Research on the influence of the characteristics of elderly service apps on the usage intention of elderly users - Taking the Chinese market as an example

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Abstract: *Background:* China's aging population worsens the imbalance between the supply and demand for elderly care resources. Applications that provide elderly care service integrating medical, caregiving, and daily life functions are critical for promoting digital inclusion. However, the factors that influence seniors' adoption of these technologies have not been thoroughly examined. *Purpose:* This study explores how three core attributes—perceived ease of use, perceived usefulness, and perceived safety—affect elderly users' behavioral intentions, aiming to inform app optimization and advance smart elderly care practices. *Methods:* A mixed-methods approach was adopted, combining literature review, functional analysis of 3 mainstream apps, and quantitative analysis of 302 valid questionnaires via SPSS regression modeling. *Results:* The findings indicate the following key points: 1) Perceived ease of use is the strongest predictor of behavioral intention, as a simplified interface   and smooth operation directly enhance user engagement; 2) Perceived usefulness ranks second, with practical functions significantly improving user retention; and 3) Perceived safety primarily fosters trust but has relatively limited direct impact on engagement. *Conclusion:* Three optimization strategies are proposed: 1) Develop age-appropriate interaction frameworks with simplified operations; 2) Enhance the adaptability of core services (e.g., health monitoring, emergency calls); 3) Integrate transparent data encryption and privacy protection measures. This study provides empirical support efforts in bridging the digital divide and promoting sustainable innovation in smart elderly care.

Keywords: Elderly care service app, Usage intention, Age-appropriate design, Smart elderly care, Regression analysis

1. Introduction

1.1 Research Background

According to the United Nations Population Division, the global population aged 65 and above is projected to reach 1.5 billion by 2050, accounting for 16% of the total population (United Nations, Population Division, 2020a; Wan et al., 2022). China, in particular, is undergoing a rapid demographic transition, with the elderly population aged 60 and above projected to reach 297 million by the end of 2023, accounting for 21.1% of the total population. Of this group, those aged 65 and above account for 15.4% (National Bureau of Statistics, 2023). Concurrently, the dependency ratio of the population aged 65 and above has risen to 22.5% (Ministry of Civil Affairs, 2024), placing increasing pressure on the country's elderly care system and exacerbating the imbalance between the supply and demand for elderly care resources. The traditional elderly care model, which primarily relies on family-based support and institutional services, is becoming increasingly strained due to labor shortages, rising service

demands, and inefficiencies in service delivery. These challenges underscore the urgent need for innovative and scalable solutions to enhance the efficiency and quality of elderly care.

In this context, digital technology has emerged as a pivotal tool for improving elderly care services. Digital platforms and senior care applications, which integrate medical services, caregiving, and daily living support, play a significant role in promoting digital inclusion among older adults (Chen, 2024). These applications have the potential to address key challenges by enhancing service accessibility, improving communication between caregivers and seniors, and enabling more personalized care. However, despite the growing prevalence of such technologies, significant disparities persist in the adoption and sustained use of these applications among elderly users. Various features, including ease of use, perceived usefulness, and perceived security, heavily influence their willingness to engage with digital platforms. While existing research has identified these factors as key determinants of technology adoption (Lee, 2014), the underlying mechanisms through which these factors influence user behavior remain insufficiently explored. Additionally, the impact of contextual factors such as digital literacy, social support, and prior technology experience on the adoption patterns of elderly users is often overlooked. Therefore, further systematic research is necessary to deepen our understanding of these pathways and address the existing theoretical gap in the field of elderly technology adoption.

1.2 Research Purpose

Focusing on Chinese elderly users, this study investigates how Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Perceived Safety (PS) influence their willingness to adopt elderly care service applications, thereby addressing existing theoretical gaps. By analyzing empirical data, the study proposes further optimization strategies to mitigate the challenges faced by these applications and promote digital inclusion among elderly users. From a theoretical perspective, this research deepens the understanding of technology acceptance models within the context of an aging population, offering insights into the specific factors that drive or hinder technology adoption among elderly users. From a practical standpoint, the findings offer valuable guidance for the development of age-friendly applications, thereby bridging the "digital divide" and facilitating the high-quality development of innovative elderly care services.

