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Silver Netizens as Digital Residents: Exploring the Daily Digital Experience of Senior Netizens in China

by

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Abstract

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The last few decades have witnessed the penetration of digital technologies in all aspects of everyday life. The emergence of new technologies has come in parallel with opportunities and challenges to the world. While technological advancements are seen as societal advancement and beneficial for most, they can also exacerbate inequalities for groups not prioritised or included in the development of digital technologies, leading to greater social exclusion.

Influenced by individual and social factors, older generation could encounter more challenges than their younger counterparts in the digital world. The difficult circumstances for the older population concerned researchers thereby promoting studies working on the intergenerational digital divide. However, the existence of digital ageism within the progress of research and technology design is widening the digital divide, reinforcing the negative stereotype towards older population, and exacerbating digital inequalities.

A growing number of scholars are embarking on dispelling the myths of older people's digital use, breaking down prejudice and stereotypes towards their digital practices. Despite growing efforts were made, most existing research has been conducted in Western countries. It is necessary to provide empirical data on the digital daily lives and experiences of older adults in other countries around the world.

From a moderate social constructionism perspective, this study explored the digital experiences in everyday lives of Chinese silver netizens, inviting participants to interpret their experiences of digital use, intergenerational interactions, and digital inclusion in everyday life, and assign significance to these aspects. The study reveals that the digital activities of silver netizens primarily address practical needs such as socialising, information acquisition, and entertainment, with smartphones serving as central tools bridging their physical and digital realities. Older adults actively engage with platforms like WeChat, Taobao, and Alipay, creating personalised "digital spaces" akin to living rooms, study rooms, and playgrounds. The findings also highlight significant heterogeneity in their digital practices, challenging stereotypes and underscoring the importance of age-friendly designs. In terms of intergenerational digital interactions, the study emphasises the role of younger family members as "warm experts" while acknowledging the limitations of relying solely on this dynamic. Peer support emerges as an effective alternative. Silver netizens recognise significant generational differences in digital confidence, usage, and device needs. Additionally, the presence of "digital leaders" among older adults, who excel in and teach digital technologies, challenges stereotypes about their technological abilities and redefines perceptions of digital ageism. Finally, the research underscores the challenges and opportunities of digital inclusion for urban older adults in China. While digital inclusion initiatives in China are relatively new and lag behind developed countries, participants recognised the positive impact of existing training programs and called for improvements. They stressed the importance of user-friendly, simplified designs, particularly in emergency response and intelligent automation, to ease learning burdens and support daily life, including caregiving challenges in one-child families. Aligning policies and services with the specific needs of older adults is crucial for practical and accessible digital inclusion, fostering empowerment rather than adding burdens. Despite its limitations, this research challenges stereotypes about older adults' digital practice and contributes to a deeper understanding of their interactions with digital technologies.

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Research Thesis: Declaration of Authorship

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I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
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3. Where I have consulted the published work of others, this is always clearly attributed;
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Acknowledgements

From May 2019, when I drafted my proposal, to the completion of this thesis, my PhD project spanned nearly five years. During this period, the world underwent significant changes. The unexpected outbreak of the COVID-19 pandemic disrupted people's lives, impacted our daily routines, and influenced my research plans, bringing new considerations to my work. Ageing is an inevitable journey for everyone, not just someone else's story. Studying the digital daily lives of older adults is also a study of our own future. Therefore, my initial research, proposed before COVID-19, aimed to explore the digital divide among older adults, to understand the challenges they encountered in using digital technologies, and to investigate the enablers and barriers of their digital use. The COVID-19 pandemic highlighted the negative impacts of this digital divide, prompting Chinese scholars to pay more attention to the issue and the need for digital inclusion. Consequently, research on the digital divide among older adults flourished, and the image of "digital refugees in need" became prevalent in academic articles and the media. Yet, as more research adopts a patronising tone, we must be cautious of ageism in our studies. Is the term "digital immigrants" or "digital refugees" appropriate? Are all older adults digitally incompetent? Do all older adults need to actively and collaboratively engage in the digital society? Are the digital challenges we assume they face truly representative of their real situations? As more older adults step into the digital world, how do they cope and interact with digital technology in their daily lives? What does the use of digital technology mean to them? With these questions in mind, I embarked on my PhD exploration.

Over the past five years, I have received invaluable help and care from many people. Without their generous support, this thesis would not have been possible. I would like to express my deepest gratitude to them here.

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I am deeply thankful to *all my research participants*. Their support, trust, and willingness to share their digital daily lives with me have been invaluable. Their stories have shown that later life can be vibrant and diverse, far from 'grey'. Together, we have worked to reveal more 'possibilities' to the world.

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Definitions and Abbreviations

CGSS .....Chinese General Social Survey

CNNIC .....China Internet Network Information Centre

CNR .....China National Radio

ICTs.....information and Communication Technologies

LAN.....Local Area Network

MIIT .....Ministry of Industry and Information Technology

NBS.....National Bureau of Statistics of China

SNS.....Social Networking Services

UN.....The United Nations

Chapter 1 Introduction

Users are the experts of their own lifeworld (Halskov & Hansen, 2015); however, older adults and their lifeworld are often excluded from consideration by researchers and technology designers (Bischof & Jarke, 2021). Studies have proven that older users are more silent online (Brewer et al., 2021; Nimrod, 2010). Their views are crucial, but their voices are rarely heard (Komatsu et al., 2018). Older adults could be active contributors to progress rather than lagging behind (Lemieux, 1995). The digital stories of older users should be told by themselves. Currently, researchers worldwide are dedicated to studying the digital use in everyday life of older adults, but their work is mainly focused on Western countries. Research on older adults' digital use in the Chinese cultural context is predominantly based on large-scale quantitative surveys, while qualitative studies are rare. Understanding older adults' digital usage requires both a broad and detailed view—seeing the forest as well as the trees. Employing qualitative research methods to delve into their digital everyday lives and to understand the significances and meanings of digital technology and digital use to them is crucial. Moreover, the digital engagement of older adults is not an issue confined to the older population. Family support and social inclusion should also be taken into account. It is also vital to learn if older adults have received adequate and appropriate support from warm experts and society. This could contribute to the independence and autonomy of older adults in the digital world. This study, using mixed methods under a moderate social constructionism perspective, will invite participants to construct their digital everyday lives and culture, interpret their own experiences of digital use, intergenerational interactions, and digital inclusion in everyday life, and assign significance to these aspects. Questionnaires, interviews, and focus groups will be utilised to gain insights into these areas.

1.1 Contextualise the Silver Netizens and Their Digital Experiences

The last few decades have witnessed the penetration of digital technologies in all aspects of everyday life. The emergence of new technologies has come in parallel with opportunities and challenges to the world. For most people, the development of technologies represents social advancement and benefits for individuals. However, for some groups that have not been prioritised or even not included in the development of digital technologies, the rapid pace of technological development may exacerbate the inequalities they experience and bring about greater social exclusion. Due to the convenience low costs, and remote accessibility, digital solutions have been widely adopted by administrative departments or enterprises as their collaboration, business and service platform, especially under the pandemic circumstance (UN,

2020; Papagiannidis et al., 2020; Li, 2021). The advancement of digital technologies brings people freedom and efficiency while hides potential unfairness which could lead to new forms of social inequalities such as 'digital divide'.

The 'digital divide' can be understood briefly as the inequalities or differences of accessing, using and benefiting from digital technologies between individuals, organisations and nations (Wei et al.,2011; Scheerder et al., 2017). As a new form of 'knowledge-gap'[1] in the information age, the digital divide exerts profound impacts on individuals and the society. Scholars believe that the unbalanced distribution of economic, social and cultural resources and capital owned by individuals is the basis of digital inequality (Van Deursen et al., 2015; Scheerder et al., 2017). Besides, inadequate and improper use of technology can prevent individuals from benefiting from digital advancements, restricting their access to information, public services, and opportunities for social participation (Neves & Vetere, 2019). According to the digital capital theory (Ragnedda & Ruiu, 2020), the quantity of individual capital (including the accessibility to the digital devices, availability of digital support and training, as well as the capacity and literacy of using digital technologies), will accumulate in the process of their digital engagement, thus forming a larger divide between the 'information haves' and the 'information have-nots'.

The world is getting older. It is 'predicted that 'by 2050, one in six people in the world will be over age 65 (16%), up from one in 11 in 2019 (9%)' (UN, 2019). Accelerated digitalisation and demographic shift have led to the emergence of the 'grey digital divide,' which refers to the inequalities in digital technology use between older and younger generations. Influenced by factors like age, health, education, income, and regional economic development, older adults could encounter more challenges than their younger counterparts in the digital world. Though it is suggested that digital engagement can enhance the well-being of older adults by promoting social participation, maintaining relationships, and providing social support, however, the presence of the digital divide means that not all older adults have equal access to these benefits. Financial, technical, and psychological barriers can hinder their digital participation and enjoyment (Pan et al., 2010; Lee & Coughlin, 2015).

[1] The hypothesis of 'knowledge gap' was put forward by Tichenor et al. in 1970. The main proposition of this theory assumed that if the mass media input into the social system increases, those more educated segments， compared to the lower-educated groups, will acquire information and knowledge more quickly and efficiently, therefore the gap between the two groups of different status is likely to grow rather than narrow. (Tichenor et al., 1970)

Though ageing digital divide exists, more older adults are getting engaged into digital world. According to CNNIC's 47th and 51st reports, the proportion of Chinese Internet users aged 60 or above to total Internet users rose to 14.3% by the end of 2022, up from 11.2% at the end of 2020. The Internet further penetrates China's older population. In the past years, with the penetration of digital technology, silver netizens, those older adults who have accessed the internet with digital devices like smartphones or computers, have gained more experience in digital use. The terms like 'digital immigrants' (Prensky, 2001) and 'digital refugees' (Fryer, 2006), used to categorise older adults based on their digital abilities, have been deemed outdated and discriminatory (Holton, 2010). Age is no longer used as a differentiation or defining factor for people's digital competence. Older adults could be considered as a segment of the population that can actively participate in and benefit from the digital world. Beneito-Montagut et al., (2022) pointed out in their study that smartphone use is not determined by age, but by other socio-cultural factors. Although previous research has suggested differences in digital activity between age groups (Hunsaker & Hargittai, 2018), age might not be the core that determines smartphone use among older adults (Beneito-Montagut et al., 2022).

As older people who use digital technologies, silver netizens could have their unique experiences and needs in the use of digital technologies. However, as a group that received less attention in the field of digital technology research and development, the digital lives of the older population remain under-explored. Regardless of age or digital capability, everyone has the right to access digital technologies. However, digital ageism, rooted in stereotypes and prejudice towards older individuals, is perpetuating the myths about their digital use. Therefore, exploring and understanding the digital experiences and needs of silver netizens is both vital and valuable. By studying the digital practices of silver netizens in their everyday lives, researchers can restore the coloured (rather than *grey*) picture of the digital activities of the older adults and sketch the landscape of the digital world constructed by older adults themselves. By capturing the realities of silver netizens' use of digital technologies, it is possible to better understand their digital experiences and needs, as well as understand the importance and significance of digital technologies for the older population. This can inform policy makers and service providers and help develop more age-friendly digital technologies, services and support systems, thus creating an inclusive digital environment for the older population, enhancing the digital experience of silver netizens and promoting their digital engagement.

1.1.1 Debunking the Myths of Older People's Digital Use

Given the significance of digital technology in everyday life, researchers are increasingly concerned about the digital exclusion faced by older adults. A large number of studies have demonstrated the existence of a digital divide between younger and older adults (e.g., van Dijk, 2006； Paul & Stegbauer, 2005; Morris & Brading, 2007; Friemel, 2014; Rainie, 2015; Lee & Coughlin, 2015). However, even in the process of ageing digital inclusion research and the development of age-friendly technologies, digital ageism existed and sometimes in a 'patronising way' (Rosales et al., 2023). Digital ageism is a complex phenomenon involving biases and exclusions based on age in digital technologies, which is typically a negative construct of age (Ayalon & Tesch-Römer, 2018). These age-related biases can stem from individual or societal levels（Iversen et al., 2009), affecting access to digital innovations (Fernández-Ardèvol & Blanche, 2019). Even terminologies (e.g, digital immigrants, digital refugees, grey digital divide) used in ageing research may also relate to digital. Digital ageism perceives older adults as a homogenised group, assuming they share similar life experiences, lack interest in digital technologies, and are incapable of learning how to use them (Sawchuk et al., 2020; Rosales & Fernández-Ardèvol, 2020). Rosales et al. (2023) stated that the struggles and negative impacts brought by digital ageism on the aged population is less realised and recognised as the 'elephant in the room', which would lead to a lack of motivation and confidence in older people to use technologies (Neves & Amaro, 2012). Although there are early digital adopters or digital-savvy users among the older age group, they also need to fight against stereotypes (Rosales & Fernandez-Ardevol, 2019).

Given the negative impacts brought by digital ageism, a growing number of scholars are embarking on dispelling the myths of older people's digital use, breaking down prejudice and stereotypes towards their digital practices (e.g., Wandke et al., 2012; Durick, J. et al., 2013; Loos, E. et al.,2022). Broady et al. (2010) pointed out that the negative stereotypes about older adults avoiding technology and being unable to use it are outdated. Older adults certainly have the potential to use technology and computers as effectively as younger groups under proper encouragement. Digital seniors are working to create their own digital practices and routines (Quan-Haase et al., 2016). Duque (2020) pointed out that, empowered by smartphones, older adults are constructing their health identity by participating in and creating content that emphasises the positive aspects of ageing. In the digital age, older people might want to reinvent themselves more than any other generation (Quan-Haase et al., 2018).

To further debunk the myths of older people's digital use, it is necessary and essential to explore and represent their digital practices in everyday life. Researchers who want to understand older adults and promote their later-year well-beings have to meet the older adults where they are. For the older adults, good digital technologies and skills could be ones that suit their needs in the 'lifeworld' (Schirmer, W. *et al.*, 2022) rather than complex or cutting-edge high technology. Researchers should not only focus on what older adults *cannot* do with digital technology, nor should we merely view the older adults as a homogeneous group and evaluate their digital capabilities through quantitative data. Instead, researchers should capture how elderly people engage in digital practices in their daily lives (Quan-Haase et al., 2016), understand their daily digital experiences as well as the significance and importance of digital technologies for the older generation.

On the one hand, for older adults who have already become digital users, understanding their digital daily lives should not remain in the *grey zone*. More research should be invested in exploring the daily digital practices of the older population to re-colour their digital lives. It must be acknowledged that the level of skill in using digital technology does influence people's digital experiences to some extent; however, it does not determine the significance that digital technologies bring to people's lives. The digital transformation of society will not stop or reverse, whether high or low digital capability cannot challenge the fact that digital technology has become an indispensable part of people's daily lives. To Explore the contexts and scenarios in which older people use their digital devices in daily life, to understand the reasons why they use them, to learn what and how significances of digital practices are constructed by the older population could be worthwhile. On the other hand, for those who are still hesitating and lingering outside the digital world, the 'lived experience' of others can provide them with references. The 'lived experience' of users who have already adopted digital technology would influence and help new users (Vincent, 2023), especially older adults who rely on others' experience. When older adults notice the benefits of digital use from others' experience, they are more likely to adopt these technologies (Kok, Williams, & Yan, 2012). It can be argued that even if the digital daily life studies reveal difficulties and negative impacts faced by elderly people in their digital practices, descriptions and analyses of these circumstances will embody the actual challenges in digital world, helping the new or non-users to visualise the unknown difficulties and thus stop them from fearing the technological problems they imagine. Moreover, from a gerontechnology design perspective, Durick et al. (2013) advocated for more user research into the daily lives of ageing individuals to derive insights into the interactions between technologies and users before implementation.

1.1.2 Ageing Digital Divide in Post-pandemic China

In China, the country with the largest ageing population in the world (UN, 2017), the ageing digital divide has been further highlighted into an increasingly prominent social issue especially when their senior citizens encountered tremendous challenges during the COVID-19 pandemic. Comparing with that of the developed countries, the research on the digital divide started relevantly late in China and paid more attention on the digital literacy of children and adolescents rather than the older population. However, the outbreak of the COVID-19 pandemic reinforced the digital difficulties for older adults, posing a greater challenge to the ageing society in the digital age. When maintaining social distancing and self-isolation became standard measures to prevent the spread of the virus, older adults in China, like their counterparts around the world, had to practiced more online activities. Under this circumstance, as 'digital-poor group' (Kuang, 2022, P.46), older population has received more discussion in China.

In November 2020, the General Office of the State Council of China issued the *Implementation Plan on Effectively Solving the Difficulties of Using Intelligent Technology for Older Adults*, proposing to establish a long-term mechanism to solve the problem of digital divide for older adults and build a digitally inclusive ageing society. Along with the release of this plan, many studies on the digital divide of older adults have emerged in China in the past two years. The development of COVID-19 prompted researchers to respond rapidly and sensitively to advance the research of the age-based digital divide. Under the 'call' of the government and the considerations for the older population, massive studies and journal articles were published to discuss how to make more seniors to fully engage with and benefit from the development of new technologies. Scholars illustrated the factors that constrain and hinder older adults in digital technology access, analysed their cognitive and psychological barriers to the Internet and smartphones, explained the reasons why they resist and avoid integrating into the digital society and reminded the publics that our elders are going through a painful digital struggle. However, behind this research perspective loaded with care, compassion and patronisations. Over emphasising the vulnerability and incompetence of older adults can also be seen as discrimination and underestimation of their capabilities and value 'in a patronising way'. Besides, some studies put forward the 'bridging strategies' straightway on how to deal with the digital divide without any investigation but only based on simple discussions (Pan & Yang, 2021), which is timely but insufficient. In their research, Pan and Yang (2021) proposed a digital inclusive governance mechanism for the seniors with 'dynamic, inclusive, collaborative and open' as its main dimensions, and also proposed that technologies should be integrated into the design framework of life scenarios oriented to meet the living needs of the seniors, however, what are the 'needs' of seniors is still unquestioned and underexplored.

While a growing number of researchers focus on dispelling the myths associated with ageing and digital use, most of these studies are centred in Western countries. In their conclusion, Loos et al. (2022) advocate for expanded research from various countries. Therefore, exploring the digital use of Chinese silver netizens not only improves the digital well-being of the older population in China, but also contributes empirical data to the research field of debunking the myths about the older adults' digital use.

1.1.3 Defining Chinese Silver Netizens and their Digital Experience

'Chinese silver netizens' are a large population set while *Digital experience* is a broad concept. Although it is better to consider a wider range of social aspects and include more age groups in the research, considering the limitations and feasibility of a PhD project, it is necessary to define the research scope and key concepts of the project to make the research more executable.

The Chinese Silver Netizens: The study will recruit participants with a purposive sampling strategy (Denscombe, 2014; Neuman, 2016) to match the research aims. Chinese silver netizens are invited to participate in the research. *Silver*, as a metaphor indicating people with silver hair, refer to people who are retired but still active in their third age (Weiss & Bass, 2002). *Netizen* is '*A word formed by combining 'Net' and 'Citizen'. It is used to describe a habitual or keen user of the Internet'* (Ince, 2012). It describes individuals who frequently or avidly use the Internet. In this study, *Chinese silver netizens* are older adults who are retired (normally aged 60 above in China) but also have already got the access to internet-enabled device like smartphones or tablets.

Digital Experience: Regarding the relevant definitions proposed by scholars (Rahim, 2018; Ragnedda, 2018; Earley, 2014) and the aims of this project, in this study, digital experience can be conceptualised briefly as digital activities senior netizens experiencing online and their feelings after that. The prosperities of technological innovations have brought about the diversification of the forms of online activities and digital experiences. In addition to some common digital experiences such as activities on smartphones and computers, the tech savvy and motivated pioneers in the older population may also try some trendy smart devices or applications which are not exclusive to young people. In consideration of maintaining an open-minded attitude towards research exploration, digital experience in this study can include but is not limited to the experience that people obtained when they are using and interacting with digital technologies including Internet-enabled devices such as smartphones and tablets, as well as online applications and services such as social media, entertaining and shopping platforms etc. For instance, in the semi-structured interviews of this study, I invited participants to discuss their

daily lives with smartphones primarily, but digital experience obtained from other digital devices and applications are also appreciated and encouraged.

1.1.4 Researcher Positionality and Reflexivity

Though it is suggested that researchers should try to put aside prejudices or preconceived stereotypes to analyse the behaviours and attitudes of participants and understand their experiences through the text materials they provide (Moustakas, 1994), in qualitative research, it is impossible to be completely objective at least the researcher's personal experience will also affect the interpretation of the study results (Kvale & Brinkmann, 2009). Researchers must increasingly focus on self-awareness and sensitivity, critically examine how their biases and experiences influence their work.

In qualitative research, reflexivity is a key strategy for ensuring research quality, emphasising the researcher's role in knowledge production and its potential impact on the research process (Berger, 2013). Berger (2013) argues that reflexivity challenges the notion of knowledge production as independent and entirely objective. It involves self-examination to understand how the researcher's characteristics, experiences, and positionality—such as gender, ethnicity, personal background, and worldview. These factors influence access to the research field, the nature of relationships with participants, and the framing of questions and interpretation of data.

In my research, my cultural background, educational experiences, and personal upbringing have inevitably shaped my perspective on the digital lives of older adults in China. While I strive to maintain objectivity and fairness, I acknowledge that qualitative research inherently involves co-constructing meaning with participants through dialogue and interpretation. This dynamic interplay of researcher and participant perspectives aligns with my philosophical commitment to moderate social constructionism.

I was born in the 1980s as part of China's one-child policy generation. Influenced by the Confucian cultural value of xiaoshun (filial piety), young Chinese adults often perceive it as their responsibility to support and protect their elders (Tang et al., 2022). Similarly, I feel a personal obligation to support older family members in their use of digital technologies, positioning myself as a responsible "warm expert." This sense of responsibility has shaped my interest in understanding how older adults perceive and use digital technologies in their everyday lives. It

has also driven me to explore the stories behind their interactions with digital tools and to contribute to their digital inclusion.

The initial motivation for this research arose from observing the generational and interpersonal differences in how my elderly family members and their peers engage with digital tools. My early research perspectives were shaped by my role as a child and grandchild within intergenerational relationships. At first, I was particularly interested in finding ways to help older adults enhance their digital literacy, integrate better into the digital era, and benefit from its opportunities. However, I must acknowledge that my initial viewpoint carried traces of a digital upper-class or even a patronising perspective, assuming that older adults were inherently inferior in their digital skills compared to younger generations. Over the course of my four-year research journey, I have continuously refined this perspective, challenging such assumptions and adopting a more balanced and respectful approach. My engagement with participants revealed the complexity and diversity of older adults' interactions with technology, reshaping my understanding and fostering a deeper appreciation for their agency and adaptability.

Besides, my experiences in daily life may lead me to adopt a more optimistic attitude toward technology. Compared to techno-pessimists, I am more inclined to align with techno-optimism. In the 1990s, the internet was imbued with a “magical” aura and regarded as a catalyst for social transformation, capable of revolutionising various aspects of society (Lindgren, 2017; Curran, 2012). This perspective can be categorised as techno-optimism, which is rooted in the belief that technology can make the world a better or a good place (Königs, 2022; Danaher, 2022). However, over time, some of the utopian predictions about the internet have partially realised, but they have also been accompanied by issues such as the digital divide, surveillance and censorship. Lindgren (2017) illustrates the clash between pessimism and optimism views on technology by referencing Postman and Negroponte as examples. For instance, in Technopoly, Postman expressed deep concerns about a society dominated by technology, arguing that technology could erode cultural values and place efficiency and economic interests above the moral core of society (Postman, 1992). In contrast, Negroponte, in Being Digital, embraced an optimistic stance, asserting that digital technologies would foster global decentralisation and collaboration, bringing profound positive transformations to human life (Negroponte, 1995). In reality, technology itself is neither inherently good nor bad; its impact depends on how it is used and the intentions behind its use.

My grandparents and parents generally hold positive attitudes toward technology. Among my parents’ siblings, some are professors and experts in technical fields who actively assist my

grandparents in using digital devices such as smartphones and tablets. As a result, my grandparents, despite being in their 80s, are enthusiastic adopters of digital technologies. For example, my 84-year-old paternal grandmother uses an iPhone and considers WeChat indispensable in her daily routine, even navigating WeChat mini-programs to edit and manage images and text. Similarly, my maternal grandparents engage with social media daily, with my maternal grandfather frequently sharing articles with family and friends on WeChat. I acknowledge that my attitude toward technology may be influenced to some extent by techno-optimism. Observing how my elder family members engage with digital technologies, I have witnessed the convenience and joy that technology brings to their lives. However, I am also aware of the potential negative impacts of technology, such as over-reliance, susceptibility to misinformation, and the risks of digital fraud.

Despite the influence of my positionality, I have actively worked to minimise its impact and mitigate preconceptions throughout the research process. For instance, I adopted a mixed-methods approach that incorporated surveys, interviews, and focus groups to ensure the authentic representation of participants' voices. Regular discussions with my academic supervisors and peers further helped me critically examine my interpretations and assumptions. These steps were aimed at enhancing the objectivity and credibility of my findings. At the same time, I embrace my positionality as an integral part of the interpretive process. My personal experiences and cultural background enable me to empathise with participants and situate their narratives within broader cultural and social frameworks. My positionality serves as the lens through which I interpret the digital daily lives of older adults, framing the boundaries of this study while simultaneously contributing to the uniqueness and depth of my interpretation. While I acknowledge the limitations of this study, I believe it offers valuable empirical evidence and insights into the digital daily lives of urban older adults in specific regions of China. By highlighting the diversity and complexity of their digital experiences, this research aims to challenge stereotypes about older adults' technological capabilities and contribute to a deeper understanding of their interactions with digital technologies.

1.2 Research Aims

Regardless of age or digital capability, everyone has the right to access digital technologies. Age is not the only explanatory variable for older adults' digital access and capability, nor is digital capability necessarily the decisive factor in older users' digital experience and well-being. Are all older users digitally deficient? Are older generation less interested and expectant towards digital technologies than their younger counterparts? What digital practices and experiences do older

users have in their everyday lives? Most importantly, what does digital technology mean for the older generation? To answer these questions adequately and properly, researchers may need to delve into the digital daily lives of the silver netizens, capturing their digital practices and representing their construction of the significances of digital technologies and experience.

This project aims to explore the digital daily life of older adults, learning the significance of digital technologies for them through a constructivist lens. This will help to restore the coloured (rather than 'grey') picture of the digital activities of the older adults and sketch the landscape of the digital world constructed by older adults themselves, fostering intergenerational mutual understanding and improving the digital well-being of silver netizens in the digital age.

To achieve this, the study focuses on Guilin, a city in China classified as a Tier 3 city[2] in terms of economic and commercial development (China Business Network, 2021) and as a Type II large city[3] in terms of population size (The State Council of the People's Republic of China, 2014). Guilin has a permanent population of over 4.9 million, with 20.33% aged 60 and above—slightly higher than the national average of 18.70% (National Bureau of Statistics, 2021). Guilin's economic and digital development status further supports its suitability as a research site. Ranked as a third-tier city in China's City Business Attractiveness Ranking, Guilin is neither highly developed like

[2] According to The State Council of the People's Republic of China (2014), cities are classified into five categories and seven tiers based on the urban resident population within city districts. Cities with an urban resident population of less than 500,000 are categorised as small cities, which are further divided into two subcategories: Type I small cities with a population between 200,000 and 500,000, and Type II small cities with a population of less than 200,000. Cities with an urban resident population of 500,000 to 1,000,000 are classified as medium-sized cities. Cities with a population of 1,000,000 to 5,000,000 are considered large cities, which are further divided into Type I large cities (population between 3,000,000 and 5,000,000) and Type II large cities (population between 1,000,000 and 3,000,000). Cities with an urban resident population of 5,000,000 to 10,000,000 are categorised as megacities, and those with a population exceeding 10,000,000 are classified as super megacities. According to these standards, Guilin is classified as a Type II large city.

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Tier 1 cities (e.g., Beijing and Shanghai) nor economically underdeveloped. Its digitalisation level is moderate, with a Digitalisation of Cities Index score of 54.8, close to the national average of 54.3, reflecting typical technological infrastructure and access to digital services. These characteristics make Guilin an ideal setting to examine the digital lives of older adults in medium-sized Chinese cities, ensuring that the findings are not only locally grounded but also broadly generalisable to similar urban contexts.

Besides, although an increasing number of researchers are dedicated to debunking the myths about ageing and digital use, these studies are predominantly conducted in Western countries. Loos et al. (2022) call for more research from other countries in their conclusion. In this regard, this study will provide empirical data from China, contributing to the elimination of digital ageism and enhancing the understanding of older adults' digital lifeworld.

1.3 Research Questions

To clarify, this study will not dedicate to denying the existence of an intergenerational digital divide or difference, after all, its existence (and continuity) has been extensively explored and proved in previous studies. Recognising intergenerational digital differences but escaping from the stereotypical constraints that 'older adults are all digitally incompetent', it seeks to acknowledge the sliver netizens' digital practices in China. Specifically, it focuses on older adults residing in urban China, with Guilin as a representative case. This scope allows the study to reflect the broader digital experiences of older adults in similar urban contexts across China while acknowledging the diversity in regional and socioeconomic conditions. The main research question is therefore framed as:

What digital experiences do older adults in urban China have in their everyday lives?

To further refine and explore this inquiry, the following sub-questions have been formulated:

Research Question-1: What are the key dimensions (activities/functions) and venues (places/spaces) of older adults' digital everyday life in urban China?

Research Question-2: What digital experiences (practice and user experience) do older adults in urban China have in their everyday life?

Research Question-3: How do older adults in urban China perceive intergenerational digital interactions and differences?

Research Question-4: What suggestions do older adults in urban China have towards a better digital living?

1.4 Chapter Outlines

Chapter 2 reviews literature of older adults' digital use and everyday life in the digital age. Section 2.1 locates ageing within the digital age context, introducing and reviewing how the study of older adults' digital use is approached from the perspective of everyday life. The relationship between active ageing and digital use was discussed, emphasising the importance of digital technology in later life. Additionally, warm experts and digital inclusion are discussed and proposed as methods for bridging the digital divide. In section 2.2, the focus shifts to how older adults age with smartphones and the internet in post-pandemic China. Firstly, a distinct cohort within China's older population is introduced. These individuals, often parents of only children and witness of the Cultural Revolution, are also digital residents in today's digital age. It analyses China's historical and current ICT development, highlighting its late start compared to Western nations but dramatic changes over the past 30 years. Internet penetration among older adults in China now exceeds the global average, further accelerated by COVID-19. Then it analyses the studies on older adults and digital divide in China before and after the pandemic, as well as the Chinese government's digital inclusion initiatives for the older population in the post-pandemic era.

Chapter 3 introduces the Methodology of the research in detail, including research philosophy, research design, research methods, and research ethics. Aiming to demonstrate the justification of the research methods adopted in the study, the chapter is planned and organised according to the main components involved in the selection of the research approach that proposed by Creswell (2018): philosophical worldviews, research designs, and research methods. In this chapter, section 3.1 introduces the research philosophical stance of the study. A moderate social constructionism stance was discussed and proposed as the research philosophical paradigms. Secondly, the section 3.2 analyses and introduces the four main questions to be inquired with social constructionism approaches in this study. Section 3.3 introduces the research strategies as well as the procedures of the study. In this study, though quantitative and qualitative research methods were adopted as mixed methods, the qualitative research phases count for the core part of the study, exploring the experience and significance of older adults' digital everyday life. In the section 3.4, specific research techniques of the study are illustrated in detail. The method of in-depth interview and focus group are used as the primary tools. At the end of the chapter, ethics issues of this study are discussed.

Chapter 4 delves into the digital daily life experiences of silver netizens, examining how digital technology has profoundly influenced their lifestyles. Section 4.1 explores the history of these netizens' interactions with technology before retirement, focusing on those born in the 1950s and

1960s. It analyses their pre-retirement digital experiences and challenges, including the complexity of Chinese input methods. Section 4.2 sketches the digital everyday life of silver netizens, drawing on findings from both quantitative and qualitative research. Section 4.3 highlights the pivotal role of smartphones in the lives of older people, describing them as gateways to the digital world. Section 4.4 analyses the main activities and spaces for older people in the digital realm, including social interaction, information access, online shopping, and leisure, showcasing the significant presence of silver-haired internet users in the digital landscape. Lastly, Section 4.5 emphasises the heterogeneity of older people's digital engagement through NVIVO data visualisation results, revealing the individuality and diversity in the digital activities and app choices of silver netizens.

Chapter 5 seeks to learn the digital interactions and differences between generations. Section 5.1 analyses the interactions and support activities between silver netizens and younger generations, highlighting the dynamics of their digital engagements. Section 5.2 explores perceptions of generational differences in digital habits between the young and the old. This section challenges the notion that digital overuse is only a youth phenomenon and discusses the compensatory behaviours older adults exhibit in their digital use. Section 5.3 presents findings from research data identifying digital leaders among older users.

Chapter 6 delves into the digital inclusion experiences of Chinese silver netizens based on the results of focus group discussions. It is divided into two parts. The first section 6.1, focuses on the older adults' experiences and suggestions regarding digital inclusion, analysing community-based digital support services and their role in better integrating the older population into digital life but also examines how organisations and institutions serving retirees provide necessary support to foster digital inclusion. The second section 6.2 explores the perspectives of elderly internet users on their expectations and suggestions for future digital co-inclusion. This includes their specific hopes for digital inclusion and their attitudes towards continuing to learn and adapt to new technologies. Through these analyses, this study aims to gain a comprehensive understanding of the current support for digital inclusion among Chinese older population, identify issues and problems they perceive, and provide a basis for future policymaking and practice.

Conclusion of the research results, contributions, and researcher's reflection and the limitation of the study will be demonstrated in Chapter 7.

Chapter 2 Literature Review

Introduction

Researchers studying media use in everyday life might currently face greater challenges than they did in the past before the rise of smartphones. In the past, people read newspapers but could not make a phone call with them. They listened to the radio but could not pay bills with it. While they watched TV, they normally would not carry it with them while traveling. People used computers for working, studying, entertaining, and everything, but they typically did not use them in a toilet. When smartphones emerged and penetrated our daily life, the situation became complicated. Nowadays, people read newspapers on their smartphones while chatting with friends via IM apps. They listen to the radio with smartphones while buying themselves a cup of coffee. People watch TV shows on smartphones while they are on a train, on a flight, or anywhere else. They use smartphones to do everything they would do on a computer, anywhere, including in a toilet or even in a bathtub. Information and communication technologies have tightly intertwined with every aspect of people's daily lives. Consequently, studying the use of digital technology means studying everything in people's everyday lives.

In this chapter, I contextualised older adults' digital use into everyday life in the digital age. In the first section, I primarily located ageing within the digital age context, introducing and reviewing how the study of older adults' digital use is approached from the perspective of everyday life. The relationship between active ageing and digital use was discussed, emphasising the importance of digital technology in later life. Additionally, it addresses digital inequality and propose methods for bridging the digital divide, which is digital inclusion. In the second section, the focus shifts to how older adults age with smartphones and the internet in post-pandemic China. Firstly, a distinct cohort within China's older population is introduced. These individuals, often parents of only children and witness of the Cultural Revolution, are also digital residents in today's digital age. I then analysed China's historical and current ICT development, highlighting its late start compared to Western nations but dramatic changes over the past 30 years. Internet penetration among older adults in China now exceeds the global average, further accelerated by COVID-19. I analysed studies on older adults and digital divide in China before and after the pandemic, as well as the Chinese government's digital inclusion initiatives for the older population in the post-pandemic era.

The literature reviewed in this section provides the theoretical foundation for this study while the second section offers a social and cultural context to understand the digital everyday lives of older adults in China.

2.1 Ageing in the Digital Age

> *'A coincidence of two trends-the current technological revolution and the rapid increase in the size of the U.S. older population has created an urgent need to consider the characteristics, capacities, and limitations of older adults in relation to new technologies. This article proposes that older adults should be perceived as active users of these technologies rather than as passive recipients. Everyday interactions with technology at work, in the home arena, in medical and health care settings, and on the highway are identified...' (Czaja and Barr, 1989, p.127)*

This excerpt is quoted from the abstract of Czaja and Barr's (1989) article Technology and the Everyday Life of Older Adults. At the time of their writing, the population aged 65 and above in the United States accounted for approximately 12% of the total population (Bureau of the Census, 1989), with an increasing number of American households owning at least one computer, and the internet penetration rate in the United States poised to soar in the coming years. Interestingly and coincidentally, this statement remains relevant today and is particularly applicable in contemporary China. Currently, the proportion of the population aged 65 and above in China is approximately 13.5%, and the internet penetration rate among individuals aged 60 and above exceeds 43%.

More and more older adults are getting involved in the digital world, yet we know very little about their digital use in everyday lives. After COVID-19, there has been a significant increase in quantitative research on the digital usage of elderly people in China. However, qualitative studies exploring how they engage in digital practices in their daily lives are few and far between. In light of this, to explore and understand the digital practices in daily lives of the older users is timely and urgent.

2.1.1 Digital use and everyday life of older adults

With the development of digital technologies such as smartphones and the internet, people's lifestyles have undergone revolutionary changes. Traces of digital technology participation can be found in essential aspects of daily life such as socialising and entertainment, news and information, shopping and financial management, dining and travel, social engagement, and government services. The prevalence of smartphones allows people to transitioning between online and offline lives, thereby profoundly impacting people's daily lives.

'This is what the concept of everyday life tries to capture: life as a set of routines, practices, ways of living, thinking, and doing things' (Buchanan, 2010). Everyday life approach aims to unveil the extraordinariness within the ordinary, involving repetitive actions and habits which are familiar to us (Leccardi, 2014). Felski (2000) uses 'driving' as an illustration to explain that everyday life embodies a process of routinisation, wherein tasks initially perceived as awkward or strange but gradually become taken for granted. Replacing the concept of 'driving' by 'using digital technology', from this perspective, will allow us to explore how older adults domesticated and normalised digital technology into their lives from a daily life perspective. Here is an example for better understanding the normalisation of digital technology in everyday life. In 1995, Marsiske and Willis adopted three measurements to investigate individual differences in older adults' everyday problem-solving abilities (Marsiske & Willis, 1995). From their study, it can be seen what constituted important elements of older adults' lives: shopping and consumerism, technical information management, home management, relationships with family and friends, medical and health, telephone use, financial management, housekeeping, and cooking (food preparation), and transportation. Nearly thirty years later, these elements could still be essential and ordinary in older adults' daily lives while digital technology has been adopted and normalised within all of them.

Leading digitalised daily lives by older adults has become 'ordinary', however, the extraordinaries embedded with them are little known, as the daily lives and daily behaviours of older adults remain a relatively unexplored area of research (Larsson et al., 2009). In their study, combining the daily routines of older individuals with the technological developments of the time in the United States, Czaja and Barr (1989) discussed older adults' technology use on the 'settings where the older adult will need to interact with technology' (p.128-129) and provide examples to prove that 'technology has become a part of most routine tasks and activities' (p.129). They analysed the use of technology by older adults at work, at home, in medical environments, and on the highway. From computers to seat belts, they conducted analyses based on the critical technologies prevalent in the daily lives of older adults and provided recommendations. Czaja

and Barr (1989) point out that a task for researchers and designers is to understand the 'areas where older adults will interact with technology' (p.128) and develop methods to promote such interaction. In this regard, everyday life provides researchers a considerable venue to meet the older digital users where they interact with digital technology.

