behavioral intention toward AI-powered dementia insurance. This model is an extended version of the UTAUT model, incorporating trustworthiness (*Trust*) as an additional construct alongside the main constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions.

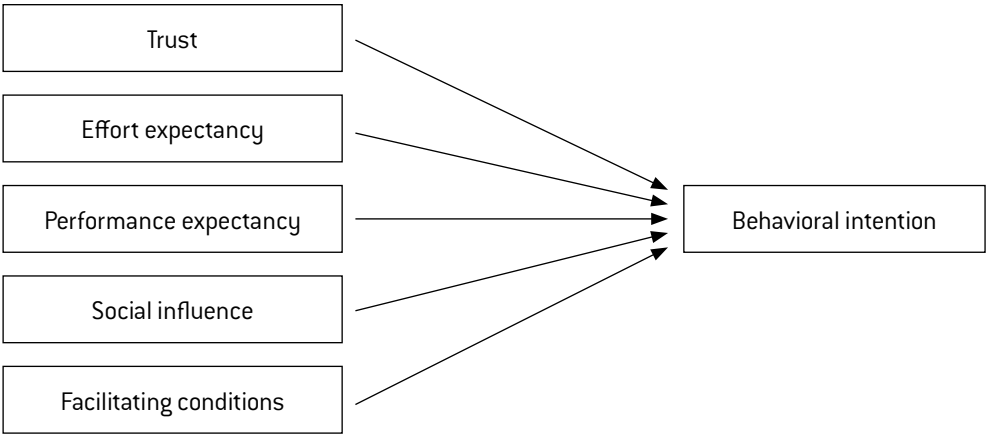
Performance expectancy (representing the anticipated benefits of AI) and effort expectancy (indicating ease of use) are hypothesized to influence behavioral intention independently. Social

24. Davis, F. D., *Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology*, "MIS Quarterly", 1989 No 3

25. Venkatesh V., Morris M. G., Davis G. B., Davis F. D., *User Acceptance of Information Technology: Toward a Unified View*, "MIS Quarterly", 2003 No 3

influence is assumed to shape behavioral intention directly through recommendations and recognition from family, doctors, and experts. Furthermore, facilitating conditions (representing the availability of technological and institutional support) are hypothesized to influence behavioral intention directly. Additionally, trustworthiness, newly introduced in this study, is a factor constituting reassurance regarding AI's diagnostic judgments and data processing. It is hypothesized to influence performance expectancy and effort expectancy as well as directly or indirectly affect behavioral intention. These hypothesized relationships are indicated by arrows and hypothesis numbers (H1–H5) in Figure 1.

Figure 1: Hypothesized and analytical model of the study



Source: Prepared in-house

This structure shows the influence of trustworthiness, performance expectancy, effort expectancy, social influence, and facilitating conditions on behavioral intention. Each hypothesis (H1–H5) is indicated in the figure.

3.3 Hypothesis Formulation

Based on the hypothesized model above, the following hypotheses are formulated:

- **H1: Trustworthiness (*Trust*) positively influences behavioral intention.** If insured individuals trust AI's judgments and its implementation, then their intention to use insurance products incorporating this technology is likely to strengthen.
- **H2: Performance expectancy (*Performance Expectancy*) positively influences behavioral intention.** The clearer the recognition of outcomes, such as AI-based risk detection, screening, and waiver of disclosure, the higher the intention to use the relevant insurance product.
- **H3: Effort expectancy (*Effort Expectancy*) positively influences behavioral intention.** If AI-powered insurance services are evaluated as simple and intuitive to use, then consumers' intention to use them strengthens.
- **H4: Social influence (*Social Influence*) positively influences behavioral intention.** If recommendations and endorsements are gathered from those around, such as family, doctors, and experts, then the intention to use the relevant insurance product increases.