1.3 Research Content

This study investigates the impact of elderly service apps on the behavioral intentions of elderly users, with a particular focus on the Chinese market. The research is structured around a comprehensive three-stage methodology.

In the first stage, three widely used apps—Anxin Elderly Care, Lao Lai Health, and Care 365—were selected for an in-depth analysis of their functional modules and user experience strategies. This analysis provided valuable insights into their service features, interface design, and interaction logic, helping to identify the design elements that are most appealing to elderly users.

In the second stage, a research model was developed, and data were collected through structured questionnaires. A total of 302 valid responses were gathered, enabling a quantitative assessment of the effects of three key factors—PEOU, PU, and PS—on the behavioral intentions of elderly users regarding the adoption of these apps. This data collection process established a basis for understanding the factors that most influence elderly users' willingness to engage with and use these services.

In the final, regression analysis was performed to test the hypotheses concerning the relationships between the identified app characteristics and users' behavioral intentions. The analysis provided empirical evidence on how these factors interact to influence elderly users' decisions to adopt or reject elderly care apps. Additionally, a detailed

examination of the demographic characteristics of the respondents was conducted. This allowed for the identification of variations in user needs based on factors such as age, location, and socio-economic background, offering a deeper understanding of potential subgroup differences. These insights provide a solid foundation for future efforts in user segmentation, the development of personalized services, and the optimization of app features to better meet the diverse needs of elderly users in the context of smart aging.
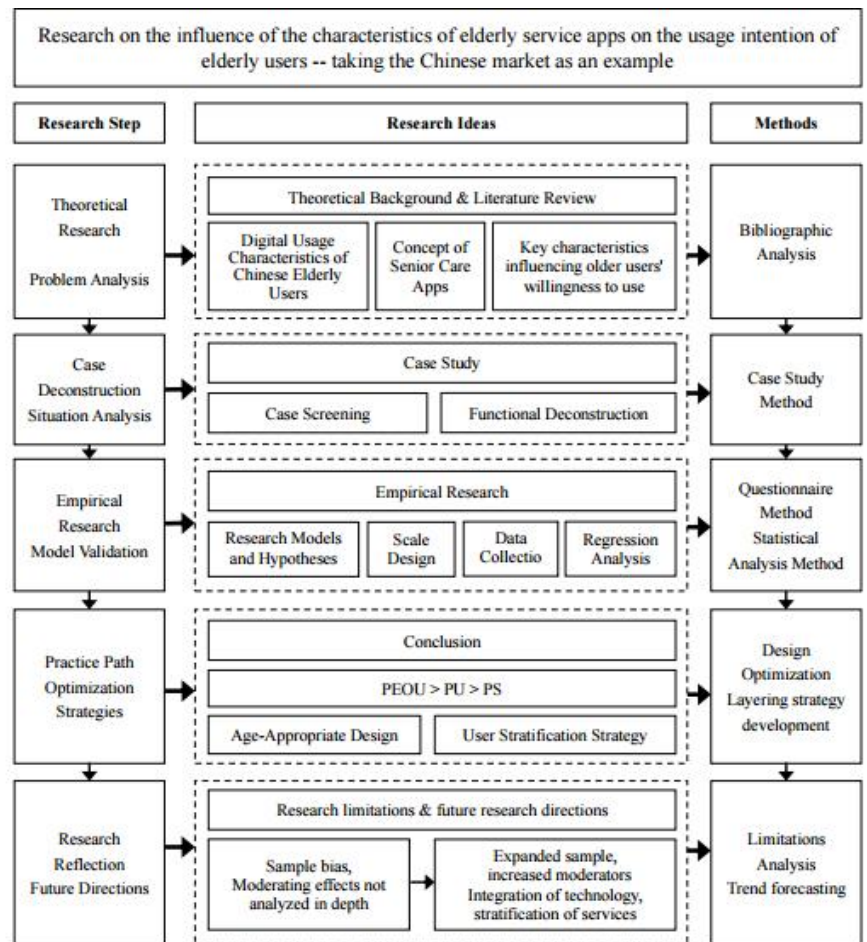

Figure 1: Frame diagram

1.4 Research Methods

This study employs a mixed-methods approach, combining literature review, case studies, and quantitative surveys. At the theoretical level, relevant prior research is reviewed to establish the theoretical framework and formulate hypotheses. At the practical level, the aging-friendly design logic of the selected case study apps is examined through functional deconstruction and user feedback analysis. Additionally, a quantitative survey using a Likert scale is conducted, and hypotheses are tested through regression modeling. To ensure the representativeness of the sample, data collection encompasses both urban and rural areas and includes elderly users with diverse educational backgrounds and digital proficiency levels. By integrating theoretical analysis with empirical validation, this study provides actionable strategies for optimizing and promoting smart elderly care services.

