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SMART ELDERLY CARE AND DIGITAL INCLUSION: THE ROLE OF SOCIAL CONNECTIVITY IN ENHANCING LIFE SATISFACTION IN URBAN CHINA

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ABSTRACT

This study aims to examine the effect of digital application education and digital literacy on elderly people's life satisfaction directly and indirectly through social connectivity as a mediator and social norms as a moderator variable. A total of 934 participants joined in this study. Structural equation modelling (SEM) was used to examine research hypotheses. The digital application of education has a positive and significant effect on social connectivity. Whereas, digital literacy does not have a significant effect on elderly people's social connectivity. Furthermore, social connectivity partially mediates the effect of digital application education and digital literacy on elderly people's life satisfaction. Moreover, social norms also have a positive and significant role in moderating the effect of digital application education and digital literacy on social connectivity. The elderly people's ability to learn and operate new technologies has a fundamental role in boosting their social connectivity and life satisfaction. The care services can improve quality of life and foster social connections, providing emotional support and reducing feelings of isolation. Hence, the government should evaluate the technology care and development based on elderly people's experiences.

KEYWORDS: Elderly Care Service, Social Norm, Social Connectivity, Life Satisfaction.

1. INTRODUCTION

The phenomenon of population aging is a significant global trend, characterized by increasing numbers and proportions of older individuals in many countries (Ong, 2022; Thanh Trong et al., 2024). According to the United Nations' definition, a society is considered aged when individuals aged 60 and above account for 10% of the total population or when those aged 65 and above comprise 7% of the total population (WHO, 2023). This shift is primarily driven by declining fertility rates and improvements in life expectancy. For instance, China's elderly proportion of individuals aged 60 and above is expected to rise dramatically, reaching approximately 28% by 2040. Furthermore, fostering intergenerational connections and community support systems can help mitigate feelings of isolation among the elderly (Demir & Kurtulus, 2024; Díaz et al., 2024). This demographic transition presents numerous challenges, including increased healthcare demands, pension sustainability, and the need for adequate elder care services (Anriani et al., 2022; Juma, 2024). As the elderly population grows, it becomes crucial to implement comprehensive policies that promote healthy aging, improve healthcare access, and encourage active participation among older adults in society. The rapidly expanding elderly population underscores the urgency and complexity of actively addressing population aging, such as smart elderly care service.

Elderly care services leverage advanced technologies to address the challenges faced by senior citizens, such as safety, health monitoring, and social isolation (Guti´errez-Domingo, 2024; Zhou et al., 2025). These services enhance the safety and independence of older adults towards incorporating features like automated medication reminders, emergency alerts, and smart home systems (Holloway et al., 2023). Additionally, virtual communication tools and community engagement programs help mitigate feelings of loneliness, fostering social connections. The integration of wearable devices for health monitoring allows for proactive management of health conditions, providing caregivers with real-time data to make informed decisions (Penninkilampi et al., 2018). While the success of these services can vary, some studies indicate significant improvements in health outcomes, user satisfaction, and caregiver relief, highlighting their potential to create a more supportive and enriching environment for the aging population. As technology continues to evolve, smart elderly care services are poised to play an increasingly vital role in enhancing the quality of life for seniors.

The elderly care effectively breaks the limitations of time and space, integrates resources to the maximum extent, optimizes the configuration, and accurately provides life, medical care, entertainment, and leisure (Chen et al., 2025; He, 2025). It emerged through the seamless connection of intelligent input equipment, the informationized elderly care service platform, and the offline service circle, realizing the timely, efficient, convenient, and flexible supply of elderly care services. A significant focus is on developing service models that enhance care quality through grassroots healthcare initiatives (Díaz et al., 2024; Luo et al., 2025; Zhou et al., 2025). Challenges in implementing these services often stem from factors such as age, income, and awareness levels among the elderly, which can affect their engagement with technology. Moreover, studies emphasize the importance of community engagement and virtual communication tools in combating social isolation among elderly people. The integration of wearable devices for health tracking enables proactive health management, offering caregivers real-time insights into their patients' conditions. While the potential benefits of smart elderly care services are significant, ongoing research is needed to address the challenges of technology adoption and to ensure these services meet the diverse needs of the elderly population.