- **H5: Facilitating conditions (*Facilitating Conditions*) positively influence behavioral intention.** If technological and institutional conditions are perceived as well-established, such as the availability of smartphones and the Internet environment and online support from insurance companies, then they can support the formation of behavioral intention.

4. Research methodology

4.1 Questionnaire design

This study aimed to clarify consumer acceptance intention toward AI-powered dementia insurance by conducting a questionnaire survey based on the UTAUT model. Specifically, it introduced trustworthiness as a new construct in addition to the four constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions, and analyzed their impact on behavioral intention.

Each construct is as follows, and each is composed of multiple questionnaire items. All questions were answered on a 5-point Likert scale (from 1 = strongly disagree to 5 = strongly agree).

Table 1 presents the descriptive statistics of the constructs examined in this study, including the mean and standard deviation for each item. These results provide an overview of the general trends in participants' responses.

Table 1. Survey questions

Construct	Question number	Example content
Performance Expectancy	Q1–Q3	Do you feel that AI-based diagnosis is useful?
Effort Expectancy	Q4–Q5	Is the AI-based application process easy?
Social Influence	Q6–Q8	Does the recommendation of family and experts influence your behavioral intention?
Facilitating Conditions	Q9–Q11	Are information and support systems well-established?
Trustworthiness	Q12–Q14	Do you feel that you can trust the AI's judgment and processing?
Behavioral Intention	Q15–Q17	Would you consider using AI-powered dementia insurance?

4.2 Survey target and implementation method

This survey was conducted in 2025 through an online research company. The target population comprised 200 individuals across Japan, aged between 20 and 79, representing the general age range for insurance subscription. Among them, 133 valid responses were obtained from participants who currently hold insurance policies.

Considering the relatively small sample size (n = 133) and the online sampling approach, this study has been regarded as preliminary. The findings should be interpreted with caution, **particularly in terms of generalizability to the broader population**.

To assess the key constructs of the UTAUT, a structured questionnaire was developed. The model includes five constructs: performance expectancy, effort expectancy, social influence, facilitating conditions, and trust. Table 2 presents an overview of these constructs, along with the corresponding questionnaire items used to measure each.

The main attributes of the survey participants are as follows.

Table 2. Constructs and question contents

Construct	Question content
Performance Expectancy	Q1: Do you think grasping dementia risk early through AI is beneficial? Q2: Do you think reducing the process of dementia diagnosis through AI is highly convenient? Q3: If an AI-based dementia risk assessment is available, do you think it would be useful for preparing for caregiving in advance?
Effort Expectancy	Q4: Do you find insurance products with an AI-based waiver of disclosure, which are simpler in procedure than traditional insurance, attractive for you to consider subscribing to? Q5: Do you think that an AI-based waiver of disclosure dementia insurance can be easily applied for by anyone, including the elderly?
Social Influence	Q6: If family or friends used an AI-based waiver of disclosure insurance, would you consider it? Q7: If medical professionals recommend an AI-based waiver of disclosure insurance, would you feel secure using it? Q8: Do you think your interest would increase if an AI-based waiver of disclosure insurance were introduced in the media?
Facilitating Conditions	Q9: Do you think it would be convenient if an AI-based waiver of disclosure insurance could be purchased online? Q10: Do you feel secure using an AI-based waiver of disclosure insurance if support is available from insurance companies and experts? Q11: Do you feel confident in AI-based waiver of disclosure insurance if the government and local authorities promote it?
Trustworthiness	Q12: Do you trust AI diagnostic results to a certain degree? Q13: Can you trust AI services provided by insurance companies? Q14: Do you feel secure in contracting insurance products where AI determines eligibility for insurance coverage?
Behavioral Intention	Q15: If such AI-powered insurance were available, would you consider subscribing? Q16: If such AI-powered dementia insurance were available, would you use it in the future if your dementia risk increased? Q17: If such AI-powered dementia insurance were available, would you seriously consider subscribing if recommended by others?