2. Literature Review

2.1 Digital Usage Patterns Among Elderly Users in China

1) Hierarchization of Functional Requirements

Elderly users in China prioritize practicality and functionality when adopting digital products, particularly in areas such as health management, social interaction, and daily life convenience. Zhou et al. (2023) highlighted that elderly users exhibit strong demand for features like fall monitoring, blood pressure measurement, and health record tracking in elderly care service apps. They prefer applications that are easy to use and have clearly defined functionalities. Zhang et al. (2024) revealed that in smart elderly care scenarios, fall detection systems that rely on camera-collected data may raise privacy concerns. Differing perceptions of personal dignity often influence these concerns. Furthermore, Elahi et al. (2021) emphasized that older adults demonstrate significantly heightened privacy protection needs when engaging with functions that involve financial transactions or health data. However, this demographic often exhibits low technological acceptance and limited privacy awareness, making them particularly vulnerable to risks in digital service environments.

2) Intergenerational Support in Technological Learning

The digital literacy of older adults is highly dependent on intergenerational support, with family members playing a crucial role in promoting the adoption of technology. A national survey conducted by the China Scientific Research Center on Aging (2024) revealed that 60.7% of older adults expect to live with their children, highlighting the significant role children have in helping transfer digital skills. Jiang and Qu (2025) found that intergenerational support can significantly reduce the perceived complexity of elderly care service apps, noting that "coaching can effectively enhance technological adaptability and increase the willingness of elderly users to continue using the apps." This suggests that interactions between generations not only help bridge the digital divide for older adults but also serve as a vital link in their integration into a technology-driven society.

2.2 Concept of Elderly Care Service Apps

Elderly care service apps utilize mobile internet technology to provide a platform for comprehensive elderly services. Zhu et al. (2023) summarized their core functions into six modules: chronic disease management, home health monitoring, personalized health intervention, online medical consultation, life care services, and electronic health record management. The deep integration of Internet of Things (IoT) technology significantly enhances these functions. Wang et al. (2021) highlighted that a real-time data collection system based on wearable devices and home sensors can enable all-weather tracking of the elderly's health status and living environment. This system generates personalized risk alerts through algorithmic models, significantly improves service response efficiency, and enhances users' sense of security.

2.3 Key Characteristics Influencing Behavioral Intention of Elderly Users

This study presents a literature review focused on the keywords "Smart Aging," "App," and "Behavioral Intention." Previous studies relevant to this topic indicate that Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Perceived Safety (PS) are critical determinants of technology adoption among elderly users. For instance, Xia et al. (2020) verified through experimental approaches that initial interaction design can positively influence adoption decisions by reducing the learning curve of older users. A comparative study by Natarajan et al. (2018) showed that the explanatory power of PEOU and PU for behavioral intention is significantly higher among older age groups than younger ones, with the moderating effect of PS increasing nonlinearly with age. Furthermore, Song et al. (2021) found that concerns about PS may lead to a 37%–52% decrease in the willingness to use applications when sensitive health information is involved, which is highly relevant to elderly care service apps. Weng et al. (2025) further

confirmed that privacy security and system reliability are essential components for elderly user satisfaction in smart fall monitoring systems.

1) Perceived Ease of Use (PEOU)

Perceived Ease of Use (PEOU) is often defined as how easily users can learn and use an application. Natarajan et al. (2018) describe it as a combination of users' perceptions of operational fluency and learning cost. In their study on mobile tourism applications, Fang et al. (2017) attribute PEOU to the ease of operation, which enables users to get started quickly and complete tasks successfully. Similarly, Diaz et al. (2021) defined PEOU in their study of farmers' behavioral intention regarding mobile applications as users' perception of learning difficulty and ease of use. Therefore, this study defines PEOU as the subjective perception of elderly users on the difficulty of learning and operating senior care service Apps, specifically focusing on whether these apps are easy to understand, easy to operate, and capable of enabling users to complete the required tasks successfully.

