The Prediction of Digital Engagement on Psychological Well-being in Older Adults in Taiwan

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Abstract. The engagement of digital device services and their potential value for psychological well-being in older adults is a modern societal phenomenon that has become a must-address subject. Older adults' use of social media was crucial because it provided an unprecedented role in communicating with friends and family. However, loneliness among older people becomes another issue in the virtual environment. This article predicted the relationship between the personal experience of happiness and social media engagement among older adults in Taiwan. Seniors' experience of psychological well-being may be associated with any direction of digital engagement. Findings from the reviewed research documents predict several possible factors between digital engagement and psychological well-being. Digital engagement among the elderly and its possible consequences are outlined. Regarding meaningful social impact, highly digital engagement may provide social support and enhance psychological well-being among older adults.

Keywords: Digital engagement, Psychological well-being, Older adults.

1. Introduction

1.1. Background and Context

1.1.1. *Digital Technology Adoption Trends in Older Adults*

Many researchers delve into the trajectory of mobile app development and outline anticipated advancements and shifts in the industry. By exploring technological innovations, evolving user preferences, and industry trends, Goldsmith (2015) provides profound insights into digital engagement regarding the future landscape of mobile applications, thereby enlightening the reader on the potential of this evolving field [1]. Arjoune and Faruque (2020) provide an in-depth analysis of the latest developments shaping the mobile application landscape and point out various facets of mobile app evolution, including technological advancements, user behavior shifts, and industry trends. The authors identify several emerging trends, such as the increasing integration of artificial intelligence (AI) and machine learning (ML) for enhanced personalization and user experience. They also emphasize the importance of security and privacy measures in digital technology adoption, thereby connecting the audience to the current trends and challenges in their field of interest [2]. Kim

et al. (2020) explore the specific context of digital technology adoption, such as mobile app development trends, concerning older adults. Researchers provide a comprehensive analysis of the evolving landscape of digital applications catering to the needs and preferences of this demographic group. It highlights key trends in digital adoption tailored for older adults, including features designed to enhance accessibility, usability, and user experience for seniors. The authors discuss integrating intuitive user interfaces, larger font sizes, voice-based interactions, and simplified navigation options to accommodate the unique requirements of older users. Additionally, researchers address using health and wellness apps, cognitive training apps, and social networking platforms to foster connections and combat social isolation among older adults [3].

1.1.2. *Importance of Psychological Well-being in Aging Populations*

Researchers Abadir et al. (2023) present a comprehensive conceptual framework for leveraging artificial intelligence (AI) to improve the psychological well-being of older adults via smartphone applications. This framework implies the unique challenges older adults face in maintaining mental health and well-being in the digital age. The conceptual framework explores various ways AI can benefit older adults' psychological well-being, including AI-powered personalized recommendations for mental health resources, mood tracking and analysis functionalities, virtual companionship through chatbots or virtual assistants, and cognitive training programs tailored to individual needs and preferences. It is essential to use user-centric design principles and accessibility considerations to ensure that AI-enhanced smartphone applications are intuitive and easy for older adults to use. On the other hand, the potential of digital engagement positively impacts older adults' mental health and well-being [4]. Riboni et al. (2020) offer a comprehensive examination of the potential benefits of AI-powered smartphone applications in enhancing the psychological well-being of older adults. Through a systematic review of existing literature, the authors explore various aspects of AI-driven applications to promote mental health and well-being in older adults. The review identifies various AI-powered features and functionalities incorporated into smartphone applications targeting older adults. These include personalized mood tracking and analysis, virtual companionship through chatbots or virtual assistants, cognitive training programs, and AI-driven recommendations for mental health resources and interventions. The authors also analyze the effectiveness of these applications in improving psychological outcomes such as mood, stress, and loneliness among older adults. Furthermore, the review highlights the importance of user engagement, accessibility, and privacy considerations in designing and implementing AI-powered smartphone applications for older adults. The authors also discuss the need for further research to assess these interventions' long-term impact and scalability [5].