Attributes of Survey Participants (n = 133)
Gender: Male: 81 (61%), Female: 52 (39%)
Age Range: 20–79 years

4.3 Analytical methods

This study conducted a statistical analysis based on the following procedures:

Descriptive statistics – mean values and standard deviations for each questionnaire item to grasp overall response trends were calculated;

Multiple regression analysis – multiple regression analysis was performed with *Behavioral intention* (average of Q15–Q17) as the dependent variable and the other five constructs (average of Q1–Q14) as independent variables, targeting insurance subscribers (n = 133).

5. Analysis results

5.1 Descriptive statistics and correlation analysis

This study analyzed behavioral intention (BI; mean of 0.15–0.17) as the dependent variable and performance expectancy (PE; mean of 0.1–0.3), effort expectancy (EE; mean of 0.4–0.5), social influence (SI; mean of 0.6–0.8), facilitating conditions (FC; mean of 0.9–0.11), and trustworthiness (TW; mean of 0.12–0.14) as independent variables. The analysis used data from 133 insurance subscribers. Table 3 presents the descriptive statistics for each construct. Table 4 presents the Pearson correlation matrix among the independent variables. To assess multicollinearity, we also computed the tolerance and variance inflation factors (VIF) (Table 5). The collinearity diagnostics indicated no serious multicollinearity concerns (VIFs = 2.15–4.91; tolerance = 0.204–0.465). Overall, the mean scores ranged from approximately 2.5 to 2.7, indicating no extreme response tendencies. The standard deviations were approximately 0.7, suggesting relatively limited dispersion across constructs.

Table 3. Descriptive statistics for each variable (n = 133)

Variable	Mean	Standard deviation	Minimum	Maximum	Number of responses (n)
Performance Expectancy	2.528	0.746	1	5	133
Effort Expectancy	2.669	0.747	1	5	133
Social Influence	2.734	0.775	1	5	133
Facilitating Conditions	2.682	0.737	1	5	133
Trustworthiness	2.502	0.735	1	5	133
Behavioral Intention	2.644	0.735	1	5	133

Table 4. Pearson correlation matrix among independent variables (n = 133)

Variable	1	2	3	4	5
Performance Expectancy	1.000				
Effort Expectancy	0.675***	1.000			
Social Influence	0.654***	0.738***	1.000		
Facilitating Conditions	0.685***	0.752***	0.857***	1.000	
Trustworthiness	0.641***	0.761***	0.828***	0.794***	1.000

Note. Pearson's r is reported. ***p < .001 (two-tailed).

Table 5. Collinearity diagnostics for the regression model (tolerance and VIF; n = 133)

Predictor	Tolerance	VIF
Performance Expectancy	0.465	2.15
Effort Expectancy	0.332	3.01
Social Influence	0.204	4.91
Facilitating Conditions	0.217	4.61
Trustworthiness	0.256	3.91

Note. VIF = variance inflation factor.

5.2 Multiple regression analysis results

This study conducted multiple regression analysis to clarify the factors influencing behavioral intention toward AI-powered dementia insurance (average of 0.15–0.17). The analysis included performance expectancy, effort expectancy, social influence, facilitating conditions, and trustworthiness as the independent variables. Ordinary least squares was used for the analysis, and the overall significance of the model and the significance of each coefficient were verified (n = 133). The results are shown in Table 6.

Table 6. Multiple regression analysis results for behavioral intention (n = 133)

Variable	Regression coefficient (β)	Standard error	t-value	p-value
Constant	0.221	0.145	1.521	0.131
Performance Expectancy	–0.223	0.071	–3.125	0.002
Effort Expectancy	0.203	0.084	2.415	0.017
Social Influence	0.650	0.097	6.720	<0.001
Facilitating Conditions	0.043	0.096	0.446	0.657
Trustworthiness	0.274	0.093	2.936	0.004

Notes: Coefficient of determination $R^2 = 0.780$ (Independent variables explain 78.0% of behavioral intention.) Overall model significance: F-value (F-test): 90.21 ($p < 0.001$) → Overall model is significant.