Older people are crafting their lifestyle and norms in the digital daily lives. Rosales and Fernández-Ardèvol (2016) investigated the specific uses and routines of older adults in their daily lives regarding smartphone usage. They found that instant messaging apps, especially WhatsApp, were the most widely used services among older participants. Additionally, they observed that older adults preferred using tablets or computers at home instead of smartphones for a more comfortable ergonomic experience. Furthermore, their quantitative research data indicated that older adults frequently used Facebook, but during focus group discussions, they showed more enthusiasm for sharing their experiences with WhatsApp. This suggests that the frequency of use of a particular digital technology cannot predict or determine its importance in the daily lives of older adults. Caliandro et al. (2021) investigated the usage of smartphones among elderly individuals in their daily lives and found that elderly users utilise smartphones to build social relationships. Through smartphones, they create three distinct social spaces which are spaces for interacting with peers, spaces for coexistence with younger generations, and spaces for digital education with grandchildren. Quan-Haase et al. (2016) studied the application of ICT in the daily life of older adults through interviews. Applying a theoretical perspective on the use of ICTs in everyday life, they see ICTs as factors embedded in the daily practices of older people. They found that older people use ICT to create new practices, hybrid practices and recreate existing practices with digital means. Given misunderstandings and stereotypes embedded in older adults' digital use studies, studying the digital daily lives of older people will also help us to debunk the myths about digital use among older people. Loos et al., (2022) challenged the 7 myths about older adults' smartphone usage based on smartphone activity logs. They found that digital technology is not alien to older adults, older adults are capable of mastering internet skills. Age does not affect the duration of smartphone usage. Older adults are a heterogeneous group, not defined solely by their medical conditions and digital needs. Their app usage depends not only on medical conditions but also on personal interests. Older adults play games on smartphones, such as " Candy Crush" and "Pokémon Go". They also use SNS and are users of Instagram, Facebook, and even Tinder (a dating app).

Currently, qualitative research on older adults' digital everyday life is primarily concentrated in Western countries but still holds relevance for research in other countries and regions. More

studies are required from countries worldwide to help understand older users in diverse cultural context, thereby promoting their well-beings and achieving active ageing in the digital age.

2.1.2 Active ageing in the digital age

The World Health Organization (WHO, 2002) had defined the term *active ageing* as 'the process of optimizing opportunities for health, participation and security in order to enhance the quality of life as people age' (p.12). *Health* means physical, mental and social well-being of seniors, while *participation* emphasizes their full participation in political, economic, cultural and social affairs, and *security* includes their 'social, financial and physical security needs and rights' (p.46). The active ageing approach, with its emphasis on older people' s rights, independence, participation and self-fulfilment, provides us a new paradigm of studying senior digital divide by shifting the traditional needs-based view to a rights-based one, which recognises both the demands and rights of the seniors in the digital era. In this internet-based society, keeping an active digital engagement could be an important and effective way for senior citizens to enhance their life quality by positively building connections with society, thereby maintaining healthy, as well as obtaining better protection and social support.

Digital technologies offer considerable potentials in supporting older individuals to achieve successful and active ageing (Fang et al., 2017). Higher digital literacies and digital engagements will enable seniors to achieve higher quality of life and boost active ageing (Loureiro & Barbas, 2014; Chan & Suarez, 2017; Schmidt-Hertha, et al., 2019). Numerous studies have demonstrated the benefits of digital technology usage for older adults. Firstly, utilising digital technologies can provide older adults with increased social support. The use of the internet expands their social networks, enriches their life experiences, and enhances their mental health and well-being by increasing the frequency of their interactions with family, friends, and other social network members (Fang et al., 2017; Nie et al., 2017; Sims et al., 2017). Additionally, internet use promotes the expansion of social networks among older adults, enhancing their levels of social participation (Zhang & Li, 2022), fostering greater social connections, and helping to reduce loneliness and depression (Masi et al., 2011; Cotten et al., 2014). Digital use also found to be associated with higher levels of autonomy (Schlomann et al., 2020) and better cognitive function (Li et al., 2021). Zhang et al. (2022) found that moderate use of the Internet for online social, entertainment and business activities can significantly reduce depression levels and enhance cognitive function in middle-aged and elderly people.

However, not every older adult could benefit from the dividends of digital technology equally. The disparities of individual demographic variables such as gender, age, education etc. and other socio-economic and socio-cultural factors will lead to differences in people's access to and use of digital technology, resulting in inequalities in the degree of benefiting and outcomes (Wei et al., 2011), which is so-called *digital divide*.

2.1.3 Digital divide: an evolving concept of inequality

2.1.3.1 Digital divide: The knowledge gap in digital age

Differences in media use led to disparate outcomes and unequal capital accumulations. In this respect, digital divide can be considered a new form of *knowledge-gap* in the information age. The hypothesis of *knowledge gap* was put forward by Tichenor et al. in 1970 to explain the phenomenon of 'knowledge gap' caused by news communication activities between privileged social groups and inferior social groups in the modern information society. The main proposition of this theory assumed that if the mass media input into the social system increases, those more educated segments, compared to the lower-educated groups, will acquire information and knowledge more quickly and efficiently, therefore the gap between the two groups of different status is likely to grow rather than narrow. The knowledge gap hypothesis connected social inequality with media effects, which laid a theoretical foundation for the subsequent research on communication and social equity.

In their research, Tichenor et al. (1970) conducted an empirical study on the collected data and verified the original theoretical hypothesis: with the increase in the amount of information transmitted by media, the knowledge gap of all social classes will become wider. Under the premise of equal access to media information, the knowledge gap between people with higher education level and those with lower education level will increase. they suggest that there are five main reasons for this phenomenon: (1) People with higher education have better communication skills; (2) They have a richer knowledge and information stored; (3) They have better social contacts and additional channels of information resource; (4) People with higher education levels are more concerned about public affairs and have a greater sense of social responsibility; (5) Most science and public affairs news is published in the 'print' media. which have traditionally been used more by people of higher status.

The knowledge gap hypothesis aroused heated academic discussion. Sociologist Katzman (1974) further proposed an 'information gap' theory, the main viewpoints include: (1) The application of

new communication technology will inevitably increase the information flow and the amount of information contact of the whole society, but not every member of the society can equally obtain the benefits brought by the application of new technology; (2) The existing information rich class can have an information advantage over others through the early adoption and skilled use of these advanced information processing machines. (3) New media technologies will continue to be created and updated at an accelerating speed. Therefore new 'information gap' may appear before the 'old gap' has been bridged.

On the contrary, Ettema and Kline (1977) believed that individuals' demand for information transmission through mass communication is not endless, and there is a certain *ceiling effect* on the impact of mass communication. Although individuals may reach the limit faster or slower due to their different socioeconomic status, as time goes on, the higher status and the lower status will successively reach saturation, and the final result is that the knowledge gap between the two continues to narrow and become smaller. In 2009, Hwang and Jeong carried out a meta-analysis research on 160 previous papers on the knowledge gap hypothesis and reached two conclusions: First, their study proved that the knowledge gap existed between people of high socioeconomic status and those of low socioeconomic status but it would not change, neither over time nor with increasing media publicity; Second, there is no significant disparities in knowledge gaps between the high and low media publicity issues and the knowledge gap between people with different socioeconomic status (Hwang & Jeong, 2009).

Although the knowledge gap hypothesis has its limitations, it still has its merits in providing some thread to the later communication studies, as well as the study of digital divide. With the emergence of Internet, Bonfadelli (2002) reviewed massive knowledge gap related studies (Ettema & Kline, 1977; Dervin, 1980; Kwak, 1999, e.g.) and discussed the implications of the knowledge gap hypothesis in online communication from theoretical and empirical perspectives. Based on the assumption of knowledge gap, Bonfadelli proposed 'different types of gaps in the communication process' - gaps in (1) information supply and *access* to the Internet, (2) using and processing the information and (3) *resulting* knowledge (Bonfadelli, 2002, P.71), which can be regarded as the embryonic form of the 3-level digital divide proposed by Wei et al. (2011). In his article written almost 20 years ago, Bonfadelli discussed the possibility of applying the theory of the knowledge gap to the study of the social effects of the Internet (Internet Gap), even though the Internet was not yet as developed and widespread as it is today. The knowledge gap hypothesis assumed that 'education' is an important condition for people to benefit from the media. If so, it should be even more obvious in the field of digital new media, because digital technologies require their users to be more trained with new skills (Bonfadelli, 2002) to make

them work. Bonfadelli's study confirmed this point, and later a large number of studies also proved that 'education' is an important factor affecting people's digital participation behaviour and the formation of the digital divide.

Besides, Tichenor et al. suggested that the knowledge gap hypothesis could explain 'the apparent failure of mass publicity to inform the public at large' (Tichenor et al., 1970, p.161). Even though traditional media or the Internet were invented and adopted with purpose of making an accessible informed society to everybody, the results might run counter to it, the privileged segments in the society have higher access to the Internet (Bonfadelli, 2002). When discussing the relationship between social capital and the digital divide, Ragnedda and Ruiu (2017) proposed the idea that 'the Internet seems to *privilege the privileged'*, which is allied with the views by Tichener et al. and Bonfadelli, could be considered as a core formation mechanism of digital divide.

In this regard, as a concept of inequalities resulted by media use, digital divide has definite relation with knowledge gap. Digital divide can be considered as derived from several concepts of inequalities or gaps, from the knowledge gap (Tichenor, 1970), to the information gap (Katzman, 1977), then to the Internet gap (Bonfadelli, 2002). These concepts respectively represent the inequalities in benefiting from the media between higher and lower social segments in different communication ages, while digital divide is the one for the digital age.

2.1.3.2 The three-level framework of digital divide and digital capital

Digital divide is a concept of 'inequality' generated by the development and penetration of digital technologies. As a new form of 'knowledge gap' in the digital era, its connotation evolved with the advancement of technologies and progress of studies on it.

In the late 1990s, scholars discussed and verified more frequently whether countries and people in the privileged class or developed areas of the society had more Internet access than their lower counterparts (NTIA, 1995,1999; Howland,1998; Waddell,1999; van Dijk, 1999, 2000). Digital divide, which initially focused on a binary distinction regarding the physical access or ownership to the ICTs especially the Internet, has been conceived on levels from global (unbalances between developed and developing countries), national (unevenness by factors of geography, socioeconomic status and ethnicity) and domestic (inequalities stratified by gender and generations) perspectives (Livingstone, 2004). At the beginning when ICTs and the Internet were

just being applied by the public, access to the Internet or other digital technologies was considered as the primary barriers forming the digital divide.

At the beginning of the 21st century, with the development and penetration of the Internet, scholars began to consider the gap formed by people's unequal use and skills of Internet, since this kind of new technologies require people with more digital related skills (Van Dijk, 2002; Bonfadelli, 2002). Scholars suggested that it required more complex views on 'digital divide' rather than a simplistic dichotomy of information or Internet 'haves' or 'have-nots' (Liff, 2001; Selwyn, 2004; Livingstione, 2004). Researchers noticed that 'access' might not be the only obstacle for individuals benefiting from the Internet. For instance, Bonfadelli (2002) found that significant gaps in the use, skills and attitudes towards the Internet existed between high and low educational backgrounds in Switzerland. Fragmented and individualised information searching and processing will rely more on one's education and skills, which will bring more possibilities for social groups to be separated into 'communication ghettos' (Bonfadelli, 2002; Graber, 2001, p.166). Van Dijk (2002) classified 'accesses' into four categories while skills and usage accesses were put forward beside mental and material accesses. Hargittai (2002), moreover, proposed that a second level of digital divide, which means the 'differences in Internet users' online skills', should be distinguished from the digital access divide. The second level of digital divide, which emphasizes the differences and inequalities in people's abilities to use digital technologies due to their different socioeconomic status, therefore, was defined as the 'capability divide' (Hargittai, 2002; Dewan & Riggins, 2005).

Inevitably, the inequality and unevenness of accessing and using ICTs would exert impacts, either benefits or drawbacks, on individuals and the society. Scholars argued that studies on digital divide should move forward more comprehensively into an outcome dimension (e.g., Fuchs, 2009; Shu & Strassmann, 2005). To demonstrate the consequences of ICTs usage, Wei et al. (2011) extended the 2-level framework by Dewan and Riggins (2005) and explicitly articulated the third level of digital divide - the 'outcome divide' (see Figure 1). Consequently, the concept of the digital divide has evolved from a simple dichotomy of digital haves and have-nots to a more nuanced understanding that includes disparities in digital literacy—defined as the ability to use, understand, and create media content through ICTs (Rasi et al., 2020). It also encompasses the varying impacts, whether beneficial or detrimental, of using ICTs, particularly the Internet (Van Deursen & Helsper, 2015). In essence, in the modern information age, the digital divide can be defined as the inequalities arising from unequal ICT access, differences in individual digital skills, and the impacts of digital usage.

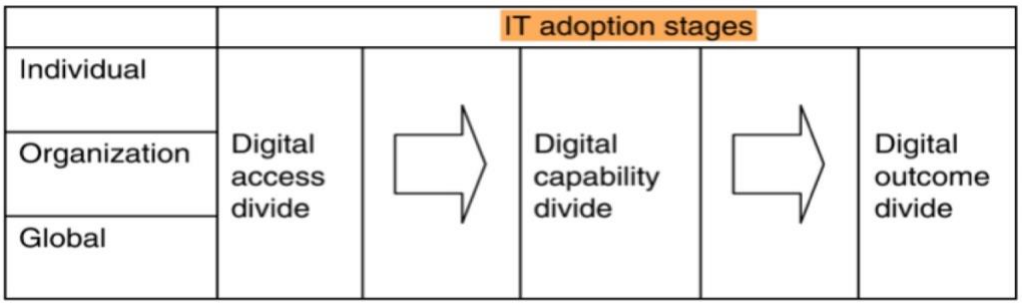


Figure 1 The 3-level digital divide framework by Wei et al. (2011, P.171)

According to the traditional three-level digital divide framework, the disparities of individual demographic variables such as gender, age, education etc. and other socio-economic and socio-cultural factors will lead to differences in people's access to and use of digital technology, resulting in inequalities in the degree of benefiting and outcomes (Wei et al., 2011). From a 'digital capital' perspective proposed by Ragnedda and Ruin (2020), the inequalities of individual social capital will bring about the discrepancies of digital capital and online activities, which exert the further uneven accumulations of social capital and lead to greater social differences. In the regard of digital capital theory by Ragnedda and Ruiu (2020), digital capital has two components: digital access capital and digital competence capital. This corresponds respectively to the first level of access divide and the second level of use divide of the digital divide. Specifically, digital access capital includes the elements of Digital equipment/Connectivity (quality and place)/Time spent online/Support and Training while the digital competence capital was constituted by Information and literacy/ Communication and collaboration/ Digital content creation / Safety/ Problem solving. These components of digital capital have covered the latest and comprehensive elements of digital use and digital inclusion, which could provide clues for analysing and discussing on older adults digital practice and inclusion. (See the Figure 2)

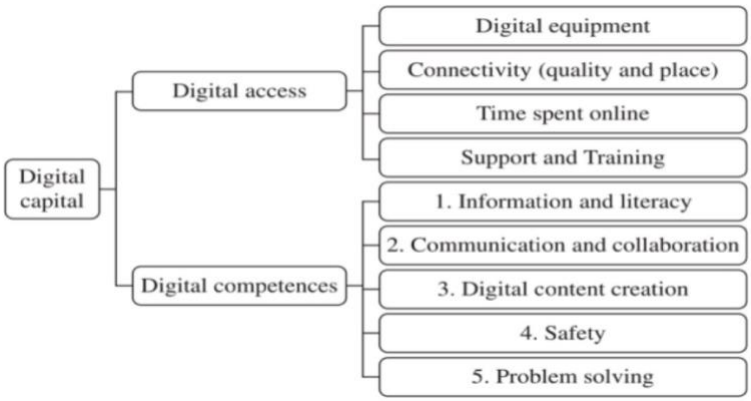


Figure 2 Constitutive Components of Digital Capital. (Ragnedda and Ruiu, 2020, p.42)

2.1.4 Grey divide: generational digital divide between and within generations

The knowledge and experience skills that people accumulate are maintained into old age, but aging leads to a decline in cognitive abilities (Murman, 2015). It is accepted that age has a negative impact on internet usage (Morris et al., 2006; Scheerder, van Deursen, and van Dijk, 2017; van Deursen, 2020). *'Grey divide'* refers to the digital divide between older and younger groups or differences in digital engagements among older adults (Morris & Brading, 2007; Friemel, 2014). Age is considered one of the main obstacles of media literacy which stratifies people in their access to new media (Livingstone et al., 2004). It is often seen as a significant barrier hindering older adults from using digital technology, leading to lower usage rates (Morris & Brading, 2006; Millward, 2003), poorer digital skills (Morris & Brading, 2007), and less interest in usage (Carpenter & Buday, 2007). A plethora of studies show that age is negatively correlated with one's online performance including ICT access and digital literacy (e.g., Friemel, 2014; Scheerder et al., 2017). Researchers have made efforts on the determinants of seniors' adoption of Internet. Through quantitative studies, researchers identified the relatively low digital knowledge, literacy and competence of the older population due to their demographic factors like age, gender, education, and financials (Morris and Brading, 2007; Pan & Jordan-Marsh, 2010; Ramón-Jerónimo et al., 2013). Limited knowledge of ICTs and physical constraints such as deterioration of memory, vision, and hearing can lead to a low use of digital technologies (Friemel, 2014; Pan & Jordan-Marsh, 2010). Perception of risk and complexity, cost and affordability, value proposition and low expectation will also obstacle seniors' use of digital technologies (Knowles & Hanson, 2018; Blok et al., 2020; Orellano-Coló, 2016). Due to these subjective and objective factors, older people reject or abandon using digital technologies. Many older adults experience lower intension and possibility (Niehaves & Plattfaut, 2014), or low interest and difficulty in using new digital technologies, and sometimes even hold resistant and fearful attitudes toward using or learning them (Nimrod, 2018).

However, it is crucial to note that, though the impact of age on digital use must be acknowledged, the 'age' (era or times in which people live) rather than just 'age' (stage of one's life) could also influence people's use of digital technology (Gilleard & Higgs, 2008). Defining a person or group as immigrants or refugees of the digital age based on age alone is inappropriate. No one would consider a retired computer science professor a digital refugee, just as it is inappropriate to label an 18-year-old who has never encountered digital technology as digital-savvy. For older digital users, they could use digital technology based on their lifestyle and needs (Quan-Haase et al., 2016). Their digital skills do not need to match the quantity and quality of those still studying and working. White and Le Cornu (2011) pointed out that people can be light users, like a visitor, of digital technology, seeing it as an occasional tool, or they can be residents, deeply engaged in

social media and other digital media. The behaviour of older users in using digital technology can be diverse, and it is unfair to define them as digitally incompetent just because they use fewer digital applications in certain areas or are unable to use some digital functions.

2.1.5 Warm Experts and Intergenerational Interaction

According to Bakardjieva (2005), a 'warm expert is an Internet/computer technology expert in the professional sense or simply in a relative sense compared with the less knowledgeable other' (Bakardjieva, 2005, p.99). A warm expert possesses and applies technological knowledge and skills within the 'System world', while simultaneously being immediately accessible in the user's 'lifeworld', bridging the gap between the universal aspects of technology and the specific needs and background of novice users. In Bakardjieva's (2005) work, warm experts are often exemplified by friends and relatives.

Older adults could encounter digital technical difficulties in their daily digital use, requiring support from 'warm experts'. Researchers found that many older adults struggle with operating new technological devices (Seifert & Schelling, 2016; Anderson & Perrin, 2017), and children and grandchildren often serve as key 'warm experts' (Olsson and Viscovi, 2018), and intergenerational support and interaction are vital for older adults. Anderson and Perrin (2017) highlighted that older adults face unique obstacles in using and adopting new technology. In their study, approximately 34% of older internet users lack confidence in their ability to finish online tasks with digital devices, and 48% report needing assistance to set up or learn how to use new devices. The hesitation of older adults to try new technology due to a lack of digital experience (Quan-Haase et al., 2014) underscores the importance of family members as 'warm experts'.

Family support is crucial for the digital inclusion of older adults. Schreurs et al. (2017) found that older adults frequently seek help from younger family members, viewing the family as a primary source of technical support. Although some of their participants attended courses at local universities or libraries, they relied more on the support from family and friends. When digital daily life becomes too complex to cope, older adults typically turn to family for help. Without continuous assistance from 'warm experts', older adults requiring digital support may struggle to participate in the digital world, or their participation may be limited (Hänninen et al., 2020). Taipale (2019b) emphasised that close familiarity with other family members is a fundamental quality for 'warm experts'.

However, it is important to note that while older adults receive help, their ability to use technology independently can be constrained. If 'warm experts' only perform digital tasks for older adults instead of teaching them digital skills, it may increase their dependency. Some children, acting as 'warm experts', handle digital tasks for older adults or even control their digital usage, which can diminish their independence and sense of accomplishment in using technology. Selwyn et al. (2016) argued that proxies often do not scaffold the individuals they support to become autonomous internet users but rather increase their dependency. This not only reduces the potential for skill enhancement among older adults but also makes it challenging for them to continue using complex applications (such as online banking) without support. Additionally, relying on proxies for tasks involving personal information can result in privacy breaches (Selwyn et al., 2016). Quan-Haase et al. (2016) observed that older adults, when supported and controlled by family members, often adopt information and communication technologies reluctantly and without enthusiasm. They must carefully balance the pressure from their families to use technology with how it integrates into their lives. Consequently, 'self-determination' and agency are critical dimensions in studying older adults' use of information and communication technology. Emphasising these dimensions can provide a clearer understanding of their independence and autonomy in the digital world, helping them gain more control and a sense of accomplishment in using technology. Thus, from the perspective of intergenerational digital support and interaction, future research should explore effective ways to help older adults enhance their digital skills, reduce their dependency on proxies, and increase their independence and sense of accomplishment.

2.1.6 Digital inclusion: a countermeasure to bridge the grey digital divide

As societies continue to undergo digital transformations, it is crucial to ensure that every individual, including older populations, can fully participate in the digital age. Researchers suggested that digital inclusion positively affect quality of life (Ali et al., 2020; Alhassan & Adam, 2021). Due to existing social inequalities and circumstances, not everyone has equal access and competence with digital technologies. As a result, discussions on digital inclusion often run parallel with studies of the digital divide, as this inequality has become an unavoidable global issue that requires effective solutions. Recognising the benefits of digital technology adoption, promoting digital engagement among those facing digital disadvantages is crucial for ensuring social equity and inclusivity.

Digital inclusion can be considered as the countermeasures to eliminate digital inequalities and allow more people to participate in the digital society on an equal footing. According to the comprehensive research of scholars, digital inclusion can be understood as: enhancing the opportunities for individuals or groups to have equal access to and use ICTs through various means (IMLS, 2011; Yan et al., 2018; Chen et al., 2020). In short, the studies of digital inequalities and exclusion focus on the question of what the digital divides are, while the studies of digital inclusion focus on what we shall do to these divides. Improving national or regional digital infrastructure and public services to promote accessibility as well as improving personal competence to use and digital literacy are the focus of discussions and studies by scholars and policy makers (IMLS, 2011; Goggin et al., 2017; McMahon, 2020).

The discourse on digital inclusion has evolved alongside developments in digital divide studies and changes in the digital media landscape and social development (Helsper, 2008, 2014; Carmi & Yates, 2020). Initially, during the early stages of digital inclusion research, there was a focus on increasing access to ICTs for a broader population. As ICT penetration increased, scholars shifted their focus towards enhancing individual digital literacy and proficiency. Digital literacy, which can be briefly understood as 'the ability to use ICT and the Internet' (European Commission, 2003, p.3), reflects people's capacity to survive in a digital society (Morris, 2007; Eshet-Alkalai, 2004), or to benefit from online communication and socializing, education and training, entertainment and shopping (Zhang et al., 2018). How to help people digitally disadvantaged to improve their digital literacy is one of the most frequently mentioned topics by researchers and policy makers. Scholars believe that in the digital age, people will be deprived of some social rights due to their inability to access or use digital technology and 'becoming disenfranchised' (Morris, 2007, P.13; Martin, 2005) and socially excluded (Helsper, 2012). As new skills are demanded alongside with new technologies emerging, in this regard, to keep digital literacy up to date becomes a constant and never-ending task for everyone in the society. Later, increasing concerns are given to the relation between digital inclusion and social inclusion or social well-being (Pascoa& Gil, 2015; Aziz, 2020; Helsper, 2012, 2014). Helsper (2014) summarised a five-stage shift of digital inclusion – 'from universal access as the central aspect of digital inclusion to an emphasis on digital literacy and awareness around the benefits of ICT use for economic, social, cultural, civic and personal well-being among the general population' (Helsper, 2014, p.1).

In recent years, with the outbreak of COVID-19 exacerbating the digital challenges faced by older adults, there has been increased attention to issues of digital inclusion and digital well-being among the older population. The COVID19 pandemic, a global health emergency lasting for more than three years between December 2019 to 2023 May (UN, 2023), has left social distancing and

self-isolation as measures to prevent the spread of the virus to maintain health (UK Health Security Agency, 2020). A big lesson learnt from the COVID-19 pandemic is that digital divide may not only prevent people from sharing the advancements and benefits brought by technological progress, but also exclude them from normal social life in emergencies and extreme conditions. During the pandemic, an increasing number of activities of everyday life and social services turned online, accelerating the pace of digital transformation (UK Health Security Agency, 2020), as well as brought a double burden of social exclusion and digital exclusion to older adults (Seifert et al., 2020; Tsetoura, 2022). The digital circumstance and challenges encountered by older population concerned the researchers and policy makers. Digital inclusion studies, policies, schemes and projects have been developed to help older groups better use digital technologies and adapt to a digital society (e.g.: Centre for Ageing Better, UK; Australian Digital Inclusion Index; Australia).

2.2 Ageing with smartphones in China

2.2.1 Born in 1950s: A unique cohort of Chinese Silver Netizens

This study focuses primarily on individuals born in the 1950s, who constitute the majority of the research participants. Although a smaller number of participants were born in the early 1960s (e.g., 1960 and 1962), their historical and social experiences largely align with those of the 1950s cohort. These participants, now in their 60s and 70s, are parents of the only-child generation, as well as digital residents navigating the challenges and opportunities of the digital age. This generation lived through a series of transformative events that profoundly shaped their lives. During their childhood, they experienced the Great Chinese Famine (1959-1961); In their youth, they were swept into the Cultural Revolution (1966-1976), a period that disrupted formal education and traditional social structures, profoundly shaping their values and life trajectories. In their childbearing years, this generation faced the restrictions of the one-child policy (1979 – 2015), which redefined family structures and caregiving expectations in later life. Now, as they approach or enter retirement, these individuals face new challenges, including “empty nest” households, rapid societal digitalisation, and the disruptions brought about by the global COVID-19 pandemic (2019-2023). Their digital engagement, particularly through smartphones, reflects both the opportunities and barriers encountered during this stage of life, as they strive to adapt to a rapidly evolving technological landscape.

2.2.1.1 Children of the Cultural Revolution

The Cultural Revolution cohort, individuals born between 1947 and 1963 (Meng & Zhao, 2017), experienced various durations of educational interruption. During this period, many schools in China ceased to operate normally for extended periods, and over 20% of students discontinued their education at the secondary school level. Prolonged disruptions lasting up to six years significantly reduced the number of people obtaining university degrees and high school diplomas. At every educational level, most individuals experienced missed or interrupted schooling (Meng and Gregory, 2007). Among the cohort, those born in the 1950s, known as the 'Red Guard Generation', received pre-Cultural Revolution education, but soon saw political indoctrination replace basic educational content (Chen, 1999). One-third of this generation participated in the 'Up to the Mountains and Down to the Countryside' (Shangshan Xiaxiang) Movement. Between 1967 and 1978, over 17 million urban youths, mostly junior and high school graduates, were compelled to live and work in rural areas. About one-third of those born or growing up during the Cultural Revolution were sent to the countryside, with some spending over ten years there. This rural experience disrupted their formal school education (Zhou & Hou, 1999) and affected subsequent life events such as employment, marriage, and childbirth. From 1972, Chinese universities began to restrict admissions based on political background rather than academic performance, only accepting new students from worker, peasant, and soldier backgrounds. Due to the low quality of admissions and the lack of qualified teachers, the quality of university education declined, but it still enabled some to earn what might be considered semi-degrees (Meng & Gregory, 2007). The university entry examination was not resumed until after the Cultural Revolution in 1977, provided some youths disadvantaged (in social origins) with opportunities to return to the city and enter university. Nonetheless, many young people during the Cultural Revolution were deprived of the opportunity to earn university degrees. The Cultural Revolution caused a significant generational divide, depriving urban youth of the opportunity to receive a formal education. On average, the Cultural Revolution cohort experienced an educational interruption of 2.9 years (Meng & Zhao, 2017). During the Cultural Revolution, China's domestic production stagnated, and the economic and technological gap between China and both developed and some developing countries widened significantly (Wu, 2008). The challenges faced by these silver netizens, due to interruptions in formal school education during childhood and adolescence, as well as the slow progress of the national economy and technology influenced by the Cultural Revolution, are greater compared to their younger counterparts.

2.2.1.2 Parents of only children

The one-child policy, implemented for nearly four decades from 1979 to 2015, fundamentally transformed China's population and social structure, leading to issues such as gender imbalance and rapid population ageing (Cai and Feng, 2021). Since the family planning policy was first enforced, the traditional large family structure in China rapidly changed. Today, the parents of the first generation of only children have reached retirement age, and their elderly care issues are becoming more pronounced as they are ageing (Lu & Feng, 2022). The ongoing decrease in fertility rates alongside the one-child policy has significantly altered family structures, internal family relationships, and parenting styles. With China's rapid economic growth and families having only one child, many families have increased their investment in their child's education (Li, 2020). The increased educational investments have led to younger population mobilities. For better educational opportunities or for higher employments, younger generation are sent oversea or moved into China's megacities like Beijing, Shanghai, Guangzhou, and Shenzhen (Li, 2020), staying in more economically developed areas to study, work, and live, leading to an increasing number of parents becoming 'empty-nest elders' (Zhang, 2020). It is estimated that 'empty nest families' account for 25-35% of Chinese households (Luo & Waite, 2014). This generation of parents of only children may face more challenges in obtaining support from their children in their old age than previous generations. Families with only child could have very limited resources in terms of economic support, life care, parent-child communication, and spiritual comfort (Feng, 2009). The absence of children will greatly weaken the kinship bond that traditional Chinese elderly people have and bring them great mental health challenges (Wang et al., 2023). Given this circumstance, the Internet and smartphones may help older people maintain close intergenerational relationships, thus contributing to their subjective well-being and mental health (Li & Zhou, 2021; Wang et al., 2023).

2.2.1.3 Digital residents in the digital age

In China, the internet penetration rate among those aged 60 and above has reached 43.2% (CNNIC, 2022). The result of 2021 Chinese Longitudinal Healthy Longevity and Happy Family Study (CLHLS-HF 2021) shows that more than half of China's older adults aged 65 to 69 use smartphones. 31.2% of those aged 70 to 79 use smartphones, and even among those aged 100 and above, there are still a portion of 1.3% who use smartphones (Tian, 2023). Despite the intergenerational digital divide, digital disparities, and deficiencies in digital skills and knowledge of older people, which have been confirmed by numerous quantitative studies, there are still many myths about the digital use of older people. deficiency and differences in digital abilities have not prevented the older population in China from becoming digital users, and the number of

elderly Internet users in China is increasing every year (of course, this may also be because some 'old users' have entered the old age). The lack of spiritual and material resources, interrupted education, and adversities encountered earlier in life may be the driving forces behind their desire for enhanced digital experiences in their third age, compensating for opportunities missed during their youth. This unique generation, bearing with the imprints of times, are crafting their digital everyday lives, which are vibrant and diverse rather than 'grey'.

2.2.2 China's Internet penetration in the past 30 years

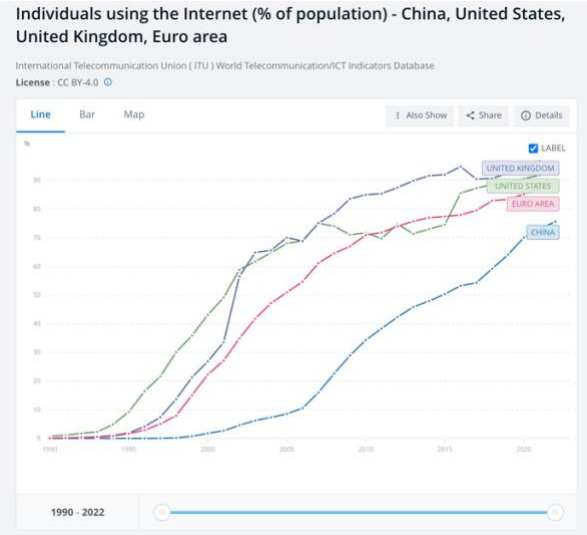
2.2.2.1 Falling Behind and catching up:

While China was taking its first steps in the 1990s, Western developed countries were already speeding along the information highway. The National Telecommunications and Information Administration of the United States had already been discussing the digital divide caused by unfair internet access between information haves and have-nots. In contrast, China was still primarily an agrarian nation, slowly progressing along the path of industrialisation. According to assessments by the Chinese Academy of Social Sciences, China did not complete its industrialisation process until around 2020 (Huang, 2021).

On April 20, 1994, a significant milestone was achieved in the history of the Chinese internet. The National Computing and Networking Facility of China (NCFC) officially established a comprehensive connection to the international internet through a 64K international satellite link with the American company Sprint, marking China's entry into the internet era and becoming the 77th country globally to have complete access to the full-function internet (CNNIC, 2012). In January 1995, the General Administration of Telecommunications of the Ministry of Post & Telecommunications began providing internet access services to the public, ushering in the civilian era of the Chinese internet. Meanwhile, China's reform and opening-up policies provided the necessary social and market environment for the development of the Chinese internet, while the internet itself continuously drove social progress, becoming the most critical driving force in advancing China's informatisation process (Min, 2014).

Although China's internet development started relatively late, resulting in a certain gap compared to developed countries, it has been making efforts to up. Seen from Figure 3 and Figure 4, according to World Bank (2022), in the late 20th to early 21st century, the United States, the United Kingdom, and the Eurozone experienced rapid growth in the number of internet users. Currently, internet penetration rates in the United Kingdom and the United States are as high as

97% and 92%, respectively, while the Eurozone has reached 89%. In comparison, China's internet penetration started later, with the proportion of internet users beginning to rise in the early 2000s and experiencing rapid growth after 2006. Over the sixteen years from 2006 to 2022, the proportion of internet users in China surged from 11% to 76%. In contrast, the United States and the United Kingdom have reached this proportion in 2007, while the Eurozone did so in 2013.



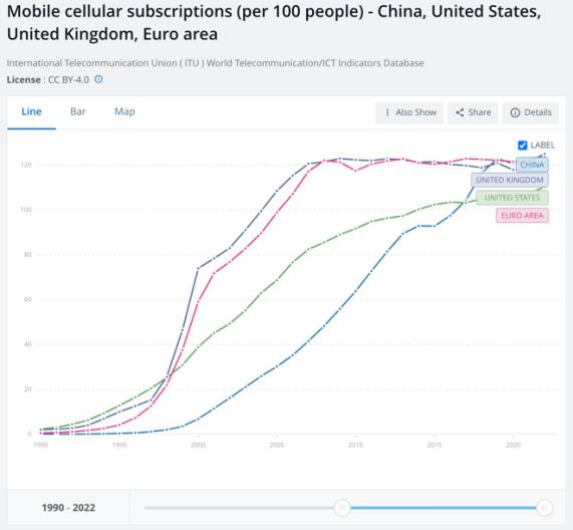


Figure 3 Individuals using the Internet (% of population)

Figure 4 Mobile cellular subscriptions (per 100 people)

The past three decades witnessed the rapid development of information and communication technology in China. China is currently the largest smartphone markets and one of the countries with the fastest average fixed broadband internet speeds worldwide. Since 1994, the lives of one billion Chinese people have undergone revolutionary changes.

2.2.2.2 Internet penetration among Chinese older population

In 2010, among all internet users, the proportions using desktop computers, mobile phones, and laptops for internet access were 78.4%, 66.2%, and 45.7% respectively (CNNIC, 2011). At that time, desktop computers were still the most widely used internet access device. However, by June 2012, the proportion of internet users accessing via mobile phones rose to 72.2% (see Figure 5), surpassing those using desktop computers (70.7%) for the first time, making mobile phones the preferred internet access device for Chinese netizens. It can be seen from Figure 6 that, during the same period, the proportion of internet users aged 60 and above was only 1.4% (CNNIC, 2012).

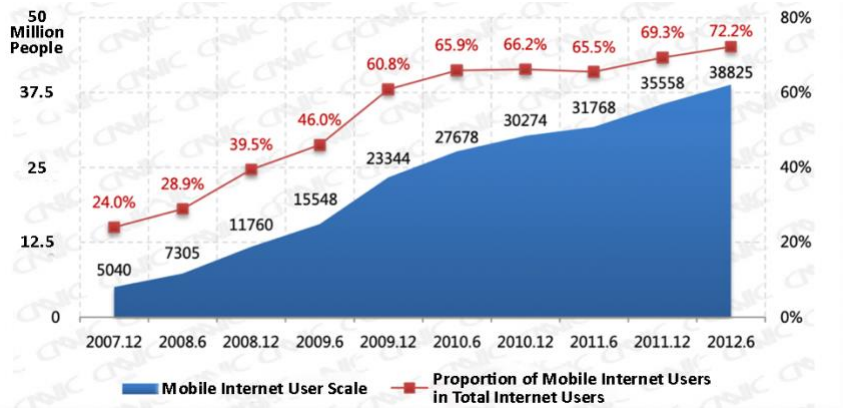


Figure 5 The scale and proportion of mobile Internet users in China from 2007 to 2012 (Unit:10 thousand users)

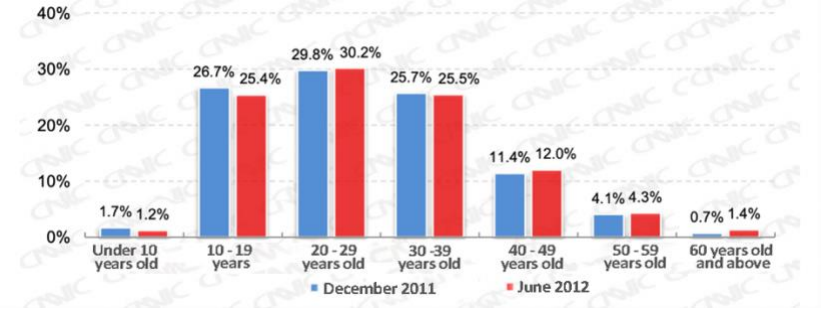


Figure 6 Chinese Netizen Age Structure (December 2011 & June 2012)

According to Figure 7, a decade later, by December 2022, mobile phones had further cemented their status as the predominant method for accessing the internet, with an astonishing 99.8% of internet users utilizing mobile devices to go online (CNNIC, 2023).