1.2. Research Gap

The relationship between digital engagement and psychological well-being in older adults is an area of growing interest and research. Thus, there may be a lack of understanding of the relationship between digital engagement and psychological well-being in older adults. While digital technologies offer numerous opportunities for older adults to stay connected, access information, and engage in various activities, understanding the impact on their psychological well-being is complex and multifaceted. One challenge is the diversity within the older adult population. Individuals vary widely in their familiarity and comfort with digital technologies and their motivations for using them. Socioeconomic status, education level, and health status

can influence digital engagement and psychological well-being. Research findings on the relationship between digital engagement and psychological well-being in older adults are still unclear. While some studies suggest that increased digital engagement can lead to improved cognitive function, social connectedness, and overall well-being, others have raised concerns about the potential adverse effects of excessive digital use, such as increased feelings of isolation, anxiety, and decreased satisfaction with life. However, researchers should consider older adults' diverse needs and preferences to understand this relationship better. Other studies have raised concerns about the potential adverse effects of excessive digital use, such as increased feelings of isolation, anxiety, and decreased satisfaction with life. Additionally, older adults may face unique challenges in navigating digital technologies, such as difficulty with small screens, complex interfaces, and concerns about privacy and security [6]. Additionally, interventions aimed at promoting positive digital experiences and addressing barriers to access and use could help support the psychological well-being of older adults in the digital age.

1.3. Objectives of the Study

For several reasons, understanding the predictive factors of digital engagement in older adults is crucial—first, it is essential to tailor interventions. By identifying the factors influencing digital engagement, we should tailor interventions to address older adults' specific needs and preferences. This customization increases the effectiveness of programs that promote digital literacy and encourage the use of digital technologies. Secondly, reducing disparities is crucial for elderly society [7]. Older adults are not a homogenous group, and factors such as socioeconomic status, education level, and health status can impact their access to and use of digital technologies. Understanding these predictive factors can help identify and address disparities in digital engagement, ensuring that all older adults can benefit from digital resources and services. Thirdly, it is the urge to enhance well-being in the 22nd Century. Digital engagement has the potential to positively impact various aspects of older adults' lives, including social connectedness, cognitive function, and access to health information. By understanding the factors that predict digital engagement, maximize these benefits, and enhance overall well-being by intentions. Moreover, we need to inform policy and practice. Insights into the predictive factors of digital engagement can inform the development of policies and practices promoting digital inclusion among older adults [8]. The government may involve initiatives to improve access to technology, provide training and support, and create age-friendly digital environments. Finally, researchers and technology developers can use knowledge of predictive factors to design studies and products that better meet the needs of older adults [9].

2. Literature Review

2.1. Digital Engagement and Its Importance for Older Adults

Former scholars present a thorough analysis of empirical evidence surrounding digital engagement in older adults [10, 11]. Based on their review, several suggestions, including the following:

(1) Tailored Interventions: Based on theoretical insights, develop tailored communication that addresses older adults' specific needs and preferences. For instance, interventions could focus on enhancing digital technologies' perceived usefulness and ease of use, drawing from the Technology Acceptance Model

(TAM). Design interventions tailored to older adults' specific needs and preferences, considering factors such as digital literacy, access to technology, and interests.

(2) Community-Based Approaches: Implementing community-based programs is a powerful tool that allows us to harness the influence of social networks. This approach, in line with the Socio-Technical Interaction Networks theory, promotes digital engagement among older adults and fosters a sense of belonging and support. This supportive environment can make the transition to digital technologies more reassuring and practical, motivating older adults to engage with them. Promoting Lifelong Learning: Lifelong learning initiatives do more than promote digital literacy and skills acquisition among older adults. They empower them to overcome age-related changes in cognition and physical abilities, fostering greater confidence and competence in digital technologies. This empowerment is the key to inspiring and motivating older adults to engage with digital technologies. Encourage older adults to actively participate in online communities, such as social media platform groups, to engage with unique individuals and share experiences and knowledge.

(3) User-Centered Design: Prioritize user-centered design principles in developing digital products and services for older adults. This design entails conducting usability testing and incorporating feedback from older adult users to ensure that technologies are accessible, intuitive, and responsive to their needs.

(4) Cross-Sector Collaboration: Collaboration between government agencies, healthcare providers, technology companies, and community organizations to comprehensively address barriers to digital engagement among older adults. Foster collaboration between gerontology, digital media, and social sciences to develop holistic approaches to understanding and addressing the digital engagement needs of older adults. This collaborative approach can facilitate the development of holistic strategies and initiatives that promote digital inclusion and accessibility.