Preliminary studies demonstrate that countries worldwide are exploring smart elderly care, identifying global hotspots for innovation. A significant focus is on developing service models that enhance care quality through grassroots healthcare initiatives. Challenges in implementing these services often stem from factors such as age, income, and awareness levels among the elderly, which can affect their engagement with technology. Smart homes equipped with remote healthcare technologies are a key area of development, providing solutions for health monitoring and daily assistance. The smart elderly care products are increasingly rich, including smart wearable devices, remote medical consulting systems, home service robots, intelligent drug managers, fall detectors, and so on. These products provide more peace of mind and convenience for the elderly and their families by monitoring their health status in real time and providing timely warning of potential health risks.

Prior studies utilizing the Theory of Planned Behavior (TPB) in the context of elderly care services often exhibit several weaknesses. Many studies lack a comprehensive understanding of the unique barriers faced by older adults, such as technology

anxiety, low internet efficacy, and privacy concerns, which can significantly influence their behavioral intentions. Additionally, there is a tendency to focus on quantitative measures without adequately exploring qualitative insights that could provide a deeper understanding of older adults' experiences and motivations. Furthermore, the existing research often overlooks the role of social influences and community engagement, which are critical in shaping attitudes and perceived behavioral control among the elderly. Lastly, there is a notable scarcity of longitudinal studies that track changes in attitudes and behaviors over time, limiting the ability to draw robust conclusions about the effectiveness of interventions aimed at promoting smart elderly care services. Moreover, many studies fail to consider the diversity within the elderly population, such as variations in cultural backgrounds, socioeconomic status, and health conditions, which can affect technology adoption. Overall, addressing these weaknesses is key to creating more effective strategies that cater to the needs of older adults and enhance their engagement with smart elderly care services.

The widespread adoption of devices such as smart mattresses and health-monitoring wristbands has extended professional elderly care services into home settings, breaking spatial and temporal constraints and improving convenience in daily living. Collectively, these technological innovations are advancing smart elderly care toward more personalized and intelligent solutions, creating a safer and more comfortable living environment for older adults.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The concept of smart elderly care was first proposed by the British Life Trust, formerly known as the "fully intelligent elderly system" (Demir & Kurtulus, 2024; Sun et al., 2025). Furthermore, based on the comprehensive views of scholars at home and abroad, this paper defines smart elderly care as the use of the Internet of Things, the Internet, big data, cloud computing, blockchain, and other new-generation information technology to develop a comprehensive platform for smart elderly care services and closely connect the elderly, communities, elderly care institutions, elderly care enterprises, medical institutions, governments, and other parties (Ren & Zhou, 2023). Provide real-time, convenient, efficient, diversified, standardized, and intelligent elderly care services; fully meet the needs of the elderly, such as life care, emergency rescue, medical rehabilitation, leisure, and entertainment; and realize the high-quality elderly care model.

The elderly's needs for old-age care services will change with the improvement of living standards and the decline of self-care ability (Abdi et al., 2019; Liu et al., 2022). The physiological needs and safety needs belong to the lower level, while emotional belonging needs, respect needs, and self-actualization needs belong to the higher level (Luo et al., 2025; Sun et al., 2025). The personal behavioral attitude is a key predictor of behavioral intention, reflecting an individual's positive or negative evaluation of a specific behavior (Baba et al., 2025; Juma et al., 2024). This evaluation encompasses various factors, including perceptions of service effectiveness, convenience, safety, and affordability. This positive attitude is crucial, as it can significantly influence their willingness to engage with and utilize such services (Shukri et al., 2022). On the other hand, behavioral intention can be understood as the degree of demand that the elderly have for smart elderly care services. It represents the likelihood that they will seek and use these services based on their attitudes and evaluations (Fischer & Karl, 2025; He et al., 2025).

A strong correlation exists between positive attitudes and increased behavioral intention; when elderly individuals have favorable personal experiences with smart health devices, their intention to use elderly care services is markedly enhanced. This relationship underscores the importance of providing effective services and ensuring that these services are perceived positively by the target demographic. The evaluation of smart health devices plays a critical role in shaping the elderly's willingness to adopt new technologies (Zhou et al., 2025). This willingness is essential for the successful implementation of smart elderly care services, as it directly impacts the demand for such innovations (Abdi et al., 2019; Liu et al., 2022). It demonstrates that fostering a positive personal behavioral attitude among the elderly is vital for enhancing their behavioral intentions toward smart elderly care services. Stakeholders can encourage greater adoption of these technologies by focusing on improving perceptions of service effectiveness, convenience, safety, and affordability. Ultimately, understanding and addressing the factors that influence attitudes and intentions will lead to better outcomes in the realm of elderly care, ensuring that the needs and preferences of this demographic are met effectively.