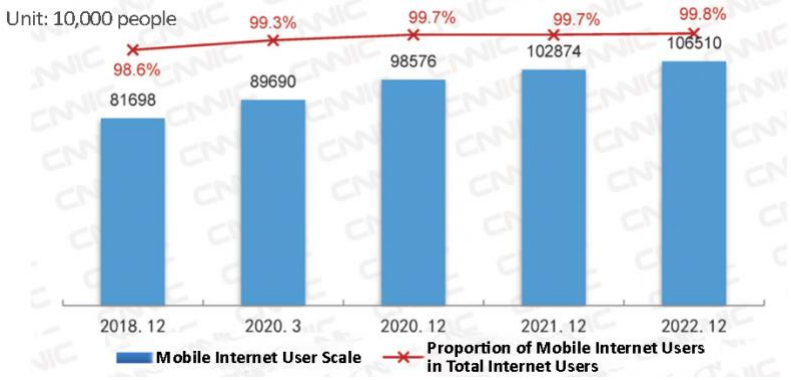


Figure 7 The scale and proportion of mobile Internet users in China from 2018 to 2022 (Unit:10 thousand users)

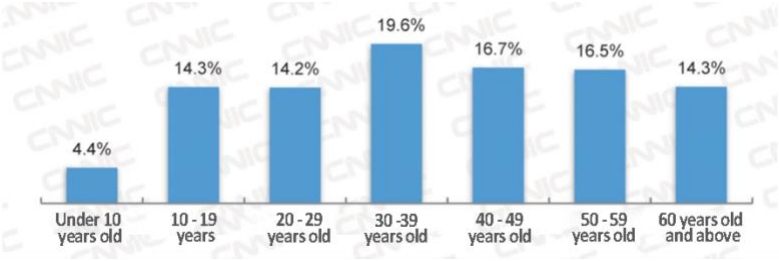


Figure 8 Chinese Netizen Age Structure (December 2022)

Additionally, demonstrated in Figure 8, the proportion of internet users aged 60 and above also saw significant growth, reaching 14.3%, ten times that of 2012, indicating the rapid growth of elderly netizens. Among the older users, over eighty percent of them chat on smartphone, and more than half of them use smartphones for leisure and entertainment activities (Tian, 2023).

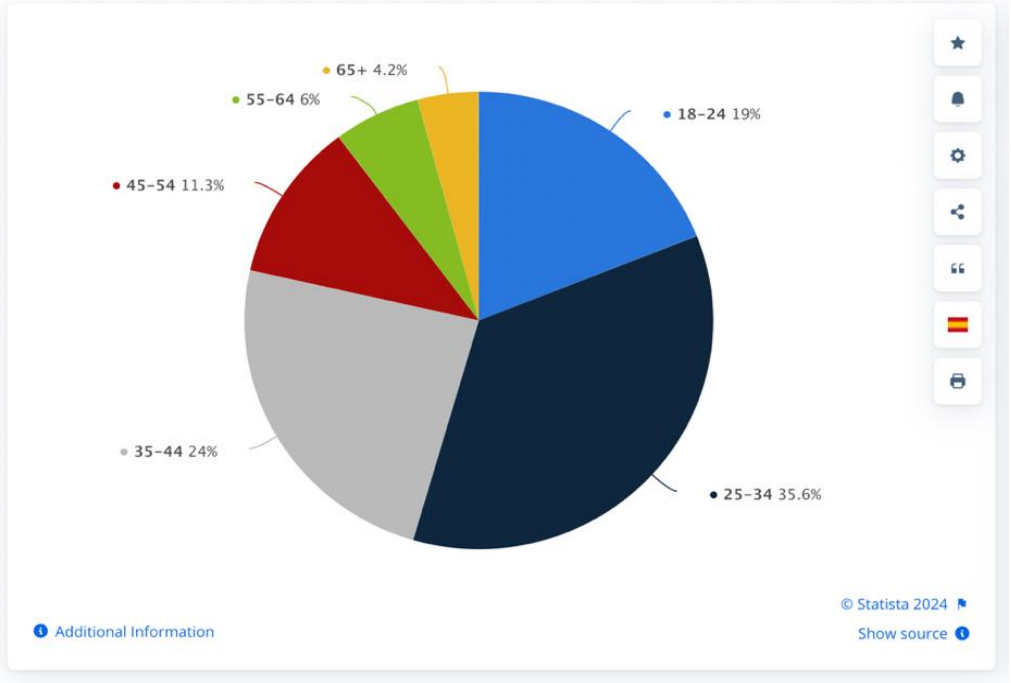


Figure 9 Distribution of internet users worldwide as of February 2024, by age group.

Data from Statista (Figure 9) shows that, as of February 2024, the global digital population aged 65 or above accounts for approximately 4.2% of all internet users worldwide (Petrosyan, 2024). While China may not match the internet penetration levels among older adults seen in developed countries like the UK and the US, its older population's internet penetration rate far exceeds the global average.

2.2.3 Pre- and post-pandemic research on Chinese older adults' digital use

Similar to earlier studies by scholars in other countries and regions around the world, before COVID-19, Chinese scholars discussed more about digital inclusion and mainly focus on the following areas: 1) Scholars investigated the barriers prevent Chinese older adults from using digital technologies (e.g., Ma et al., 2018; Li, 2020; Liu, 2020) believes that the long-term neglect of the needs of older adults by the economic market and the discourse barriers constructed by the network culture make the older population have to face the reality of being 'isolated' by technologies even though they can touch the Internet. In this regard, Chen (2020) believes that merely improving the digital skills of older adults cannot really narrow the digital divide. Instead, it is necessary to start from the practical needs of older adults to create an 'age-appropriate' medium for them. 2) Exploration on digital inclusive intervention and intergenerational digital support for older adults (e.g., Zhou & Ding, 2020). et al. (2020) took family as the research field and found that this digital generation gap (especially the literacy gap) was significantly positively correlated with the health generation gap. Therefore, in order to bridge the digital generation gap, it is particularly important to improve the family's cultural level and especially the 'digital feedback' from the young people within the family. Bu and Ren (2020) further proposed that the ideal digital literacy education is not just a one-way effort about getting older people to 'cross' the digital divide but strive to eliminate the negative impact of digital divide on disadvantaged groups on the basis of social inclusion. It is worth noting that, at this stage, the studies on digital inclusion in China still mainly focus on domestic intergenerational digital support rather than public interventions by governments. Some scholars have realised the lack of public digital inclusion and digital literacy intervention for the older population in China and made suggestions on it (Zhang & Fan, 2019; Zhu et al., 2020), however, China's digital inclusion and intervention for the older population are still in an inadequate state. 3) The impacts of Internet use on seniors' later-year lives (e.g., Jin & Zhao, 2019; Song et al., 2019). Scholars proposed that 'Internet use' has a significant positive effect on the health and well-being of Chinese older population (Wang, 2018; Peng et al., 2019), while some found that the impact of 'Internet use' on the seniors' life satisfaction was not obvious (Wu, 2017). By questionnaire survey, Xu et al. (2018) studied the influence of Internet adoption on social participation of the seniors and found that the 'Internet use' promotes the overall social participation of older adults.

The outbreak of the COVID-19 pandemic has accelerated the proliferation of the internet among the older population in China (Yang & Jin, 2022). From August 2019 to February 2022, the proportion of internet users aged 50 and above in China surged from 13.6% to 26.8% (CNNIC, 2022). With the increasing adoption of the internet and smartphones in China, digital usage has become increasingly common, prompting more scholars to explore the implications of internet

usage for older individuals and society. The risks and negative impacts of internet usage are gradually being recognised. During the COVID-19 period, the Chinese government employed measures such as health QR codes and travel QR codes to track the health and travel status of the public, forcing the older population to learn digital technologies to cope with digital control and barriers. On the other hand, reducing interpersonal contact became a routine measure to prevent the spread of COVID-19. Nationwide lockdowns limited opportunities for outdoor activities for older adults, making them more reliant on the internet. Consequently, issues related to the digital divide and digital inclusion among older adults have received increasing attention from researchers in recent years. Nowadays, it is very common for middle-aged and elderly people in China to use the internet for socialising and entertainment. The discussion on the digital divide among older adults in China is no longer limited to the issues of 'haves' and 'have-nots' or how to get more elderly people to join the digital world. Instead, discussions are emerging on new issues such as digital addiction and internet overuse among older adults, which are increasingly becoming signs of social problems and public health issues (Yang & Jin, 2022).

To alleviate 'loneliness' and 'disconnection', elderly internet users are keen on seeking a sense of belonging' online. However, when they are unable to access the internet or when their internet usage is reduced, they exhibit significant withdrawal reactions, such as anxiety and unease (Yang & Jin, 2022). Many elderly individuals now find themselves immersed in online activities day and night, with the average daily internet usage among Chinese internet users being 3.74 hours (CNNIC, 2021). However, it is reported that 51% of Chinese middle-aged and elderly individuals spend more than 4 hours online each day (iiMedia Industrial Upgrading Research Center, 2021a). Research by Xie et al. (2021) indicates that internet usage can affect the mental health of older adults, with those with lower levels of education being more susceptible to the negative effects of the internet (Xie et al., 2021; Peng et al., 2019), increasing the likelihood of depression. Based on data from the China Family Panel Studies (CFPS), Zhou and Zhang (2021) suggest that the substitution effect caused by internet usage may reduce the quantity and quality of face-to-face interactions among individuals, hindering interactions among family members and leading to emotional estrangement, thereby reducing individual life satisfaction. Peng et al. (2019) found that using the internet for learning activities can decrease the happiness of older adults. Excessive internet usage can also lead to increased levels of depression and decreased cognitive function (Zhang et al., 2022). Research by Yang and Jin (2022) found that, unlike adolescents who seek a virtual environment to release emotions from the real world, middle-aged and elderly individuals are more likely to use the internet as an extension of real life to obtain various experiences that cannot be obtained in real life, leading to excessive internet usage, with loneliness being an important psychological mediator of their excessive usage. Tang et al. (2022)

suggests that internet use for information acquisition can disrupt older adults' existing social networks, further exacerbating feelings of loneliness.

2.2.4 Chinese Government's Digital Inclusion Initiatives for the Older Population in the Post-Pandemic Era

Digital inclusion policies play a crucial role in bridging the digital divide by implementing measures and guarantees at the policy level. As early as 2003, governments worldwide pledged their commitment to establishing a 'people-centered, inclusive, and development-oriented Information Society, where everyone can create, access, utilise, and share information and knowledge, enabling individuals, communities, and peoples to achieve their full potential in promoting sustainable development and improving their quality of life…' (Olphert et al., 2005). Over the past decade, both developed and developing countries have introduced various policies aimed at promoting digital inclusion. Scholars have been actively exploring these policies and measures for digital inclusion for more than a decade (Olphert et al., 2005; Madon et al., 2009).

Digital inclusion has gained even more prominence in the post-COVID-19 era, as the pandemic has accelerated the reliance on digital platforms for work, education, healthcare, and social interactions. It has exposed the vulnerabilities faced by elderly individuals who are digitally excluded and highlighted the urgency to address this issue. Recognising the importance of digital inclusion for older adults especially after the outbreak of COVID-19, the Chinese government has implemented various initiatives aimed at fostering digital literacy, improving access to digital technologies, and enhancing the overall digital well-being of older adults. These initiatives range from providing training programs on digital skills to advocating for concerted efforts from all sectors of society to reform services in order to enhance digital inclusion.

2.2.4.1 The development of digital inclusion policies for older people in China

Before the COVID-19, no digital inclusion policy had been issued by Chinese government. According to Zeng & Deng (2021), there is little research on the topic of digital inclusion policies in Chinese academia. Based on the retrospective analysis by Zeng & Deng (2021), the development of digital inclusion policies in China can be traced back to 2011, where initial emphasis was placed on the application of technology and informatisation in the field of disability services. The year 2016 marked a peak in the development of digital inclusion policies, coinciding with China's national 'Thirteenth Five-Year Plan' that specifically targeted digital inclusion for information-vulnerable groups, such as people with disabilities. However, it is noted that during

this stage, the challenges faced by older adults in accessing information and bridging the digital divide received insufficient attention. The COVID-19 outbreak has brought attention to the use of digital technologies among older people and prompted the Chinese government to introduce digital inclusion policies for older people. After 2020, the Chinese government's digital inclusion policy has entered a rapid development phase, witnessing the introduction of comprehensive policies specifically targeting the older population. These policies encompassed various domains, including internet applications, public services, transportation, and healthcare, aiming to bridge the digital divide and cater to the specific needs of older adults. After that, the steady advancement of digital inclusion policies in China further emphasised the importance of internet applications, healthcare, and transportation for older adults. Policies in this stage focused on refining and implementing specific measures, such as standardising internet applications for older adults, incorporating smart technology education into elderly education, and promoting exemplary cases of elderly-friendly digitalisation. These policy developments highlight the high priority given by the government to digital assistance for older adults, ensuring comprehensive, user-centric, and direct service provision, and guiding the construction of a digitally inclusive society (Jin et al., 2023).

2.2.4.2 Digital Inclusion for Older Adults in China: An Issue Brought to the Forefront by COVID-19

The year 2020 marked a significant turning point in the development of digital inclusion policies for the older population in China, largely influenced by the COVID-19 pandemic. The digital divide persists for older adults, despite their increasing technology use. The COVID-19 pandemic has underscored the urgent need to enhance their digital inclusion and address challenges in technology adoption (Weil et al., 2021). The pandemic revealed the presence of a digital divide among older adults, as some individuals faced difficulties due to limited digital skills or lack of access to technology, impeding their participation in online services and causing daily life inconveniences. This highlighted the urgency and importance of addressing digital inclusion for older adults, prompting the government to allocate more resources and efforts towards bridging the digital gap. Prior to the pandemic, digital inclusion for older adults was not a prominent topic in China, as digital and technological development had started relatively late compared to other developed countries. However, with the advancement of technologies and the outbreak of the pandemic, digital inclusion gained significant attention in the past two years. The COVID-19 outbreak changed people's lifestyles and exacerbated the digital divide among different generations. Older adults faced challenges in bridging the digital divide and experienced digital exclusion due to limited knowledge, skills, motivation, and confidence in using digital

technologies. Instances of older adults being denied access to public transportation or public places due to their inability to present a 'health QR code' on their smartphones or struggling to purchase essential goods through WeChat applets during quarantine, were widely reported and recognised throughout the country. These issues raised concerns about the digital divide among the older population in China and led to increased academic discussions and explorations of digital inclusion for older adults (e.g., Kuang, 2022; Liu & Li, 2022; Song et al., 2021).

Furthermore, the pandemic accelerated the digital transformation across various sectors of society, leading to an increased reliance on online services and tools. This shift highlighted the relevance of digital inclusion, particularly for the older population, and prompted the government to prioritise policies that catered to their digital needs. Additionally, digital technologies played a crucial role in helping older adults cope with the challenges brought by the pandemic, such as accessing healthcare services remotely and maintaining social connections. Consequently, a series of policies were introduced to ensure that older adults had access to the necessary digital support and services they required (Jin et al., 2023).

2.3 Research Gap

Halskov and Hansen (2015) stated that users are the experts of their own lifeworld. However, as experts of their own digital lives, older adults and their lifeworld are often excluded from consideration by researchers and technology designers (Bischof & Jarke, 2021). Older adults could be active contributors to progress rather than lagging behind (Lemieux, 1995). Returning the right of negotiation to the older population is important. Studies proved that older users are more passive and silent online (Brewer et al., 2021; Nimrod, 2010). The expression of public opinions from older population is still far from sufficient. The views of them are crucial, but their voices are rarely heard (Komatsu et al., 2018). The digital stories of the older users should be told by themselves. Therefore, adopting a participatory approach which includes quantitative and qualitative in the study is important (Garavaglia et al., 2023).

Currently, researchers around the world are dedicated to studying the digital everyday use of older adults (e.g., Rosales & Fernández-Ardèvol, 2016; Loos et al., 2022; Seifert & Schelling, 2016; Pirhonen et al., 2020; Taipale, 2019a, 2019b; Quan-Haase et al., 2016, 2018; Schirmer et al., 2022; Caliandro et al., 2021). However, these studies are mainly concentrated in Western countries such as Italy, the Netherlands, Spain, Sweden, Finland, Switzerland, the United States and Canada. Research on the digital everyday use of older adults in the Chinese cultural context also

exists, but it is predominantly based on large-scale quantitative surveys (e.g., Yang & Jin, 2022; Xie et al., 2021; Peng et al., 2019; Zhou & Zhang, 2021; Zhang et al., 2022), with qualitative studies being quite rare (e.g., Wang, 2023; Tang et al., 2022). Busch et al. (2021) emphasise that we know very little about the digital usage of older adults. Research on older adults' digital everyday life should see both the 'forest' and the 'trees'. It is necessary to employ qualitative research methods to delve into the digital everyday life of older adults and the construction of its meanings.

Moreover, the digital usage of older adults is not an issue confined to the older population. To enhance the digital well-being of older adults, it is important to consider multiple perspectives, including the older individuals themselves, family support, and social inclusion. Younger family members are usually considered as 'warm experts' for older adults (Martinez & Olsson, 2022). For Chinese silver netizens, understanding their digital interactions with family members and improving communication methods in digital technology support are essential. This will provide more recommendations to support the independence and autonomy of older adults in the digital world.

Meanwhile, the outbreak of COVID-19 has highlighted the digital divide among the older population in China, as well as the inadequacies in the government's previous digital inclusion policies and measures. In the post-pandemic era, it is crucial to explore the digital inclusion experiences of the older population in China. To learn the appropriate and effective ways to bridge the gap between older adults' needs in the digital society and their digital capacities, and to enhance their integration and participation in the digital world, are key directions that need to be explored.

Accordingly, using a moderate social constructionism approach, this study will invite and empower participants to construct their digital everyday lives and culture, interpret their own experiences of digital use, intergenerational interactions, and digital inclusion in everyday life, and assign significance to these aspects. Questionnaires, interviews, and focus groups will be utilised to gain insights into these areas.

2.4 Theoretical Framework

This study seeks to explore a main research question: *'What digital experiences do Chinese silver netizens have in their everyday lives?'* The research framework is divided into three sub-frameworks, focusing on Chinese silver netizens' digital use and experiences in everyday life,

intergenerational digital interactions and experience, and their experiences and suggestions for digital inclusion respectively (see Figure 10). The theories and concepts of digital use and dimensions in older adults' everyday lives will serve as the main branches in constructing the Theoretical Framework of this study. The agenda in digital divide research will help to explore the digital use and its impacts among the older population. Chinese silver netizens' generational background will be included into the framework as third-party factors which impact older adults' digital use.

The sub-framework on silver netizens' digital use applies the theory of the digital divide and digital capital, examining their digital use access and histories, their daily digital activities and spaces they visit, and their experience and impacts on daily lives. It addresses two research questions: What are the key dimensions (activities/functions) and venues (places/spaces) of Chinese silver netizens' digital everyday life (RQ-1), and what digital experiences (practice and user experience) do they have in their everyday life (RQ-2)? The sub-framework on intergenerational interaction explores the theory of 'warm experts,' investigating intergenerational digital supports, differences, and interaction experiences, raising the research question: How do Chinese silver netizens perceive these intergenerational digital interactions and differences (RQ-3)? The sub-framework on social and digital inclusion employs the theory of digital inequality and inclusion, studying silver netizens' digital inclusion experience, their expectations, and suggestions for service and technology development, addressing the research question: What suggestions do Chinese silver netizens have towards a better digital living (RQ-4)?

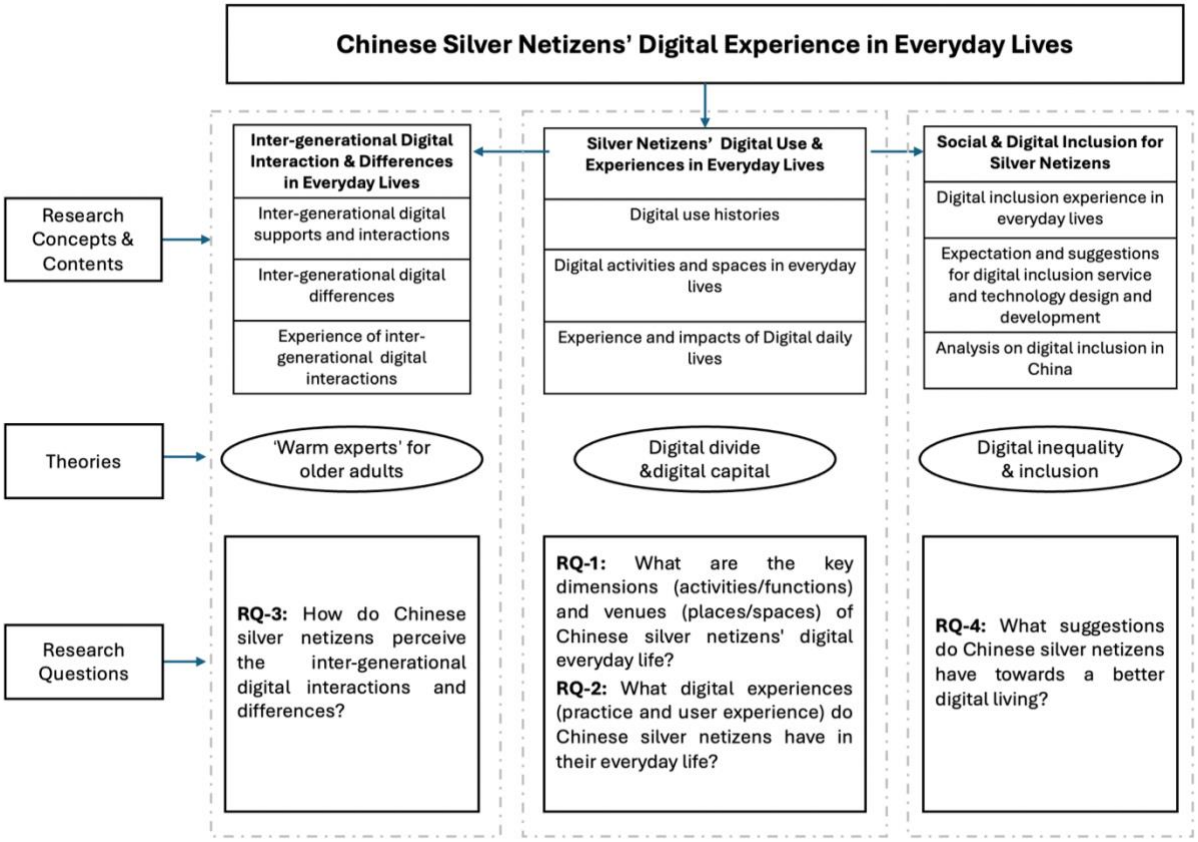


Figure 10 Theoretical framework of this study

Considering the current internet development and widespread adoption where all participants are digital users in China, the first level digital divide (access divide) will not serve as a primary element of the framework. The concept and dimensions of elderly daily life will intersect with the study of digital use, providing an analytical framework and perspective for each topic of digital use.

Chapter 3 Methodology

I am a researcher-traveller in Kvale and Brinkmann's (2009) metaphor. During my research journey to explore the digital everyday lives of the older digital residents, I encountered my participants. We 'wondered' together on their stories of digital experiences. Knowledge is socially constructed in our conversations and interactions, some 'previously taken-for-granted values and customs' (common assumptions) of older adults' digital use were challenged. I will introduce the stories and knowledge, alongside the challenges to the previous common assumptions I've collected in my wandering journey in this thesis. While representing the stories, I will not only present direct quotes from the participants recorded during the research, but also analyse and discuss the data based on my own knowledge and experience. I will strive to represent the realities and truth that I have collected, however, throughout this process, my personal life experiences, cultural background, my limitations, and my reflections and perceptions on my own later life in the future, will inevitably influence my understanding, interpretation, and discussion of their stories, as well as the construction of knowledge from the study.

Introduction

There is already a great amount of quantitative research based on large-scale research exploring the landscape of older people's digital use and its impact. These studies provide information about broad trends and patterns in the use of digital technology by older people's groups - it is as if we are looking down on a vast *forest* from a high vantage point and are able to see its overall shape and structure and understand the dynamics at the group level. However, as Johnson (2008, p. 166) stated, 'social life is shaped by both the nature of systems and how people participate, by the forest and the trees. While these quantitative studies provide valuable macro-level perspectives, they often fail to delve into the individual tree level, that is, how individual older adults experience and value their digital use in everyday lives.

Just as each tree in a forest has its own unique growth trajectory and characteristics, older people's digital lives and digital experiences are influenced not only by their age, but also by their life course and cultural background (Beneito-Montagut et al., 2022). Researchers should recognise the heterogeneity of older adults (Pirhonen et al., 2020), whose digital experiences can be individual and complex. An in-depth understanding of these trees through qualitative research methods can not only complement the existing *forest* perspective, but also provide evidence and reference for the inclusive design of age-friendly digital technologies, thereby promoting social inclusion.

Based on the above discussion, this study adopts a mixed-method strategy in which qualitative research constitute the core part. Through in-depth interviews and focus groups, it will explore older people's digital experiences and to reveal the deeper significance of their digital practices in their daily lives. This approach is similar to taking a closer look at each tree in a forest, not only focusing on their overall growth environment, but also delving into the uniqueness of the trees.

In this chapter, *Methodology* of the research will be introduced in detail, including research philosophy, research design, research methods, and research ethics. Aiming to demonstrate the justification of the research methods adopted in the study, the chapter is planned and organised according to the main components involved in the selection of the research approach that proposed by Creswell (2018): philosophical worldviews, research designs, and research methods. In this chapter, the first section of *Research Philosophy* introduces the research philosophical stance of the study. A *moderate social constructionism* stance will be discussed and proposed as the research philosophical paradigms. Secondly, the section of *Research Questions* analyses and introduces the four main questions to be inquired with social constructionism approaches in this study. Thirdly *Research Design* will introduce the research

strategies as well as the procedures of the study. In this study, though quantitative and qualitative research methods will be adopted as mixed methods, the qualitative research phases will count for the core part of the study, exploring the experience and significance of older adults' digital everyday life. In the *Research Methods* section, specific research techniques of the study will be illustrated in detail. The method of i*n-depth interview* and *focus group* will be used as the primary tools. At the end of the chapter, ethics issues of this study will be discussed.

3.1 Research Philosophy

'Research philosophy refers to a system of beliefs and assumptions about the development of knowledge' (Saunders et al., 2019, p.130). This study seeks to learn the digital experience of the older adults. Social constructionism will help to learn people's interpretation of their own circumstances over the common social understanding, or the significances or meanings that people gave to their own lived experiences (Waller et al., 2016). Therefore, a *social constructionism* research philosophy will be adopted to understand older adults' digital use experience in their everyday lives, while *a moderate social constructionism paradigm* will be applied.

3.1.1 Clarification of the moderate social constructionism

'The types of beliefs held by individual researchers based on these factors will often lead to embracing a strong qualitative, quantitative, or mixed methods approach in their research' (Creswell, 2018, P.44). Before deciding on the research methods and approaches, it is necessary to explain my philosophical worldview. A philosophical worldview or knowledge claim statement is an assumption about what is knowledge and how to learn it held by researchers when they conduct research project, which is a belief guiding the researcher's action during the research period (Creswell, 2003; Creswell, 2018). Glesne (2014) identifies four paradigmatic families: post-empiricism, interpretivism, critical theory, and poststructuralism. Similarly, Creswell (2018, 2003) outlines four predominant schools of worldviews: postpositivist, constructivism, transformative or advocacy/participatory, and pragmatism.

Among the research paradigms, constructivism is usually associated with interpretivism. In Glesne's (2014) classification, constructivism also belongs to the interpretivism paradigm. Kivunja and Kuyini (2017) stated that sometimes interpretivism and constructivist could be regarded as same paradigm. However, sharing 'the goal of understanding the world of lived

experience from the perspective of those who live in it' (Andrews, 2012), constructivism is different from interpretivism. Unlike interpretivists who seek an objective explanation of subjective human experiences (Schwandt, 1997), constructivists assert that objective knowledge and truth is derived from perspective (Schwandt, 1994).

Social constructionism and constructivism nearly align in their view that knowledge and truth are constructed and created rather than found or discovered (Schwandt, 1994, 2000). However, even though they are often used interchangeably (Young & Colin, 2004; Andrews, 2012), social constructionism is different from constructivism. Young and Colin (2004) differentiated between them, noting that constructivism concentrates on individual's meaning-making and the construction of social and psychological worlds through personal cognitive processes. In contrast, social constructionism emphasises that these worlds are shaped through collective social processes and interactions.

It is also important to clarify that as an epistemology, social constructionism does not deny the existence of an objective reality. Andrews (2012) addresses common misconceptions that social constructionism disregards the objective reality. Additionally, Heron and Reason (1997) critique social constructionism from a participatory inquiry perspective for overlooking the experiential subjective-objective world. Schwandt (1994) contends that 'one need not be an antirealist to be a constructivist. One can reasonably hold that concepts and ideas are invented (rather than discovered) yet maintain that these inventions correspond to something in the real world' (p.237). Andrews (2012) asserts that social constructionism indeed recognises an objective reality but maintains an epistemological rather than ontological stance. The social world is seen both as a subjective and an objective reality, which posits reality as socially defined—pertaining to the subjective experiences of everyday life rather than the objective realities of the natural world (Andrew, 2012). Burningham and Cooper (1999) argue that the constructivist stance does not make ontological claims about the non-existence of reality, although it acknowledges that the nature of reality is socially constructed. Moreover, Schwandt (2000) distinguishes between *weak* and *strong* constructionism. While *strong* is referring to more radical, the *weak* one acknowledges the influence of social factors on shaping knowledge and recognises the importance of experiential data and observations in validating hypotheses and theories, admitting that while knowledge is constructed, there remains a reality that somewhat constrains our constructions (Longino, 1993).

3.1.2 Epistemology and Ontology of moderate social constructionism

Based on this understanding, this study adopts a 'moderate version' form of social constructionism. The ontology of the study argues that knowledge can be viewed as both an objectively existing social reality and an individual's subjectively constructed thoughts and experiences. This means that knowledge is not only an objectively existing fact but can also be the construction of subjective experience. In regard of epistemology, it adopts a *moderate version of constructionism* (Schwandt, 2000) approach, which holds that individuals' experiences are constructed under the influence of socio-cultural, historical, and other factors, while also embracing *contextual empiricism* (Longino, 1993), which emphasises that the methods used for processing data and linking evidence with hypotheses are contextual, consisting of subjective assumptions that incorporate social values and ideologies knowledge.

Accordingly, this study firstly acknowledges the age-related digital disparities widely recognised and validated in quantitative research as 'contextual empiricism' (Longino, 1993). It also recognises the existence of digital ageism' as a social construction, which is based on ageist stereotypes towards older adults' digital use. Furthermore, this study acknowledges that the digital use activities conducted by older adults are real practices that can be experientially known and documented. Finally, following a social constructionist approach, this research recognises that the older adults' digital experience in everyday life is socially constructed, influenced by both individual and social factors. Older adults construct meanings of digital experience during their interactions with digital technologies, while researcher construct new understandings and knowledge of older adult's digital experience through interactions with them.

3.2 Research Questions

To understand the older adults' everyday lives in a social constructionism perspective allows us to understand and reveal how they attribute specific meanings to digital technologies within their social and cultural contexts. As aforementioned in section 3.1, combining moderate social constructionism with contextual empiricism, this study primarily explores the following questions:

Research Question 1: What are the key dimensions (activities/functions) and venues (places/spaces) of Chinese silver netizens' digital everyday life? This question explores the main functions, digital activities and spaces (apps or platforms) of older adults from the perspective of contextual empiricism, restoring the landscape and picture of their digital world.

Research Question 2: What digital experiences (practice and user experience) do Chinese silver netizens have in their everyday life? This research question primarily explores the subjective experiences and meaning making of older adults. Through communication and interaction based on social constructionism, it seeks to learn how do older users feel about using digital technologies (from a user experience perspective) and what meanings do they attribute to their digital practices.

Research Question 3: How do older adults perceive intergenerational digital interactions and differences? This research question involves older adults' understanding of digital interactions and differences between the younger generations and themselves. It seeks to understand generational digital disparities from their perspective.

Research Question 4: What suggestions do Chinese silver netizens have towards a better digital living? Exploring digital inclusion from a social constructionism perspective with older adults will help us better understand the good inclusion and better digital future constructed by older adult groups, gaining insights from them, the stakeholders involved in the study.

3.3 Research Design

A mixed-method strategy will be applied in this research while moderate social constructionism admit that knowledge can be objective social realities as well as social constructed experiences and significances. Older adults' digital experience in everyday lives will be explored qualitatively with in-depth interviews and focus groups, while quantitative approach will also be applied as a tool to assist support triangulation and give clues to form the interview guidelines.

3.3.1 Mixed methods

Before the mixed method was widely recognised as 'the third research paradigm', there were basically two widely recognised social science research paradigms: quantitative research paradigm and qualitative research paradigm. There are some differences between quantitative and qualitative research paradigms. Quantitative research is often described as positivism, post-positivism, experimental, quasi-experimental, correlational, or causal comparative (Mertens, 1998). It generally refers to the method of studying social science by means of natural science methods, especially those studying social phenomena by means of positivism (Bryman, 1984). The counterpart, qualitative research, has been described as interpretative, constructive, naturalistic, phenomenological, or ethnographic research. Qualitative research tends to

understand certain phenomena in specific circumstances in order to understand particular behaviours used by a group or society in certain meaning system. Which paradigm is more suitable for the study of humanities and social sciences, quantitative or qualitative research? The paradigm battle between these two began in the 1960s (Bryman, 1988).

The first is the debate on the philosophical basis of research methodology. The theoretical basis of quantitative research originates from positivist cognitive methodology and world outlook. Those who adhere to this paradigm believe that subject and object are separate entities, and that social phenomena exist objectively and are not affected by the subjective value of the subject; The theoretical basis of qualitative research comes from interpretivist cognitive methodology and world outlook. Those who adhere to this paradigm believe that subject and object are not completely separated entities, and that the understanding of social phenomena will be affected by subjective values. The second is the debate on the specific methods of quantitative and qualitative research. Quantitative research is mainly a deductive method, that is, through the measurement and analysis of data to obtain relevant information, such as experimental and statistical methods, and then quantify and hypothesize the obtained information to reveal the causal relationship between things; qualitative research follows the inductive method, mainly collecting text and social information, such as interviews and case studies, emphasizing holism and situationism. The third is the debate about the purpose of quantitative and qualitative research. The purpose of quantitative research is to explore the essence of things by measuring and analysing the quantitative characteristics and changes of the objects, thus figure out the quantitative regularity of them; the purpose of qualitative research is to understand and explain the facts through in-depth study on the object to learn the qualitative laws of it. The great differences between quantitative research and qualitative research paradigms on philosophical basis and other levels, as well as the controversy caused by them, provide the premise and space for the emergence of mixed method research.

In the process of the 'paradigm war' between quantitative research and qualitative research, the 'mixed methods', which combines qualitative and quantitative methods, came up as result. The mixed methodology emerged at the end of the 20th century. Tashakkori and Creswell (2007) defined the concept of *Mixed Methods* in their first issue of the *Journal of Mixed Methods Research* as:

> *'…research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative*

> *approaches or methods in a single study or a program of inquiry.' (Tashakkori & Creswell, 2007, p. 4)*

The emergence of the mixed methods has provided the researchers with a generous offer that prevent them from falling into the dilemma of making a difficult choice between quantitative and qualitative paradigms. As a result of a long-standing debate between 'quantitative' and 'qualitative' paradigms, the mixed methods have not yet been fully developed, however, it has received many recognitions and is regarded as 'the third research paradigm' or 'the third methodology' after quantitative and qualitative methods (Gorard & Taylor, 2004; Johnson &Onwuegbuzie, 2004; Teddlie & Tashakkori, 2008;).

Currently, the boundaries between quantitative, qualitative, and mixed research are no longer as clear as they first appeared (Creswell, 2018). Quantitative and qualitative studies are more like two ends of a continuum (Newman & Benz, 1998) and mixed methods research lies between the two ends of the 'qualitative-quantitative' continuum because it combines quantitative and qualitative approaches. A study may tend to be more quantitative or more qualitative rather than completely quantitative or qualitative. (Creswell, 2018)

3.3.2 The purpose of adopting the mixed methods in this study

Mixed methods are effective in exploring the digital usage among older adults. Researchers have found that when both quantitative and qualitative research are employed, the results of quantitative data analysis are sometimes inconsistent with qualitative research. Such inconsistencies can lead researchers to discover the meaning of digital technology for older adults. For example, Rosales and Fernández-Ardèvol (2016) proposed dialogue between the quantitative and qualitative results on older adults' smartphone use in daily life, thereby enhancing the interpretation of both types of data. In their study, they found that most older adults use Facebook through the quantitative method of cell phone logs; however, during interviews, participants talked more enthusiastically about the WhatsApp experience and less about Facebook。This suggests that quantitative data can uncover the fact that digital use occurs, however, sometimes lacks the ability to explore subjective meanings. As Quan-Haase et al. (2016) pointed out, most studies gain insights into older adults' digital use from large-scale survey research. Through quantitative analysis of questionnaire data, researchers explore the reasons why older adults use or do not use digital technology, analysing the positive or negative impacts of using digital technology for older adults. However, these studies overlook the

challenges and opportunities that older adults face in their digital everyday lives (Quan-Haase et al., 2016), and also fail to explore those potential digital uses and experiences that have not yet been universally known.

Greene et al., (1989) identified five purposes for mixed-method evaluations: *triangulation*, *complementarity*, *development*, *initiation*, and *expansion*. Four of them are cited here to explain the purpose and values of adopting the mixed methods in my study: *(1) Triangulation*, that is, comparing the results of quantitative data with qualitative data; Qualitative research data on the digital experience of the older population will be compared with quantitative secondary data and questionnaire data to examine the consistency between qualitative research results and quantitative research results. If it results to be inconsistent, the researchers can continue to explore *why* with the participants further. *(2) Complementarity,* to seek explanation, exemplification, improvement, and clarification in the comparison of the results of one method with the results of other methods. The conceptual framework and questionnaire for the quantitative study were developed based on existing research through literature review. However, the digital experience of the older population will not be limited to the framework of quantitative research. There are some potential experiences outside the research framework that need to be explored and revealed through qualitative research. *(3) Development,* which uses the results of one method to develop the other method. As stated in the research objectives, the results of the quantitative research will help the researchers to determine the preliminary qualitative research and construct a semi-structured research outline. *(4) Initiation*, which reveals the paradoxical ideas and contradictions in the reconstruction of research questions and describes the new ideas emerging in the data. The results of small-scale qualitative studies (interviews and focus groups with silver netizens resided in city of Guilin) can be further confirmed by quantitative studies of large samples (silver netizens from other cities in China) in the future.

3.3.3 The research design

In this study, the research design is 'a mixed-method strategy tending to be more qualitative'. The mixed methods approach of this study will consist of quantitative research methods of secondary data and questionnaires, and qualitative research methods of interviews and focus groups. On the mixing arrangement strategy of the research methods, Creswell (2018) proposed three primary mixed research designs: (1) *Convergent mixed methods* (2) *Explanatory sequential mixed methods*, and (3) *Exploratory sequential mixed methods*. My preliminary arrangement of the order of quantitative and qualitative research phases (quantitative research first and qualitative research later) basically obeys his *Explanatory sequential mixed methods* in chronological order.

In the explanatory sequential mixed methods, the use of qualitative research methods is aiming to explain the results of the quantitative research. However, it is to be clarified here that in this research, the results of quantitative research will not only be the materials that to be interpreted in the second stage, but more essentially will support the design of semi-structured explorations of the later qualitative studies.

3.4 Research Methods

3.4.1 Qualitative approaches: in-depth interview & focus group

Qualitative research is a research activity in which the researcher himself/herself is used as a research tool. It generally uses a variety of data collection methods to explore social phenomena holistically, adopts the method of induction to analyse data and form theories, then obtains understanding of the behaviour and meaning construction through interaction with research objects (Chen, 2009).

3.4.1.1 In-depth Interview

Kvale and Brinkmann (2009) consider interview as an interaction of views (*InterViews)*, which constructs knowledge in the interactions of researchers and participants.

> *'If you want to know how people understand their world and their lives, why not talk with them? Conversation is a basic mode of human interaction. Human beings talk with each other; they interact, pose questions, and answer questions. Through conversations we get to know other people, learn about their experiences, feelings, attitudes, and the world they live in. In an interview conversation, the researcher asks about, and listens to, what people themselves tell about their lived world. The interviewer listens to their dreams, fears, and hopes; hears their views and opinions in their own words; and learns about their school and work situation, their family and social life.' (Kvale & Brinkmann, 2009, p.xvii)*

Kvale and Brinkmann (2009) also use the metaphors of the miner and the traveller to portray the different roles and approaches of researcher in interviews. Both roles are dedicated to understanding social reality and the pursuit of truth. The miner represents the post-positivist,

who sees knowledge as objective, like metal ores in the ground waiting to be mined. The travellers are constructivists, who are constantly constructing and forming their own knowledge and insights through interactions and dialogues with people on their journeys.