(5) Policy Implications: Advocate for policies that promote digital inclusion and access for older adults, ensuring they have the necessary resources and support to participate fully in the digital world.

(6) Promoting Active Aging: Emphasize the role of digital engagement in promoting active aging by providing opportunities for older adults to stay connected, informed, and involved in social and community activities online.

Recent research examines digital engagement patterns and predictors among older adults in Taiwan, indicating the factors that drive technology in the senior population. The research explores how older adults in Taiwan engage with digital technology and the factors influencing their level of engagement. To understand their relationship with digital engagement, the researchers examined various factors, such as demographic characteristics, socioeconomic status, health status, and social support networks. The study highlights the importance of social support networks in influencing older adults' digital engagement behaviors. These include demographic factors, including age, gender, education level, marital status, and socioeconomic factors, such as income and employment status. Health-related factors, such as self-rated health and chronic conditions, also play a role in determining digital engagement levels. Those with strong social support networks are likelier to engage with digital technology, suggesting that social connections significantly facilitate digital engagement among older adults in Taiwan. In conclusion, the author predicts essential factors influencing digital engagement among older adults in Taiwan [12].

2.2. Psychological Well-being in Older Adults

Wang et al. (2018) and Zhang et al. (2021) investigate the factors influencing psychological well-being among older adults, with the role of social support [13][14]. Wang's study, a significant contribution to the field, specifically examines the impact of social support on the psychological well-being of older adults in China. Their use of quantitative and qualitative methods provides a comprehensive understanding of various dimensions of social support, such as emotional, instrumental, and informational support. Their findings, which highlight the significant positive relationship between social support, particularly from family members and close friends, and psychological well-being among older adults in China, underscore the cultural importance of family-based support networks in Chinese society. This study emphasizes the need for interventions and policies that strengthen these networks to promote the well-being of older individuals, offering a clear path for future research and policy development.

With its practical implications, Zhang's research delves into promoting psychological well-being in older adults through social support and engagement in leisure activities. Their quantitative approach investigates the associations between social support, participation in leisure activities, and psychological well-being indicators such as perceived stress, depressive symptoms, and life satisfaction. They find that higher levels of social support and greater engagement in leisure activities are associated with better psychological outcomes among older individuals. It underscores the importance of interventions and programs that facilitate social connections and meaningful leisure activities for older adults to enhance their overall well-being, offering tangible strategies for improving the lives of older adults. In summary, both studies provide valuable insights into the factors influencing adults' psychological well-being with any social support. While Chen focuses on the Chinese context, Zhang offers broader insights into promoting psychological well-being through social support and leisure activities. Their findings collectively underscore the importance of social connections and meaningful engagement in promoting the psychological well-being of older adults across different cultural contexts.

2.3. Existing Research on the Relationship Between Digital Engagement and Psychological Well-being

Hsu et al. (2018) present a study focusing on developing and preliminary evaluating a digital engagement intervention tailored for older adults in Taiwan [15]. The research aims to address the digital divide among older adults by creating an intervention program to enhance their digital skills and encourage active engagement with digital technology. The study meticulously outlines the process of developing the digital engagement intervention, which involves a comprehensive approach to identifying the specific needs and preferences of older adults in Taiwan regarding digital technology. The intervention encompasses a range of activities, such as training sessions, workshops, and support services, all aimed at enhancing participants' digital literacy, confidence, and motivation to use digital devices and platforms. The intervention's preliminary evaluation involves assessing its effectiveness in improving participants' digital skills and engagement with technology. This evaluation includes measures of digital literacy, attitudes toward technology, and self-reported levels of digital engagement among participants before and after the intervention. The preliminary evaluation of the intervention yields encouraging results, with participants demonstrating significant improvements in their digital literacy and confidence in using digital technology. Moreover, participants express a notable increase in their motivation to engage with digital devices and platforms, underscoring the potential

effectiveness of the intervention in addressing the digital divide among older adults in Taiwan. Overall, the study contributes to the growing research on digital engagement interventions for older adults, particularly in Taiwan. By developing and evaluating a tailored intervention program, the research provides valuable insights into practical strategies for promoting digital inclusion and improving the well-being of older adults through enhanced digital engagement.