2) Perceived Usefulness (PU)

Perceived Usefulness(PU) refers to the extent to which users believe that a technology enhances their performance. This concept was initially proposed by Davis (1989) as part of the Technology Acceptance Model (TAM), and subsequent studies have explored its application to elderly populations. Natarajan et al. (2018) studied the effect of user age on Behavioral Intention to use mobile shopping apps, defining PU as the extent to which users feel that the app improves shopping efficiency or optimizes the shopping experience. Diaz et al. (2021) explored PU in the context of agricultural digitalization, describing it as "production risk reduction" and "market information symmetry," highlighting the role of context specificity in reshaping the understanding of PU. Based on this, this study defines PU in relation to senior care service apps as the extent to which elderly users believe these apps can enhance the convenience of daily life, improve health management efficiency, and facilitate access to senior care services.

3) Perceived Safety (PS)

Perceived Safety(PS) is a multidimensional concept that reflects users' confidence in both the technical reliability and data governance mechanisms of digital applications. As highlighted by Natarajan et al. (2018), PS consists of two main dimensions: "technical system dependability" and "information sovereignty control." Research indicates that elderly populations are particularly sensitive to the effective implementation of the latter dimension. In a study of short-video apps, Song et al. (2021) defined Behavioral Intention as the user's perception of the authenticity and reliability of the information provided. They emphasize that the credibility of the platform's content has a significant impact on users' trust. Similarly, Fang et al. (2017) view PS as a guarantee of data security and privacy protection for users in their study on travel apps. They argued that enhancing users' trust in data security could positively influence Behavioral Intention. Based on the above studies, this research defines PS in the context of elderly users' perceptions of senior care service apps, specifically in the areas of personal information protection, financial transaction security, and health data privacy.

2.4 Behavioral Intention (BI)

Behavioral Intention (BI) is defined as the subjective likelihood that users will use a particular technology in the future. Davis (1989) suggested that BI is influenced by two key factors: PEOU and PU. In a study by Widjaja et al. (2019) on cloud storage applications, BI refers to the subjective likelihood that a user is willing to store or share personal information on the platform. The study found that Perceived Risk, Trust, Perceived Safety, and Perceived Usefulness significantly influence BI. Ma et al. (2022)

examined the BI of older Chinese adults regarding smartphones and related digital technologies. They defined BI as the willingness to use smartphones and enhance digital skills, and found that Perceived Ease of Use, Perceived Usefulness, and Social Support had a significant impact on older users' intentions. Based on the above research, this study defines BI as the subjective likelihood that elderly users are willing to use and continue to use senior care service apps.

3. Case Study

This study focuses on elderly users of senior care services in China. The case study examines three specific applications: "Anxin Elderly Care", "Lao Lai Health", and "Care 365." The selection of these apps is based on the specific criteria related to the research objectives.

In recent years, intelligent senior care services have been developed rapidly; however, related applications are still in the market cultivation stage, and their functionality and operational modes remain immature. Currently, most senior care functions are integrated into government and public service applications. While these applications cover a wide range of functions, they tend to be generalized, making it difficult to accurately meet the specific needs of elderly users and resulting in low actual usage rates.

This study focuses on specialized senior care apps, excluding comprehensive government and public service apps, with an emphasis on analyzing core functions and user experience. The case selection is based on the principles of market representativeness and user scale.

As shown in Table 1, "Anxin Elderly Care" offers one-stop comprehensive services, "Lao Lai Health" builds a health management ecosystem utilizing community resources, and "Care 365" focuses on home care services as its core competence. All three apps rank among the top in the industry in terms of the number of downloads and the scale of active users. As typical cases with high market share, they reflect the mainstream functional design logic of current senior care apps and enhance the practical guidance value of the research findings.

Table 1: Three of the most popular senior care service apps in China

No.	App Name	App Name
1	Anxin Elderly Care	Provide professional "one-stop" comprehensive services for the elderly, covering the needs of the elderly in seven dimensions: clothing, food, housing, transportation, medical care, emotion, and finance.
2	Lao Lai Health	Relying on the community, it has built a digital life platform for the middle-aged and elderly community, focusing on "medical and healthcare" and "life services," and providing comprehensive one-stop services.
3	Care 365	Provides home care, in-hospital care, home rehabilitation, medical accompaniment, massage, care counseling, industry information, and other services. Users can easily access quality home care and rehabilitation services.