From a social constructionism perspective, the exploration of the study in the qualitive interviews is a collaboration to co-construct knowledges by both the researcher and the participants. In the dialogues and interactions, researcher and participants would construct knowledges together rather than researcher or participants alone explaining their meanings and stories alone respectively. In this process, the focus of research questions and interview outline will be constantly updated with the deepening of the research exploration.

In addition, both the researcher and the participants have their own unique knowledges and experiences and purposes. In the process of interviews, the researcher will maintain a balance between 'listening to each other' and 'keeping in mind the research questions and research purposes. The researcher's purposes and questions on the issue of digital experience of older people is clear, but participants are usually intending to be interviewed according to their own agenda and expectations. They have their own stories to tell. In many cases, they have different languages, different meaning systems, different cultural customs, and social realities from the researchers, and they want to be heard, understood, and expressed (Chen, 2013). Their appeals for the research should be given concerns. The meaning of digital experience to the seniors and the culture and norms in their own world can be learned within a context of their digital daily lives.

3.4.1.2 Focus Group

Focus group is a group discussion organised to exploratory attitudes and perceptions, feelings and ideas on a specific set of research topics. It is a technique for obtaining data on the interaction of group members (Denscombe, 2014; Kitzinger, 1994). It is a useful way for uncovering how people think and discuss specific issues. It helps not only in understanding the thoughts of participants but also in clarifying why they hold such views. The data generated during group interactions further empowers participants to control the dynamics of the interaction (Morgan & Krueger, 1993, p.44).

Focus group would be good way to collect silver netizens' attitudes and opinions on their daily digital experiences. The collective nature of focus groups will empower older participants and facilitates the expression of negative opinions in the presence of fellow participants. In focus groups, participants are chosen for their knowledge of the research topic, giving them a sense of

being ‘experts’. This setup is particularly effective when people with common feelings and experiences come together, enabling them to express their opinions more freely (Morgan & Krueger, 1993). Ivanoff and Hultberg (2006) review the ideas underlying the focus group approach and argue that in a focus group, participants can construct a framework for making sense of their experiences and that the interaction with others leads to the construction of new knowledge. This will contribute to extend the understanding of digital experiences to the older users.

The full focus group is comprising between six and ten people while a mini focus group is involving 4 to 6 people in each. Mini focus group can be considered when examining groups such as children or older adults (Litosseliti, 2003). Some researchers believe that in the limited time available, more information can be obtained through mini groups (Greenbaum,1999). Besides, people might prefer mini group for it is more relax and friendly (Oates & Alvizou, 2018). Older people might need to sit closer to each other to listen and talk for the physical declines of vision and hearing (Bloor et al., 2001). The cognitive decline of older adults will also increase their burden of identifying information among too many people. Consequently, focus groups of this project will be conducted in mini size of 4 to 6 people in each group.

3.4.2 Quantitative approaches: secondary analysis and questionnaire

Secondary data analysis is to analyse secondary data that collected by someone else by some purpose (Boslaugh, 2007). By analysing the published open data, researchers can figure out the specific factors that should be investigated.

Questionnaire is a research tool to collect information to be used subsequently as data for analysis. Researchers can use questionnaire to collect straightforward information (relatively brief and uncontroversial), standardized data and definitive answers under an open social climate which allows people to give honest answers (Denscombe, 2014). Questionnaire is a way to collect researcher’s own primary data with a purposive designed question list.

These two quantitative research methods have their own pros and cons. Secondary data is low-cost, large sample size, but the data is of low-targeted for it is not customed. Original-designed questionnaire can be customed to collect targeted primary data, but for individual researchers, it is relevant costly but with smaller samples. In the daily digital lives of older adults, there are many research *aspects* can be started with. Before conducting open or semi-structured studies, so as not to lose direction and rationale in the studies, it is important to have a general understanding of the normal routine in digital lives of older adults. A small-scale online

questionnaire with purposive samples and a secondary data analysis on large-sampled survey are used in this project to give some clues to the qualitative studies.

Building on the analyses in Sections 3.1 to 3.4, this study adopts a mixed-methods approach. Quantitative data provide a comprehensive overview of digital practices among older adults, while qualitative data from interviews and focus groups delve into their subjective experiences and nuanced perspectives. As illustrated in Figure 11, RQ1 and RQ2 focus on identifying the dimensions, venues, and user experiences of silver netizens' digital practices. These questions are addressed using data from online questionnaires to capture broad patterns and in-depth interviews to provide detailed qualitative insights. RQ3 investigates intergenerational interactions, drawing primarily on focus groups as the main method, supplemented by interviews where appropriate, to enrich the understanding of generational dynamics. RQ4 examines older adults' suggestions for digital inclusion, relying predominantly on focus groups to gather their expectations and recommendations.

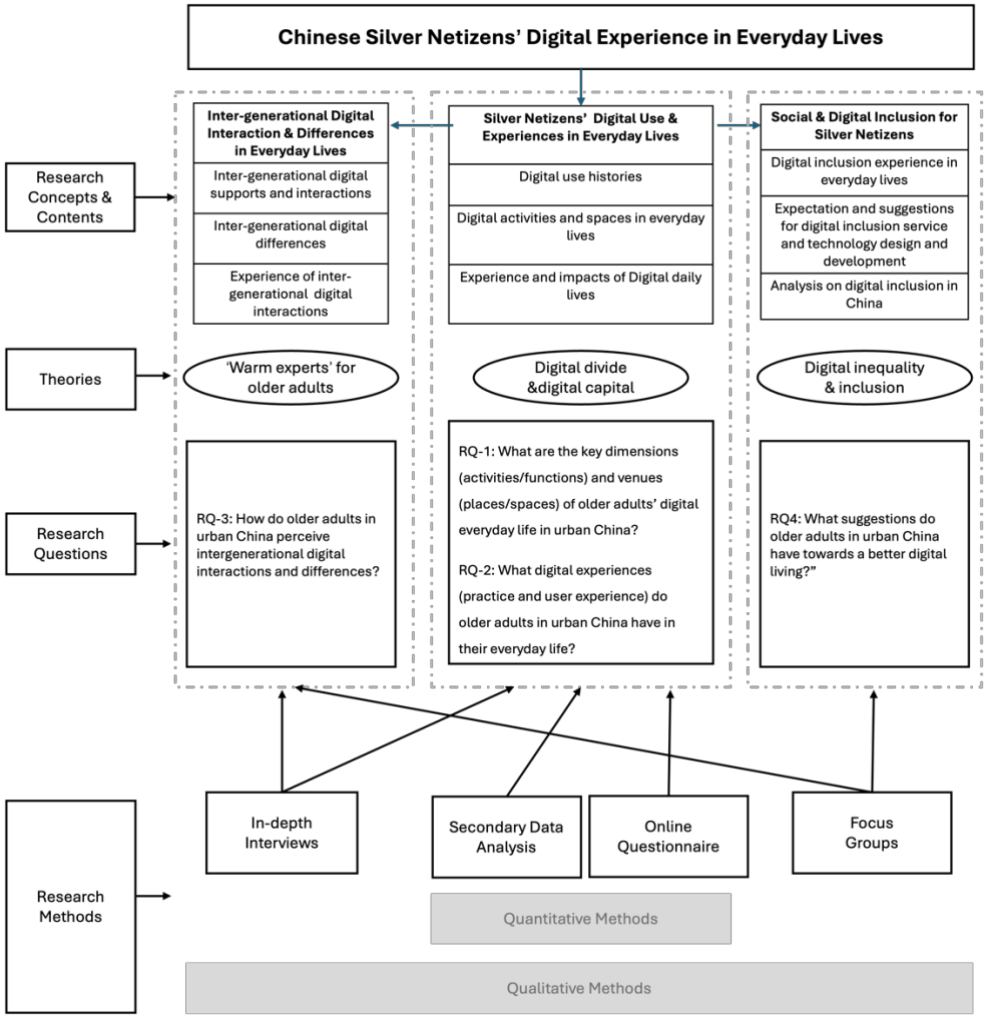


Figure 11 Research Framework and Method Design

3.5 Research Plan

3.5.1 Research site

This study employs a mixed-methods approach, with a primary focus on qualitative research conducted in Guilin, supplemented by secondary data analysis and an online survey with a national scope.

Qualitative Study Research Site

The qualitative study was conducted in city of Guilin. I invited local participants to share their digital life experiences. The choice of Guilin as a research site is justified by the following demographics, level of economic development, and digital development of the city:

Demographics: The following bar chart (Figure 12) is based on data from China's seventh population census (National Bureau of Statistics, 2021). The age structure of Guilin's population shows some representativeness compared to the national average. First, Guilin's population structure (percentage of population in age groups) is close to the Chinese average. In terms of the proportion of older population, Guilin's 20.33% is slightly higher than the national average of 18.70%, which can provide a more typical sample for studying the older population.

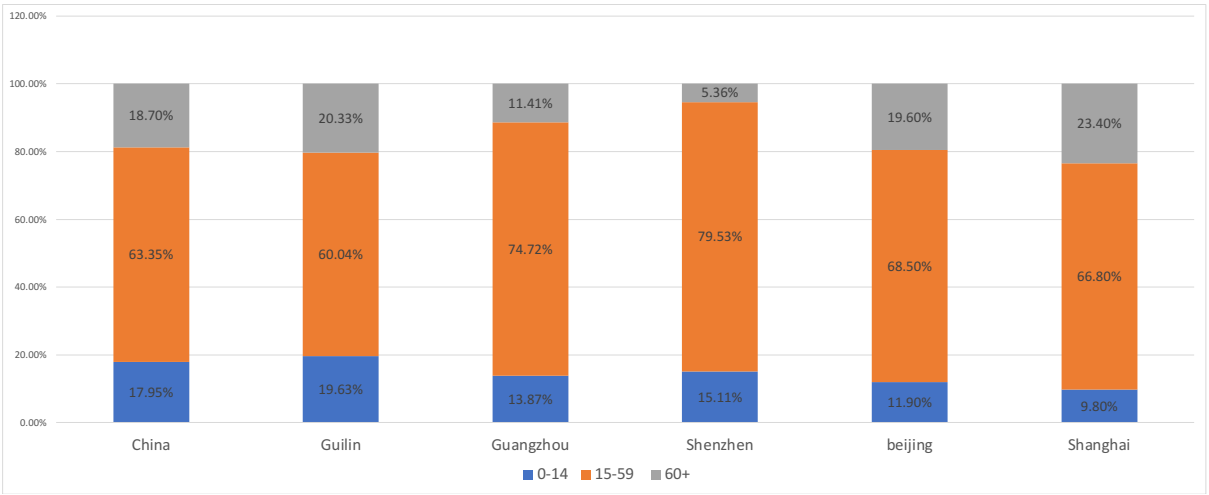
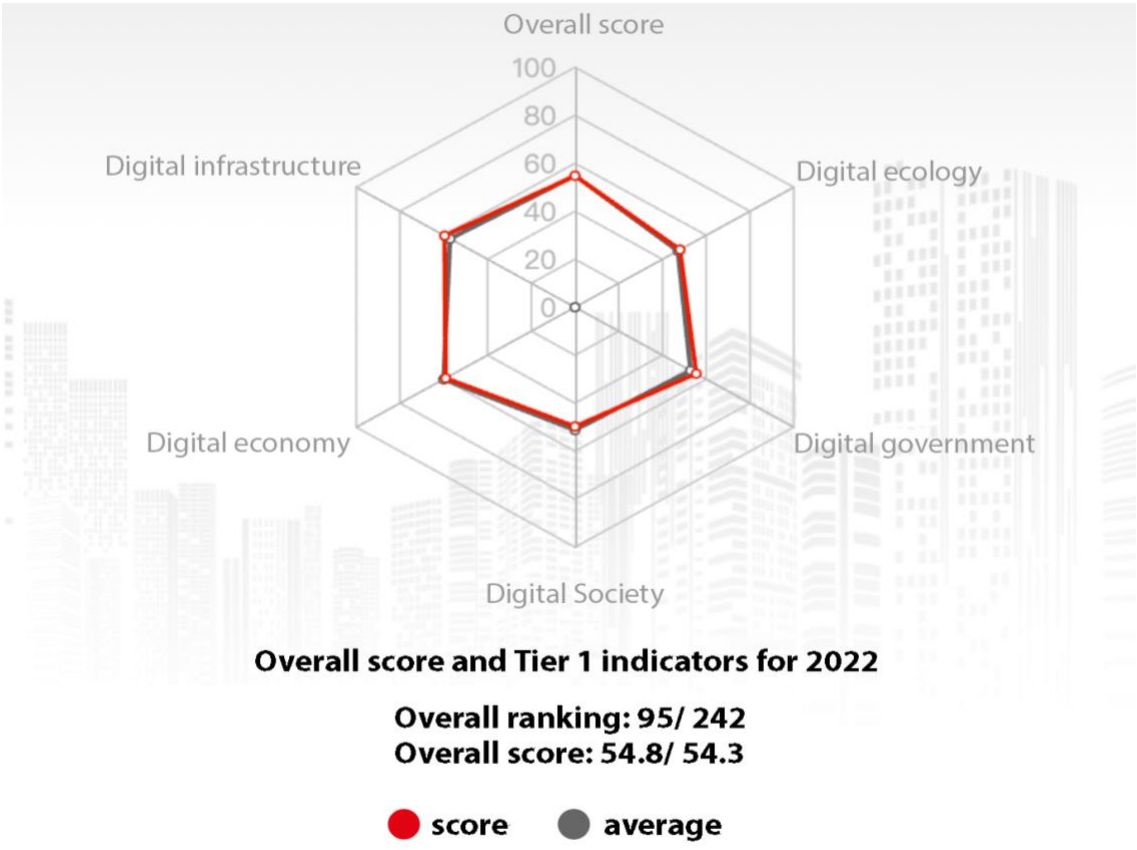


Figure 12 Age Distribution Comparison across Chinese Cities

Economic development: Guilin is in the middle of the national GDP rankings and is ranked 136th out of 355 cities in China's GDP rankings in 2021 (21 Data Journalism Lab, 2021). China's City Business Attractiveness Ranking study measures the business attractiveness of Chinese cities at prefecture level and above based on five dimensions: concentration of business resources, urban hubs, activeness of urbanites, diversity of lifestyles and future plasticity. According to City Business Attractiveness Ranking 2021 (YICAI China Business Network, 2021), Guilin falls into

China's Tier 3 cities (out of a total of five tiers). This medium level of economic development status means that Guilin is neither among the cities with the most prominent economic development (e.g., Tier 1 cities such as Beijing and Shanghai) nor among the more economically backward regions, which makes the results of the study more generalisable.

Digitalisation of Cities: China's Digitalisation of Cities Index assesses the level of digitalisation of Chinese cities, with 242 cities scoring an average of 54.3. Guilin scored 54.8 and ranked 95th out of 242 cities (Digital China Institute, 2022); its score and ranking are close to the national average. This moderate level of digital development status reflects that Guilin is similar to most Chinese cities in terms of technology infrastructure and access to digital services. This provides a typical setting for studying the digital lives of older people in China and can effectively shed light on how the older population in Chinese cities in general accepts and uses digital technologies, as well as the challenges and opportunities they face.



Combined with these three aspects, Guilin is an 'average' city in China, with a medium level of demographics, economy, and digital development, which makes the results of this study a good reflection of the general status of the digital life of the older population in medium-sized cities in China, and thus of high reference value and practical significance.

Geographic Scope of Quantitative Study

The quantitative component of this study draws on data collected at the national level. The CGSS 2017 dataset covers 31 provinces, autonomous regions, and municipalities in mainland China (excluding Hong Kong, Macau, and Taiwan), while the online questionnaire collected responses from participants across 18 provinces. Although the quantitative component draws on nationwide data, the secondary analysis and online survey primarily served to inform the design of the qualitative research guide and to provide a preliminary understanding of the digital everyday lives of older adults in China. Given the relatively small sample size, the representativeness of the data and results is limited. The primary aim of this study is to explore older adults' digital everyday lives through an in-depth analysis of qualitative data. Geographically, the findings are more applicable as references for cities similar to Guilin—those with medium levels of urbanization, economic development, and digital infrastructure within the Chinese context.

3.5.2 Research participants

As introduced afore, this study focuses on the exploration of digital use and experience of Chinese older adults. Therefore, participants are required to meet specific criteria regarding age and digital usage. In China, the typical retirement age for elderly people in China is 55 for women and 60 for men. According to the Law of the People's Republic of China on the Protection of the Rights and Interests of older adults, older people refer to citizens aged 60 and above in China. Therefore, participants in this study were set at the age of 60 and above. Accordingly, this study invited participants who are not only aged 60 and above, but also already have had the access to internet with internet-enabled devices like smartphones or tablets in China.

Sampling Methods

The survey in this study employed an opportunity sampling process. Opportunity sampling, also known as convenience sampling, identifies and accesses data sources by utilising the researcher's knowledge, familiarity with an area, or past experiences to engage participants or gatekeepers (Brady, 2006). This method is commonly employed in studies involving older adults (e.g., Zhang & Velez, 2022; Soar & Su, 2014; Nazari et al., 2020). In the context of this study, opportunity sampling was particularly appropriate for investigating older digital users in urban China. As Brady (2006) notes, social researchers often employ this method to study hidden, vulnerable, or hard-to-reach groups, especially those underrepresented or lacking a formal presence in institutional records. Silver netizens, as older digital users, fit this description. For me, older digital users represent a group that is challenging to access directly. However, I was able to leverage my personal network to connect with these local participants, thereby ensuring

the collection of meaningful and relevant data. Consequently, participants were recruited via social networks such as WeChat Moments, where individuals were invited to share the questionnaire with friends or acquaintances who met the study criteria: aged 60 and above and with experience using digital devices and the internet. While the survey set an age range, it did not impose any geographic restrictions. Based on location data provided by Qualtrics, respondents came from 18 provinces, autonomous regions, municipalities directly under the Central Government and special administrative regions in China (Shanghai, Yunnan, Beijing, Sichuan, Tianjin, Shandong, Shanxi, Guangdong, Guangxi, Jiangsu, Jiangxi, Hainan, Fujian, Guizhou, Liaoning, Chongqing, Macau and Hong Kong). In contrast, the CGSS 2017 dataset covers 31 provinces, autonomous regions, and municipalities in mainland China (excluding Hong Kong, Macau, and Taiwan). When comparing the results of this survey with CGSS 2017, the findings reveal similarities in the most frequently used online functions among older internet users. In CGSS 2017, the most common activities were Social Activity, Information, and Leisure & Entertainment (see 4.2.1), while in this survey, the top three functions were Information, Leisure & Entertainment, and Social Activity (see 4.2.2.3). This alignment indicates that the core online behaviours of older adults remain consistent across datasets. The opportunistic sampling method facilitated the rapid dissemination of the survey and helped to reach the target demographic. However, this approach introduced inherent limitations regarding representativeness. For instance, participation relied on social media connections and voluntary responses, potentially biasing the sample toward individuals who are more digitally and socially active. Consequently, while the survey provides valuable insights into the digital practices of older adults, sampling constraints should be recognised. Moreover, in studies involving older adults, the limitations of online questionnaires can be significant and should be approached with caution. The limitations of the online questionnaire method are further discussed in Section 7.2.3 of this thesis.

The participants for the interviews and focus groups were recruited using a combination of opportunity sampling and snowball sampling approaches. Initially, participants were identified through personal networks, social media platforms, and organisational retirement departments. These initial participants were then encouraged to recommend others who met the study criteria, including being aged 60 and above and having experience using digital devices and the internet. This approach proved particularly effective in reaching older adult participants, however, while this method facilitated access to individuals relevant to the study, it also has inherent limitations concerning representativeness. For instance, recruitment through personal networks, organisational connections, and snowball sampling could introduce potential biases, such as an

increased likelihood of recruiting participants from similar social or (higher) educational backgrounds.

Participants in Online Questionnaire

See from Table 1, a total of 342 responses were made to the questionnaire, and 160 valid entries were obtained from users aged 60 and above. Among the 160 respondents, 64 were male, 92 were female, and 4 identified as 'other' or 'preferred not to say'. The age distribution was as follows: 74 participants were aged 60-64 years, 56 were 65-69 years, and 30 were 70 years or older. Regarding educational background, 13 individuals have an education level of primary school or below, 21 have completed secondary school, 48 have high school or technical secondary school education, 74 have undergraduate or college education, and 4 have postgraduate education or higher.

Table 1 Online Respondents Statistics

Age	**Number of Participants**	**Gender**	**Number of Participants**
60-64	74	Male	64
65-69	56	Female	92
70 and above	30	Other	4
total	160	total	160

Education Level	**Number of Participants**
Primary School and below	13
Secondary School	21
High School / Technical secondary school	48
Collage Edu / Undergraduate	74
Postgraduate	4
total	160

Participants in Interviews

Table 2 provides an overview of the background information of interview participants, including their gender, year of birth, age, education level, and whether they are an only-one child parent. There are 8 male, and 7 female participants took part in the interviews. 7 of them aged 60-64, 5 were 65-69, and 3 of them were age 70 and above. Out of the 15 participants, 11 had a

college/undergraduate level of education or higher, with one having a postgraduate degree. 3 participants had a high school/technical secondary school education level and 1 had primary school level. Only 2 participants have more than one child among all the participants.

Table 2 Interview Participants Background Information

Participant NO.	Gender	Year of Birth	Age	Education	Only-one Child
IP001	Female	1958	64	Collage Edu / Undergraduate	Yes
IP002	Female	1951	71	Collage Edu / Undergraduate	NO
IP003	Male	1958	64	Postgraduate	Yes
IP004	Male	1955	67	Collage Edu / Undergraduate	Yes
IP005	Male	1954	68	High School / Technical secondary school	Yes
IP006	Female	1956	66	Collage Edu / Undergraduate	Yes
IP008	Male	1959	63	Collage Edu / Undergraduate	Yes
IP009	Female	1960	62	High School / Technical secondary school	Yes
IP010	Male	1950	72	Collage Edu / Undergraduate	Yes
IP011	Male	1962	60	Collage Edu / Undergraduate	Yes
IP012	Female	1952	70	Collage Edu / Undergraduate	Yes
IP013	Female	1954	68	Collage Edu / Undergraduate	Yes
IP014	Male	1953	69	Primary School	No
IP015	Male	1960	62	Collage Edu / Undergraduate	Yes
IP016	Female	1962	60	High School / Technical secondary school	Yes

Participants in Focus Groups

Five focus groups have been organised in this study, involving 25 participants. Table 3 provides the background information of focus group participants. There are 15 female participants and 10 male participants, aged from 60 to 73 years. Regarding educational background, 13 participants have a high school or technical secondary school education, 10 have a college or undergraduate education, and 2 have a junior high school education.

Table 3 Focus Group Participants Background Information

Group NO.	Participant NO.	Gender	Year of Birth	Age	Education
FG01	FG01-01	Female	1962	60	Collage Edu / Undergraduate
	FG01-02	Male	1958	64	Collage Edu / Undergraduate
	FG01-03	Female	1956	66	Collage Edu / Undergraduate
FG02	FG02-01	Male	1962	60	Collage Edu / Undergraduate
	FG02-02	Female	1962	60	High School / Technical secondary school
	FG02-03	Female	1958	64	Collage Edu / Undergraduate
	FG02-04	Female	1959	63	Collage Edu / Undergraduate
	FG02-05	Male	1962	60	Collage Edu / Undergraduate
FG03	FG03-01	Female	1952	70	Collage Edu / Undergraduate
	FG03-02	Female	1950	72	High School / Technical secondary school
	FG03-03	Male	1956	66	High School / Technical secondary school
	FG03-04	Male	1958	64	Secondary school
	FG03-05	Male	1955	67	High School / Technical secondary school
FG04	FG04-01	Female	1956	66	Secondary school
	FG04-02	Male	1955	67	High School / Technical secondary school
	FG04-03	Female	1960	62	High School / Technical secondary school
	FG04-04	Male	1959	63	Collage Edu / Undergraduate
	FG04-05	Female	1961	61	High School / Technical secondary school
	FG04-06	Female	1957	65	High School / Technical secondary school
FG05	FG05-01	Female	1962	60	High School / Technical secondary school
	FG05-02	Female	1958	64	High School / Technical secondary school
	FG05-03	Female	1949	73	Collage Edu / Undergraduate
	FG05-04	Female	1959	63	High School / Technical secondary school
	FG05-05	Male	1957	65	High School / Technical secondary school

	FG05-06	Male	1950	72	High School / Technical secondary school

3.5.3 Data collection

The field work for this study was conducted in the first half of 2022, comprising three phases: a questionnaire in February, interviews in March and April, and focus groups in June. This period coincided with the ongoing impacts of the COVID-19 pandemic, during which China implemented a region-specific risk management system, categorising areas as high, medium, or low risk based on local outbreaks. Even in low-risk areas, people were required to take preventive measures and avoid gatherings. These measures added challenges to the fieldwork, particularly in participant recruitment and the organisation of focus groups. Participants expressed more concerns when invited to join, especially for group activities involving multiple attendees. During several in-person interviews and focus group discussions, both the participants and I wore masks. Discussions about the progression of the pandemic and its impact on society and digital technology use often emerged during the warming-up sessions of interviews and during breaks in focus groups. At the same time, this study took place during a period of rapid digital development in China, characterised by the widespread adoption of 4G and 5G networks and the prevalence of digital platforms such as WeChat, Douyin (TikTok), and Alipay. The outbreak of COVID-19 further highlighted the challenges posed by the digital divide, and government initiatives aimed at promoting digital inclusion for older adults gained momentum, encouraging more seniors to participate in digital society. Though the outbreak of COVID-19 added challenges to the fieldwork, these contextual factors created a practical opportunity for this research and shaped its unique significance within the broader social and technological landscape. The following sections will detail each step of the data collection process.

Step-1 Secondary data analysis: The analysis of secondary data and questionnaire responses serves as references for qualitative research, providing a descriptive analysis of the digital usage landscape among Chinese older adults. Initially, a secondary data analysis was conducted based on the open data from the Chinese General Social Survey 2017 (CGSS 2017).

The Chinese General Social Survey (CGSS) is the first nationwide, comprehensive, and continuous large-scale social survey project in China. It is managed and executed by the National Survey Research Centre (NSRC) at Renmin University of China. It aims to systematically and regularly collect data on various aspects of Chinese society and individuals, enabling the study of long-term social trends, addressing critical theoretical and practical issues, and fostering

openness and data sharing in domestic social science research. Additionally, it provides valuable data for government policymaking and international comparative studies (Chinese National Survey Data Archive, 2020). According to the sampling scheme released by the CGSS, the target population of this survey includes all urban and rural households across 31 provinces, autonomous regions, and municipalities in mainland China (excluding Hong Kong, Macau, and Taiwan) (CGSS, 2010).

The CGSS 2017 dataset, released on October 1, 2020, coincided with the commencement of this research. It served as a key source for secondary data analysis and as a reference for designing this study's questionnaire. While subsequent datasets from CGSS (e.g., 2018 and 2021) were released in 2022 and 2023, they were not utilised in this research for two primary reasons. Firstly, at the time of research design, these later datasets were not yet publicly available. Secondly, the 2018 and 2021 datasets do not include the "Module C: Internet and Society," which is a critical focus of this study (Chinese National Survey Data Archive, 2021; 2022). According to the official description from CGSS, the 2017 data modules A and C contain questions regarding individuals' internet usage. These modules are described as providing "rare, nationally representative individual-level data on internet usage in China" (Chinese National Survey Data Archive, 2020). Researchers from domestic and international institutions, university faculty, and students can freely access and download the latest CGSS datasets for research after registering on the official website cgss.ruc.edu.cn.

It is worth noting that, though CGSS 2017 dataset included a total of 12,582 valid responses, only 291 responses were from individuals aged 60 and above who use the internet. While this subset is relatively small, it is worth noting that CGSS is a nationally representative survey, employing rigorous multistage stratified random sampling. This lends credibility to the data, even within smaller demographic subsets, and ensures it provides valuable reference for understanding older adults' digital practices. Besides, in early 2021, the outbreak of COVID-19 drew academic attention to the digital divide among older adults in China. Given that research in this field was still in its infancy in China that time, data on internet usage among Chinese older adults was extremely limited. Under such circumstances, the 291 samples from CGSS 2017 provide significant reference value for this study, serving as a useful resource to explore the current state of digital engagement among this demographic. While the findings should be interpreted with caution, the data is instrumental in providing a foundational understanding of older adults' digital practices and informing my further qualitative research.

It also needs to be clarified that, in this study, CGSS 2017 data was primarily used as a reference for designing the questionnaire. To further inform the qualitative research phase, particularly in identifying relevant topics for discussions with older participants, this research also analysed Question C42 from CGSS 2017, which focuses on the internet activities of older adults (discussed in 4.2.1). This analysis allowed for a more targeted exploration of older adults' digital practices and enabled meaningful comparisons between CGSS findings and the results of this study.

Step-2 Online Questionnaire: An online questionnaire was developed for this study, drawing on insights from secondary data analysis and established frameworks. The questionnaire surveyed the daily digital routines of older adults, including the types of digital devices they use, the functions they utilise, their primary activities and locations, self-assessed digital skills, and the impact of digital usage on their lives. Additionally, it explored older adults' attitudes towards digital technology and their perspectives on future technological developments. The questionnaire was designed to target Chinese individuals aged 60 and above who have experience using digital devices (such as mobile phones, tablets, and desktop computers) and digital services (e.g., social networking, online shopping, online entertainment) in their daily lives. The survey was distributed via social networks such as WeChat Moments, inviting participants to share the questionnaire with eligible friends. A random sampling method was employed, but the invitation clearly specified that the questionnaire targeted "silver netizens," referring to internet users aged 60 and above. The design of the online questionnaire used in this study is detailed in Appendix C. The questionnaire drew on the "Internet Society" section of the Chinese General Social Survey (CGSS) questionnaire, from Questions C37 to C66 (see Appendix E). Additionally, key aspects of older adults' digital everyday life were identified through the literature review and incorporated into the questionnaire. The questionnaire (Appendix C) comprises four parts. Part A collects personal background information, while Parts B, C, and D are structured around the three levels of the digital divide framework: Access, Use, and Impact. These sections aim to explore older adults' Digital Access, Digital Use Patterns and Capacity, and Digital Use Impacts, respectively. This design not only provides insights into the digital practices of older adults in urban China but also supports answering RQ1 and RQ2. Furthermore, the findings from the questionnaire serve as a foundation for developing interview guides for subsequent in-depth interviews and focus groups in the qualitative phase of the study. The questionnaire was distributed via Qualtrics, a platform approved by the University of Southampton. The questionnaire was designed and completed in Chinese to ensure clarity and cultural relevance for the target demographic of Chinese digital users aged 60 and above, particularly given the widespread lack of English proficiency among this generation in China. A translated version is provided in Appendix C for reference. Before distribution, the questionnaire was tested by three

volunteers aged over 60. They reported that they completed the questionnaire within 10–15 minutes. Based on their feedback, several adjustments were made. The font size for the informed consent and questionnaire content was increased for better readability. Some question formats were revised to improve usability. For instance, the scoring method for digital use and experiences (Sections C2 and D1) was originally designed as a matrix table, a format more suited to paper-based surveys. However, in the online version, the dropdown interactions required for matrix tables proved cumbersome for older participants. To address this, the matrix table format was replaced with a single-choice question format, making it easier and more intuitive for older adults to respond.

Step-3 In-depth Interviews: One-on-one semi-structured interviews were employed to explore Chinese older adults' digital use and experiences in their everyday lives. The interview questions focused on older adults' experiences of digital use, daily patterns, personal experiences with digital technology, and perceptions of their daily lives with digital technology. The Semi-Structured Interview Guide can be found in Appendix A. The guide for in-depth interviews was designed based on the three-layer framework of the digital divide (access, use, and impact), with some prompts derived from the secondary analysis of the questionnaire results. For example, questions such as "*Has digital usage generated impacts on your daily life? In what aspects and how are you affected? (e.g., social & participation, leisure & entertainment, shopping & business, transportation & travel, health & medical care)* "were inspired by findings from quantitative analysis. The primary purpose of the interview questions was to address Research Questions 1 and 2:

RQ1: What are the key dimensions (activities/functions) and venues (places/spaces) of older adults' digital everyday life in urban China?

RQ2: What digital experiences (practice and user experience) do older adults in urban China have in their everyday life?

In practice, my interviews consist of two main parts: 1) older people's experiences of digital use in their daily lives, including the history of digital use, habits of digital use in their daily lives, difficulties and successes, and the impact that digital technology has had on their daily lives; and 2) I discussed with participants the future development of digital technology, and discuss how to improve older people's use and experience of digital technology to promote well-being in later life. There were 15 participants who took part in the one-on-one interviews. Considering the Chinese government's pandemic prevention policy to COVID-19 (this study was conducted in March 2022, when the Chinese government still had measures against COVID-19), I confirmed with the participants that both do not have any symptoms and are in good health condition two days before the interviews. On the day of the interview, the study began after the participant confirmed

informed consent and signs a consent form. All the interviews have been audio- and video-recorded for data analysis. Each interview lasted approximately 60 to 90 minutes.

Step-4 Focus Groups: Focus groups were organised to explore older users' views on their daily digital experiences, digital interactions and differences with younger generations and digital inclusion. The Focus Group Discussion Guide can be found in Appendix B. The focus group discussions were primarily divided into two main themes: intergenerational digital interactions and intergenerational digital differences. These topics were informed by literature on *warm experts* and the digital intergenerational divide, as well as insights from the in-depth interviews. Since the focus groups were conducted after the interviews, a preliminary review and analysis of the interview results helped identify additional topics for exploration in the focus groups. For instance, questions like "*Do you know what 'digital literacy' is? Is 'digital literacy' important? Why?*" were developed based on interview findings. The focus group topics were designed to mainly explore Research Questions 3 and 4:

RQ3: How do older adults in urban China perceive intergenerational digital interactions and differences?

RQ4: What suggestions do older adults in urban China have for improving digital living?

Ultimately, five focus groups were organised involving 25 participants, with each group consisting of three to six participants. I moderated the group, organising the discussion but striving to participate minimally. Participants were encouraged to share their views on the topic. Throughout the focus group sessions, I proposed topics for discussion, ensuring the smooth flow of conversation and guaranteed all participants could express their opinions. COVID-19 consideration and measure of focus groups was same as the interview studies. On the day of the focus group, the study began after the participants confirmed informed consent and signed the consent forms. All the focus groups have been audio- and video-recorded for data analysis. Each focus groups will last approximately 90 to 120 minutes.

3.5.4 Data analysis

Quantitative statistics: Data form open data set and questionnaire were used in descriptive statistical analysis to illustrate the digital-use landscape of Chinese silver netizens. The statistical and visualisation tools on Qualtrics was employed to conduct the data analyses.

Qualitative analyses: Qualitative data analysis mainly includes the process of text transcription and coding. After completing the interviews and focus groups, I transcribed and proofread the

interview and focus groups. The process of transcription is also a process of returning to the research site, which helped me deepen my understanding of the participants. The second phase is coding. I employed Thematic Analysis (TA) to identify and interpret patterns of meaning (themes) within the data. Renowned for its accessibility and flexibility, TA is applicable across a wide range of theoretical frameworks and research paradigms (Clarke & Braun, 2016), and it accommodates various sample sizes and diverse data types, such as interviews, focus groups, and qualitative surveys (Braun & Clarke, 2013). Firstly, the theoretical and practical flexibility of TA makes it an ideal tool for analysing the data in this research. As Braun and Clarke (2006) suggested, researchers can code data with a focus on a highly specific research question, allowing the analyst to take the lead in conducting a detailed examination of a particular aspect of the data. My four research questions and the interview and focus group guides were developed based on the theoretical framework, according to Braun and Clarke (2006), my study aligns more closely with what they describe as a "theoretical" thematic analysis. This makes TA can a suitable analytical tool for my study. Secondly, as Clarke and Braun (2016) note, TA can be used to explore participants' lived experiences, views, and practices, as well as to understand what participants think, feel, and do—an approach that aligns closely with the goals of my research on older adults' digital everyday lives. In my study, TA not only provided a systematic method for coding but also offered a robust framework to deeply explore how older adults construct and attribute meaning to digital technologies within specific social and cultural contexts.

Accordingly, the qualitative data analysis for this study was conducted using NVivo software, following the six-step process outlined by Braun & Clarke (2006) to ensure a systematic and rigorous approach. First, all data collected through interviews and focus groups were transcribed. I repeatedly read these transcripts to gain understanding of the overall structure of the data, while noting initial ideas and identifying potential codes and themes. After familiarising with the data, I systematically coded key features of the data that were relevant to the research questions. These codes highlighted topics of significance discussed in the interviews and focus groups, such as the specific activities older adults engage in as part of their digital everyday lives (e.g., *Check My Phone When I Wake Up; Managing Chronic Disease*), the applications and platforms they frequently use (e.g., *WeChat, Alipay, Toutiao*), their attitudes toward technology (e.g, *Felt Anxious Without Smartphone, Worry About Online Fraud*), and the meanings attributed to digital technologies (e.g, *Cannot Cope With Daily Task Without A Smartphone*; *Study Room- To Learn And* Develop), especially smartphones and the internet and practices within their social and cultural contexts. Once initial coding was complete, related or similar codes were collated into potential themes (e.g, *The 'Good Places' in the Digital World*), which were then preliminarily

defined and categorised. During the theme review phase, I evaluated the alignment between themes and specific coded extracts, ensuring that each theme accurately captured relevant data (e.g, I adjusted *Intimacy with Smartphones* into *Smartphones-A Gateway to Digital Everyday Life,* emphasising the centrality and significance of smartphones in silver netizens' digital everyday lives, rather than focusing solely on their emotional attachment). This stage also involved creating an initial hierarchy of themes within NVivo, organised them into different topics, which helped visualise the relationships between themes and the overall structure of the thesis. Then, I refined and clearly defined the core content of each theme, assigning clear and meaningful names that effectively conveyed the underlying ideas (e.g., refine *Digital Leaders* into *Digital Leaders Among Seniors*). Based on the results of the thematic analysis, I selected representative and compelling data extracts for further in-depth analysis. These excerpts were used as quotations to illustrate key findings in the research, contributing to a detailed and meaningful interpretation of older adults' digital everyday lives. Overview of all themes, codes, code definitions, and coded data examples can be found in Appendix F.

3.6 Ethical Considerations

This research complied fully with the university's regulations on research ethics to make sure the research can be approved by the research ethics committee or other concerned department, all the research process followed the guidance provided on recruitment, participant information, informed consent, participant anonymity and data storage etc. The *ERGO* application (*Submission ID: 64859*) has *been approved on 2nd February 2022*. Considering this study will be conducted among Chinese older adults, all the ERGO application documents are available in both English and Chinese. Measures were taken to avoid invasion of privacy and other improper conducts. First of all, Participant Information Sheet and Consent Form were prepared before the questionnaire or interview to inform the participants of the research contents and process, and the studies were conducted with the agreements of the participants. Secondly, all the participants were coded to be anonymous to avoid the invasion of their privacy. Thirdly, the research results discussion and presentation will avoid discriminations and guarantee anonymities.

I had set up a specific WeChat account for the study. All communications between participants and researcher including before, during or after the study were through this WeChat ID. This ID was presented in participant recruitment letter on social media and local public bulletin boards, as well as the start and the end of the questionnaire. People who are interested in participating in this study could contact the research via WeChat to get more information about the study.

