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Technology Acceptance and Service Experience of Elderly Users with AI Translation Tools

Zhang Zhengkun[1], Guo Chuhao[1], Wu Gaoshan[2], Shenhui[2], Wen Junhao[3], Wang Jia[4], Liang Wenrui[2,4*]

[1]Faculty of International Tourism and Management, City University of Macau, Macau, China, 999078.
[2]Beijing Normal University-Hong Kong Baptist University United Inernational College, Zhuhai, China, 519087.
[3]College of Music & Dance,Guangzhou University,510006, China.
[4]University of Malaya, Kuala Lumpur, Malaysia, 50603; s2131713@siswa.um.edu.my (L.W.).

Abstract. With advancements in artificial intelligence (AI), AI-assisted translation tools have become vital for daily communication. However, elderly users often face various challenges and obstacles when adopting these technologies. Using the Technology Acceptance Model (TAM) and Service-Dominant Logic (SDL), this study delves into the behaviors and experiences of elderly users engaging with AI translation tools. Based on interviews with multiple elderly participants, the findings reveal that their acceptance of new technologies depends not only on ease of use and functionality but also on factors like service experience, emotional support, and social networks. The study highlights that simplifying interface design, improving translation accuracy, and providing personalized training and service support are key to enhancing technology acceptance among the elderly. Theoretically, this study extends the application of TAM and SDL, while practically, it offers actionable recommendations for the design and promotion of AI translation tools.

Keywords: AI translation tools, Digital adaptation, Elderly users, Emotional support, Service-Dominant Logic (SDL), Technology Acceptance Model (TAM).

1. INTRODUCTION

The global trend of aging has intensified focus on the social participation and technological inclusivity of elderly populations(Wang et al.,2023;Wang et al.,2024). In the realm of language services, the rise of AI-assisted translation tools offers elderly users an effective means of communication, bridging language barriers and helping them integrate into the global economy and cultural networks(Zhu et al.,2023;Feng et al.,2024). As an increasingly significant consumer demographic, elderly users' specific needs and behavior patterns hold crucial value in the development and commercialization of AI-assisted translation tools.Existing research primarily emphasizes technical performance and young users' experiences, with insufficient attention given to elderly users(Jiang et al.,2024;Wang et al.,2023). Two significant gaps are identified: (1) a lack of systematic analysis of elderly users' behavioral patterns and primary obstacles when using AI-assisted translation tools, and (2) insufficient exploration of business models and market strategies targeting elderly users. This study addresses these gaps by exploring the intersection of elderly users and AI-assisted translation tools from both theoretical and practical perspectives.Specifically, the study aims to: Uncover the needs and barriers faced by elderly users to inform technological optimization.Develop market strategies for AI-assisted translation tools targeting elderly users, providing actionable insights for businesses.Two central research questions guide this study: What obstacles do elderly users encounter when using AI-assisted translation tools?How should AI-assisted translation tools be designed and marketed to enhance acceptance and market penetration among elderly users? Using semi-structured interviews and integrating TAM with SDL, this study not only deepens theoretical understanding of elderly users' technology adoption behaviors but also provides practical insights for developing effective market strategies. This research advances technological inclusivity for the elderly and offers inspiration for intergenerational technological integration and innovation.

2. LITERATURE REVIEW

2.1. AI-Assisted Translation Technologies and Applications

Recent advancements in AI-assisted translation (AIAT) technologies, including natural language processing, neural machine translation (NMT), and speech recognition, have significantly improved translation quality (Yann et al., 2024). Popular tools such as Google Translate and DeepL provide high-quality multilingual services across various sectors, including education, tourism, and e-commerce (Schmitt, 2019). However, these studies largely focus on younger users, neglecting the unique scenarios faced by elderly users (Kuerbis et al., 2017). Elderly users present unique physiological, cognitive, and psychological requirements, posing new challenges for technology usability, such as simplified interface design, adjustable font sizes, and enhanced voice interactions. Moreover, factors such as cultural background, technological literacy, and economic capacity influence elderly users' behaviors (Ryan et al., 1995). While AI translation tools continue to evolve, ensuring accessibility for elderly users remains underexplored.

2.2. Factors Influencing Technology Adoption Among Elderly Users

The adoption of technology by elderly users has emerged as a key research area in digital inclusion (Peek et

* Correspondence: s2131713@siswa.um.edu.my

al., 2014; Fan et al.,2024). According to TAM and the Unified Theory of Acceptance and Use of Technology (UTAUT), elderly users' adoption of new technologies is primarily influenced by perceived usefulness, ease of use, and social support (Ma & Luo, 2024). Simple interfaces and intuitive functionality are crucial (Li & Luximon, 2020). Psychological safety also significantly impacts adoption, as concerns about data privacy may deter elderly users (Roberts et al., 2021). Existing studies reveal obstacles such as limited technical knowledge, declining learning capacity, and a widening digital divide. However, research on elderly users' adoption of language service technologies, particularly AI-assisted translation tools, remains sparse (Shokoohifar, 2024; Mao et al.,2024).