The analysis results confirmed that social influence ($\beta = 0.650$, $p < 0.001$) and trustworthiness ($\beta = 0.274$, $p = 0.004$) have a significant positive impact. Particularly, the coefficient for social influence was the largest, confirming that recommendations and approval from family and medical professionals strongly enhance the intention to use insurance.

Furthermore, effort expectancy ($\beta = 0.203$, $p = 0.017$) also showed a significant positive impact, revealing that the evaluation of AI-powered contract procedures and diagnostic processes as intuitive and simple contributes to the formation of behavioral intention.

In contrast, performance expectancy ($\beta = -0.223$, $p = 0.002$) was significant but showed a negative coefficient, rejecting the initial hypothesis. Therefore, expectations for AI's technical performance and functions do not necessarily translate directly into behavioral intention, and overly high expectations may conversely inhibit preference.

Facilitating conditions ($\beta = 0.043$, $p = 0.657$) did not show a statistically significant impact. Therefore, the presence of physical and institutional support, such as smartphones and the Internet environment, may have a limited direct impact on behavioral intention.

6. Discussion: implications based on analysis results

6.1. Importance of social influence and trustworthiness

Based on the multiple regression analysis results of this study, the following findings were obtained regarding the key factors influencing the behavioral intention of AI-powered dementia insurance. These findings promote a multifaceted understanding of AI technology characteristics, the social

role of dementia insurance, and consumer psychology in an aging society. These factors, although interrelated, derive practical implications for building a new insurance model.

The analysis result confirmed that social influence ($\beta = 0.650$, $p < 0.001$) has the strongest and most significant positive impact on behavioral intention. Therefore, recommendations and approval from those around, such as family and medical professionals, significantly influence the decision-making of the elderly and their families. Even for insurance products incorporating new AI technology, the aspect of social acceptance, such as "who recommends it" and "how it is socially accepted," strongly affects the formation of consumers' behavioral intention, rather than the innovativeness.

Additionally, trustworthiness ($\beta = 0.274$, $p = 0.004$) also showed a significant positive impact on behavioral intention. Therefore, trust in AI's judgments and its implementation is indispensable for enhancing behavioral intention. This finding aligns with previous research stating that trust is an important factor in contract decision-making in conventional life insurance. Amid concerns about AI's black-box nature and ethical issues, consumers' sense of security and perception of validity regarding AI technology largely determine its acceptance.

These results indicate that for the widespread adoption of AI-powered dementia insurance, emphasizing technological superiority and ensuring information dissemination through social networks based on human relationships are indispensable, including the transparency and safety of the AI system.

6.2. Negative impact of performance expectancy: gap between expectation and reality and perceived potential risks

Interestingly, performance expectancy ($\beta = -0.223$, $p = 0.002$) was statistically significant but showed a negative coefficient, thus rejecting the initial hypothesis. Therefore, overly high expected outcomes such as AI-based dementia risk assessment and diagnostic accuracy may, conversely, lead to user skepticism or risk-averse attitudes. This phenomenon can be interpreted in relation to findings from expectation–confirmation theory. It suggests that high initial expectations can create a gap with subsequent perceived performance, leading to dissatisfaction and decreased behavioral intention.

Particularly, the characteristics of dementia also influence this result. Dementia diagnosis is delicate, and the more the "high accuracy" of AI diagnosis is recommended, the more potential risk perception increases regarding negative aspects, such as the risk of misdiagnosis, privacy infringement concerns, and psychological burden (e.g., increased anxiety due to early diagnosis). Therefore, users do not accept AI's capabilities as absolute but rather are overly concerned about the uncertainty caused by "imperfect AI" diagnostic results and the associated psychological and economic impacts. Furthermore, differences in technological literacy among the elderly and distrust of AI are also background factors. In situations where AI technology is not fully understood, exaggerated communication of its outcomes can conversely lead to distrust or rejection, such as "I can't handle this." Therefore, in marketing AI-powered dementia insurance, its outcomes must not be overemphasized. Rather, realistic and appropriate expectations must be set, and transparent information about AI's limitations and usage conditions must be carefully provided. This approach will reduce users' psychological resistance and encourage acceptance.