H1: The digital application education significantly and positively enhances the social

connectivity of elderly people towards elderly care services.

Digital literacy has a significant positive influence on social connectivity, indicating that the stronger the perceived social support, the greater the likelihood of an individual engaging in a specific behavior (Baba et al., 2025; Lee et al., 2024). Social connectivity refers to the perceived social pressure or the degree of support from the surrounding environment regarding an individual's actions. This includes the influence of family members, community organizations, and even social media on the elderly's decision-making processes (Holloway et at., 2023). The role of digital literacy is particularly crucial in the context of elderly care, where social support can greatly impact the choices and behaviors of older adults (Peng et al., 2024). This study illustrates how social expectations and community norms can drive individuals to adopt behaviors that align with collective values. Similarly, Qin et al. (2024) highlighted that support from family members and the community directly increased the elderly's willingness to choose integrated medical and nursing care institutions.

H2: Digital literacy has a positive and significant effect on elderly social connectivity towards elderly care services.

The importance of familial and communal encouragement in shaping the healthcare decisions of older adults, suggesting that when family members advocate for certain services, the elderly are more likely to consider and utilize them. Furthermore, Park et al. (2025) demonstrated that community promotion of smart elderly care services significantly enhanced the elderly's demand for and willingness to use such services. This research underscores the impact of community initiatives and social marketing in fostering a supportive environment for the adoption of new technologies and services. When communities actively promote smart elderly care solutions, they create a social norm that encourages older adults to embrace these innovations, thereby increasing their overall engagement with available resources (Qin et al., 2024). It proves that subjective norms play a pivotal role in shaping behavioral intentions among the elderly. The influence of perceived social support from family, community, and social networks cannot be overstated. Hence, stakeholders can significantly enhance the willingness of older adults to engage with essential services, such as integrated medical care and smart elderly care technologies, with regard to fostering elderly environments, strengthening social support networks, and promoting positive community norms (Sadio et al., 2025; Shukri et al., 2022). It has a vital role in improving the quality of care and life satisfaction. Ultimately, understanding the dynamics of subjective norms can lead to more effective strategies for encouraging healthy behaviors and enhancing the adoption of innovative care solutions among older adults.

H3: Social connectivity has a positive and significant effect on elderly life satisfaction towards elderly care services.

The concept of social connectivity plays a crucial role in influencing behavioral intention and enhancing demand by increasing individuals' confidence in their ability to successfully complete a specific behavior, as well as life satisfaction (Park et al., 2025; Sarma et al., 2025). This concept reflects an individual's subjective perception of the ease or difficulty associated with performing a particular action, which includes considerations of the resources required, such as time and money, as well as potential barriers like necessary skills and technical requirements. This idea is especially pertinent among elderly individuals, who may face unique challenges in adopting new behaviors or technologies (Juma & Fernández-Sainz, 2024). For the elderly, perceived behavioral control is particularly significant when it comes to the adoption of smart elderly care services. When older adults feel that they have the necessary control over their ability to use these services, they are more likely to engage with them. Enhancing the elderly's sense of behavioral control can lead to increased confidence and willingness to utilize smart health devices and services.

Mohammadi et al. (2024) and Ogiemwonyi (2024) found that higher perceived behavioral control significantly enhanced individuals' intentions to participate in social activities. This finding illustrates how confidence in one's ability to engage in a behavior can lead to greater participation and commitment. These studies highlight the broader applicability of perceived behavioral control across various contexts, reinforcing its importance in shaping behavioral intentions. Moreover, Jo et al. (2021) and Wang et al. (2023) pointed out that the elderly's perception of the complexity involved in operating smart health devices directly affects their willingness to use social care services. If older adults perceive these devices as complicated or difficult to manage, their likelihood of adoption diminishes. Therefore, simplifying the functions of these devices and providing adequate technical support can significantly increase demand. By addressing the barriers that contribute to a lack of perceived

behavioral control, stakeholders can facilitate a smoother transition for the elderly to use smart technologies.