2.3. Market Strategies and Business Models for AI Translation Tools

Effective commercialization strategies play a vital role in the widespread adoption of AI technologies (Wamba-Taguimdje et al., 2020). Studies indicate that successful market strategies often include user segmentation, scenario-based services, and community engagement (van der Bijl-Brouwer & van der Voort, 2013). Elderly users represent a growing market segment with substantial purchasing power and increasing demand for cross-cultural communication and globalization (Crane, 2016). However, current market strategies often fail to cater to this demographic. This misalignment between technological capabilities and user needs underscores the importance of understanding elderly users' behavior and developing targeted strategies (Mao et al.,2024).

2.4. Research Framework

This study integrates TAM and SDL to bridge the research gap. This theoretical framework facilitates understanding elderly users' behavioral patterns and supports businesses in developing effective market strategies.

3. RESEARCH METHODOLOGY

3.1. Research Design

This qualitative study employs semi-structured interviews to investigate the needs, obstacles, and market strategies applicable to elderly users of AI-assisted translation tools (Xie et al.,2024). This approach allows for in-depth exploration of personal experiences while adapting questions to uncover deeper insights.

3.2. Sample Selection

Participants were selected through purposive sampling, including: Elderly users: 40 participants aged 60 and above, balanced by gender, with diverse cultural backgrounds and varying levels of technological experience. Participants were recruited via community recommendations, workshops, and online user groups to ensure diversity and representativeness. Industry representatives: 5 professionals from the AI translation industry, including product managers, marketing experts, and R&D personnel, to provide insights into market strategies.

3.3. Interview Design

Interviews focused on three themes: Experiences with AI-assisted translation tools, including operational challenges and functional needs. Acceptance of translation products and feedback on promotional activities. Challenges and opportunities in designing and promoting AI translation tools for elderly users.Each interview lasted 40–60 minutes, with recordings transcribed verbatim and coded for analysis.

3.4. Data Analysis

Data were analyzed using thematic analysis, including:Initial Coding: Transcripts were coded using NVivo, identifying keywords such as "interface complexity" and "privacy concerns."Theme Development: Codes were grouped into themes like "technical barriers," "psychological safety," and "market strategy preferences." In-Depth Analysis: Core themes were cross-referenced with research questions to identify user needs and obstacles, while feedback from industry representatives informed market strategies.

3.5. Interview Findings

3.5.1. Technical Barriers

Elderly respondents frequently reported that the interface design of existing AI-assisted translation tools is overly complex (75% of elderly respondents). Specific issues include too many menu layers and unclear function descriptions. Furthermore, approximately 50% of elderly respondents expressed concerns about privacy and security, believing that translation tools could potentially leak personal information.

3.5.2. Psychological Needs

Many elderly users emphasized the importance of psychological comfort when using new technologies. Around 60% mentioned feeling anxious about making mistakes or misusing tools, especially when there is a lack of immediate technical support. Additionally, 40% of respondents noted that positive feedback, such as praise or encouragement during tool use, could significantly enhance their willingness to adopt the technology.

3.5.3. Functional Optimization

Elderly users provided specific suggestions for improving tool functionality, such as simplifying the interface, increasing font size, and enhancing voice interaction capabilities. Approximately 70% of respondents expressed a preference for voice translation features, while nearly 55% suggested adding localized cultural references to improve translation accuracy and relatability.

3.5.4. Market Channel Preferences

The study revealed that elderly users are more likely to trust tools recommended by their social networks, such as family members, friends, or community organizations. Over 65% of respondents stated they are willing to participate in technology workshops organized by local communities, indicating the importance of interpersonal influence in promoting AI-assisted translation tools.

3.5.5. Community Support

Elderly respondents highlighted the role of social support systems in facilitating their adoption of AI-assisted translation tools. About 50% expressed interest in participating in user groups or forums where they could share experiences and learn from peers. Community-based training sessions were also deemed effective in improving their digital literacy.