2.4. Gaps and Limitations in Current Research

Based on previous findings, the researchers highlight several key points: First, various barriers hinder older adults in Taiwan from engaging with digital technologies. The researchers underscore the importance of addressing both barriers and facilitators of digital engagement to empower older adults in Taiwan to fully participate in the digital world and reap the potential benefits it offers. For example, a shortage of digital devices and the internet, limited digital literacy skills, concerns about privacy and security, and age-related physical or cognitive limitations may cause the barriers to rise. Secondly, despite the barriers, facilitators encouraging digital engagement among older adults in Taiwan are a significant concern. These facilitators may include social support from family and peers, availability of user-friendly digital devices and applications, participation in digital literacy programs, and perceived benefits of digital engagement, such as staying connected with others and accessing information and services. Third, the authors emphasize the importance of addressing barriers and enhancing facilitators to promote digital engagement among older adults in Taiwan. They suggest that policymakers, community organizations, and healthcare providers collaborate to develop comprehensive strategies and interventions to improve digital access, literacy, and support for older adults. Such efforts can help enhance older adults' well-being and social inclusion in an increasingly digital society [16].

3. Theoretical Framework

3.1. Social Cognitive Theory and Digital Engagement

Social Cognitive Theory (SCT), proposed by Aisyiyah et al. [17], posits that individuals learn and develop behaviors through observation, imitation, and modeling, particularly in social contexts. SCT emphasizes the role of cognitive processes [18], such as attention, retention, reproduction, and motivation, in shaping behavior. When applied to digital engagement in older adults, SCT suggests that their observations of others influence their engagement with digital technologies, their self-efficacy beliefs regarding their ability to use technology, and the perceived outcomes of digital engagement.

(1) Observation and Modeling: Using digital technologies, older adults may observe their peers, family members, or other social contacts. Positive experiences and successful interactions with technology demonstrated by others can serve as models for older adults, encouraging them to adopt similar behaviors.

(2) Self-Efficacy: Self-efficacy, a key concept in Social Cognitive Theory, refers to individuals' beliefs in their capabilities to perform specific tasks successfully. In digital engagement, older adults' confidence in their ability to use digital technologies plays a significant role. Higher levels of self-efficacy are associated with a greater willingness to learn and adapt to new technologies [19], suggesting that fostering self-belief can be a powerful tool in promoting digital engagement among older adults.

(3) Outcome Expectations: Outcome expectations refer to individuals' beliefs about the consequences of their actions. Older adults may engage with digital technologies if they perceive positive outcomes, such as improved communication with family and friends, access to information and services [20], and opportunities for social interaction and entertainment.

(4) Social Support: SCT highlights the importance of social support in shaping behavior. This support can be crucial in digital engagement among older adults. Older adults may be more likely to engage with digital technologies if they receive encouragement [21], assistance, and guidance from family members, peers, or community organizations. Social support can help older adults overcome barriers and build confidence in their digital skills, fostering community and shared learning.

(5) Reinforcement: Positive reinforcement, such as praise, encouragement, or tangible rewards, can reinforce older adults' digital engagement behaviors. Conversely, negative experiences or lack of support may deter older adults from further engagement with technology.

Overall, Social Cognitive Theory provides a valuable framework for understanding the factors influencing digital engagement in older adults. By considering the role of observational learning, self-efficacy beliefs, outcome expectations, social support, and reinforcement, interventions, and programs to promote digital engagement among older adults can be tailored to address these factors effectively. This understanding can guide the development of strategies that enhance older adults' digital skills, increase their confidence in using technology, and create a supportive environment that encourages their digital engagement.

3.2. Theory of Successful Aging and Psychological Well-being

The Theory of Successful Aging, proposed by Rowe and Kahn in 1987, suggests that successful aging involves three main components: avoidance of disease and disability, maintenance of high cognitive and physical functioning [22], and sustained engagement with life. According to this theory, older adults can achieve successful aging and empower themselves by actively participating in activities promoting physical health, cognitive vitality, and social connectedness, enhancing their overall well-being. When examining the relationship between the Theory of Successful Aging and psychological well-being in older adults, several key points emerge:

(1) Physical Health and Psychological Well-being: The theory emphasizes the importance of avoiding disease and disability as a component of successful aging. Older adults who maintain good physical health are more likely to experience higher psychological well-being and enjoy the positive outcomes of successful aging [23], including lower rates of depression and anxiety, greater life satisfaction, and a sense of purpose and fulfillment.