3.1 Analysis of the "Anxin Senior Care App"

Anxin Senior Care App is an intelligent senior care management system developed by China Construction Bank (CCB). It utilizes big data, the Internet of Things (IoT), and mobile internet technology to provide comprehensive, full-life-cycle, and multi-scenario services for the elderly. The app operates under the "CCB + Constructive Trust Senior Care" model, which integrates a dedicated management platform for senior care service providers, thereby enhancing operational efficiency and service quality.

The platform offers a range of core functions, including check-in management, health monitoring, operational oversight, expense settlement, visitor reception, and elderly capability assessment. It also enables family members to remotely monitor the living conditions of elderly users, promoting greater family interaction and emotional connections. In addition to care services, the platform incorporates financial solutions to

streamline fund management, facilitate secure and convenient payments, and enhance overall service reliability. By combining technology, financial security, and senior care expertise, the Anxin Senior Care App aims to create a more efficient, user-friendly, and trustworthy digital ecosystem for elderly care.

3.2 Analysis of the "Lao Lai Health App"

Lao Lai Health App is a comprehensive service platform designed for middle-aged and elderly users. It integrates social security authentication, health management, lifestyle services, and social interaction to provide more convenient and efficient elderly care services, enhancing accessibility and overall user experience.

In terms of social security authentication, the app supports pension eligibility verification, pension inquiries, benefit calculations, and electronic social security card management. These features simplify social security-related tasks for elderly users, reducing their reliance on offline processes and making financial management more efficient.

For health management, the app offers real-time health monitoring, online medical consultations, and chronic disease management, enabling proactive health care. Beyond practical services, Lao Lai Health App also fosters social engagement by providing an online communication platform where elderly users can make new friends, participate in discussions, and share life updates. This social connectivity helps alleviate loneliness, enrich daily life, and enhance overall well-being. By integrating essential services with social interaction, the app aims to create a holistic and user-friendly digital ecosystem for aging populations.

3.3 Analysis of the "Care 365 App"

Care 365 App is developed by Shanghai Zunhe Medical Technology Co., Ltd., focusing on the healthcare sector and dedicated to creating a digital health service platform centered on rehabilitation care and health management. The App offers a wide range of functions, including home care, in-hospital care, home rehabilitation, medical consultations, massage, care consultation, and industry information, enabling users to easily access professional, high-quality medical care and rehabilitation resources according to their own needs. Whether it's long-term care or short-term rehabilitation support, the app provides personalized solutions.

In addition, to enhance the user experience, the App also provides preferential activities, professional customer service, and online consultation. It supports a variety of payment methods such as Alipay and WeChat, ensuring a convenient and secure payment process.

Figure 2: Part of the interface of the application products
(left: Anxin Senior Care App; center: Lao Lai Health App; right: Care 365 App)
Source: Actual interface of each application product

4. Empirical Research

4.1 Methodology of the Study

This study adopts the questionnaire survey method and collects data through the "Wenjuanxing" platform. Initially, we reviewed both domestic and international literature to analyze the digital usage characteristics of Chinese elderly users. We defined the concept of elderly care service apps, identified the three major characteristics that affect the willingness to use, and constructed the research model and hypotheses.

The questionnaire design is based on existing research and refined with specific application scenarios in mind. The first draft was written in Chinese and subsequently translated and proofread by professionals to ensure accuracy and consistency. To improve the comprehensibility of the questionnaire, we conducted a pre-survey with 10 elderly users. Based on their feedback, we optimized the presentation to ensure that the respondents could easily understand and accurately answer the questionnaire.

The questionnaire survey was conducted from February 1 to 28, 2025, and a total of 313 questionnaires were collected. After excluding 11 invalid questionnaires, the final sample comprised 302 valid questionnaires. After data collection, SPSS was used for statistical analysis to test the hypotheses and explore the causal relationship between variables, ensuring the scientific validity and effectiveness of the research conclusions.