4. RESEARCH FINDINGS

4.1. Major Barriers for Elderly Users in Adopting AI-Assisted Translation

Interview results indicate that elderly users face three primary barriers when using AI-assisted translation tools: technical, cognitive, and psychological challenges. Technical Barriers: These are the most common difficulties. Many respondents reported that the interface design of translation tools is overly complex and not intuitive, particularly for elderly users unfamiliar with smart devices. For example, Respondent A mentioned, "Every time I use a translation app, I spend a long time finding the voice input feature; the steps are too complicated." Additionally, redundant features and unfamiliar terminology increase the difficulty of use, as many elderly users do not understand terms like "batch translation" or "translation memory." Respondent B stated, "I've never heard of these terms—they seem so complicated." Furthermore, the accuracy of voice recognition is a significant issue, especially in dialect-heavy environments commonly used by elderly users. Respondent C noted, "I speak my local dialect, and the translation tool doesn't understand me—the results are always wrong."Cognitive Barriers: Many respondents expressed that learning to use new technologies takes significant time, especially for those with no prior exposure to digital tools. Respondent D remarked, "At my age, learning these things is particularly difficult."Psychological Barriers: Concerns about privacy are prominent, with some elderly users fearing that their personal information could be leaked. Respondent E said, "I'm hesitant to input personal information into translation software—I'm worried it might leak my privacy."

4.2. Needs and Preferences of Elderly Users for AI-Assisted Translation Tools

Despite facing various barriers, respondents articulated clear needs and preferences for AI-assisted translation tools.Firstly, many emphasized the importance of simplifying functionality and interface design, making the operation more intuitive and user-friendly. Respondent F suggested, "It should be as simple as dialing a phone—open it and translate directly."Secondly, elderly users expressed a strong preference for tools that support more dialect recognition and translation, particularly for their local dialects. Respondent G stated, "If the translation tool could accurately translate Cantonese, it would be incredibly convenient."Moreover, psychological support and community interaction emerged as crucial factors influencing their willingness to adopt such tools. Respondent H remarked, "If there were dedicated instructors or community activities to teach us how to use these tools, I'd be more willing to try."The elderly generally prefer learning through community activities or workshops, where they can acquire skills in a social and interactive setting rather than learning independently.

4.3. Market Strategy Analysis for Elderly Users

In terms of marketing, strategies targeting elderly users should focus on addressing their specific needs(Sabri et al.,2024).Firstly, offline promotional activities are deemed the most effective method. Many respondents stated they prefer attending in-person technology experience sessions or training courses to understand the functions of translation tools through hands-on experience. Respondent I noted, "I prefer on-site experiences where I can operate the tools directly and ask questions to the staff."Additionally, collaborating with elderly care institutions is considered an effective market strategy. Respondent J suggested, "If free technical training sessions were held in nursing homes or communities, I would definitely participate to learn more." By partnering with nursing homes and community centers, companies can better reach elderly users and provide customized services to meet their needs.Furthermore, brand promotion that emphasizes emotional value resonates strongly with elderly users. They are more inclined to support brands that show care and empathy. Respondent K shared, "If a brand designs products specifically for us elderly people and emphasizes caring for us, I'd be more willing to support it."

4.4. Potential Value of AI-Assisted Translation for Elderly Users

Despite some barriers, AI-assisted translation tools hold significant potential to help elderly users better integrate into the digital society and globalized communication environment.Firstly, enhancing cross-cultural communication abilities is a key motivation for elderly users to adopt translation tools. Respondent L noted, "I can use the translation software to communicate with foreign friends without worrying about language barriers."Additionally, AI translation tools can enhance the elderly's sense of digital participation, helping them overcome anxieties about being left behind by the times. Respondent M commented, "After learning to use these translation tools, I feel I can integrate better into modern society and no longer see myself as outdated."By mastering translation tools, elderly users can not only improve their cross-cultural communication skills but also build confidence, further integrating into the digital world and experiencing equality and respect in communication with others.These findings suggest that AI-assisted translation tools can alleviate language barriers for elderly users and play a broader role in fostering social and cultural exchange, promoting social inclusion, and enhancing digital participation among the elderly.

5. DISCUSSION

This study delves into the multifaceted barriers and needs experienced by older adults when using AI-assisted translation tools, as well as their psychological and behavioral responses to technology adoption. By analyzing interview data, we explore these phenomena through philosophical, anthropological, the Technology Acceptance Model (TAM), and Service-Dominant Logic (SDL) frameworks, reflecting on how older adults interact with AI technology and how market strategies can optimize their user experience.

For older adults, adapting to technology is not merely about learning a new tool; it challenges their established way of life and cognitive frameworks. Their interactions with AI translation tools often evoke feelings of "alienation," closely linked to the concept of "technological alienation." Complex interfaces and opaque functionalities exacerbate their anxiety and resistance. For example, participants expressed frustration with unintuitive operations, reinforcing their dependence on traditional methods. This calls for more "human-centered" technology design, respecting older adults' cognitive habits while minimizing their adaptation burden.