(2) Cognitive Functioning and Psychological Well-being: Another aspect of successful aging is maintaining high cognitive functioning. Older adults who engage in mentally stimulating activities [24], such as lifelong learning, problem-solving, and cognitive training, are more likely to preserve cognitive abilities and experience better psychological well-being.

(3) Social Engagement and Psychological Well-being: The Theory of Successful Aging highlights the significance of sustained engagement with life, which includes maintaining social connections, pursuing meaningful activities, and contributing to society. Older adults who remain socially active and involved in their communities tend to report higher levels of psychological well-being [25], a sense of

belongingness, social support, and emotional satisfaction, underlining the importance of social engagement in successful aging.

(4) Adaptation and Resilience: Successful aging involves adapting to age-related changes and overcoming adversity with resilience. Older adults who demonstrate adaptive coping strategies, such as acceptance, optimism, and problem-solving skills, are better equipped to maintain psychological well-being despite challenges and stressors associated with aging.

(5) Life Satisfaction and Meaningful Aging: Successful aging is associated with life satisfaction and meaningful aging [26]. Older adults who perceive their lives as meaningful, purposeful, and fulfilling are likelier to experience positive psychological outcomes, including greater happiness, contentment, and subjective well-being.

The Theory of Successful Aging provides a framework for understanding the factors contributing to older adults' psychological well-being [27]. Interventions and programs aimed at facilitating successful aging can help enhance the psychological well-being of older adults and promote their overall quality of life by promoting physical health, cognitive vitality, social engagement, adaptation, and resilience.

3.3. Theoretical Integration: Exploring the Interplay Between Digital Engagement and Psychological Well-being in Older Adults

Theoretical integration involves combining multiple theoretical perspectives to understand a phenomenon better. Integrating Social Cognitive Theory (SCT) and the Theory of Successful Aging can provide a comprehensive framework for exploring the interplay between digital engagement and psychological well-being in older adults.

(1) Social Cognitive Theory (SCT): SCT emphasizes the role of observational learning, self-efficacy, and outcome expectations in shaping behavior [28]. Applied to digital engagement in older adults, SCT suggests that observing others' successful use of technology, believing in their capabilities to learn and adapt, and anticipating positive outcomes from digital engagement can influence older adults' willingness to engage with digital technologies.

(2) Theory of Successful Aging: The Theory of Successful Aging emphasizes the importance of maintaining physical health, cognitive functioning, and social engagement for overall well-being in later life. Integrating this theory with the exploration of digital engagement suggests that older adults who actively participate in digital activities to promote their physical, cognitive, and social well-being are more likely to achieve successful aging outcomes.

By integrating these theories, we can propose a conceptual model that elucidates the mechanisms through which digital engagement influences psychological well-being in older adults:

(1) Observational Learning and Modeling: Older adults effectively observe peers or family members using digital technologies, increasing their self-efficacy and motivation to engage with technology.

(2) Self-Efficacy Beliefs: Older adults with higher levels of self-efficacy regarding their ability to use digital technologies are more likely to explore and adopt new digital tools and platforms, leading to increased digital engagement.

(3) Outcome Expectations: Positive outcomes of digital engagement, such as enhanced social connections, access to information, and opportunities for cognitive stimulation, reinforce older adults' engagement with

technology and contribute to their psychological well-being.

(4) Physical Health and Cognitive Functioning: Digital engagement activities, such as online health monitoring, cognitive training apps, and telemedicine services, promote physical health and cognitive functioning, positively influencing psychological well-being.

(5) Social Engagement and Support: Digital engagement facilitates social connections and communication among older adults, reducing loneliness and isolation and enhancing psychological well-being.

In summary, theoretical integration allows for a holistic understanding of the interplay between digital engagement and psychological well-being in older adults by considering the cognitive, social, and health-related factors that influence their digital behaviors and outcomes. This integrated approach can inform the development of interventions and programs to promote digital well-being and prosperous aging in older adult populations.