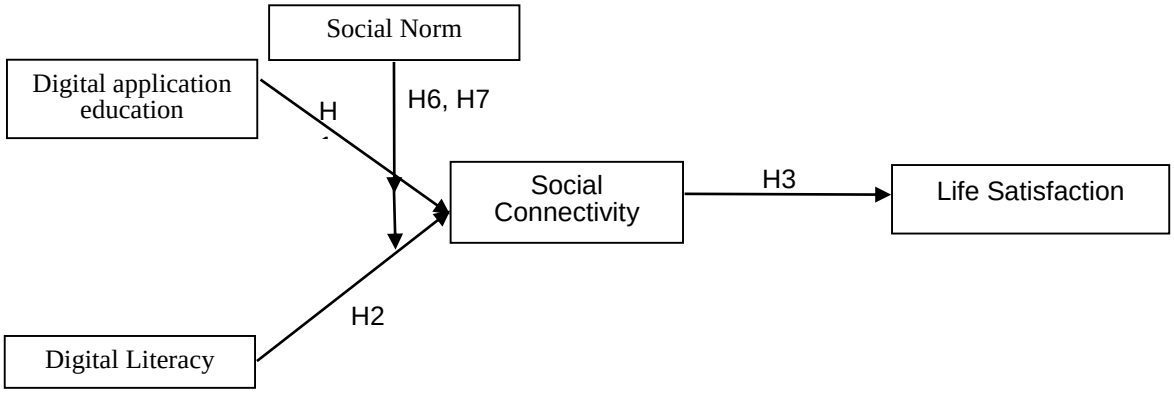
H4: Social connectivity has a positive and significant effect on elderly digital application education and life satisfaction towards elderly care services.

H5: Social connectivity has a positive and significant effect on elderly digital literacy and life satisfaction towards elderly care services.

Social norm is a key determinant of actual behavior, significantly influenced by various factors, including an individual's attitude toward the behavior, social support, and perceived behavioral control. For the elderly, a stronger demand for elderly care services correlates with enhanced behavioral intentions toward social norms. This relationship is crucial, as it suggests that when older adults recognize a need for specific services, their likelihood of engaging with them increases. Lee et al. (2025) and Zhang (2023) support this notion, demonstrating that patients with stronger demand intentions for primary healthcare services exhibited a higher probability of actual usage. Luo et al. (2025) emphasizes that the perceived necessity of these services can significantly impact the elderly's willingness to embrace technological solutions designed to enhance their quality of life. It highlights the importance of demand in driving behavior, particularly in healthcare contexts (Lee et al., 2024). Therefore, the stronger the elderly's demand for elderly care services, the more likely it is to translate into social norms and social connectivity. This relationship is vital for promoting the adoption and application of smart elderly care services (Kim et al., 2024). Similarly, there are reciprocal effects between behavioral attitude and social support among the elderly regarding smart elderly care services. The elderly's digital education and literacy have positive reciprocal relationships with regard to elderly care services. Specifically, improvements in behavioral attitude will enhance the sense of social support, norm, and connectivity.

H6: Social norm has a positive and significant effect on moderating the relationship between digital application education and social connectivity.

H7: Social norm has a positive and significant effect on moderating the relationship between digital literacy and social connectivity.



H4: Digital application education -> Social Connectivity -> Life Satisfaction
H5: Digital Literacy -> Social Connectivity -> Life Satisfaction

Figure 1: Proposed Research Model.

3. METHODS

3.1. Research Design

The research object of this subject is the elderly group (≥65 years old) in Guiyang, Guizhou province. The target group of this survey specifically includes all citizens of the People's Republic of China aged 60 years and above living in urban areas of Guiyang City. In 2022, the permanent population of Guiyang reached 8.8917 million, with 1.36 million people aged 60 and above, accounting for 15.3% of the total population. Among them, 1.0218 million were aged 65 and above, making up 11.49%. This indicates that Guiyang is a typical aging city, with a gradually deepening level of aging and a significant demand for elderly care services. Hence, national elderly care policies are implemented in Guiyang for assessing the urban effects. It provides a scientific basis for formulating policies and promotes the consumption of smart pension products (See table 1).

Considering the actual situation, this survey adopts the non-probability sampling method, which means that some individuals are selected from all the survey objects without probability for investigation, and the characteristics of all the survey objects are inferred from the characteristics of the individuals. Random encounter sampling is one of the non-

probability sampling methods, which requires the investigator to include sample members in every overall unit encountered under specific conditions. This sample sampling method can make it convenient for the investigator to get close to the survey object. In order to ensure a sufficient sample size, 200 questionnaires are planned to be distributed in each urban area, with a total of 1,200 questionnaires. This selection is intended to cover older people from different economic backgrounds to obtain more comprehensive and accurate data. The digital application education and digital literacy was measured using items adapted from Sánchez-Cruzado et al. (2021) and Sun et al. (2025), elderly people social norm and connectivity refer to Helferich et al. (2023). Life satisfaction were adopted from Shukri et al. (2022).