4.2 Research Model and Hypothesis

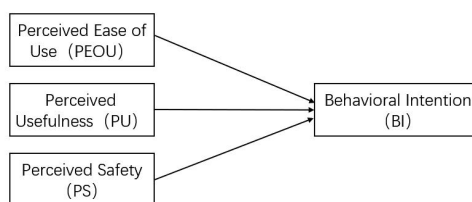Figure 3 presents the research model and its hypothesized relationships:

Figure 3: Research model

H1: PEOU of elderly care service apps positively affects the BI of Chinese elderly users.

H2: PU of elderly care service apps positively affects BI of Chinese elderly users.

H3: PS of elderly care service apps positively affects BI of Chinese elderly users.

4.3 Scale Design

In this study, we examine the relationship between several factors related to senior care service apps. The independent variables are Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Perceived Safety (PS) of senior care service Apps, while the dependent variable is Behavioral Intention (BI). The measurement scale was developed based on classical scales and tailored to the research context, ensuring the reliability and validity of the measurement tool. All variables were measured using a five-point Likert scale (1="Strongly Disagree", 5="Strongly Agree"). Specifically, PEOU measurement entries were adapted from the works of Davis (1989), Jung et al. (2012), Huang & Hsieh (2012), and Fang et al. (2017). The PU was based on Davis (1989) and Natarajan et al. (2018). The PS measurement was based on Featherman and Pavlou (2003) and Nepomuceno et al. (2014), while the BI measure was referenced to Davis (1989). A detailed list of all measurement entries is provided in Table 2.

Table 2: Test scale

Construct	Code	Item	Adapted from
PEOU	PEOU1	The elderly care service app is easy for me to use.	Davis, 1989;
	PEOU2	Learning how to use the elderly care service app was easy for me.	Jung et al., 2012;
	PEOU3	I think most elderly users would quickly learn to use the elderly care service app.	Huang & Hsieh,
	PEOU4	I can use the elderly care service app to complete tasks without difficulty.	2012;

	PEOU5	The elderly care service app's interface is easy to understand.	Fang et al., 2017.
PU	PU1	The elderly care service app is helpful in my daily life	Davis, 1989; Natarajan et al., 2018;
	PU2	I can improve the efficiency of my life by using the elderly care service app	
	PU3	Apps can help me complete my elderly-related tasks more quickly.	
	PU4	Apps for elderly care services can reduce my energy consumption on senior care-related matters	
	PU5	The app can help me get information about senior care services more conveniently	
PS	PS1	I feel safe when using the elderly care service app	Featherman & Pavlou, 2003; Nepomuceno et al., 2014.
	PS2	I feel that my personal data is well protected in the elderly care service app	
	PS3	I am confident in the security of the services/functions provided by the App	
	PS4	I believe the security system of the App is strong enough to protect my privacy	
	PS5	I am not concerned about making payments or entering personal information on the app	
BI	BI1	I would like to use the elderly care service app	Davis, 1989.
	BI2	I would prefer to use an elderly care app if needed	
	BI3	I would recommend the app to others	
	BI4	I have a positive attitude towards using elderly care apps	
	BI5	I will continue to use the elderly care App	

4.4 Empirical Analysis

1) Demographic Characteristics

In this study, data were collected using a web-based questionnaire with the age of the respondents set at 60 years and above with elderly users in China as the target population. As shown in Table 3, a total of 302 valid samples were collected, of which 143 (47.4%) were male and 159 (52.6%) were female. Age was predominantly 60-69 years old (55.0%), followed by 70-79 years old (33.1%); 80.1% were urban residents; 70.9% had junior high school education or less; and 80.1% were retired.

Table 3: Demographic characteristics (N=302)

		Frequency	Percentage
Gender	Male	143	47.4
	Female	159	52.6
Age	60-69	166	55.0
	70-79	100	33.1
	Over80	36	11.9
Place Of Residence	Urban	242	80.1
	Rural	60	19.9
Occupation	Elderly university students	29	9.6
	Retirees	31	10.3
	Retired staff	242	80.1
Education Level	Primary and below	108	35.8
	Junior high school	106	35.1
	High school/Secondary school	67	22.2
	University college	21	7.0
	University undergraduate course	0	0.0
	Master's degree or above	0	0.0