Questionnaire participants were given PIS and consent form automatically by the questionnaire platform Qualtrics before they start the online questionnaire. There is a system requirement for the consent form to be completed before the questionnaire is provided. Participants for interviews and focus groups were given the PIS and Consent Form before the interviews and focus groups begin.

Online questionnaire did not collect participants' names; Interviews and focus groups did collect data of participants' basic information like names, genders, ages, education levels, incomes, ownership of digital devices; digital habits and preferences, barriers, and accomplishments of using digital technologies; feelings, and the impacts of using digital technologies on their daily lives, etc. Besides, Transcriptions and notes of interviews and focus groups were documented in MS Word documents. The audio and video data were destroyed after transcriptions. All these raw data mentioned above which involving 'personal data' from participants will be stored in OneDrive and accessed only by my own university email.

Summary

This chapter provides a detailed introduction to the methodology of the study, including research philosophy, research questions, research design, research methods, and research ethics. Firstly, this study adopts a moderate stance of social constructionism as its research philosophy. Social constructionism posits that individuals' understanding of their experiences transcends conventional social understanding, emphasising the significance and importance of personal life experiences. In this context, this philosophy is used to explore older adults' digital use experiences in their daily lives. From an ontological perspective, this study views knowledge both as an objectively existing social reality and as subjectively constructed thoughts and experiences. This implies that knowledge is not only an objective fact but also a construction of subjective experience. Epistemologically, the study adopts moderate constructionism (Schwandt, 2000), emphasizing that individual experiences are constructed under the influence of sociocultural, historical, and other factors, while also embracing contextual empiricism (Longino, 1993), which stresses that the methods for processing data and linking evidence with hypotheses are contextual, involving subjective assumptions that integrate social values and ideologies. This research philosophy aims to provide a comprehensive understanding of older adults' digital life experiences, exploring both macro-level social realities and individual subjective experiences, thereby deeply examining and revealing older adults' behaviours and experiences in a digital environment.

The research questions section analyses and introduces four research questions to be explored through social constructionism methods. Firstly, the research will explore key activities, functions, and the commonly used digital platforms and spaces of older Chinese netizens. Second, the study will delve into older adults' digital experiences in their daily lives, including their feelings about using digital technologies and the meanings they attribute to their digital practices. Additionally, the research will explore how older adults perceive digital differences between generations and how these differences impact their social constructions. Finally, the study will investigate older adults' suggestions for improving digital living, aiming to explore how to achieve a more inclusive and better digital future from the perspective of social constructionism with the older adult group.

In the research design section, the strategy and procedures of this study were introduced. This study employs a mixed-methods strategy, designed under a moderate social constructionism paradigm, which acknowledges that knowledge can be both an objective social reality and a socially constructed experience and meaning. Under this framework, the study will explore older adults' everyday digital experiences through qualitative methods such as in-depth interviews and focus groups, while also using quantitative methods to support data triangulation and help formulate interview guidelines. Mixed methods help to deeply understand older adults' digital usage and resolve any inconsistencies between quantitative data analysis and qualitative research findings, thereby more comprehensively revealing the significance of digital technology for older adults. However, though both quantitative and qualitative methods are employed, the central role of qualitative research was emphasised.

Finally, this chapter illustrated the data collection and analysis process of the study. It covers four detailed steps aimed at deeply understanding the digital usage and experiences of older Chinese adults. Firstly, key variables related to older adults' digital use are defined through an analysis of publicly available data from the Chinese General Social Survey (CGSS), which also aids in designing the subsequent online questionnaire. Next, based on the results of this data analysis, an online questionnaire is developed to thoroughly investigate older adults' daily digital habits, including the types of digital devices they use, the functions they utilise, and the main locations of these digital activities, as well as their assessments of their digital skills and the impact of digital usage on their lives. Then, through one-on-one semi-structured in-depth interviews, the study explores older adults' digital use experiences and perceptions, focusing on their daily patterns and personal experiences with digital technology. Lastly, focus group discussions are organised to further explore older users' views on their everyday digital

experiences, digital disparities, and digital inclusion. Additionally, quantitative data are used in descriptive statistical analyses to depict the digital usage landscape of Chinese silver netizens, while qualitative data analyses include text transcription and coding using the Constructing Grounded Theory coding strategy to deepen the understanding of participants' experiences.

In all, from a perspective of social constructionism, this study emphasises the importance of qualitative research. In exploring the digital daily lives of older adults, qualitative research methods help to see the trees (individuals) within the forest (whole ageing group), allowing for an in-depth understanding of each older adult's unique experiences and perceptions in the digital world, and constructing their understanding and meaning of their digital daily lives. Through in-depth interviews and focus group discussions, this research seeks to capture the personalisation and diversity of older adults' digital lives, as well as collective generational opinions, providing more comprehensive and specific insights into the study of digital use among older adults.

Chapter 4 See the Forest and the Trees: Chinese Silver Netizens' Digital Everyday Lives with Smartphones

The first thing they do every day when they wake up and the last thing they do before going to bed is to check their mobile phones; the first thing they do after going out and taking pictures is to share them on social networks; they initiate, organise and participate in events via online groups; they pay with their smartphones and manage their money through e-banking; they buy clothes, household items and groceries online; they purchase discounted goods through group-buying platforms; they book hotels online; they use news aggregators as for news and information; the first thing they do when they encounter a problem is to check it out on search engines to see how to solve it; they feel uneasy and anxious when they are away from their smartphones…If you think these experiences came from the so-called 'digital natives' (the generation born after the advent of computers), you have obviously misjudged. The above description is just about some digital experiences of some Chinese older users in their digital everyday life. Older people are not outdated; it is the patronising prejudices that are. It is inappropriate to use the terms 'digital natives' and 'digital immigrants' to define different age groups, which is a form of ageism. It would be more interesting and meaningful to explore the significance of digital technology and digital use to them rather than focus on what they failed to do digitally. It can be argued that older users are not immigrants or refugees in the digital world, but rather digital residents who are leading their own unique and diverse digital daily lives and can be called silver netizens.

Introduction

Smartphones have become the main connected devices for silver netizens in the digital world. With the support of smartphones and mobile Internet, silver netizens are able to experience a rich and colourful digital life.

This chapter primarily draws on data collected through in-depth interviews with participants. It analyses the digital daily life experiences of silver netizens and explore how digital technology has profoundly affected their lifestyles. Section 4.1 focuses on the history of silver netizens' interactions with technology before they retired, analysing the pre-retirement digital experiences of those born in the 1950s and 1960s and the challenges they faced, such as the problem of the complex Chinese input. Section 4.2 will sketch the landscape of digital everyday life of silver netizens with general findings from both quantitative and qualitative research. Section 4.3 focuses on the central role of smartphones in older people's lives, describing how smartphones are the gateway to the digital world for older people. Section 4.4 analyses the main activities and spaces of older people in the digital world, covering social interaction, information access, online shopping and leisure, revealing the important places of silver-haired Internet users in the digital world. Then, the section 4.5 will introduce the concepts of some 'good places' in silver netizens digital daily life. Finally, Section 4.6 highlights the heterogeneity of older people's digital through the NVIVO data visualisation results, revealing the individuality and diversity of silver netizens digital activities and application choices.

4.1 Settled Down in The Digital World: A Brief Introduction of Silver Netizens' Digital Use Experience Before Retirement

The arrival of *mobile epoch* (Naughton, 2021) activated Chinese older users. By the end of 2021, the proportion of silver netizens (aged 60 and above) using smartphones for Internet access reached 99.5%, far exceeding those of desktop computers (17.7%) and laptops (12.4%) (CNNIC, 2022). Consistently to this, the result of online questionnaire within this project demonstrates that the most frequently used Internet access device by silver netizens is also the smartphone. Social transformation and technological development in the past decades in China have generally influenced the digital use pattern of this generation.

As stated in the Chapter introduction, due to the later start of internet development in China compared to developed countries, Chinese born in the 1950s and 1960s largely began their engagement with the internet only after the popularisation of smartphones, missing out on the initial wave of the PC and internet era. Therefore, this generation is unfamiliar with the operation of computers. In addition, some conventional digital tools, such as email, which had been used in Western countries since the early days, never became popular among this generation. Although a few of them have tried to use email, it did not become a mainstream office routine in China at that time. In fact, even in today's China, companies and organisations prefer to use instant messengers like QQ for work communication rather than email. (Guo et al., 2021)

With the progress of the Internet development in China, some of this generation was driven by the demands of their jobs to adapt to a digital office environment, although they were gradually approaching retirement age. The complexity of Chinese input and their lack of knowledge in basic computer operations certainly made this a huge challenge. Difficult and troublesome was their general impression of computer operation. The participants in this study had a very limited history of digital use in the PC Internet era.

4.1.1 Limited experience with computer and internet before retirement

During the interviews, participants shared their digital use history with me. All the participants had experiences of digital use before retired, but in general, they have very *Limited Experience with Computer and Internet Before Retirement*. Besides Internet, a few participants also mentioned that they had used intranet or *LAN (local area networks)* within their work units and organisation. In terms of hardware, most participants used desktop computers during their work, while some had experience using laptops for office work. In regard of software applications, they predominantly used Tencent QQ and Microsoft Office. It is worth mentioning that, in the age when they were working, even in urban China, email is not frequently used in the workplace.

Few participants in this study reported that they had any experience of employing email at work, nor did they use it in their retirement. Only three of them mentioned that they had used email at work, and coincidentally they were all university or college staffs. In her previous job role, IP001 was a university administrator. She informed me that her job involved organising students to participate in national-level competitions. She needed to communicate about competition

documents and organise student participation through email. This required the use of both email and MS Word document functionalities. IP003, a university professor, told me that he used to use email in his former job of supervising students, but subsequently found Tencent QQ (abbreviated as QQ) more convenient. He also talked about his experience with email and QQ, as well as the reason why he turned to QQ finally:

> *'Yes, email. But then QQ came out, and o lot of people started using QQ. For example, when I was supervising students in writing their dissertations and communicating with them for other issues, most of the communications were done through QQ because it was more convenient. Initially, we used emails, but later we found that emails were not as convenient as QQ.' (IP003-M64)*

IP010 also mentioned his early experience with email. However, according to the result of interviews, few Sliver Netizens in China have experience of using email.

In fact, email is also less commonly used in the workplace in China. The reasons for this are complex. On the one hand, it is because of China's history of technological development. China's internet development was late, and during the boom in the West, the internet in China progressed at a slower pace. According to CNNIC's 51st report, as of December 2022, the number of Internet users in China was 1.067 billion and the Internet penetration rate reached 75.6%. However, 20 years ago, in 2002, less than 5% of China's population had access to the Internet (CNNIC 11th Report). But in the UK at that time, 45% of households already had access to the Internet. In developed countries, most companies started using email as a collaborative communication tool in the early days of the Internet, and email was the most common form of communication used in the office. In China, however, the popularisation of the Internet and the emergence of instant messaging software almost happened simultaneously. Chinese people started using instant messaging software before they were able to use email adequately and proficiently. On the other hand, the rapid rise of China's homegrown Big Tech, Tencent, whose products QQ and WeChat dominate the collaborative work of most Chinese companies, had left email as a spare choice.

QQ was one of the first popular instant messaging software in China, and several participants mentioned that they had used QQ in their work and life before retirement. Besides instant message, the QZone (the affiliated SNS function) also provided Chinese with first bite of social networking. In the interview, participant IP006 shared her early Internet experience around 2009. At that time, Tencent's QQ launched an online game called QQ Farm, which allows players to grow various vegetables and fruits in a virtual farm. More interestingly, players can visit other players' farms through QZone, a social networking service, and 'steal' mature crops from them. IP006 recalled that during that time, she often stayed up late to play the game and steal other players' fruits and vegetables. While shareing her experience with QQ and QQ Farm before her retirement, IP006 said:

> *"...We didn't have QQ on our phones that time, we only used it from the computers...I often stayed up late at night to steal others' vegetables." (IP006-F66)*

IP010 introduced how he started his internet journey with QQ. In 2000, before the internet was pervading in China, he could already access the internet with a phone line and use QQ for online contact.

> *"I started using QQ that time and it was quite interesting. I remember the first time I used QQ was in 2000. At that time, the university's network wasn't yet set up, so I had to connect to the internet via the telephone line. Connecting via telephone line was very expensive, so I usually only stayed online for about 10 minutes each time, because it was just like making a phone call (expensive). You know, not every household could have a telephone installed that time; only homes of high-level cadres had them, and a telephone line could cost you 600 RMB, which was not cheap. Although I was just getting started and didn't understand much about inputting Chinese, I was quite confident and just began learning." (IP010-M72)*

Though early digital use experiences were shared in interviews, according to the participants, their experience with computer and internet was still limited. As IP010 stated, internet access was expensive at that time and not everyone could afford for it. In fact, not only the cost of Internet access was expensive, but also the cost of computer purchase was very expensive around 2000 in China. IP002, as a financial officer who used computer to handle financial work for a short time before retired, mentioned that *'computers were not yet popular that time, and it was very expensive to buy a computer'*.

It can be seen from an article and a set of data from 2000 to understand how expensive computers were in China at that time. An old article posted by Wu on *TechSina* in 2001 reviewed the configurations and prices of 'mainstream' and 'entry-level' laptops in the Chinese market at that time:

> *'Laptops around 20,000 CNY are the mainstream products in the current market...For laptops under 15,000RMB we chose the following: the processor must be at least 450MHZ, the size of the ... There is an exception here, that is, the Founder 2100's hard disk is only 4.8GB, looking at its price of less than 9000 CNY, also listed it...such as SONY a laptop only 10.4-inch display, 400MHZ processor is priced at 13,000 CNY! ...As this is the introduction of entry-level laptop products, so some brand-name manufacturers of products such as NEC, DELL has not yet appeared, in the mid-range and high-end products will be introduced when they will make an appearance.' (WU, 2001)*

As seen in Wu's article, a 'entry-level' or 'mainstream' laptop in China cost around 9,000-20000 CNY in 2001, however, according to the National Bureau of Statistics of the People's Republic of China (NBS) bulletin of 2000 (National Bureau of Statistics, 2001), the annual per capita disposable income of urban residents in China was 6,280 CNY in 2000, which means that the price of a computer at that time was almost twice the average annual disposable income of urban residents. Therefore, limited purchasing capacity could be one of the reasons prevented Chinese people from having digital experiences.

Moreover, even those who could afford the high prices of computers and the internet access would be stopped from using PC and internet by one thing at that time: the complex Chinese input method.

4.1.2 Struggling with Chinese character input: it is too difficult to do the typing

It is undeniable that digital differences exist between generations. Although researchers repeatedly emphasise that digital ageism is inappropriate, the fact remains that in the early 21st century PC epoch, China's older population faces more digital challenges compared to younger generations. For example, typing Chinese characters on computers.

Doubé and Beh (2012) found that older adults took significantly more time and made significantly more errors than younger adults in completing typing tasks. Older participants also spent significantly more time looking at the screen while typing, as well as the frequency with which they looked from the keyboard to the screen. However, for older Chinese adults, the fact that 'typing is difficult' is not limited to, or even extends beyond, the difficulty of coordinating eyes (screen) and fingers (keyboard). For them, the challenge is to encode the Chinese characters using the QWERTY keyboard. In the early stages of information technology development in China, the complexity of Chinese input systems often posed significant challenges for many older and middle-aged individuals, preventing them from fully accessing the digital world. During the interviews, participants mentioned *It Is Too Difficult To Do The Typing*.

> *"I don't find it difficult to type anymore, but I did face some challenges when I first started learning to type. I chose to learn five-stroke (Wubi) typing because my pinyin is not very good. If I am not allowed to use Pinyin, it would be difficult for me to type correctly. So, I stuck with the five-stroke input method. I still remember that it took me a long time to memorise that five-stroke components coding list. This would have been around 2002 or 2003, when computers and the Internet first became popular." (IP011-M60)*

Although Chinese users operate QWERTY keyboards similar to those used for English, the process of inputting Chinese characters is far from intuitive. Chinese keyboarding involves a

conversion of characters into keyboard letters, utilising complex methods such as Pinyin and Wubi (five-stroke).

The Pinyin input method is based on the standard Mandarin pronunciation of Chinese characters. When employing Pinyin, users must not only be familiar with the characters themselves but also thoroughly understand the rules of Pinyin pronunciation and accurately input the corresponding letters based on these rules. On the other hand, the Wubi input method emphasises the structural composition of characters. Using Wubi requires users to remember which of the 26 letters on the QWERTY keyboard represents each stroke component of Chinese characters (typically, one key corresponds to 3 to 12 components). During typing, users input the letters that represent the strokes needed to construct the desired Chinese character.

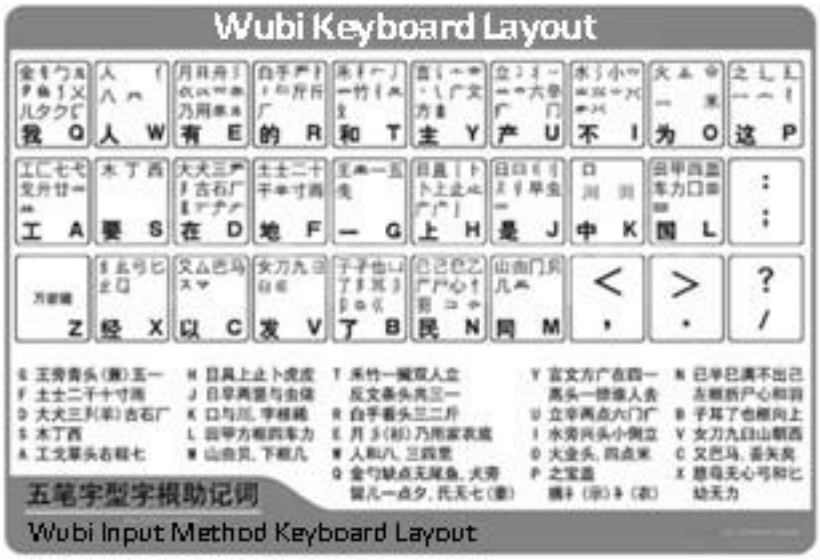


Figure 13 the Five-stroke Chinese Input Method Coding Sheet

Figure 13 is a diagram (Yang, 2023) illustrating the distribution of the five strokes across the keyboard. The top half (keyboard section) displays the corresponding stroke components for each letter key, while the bottom half features mnemonics (similar to poems) to assist users in remembering the combinations.

Compared to Wubi, which requires users memorising a complex *encoding table*, Pinyin input seems much simpler at first glance—it appears that as long as you can speak Chinese, you can type in Chinese. However, the reality is not so straightforward. The Pinyin input method, which uses standardised Latin letters to spell each Chinese character, was actually developed in the

1950s and was not incorporated into elementary education until the 1980s and 1990s, where children began to learn it (Yang, 2023). Therefore, for those born after 1980, Pinyin is undoubtedly a simpler and more widely accepted method of input. But for those born before 1980, to type Chinese on a computer, they need to choose between memorising the complex Wubi encoding table or starting from scratch to learn Pinyin.

Besides, the Pinyin input method requires standard Chinese Mandarin, which means that if you do not have a standard way of typing pinyin, you will not be able to get the right text you want. The pronunciation of Southwestern Mandarin can cause people to misspell the pinyin of words, making it more difficult to type in text. For example, the standard pinyin for *shoe*(鞋子) in Mandarin is *xie-zi*, but in Southwestern dialect, it pronounced as *hai-zi*, as same as *child*(孩子). Consequently, if an older adult from southwest China, similar with some participants in this study, wanted to type the word *shoe* with pinyin but inputted *hai-zi* rather than *xie-zi* on the keyboard, they would get the result *child* (孩子).

In the article *The fascinating evolution of typing Chinese characters*, Yang (2023) discussed in detail how Chinese people use the complex rules of the QWERTY keyboard to type in Chinese. Using the character '犬' (dog) as an example, he evaluated the respective issues with Wubi and Pinyin input.

Regarding the Wubi input method, Yang commented:

> *'Wubi was able to match every Chinese character with a keystroke combination using at maximum four QWERTY keys. It's considered one of the fastest ways to type Chinese, but the downside is also obvious: users need to memorise which keys correspond to which strokes, so the learning curve is quite steep.' (Yang, 2023)*

As for the issues with Pinyin, Yang stated:

> *'…dozens or hundreds of Chinese characters can share the same phonetic spelling. If you type QUAN, the computer has no way to tell which of 81 characters is the one you want.' (Yang, 2023)*

Yes, it seems all roads (input methods) lead to Rome while all roads are challenging. As a result, the lack of Pinyin and Wubi coding skills prevents some Chinese people from inputting text when using a computer. With this limitation, they could only do browsing task online that time, without interactions like giving comments.

> *"I used a computer to access before, mainly searching on the internet, but I don't really know how to type in text, so I just read whatever I found, that's all. Just browsing the websites and read whatever I found interesting." (IP014-M69)*

However, the widespread adoption of touchscreen devices such as smartphones and tablets has greatly facilitated the penetration of internet technology among the older population. Touchscreens and touch control systems provide an easier and more intuitive interaction method for the older users (Levy and Simonovsky, 2016), significantly lowering the technological barrier and allowing those who have never learned Pinyin to easily use smart devices. Currently, the main methods for inputting Chinese on touchscreen devices include Pinyin input, handwriting input, and voice recognition input. Handwriting and voice recognition technologies allow Chinese users to input text on smart devices if they can write Chinese characters or speak Chinese. Of course, both handwriting and voice input systems require users to have a basic ability to recognise characters. Therefore, for elderly individuals who are completely illiterate, instant messaging apps like WeChat that support voice messaging also provide significant assistance.

> *'Smartphone is much easier (than computers) to operate, especially for its direct 'handwriting input'. Computers can have 'handwriting input' too, but you have to install a software first, which is a big trouble for me. While I was still thinking about installing this input software, smartphones became popular. In that case, I'll just need a smartphone and I don't need a computer… text input is a big challenge for me. I haven't received much education, and I don't know how to use Pinyin for inputting.' (IP014-M69)*

4.2 See the Forest: The Landscape of Silver Netizens' Digital Everyday Lives

While I adopt a mixed-methods approach, my research places greater emphasis on qualitative inquiry. Unlike previous work, my aim was not to explore causality but to establish a foundation for my qualitative research. Following the release of the CGSS 2017 dataset, some studies have utilised the data to explore the relationship between internet usage and the health and well-being of older adults (e.g., Han & Zhao, 2021; Yan et al., 2023). These studies primarily employed a quantitative approach, using regression analysis to examine correlations between variables. However, the engagement of the CGSS 2017 dataset in my research differs from these studies in both scope and methodology. Firstly, my analysis of the CGSS 2017 dataset is highly limited and primarily descriptive. For instance, I focus specifically on Question C42, which explores older adults' digital activities, to conduct a descriptive statistical analysis. This analysis provided an overview of what older adults typically do online, serving as an initial step to understand their digital everyday lives. Secondly, I leveraged the CGSS 2017 questionnaire design itself to inform the development of my own questionnaire. By adapting specific questions and options from CGSS 2017—including a question similar to Question C42—I ensured consistency and comparability between the datasets. This allowed me to validate the relevance of my questionnaire items while aligning them with the broader trends identified in CGSS data. Lastly, the analyses of both the CGSS 2017 dataset and my own survey were used as tools to support the design of interview and focus group guides. While CGSS 2017 data and my survey provided valuable preliminary insights, they were not the central focus of the study. However, these analyses still informed and enriched the subsequent qualitative component, which remains the primary source for exploring the digital use of older adults. At least, they help to see the 'forest'-the general picture of silver netizens' digital daily lives.

4.2.1 A Brief Description of Quantitative Data Analysis of Secondary Study

The CGSS2017 includes entries for 291 validated internet users who are aged 60 and above. The frequency of their online activities was assessed in Question C42, quantifying participation levels on a scale from 1 representing 'never,' to 5 indicating 'always'. Table 4 presents the statistics for six types of online activities: social activities, self-expression, online campaigns, leisure & entertainment, information, and business & trade.

Table 4 Statistics of Chinese Silver Netizens' Online Activities Based on CGSS2017 Data

	Social activities	*Self-expression*	*Online campaign*	*Leisure & Entertainment*	*Information*	*Business & Trade*
mean	3.355	2.336	1.515	2.896	3.316	1.866
M	4	1	1	4	4	1
SD	1.210	1.211	0.834	1.264	1.258	1.185
minimum value	1	1	1	1	1	1
maximum value	5	5	5	5	5	5

1=never，2=seldom，3=sometimes，4=often，5=always

Based on the analysis of CGSS2017 and seen from Figure 14, the frequencies of silver netizens' online activities are ranked as follows: Social Activity and Information are the most frequently conducted activities, while Leisure & Entertainment and Self-expression came next, followed by Business & Trade and Online Campaign.

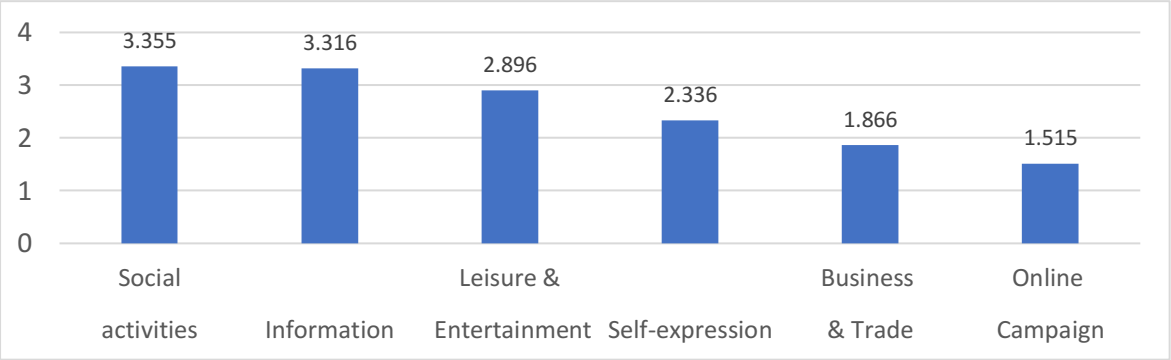


Figure 14 Frequency Based on the analysis of CGSS2017

4.2.2 A Brief Description of Quantitative Data Analysis of Online Questionnaire

The questionnaire was divided into four sections, Part A, B, C, and D. To ensure the usability of the data, each question had a 'mandatory response requirement'. According to the 'Participant Informed Consent Form', participants were allowed to abstain from participating in this questionnaire at any point, but their previously submitted data were retained. According to the

survey results presented in Figure 15, 160 participants completed Part-A questions, 148 of them completed both Part-A and Part-B, 132 of them completed Part-A, B and C, and there were 126 participants completing the entire questionnaire from Part-A to D.

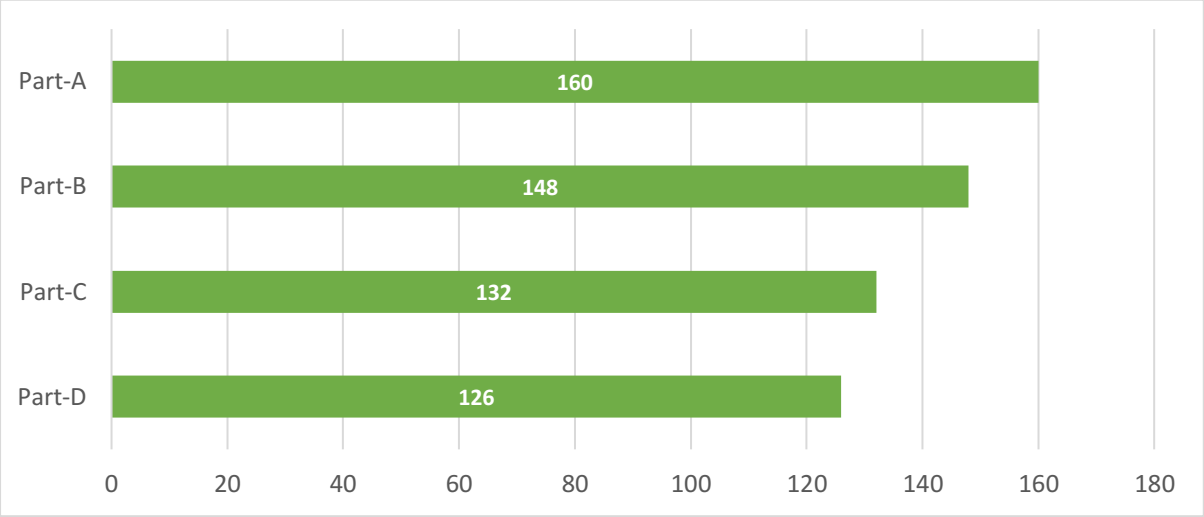


Figure 15 Number of participants who completed each section of the questionnaire

4.2.2.1 Part-A: Basic Personal Background Information of the Respondents

Gender and Age Distribution of Respondents: Among the 160 respondents in the questionnaire, 64 were male, 92 were female, and 4 identified as 'other' or 'preferred not say'. The majority of the participants were female, outnumbering the male participants.

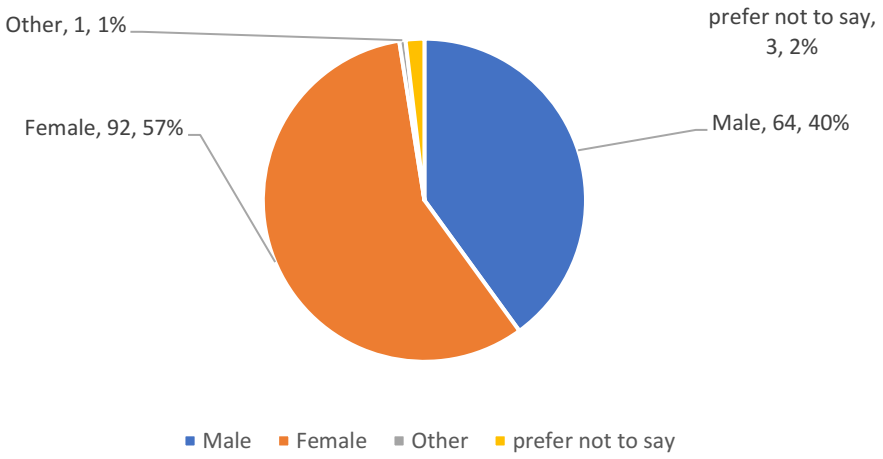


Figure 16 Distribution of Questionnaire Respondents Gender

Age Distribution: According to Figure 17, among the questionnaire respondents, 74 participants aged 60-64 years, 56 participants aged 65-69 years, and 30 participants aged 70 years or older. This age distribution aligns with findings from previous studies, indicating a decline in the number of Internet users within older age groups as age increases.

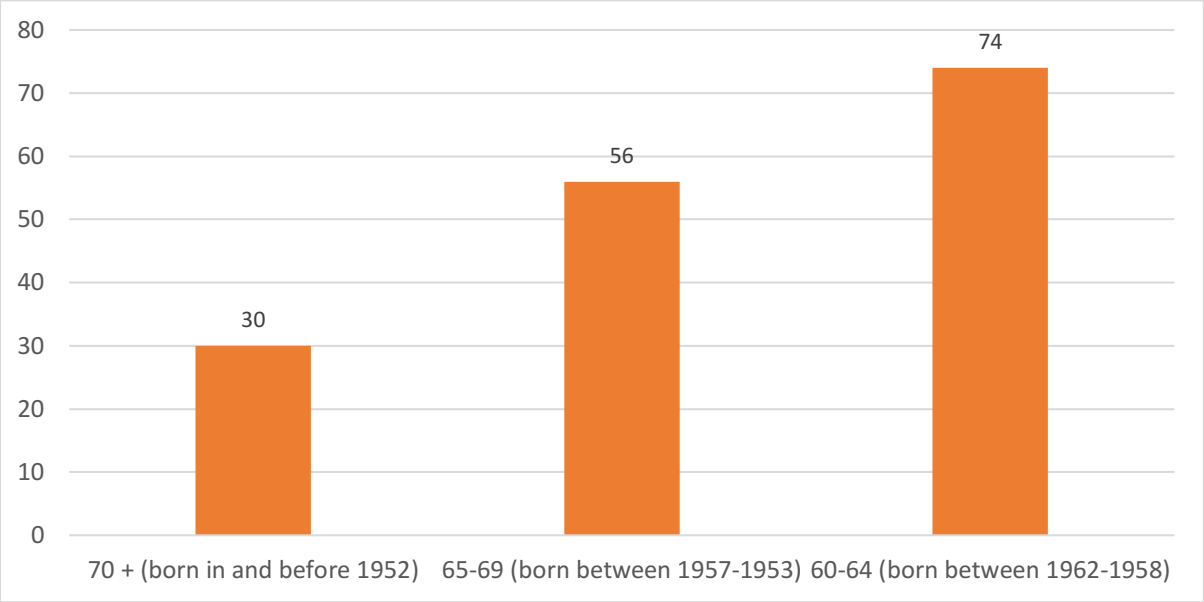


Figure 17 Age distribution of Questionnaire Respondents

Education Level of the Questionnaire respondents: Figure 18 illustrates the education levels of the participants: 13 individuals have an education level of elementary school or below, 21 have completed middle school, 48 have high school or technical secondary school education, 74 have undergraduate or college education, and 4 have postgraduate education or higher. This data indicates a prevalence of higher educational attainment among the senior netizens surveyed, with fewer individuals at the lower education levels. This trend aligns with the typical distribution pattern seen in internet users, where those with higher education levels tend to have a higher rate of internet presence.

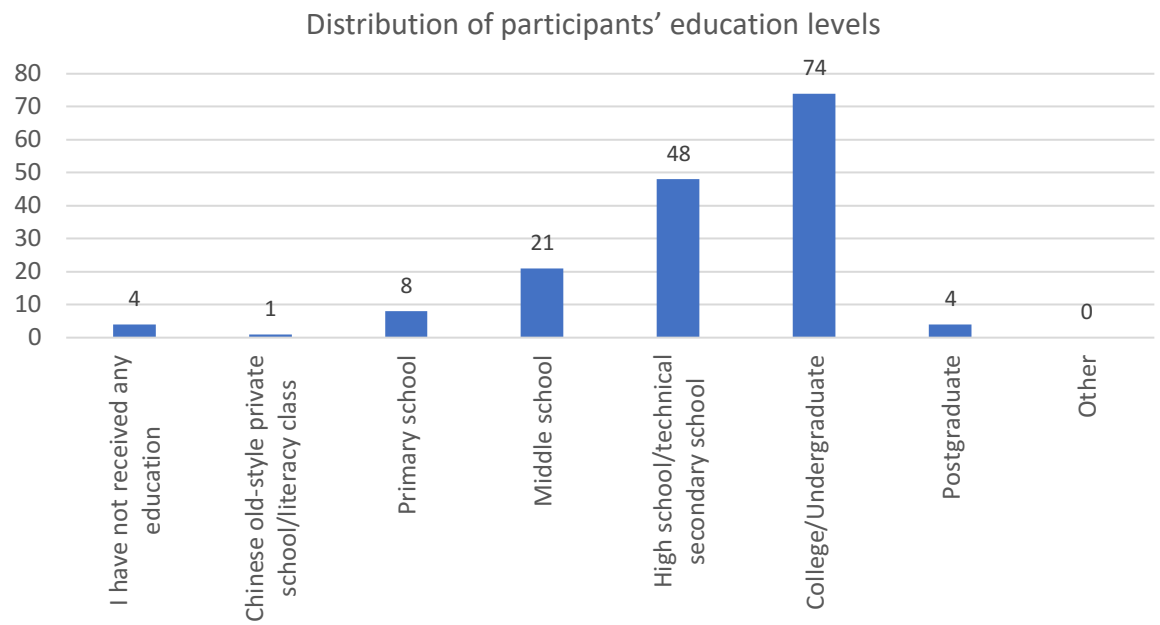


Figure 18 Education distribution of Questionnaire Respondents

This questionnaire also investigated **which family members the participants lived.** This is a multiple-choice question. The Figure 19 demonstrates that 136 respondents live with their spouse; 74 live with their children; and 54 live with their grandchildren.

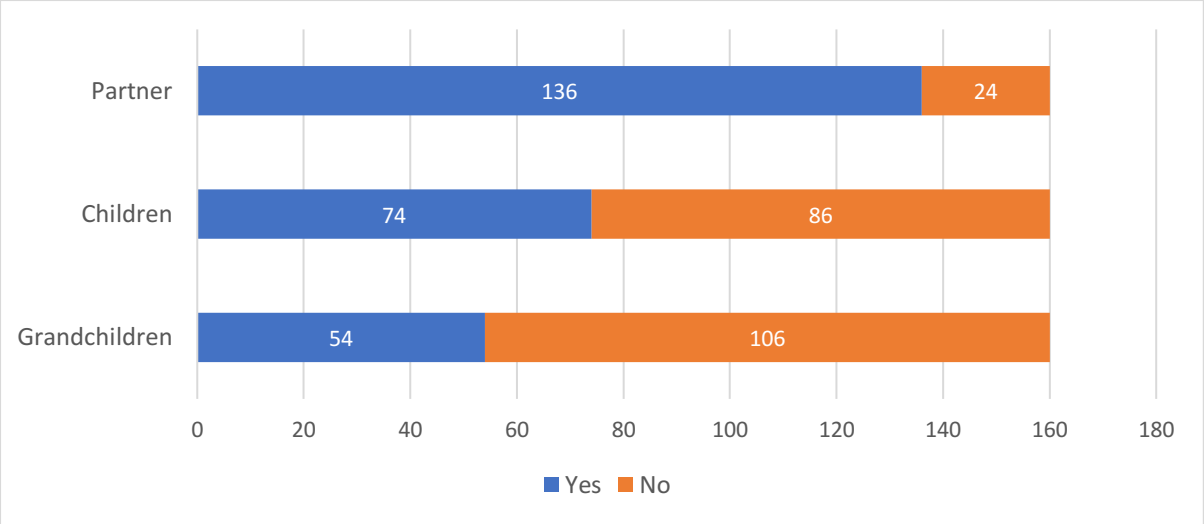


Figure 19 Distribution of respondents living with their families 'Are you living with your partner/children/grandchildren?'

4.2.2.2 Part-B: Digital Use History & Internet Access

The number of participants who completed Part-B was 148, indicating that 12 out of 160 participants left this questionnaire before the completion of Part-B.

Digital-use history: According to Figure 20, 103 of the participants had more than 5 years of Internet usage history and 26 had 3-5 years of usage history. Seven people had less than 1 year of usage history and were new users of the Internet.

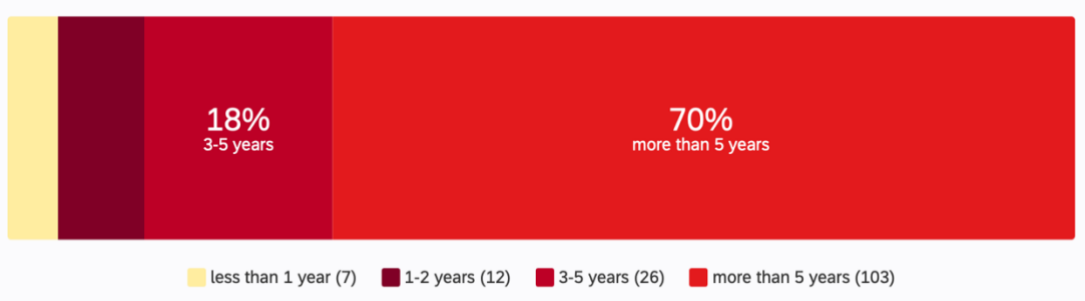


Figure 20 Digital-use history

Device Ownership: Figure 21 illustrates the distribution of the number of devices owned by the 148 participants who completed Part B. 31% among them owned one internet-accessible device, 34% owned two, 26% owned three, and 13 respondents indicated they owned four or more internet-accessible devices. Notably, nearly 70% of these participants possess two or more internet-accessible devices.