Table 1: Sample Structure.

Demographics	Category	Frequency	Percentage (%)
Gender	Male	487	48.7
	Female	513	51.3
Age Group	60-69	421	42.1
	70-79	358	35.8
	≥ 80	221	22.1
Education	No formal education	138	13.8
	Primary school	326	32.6

The research was approved by the Human Research Ethics Committee Network of Naresuan University, Thailand (R0034/2568). This research adheres to ethical research standards in May 2025. Following the ethical standards as laid down in the 1964 Declaration of Helsinki and the ethical principles and code of conduct, participation in this study was voluntary. In this study, informed consent was obtained from all participants who agreed to participate in this research and publish their data in publications. This consent was provided through online survey forms. Data collection for this study occurred online between March 02 to April 15, 2025.

3.2. Data Analysis

A pretest and a pilot test were applied before the formal test. This study also utilized common method variance (CMV) to mitigate potential bias issues in anonymous questionnaire distribution and randomly arranged the measurement items (Podsakoff et al., 2003). The structural equation model (SEM) was additionally used to examine the correlation of research constructs using AMOS and SPSS software. This study also suggested post-detection methods for the common latent factor (CLF) using Harman's single-factor test. Table 2 shown the correlations between the variables (Hair Jr. et al., 2019). Furthermore, a two-step methodology that included confirmatory factor analysis (CFA) and structural equation modelling (SEM) was used to assess causal relationships between variables and research hypotheses.

Table 2: Correlation Matrix for Measurement Scales.

Constructs	Mean	SD	DE	DL	SC	LS
DE	5.12	1.61	**0.845**			
DL	5.37	1.53	0.256**	**0.852**		
SC	5.45	1.89	0.346**	0.415**	**0.774**	
LS	5.28	1.74	0.562**	0.462**	0.351**	**0.761**

SD: Standard Deviation
Diagonal Elements Are the Square Roots of The AVE For Each Construct
Pearson Correlations Are Shown Below the Diagonal
Significant At *: *P* < 0.05, **: *P* < 0.01, *: *P* < 0.001**

3.3. Measurement Model

The confirmatory factor analysis (CFA) results $\chi 2/df$ 3.471, TLI = 0.943, RMSEA = 0.043, CFI = 0.946, and IFI = 0.948) showed that the data fit well with the model. The results given in Table 3 showed that all the items of all the variables loaded significantly, and therefore, no item was deleted. The values of Cronbach's alpha, composite reliability, and average variance extracted (AVE) are significantly above the threshold value, indicating that inter-item reliability exists among the items of each variable in this study.

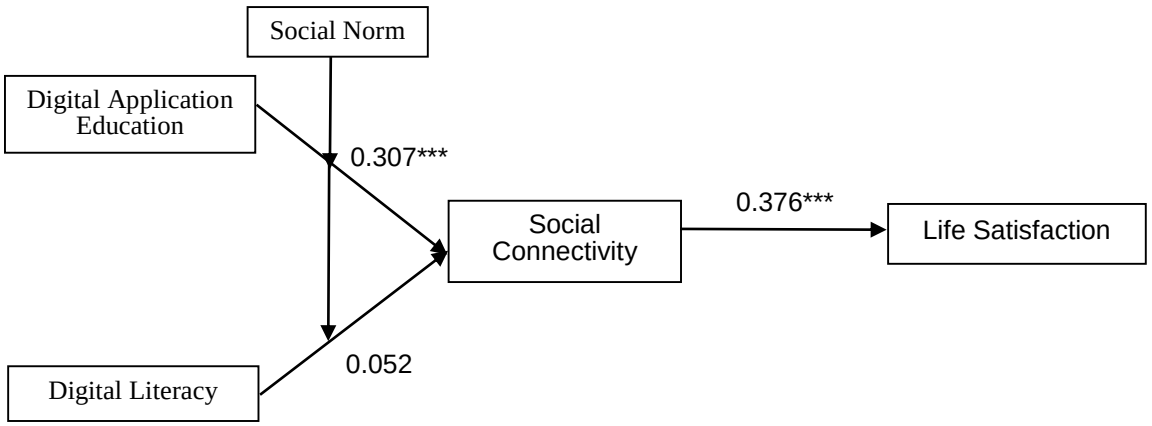
Table 3: Measurement Result.