4. Predictive Factors of Digital Engagement in Older Adults

4.1. Socio-Demographic Factors

Predicting socio-demographic factors influencing digital engagement in older adults involves identifying variables such as age, gender, education level, income, and living arrangement that may predict the extent of older adults' engagement with digital technologies [29]. Here is a list for predicting these factors:

(1) Age: Older age is commonly associated with lower levels of digital engagement due to generational differences in technology adoption and age-related barriers such as decreased sensory acuity and cognitive decline.

(2) Gender: It is important to note that gender influences digital engagement dynamically. Research suggests that while men were traditionally more likely than women to engage in digital activities such as internet use and smartphone adoption, the gender gap in digital engagement has been narrowing in recent years.

(3) Education Level: Higher levels of education can be a powerful tool in promoting greater digital engagement among older adults. Education equips individuals with the skills and resources needed to navigate digital technologies effectively and can also influence attitudes toward technology adoption, offering a promising avenue for increasing digital engagement.

(4) Income: Income can predict digital engagement, as individuals with more disposable incomes may have better access to digital devices and internet services. Additionally, the affordability of technology and internet access may vary based on income.

(5) Living Arrangement: Older adults' living arrangements, such as living alone versus living with family or in a retirement community, may influence their access to and utilization of digital technologies. For example, older adults living alone may rely more on digital communication tools for social connection. In contrast, those living in retirement communities may have access to shared technology resources and support services.

4.2. Technological Literacy and Experience

Predicting technological literacy and experience factors that influence digital engagement in older adults involves identifying variables such as familiarity with technology, experience with digital devices, and comfort

level with digital tools [30]. Here is a proposed list for predicting these factors:

(1) Familiarity with Technology: This variable is crucial to older adults' digital engagement. Those more familiar with technology are likelier to engage with digital tools and platforms and reap the benefits of digital inclusion and participation.

(2) Past Experience with Digital Devices: Previous experience adopting digital mobile devices can influence older adults' comfort level and proficiency with technology. Individuals with more experience will likely be more confident and adept at using digital tools.

(3) Comfort Level with Technology: Comfort level refers to older adults' perceived ease and confidence in using digital devices. Those who feel more comfortable with technology may be more willing to explore new digital tools and engage in a broader range of digital activities.

(4) Training and Education: Participation in technology training programs and educational initiatives aimed at older adults can enhance technological literacy and experience. Older adults who have received training or education in digital skills may be more likely to engage with technology and use it effectively.

(5) Social Influence: Social factors, such as encouragement from family members, peers, or caregivers, cannot be overstated in shaping older adults' technological literacy and experience. Positive social support and encouragement motivate older adults to engage with technology and seek learning and skill development opportunities.

4.3. Social Support and Networks

Predicting social support and network factors that influence digital engagement in older adults involves identifying variables such as perceived social support, network size, and quality of social connections that may predict the extent of older adults' engagement with digital technologies [31, 32, 33]. The following is a proposed outline for predicting these factors:

(1) Perceived Social Support: Older adults' subjective perceptions regarding the availability and adequacy of support from family, friends, and other social contacts can significantly influence their digital engagement. Older adults who perceive higher levels of social support are more likely to engage with digital technologies, as they may feel more comfortable seeking assistance and guidance from their social network when learning to use digital devices or participating in online activities. This support underscores the importance of social support in facilitating older adults' technology use.

(2) Network Size and Diversity: The size and diversity of older adults' social networks can influence their digital engagement. Those with more extensive and diverse social networks may have more significant opportunities for social interaction and online information exchange, leading to increased digital engagement. Additionally, older adults who belong to multiple social groups or communities will access a broader range of digital activities and interests.

(3) Quality of Social Connections: The quality of social connections, including the strength of interpersonal relationships and the level of trust and intimacy, can impact older adults' digital engagement. More robust social ties and meaningful connections may encourage older adults to share experiences, seek advice, and collaborate with others in digital spaces, enhancing their overall engagement with technology.

(4) Digital Support Networks: The availability of digital support networks, such as online communities, forums, and peer support groups, can significantly enhance older adults' digital engagement. People in

these networks allow older adults to engage in similar activities, interests, and experiences, exchange information and resources, and receive emotional and instrumental support related to technology use. It highlights the instrumental role of digital support networks in promoting older adults' technology use.