6.3. Positive impact of effort expectancy: evaluation of simplicity

Effort expectancy (β = 0.203, p = 0.017) showed a significant positive impact on behavioral intention. Therefore, evaluating AI-powered contract procedures and diagnostic processes as simple and intuitive contributes to the formation of consumers' behavioral intention. In today's society, smartphone and Internet penetration are increasing, and elderly individuals are gaining a certain degree of digital literacy. Thus, the non-face-to-face convenience and ease of understanding provided by AI can enhance service acceptability. This finding emphasizes the importance of pursuing the simplification of user interface (UI)/user experience (UX) and intuitive operability in the service design of AI-powered dementia insurance.

6.4. Limited impact of facilitating conditions

In contrast, facilitating conditions (β = 0.043, p = 0.657) did not show a statistically significant impact. Therefore, the presence of physical and institutional support, such as the availability of smartphones and online support from insurance companies, may have a limited direct impact on behavioral intention in the context of insurance contracts. Rather, psychological and social factors, such as trustworthiness and social influence, have a superior effect on consumers' decision-making.

This result indicates that in an era where infrastructure development has progressed, overcoming psychological barriers and fostering social acceptance should be prioritized over providing technological infrastructure only for the widespread adoption of AI-powered insurance.

6.5. Theoretical and practical implications

This study empirically clarified the acceptance mechanism of AI technology in the insurance field by using an extended UTAUT model that incorporates trustworthiness. The finding that trust in the technology and social support from family members and experts significantly influence consumers' behavioral intention—beyond AI performance and functionality—constitutes an important theoretical contribution.

Moreover, the negative effect of performance expectancy highlights a complex interaction between AI characteristics and consumer psychology, offering a new perspective for traditional technology acceptance models. From an expectation–confirmation perspective, excessively high expectations may amplify perceived risks (e.g., concerns about misdiagnosis or privacy), thereby inhibiting the intention to use.

From a practical standpoint, insurers developing and marketing AI-enabled dementia insurance products should not solely focus on technological convenience or accuracy. AI adoption can reshape not only customer-facing processes but also insurers' broader business models and value-chain roles. Accordingly, product and service design should be aligned with clear AI-enabled value propositions and governance arrangements rather than treated as a standalone feature.[26]

26. Zarifis A., Holland C. P., Milne A., *Evaluating the Impact of AI on Insurance: The Four Emerging AI – and Data--Driven Business Models*, "Emerald Open Research", 2019 No. 1

First, it is essential to enhance the visibility of trustworthiness. Insurers should strengthen transparency regarding AI decision-making and data usage and clearly communicate security measures. This is particularly important for fostering users' peace of mind regarding data privacy and ethical AI use when handling sensitive information related to dementia. Prior research on AI-mediated customer interaction suggests that trust is a key determinant of whether users accept AI-based interfaces, including chatbots, in insurance contexts. Emerging evidence indicates that some consumers may resist AI-based interaction when trust is insufficient, implying that "more AI" does not automatically translate into higher acceptance. Therefore, insurers should complement technical advancement with trust-building measures, such as clear disclosure, explainability, and options for human support.[27][28]

From the insurer perspective, organizational and governance-related barriers (e.g., strategic IT alignment, skills, and implementation readiness) can materially constrain AI adoption, indicating that consumer acceptance should be addressed in parallel with supply-side implementation capability.[29]

Second, promoting social acceptability can facilitate adoption. Recommendations through influential channels—such as family members and medical professionals—together with broader public communication (e.g., media outreach) about the significance of dementia insurance and the benefits of AI utilization may help AI-enabled insurance products be recognized as quasi-public services that reduce risks not only for individuals but also for society as a whole, thereby cultivating a supportive environment for acceptance.