Variables					
Digital application education (DE)				0.944	0.683
1. I find it easy to learn and use new technology.		0.775			
2. Technology improves my daily life and helps me stay independent.		0.825			
3. I feel overwhelmed by the rapid changes in technology.		0.757			

4. Technology helps me stay connected with my friends and family	0.725			
5. I trust technology to manage important aspects of my life, such as banking or healthcare.	0.872			
6. The influencer attracted	0.852			
7. I prefer traditional methods over digital tools for communication and information retrieval.	0.885			
Digital Literacy (DL)			0.935	0.674
1. I feel confident in my ability to use digital devices (e.g., smartphones, tablets, computers).	0.781			
2. The digital device promoted life much better.	0.789			
3. I am comfortable navigating the internet to find reliable information.	0.785			
4. I feel frustrated when trying to use new digital applications or services.	0.857			
5. I can recognize and avoid online scams or fraudulent activities.	0.846			
6. I actively seek opportunities to improve my digital skills.	0.754			
7. I believe digital literacy is essential for maintaining an active and social lifestyle.	0.624			
Social connectivity (SC)			0.901	0.768
1. Technology has made it easier for me to maintain my social relationships	0.855			
2. I feel socially connected despite physical distance from my loved ones.	0.859			
3. I prefer face-to-face interactions over digital communication	0.887			
4. Ssocial media helps me stay updated on the lives of my friends and family.	0.905			
5. Technology has led to a decrease in the quality of my social interactions.	0.894			
6. I use digital tools to engage in community or social activities.	0.885			
Life Satisfaction (LS)			0.814	0.527
1. I am satisfied with my overall quality of life.	0.841			
2. Technology has contributed to my overall happiness and well-being.	0.792			
3. I feel a strong sense of purpose in my daily life	0.802			
4. My social interactions make me feel valued and supported.	0.728			
5. I am optimistic about aging in a technology-driven world.	0.698			
6. I feel that digital literacy has positively impacted my well-being.	0.742			

3.4. Structural Model

The fit of data to the proposed model was adequate (Hair Jr et al., 2019): $\chi 2$ 3.747, GFI = 0.906, NFI = 0.901, CFI = 0.904, IFI = 0.905, and RMSEA = 0.042. The results revealed several significant relationships among the variables. First, digital application education has a positive and significant effect on social connectivity ($\gamma 11$ = 0.307, $p < 0.001$), thereby supporting H1. This indicates that structured digital education programs effectively promote interaction, reduce social isolation, and strengthen interpersonal ties in later life. Furthermore, digital literacy also has a significant effect on social connectivity ($\gamma 12$ = 0.052, $p > 0.05$), indicating that H2 is unsupported. This suggests that while older adults may acquire technical competence, these skills do not necessarily lead to stronger social networks without broader educational or contextual support. Social connectivity also has a positive and significant effect on life satisfaction ($\beta 21$ = 0.376, $p < 0.001$), supporting H3. This result aligns with previous findings emphasizing the importance of emotional support and community engagement in improving psychological well-being among older populations (See figure 2).



Note. Model Fit: X^2/Df = 3.793, GFI = 0.961, NFI = 0.962, CFI = 0.961, IFI = 0.962, And RMSEA= 0.043.

Figure. 2: Structural Model Result.

3.5. Mediation Effect

The results of Table 5 present a mediation analysis that examines the direct and indirect effects of digital application education and digital litteracy on elderly people life satisfaction towards social connectivity. This result aligns with the earlier finding that digital application education and digital litteracy significantly predict the life satisfaction to support H4 and H5. This implies that the elderly people who are more socially connected tend to report higher levels of well-being. These findings underscore the critical importance of psychological resilience and digital literacy as a mechanism by which school the life satisfaction.

Table 4-11: Mediation Result.

Direct effect			B	*T*	95% CI
Digital application education	→	Social connectivity	0.412	14.814***	(0.314, 0.510)
education					

Indirect effect				B	SE	95% CI
Digital application education	→	Social Connectivity →	Life satisfaction	0.224	0.051	(0.136, 0.312)
Digital literacy	→	Social Connectivity →	Life satisfaction	0.183	0.045	(0.101, 0.264)
Interaction						

Note: Significant At *: P < 0.05, **: P< 0. 01, ***: P < 0.001

3.6. Moderation Results

The digital application education and digital literacy play a crucial role in influencing social connectivity towards social norm (see table 5). This implies that when older adults perceive strong social encouragement and acceptance regarding technology use, their participation in digital education leads to significantly greater improvements in life satisfaction. It proves that the elderly social connectivity emerged though, if they have any care and maintain the technology properly. It demonstrates how crucial it is to handle social connectivity (Díaz et al., 2024; Holloway et al., 2023; Luo et al., 2025). The indirect role of social connectivity and the contextual influence of social norms underscore the need for holistic digital inclusion strategies, which emphasize not only training content but also peer support, community involvement, and interpersonal engagement.