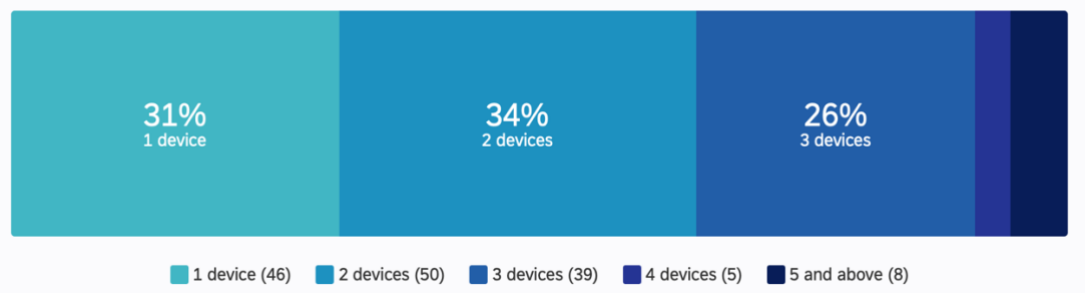


Figure 21 Number of Devices Owned by Participants

4.2.2.3 Part-C Digital Use Preference

132 respondents have completed Part-C, and 16 people left the survey during the Part-C process. Although a significant number of respondents reported owning multiple Internet-accessible devices in Part-B, smartphones emerged as the **most frequently used device** according to the result. Seen from Figure 22, an overwhelming 86.4% of participants indicated that smartphones are their primary device for internet access. Conversely, laptops were noted as the least used devices among the survey participants.

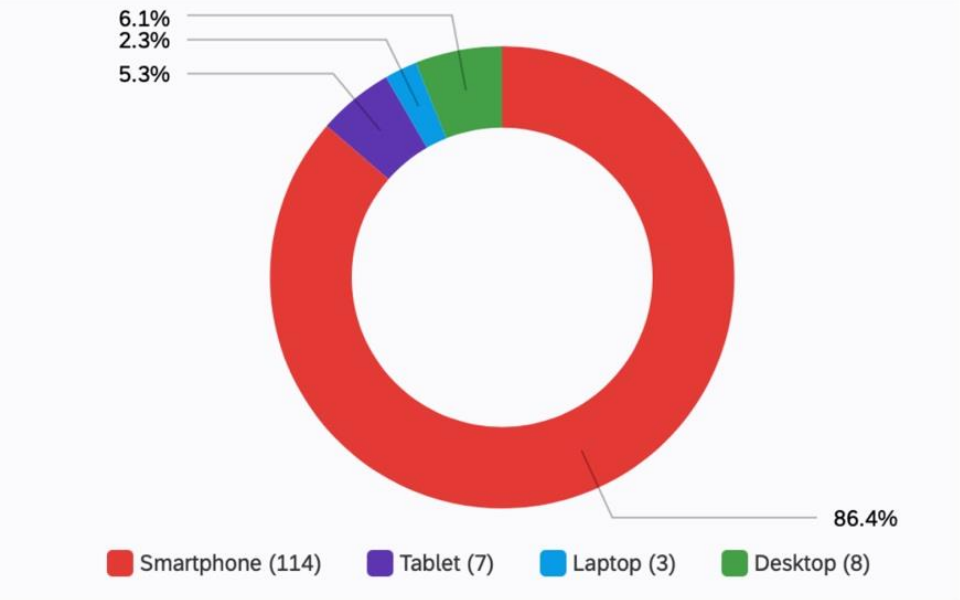


Figure 22 Most-used Internet devices

Distribution of Participants' Daily Smartphone Usage: Figure 23 illustrates the distribution of participants' daily smartphone usage. Among the survey participants, 40% reported using their smartphones for 3-4 hours daily. A further 29% indicated they spend 1-2 hours per day on their smartphones. Additionally, 24% of the respondents use their smartphones for 5 hours or more each day.

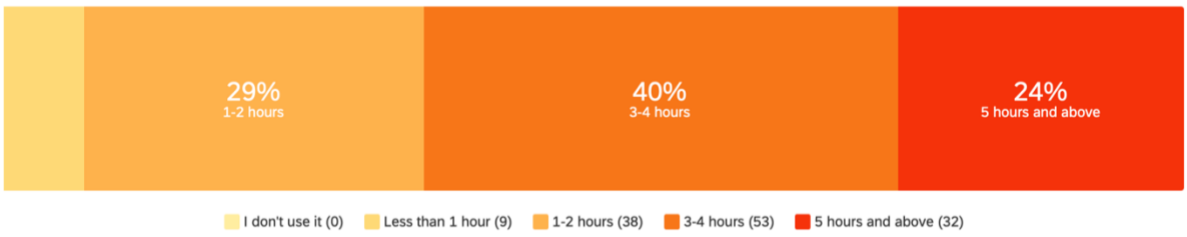


Figure 23 Distribution of Participants' Daily Smartphone Usage

Frequency of Using Internet and Digital Device Functions: The questionnaire was designed with five options to evaluate the daily usage frequency of various Internet and digital device functions among older adults. The bar chart utilises a colour gradient from dark red to light orange, where darker shades indicate higher frequency of use. According to Figure 24, the functions most frequently utilised by older individuals are social interactions, leisure and entertainment, and news and information. These findings align with the secondary analysis of the CGSS open data.

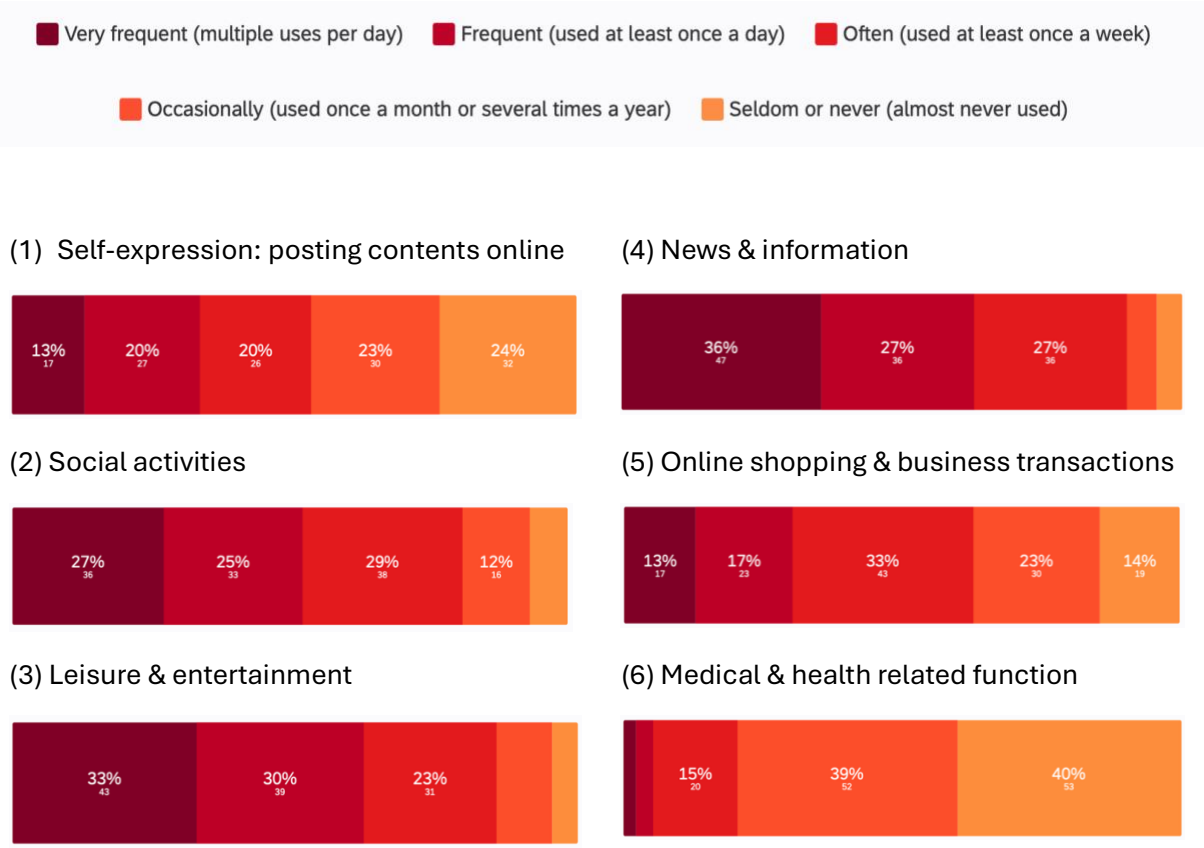


Figure 24 Frequency of Using Internet and Digital Device Functions

Digital Technology Proficiency Among Participants: In Part-C of the questionnaire participants were asked to assess their digital technology proficiency through over 20 questions (*see the 20 questions in Appendix C, questions C3-3 to C3-22).* Then they were asked to evaluate their digital capacity with question C4. Figure 25 presents the results of participants' self-assessed digital proficiency levels. Accordingly, more than half of the respondents rated their digital technology skills as 'very good' (*I can use it very well and my digital capacity is very good*) or 'good' (*I can use it well and my digital capacity is good*). Additionally, 33% perceived their abilities as average, while only four individuals considered their skills 'very poor' (*I can't use it at all*). This suggests that elderly netizens generally feel confident and satisfied with their application of digital technology.

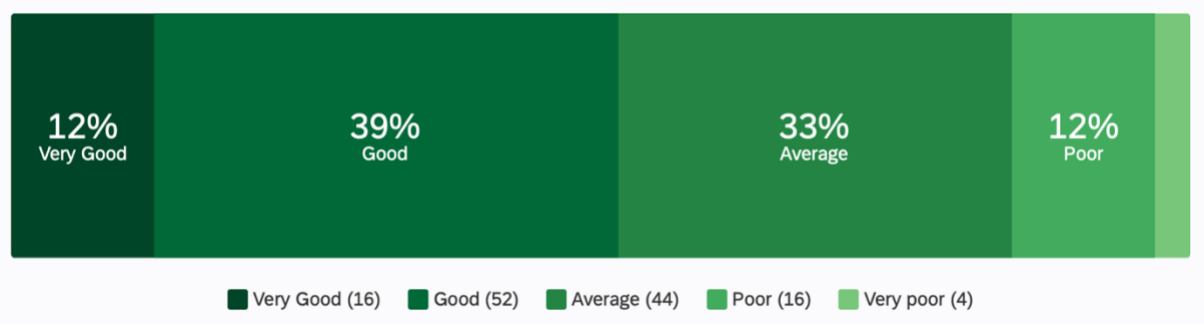


Figure 25 Participants Self-assessed Digital Technology Proficiency

Digital Support Resource: In a multiple-choice question, participants identified their current primary sources for acquiring digital skills and expressed preferences for future training providers. The findings indicate that self-learning and guidance from children or grandchildren are significant pathways for the older cohort to acquire digital skills. Additionally, coaching from partners and other peers also plays a crucial role in their learning process. While older adults currently receive limited digital skills training from public institutions like community centres, there is a clear desire for increased training services from these community resources in the future.

4.2.2.4 Part-D Digital Use Impacts

Part-D of the questionnaire set out questions to assess the impact and outcomes of digital technology use. ', 'disagree', and 'strongly disagree', participants were asked to evaluate the impact and outcomes of digital technology use on various aspects of their personal lives.

In terms of the impact of digital technology on social relationships, the older group tended to believe that the Internet had a positive impact on their social relationships and social activities. As Figure 26 shows, close to 80% believe ('strongly agree' and 'agree') that interactions on the Internet have facilitated their relationships with family members, and over 70% believe that interactions on the Internet have brought them closer to their friends and peers closer to their friends and peers. More than 75% recognise the effectiveness of the Web for social engagement, saying that the Web and digital technologies have made it more and easier for them to participate in social activities. In terms of the negative impact of digital technology on social relationships and social activities, nearly 50% of participants believe that 'online registration' and 'online sign-ups' reduce their interest and motivation to participate in activities. As to whether online interaction affects offline social relationships, participants' opinions were divided. Thirty-six

people (nearly 30% of the total) agreed (8 strongly agreed and 28 agreed) or disagreed (34 disagreed and 2 strongly disagreed) with the question 'Surfing the Internet and screen entertainment takes up too much of my time and affects my interactions with family and friends.

Three-quarters of the participants felt that access to the Internet had enabled them to learn more knowledge and skills and to improve themselves. This can be considered the 'Matthew effect' of digital capital accumulation in the Internet, where people with more digital knowledge and skills are more likely to use the Internet, and more use of the Internet leads to more digital skills and knowledge accumulation. Digital use brings about a circular accumulation of digital capital, which exacerbates the differences between those who use the Internet and those who do not. This also confirms the existence of the third level of the digital divide - the outcome divide.

The negative effects of the Internet were also reported by the participants. Nearly half of the participants agreed that the Internet exposes them to more fraudulent information, and close to 60% felt that they were concerned about privacy violations when they were online. Sixty-seven percent and 73 percent of participants agreed that 'screen time' and the use of electronic devices caused vision loss (16 percent strongly agreed and 51 percent agreed) and shoulder and neck pain (13 percent strongly agreed and 60 percent agreed), respectively.

But despite concerns about negative effects, most participants recognised the convenience of the Internet and digital technology. For example, 86% of participants believe that online payments have made life easier, and 66% of participants agree (18% strongly agree and 48% agree) that online shopping has allowed them to buy more products at better prices.

However, the participants' opinions diverged on other impacts brought by the Internet. For example, 37% of participants believed (8% strongly agreed and 29% agreed) that online payments could create property security risks, but 30% of participants (28% disagreed and 2.5% strongly disagreed) disagreed with this statement. Forty-two participants agreed (9 strongly agreed, 33 agreed) that online registration and booking causes hassles in accessing medical care, when the same number of participants disagreed (40 disagreed, 2 strongly disagreed) with this statement.

It is worth noting that 61% said they would first search for symptoms online when they felt unwell. This result, on the one hand, indicates the convenience of the Internet's search function and, on the other hand, confirms the irrationality of the 'digital native' theory (although it has been well criticised for more than a decade.) The 'digital natives' theory suggests that 'natives' will use web search as their first port of information, and the results of this study suggest that the older age groups classified as 'digital immigrants' by this theory will also use web search as their first port of information. The results of this study suggest that the older age groups classified as 'digital immigrants' by this theory also use the web as their 'first port of call' for information.

Overall, respondents believe that the Internet brings more positive impacts than negative ones. 79% of participants were positive (42% very positive and 37% positive) and only 2 were negative about the future development of digital technologies such as the Internet, Internet of Things and artificial intelligence.

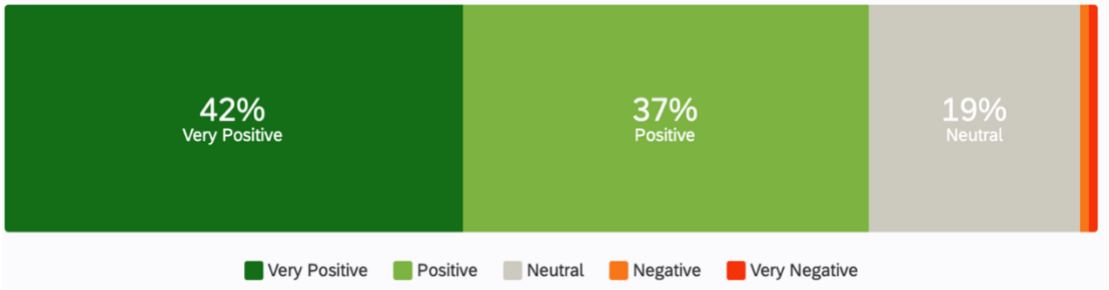


Figure 26 Overall of respondents' evaluation of digital use impact

4.2.2 An Overview of Silver Netizens' Digital Everyday Lives

Rather than being passive users, the older users are actively incorporating and manipulating the digital tools for their own purposes in daily lives (Caliandro et al., 2021). Digital technology has intertwined into every part of people's daily lives. The older population plays as active a role in the digital transformation of society as any other generation. Far from being monotonous and grey, their digital lives are colourful and diverse. From social interaction and engagement to online shopping, from health management to financial services, older adults are actively integrating into the digital world through a variety of applications and platforms.

Figure-27 and Figure-28 are the results of the data visualisation generated in NVivo based on the data from this study. Figure-27 illustrates the types of their digital daily activities mentioned by the study participants in the interviews, while Figure-28 demonstrates the most frequently used applications and platforms discussed by them. In Figure-27 and Figure-28, The "references" value in each block refers to the total number of times this activity or application was raised during the interviews. The size of each colour block reflects the number of references to an activity or application. A higher reference value suggests that the topic was discussed more extensively during the interviews. A higher value leads to a larger block. The "participants" value indicates the number of participants who mentioned this activity or application. The colour intensity represents the number of participants mentioning an activity or application, with darker colours indicating more participants mentioned this topic within the interviews. However, when interpreting these data, it is important to note that a larger block size, representing more participants mentioning an app, does not necessarily mean the app is more 'significant' to older adults. As found in the study by Rosales and Fernández-Ardèvol (2016), although some apps frequently appeared in participants' log data, the participants showed little enthusiasm or interest in sharing their experiences of using these apps. Some apps, once integrated into daily routines, become so commonplace that they are considered 'part of the everyday'. Therefore, in qualitative studies, the way digital technologies are mentioned—through enthusiastic sharing and discussion from silver netizens, the frequency of these mentions, and the proportion of such discussions within their overall conversations sometimes hold greater explanatory value.

It can be clearly seen from the figures that older users engage in a wide range of digital activities and make full use of a variety of different apps and platforms. The figures present an active, positive and colourful picture of older adults' digital daily lives.

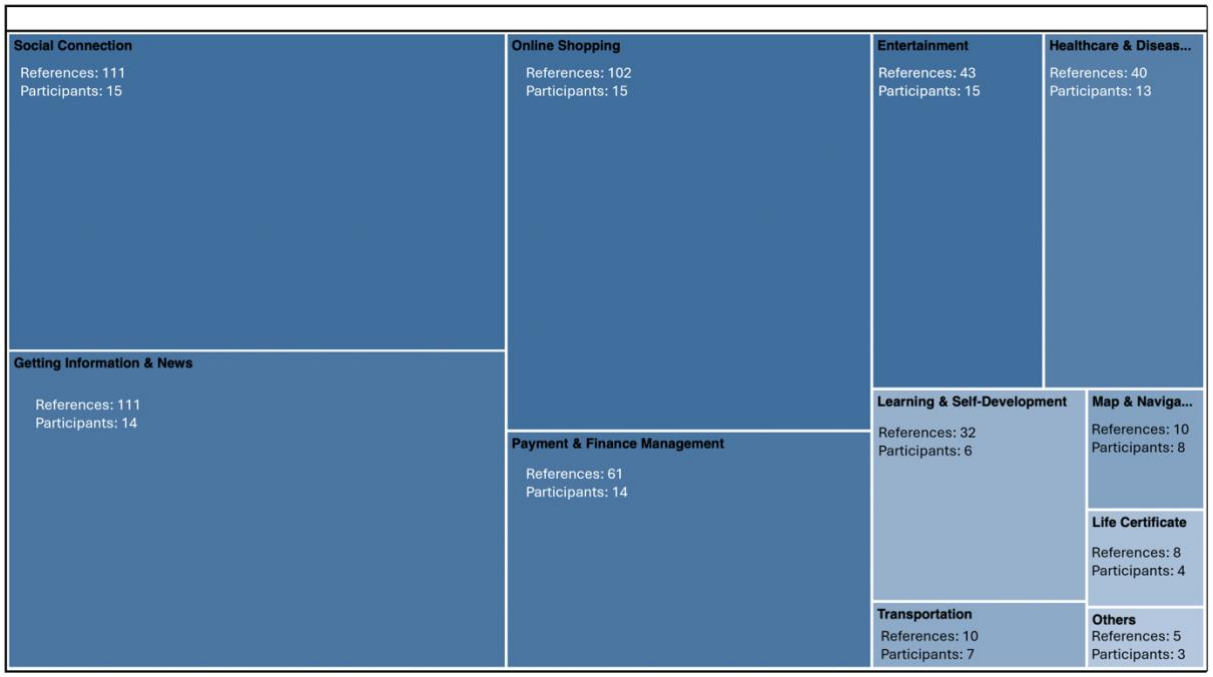


Figure 27 Silver Netizens' Digital Daily Activities

Firstly, in terms of digital daily activities, older people engage in a wide range of digital activities in their daily lives. From social activities, leisure and entertainment to health management, older people can have various interactions based on digital facilities such as smartphones and mobile internet. As shown in Figure 27, the participants frequently talked about their digital social interactions and engagements in their daily lives in the interviews, staying socially connected through news and entertainment apps, shopping and engaging in leisure and entertainment activities through online platforms, and so on. Their integration of digital technologies into these daily life activities not only reveals the active participation of older adults in the digitalisation process, but also reflects their ability and interest in adopting digital technologies. Second, in terms of adoption of applications and platforms, the acceptance and use of various digital platforms by older users demonstrates their adaptability and positive attitude towards new technologies. As shown in Figure 28, older adults not only heavily use social applications such as WeChat, but also actively adopt information, e-commerce and financial service platforms such as Baidu (search engine), Taobao and Pinduoduo (shopping platforms), and Alipay (payment application). In addition, some of them use platforms like Xiaohongshu and Xuexi for learning and knowledge expansion or use tools like Gaode Maps and Didi to solve practical life needs. This diverse use of apps demonstrates older people's exploration in the use of technology and shows that they are able to effectively utilise different digital tools to solve practical problems, thus enriching and facilitating their lives.

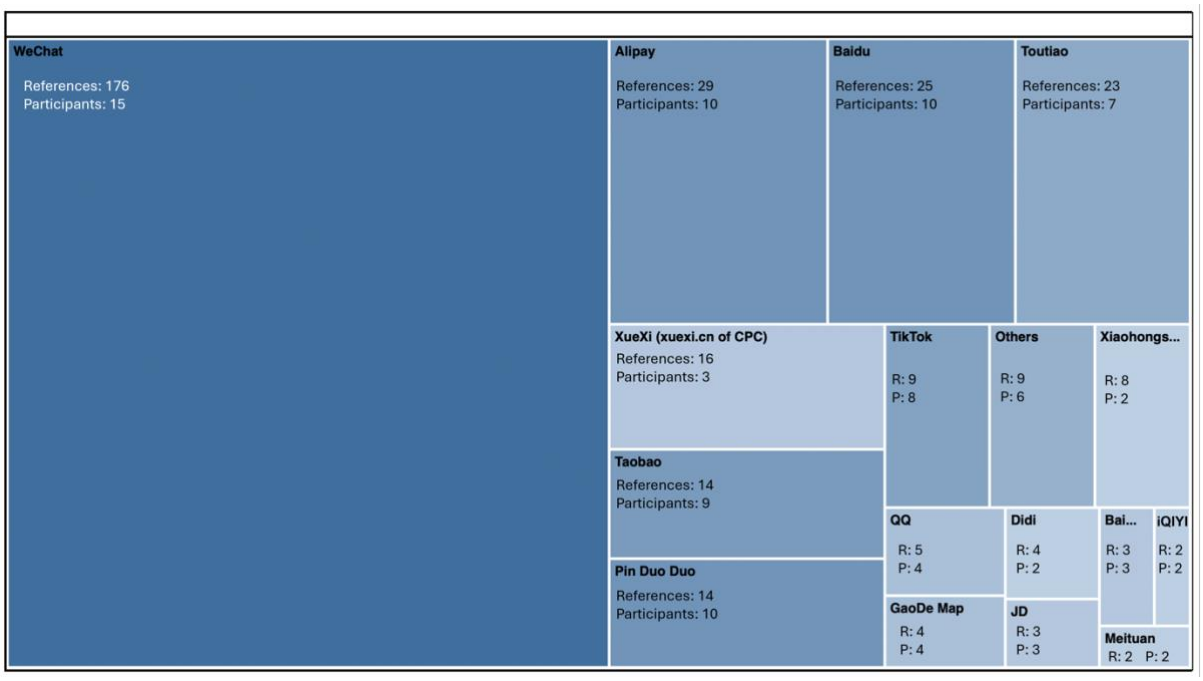


Figure 28 Frequently Used Apps & Platforms in Silver Netizens' Digital Everyday Lives

It can be argued that activities which were central to traditional lives are now intertwined with digital technologies. Tasks that could only be accomplished in offline spaces can now be handled and managed through apps and platforms online. In other words, older people are not merely 'using technologies in their everyday lives, they are actually leading digital daily lives in a world constructed with digital technologies like smartphones, the internet, and other digital facilities.

4.3 Smartphones: A Gateway to the Digital Everyday Life

The development of smartphones and mobile internet in China has transformed how older adults engage with the digital society, making it possible for older adults to lead digital daily lives.

4.3.1 Some improvements brought by smartphones

Advances in smartphones and the mobile Internet have not only enabled older people to break through technological and knowledge limitations but have also provided them with a more convenient digital communication platform. First, the intuitive design and user-friendly interface of smartphones greatly reduces the difficulty of using technology for older adults, and the simple

interaction of touching the screen directly with a finger is a simpler and more desirable option for older adults who are not familiar with computers (Holzinger, 2003). The ability to set larger fonts and larger icons, as well as features such as voice commands make it easier for older adults to operate smartphones. In addition, especially instant messengers such as WeChat, which provide older users with convenient voice messaging features and emoticons, make communication more accessible. These tools make non-textual communication feasible and reduce people's reliance on text input when communicating (Zhou et al., 2017). The invention of voice messaging and emoji (stickers) function is especially important for older people who may face difficulties in inputting Chinese characters. They enable older adults to send voice messages through simple recordings, share emoticons and pictures by clicking on icons, and engage in direct voice or video chats by clicking a few buttons. All these non-textual features have greatly enriched the way older users communicate, helping them to stay in touch with their family and friends in a more intuitive and simpler way than computers. Smartphones have lowered the technological threshold for older users and simplified the operational process for them. According to the participants, smartphones provide them with a more convenient and intuitive way to operate than computers, thus greatly simplifying their daily activities and Internet use. For example, IP009 stated that the operation of smartphones is more convenient than computers.

> *"For people like us, it is really a bit difficult to use computers. In the past, the operation of computers was not as convenient as smartphones nowadays, and you can now directly input Chinese with handwriting, which was not available before. In the past, we still have a process of slowly adapting to the computer, but now the function of smartphones is much more convenient than computers in the past. Smartphones have made it much easier to access the Internet…Everything on the internet is now basically done with a smartphone. Using a smartphone is so much more convenient than computer. Smartphones are easy to carry around and those applications like Alipay and Taobao can be easily done with a smartphone…" (IP009-F62)*

IP004 also reported that he finds using a smartphone more convenient than using a computer while emphasised that smartphones save them the trouble of inputting Chinese. As mentioned earlier, older adults in China face challenges with Chinese character input while using a computer, which often leaves them in a position where they can only browse content without interactions.

> *"...previously, typing was required when we were using a computer. However, typing abilities of us older people are usually poor. Now I have switched to smartphone, where I can input directly by handwriting, which is much more convenient...I used to work in management. In my company, there were specific employees who handled computer-related tasks, and I only needed to browse some documents and look at financial reports and data on the computer..." (IP004-M67)*

It is fair to say that the emergence of smartphones may not only bring an alternative device to computers, but also develop the possibility of a new lifestyle for the older people. With smartphones and the mobile Internet, older people can interact with society more confidently and conveniently, as well as experience and enjoy the benefits of the digital society.

4.3.2 Starting every day with smartphones

According to the results of the questionnaire and interviews, smartphone is the most used Internet-access device by silver netizens. It has become an integral part of older adults' daily lives since they employed this technology. According to the participants' descriptions, they *Start Every Day with My Smartphone*. Smartphones play a central role in both social interactions and entertainment activities and are inseparable from the daily lives of older adults. It can be said that the smartphone is not only a part of their lives, but also a "gateway" that brings them into a world where physical and digital reality are deeply integrated.

According to the participants, it has become a habit to *Check My Phone Immediately Upon Waking Up*. They usually started their daily activities by turning on their smartphones to check messages, browse news and weather forecasts, and update social media. In addition, some of them had the regular routine of sending morning greetings and updating their WeChat Moment to maintain social and emotional connections.

> *"As soon as I wake up, I grab my phone to check it. I like to browse 'Toutiao' for some international news and military content, as well as recommended articles and music, especially symphonies. Recently, I've also been following the latest developments on the Eastern Airlines accident (MU5735) and the news that the A380 jumbo jet is about to leave the market." (IP014-M69)*

Mroning Greetings are also identified as a common daily routine among participants. IP012 reported that she sends daily morning greetings to about 50 people every morning. She would edit different text messages to send to different cohort of her friends, and it takes her about 40 minutes a day to process those morning greetings.

> *"When I wake up in the morning, the first thing I do is check my phone and handle various tasks. For example, I check notifications for events or work schedules released by the Senior Sports Association, which need my immediate attention. Besides that, I also chat and send greetings to my friends. Our friends send each other morning greetings every day, like saying 'Good morning'." (IP012-F70)*

IP013 stated that she basically sends good morning greetings with stickers to her friends rather than typing text. The sticker function on WeChat also facilitates the formation of the morning greeting daily routine among older adults. In Wang's (2022) study, there were also participants who mentioned that they send good morning stickers to their friends on WeChat every morning. There is a great number of good morning stickers available on WeChat, and the stickers with pictures of flowers (like the examples illustrated in Figure 29) are popular with Chinese older users (Wang & Haapio-Kirk 2021).

Figure 29 popular morning greeting stickers

When morning greeting becomes a regular routine in daily life, it is not only a simple greeting, but also a way for older people to express their concern and make sure that the others are 'being well'.

> *"I have a few family members who definitely send me a greeting every day. Yes, they do it every day. If one day they don't, I will wonder what happened? Why didn't they send me a WeChat message this morning?" (IP009-F62)*

In the interview, IP012 shared an incident she had experienced that further emphasised the importance of this daily practice.

> *"I have something to tell you. Every morning when we wake up, my close friends and I exchange greetings with each other. However, on March 8th, 2020, I sent a message to my friend A and didn't get a reply from her for a long time. Later, another friend called me suggesting something bad might have happened, suspecting that our friend A might have passed away. I mentioned that I had sent her a message that morning, but she hadn't replied. So, I immediately contacted some friends who lived with A, and they confirmed that A had indeed passed away. So, what I want to say is, if a greeting message sent in the morning but doesn't get a reply, there might really be something wrong…" (IP012-F70)*

IP012 explained that one of the main reasons elderly friends send each other morning greetings is to check on their health conditions and to see what activities they have planned for the day, getting an update with their friends' schedules. If they feel unwell or have other issues, they will also take the opportunity to communicate these problems. Morning greetings and communication can bring happiness to older adults (Teka & Adamek, 2014). The routine of older adults checking their smartphones and sending greetings to each other every morning not only reflects their strong need for social connectivity, but also shows that they utilise this way of checking on each other's health and safety, which is in line with Sorasak et al.'s (2023) study. Such daily routines demonstrate that older people are not only able to adapt to digital technologies but can also effectively utilise these tools to enhance quality of life and social interactions, enabling them to remain active and socially engaged in later life.

4.3.3 Everyday Lives Reliant on Smartphones

Different from the findings of Rosales and Fernández-Ardèvol (2016), Chinese silver netizens rarely switch between their smartphones and other devices. Although the participants in this study were similar to the participants in Quan-Haase et al. (2016) in terms of their social status

background - retired, middle class, well-educated and with good social connections, however, unlike the participants in Quan-Haase et al. (2016) who owned multiple digital devices, the participants in this study appeared to be more homogenous in their use of digital devices.

In the interviews, only IP010 mentioned his frequent use to a computer, while IP003 and IP015 also indicated they occasionally need to use computers. IP005 and IP009 also reported they have iPads which they sometimes use them as an alternative for larger screen, however, participants showed significant reliance on smartphones. During the interviews, participants consistently emphasised the central role of smartphones in their daily lives and described their irreplaceability in providing convenience and security, as well as maintaining social connections. They suggested that the "felt anxious without smartphone" or "cannot cope with daily task without a smartphone".

Both IP004 and IP015 suggested that they would be 'useless' without their smartphones and their daily lives would be difficult:

> *"I would definitely feel uneasy if I didn't have my smartphone with me, because it would cause a lot of inconvenience. For example, if I left my smartphone at home, I wouldn't be able to pay for my shopping, right? Similarly, I won't be able to access public transport or the shared bikes, as these require payment by smartphones. As for driving, without the navigation provided by my phone, I may not be able to find my way." (IP004-M67)*

> *"If I go out without my phone, it will make me feel have 'nothing at all'. Without my phone, I can't make payments, can't check the news, nor navigate to my destination. It's like being completely helpless. If I forget my phone when I go out, I must go back and get it. If I've gone far and cannot make a return, I have to quickly finish whatever I'm doing and then rush back to get my phone." (IP015-M62)*

IP012 and IP009 both believe that every aspect of their daily lives depends on smartphones:

> *"All my work and activities rely on this phone. Now, I don't need cash when I go out; just bringing my phone is enough. Without it, I literally can't move a step…Without my phone, I have no money to spend. I can't leave it behind.*

> *As I head out, I have to make sure that I bring my smartphone with me. Now, whether food, clothing, or daily necessities, I rely on my smartphone to make the purchases." (IP012-F70)*

> *"I really think that in China, we've reached a point where 'with one phone in hand, you can go wherever you want'. Nowadays, our IDs and health insurance cards have e-versions, and basically, anything you want to do can be accomplished with your smartphone. Having my smartphone gives me a sense of security. I believe that in any emergency situation, I can handle it with my phone. Indeed, carrying a phone makes me feel much safer." (IP009-F62)*

In terms of keeping in touch, IP013 suggested that she needed to keep her phone in hand to make sure that her mother could reach her at all times:

> *"After getting used to the smartphone, I don't feel good while not having it in my hand. If you have a smartphone, people could contact you if there is any situation. Especially when we have a senior older person (IP013's mother) at home, I always keep my phone 'on' for 24 hours a day. I even do not switch it off at night, just in case she (my mom) can always reach me." (IP013-F68)*

Van Deursen and Van Dijk (2019) proposed that differences in device diversity should also be considered when studying the digital divide. As computers could offer higher storage capacity and speed, as well as a wider range and sophistication of applications, people without access to computers are categorised as the 'mobile internet underclass' (Napoli and Obar, 2014). However, the situation of 'smartphone only' and 'heavily reliant on smartphones' is indeed common among Chinese older users. It can be seen from the interviews that participants primarily use smartphones in their daily lives and seldom switch to other devices. Compared to older users who possess computer skills and experience, Chinese older users might not have alternative device for a better choice. On one hand, as previously discussed, computers are less accessible for older adults in China, with complex input methods being one of the major barriers; on the other hand, the digitalisation process in Chinese cities also pushes the older users to rely on their mobile smartphones, as nearly every aspect of urban life requires the support of a portable smartphone and the mobile internet. Smartphones have become an important bridge for older people to engage in the digital society, a basic infrastructure to keep their daily lives functional.

4.4 Silver Netizens as Digital Residents

White and Le Cornu (2011) liken digital users to two types: Visitors and Residents. Visitor users view the internet as a tool shed. They have specific goals or tasks, enter the shed to select the appropriate tools to accomplish their tasks, and return the tools to the shed after use. They typically do not leave a persistent online identity, emphasising privacy and security, and regard social networking activities as trivial and self-centred. They primarily use the internet to obtain or manipulate content, seeing it as one of many tools to achieve their goals rather than a place for thinking or development. Resident users, on the other hand, see the internet as a place for interaction and communication, akin to a virtual community. They establish and maintain online profiles, enjoy sharing information about their lives and work, and participate in social and community activities. They have a persistent online presence, with digital traces remaining even when they are offline. For them, the internet is not only a tool for obtaining information but also a crucial platform for self-expression, building, and extending relationships.

Based on the above definitions, in this study, the diversity of digital activities among silver netizens suggests that they can be both digital visitors and digital residents. However, given the high penetration of smartphones and mobile internet in daily life, the respondents in this study are largely more akin to digital residents. This is because various aspects of their lives, from social interactions to everyday shopping and payments, are closely linked with digital technology. Although some of them have not specifically created accounts on social media platforms, all of them extensively use WeChat. The social features of WeChat, like the WeChat Moments and WeChat groups have made their digital activities inseparable from opinion expression, network expansion, and identity construction.

Even though these older users, who only have access to smartphones, are considered to be the digital ‘underclass’, the participants in the interviews did not provide much insight into the disadvantages or inferiorities of older people in the use of digital technology. Instead, they took me into a thriving digital world in which they lead busy digital lives. They are no one else but just a group of digital residents who are practicing their digital experiences in different spaces (apps and platforms) within the digital world.

4.4.1 Digital Activities as Everydayness

As discussed in Section 4.3, the digital daily lives of Chinese silver netizens begin with a morning greeting. From the moment they pick up their smartphones in the morning, their digital socialising kicks off. However, their digital daily lives are much more than just social interactions. From the analyses, social interactions, access to news and information, online shopping, and leisure and entertainment are all activities that silver netizens engage in frequently. For them, these activities are not dealing with any digital challenges, but the *'everydayness'* in their digital daily lives.

4.4.1.1 Social Connections

Social Connection is one of the most important parts of the digital daily lives of silver netizens. Through digital technologies, silver netizens can connect with family and friends, as well as participate in various activities.

Keeping In Touch With Families: Besides the online interactions with friends mention in 4.3, digital technology also provides silver netizens convenience to stay in touch with their families, especially with the remote ones. In this study, nine participants had children, grandchildren, or their parents who did not live in the same city with them, so online communication became the main form of family connections between them.

IP001's hometown is in Shanxi Province in northern China. To take care for her grandson, IP001 moved to Guilin, a southern city to live with her daughter and grandson. IP001's mother is in her 90s, living in Shanxi with her carer. While IP001 and her siblings are all living far away from their mother, daily WeChat communication with their mother's carer has become a primary way for them to keep updated about how their mother is doing.

> *"I usually contact my mom and my family around 10 am. She and I will have a video call. My mom also has a security camera at home, which we can check at any time using the security camera app to see her activities. Additionally, my mom's carer measures her health indicators every morning and sends the results to me and my siblings via WeChat. All of us, including the children in our family, have WeChat contact with my mom's carer." (IP00, F64)*

According to IP004 and IP005, their children both attended universities in the United States and stayed there working and living after graduations. Before the outbreak of COVID-19, IP004 and IP005 had visited their children in the US. After the pandemic began, international travel became difficult, and WeChat became their only way to 'meet' their children.

IP004 said that he primarily contacts his children through WeChat. While discussing the methods to meet his children and grandchildren online, he mentioned that their family also uses the shared albums of Apple to share photos within the family.

> *"We can't travel now, we can't go. We can only video chat through WeChat… Do you know the 'shared albums' in the Apple system? It's free and great for family members to share photos with each other. You can save thousands of photos in the shared albums." (IP004-M67)*

IP005's daughter also lives in the US, and his first task every day is to check his smartphone for messages from her.

> *"I never turn off my phone at night. When I get up, I will check if there are any messages on WeChat from friends… especially if my daughter has left me a message." (IP005-M68)*

Even for participants who have children or other family members locally, instant message remains a crucial tool for their family communication and everyday coordination. Due to China's one-child policy, 13 out of my 15 participants have only one child, while some of them have taken the roles of looking after grandchildren after retirement. Instant messaging APPs like WeChat have become their platform for family daily coordination.

In the interview, IP008 introduced how he helped his daughter with his grandchildren' daily homework via family WeChat Group.

> *"I usually turn off notifications from others, keeping only those from my family. Therefore, whenever my phone pings with a WeChat notification, I know it's definitely a message from my family. Sometimes, my daughter messages me about my grandsons' homework assigned by the teachers, asking me to help prepare the homework for the boys." (IP008-M63)*

IP006 and IP002 also live in the same city as their children, and they use WeChat to confirm the dinner menu when preparing family meals for their children and grandchildren.