2) Reliability and Validity Analysis

This study ensured the quality of measurement through reliability and validity tests. As shown in Table 4, the Cronbach's alpha coefficients for each variable were >0.8 (Hair et al., 2019), indicating good internal consistency of the scale. In the validity test, the KMO value was 0.894 (>0.7) and the approximate chi-square value of Bartlett was 2578.226 (degree of freedom = 190, significance = 0.000), which satisfied the conditions of factor analysis. Four male factors were extracted using principal component analysis with eigenvalues >1 and a cumulative variance explained of 62.9%, which met the criteria (Hair et al., 2010). In addition, all question item factor loadings were greater than 0.7 (Hair et al., 2017) and commonalities were above 0.5 (Costello & Osborne, 2005). It was confirmed that the convergent and discriminant validity of the scales were up to standard and had good measurement quality.

Table 4: Factor analysis results

	Ingredient				Commonality
	1	**2**	**3**	**4**	
BI1	0.824				0.723
BI2	0.758				0.628
BI3	0.793				0.665
BI4	0.776				0.642
BI5	0.746				0.626
PEOU1		0.773			0.666
PEOU2		0.757			0.649
PEOU3		0.720			0.595
PEOU4		0.780			0.667
PEOU5		0.775			0.688
PS1			0.757		0.633
PS2			0.724		0.573
PS3			0.715		0.542
PS4			0.756		0.622
PS5			0.774		0.648
PU1				0.776	0.632
PU2				0.743	0.588
PU3				0.723	0.590
PU4				0.779	0.621
PU5				0.736	0.579
Variance Explained (%)	16.666	16.129	15.081	15.024	
Cumulative Variance (%)	16.666	32.796	47.877	62.901	
Cronbach' alpha	0.869	0.866	0.829	0.830	
KMO=0.894 Bartlett's Test of Sphericity X^2= 2578.226 Degrees of freedom =190 P=0.0001					

3) Research Hypothesis Validation

The results of the research hypothesis are shown in Table 5.

Table 5: Results of the research hypothesis

Research Hypotheses	**Result**
H1: The ease of use of the elderly care Apps positively affects the willingness to use of Chinese senior users	Supported
H2: The usefulness of the elderly care Apps positively affects the willingness of Chinese senior users to use them	Supported
H3: The security of the elderly care Apps positively affects the willingness to use of Chinese senior users	Supported

The results of the regression analysis presented in Table 6 verified three hypotheses, indicating that Perceived Ease of Use, Perceived Usefulness, and Perceived Safety all significantly affect the Behavioral Intention of elderly users, with varying degrees of influence.

Firstly, Hypothesis 1 was supported: Perceived Ease of Use had the most significant effect ($\beta = 0.278$, p<0.001) and the highest standardized coefficient. This finding suggests that ease of use and interface intuitiveness are the key factors. Therefore, optimizing the interaction design can help to improve the Behavioral Intention.

Secondly, Hypothesis 2 was verified, indicating that Perceived Usefulness has a significant positive effect on Behavioral Intention ($\beta = 0.203$, p<0.001). This implies that older users place great importance on functionality, making apps that improve life efficiency particularly appealing.

Finally, Hypothesis 3 was also supported. While Perceived Safety has a significant effect on Behavioral Intention ($\beta = 0.134$, p = 0.020), its impact is relatively weak (unstandardized coefficient = 0.155). It indicates that although privacy protection and data security are important, they have lower priority than Perceived Ease of Use and Perceived Usefulness. Therefore, Perceived Ease of Use, Perceived Usefulness, and Perceived Safety are the most important factors influencing older users.'

Therefore, Perceived Ease of Use, Perceived Usefulness, and Perceived Safety are the core factors affecting the Behavioral Intention of elderly users. Strategies for optimization should prioritize the improvement of operational convenience, ensuring the practicality of the functions, and strengthening security.