Table 5: Moderation Test Result.

	b	*SE*	*t*
Digital application education effect on social connectivity towards social norm	0.337	0.043	4.231***
Digital literacy effect on social connectivity towards social norm	0.283	0.047	4.366***

Significant At *: P < 0.05, **: P < 0.01, ***: P < 0.001.

4. DISCUSSION

Behavioral attitudes towards digital application education and digital literacy significantly influence elderly individuals' intentions for social connectivity and life satisfaction, such that the ability to learn and operate new technologies plays a crucial role. Positive attitudes, shaped by perceived ease of use, trust in technology, and perceived benefits, can enhance their willingness to adopt these services. It demonstrates that elderly users often evaluate technology based on past experiences and the perceived relevance to daily activities. Furthermore, smart care services also can improve quality of life to lead to expressing a favorable intention to elderly service. As they work in teams, elderly people also build social connections, which can provide emotional support and mitigate feelings of isolation often linked to their stress. This result aligns with preliminary studies that found that behavioral attitudes embedded people's intention to use a service (Baelen et al., 2025; Zhang, 2023). Hence, the service providers can implement clear guidelines and provide ongoing feedback, helping elderly people navigate challenges effectively to alleviate their stress. In addition, digital application education and digital literacy have the potential to enhance elderly people's psychological well-being and social connectivity through increased engagement and support; careful implementation is essential to ensure that it is valuable to daily activities.

Social connectivity, such as encouragement from family and peers, can also impact their attitudes. When elderly individuals see others successfully using smart technologies, it can reduce anxiety and foster a more positive outlook. Conversely, negative attitudes stemming from fear of technology or concerns about privacy can hinder their willingness to engage with these services. Moreover, digital literacy is a critical factor. Those

with higher digital skills tend to have more positive attitudes towards technology, which translates into a greater intention to use smart elderly care services. Programs aimed at improving digital literacy among seniors can thus be beneficial in promoting acceptance. In addition, positive attitudes toward technology are more likely to lead to an intention to use digital application services. This positivity often stems from recognizing the potential benefits these services can provide, such as improved health monitoring and enhanced independence. This service significantly influences the service users' attitudes by fostering deeper understanding and retention of knowledge (Luo et al., 2025; Ren & Zhou, 2023; Sun et al., 2025). It demonstrates, unlike traditional learning methods that often emphasize memorization, elderly care services encourage people to engage with real-world problems, promoting critical thinking.

Social connectivity is a critical factor influencing elderly individuals' willingness to adopt elderly care services and digital applications. This concept refers to the degree to which seniors believe they will engage in a specific behavior, in this case, using technology designed to assist with their care and daily activities. Several elements contribute to this perception, including perceived ease of use, perceived usefulness, and personal motivation. Elderly individuals are more likely to intend to use care services if they believe these technologies are easy to operate. This perception can be enhanced through user-friendly designs, clear instructions, and supportive training programs that cater to their specific needs and perceived usefulness. High levels of stress can lead to anxiety, decreased motivation, and impaired cognitive functioning, which negatively impact students' ability to concentrate. It is designed for elderly people's engagement during the activity. This supports preliminary studies by Liu et al. (2022) and Luo et al. (2024); social connectivity has a strong correlation to service usage intention. Stakeholders can create targeted interventions that encourage older adults to engage with these technologies toward understanding and addressing the factors that drive demand for elderly smart care services. Ultimately, fostering a strong demand for elderly care services not only enhances behavioral intention but also leads to improved health outcomes and greater independence for the elderly population. This emphasizes the value of developing services that resonate with the needs and preferences of older adults, ensuring that they feel empowered to take advantage of the benefits that smart technologies can offer.

The role of the elderly services has been significantly transformed under the technology development combined with the modern apprenticeship care model. Furthermore, social connectivity significantly shapes elderly individuals' intentions to adopt elderly care services. Positive attitudes towards technology and social connectivity, influenced by perceived benefits like safety and independence, enhance their psychological well-being and social connectivity and also their willingness to engage with these services. Furthermore, social support from family and friends further reinforces these intentions, facilitating successful adoption. This study also demonstrates that psychological factors, particularly effectiveness perception and emotional attitudes, have an enormous impact on determining the behavioral intentions of older adults towards social connectivity. Subjective norms, or the perceived social pressure to use these services, significantly affect usage intentions. When family members and peers advocate for the use of elderly care services, it positively influences elderly people's willingness to adopt the care service. This social support can manifest through encouragement and shared experiences, making the technology feel more accessible.