> *"Actually, I rarely chat with others on WeChat; I primarily use it to discuss household matters with my family. At lunchtime or in the afternoon, I will ask my children and grandchildren if they will be coming home for dinner." (IP002-F71)*

Contacting Friends and Organising Social Activities: In later life, communication and support from peers and friends are crucial. In the study, participants reported that their digital daily interactions with family often revolve around household matters, while online interactions with peers and friends involve chatting and exchanges. For the silver netizens, digital technology helps them stay socially active and expands their social networks. WeChat serves as an indispensable hub in their social life, through which they organise or participate in social activities.

Regarding contact with friends, WeChat groups are great places to share interests. In these groups, the silver netizens can easily organise or participate in activities and get information about their interests. Online communities bring retired individuals together and keep them active; retirement no longer means being left behind or isolated from society.

IP003, who has been retired for four years, still participates in sports activities organised by former colleagues (such as badminton and volleyball). WeChat is a crucial channel for him to participate in these activities. Through WeChat groups, he can access information and register for events.

> *"Without the internet, participating in sports activities would be impossible. I need to check their WeChat group daily to see if anyone is playing. For instance, yesterday, I wasn't planning to play badminton, but when I saw that they had organised it, I decided to join them for a while. Besides, they have another badminton session tonight." (IP003-M64)*

Undoubtedly, digital technology provides older adults with more opportunities to engage in activities. There are many active members in their community who enjoy socialising and are keen

to organise events. Therefore, IM apps like WeChat and QQ have become their efficient tools for gathering friends. IP006 shared her experience organising daily outings on WeChat, including how she handles event payments.

> *"I'm the one who sends out the event notifications, I invite everyone. We have several WeChat groups, and I send out event invitations in these groups, to several groups at once... If someone responds, I'll tell them where and when to meet the next day... If I want to go on a day trip, I will invite them in the evening, and the next day we can go out... The internet makes inviting friends more convenient... After I post the event notification, I am in charge of everything. If the event requires a registration fee, I will collect money through WeChat... When we are outing, we sometimes have lunch together and we split the bill." (IP006-F66)*

Apps like WeChat and QQ offer additional features that make organising events easier. For example, event organisers can use in-group bill splitting or group payment to collect event fees. Additionally, group members can use the 'group note' (qun jie long) to collect information from members to record who will or will not attend the event. IP016 shared how she and her friends in the group organise karaoke activities:

> *"Generally, our friends who enjoy singing will go to KTV together. We use the group note in our groups to organise events. My interest groups - the fitness group, singing group, yoga group, and dance group are all organising trips to KTV." (IP016-F60)*

Similar to Busch et al.'s (2021) finding, Chinese silver netizens use their smartphones primarily for social purposes, and most of their digital activities revolve around socialising. Digital technology has greatly enriched the lives of older adults in their later years by providing them with convenient ways to stay in touch with friends and family, as well as opening up a wide range of possibilities for engaging in online and offline activities through digital platforms. The proliferation of smartphones and mobile networks has not only helped older persons to remain socially active, but has also broadened their social networks, making life in old age more fulfilling and colourful.

4.4.1.2 Getting information and news

Getting Information and News and information is another important aspect of silver netizens' activities beyond socialising. The results of this study are consistent with Busch et al.'s (2021) study showing that social media and news reading are the two most prominent areas of digital activities for older adults.

Browsing News: By accessing news and information through online platforms, older people can keep up to date with new changes happening in the world and keep up with the times. In the interviews, many participants mentioned their concern about the Eastern Airlines crash (MU5735) and the war in Ukraine. This not only shows that they are still concerned about the big events in the society after retirement, but also reflects their ability to acquire information actively in the digital age. In the interview, IP003 reported that the first thing he does every day when he wakes up is to get news from an official WeChat account.

> *"Every morning, the first thing I do when I get up is read a WeChat official account called Feng Zhan Zhang's Home (Feng Zhan Zhang Zhi Jia). It sends out a voice post every morning with a slogan 'Three Minutes a Day to Know Everything around the World', but actually, it usually lasts about ten minutes. It mainly covers major domestic and international news, daily updates on the COVID-19 situation, and ends with some health and wellness tips and advice." (IP003-M64)*

For IP005, access to news information is an extremely important part of his daily life. His smartphone is his primary source of information. He is used to reading news on his smartphone, especially through the app Toutiao. He mentioned that:

> *'I have to browse Toutiao every day and probably spend at least two hours a day on Toutiao.' (IP015-M62)*

Silver netizens are exploring new and information from various channels, from WeChat official account to news aggregators like Toutiao or other platforms. Although silver netizens have different means and practices of obtaining news information in the digital world, the hot events mentioned in their interviews show that they are always able to obtain the latest developments of

major news events at home and abroad in a timely manner. The information availability of digital technology can ensure that older netizens remain informed and updated after retirement, providing them with a sense of being-informed security.

Accessing Information of Interests and Needs: Besides news, silver netizens are also exploring the Internet for any information that fits their needs. IP015 is a diabetic. He stated that he subscribed to WeChat accounts to get information on the daily care of his disease.

> *"I subscribe to some WeChat official accounts related to diabetes, such as 'Tencent Health' and 'Stable Blood Sugar Community'. These official accounts and communities provide me with a lot of useful information. I also pay attention to Beijing TV's 'Health Hall', which also has content on blood sugar. I used to watch it from the TV, but after watching it I thought it was quite good, so I downloaded an APP for it." (IP015-M62)*

In fact, IP015 followed the official account of Beijing TV's 'Health and Wellness Hall' rather than downloading its app, but the 'confusion' of technical terms did not prevent them from benefiting from the information provided by digital technology.

Searching Useful Information: silver netizens also have their digital practices in information searching, and they can make use of search engines to solve problems in their lives. IP009 described how she uses the Baidu search engine to solve the digital technology difficulties she encounters in her daily life:

> *"When you run into technical difficulties, just go and ask on Baidu. Someone will teach you. Sometimes, there are features I don't know how to use. For instance, when I first started using a Huawei phone, I found that its method of taking screenshots was completely different from the iPhone's. I had no idea how to do it, but then I searched on Baidu and figured it out right away." (IP009-F62)*

IP010 refers to Baidu as a teacher:

> *"I can search online for things I'm not clear about. Baidu can even be used for medical consultations, I'm telling you. Online medical consultations.*

> *Any physical ailments can now be searched online. This 'teacher online' is really amazing." (IP010-M72)*

Search engines are not only a tool for the silver netizens to obtain information, but also an important way to help them enhance their independence and promote lifelong learning. In this regard, digital technology can help older people solve practical problems and improve their well-being.

4.4.1.3 Entertainments

Digital *Entertainment* is not a privilege for young people. Studies have shown that older people are interested in entertainment (Petrovčič et al., 2018; Lamanes & Deacon, 2019), and entertainment is one of the motivations for older people to engage in digital activities (Pang et al., 2015; Gaol et al., 2015). In this study, participants indicated that they could listen to music, watch films and TV dramas, watch short videos, read web novels (romance novels) and even online karaoke through their smartphones.

Music: When it comes to using digital technology to enjoy music, participants demonstrate their own unique needs and approaches. IP016 is an older person who loves to sing. Prior to the COVID-19 outbreak, she was involved in singing classes specifically for older adults. With the development of COVID-19 and the implementation of quarantine measures, she had to adjust her recreational methods to singing at home via her smartphone.

> *"Since the outbreak of COVID-19, I started singing at home. I use QQ Music on my phone to sing along. While many might think of online karaoke, I actually spend more time listening. I repeatedly listen to a song several times and then learn to sing it. For instance, there was a song that became very popular during this year's Spring Festival, and that's how I learned it. Moreover, although I have a smart speaker, 'Tmall Genie'(a Bluetooth smart speaker), at home that can play music, it's not as convenient as QQ Music." (IP016-F60)*

In addition, older Internet users explore music in a variety of digital ways. They are not limited to specific music apps or platforms. As long as they can achieve their goal of listening to their favourite music, they would not care about the platform that provides the music or whether the

process of accessing the content is 'professional'. For example, IP014 revealed to me that he likes to listen to music and listens to the 'Vienna New Year Concert' every year.

> *"I usually search for music resources on various platforms. For example, you can search for content about the Vienna concert on Toutiao. I typically listen to music on Toutiao; when I see someone singing a song well, I try to learn it myself. There is a 'Music' channel on Toutiao where I often find a lot of good new songs and music videos." (IP014-M69)*

In this way, older adults were able to continue to engage in music and find new ways to meet their entertainment needs even in the face of the challenges of social isolation posed by COVID-19.

Gaming: Games are one of the most important forms of entertainment for older adults. According to the Study on Internet Ageing in the Post-Epidemic Era published by the Chinese Academy of Social Sciences, about 23.26 per cent of older adults interviewed play mobile games. Among them, matching games like Happy Elementes are particularly favoured by older adults, with 61.9% of elderly players saying they often play such games. IP012 and IP013 live in the same county town. Their lives seem to have no connection, but they have two common hobbies: playing the online multiplayer game 'ZiPai' and the single-player game 'Happy Elements'. Zipai is a card game popular in the southwestern provinces of China. Its rules are similar to Mahjong, but more complex. ZiPai has a more flexible form than Mahjong, allowing for 3-4 people to start a ZiPai game instead of 4 people. Like Mahjong, ZiPai also has certain gambling properties. Many middle-aged and elderly people in Guilin are fond of playing ZiPai with their friends or family. With the popularisation of online games, ZiPai has also had platforms where it can be played online. Happy Elements is a matching game similar to CandyCrush and is a great time-killer. According to a research report by Tencent, there are a large number of older users of these matching games in China (Tencent Game, 2022).

> *"I play games like Happy Elements and card games like ZiPai. I often play card games, especially ZiPai and poker. I play these card games every day. However, since these games involve money, I only play the free opportunities they provide each day, and I stop playing once these are used up. I only play ZiPaiwith friends I know." (IP012-F70)*

IP013 identifies as a 'light' smartphone user. She emphasised that her primary requirement for a new phone is simply the ability to use WeChat. Throughout the interview, IP013 displayed an indifferent attitude towards other phone features, expressing no specific preferences for online content. Additionally, she explicitly mentioned, 'I don't read news.' Nevertheless, her smartphone serves as a source of daily entertainment, with apps like TikTok and ZiPai providing leisure activities.

> *"I play Happy Elements and ZiPai. Initially, many people were playing HappyElement; it was one of the first games we played. Actually, it's not that interesting, just a way to pass the time. I haven't played it in a long time…Yes, I play ZiPai, just for fun. The ZiPai app was downloaded by my younger family member. Anyone can play this game; you just need to enter the game, and it doesn't ask who you are (anonymous). These games may involve money, but I play it just for fun and I doesn't involve winning or losing money. If my eyes get tired, I stop playing. I usually play ZiPai on my phone for about 1 to 2 hours a day because I don't need to work, so I play when I am bored." (IP013-F68)*

Besides ZiPai and Happy Elements, two participants maintained an interest in traditional games such as 'Go (WeiQi)', which IP011 and IP015 would play against others through online gaming platforms. Not only do these games provide them with a way to pass the time, but multiplayer games can also enhance social connections with others through online platforms.

Web Romance Novels: IP002 is 72 years old this year, she likes to watch the popular martial arts TV drama 'Snowy Sword' which is popular among the young crowd, and she also likes to read romantic novels on a novel platform.

> *"Besides reading news from time to time, I also like to read other things on the Internet, especially novels. I often use a reading platform called Midu, which has a lot of free novels to choose from. I rarely read novels about ancient times. I prefer to read modern romance novels, such as 'MR. CEO'." (IP002-F71)*

The 'MR.CEO novel' or 'domineering novel' is a Chinese romance novel genre that revolves around a powerful and charismatic CEO who falls in love with a heroine who dares to challenge his authority. For a clearer understanding, you can think of these stories as an Oriental counterpart to Fifty Shades of Grey, or something like 'a love story between Mary Sue and her boss'

narrative. The typical plot is that of a powerful and wealthy man - whether a CEO, boss, or emperor - who becomes infatuated with an ordinary female subordinate, or a prince who falls in love with a commoner girl. These novels, which mainly appeal to young women and tap into their fantasies of romance and love, have become an important aspect of Chinese online literature over the past two decades. Recently, researchers found that older female readers have also become enthusiastic consumers of these online romance novels. The easy access provided by the Internet has removed the age barrier in the readership, allowing women of all ages to immerse themselves in the story of the 'Mr. CEO' who fell in love with them through online literature.

Accordingly, Digital entertainment for older users shows an increasingly diversified development trend. It has been suggested that older adults have stronger needs for entertainment and other aspects of smartphone use than adolescents (Xu et al., 2023). The results of this study suggest that older adults might not be inferior to younger adults in terms of digital entertainment and leisure. Engaging in digital entertainment can be beneficial for older adults, and participating in leisure and recreational activities is conducive to good mental health (Lee & Allen, 2021). Research by Ji et al. (2023) suggests that smartphone use can help to reduce depressive symptoms in older adults through increased social engagement and active leisure. Older adults can engage in a variety of leisure and recreational activities that are beneficial to mental health, such as social interaction, creative activities, and reading (Rivera-Torres et al., 2021). In addition, studies have argued that older people can make full use of digital tools such as smartphones to fulfil their purpose of continuing to learn, develop and stay active in later life. Rosales & Fernández-Ardèvol (2016b) emphasise that smartphones support older people's personal interests, such as socialising, personal management and entertainment, which go beyond the basic need for communication. Older adults overcome barriers to smartphone use primarily to stay in touch with family and expand their personal interests.

4.4.1.4 Payments and Finance Management

With the growing popularity of online shopping among silver netizens, online *Payment and Finance Management* have become 'a must' in daily life. Instead of carrying cash on the go, using their mobile phones instead of their wallets has become the norm for silver netizens. In this interview study, almost all participants said they would use online payment.

Online Payments: In the daily life of silver netizens, online payments are used for both offline and online purchases, and sometimes for transfers between friends and family. It is very common for silver netizens to not carry cash with them when they go out.

IP005 considered his smartphone to be his 'wallet'.

> *Researcher: Are there any situations where you have to take your phone out?*
>
> *IP005: Yes, usually when I have to buy something, for example. Because this (smartphone) is like a wallet. If you forget your phone, you forget your wallet, that's what it means. (IP005-M68)*

IP006 thought it's very convenient to pay by mobile phone.

> *This (mobile payment) is convenient, you can pay directly with one click. Scan the code, then you can pay. It's convenient. You see, we don't even carry cash anymore, it's convenient. (IP006-F66)*

IP016 suggested that the smartphone is 'a must' for her daily grocery shopping.

> *I go grocery shopping everyday. if I go grocery shopping, my mobile phone is vital for me. I pay with my phone all the time; we don't bring cash. (IP016-F60)*

Paying with New Method: Some participants reported their experience with Alipay's Face ID payment without a mobile phone. Alipay provide merchants with Face ID payment machines and Alipay users will simply scan their faces in front of the machine to pay, they will no longer be asked to show their payment QR code, nor to enter their password. It is often assumed that older adults may face higher risks when shopping online, such as financial risks or issues related to payment and cybersecurity, and that the perception of these risks reduces their willingness to pay and purchase online (Kwon & Noh, 2010). However, in this study, the participants were not fearful of this new payment method and instead showed trust.

> *"You can get discounts by using Alipay's Face ID payment feature at convenience stores near my home. One day, I wanted to buy something but realised I had nothing with me, even my smartphone and wallet were left at home. Just as I was about to go home to get the money, the shopkeeper reminded me that I could try using Face ID payment. I was a little hesitant but decided to give it a try. It turned out to be very convenient as the payment was completed with just a scan of my face. When I got home, I checked my*

text message to confirm the transaction details. No mistake was made." (IP009-F62)

Another participant also said that she tried Face ID payments by chance.

> *"Yes, I've tried Alipay's Face ID payment. Once, I was at the store and had forgotten to bring my phone and wallet. Seeing my embarrassment, the shop owner suggested me to try Face ID payment. It was really convenient; you don't need to pull out your phone or input a payment passowrd, just stand in front of the machine and let it scan your face. This method of payment not only saves time but also prevents the inconvenience of forgetting your payment tools." (IP012-F70).*

Additionally, participant IP016 also holds a very positive attitude towards Face ID payment, considering it to be highly convenient and accurate. When asked if she was worried about errors leading to money losses, she repeatedly stating *'impossible, impossible, impossible'*, emphasising her trustiness on the new payment method. Contrary to the stereotype that elderly people are generally fearful and hesitate of technology, especially when it involves money and property, these participants' willingness to try Face ID payment demonstrates their confidence and challenges the myth of the older adults' digital use.

Money and wealth management: Participants reported that they now rarely go to bank counters to deal with banking and money related business. They use mobile banking APPs on their mobile phones or online payment platforms like Alipay to do money transfers, investments and wealth management. From ordinary money transfers to the purchase of low-risk banking products, to medium to high-risk investments in funds and stocks, silver netizens can do them all through mobile APPs and find it a convenient and quick way to save the hassle of queuing up at bank counters.

IP002 demonstrated how she uses multiple bank apps to manage all her bank accounts, and she hardly ever needs to go to the bank counter in person:

> *"See, I have a lot of banking (apps) here, basically all my bank accounts have mobile banking apps. I also buy investment products online, basically I rarely go to the bank counters now." (IP002-F71)*

IP010 described the ease and speed of transferring money to his daughter through mobile banking, emphasising that the banking app does not charge any fees for providing the transfer service:

> *"I send money to my daughter through mobile banking, and it is very fast and convenient. You know mobile banking is easier than going to the bank counter…it doesn't charge me anything; I can transfer 200,000CNY through it and it doesn't charge me any fees. I didn't even have to pay 1 CNY while I transferred the money. The whole process only took me 3 seconds." (IP010-M72)*

IP015, on the other hand, said that he handles all his investments through his smartphone and emphasised that even market vendors are using WeChat payments:

> *"I handle all (investments) through my smartphone. I think it's still relatively easy, you basically don't have to go to the bank now. Market vendors who sell vegetables at the market can now accept customers using WeChat payment." (IP015-M62)*

4.4.1.5 Healthcare and Disease Management

For silver netizens, *Healthcare and Disease Management* was a topic that could not be avoided. From the personal background information provided by the participants, more than 50% of the participants had chronic illnesses. 13 participants mentioned in the interviews that they use their mobile phones and the internet to deal with 'healthcare and disease management' related tasks.

Accessing Online Health Inforamtion: IP002 mentioned in the interview that she had recently experienced some problems with her 'thyroid', which her doctor highly suspected to be a malignant tumour. Despite her doctor's professional advice, she had to get more information about this unfamiliar disease from the internet herself.

> *"I recently had a serious thyroid problem, so my daughter took me to see two doctors who recommended surgery. Yes, I have a thyroid nodule and the doctors suspect this could be a malignant tumour. So, I looked up the information on Toutiao. The articles I read all identified the author's name, which university or hospital they were from, so these could be trusted. This is on Toutiao, not Baidu. Toutiao offers a very wide range of content and is so*

convenient that I don't even need to download the Baidu search engine specifically." (IP002-F71)

It is an inevitable desire for every patient to want to know more information about diseases. The Internet provides elderly people with an access to more disease and health information, satisfying their needs to 'be informed'. The Internet provides elderly people with an access to more disease and health information, satisfying their needs to 'be informed'. IP003 is a gastritis patient, and he will go online to see what experience other patients have shared about 'intestine and stomach care'. Despite the doctor's suggestion to limit his inquiries online to avoid unnecessary worries, IP003 believes that contents shared by other patients on the network can serve as a reference for him. Despite the doctor's suggestion to limit his inquiries online to avoid unnecessary worries, IP003 believes that contents shared by other patients on the network can serve as a reference for him.

"For example, I read about the treatment and care of enterogastritis on Xiaohongshu. I only use this information as a reference because I have to consider my doctor's opinion and my own personal experience when I seek treatment. Although there is a wealth of information on the Internet, there are also a lot of divergent views, so I need to make a judgement based on my own situation. I have learnt that chronic illnesses such as mine can last for a long time, and I have learnt what lesions and adverse consequences may arise from chronic illnesses, etc., but they are only used as a reference." (IP003-M64)

Managing Chronic Disease: In addition to regularly accessing disease-related content on the internet, IP015 has joined a 'hospital-patient community' on WeChat. In this group, his doctor communicates regularly with him and his fellow patients. This 'doctor-patient online community' allows patients to receive professional guidance and advice from their doctor without having to go to the hospital.

"The hospital's endocrinology department has also set up a WeChat group for us diabetic patients, which is very helpful. There are not only doctors in the group, but also many patients like me, where we can share blood glucose test results and discuss the impact of diet on blood glucose. If there

are any problems, the doctor will also provide timely feedback and advice in the group, which makes me feel very relieved." (IP015-M62)

As a popular social application in China, WeChat has shown significant potential in chronic disease management as well, with many studies reporting the effectiveness of WeChat in chronic disease management, particularly in the management of diseases such as hypertension, diabetes, coronary heart disease and cancer (Chen et al., 2020; Zhong et al., 2022). By providing a platform for interaction and information exchange, WeChat helps patients to obtain timely and accurate health information while enhancing their self-efficacy and mutual support (Zhong et al., 2022).

The analysis results of this study indicate that silver netizens can use smartphones to access and manage health information on various digital platforms. Li et al. (2020) found that older individuals tend to obtain health-related information through their social network like WeChat groups rather than relying on authorised news updates. It is important to note that social media platforms like WeChat are rife with rumours and misinformation (Chen, 2015). Older adults who consider themselves confident, capable, influential, and relationship-focused may encounter more health misinformation while browsing online (Li & Chang, 2023). This indicates that while older adults can utilise digital technology to obtain health information, they also face challenges regarding the accuracy and reliability of the information. Therefore, when encouraging them to use digital technology for health management and information acquisition, it is essential to remind them to pay attention to the authenticity and authority of the information to avoid misinformation. Ensuring the credibility and authority of information sources is crucial for helping elderly individuals safely and effectively use digital resources for health management.

4.5 Some 'Good Places' in the Digital World

In his book 'The Great Good Places', Ray Oldenburg (1999) introduces the concept of the 'third place,' which refers to public spaces used for socialising and connecting with the community, beyond one's home (the first place) and workplace (the second place). These venues not only serve as platforms for community members to interact but also as bridges that transform strangers into friends, creating important gathering places outside of family and work. In the book, Oldenburg particularly emphasises the importance of these 'third places' for older adults. These locations provide a space for retired individuals to maintain connections with younger people and other community members, thereby fostering social connections across different age groups.

In traditional life, *third places* often refer to physical locations like parks, libraries, or cafes. However, in the virtual world, third places might no longer rely on physical localities. The rise of the network society has introduced the *space of flows* and *timeless time as* new spatial and temporal formats (Castells et al., 2007). In this paradigm, the *space of flows* is no longer confined to physical proximity, and the *timeless time* disrupts linear temporal sequencing, creating asynchrony and increasing flexibility to social interactions (Castells, 2010; Castells et al., 2007; Lindgren, 2017; Lindgren, 2017). For silver netizens, third places in digital life often take the form of digital platforms or apps, supporting their ability to interact and act within these fluid, boundless spaces and asynchronous timelines. Based on my research, there are diverse good places where Chinese silver netizens find opportunities to start anew in their leisurely yet active later years. They explore various digital spaces that extend their living rooms, study rooms, playgrounds, and tool sheds. These explorations are driven by their own purposes and needs, as some may pass through certain spaces briefly, while others linger and return frequently. This personalisation of digital spaces through individual practices has become an integral part of their daily lives, as these *good places* and the activities within them form the core of their digital existence.

4.5.1 Living Room - the first place to meet families and friends

The digital *Living Room* of silver netizens is primarily manifested in instant messaging apps such as WeChat and QQ. In these places, just like in their physical living rooms, silver netizens can interact and communicate with family and friends, maintaining emotional connections. Whether it's through video chats, sending voice messages, or sharing snippets of life, these apps eliminate distance as a barrier to communication. The 'living room' not only provides silver netizens with a convenient communication channel with family and friends but also becomes an important place for them to express themselves and gain social support. On WeChat and QQ, they can easily create groups to stay closely connected with families, old friends and community members. Additionally, the 'living room' offers social networking services (SNS) functions, such as WeChat Moments. By posting pictures, videos, and text messages, they can share daily life moments on their social network, receiving concerns and supports from each other. This not only provides emotional satisfaction but also helps them maintain social vitality and reduce feelings of loneliness.

> *"I served in the army for over 20 years. Back then, when comrades in-arms retired, it felt like a final farewell because we are from all over the country*

and no way to stay in touch. We didn't even have phones in old times. Once they left, we might never see each other again. But now, with WeChat, especially in recent years, we've been able to reconnect with those old comrades in-arms. Like I mentioned earlier, the comrades from my unit where I was a company commander in 1987 have gradually been able to reconnect through WeChat." (IP008-M63)

It is also noteworthy that in China, WeChat serves as much more than just a 'living room'. Beyond its instant messaging and social functions, WeChat also offers practical features like news updates, public services, payment and financial management, and health management. These functionalities greatly facilitate the daily lives of silver netizens, transforming their lifestyles and enabling them to better integrate into digital society, enjoying the conveniences and joys of the digital age.

4.5.2 Study Room - the second place after retirement

The workplace used to be the second space, but for retired individuals, there is no longer a space or burden of work. However, silver netizens remain actively engaged in learning and working on their interests during their third age. In this digital *Study Room*, they immerse themselves in personal interests, learning new knowledge to achieve lifelong learning goals and fulfil themselves in their later years. For example, they read articles of interest on Toutiao or WeChat, search for information on Baidu, or browse travel tips, life hacks, and hobby-related posts on Xiaohongshu, expanding their interests and updating their digital skills through the internet.

During the interview, IP008 shared his experience of creating and publishing articles on an app called MeiPian. In his spare time, IP008 uses the platform 'MeiPian' for creative expression, documenting his personal history through photos and text. This not only allows him to share these precious memories with friends and family but also ensures that significant moments of his life are preserved and passed on beyond the constraints of time. This method preserves personal memories and provides a unique way to record family history.

'I edit my works on MeiPian. In this article, I've chronicled my experiences year by year. Look, here are the photos from when I enlisted in the late seventies. I turned my photos into a photo album. This one is from 1979 when I served in the army that year. Even after I pass away, my children will

still be able to see these stories. This photo is from 1984, during the Vietnam War. And this is from 1985 when I was promoted to an officer. This was our independent motor battalion…'(IP008-M63)

In addition, IP008 also showed me his blog during the interview, which has attracted over 100,000 visitors. IP003 also introduced his personal interest—listening to books on Ximalaya, an FM app.

"I've been using Ximalaya for several years now. I listen to books on it, mostly history and novels. For example, I've listened to Dream of the Red Chamber several times, as well as Water Margin, Romance of the Three Kingdoms, The Sui-Tang Dynasties, and so on. I've also listened to books by Eileen Chang. Basically, I listen to all kinds of books, but mostly classics." (IP003-M64)

It is evident that digital technology also provides older adults with learning opportunities, allowing them to explore their hobbies online and offering a fulfilling way to spend their leisure time. It enables them to pursue various interests, acquire knowledge, and participate in online courses (such as IP010 attending a Photoshop training class) or engage in digital creation (such as IP008 creating content on MeiPian). This can provide a personalised lifelong learning environment for the older population.

4.5.3 Playground - The great third place in digital world

The *Playground*, like Oldenburg's definition of the 'third place,' acts as a public space that plays a vital role in integrating community members. Through shared interests or activities, people meet and interact in these informal social venues, making them a fundamental part of the community structure. This setting is incredibly valuable for all community members, especially older adults, as it helps them stay active, continue social participation, and enhance the richness and meaning of life. In the digital world of older adults, there are similar spaces. For example, in WeChat groups, elderly people can initiate invitations, organise activities, and engage more people, known and unknown, connected or not, in social interactions. Platforms like TikTok also serve as these public squares, offering entertainment videos and various social and interactive games.

> *"We usually browse TikTok. On TikTok, I generally watch local and nearby content. Some friends post their content there. However, I don't post on TikTok myself. Sometimes, I share my photos on WeChat Moments. We have a group for retired classmates, and we often organise outings where we eat, chat, play cards, and take photos together. Afterwards, we share the photos in that group." (IP015-M62)*

IP004 emphasised the importance of interaction on social platforms like TikTok or WeChat Moments. He believes that simple likes and comments can easily make others feel happy and appreciated.

> *"In terms of communication, for example, when friends go out and share photos on WeChat Moments, you can like or comment on their posts, and they will feel happy. On WeChat Moments, TikTok, and WeChat Channels, we can 'like' and comment on others' posts, simply by sharing our own opinions...From a psychological perspective, people will definitely enjoy receiving 'likes' and comments from others. No matter what, they will appreciate it. Even if it's just a simple 'like', it doesn't take any effort—just a tap of your finger. Since it's so easy to make others happy, why not do it?" (IP004-M67)*

In all, digital technology is not just a communication tool for the older users but also a 'playground'. It helps them organise activities, arrange outings and gatherings, and provides a wide range of interactive and entertainment features. By participating and interacting on these platforms, older adults can gain emotional connections and satisfactions, thereby enhancing their well-being in their later years.

4.5.4 Tool Shed: Daily life administration tools

The digital *Tool Shed* is mainly represented by Alipay and banking apps. These tools enable silver netizens to easily manage their daily finances, such as paying utility bills online, managing investments, and retirement funds. Digital payments not only enhance their convenience but also increase the security of their daily life, allowing them to easily complete various transactions and financial management tasks at home.

Finally, for most silver netizens, WeChat acts like a multi-functional infrastructure. It combines the living room, study room, playground, and tool shed. In China, the development, expansion, and monopolistic tendencies of big techs such as Tencent and Alibaba have further blurred the functional boundaries of spaces. Platforms like WeChat and Alipay, underpinned by these companies, have evolved into social infrastructures (Plantin & De Seta, 2019; Wang, 2022). These apps integrate functionalities for communication, social networking, financial management, household tasks, and entertainment, effectively consolidating the roles traditionally served by spaces like cafes, banks, and libraries. This functional diversification demonstrates how ICTs have blurred the lines between places, reshaping their definitions and uses. According to my participants, WeChat offers services that encompass most aspects of their daily activities, including but not limit to social interactions, information acquisition, entertainment, and financial management. It functions more like urban infrastructure than merely an instant messaging application—the purpose for which it was initially developed in 2011.

Even so, my research findings reveal that while users may engage with the same platform or app, their definitions of these spaces or places are unique and deeply personal. Just as Castells et al. (2007) pointed out, wireless communication redefines places as flexible and personalised spaces shaped by individual practices and communication needs. In their digital everyday life, silver netizens actively personalise and redefine these digital spaces through their practices, assigning individual meanings to these places and transforming them into the “anywhere” they need. In conclusion, while advanced communication technologies have blurred spatial boundaries, silver netizens redefine and individualise their own *good places* in the digital world, creating spaces that are meaningful and tailored to their needs. These personalised spaces demonstrate how older adults actively navigate the network society, crafting a sense of place in a boundless digital landscape. Through these digital platforms, the lifestyle of silver netizens has been completely transformed and enhanced, allowing them to enjoy the conveniences of modern technology while continuing to be active in social and cultural life, showcasing the new appearance and possibilities of elderly living.

4.6 See the Trees: Heterogeneity of Silver Netizens Digital Everyday Lives

4.6.1 Silver netizens' heterogeneity in digital activities and applications

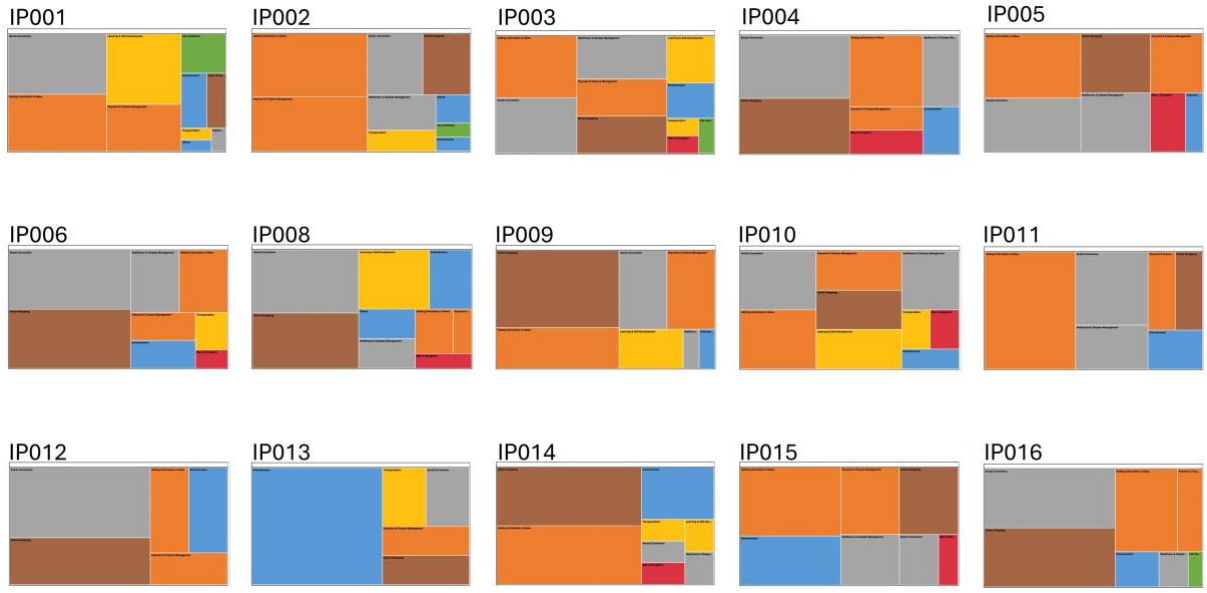


Figure 30 Visualisation results of participants' digital activities analysis

(See the full-size versions of these 15 tables in Appendix G)

The digital daily lives of silver netizens are not only colourful but also varied from one to another. These 15 mini-figures in Figure 30 were automatically generated by NVIVO's data visualisation. They show the daily digital activities of the 15 participants in this study as mentioned in their interviews. In the mini-figures, different colours indicate different types of activities, while the size of the blocks and the shade of the colours represent the frequency and length when the participants talked about the topic. The different distribution of the block sizes and colours in the mini figures reveal the diversity of the daily lives of the older digital users. The findings suggest that older people are involved in a wide range of activities in their digital lives, including socialising, accessing news and information, leisure and entertainment, health management and many other aspects.

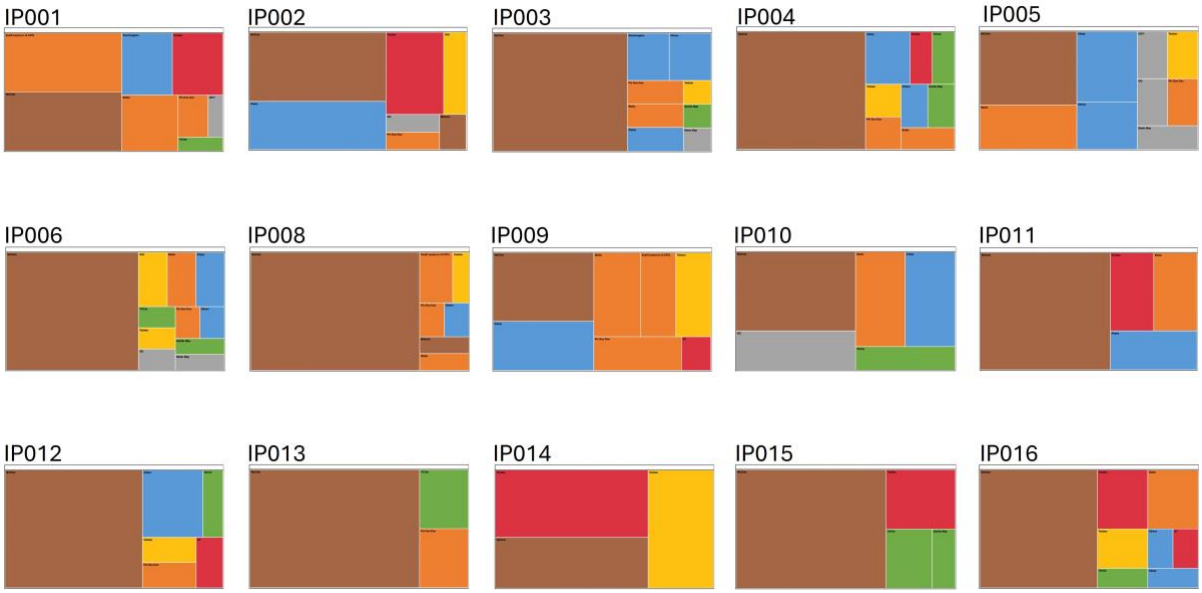


Figure 31 Visualisation results of participants' application use analysis

(See the full-size versions of these 15 tables in Appendix G)

Similar to Figure 03, the 15 mini-figures in Figure 31 demonstrate the 'places' (the digital apps and platforms) that participants visited most in their digital daily lives. These visualisations reveal the diversity and personalisation of digital application choices for older users. Firstly, WeChat (coloured in brown) occupies a prominent position in all of the mini figures, which not only reflects its central role in the daily lives of the silver netizens, but also indicates its basic function as a social infrastructure in China. After all, WeChat is not only an instant message tool, but also a collection of payment, news reading, health management and other multi-functional platform. Secondly, the figures also illustrate that older users are using wide range of apps in their digital daily lives, including shopping platforms such as Pinduoduo and Taobao, payment tools such as Alipay, search engine like Baidu, and entertainment apps such as Tiktok and Toutiao. The sizes and shades of the colour blocks are different in each mini figure, indicating that silver netizens vary in their use of each platform, reflecting their personalised routines and demands on adopting different applications.

In this way, the heterogeneity of older users' digital lives can be 'seen'. The above findings not only reflect their varied reliance and interest in diverse activities, but also show the personalisation of their digital experiences. This suggests that although older people are generally perceived to have limitations in their use of technology, they are in fact actively exploring the full use of digital tools to fulfil their needs and interests. Meanwhile, variations in the shade of the

colour blocks also reflect the importance and impact of different digital activities might vary on people's lives.

The diversities of their digital activities and their most-visited 'places' confirms that the older users are not a homogenous group in terms of digital use. Instead, each of them is leading a unique and customised digital life. Besides, this uniqueness may be determined by a variety of factors rather than age, but also individual's life background, life experiences, technological proficiency, and social needs. These findings challenge the common assumptions about older people's technology use and supports the views of scholars emphasising the heterogeneity of older populations in the digital age (e.g., Loos et al., 2022; Stone et al., 2017; Pirhonen et al., 2022). This also provides a reference for future age-friendly design. When providing technology products and services to older people, developers and researchers should consider the specific needs of older users as a diverse group, rather than considering them as undifferentiated.

4.6.2 Gender differences

The analysis results of this study indicate that gender does not influence the diversity of activities undertaken by elderly individuals, aligning with the findings of van Deursen & Helsper (2015). However, gender does result in differences in the types of activities pursued. Seen from Figure 32, it is evident that female participants more frequently discussed using digital technology for socialising and online shopping, while male participants focused more on accessing news and managing their health through digital means. Additionally, women reported higher usage of digital technology for handling public transportation tasks, whereas men discussed using it more for navigation purposes. The proportion of discussions about online shopping and leisure entertainment was nearly equal between genders, indicating that both use digital functions to manage their daily affairs. These differences reflect varying gender roles, interests, and lifestyle habits, which should be taken into account when designing related products and services.