Third, managing expectations by presenting realistic and concrete benefits is critical. Negative reactions driven by gaps between expectations and reality should be avoided by refraining from exaggerating AI capabilities and instead communicating tangible benefits (e.g., simplified procedures and reassurance from early detection opportunities). Rather than emphasizing diagnostic accuracy alone, it may be more effective to highlight values rooted in users' daily lives, such as securing sufficient time to prepare for caregiving through earlier awareness and planning.

Finally, designing a simple and accessible user interface is necessary to increase BI. Intuitive and easy-to-understand online procedures and AI screening mechanisms that can be used by older adults with minimal burden are crucial. This aligns with the observed positive effect of effort expectancy and contributes to accessibility by addressing the digital divide.

Conclusion and future outlook

This study examined consumer acceptance of AI-enabled dementia insurance products using an extended UTAUT model incorporating trustworthiness. Based on a survey of 133 policyholders and multiple regression analysis, the results indicate that trustworthiness and social influence are

27. de Andrés-Sánchez J., Gené-Albesa J., *Not with the Bot! The Relevance of Trust to Explain the Acceptance of Chatbots by Insurance Customers*, "Humanities and Social Sciences Communications", 2024 No. 1
28. Cosma S., Rimo G., *Redefining*, op. cit.
29. da Silva Tavares E., Leardini M., Pessoa M. S. P., *How Do the Barriers That Prevent or Hinder the Applicability of Artificial Intelligence Impact Its Use in an Insurance Company*, "Innovation & Management Review", 2024 No 1

the strongest positive predictors of behavioral intention, while effort expectancy also contributes positively. In contrast, performance expectancy showed a negative association, suggesting that overly high expectations regarding AI may amplify perceived risks (e.g., concerns about misdiagnosis or privacy) and reduce willingness to adopt. Facilitating conditions did not have a statistically significant effect.

Theoretically, this study contributes to technology acceptance research by extending the UTAUT framework to include trustworthiness and by empirically demonstrating its importance in an AI-enabled insurance context. The findings suggest that, for advanced technologies such as AI, consumers' intentions are shaped not only by expected usefulness and ease of use, but also by trust-related perceptions, which are particularly salient when sensitive information related to dementia is involved.

In addition, this study offers a new perspective on performance expectancy by showing that it may be negatively associated with behavioral intention in the context of AI-powered dementia insurance. This result departs from the typically positive relationship reported in prior UTAUT and TAM studies and implies a more complex acceptance mechanism, in which heightened expectations can intensify risk perceptions and uncertainty, thereby inhibiting adoption. From an expectation–confirmation perspective, this finding highlights the potential adverse effects of unrealistic expectations in ethics-intensive insurance settings.

Furthermore, this study clarifies AI acceptance mechanisms in the insurance domain by identifying the combined roles of trustworthiness and social influence in shaping responses to long-term, uncertainty-intensive risks such as dementia. Because insurance products function as quasi-public services, these findings extend acceptance research into healthcare-related insurance settings, where psychological, social, and institutional considerations interact.

From a practical standpoint, the results suggest that insurers developing and marketing AI-enabled dementia insurance products should not focus solely on technological convenience or accuracy. AI adoption can reshape not only customer-facing processes, but also insurers' broader business models and value-chain roles; therefore, product and service design should align with clear AI-enabled value propositions and governance arrangements, rather than be treated as a standalone feature.[30] In particular, enhancing the visibility of trustworthiness is essential: insurers should strengthen transparency regarding AI decision-making and data usage and clearly communicate security measures. Prior research on AI-mediated customer interaction indicates that trust is a key determinant of whether users accept AI-based interfaces, including chatbots, in insurance contexts; "more AI" does not automatically translate into higher acceptance when trust is insufficient.[31] Accordingly, insurers should complement technical advancement with trust-building measures, such as clear disclosure, explainability, and options for human support. At the same time, organizational and governance-related barriers (e.g., strategic IT alignment, skills, and implementation readiness) can materially constrain AI adoption, indicating that consumer acceptance should be addressed in parallel with supply-side implementation capability.[32]

30. Zarifis A., Holland C. P., Milne A., *Evaluating*, op. cit.
31. de Andrés-Sánchez J., Gené-Albesa J., *Not*, op. cit.
32. da Silva Tavares E., Leardini M., Pessoa M. S. P., *How*, op. cit.