5. CONCLUSSIONS

The adoption of digital applications of elderly care services among older adults is significantly influenced by a combination of digital application education and digital technology literacy. Social connectivity, driven by the perceived benefits of these technologies such as enhanced safety, improved health monitoring, and increased independence, plays a crucial role in determining whether the senior citizen will engage with these services. Furthermore, social connectivity from family, friends, and caregivers further reinforces these intentions, creating an environment where older adults feel encouraged and validated in their choices. When elderly people perceive that their social circles advocate for the use of elderly care services applications, they are more likely to overcome apprehensions and embrace technology. Moreover, addressing concerns related to cost and risk perception is essential for promoting adoption. The service care members who view the costs as reasonable and recognize the potential risks associated with aging are more inclined to adopt these services. Stakeholders must focus on fostering positive attitudes, providing education, and leveraging social support networks. Hence, the

stakeholders can facilitate a smoother transition for older adults into the digital age of care, ultimately improving quality of life and well-being.

5.1. Academic implications

The Theory of Planned Behavior (TPB) and service digitalization provide a robust framework for understanding the factors that influence individuals' intentions and behaviors, particularly in the context of adopting new technologies such as elderly care services. TPB posits that behavioral intention is shaped by three key components: attitudes toward the behavior, subjective norms, and perceived behavioral control. Each of these components has significant implications for both academic research and practical applications in the field of elderly care. A positive attitude can enhance the likelihood of adoption of elderly care services. In addition, how educational interventions and awareness campaigns can shift attitudes by highlighting the benefits of these technologies. Understanding the specific beliefs that contribute to positive or negative attitudes can inform the design of targeted strategies to promote acceptance. Furthermore, subjective norms emphasize the influence of social pressures on behavioral intentions towards family and caregiver support. Hence, the role of social networks and community engagement in shaping these norms, providing insights into how to leverage social influence to encourage technology use among elderly people.

5.2. Practical implications

The practical implications of the Theory of Planned Behavior (TPB) and elderly digital applications in promoting the adoption of elderly care services are significant for various stakeholders, including healthcare providers, technology developers, policymakers, and community organizations. Hence, stakeholders should implement targeted strategies to enhance the acceptance and use of these technologies among elderly people. The stakeholders should focus on educational initiatives that highlight the benefits of elderly care services to foster elderly people's positive attitudes. Moreover, testimonials from peers who have successfully adopted these services can help shift perceptions and reduce apprehension. Social cognitive influence plays a crucial role in shaping elderly people's behavioral intentions to use elderly care service applications. Stakeholders should engage family members, caregivers, and community leaders to advocate for the use of this service. Creating community support groups where seniors can share experiences and learn from one another can reinforce positive subjective norms. Furthermore, involving influential figures, such as healthcare professionals, in promoting these technologies can enhance credibility and encourage adoption. The stakeholders must identify and mitigate barriers that hinder elderly individuals from using technology to address their perceived behavioral control, including providing training programs tailored to elderly people and focusing on user-friendly interfaces. Furthermore, policymakers should consider creating incentives for technology adoption, including establishing mechanisms for continuous feedback from elderly users to understand their personal experiences and challenges with elderly care services. This feedback can inform ongoing improvements in technology design and service delivery, ensuring that the needs and preferences of seniors are prioritized.

5.3. Limitations and future study directions

This study has three limitations. Firstly, the territories sampled in this research do not exactly represent the whole of China. The findings may not be generalizable to all regions or educational contexts within the country. Hence, future research needs to confirm the role of elderly care services applications across diverse cultures and regions, as well as incorporate additional variables such as socioeconomic status, educational background, and institutional support to obtain more comprehensive results. Secondly, the political sensitivity in China may have influenced my informants' willingness to answer the questionnaires and interview questions openly. This limitation could lead to biased responses and a lack of depth in the data collected. Future studies should consider incorporating local wisdom and perspectives to gain a more nuanced understanding of elderly people's experiences with other social care programs. Engaging with a broader range of participants, including those from different educational backgrounds and regions, will enrich the findings and provide valuable insights into the effectiveness of social care in various contexts. Lastly, longitudinal studies could be beneficial to assess the long-term impacts of social care on elderly people.

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