The study confirms the critical roles of "perceived ease of use" and "perceived usefulness" in influencing older adults' adoption of AI-assisted translation tools. The TAM framework posits that individuals' attitudes toward technology are shaped by these two perceptions. Participants highlighted that simplifying interfaces and improving translation accuracy, especially for dialects, significantly enhance perceived usefulness. For instance, one respondent remarked that accurate dialect translation would be a "lifesaver." Simultaneously, perceived ease of use relates to intuitive, straightforward tool operations, with respondents emphasizing a preference for single-button solutions. These findings underscore the importance of designing user-friendly, purpose-driven technologies to increase acceptance among older adults.

Beyond technological factors, SDL offers a lens to understand older adults' preferences for AI-assisted translation tools. From an SDL perspective, technologies are not just value delivery mechanisms; they create value through service design and delivery. Older adults in the study expressed a strong desire for emotional support, training, and community interaction to lower usage barriers. For example, personalized guidance or community workshops can significantly boost their willingness to engage with these tools. This underscores the importance of holistic service design, catering to older adults' unique needs through individualized and community-driven support mechanisms.

Bourdieu's theory of social capital further illuminates how older adults' social networks and accumulated knowledge shape their attitudes toward technology. Several participants overcame technological barriers with help from family or friends, emphasizing the vital role of social support systems. For instance, one respondent noted that learning from a grandchild enabled independent tool use. Effective social support accelerates technology adaptation and facilitates societal integration for older adults.

This study examines older adults' interactions with AI-assisted translation tools through TAM, SDL, and socio-cultural perspectives. Key findings emphasize the importance of usability and functionality in tool design, while highlighting the critical role of comprehensive service experiences in boosting adoption. Future research should explore customized services and familial support systems to optimize older adults' technology experiences, promoting their digital participation and societal inclusion at broader cultural and social levels.

6. RESEARCH CONTRIBUTIONS

The theoretical contribution of this study lies in its integration of the Technology Acceptance Model (TAM) and Service-Dominant Logic (SDL), offering an in-depth exploration of the behavioral patterns and psychological mechanisms of older adults using AI-assisted translation tools. Through interview analysis, this study uncovers key factors influencing older adults' acceptance of new technologies, particularly the unique manifestations of "perceived ease of use" and "perceived usefulness" within this group. Furthermore, the study extends the application of SDL, demonstrating that older adults' acceptance of technology is not only dependent on the tool's functionality but also closely linked to service design and emotional support. Unlike previous studies that treat

technology acceptance solely as influenced by technical factors, this research emphasizes the unique challenges older adults face in intergenerational communication and technology acceptance, providing a fresh perspective for the development of related theories, especially when designing digital technologies and services for older adults.

From a practical standpoint, this research provides specific guidance for developers and marketers of AI-assisted translation tools. The study suggests that older adults' acceptance of translation tools is influenced not only by the usability and functionality of the tools but also by emotional support, service experience, and technical assistance. Therefore, when promoting and designing AI-assisted translation tools, designers should focus on simplifying interfaces, improving translation accuracy, and offering personalized training and technical support for older users. Additionally, the study highlights the critical role of social support systems and family members in the technology adaptation process, suggesting that relevant institutions should enhance interaction within older adult communities and provide technical training. By constructing digital skills training and technical support networks, older adults' trust and confidence in technology can be improved. These practical suggestions offer actionable directions for product design, market promotion, and policy formulation.

7. RESEARCH INNOVATIONS

The innovation of this study lies in its interdisciplinary approach, combining the Technology Acceptance Model (TAM), Service-Dominant Logic (SDL), and Social Capital Theory to deeply explore the phenomena of older adults using AI-assisted translation tools, filling several gaps in existing literature.

First, the integration of cross-theoretical frameworks is a major innovation of this study. By combining TAM and SDL, we systematically analyzed how older adults' use of AI translation tools is influenced not only by technical ease of use and usefulness but also by service experience, emotional support, and other non-technical factors. Many existing studies focus primarily on the usability or functionality of technology while neglecting the critical role of service design and social support systems in technology acceptance among older adults. By introducing SDL, this research further reveals the intertwined effects of services and technology in the technology acceptance process, offering a new perspective and theoretical framework for future studies.

Second, the study addresses the unique needs of older adults, filling a gap in previous research that has often overlooked this demographic. In older adults, technology adoption is not only a matter of individual capability but is also significantly influenced by emotional support and the social environment. Through in-depth interviews with older adults, the study provides detailed insights into the practical barriers and psychological challenges they face when using AI translation tools. It also offers specific recommendations for improvements, particularly in areas such as interface design, feature customization, and social support. This innovative focus provides a new practical path for the digital transformation and technological education of older adults, with strong real-world implications and application value.

In conclusion, the innovation of this study lies in the integration of interdisciplinary theories and the detailed analysis of practical needs, offering a comprehensive understanding and diversified exploration of older adults' technology acceptance processes. This study provides significant theoretical support and practical references for future academic research and technology development.

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