Table 6: Linear Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	VIF
Constant	1.244	0.304		4.093	<0.001		
PEOU	0.288	0.062	0.278	4.679	<0.001	0.745	1.342
PU	0.232	0.062	0.203	3.741	<0.001	0.888	1.127
PS	0.155	0.66	0.134	2.344	0.020	0.802	1.247
$R=0.466^a$　　$R^2=0.218$　　Adjusted $R^2=0.210$　　F=27.626　　$P<0.001^b$							

5. Conclusion

5.1 Conclusions and Implications of the Study

This study systematically examines how the characteristics of senior care service apps influence elderly users' willingness to adopt them, focusing on three key factors: perceived usefulness, perceived ease of use, and perceived safety. Through data analysis, the study verifies how these factors shape user behavior. The results indicate that perceived usefulness has a significant positive effect on elderly users' intention to use the apps. When an app offers essential functions that meet daily needs, such as health management and life services, elderly users are more inclined to continue using it. Perceived ease of use also positively influences user intention. A concise, intuitive interface, along with convenient functionalities and user-friendly interactions, reduces operational barriers and increases the confidence of elderly users. While perceived safety is a relevant factor, its impact is weaker compared to the other two factors. Concerns over personal data security and privacy protection can undermine trust and potentially discourage users from adopting the app. Insufficient security measures may exacerbate these concerns and further hinder user engagement. These findings highlight the need for senior care service apps to prioritize not only functionality and elderly users' experience but also robust data protection to build user trust and enhance retention.

Based on the findings of this study, the design of elderly care apps should prioritize functional utility, user-friendly interface, and data security to better meet the needs of elderly users. During the development process, it is essential to align app functionality with the daily needs and preferences of elderly users by optimizing core features such as health monitoring, medication reminders, service reservations, and emergency assistance, thereby enhancing perceived usefulness.

Moreover, incorporating age-friendly design elements—such as large fonts, high-contrast color schemes, clear icons, and voice assistance—can reduce operational complexity and improve perceived ease of use, making the app more accessible to elderly users with varying levels of digital literacy.

In addition, strengthening data security and privacy protection mechanisms is crucial for addressing users' concerns and building trust. Implementing robust encryption protocols, secure data storage, and transparent privacy policies can effectively safeguard personal information and mitigate potential security risks. Providing clear communication about these security measures can further reassure users and encourage continued engagement.

By integrating these optimizations, elderly care apps can not only increase user adoption and engagement but also improve overall user satisfaction and long-term

retention, ultimately enhancing the quality of life for elderly users through reliable and user-centric digital solutions.

5.2 Limitations of the Study And Directions For Future Research

At the theoretical level, this study mainly focuses on urban elderly groups. However, there are significant differences between urban and rural areas in terms of technology acceptance, information acquisition, and digital literacy. Future research should expand the scope of the study to encompass elderly groups from diverse geographic regions, socioeconomic levels, and cultural backgrounds. This exploration will help identify the differential characteristics of urban and rural users in terms of their technology acceptance and willingness to utilize, ultimately providing more targeted recommendations for promoting innovative elderly care services.

Additionally, this study only examines three characteristics: PEOU, PU, and PS. This limited selection of variables does not fully account for other factors that may influence elderly users' willingness to use the technology. Future research could introduce additional variables to develop a more comprehensive theoretical model that accurately explains the behavioral patterns of elderly users. Furthermore, this study is based on the unique socio-cultural context of the Chinese market, and various factors, including government policies, influence its results. Future research should consider localized contexts to construct research models that align more closely with the current state of smart aging and the national context.

With the rapid development of technologies such as AI, IoT, and big data, smart elderly services are advancing towards greater intelligence and personalization. Future research should further explore how these new technologies can enhance the digital service experience for elderly users.

First, it is important to examine the potential of intelligent voice assistants. These assistants can help the elderly complete app operations, provide life service suggestions, and monitor their health, thereby reducing the barriers to technology use and increasing willingness to engage with these services.

Second, future research should investigate the connection between health monitoring devices and senior citizen apps. Exploring how real-time monitoring of physiological data, such as blood pressure, heart rate, sleep, and other health warning functions, can enhance the sense of security and trust among elderly users.

Third, telemedicine and online consulting services play a crucial role in smart aging, significantly influencing the convenience and safety of these services. Future research should analyze user experience, service quality, and privacy protection mechanisms within telemedicine systems, optimizing their integration with senior living apps to improve acceptance of digital health services among elderly users.

Finally, as personalized recommendation algorithms continue to improve, future research can explore how data analysis and user profiling can lead to more accurate service matching. This approach aims to meet the diverse needs of elderly users and support the refinement of smart elderly services.

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