(5) Intergenerational Connections: Interactions with younger generations, such as grandchildren or younger family members, can influence older adults' digital engagement. Intergenerational connections may provide opportunities for older adults to learn from younger individuals, exchange knowledge and skills, and engage in collaborative digital activities, fostering a sense of connectivity and interdependence across generations.

4.4. Attitudes and Perceptions Towards Technology

Predicting attitudes and perceptions towards technology factors that influence digital engagement in older adults involves identifying variables such as attitudes towards technology, perceived usefulness, and perceived ease of use that may predict the extent of older adults' engagement with digital technologies [34-38]. Here is a proposed model for predicting these factors:

(1) Attitudes Towards Technology: Attitudes towards technology refer to older adults' overall evaluations and emotional responses towards digital devices and platforms. Positive attitudes towards technology are associated with higher levels of digital engagement, including perceiving it as beneficial, enjoyable, and relevant to daily life. Conversely, negative attitudes, such as fear, skepticism, or resistance towards technology, may deter older adults from engaging with digital tools and platforms.

(2) Perceived Usefulness: The perceived usefulness of digital technologies is a crucial driver of adoption and sustained use among older adults. This perception is that elders believe digital devices and services can help them retrieve their needs. Older groups are more likely to engage with social platforms when they perceive technology as a valuable tool for enhancing communication, accessing information, or accomplishing tasks.

(3) Perceived Ease of Use: Perceived ease of use refers to older adults' perceptions of the simplicity and usability of digital devices and platforms. Older adults who perceive technology as easy to use and navigate are likelier to engage with digital tools and platforms. User-friendly interfaces, clear instructions, and intuitive design features can enhance older adults' perceptions of ease of use and facilitate digital engagement.

(4) Technology Self-Efficacy: Technology self-efficacy is older adults' belief in using digital devices and platforms effectively to accomplish specific tasks. Higher levels of technology self-efficacy are associated with greater confidence and competence in using technology, leading to increased digital engagement. Older adults with higher levels of technology self-efficacy are more likely to explore new digital tools, learn new digital skills, and adapt to technological changes over time.

(5) Perceptions of Risks and Benefits: Older adults' perceptions of the risks and benefits of digital technology use can influence their willingness to engage with digital tools and platforms. Perceived risks, such as concerns about privacy, security, and potential negative consequences of technology use, may deter older adults from engaging with digital technologies. Conversely, perceived benefits, such as opportunities for social connection, access to information, and convenience, may motivate older adults to embrace technology and participate in digital activities.

5. Conclusion

5.1. Summary of Key Findings

(1) The importance of digital engagement in older adults is critical. In conclusion, the predictions drawn from previous scholars' studies provide a comprehensive framework for enhancing digital engagement among older adults, mainly through online social activities [11]. By encouraging community participation, building social capital, providing tailored support and interventions, promoting active aging, conducting further research, addressing policy implications, and fostering interdisciplinary applications, we can build a more inclusive and supportive digital environment for older adults. These suggestions emphasize recognizing older adults' diverse needs and preferences in the digital age and tailoring interventions accordingly. By doing so, people can empower older adults to harness the benefits of digital engagement, including increased social connection, improved well-being, and enhanced quality of life.

(2) The necessity of digital applications. Implementing these applications requires collaborative effort from researchers, practitioners, policymakers, and community stakeholders. It emphasizes the importance of each stakeholder's role, making them feel included and valued. Ultimately, we can create meaningful opportunities for older adults to thrive in the digital age by adopting a multifaceted approach that combines research, practice, policy, and collaboration. Digital engagement will benefit them and foster a more inclusive and connected society for all ages. Nevertheless, this future vision of a more inclusive society can inspire and motivate the audience to take action.

5.2. Directions for Future Research

Researchers may involve the following steps:
(1) Developing user-friendly interfaces.
(2) Designing targeted interventions.
(3) Exploring novel applications of digital technologies in aging-related contexts.

Overall, understanding the predictive factors of digital engagement in older adults is essential for promoting digital inclusion, enhancing well-being, and ensuring that older adults can fully participate in the digital age. The systematic review provides valuable insights into the potential of AI-powered smartphone applications to impact older adults' psychological well-being positively. It offers guidance for researchers, developers, and practitioners seeking to leverage technology to effectively.

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