Several limitations should be noted. First, the sample size was relatively small and was collected via an online survey, which may limit generalizability. Future research should validate the model using larger and more diverse samples, including older adults and caregivers, and should examine whether the findings replicate across different data collection methods. Second, because all measures were self-reported, future studies may incorporate behavioral data (e.g., usage logs) and real-world adoption outcomes, where feasible. Third, although this study treated trustworthiness as a single construct, prior Insurtech research increasingly conceptualizes trust in AI as multidimensional and linked to governance, transparency, and institutional credibility, rather than as a single attitudinal factor.[33] Future research may therefore operationalize distinct dimensions (e.g., technical reliability, organizational accountability, and ethical legitimacy) and test their differentiated effects within AI-enabled insurance adoption models. Finally, cross-national studies are needed to examine whether the acceptance mechanisms identified here generalize beyond Japan, calling for both domestic and international comparative research.

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Możliwości i wyzwania związane z wykorzystaniem sztucznej inteligencji w produktach ubezpieczeniowych dotyczących demencji: doświadczenia z Japonii

Japonia stoi w obliczu starzejącego się społeczeństwa i gwałtownego wzrostu liczby pacjentów z demencją. W związku z tym prywatne ubezpieczenia od demencji pojawiły się jako istotne rozwiązanie, choć ich udział rynkowy pozostaje ograniczony. Postęp w technologii sztucznej inteligencji (AI) umożliwia nieinwazyjne, wczesne wykrywanie demencji, co sugeruje możliwe przejście od tradycyjnych modeli „post-gwarancyjnych" do ubezpieczeń „wspierających prewencję". Jednak społeczna akceptacja takich ubezpieczeń opartych na AI jest nadal słabo zbadana.

W niniejszym opracowaniu zastosowano rozszerzony model Zunifikowanej Teorii Akceptacji i Użytkowania Technologii (UTAUT), uwzględniając zaufanie jako kluczowy element. Wśród 133 ubezpieczony przeprowadzona została ankieta a uzyskane dane przeanalizowano za pomocą regresji wielokrotnej (wielu zmiennych). Wyniki pokazują, że zaufanie (trust) i wpływ społeczny (social influence) są najsilniejszymi pozytywnymi predyktorami deklarowanej gotowości lub zamiarów klienta do korzystania z rozwiązań ubezpieczeniowych opartych na AI. Oczekiwana łatwość użycia (effort expectancy) również miała pozytywny wpływ, natomiast oczekiwana użyteczność (performance expectancy) wykazała wpływ negatywny, co sugeruje, że zbyt wysokie oczekiwania wobec skuteczności AI mogą hamować jej adopcję.

Uzyskane wyniki mają istotne znaczenie praktyczne dla dostawców usług ubezpieczeniowych, wskazując, że budowanie zaufania oraz promowanie społecznej akceptacji mogą być skuteczniejszymi strategiami niż samo podkreślanie technicznej wydajności rozwiązań. Ponadto badanie wnosi wkład do istniejącej literatury poprzez rozszerzenie modelu UTAUT oraz dostarcza nowych wniosków dotyczących akceptacji przez użytkowników usług ubezpieczeniowych opartych na sztucznej inteligencji.

Słowa kluczowe: ubezpieczenie od demencji, technologia AI, model UTAUT, akceptacja społeczna, akceptacja technologii

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