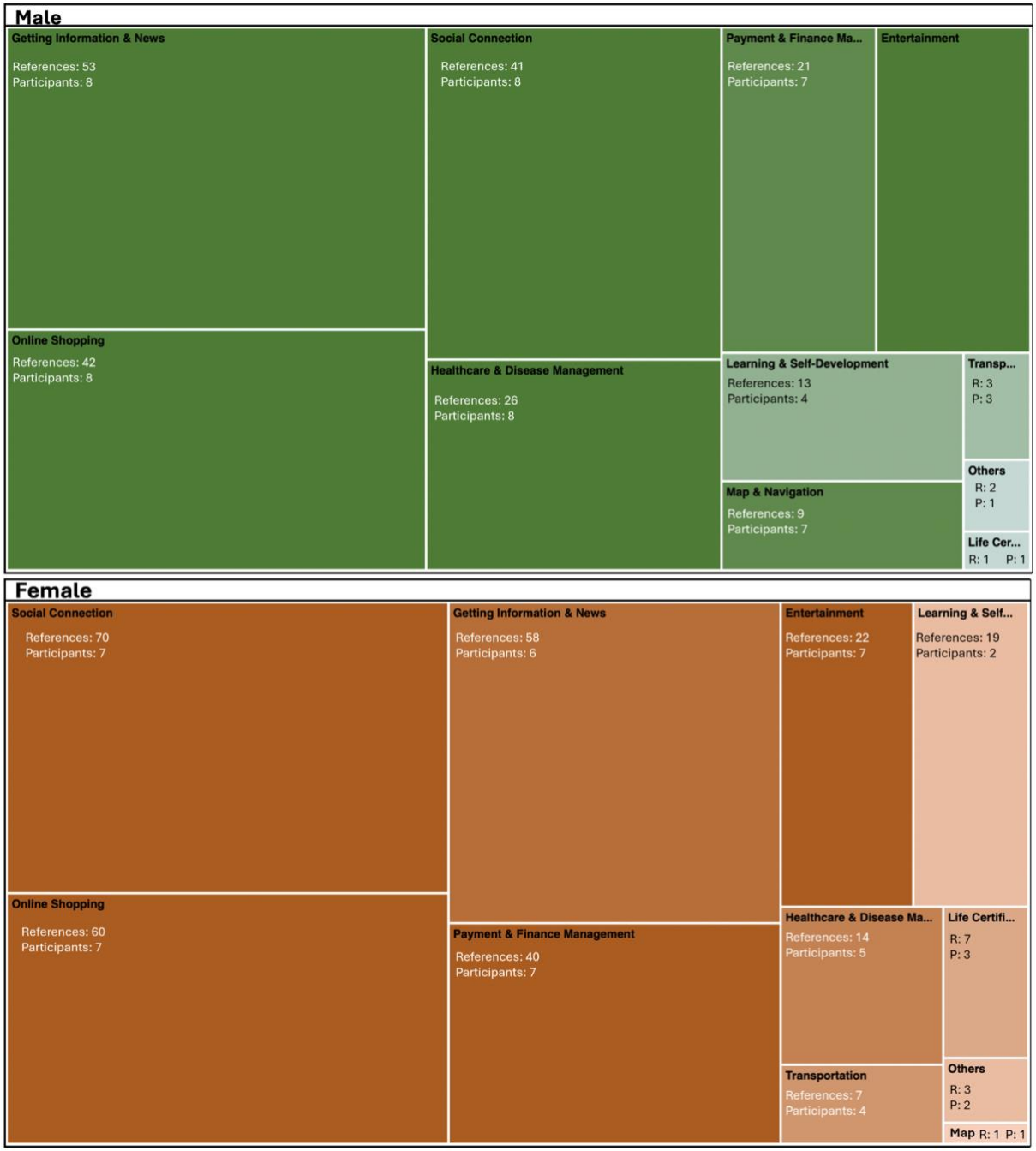


Figure 32 Gender differences of digital use between male (green) & female (brown)

Carlo and Buscicchio (2022) found that women not only own fewer digital devices than men but also use the internet and social networks significantly less frequently. They argue that the number of elderly women familiar with and using IT technology is considerably lower than that of men. Factors such as lower educational levels and less leisure time could contribute to the lower degree of digitalisation among elderly women, ultimately leading to lifelong inequalities. In this study, female respondents did not show significantly lower digital usage activity than males. However, it is notable that only men mentioned experiences as digital leaders or digital support providers (IP008, IP010). Moreover, it was also men (IP010, IP015) who discussed their continued use of computers in daily life, suggesting a difference in the diversity of digital usage between genders. Additionally, when discussing their use of digital devices for gaming, all participants

were men or non-carer women for grandchildren. This suggests that older women, often taking on caregiving roles for grandchildren, may have less time for their own digital entertainment. The words of Participants IP012 provide some evidence:

> *"Now, I want to live for myself for once. You see, I used to live for my daughter, then for my granddaughter. Now, I've let go of taking care of them, and I want to live for myself. That's why I'm always out and having activities." (IP012-F70)*

In the interviews, IP012 mentioned that she had sacrificed much of her own time to take care of her daughter and granddaughter. Now, she is now leading a very busy life because she wants to live for herself once. This indirectly shows that older women may sacrifice more of their personal time for family care, leading to a decrease in their digital capital and digital experience.

Conclusion

Research on the digital use of older adults should encompass both an overarching view (the forest) and detailed analysis (the trees). Based on the findings from both quantitative and qualitative research, the chapter explores not only the general trends of digital use among older adults but also delving into and focusing on their daily digital experiences and the specific impacts of digital technologies on their lives.

Section 4.1 examines how Chinese silver netizens interacted with technology before retirement. It highlights the transformative impact of smartphones, particularly how they have reshaped the digital lives of Chinese older users. This section also notes that many individuals born in the 1950s and 1960s only began accessing the internet after smartphones became widespread, missing the 'third wave' age of personal computers and the internet. Due to the late adoption of internet development in China, this generation faces challenges with computer operation, particularly with Chinese input.

Section 4.2 provides an overview of the digital daily lives of Chinese silver netizens from both quantitative and qualitative perspectives. Data from the 2017 China General Social Survey (CGSS2017) indicate that the online activities most frequently engaged in by silver netizens include socialising and information acquisition, followed by leisure and entertainment, self-expression, and business transactions and online activities. Questionnaire results reveal that

smartphones are the most commonly used device for internet access, with socialising, accessing news and information, leisure, and online shopping being the most frequent digital activities. The majority of participants felt that the internet positively impacted their social relationships and activities, although nearly half also perceived a negative impact on their interest and motivation to engage in activities.

Section 4.3 delves into the importance of the smartphone in the lives of older people. The use of digital technology is closely intertwined with and inseparable from the everyday lives of older adults. According to participants, the first thing they do when they wake up each morning is checking their smartphones. Smartphones play a central role in social interaction and entertainment and are inextricably linked to the daily lives of the silver netizens. It can be said that smartphones are not only a part of their lives, but also a gateway that brings them into a deeply integrated physical and digital reality. In China, older adults are generally highly dependent on smartphones, almost exclusively using smartphones in daily life and rarely switching to other devices.

Section 4.4 analyses the most important activities and places in older people's digital daily lives, showing how they can be active and enjoy diverse lives in the digital world. It is found that silver netizens engage in a wide range of digital activities, from social interactions and leisure entertainment to health management, utilising smartphones and mobile internet for various interactions. This shows that older adults' active participation in the digitalisation process and their ability and interest in adopting digital technologies. Secondly, older users' acceptance and use of various digital platforms indicate their adaptability and positive attitude towards new technologies. They not only use social apps like WeChat but also actively use information, e-commerce, and financial service platforms such as Baidu, Taobao, Pinduoduo, and Alipay. Additionally, they use platforms like Xiaohongshu and Xuexi to learn and expand their knowledge, or tools like Gaode Maps and Didi to meet practical needs. This diverse use demonstrates older adults' ability to effectively utilise different digital tools, enriching and facilitating their lives. It is also pointed out that for the older adults, activities in the digital world are also distributed in different 'Spaces', such as 'living rooms' (for social interaction with friends, such as WeChat and QQ), 'private study rooms' (information platforms for personal interests and lifelong learning), and 'playgrounds' (platforms for social and entertainment compatibility, such as TikTok and games). These digital Spaces not only enrich their social networks, but also provide a rich variety of options for their entertainment lives. Applications such as WeChat, due to their versatility, have become an integrated infrastructure of living rooms, study rooms, playgrounds and tool rooms, significantly supporting a wide range of activities for older adults in the digital world.

Finally, Section 4.6 highlights the heterogeneity in digital use among older adults through NVIVO data visualisations, showing the individuality and diversity in their digital activities and application choices. These insights challenge prevalent assumptions about older adults' technology use and support scholarly arguments emphasising the diversity of older populations in the digital age. This research informs future age-friendly designs tailored to the needs of older individuals.

In all, the silver netizens are not just like the visitors described by White and Le Cornu (2011), who see digital devices and applications as tools; they are more like residents (White & Le Cornu, 2011) who live in the digital world. These digital activities and spaces not only enrich their social networks, but also provide a rich variety of options for their entertainment lives. Digital use brings convenience to the daily lives of silver netizens and enhances their well-beings.

Chapter 5 Generational Digital Differences and Interactions: from Silver Netizens' Perspective

Born in the 1950s and 1960s, the older generation carries unique marks of their era into their digital lives. The digital divide may not simply be an issue of age but rather the deeper influence of the historical context throughout their life course. During the interviews and focus group discussions, participants expressed gratitude for the progress of the times, showing a higher-than-expected acceptance and satisfaction with digital technology. The technological skills and digital lifestyles are taken for granted for many young people, however, for the silver netizens, being capable to manage those digital technologies is an achievement worthy of recognition. Young people may take the advancements in digital technology for granted, whereas older individuals who experienced material scarcity and social unrest may value the societal changes brought about by digital technologies more preciously. Recent studies indicate that older users in China might tend to overuse on smartphones and the internet, suggesting that older individuals might depend on these devices more than younger people. However, from a perspective of ICTs compensation theory, it can be assumed that some excessive use by them might be an attempt to compensate for the deprivations of the past times.

Introduction

A growing number of research shows that older adults can be active and experienced digital users (Rosales & Fernandez-Ardevol, 2019). They are not just passive users of technology, but active participants who are willing to learn and accept new things (Ma et al., 2022). Study has shown that some digital behaviour of older people is not much different from that of younger people when it comes to practices such as online shopping (Kuoppamaki et al., 2017). Older users not only have a certain amount of digital capacity and experience, but also are willing to actively integrate into the digital society (Costa et al., 2019). With the popularisation of technology and the accumulation of experience in using it, the digital divide between generations is gradually narrowing.

However, other studies suggest that generational differences in numbers persist because of life trajectories. Gilleard and Higgs (2008) pointed out that the digital divide may not solely be linked to age, but rather more closely associated with the specific experiences and backgrounds of each generation. In other words, it is not 'age' that creates a digital divide, but the development of the times that carves the divide between generations. The digital differences between the younger and older generations, as well as between the younger and senior old adults, are both recognisable and acceptable. Some studies have pointed out that in intergenerational digital communication, netiquette incompatibility and capability differences exist between different generations (Carlo & Rebelo, 2018). Fernandez-Ardevol et al. (2022) pointed out the difference between the old and the young in the concept of digital media use. However, they also highlight intergenerational commonalities: people of different age groups tend to use digital technology in their own way *('I do it my way'*) (Fernandez-Ardevol et al., 2022). Research that explores intergenerational digital use, understanding and respecting generational differences, and finding intergenerational interactions and common ground, can promote higher digital inclusion and mutual understanding between generations.

This chapter explores the digital interactions and differences between generations. The main source of information of this chapter is the focus groups while I also rely on the interviews when appropriate. Firstly, it analyses the interactions and support activities between silver netizens and younger generations, highlighting the dynamics of their digital engagements. Then, it explores perceptions of generational differences in digital habits between the young and the old. This section challenges the notion that digital overuse is only a youth phenomenon and discusses the compensatory behaviours older adults exhibit in their digital use. In section 5.3 presents findings

from research data identifying digital leaders among older users, illustrating that some silver netizens can also be digital savvy.

5.1 Intergenerational Interactions

In the digital age, intergenerational digital interaction is crucial. It can foster understanding and respect between generations, allowing individuals from different age groups to learn about each other's cultures and perspectives. This, in turn, promotes harmonious intergenerational relationships in society and within families, reducing generational conflicts. Psychologically, it provides emotional support to older adults, reducing feelings of loneliness in their later years. In terms of daily digital life, the sharing and support from younger generations can assist the older adults in overcoming challenges related to digital technology. Sharing, support, encouragement and intervention are all possible digital interactions between generations. Participants said they only care about their own world and do not care about what young people are doing. They recognised that it is important to understand young people, accepting that young people have their own culture and just let it go. Group discussion also indicates that older adults only interact with their peers and not with their children because the children refuse to interact with them digitally.

5.1.1 Digital support from younger generations

In terms of digital technology use, older people often need support from so-called "warm experts" (Hunsaker et al., 2019). A warm expert is a person who *'mediates between the technological universal and the concrete situation, needs and background of the novice user with whom he is in a close personal relationship'* (Bakardjieva, 2005, p. 99). Family, friends and volunteers are all potential warm experts to support older adults with digital technologies, while younger family members are often considered as important 'warm experts' (Martinez & Olsson, 2022). In China's social context, retired grandparents often take on the responsibility of caring for their grandchildren. This family structure makes it possible for the older adults to have close contact with the younger generation, thus providing older adults with the opportunity to learn and master new technologies. From an intergenerational inclusion perspective, digital giving-back from children is an important way for older people to get support. During interviews, participants stated that they *Receive Supports from Younger Generations*, they turn to their children for help if they have problems using digital devices such as smartphones. For some participants, their children are their digital technology enlighteners.

> *"Yes, my daughter helped me set up my Alipay account. She helped me set up the account and taught me how to use Alipay and WeChat. Now I can operate all these apps. For example, I can now use WeChat to send messages whenever I want." (IP002-F71)*

IP005's daughter lives in the United States, far away from him. however, when IP005 has a digital problem, he still turns to his daughter for online support. Though the father and daughter need to deal with their problems remotely, IP005 feels that his daughter is patient enough to help him.

> *"If I have a problem with using my smartphone, I basically contact my daughter first and I ask her. On WeChat, I tell her what problem I got, take a 'screenshot' on my phone and send it to her. I ask my daughter for help when I have a problem, and she is always able to solve it. But generally, I rarely ask her problems about some apps, because she doesn't use the ones, I use…she is patient, and list me the steps of operations I need to do to solve the problem…she helps me even if she is busy." (IP005-M68)*

Although, drawing from Chinese cultural value of "xiaoshun" (filial piety) (Tang et al., 2022), or as observed in previous studies (e.g., Martinez & Olsson, 2022; Olsson and Viscovi, 2018), younger family members often serve as warm experts in the lives of older adults, this type of support is not universally available to all older individuals. "My child is too busy to support" or "My child is impatient to support" are common situation among participants in interviews and focus groups. IP016 said if she was going on a trip, her daughter would prepare everything she needed for her, such as train tickets booking, flights booking or hotel reservations. Her daughter is happy to help her (rather than teach her). However, if she encounters some digital technology challenges in her daily life, she is less willing to ask her daughter for help. IP016 reported her situation in the interview, mentioning that daughter and son in-law are too busy to walk her through the digital troubles.

> *"They won't help. It's better to learn by myself rather than ask them for help. They are busy with work. Young people nowadays are not like we used to be; they are under a lot of pressure to work. They generally don't have much patience. I don't think they have much patience. I can't understand either (even they teach me), I'm probably too goofy. They might say 'I've taught you, why can't you remember?' Yes, that's what my daughter used to say. 'I've*

> *already told you, why are you asking again', so I'm afraid to ask them. I don't want to ask them anymore; they are already tired from working and I can understand them as well." (IP016-F60)*

In the focus group, FG02-02 shared a negative view of intergenerational digital support:

> *"Digital skills never pass from the younger generation to the older generation, just like my child will not teach me how to use the smartphone, but he will teach his son how to use it. Sometimes when the child is crying, he will give the smartphone to him to play games, comfort the child with the smartphone, and the child will be quiet." (FG02-02, F60)*

Digital support from family members is not only a practical helping hand to help older people learn and use new technologies, but also a manifestation of emotional and social support, which has a profound positive impact on the quality of life and social participation of older people. But in both interviews and in the group, participants expressed the opinion that their children were not warm enough. Their children's lacking patience led older adults turn to their peers for help.

> *FG02-03(F64): They don't tell us which devices are good either, or they get impatient when teaching us. We can only keep practicing; after using it for a while, we'll get the hang of it.*
>
> *FG02-04(F63): They seldom make recommendations.*
>
> *FG02-03(F64): Peers will always teach you.*
>
> *FG02-05(M60): Peers can communicate well, there's no generation gap.*

It is found that learning among peers may be more efficient (Hunsaker et al., 2020) and promote beings of both beings. Pihlainen et al. (2021) found that teaching among peers makes all kinds of people express beneficial changes in their motivation and courage to participate in digital training courses and use digital technologies for older people.

5.1.2 Exchange of ideas and knowledge

The use of digital technology and digital media also facilitate intergenerational communication, bringing silver netizens with *Exchanges with Younger Generations*. For example, older and younger generations can share their interests and opinions on social media, and the act of sharing in this way allows their ideas and culture to be seen and known by a wider audience. By participating in these platforms together, different generations can more easily find common ground and topics to talk about, thus creating closer connections and communication. In addition, digital technology provides older people with greater access to information and education, compensating for their lack of digital social knowledge, which also provides more opportunities for intergenerational exchange with younger generations.

> *Without the internet and devices like the smartphone, there would be more of a gap between our thinking and that of young people. Through the internet and smartphones, we can "see/be seen" by each other. We can read the thoughts of older people, and we can read the thoughts of younger people. On the internet we can also see what young people are thinking nowadays, so it also facilitates our communication with each other. (FG01-01, F60)*

FG02-04 suggests that she can promote intergenerational understanding and interaction between her grandson by using the platforms and content that he likes.

> *Xiaohonghsu is the platform my grandson uses the most. He just particularly loves browser videos on RED. I especially love watching it too, you can learn so much on it. For example, children are interested in science and technology, and there's also a lot of craft-related stuff for children. So, that's his interest, but I also follow him on RED sometimes. (FG02-04, F63)*

5.1.3 Learn from the younger generation

According to anthropologist Margaret Mead (1970), there are three types of cultures: postfigurative, configurative, and prefigurative. In postfigurative cultures, cultural transmission occurs from elders to younger members, and the emphasis is on traditions and ancestral veneration. Configurative cultures are present-oriented, with cultural transmission happening among contemporaries. Mead predicted the emergence of prefigurative culture, which is future-

oriented, with cultural transmission predominantly from youth to elders. The shift towards prefigurative culture has been accelerated by the Digital Revolution and rapid technological advancements. This has led to a collapse of information hierarchy and an equalization of access to knowledge. The concept of childhood as a subordinate stage to adulthood has also been challenged as information becomes more accessible to all. The open-access nature of information technologies has the potential to foster a prefigurative culture where youth possess greater knowledge about the world than their elders, as predicted by Margaret Mead.

In interviews and focus groups, research participants have highlighted the recognition that young people often lead the way in technological advancements and excel in navigating the digital environment. They acknowledge that the younger generation possesses the ability to access and utilise information resources more quickly and effortlessly. In this digital age, the internet has become a catalyst for intergenerational learning, breaking down traditional barriers and facilitating the transfer of knowledge from tech-savvy youth to older individuals. It provides a dynamic exchange of knowledge and skills between generations. Various online platforms such as social media, online communities, and educational websites offer older adults an opportunity to bridge the generation gap and actively engage with young people. Through these digital channels, older individuals can *Learn from Younger Generations,* gain insights into emerging trends, acquire new skills, and broaden their perspectives. Furthermore, by observing the content shared by young people, be it creative works, innovative ideas, or cultural viewpoints, older adults can stay connected with a constantly evolving world and draw inspiration from it. While the internet undoubtedly brings about age-related divides and fragmentation, it also provides a unique opportunity for older individuals to embrace lifelong learning and maintain intellectual vitality. Additionally, it helps them actively participate in the digital world and establish meaningful connections with the younger generation. This symbiotic relationship between the two generations not only facilitates the transfer of knowledge but also fosters empathy, understanding, and a shared sense of purpose across age groups.

> *"In our community WeChat group, there are many young people who frequently share amazing things. We pay attention to their shares and engage in mutual discussions to see what worthwhile things are worth sharing. Indeed, young people have many outstanding works. For instance, I am interested in photography and dance, and some of them excel in these two fields. I enjoy browsing through the photos they share in the Guilin Photography Group. Though I don't often contribute actively, their captured images are truly magnificent and filled with unique perspectives. There are*

> *also photography teams among the young people, and their works are equally impressive. Sometimes, we can learn from their creations through observation, without necessarily pursuing formal education. Yes, and some of the information, like where they took the photo and what the places called, I get to know the location, and next time I can also go there myself. It provides many aspects of things to explore." (FG04-03, F62)*

IP009 mentioned in the interview that she follows a young author's official account (via WeChat official account). Through reading the author's articles, she experiences the wisdom, vitality, and potential of young people, as well as the limitation of knowledge and vision that older generations could have.

> *"I've followed a young writer's official account on WeChat, and his articles are excellent. I'm impressed by the perspectives of young people. Previously, many believed that young people, due to a lack of life experience, couldn't view issues comprehensively or sharply. However, the articles have made me realise that although young people may not have as much experience as older adults, their knowledge base is often much broader. We often overestimate ourselves due to our limited knowledge. As I continue to learn, I've discovered that many of my past understandings, including my views on history, were incorrect. When we were young, we lacked opportunities to learn, and if we stop learning, our understanding will always be limited." (IP009-F62)*

5.1.4 Limited digital interactions

There are different outlooks, interests and life experiences between generations. Young people may feel that there is a generational gap with older people and that they cannot find common interests, which can lead to communication difficulties and *Limited Interactions*. Some suggested that *"we are unable to understand which digital applications young people are using. We don't feel comfortable asking, and they don't disclose it."* Lack of patience and indifference from younger groups both contribute to poor intergenerational communication. Some participants said that they only communicate with their peers and not with their children because the children refuse to communicate with digital technology.

> *"We have interacted more with our friends. We rarely communicate with people of different age groups. We also don't engage in conversations with younger people. They discuss different things, and they are not interested in what we are talking about. They are not willing to be with older people. Similarly, young people may not be willing to engage in conversations with you." (FG04-02, M67)*

There is also a related discussion in the FG05 group:

> *FG05-03(F73): I also talk to my friends and peers more.*
> *FG05-04(F63): Yes, I only talk to my friends and peers. It is said that there is a generation gap that exists every 5 years between ages. It seems that they don't like to talk to us, and the topics we talk about don't seem to match with their interest.*
> *FG05-03(F73): It doesn't match, does it? When you talk to them, they say there's a generation gap and they can't accept it (and refuses to chat).*
> *FG05-05(M65): Then it's just two or three sentences and then we can't further talk anymore.*
> *FG05-06(M72): No, they don't want to talk. They don't want to talk with us.*

Participants also mentioned that they usually share online content they like or find valuable with their children. However, the feedback from their children is very limited.

> *"Sometimes we share content with them if we come across something good. But sometimes when we share with them, they say they don't need it". (FG01-03, F66)*

> *"Young people are busy with work all day long. They don't have time to communicate with us." (FG02-02, F60)*

> *"They don't even have time to answer our phone calls." (FG02-03, F64)*

When discussing whether they are concerned about what young people do online, a participant from FG03 said, "We don't feel comfortable asking them, and they are not willing to talk about it neither." FG02-01 stated that he realised that the use of smartphones doesn't get passed from young to old, but only to next generation.

> *"For example, my son won't teach me how to use a smartphone, but he will teach his own son. When children start making noise, he gives them a phone, they play with it, and they become quiet, right? But they won't give us the phone; they just won't do it. My son won't ask me, 'Dad, are you uncomfortable? Let me entertain you with my phone.' But when children become fussy, they play an animation on the phone, and the child gets chilled. So, they only pass on the use of digital technology to the next generation, not much to the older generation." (FG02-01, M60)*

The limited communication isn't because young people are 'unfriendly' or 'cruel'; they may simply lack 'empathy'. While older people may find digital technology new and challenging, needing more time and guidance, their children may not appreciate these difficulties, leading to impatience.

5.1.5 The absence of 'warm experts'

The findings from the focus group on intergenerational support align with the results of the interview study. In the interviews, participants also mentioned that their children were too busy to provide digital support for the older adults, and 'warm experts' were often absent in the digital daily lives of the. In the interviews, participants described their digital technology support resources. According to the visualisation results in Figure 33, although a considerable number of participants rely on their children for digital support (as shown by the orange block, *My Children Support Me*), the proportion of the blue block indicates that more participants choose to solve digital problems by themselves (see blue block, *I Support Myself*). On the one hand, this shows their willingness to maintain independence; on the other hand, it may also indicate a lack of support from their children, forcing them to solve problems on their own. Additionally, older adults seek help from their peers (seen from the grey block in Figure 33, *My Peers Support Me*), forming a mutual support network. This aligns with the research by Selwyn et al. (2016), which proves that older users can become *Warm Experts* themselves.

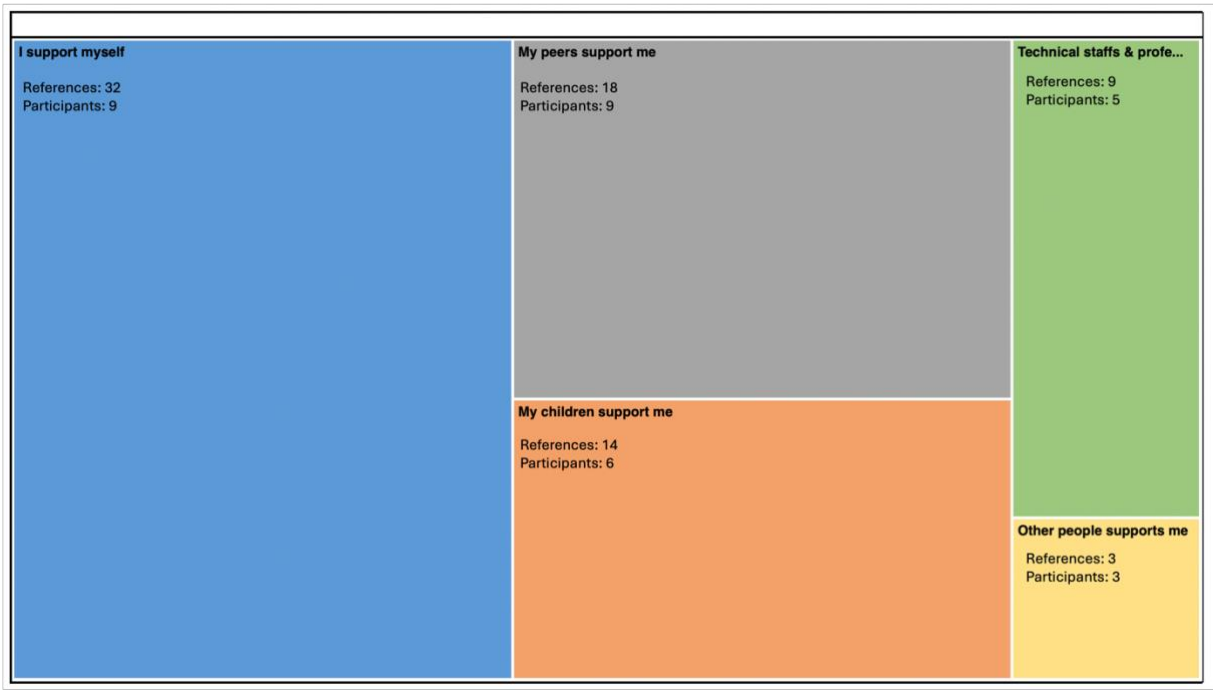


Figure 33 Who supports silver netizens' digital use

Olsson and Viscovi (2018) suggest that children or grandchildren can generally become 'warm experts' for older adults in their digital use. Schreurs et al. (2017) found that older adults view family as an important source of technological support and frequently seek help from younger family members to learn technology. Although some of their study participants also attended courses at universities or libraries, they relied more on family and friends. In my study, participants also mentioned seeking help from their children for digital technology issues, but the way in which children provided support varied. Seen from Figure 34, when participants discussed how their children provided digital support, they mainly mentioned the following aspects. Firstly, a large proportion involved children doing tasks directly for older adults (see blue block, *My Child Did It For Me Instead Of Teaching Me*). In the interviews, participants reported that for tasks such as shopping and booking tickets, as well as solving technical problems, their children preferred to solve older adults' problems directly rather than teaching them, as repeated explanations are often needed. A smaller portion of participants stated that their children would offer support when needed and were willing to help and guide them through technical difficulties patiently (see the yellow block, *My Child Supports Me Patiently*). Some elderly participants indicated that they lacked support from their children, as their children were impatient (the orange block, *My Child Is Impatient To Support*) or too busy to provide adequate assistance when needed (the grey block, *My Child Is Too Busy To Support*).

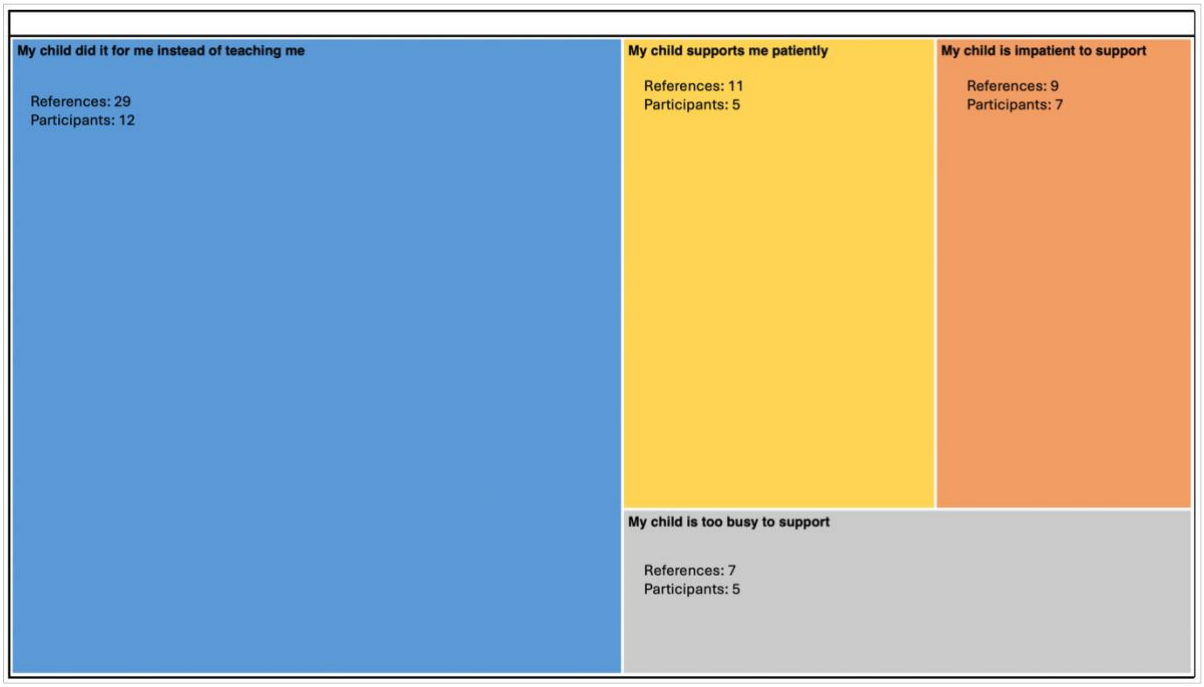


Figure 34 How do their children provide digital support for silver netizens

At the same time, the attitudes of children when providing digital technology support to their parents or grandparents vary. Participants stated that *My Child Supports Me Patiently* to offer support while others report *My Child Is Impatient To Support*. As shown in the visualisation in Figure 35, the proportion of participants discussing their children's patience versus impatience appears to be relatively balanced.

> *"My daughter is very patient. She tells me to take a photo of anything I don't understand and send it to her. She then demonstrates the steps for me. No matter how busy she is, she always helps me solve the problem." (IP005-M68)*

Not all children are patient when answering their parents' or grandparents' questions. Participants reported instances where children were impatient when providing digital support.

> *"My granddaughter helped me with that problem. When I asked her how she did it, she wouldn't tell me. She said, 'You're too dumb, I won't explain.' She handles it for me, and there's nothing I can do about it. Now, I don't try to learn unless I encounter a problem, and then I ask her. Sometimes when I ask her on WeChat, she can't explain it clearly either." (IP012-F70)*

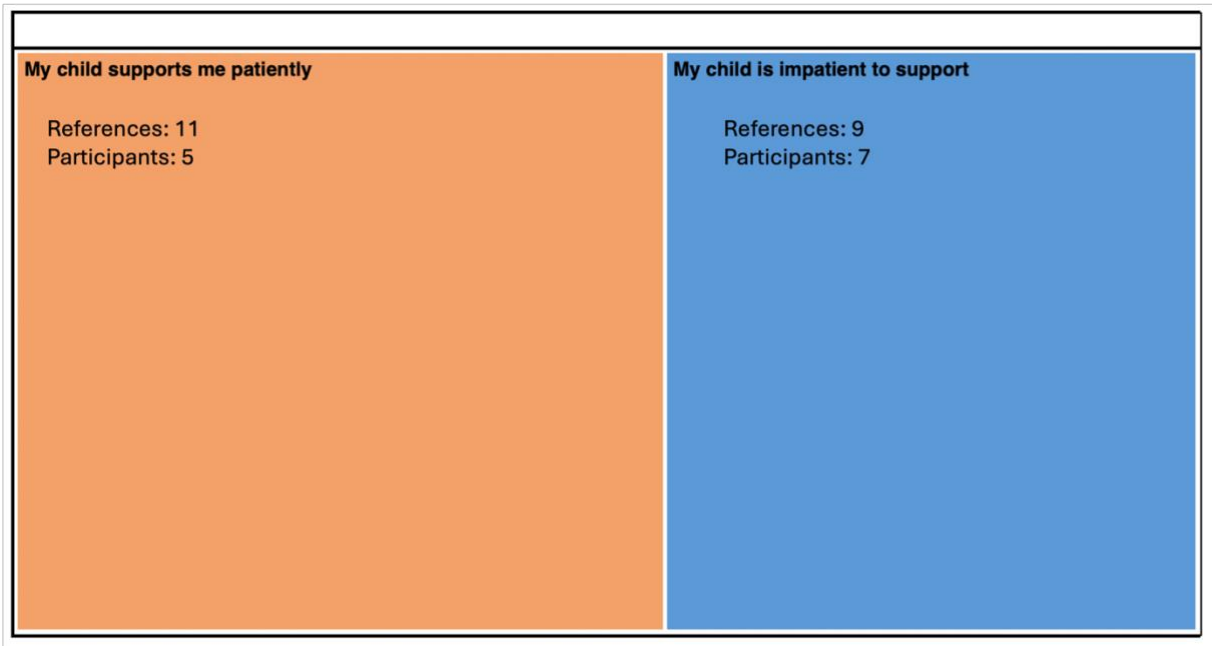


Figure 35 Children's attitudes while providing digital support

The two excerpts above reflect the varying experiences of older adults in receiving digital technology support within their families. Schreurs et al. (2017) argued that supporting digital literacy among older adults is a multifaceted effort that requires attention not only to technical skills but also to the cognitive and socio-emotional dimensions of digital involvement. Positive support and patient guidance can enhance the skills and confidence of older adults, while negative attitudes and a lack of communication can lead to fear and dependency on digital technology. Schreurs et al. (2017) also identified a paradox in digital literacy: the experience of older adults is crucial for acquiring digital literacy, yet they often struggle to gain the necessary skills due to a lack of essential support. This paradox highlights the need for a comprehensive approach that addresses both the technical and emotional needs of older adults as they navigate the digital world. From the discussion in this study, it appears that the situation of children acting as 'warm experts' in daily life is not sufficient.

In Chinese culture, which values family, the happiness of older adults is influenced by interpersonal relationships. Research shows that moderate support from adult children enhances the well-being of older adults (Li and Guo, 2022; Cheung et al., 2006). It is reported that among the entertainment content favoured by retired older adults in China, they prefer themes related to family and children (Yu, 2020). Future research could focus more on exploring intergenerational digital communication and support within families to find more effective ways to help older adults better adapt to the digital society.

5.2 Intergenerational Digital Differences

There are several intergenerational differences in digital use that silver netizens can perceive and clearly propose. In the focus group discussions, they identified a gap in ability, a difference in scope of use and a difference in psychology of use between them and the younger group.

5.2.1 Different purposes of digital use

COVID-19 has accelerated the process of working online. The smartphone has become a common 'productivity tool' involved in the digital and remote working collaboration of young people. During the group discussions, participants suggested that young people are living their lives digitally. They need to use smartphones and the internet to deal with work, while older people mainly deal with the leisure things of everyday life.

> *"Young people use their smartphones mainly for work. Or rather, it's collaboration with each other at work. They now communicate about their work online. We (the older group) are different, we are interested in 'where to go outing' or what news there is about senior living...We (older adults) are all about leisure and entertainment." (FG01-02, M64)*

Similar opinions are given in group FG02:

> *FG02-02(F60): For us older people, using a smartphone is easy; I feel no pressure when I'm on my phone. But young people often use theirs for work, needing to solve problems with it. We mainly use our phones to relax, doing whatever we want, leading a very relaxed life. So, there's a fundamental difference in how young people and we use our phones.*
> *FG02-03(F64): But sometimes young people also use their phones for entertainment.*
> *FG02-05(M60): They mostly use them for work.*
> *FG02-02(F60): We're basically under no pressure, just play when we want to. Sometimes I wonder, why can we easily put down our phones? Because we have no pressure, no problems to solve with them. I look at it when I have free time and put it aside when I'm busy with other things.*
> *FG02-05(M60): We mostly go online to check news or WeChat.*

According to Laslett (1989), people in their third age have fewer responsibilities and more opportunities to explore life's possibilities. This can also be observed in the focus group discussions on intergenerational different digital usage. Without the pressure of work, older people are more likely to use mobile phones to explore interests they wish to develop. Those in the third age display a recreational and entertainment-oriented attitude towards digital usage, which aligns with their life stage and needs. Their dependency on digital devices is lower, primarily using these tools to enhance the joy and convenience of life rather than as necessities for work. As discussed in chapter 4, older adults primarily use digital technology for socializing, information gathering, and entertainment. The third age allows them more freedom to engage in stress-free activities like browsing news, social media, or online shopping using smartphones. Jonsson (2010) suggests that the third age offers older adults new opportunities for participation. In contrast, among their participants, the use of smartphones by younger people is often closely related to work. In the context of COVID-19, younger individuals increasingly rely on smartphones for remote work, which not only heightens their dependency on technology but may also contribute to stress. Some participants expressed understanding of young people's digital use, especially the overuse of smartphones, from a work-related perspective.

5.2.2 Older adults are less confident with digital use

When it comes to using digital technology, young people can use digital devices and the internet with ease because they have more knowledge of digital technology and possess more digital skills and knowledge of the internet. The older age group, on the other hand, may have the psychological burden of fear of making mistakes and being cheated in the use process because of their lack of understanding and unfamiliarity. So, when it comes to the use of digital technology, young people can manage it at ease while older adults are afraid to take it lightly.

> *"Older people are more conservative and closed-minded. They have many concerns. Young people aren't as worried. Perhaps we need to change our way of thinking because we were taught from a young age to 'do as we're told' and never thought about rebelling. We just follow trends. When there's even a small change in the world, it seems we can't keep up. We're unsure about many things we do online; we lack confidence and a sense of security. That's why we're afraid to use many apps, worried about revealing our*

> *personal information, and hesitant to freely use smartphones." (FG05-01, F60)*

FG05-05 pointed out that some people are afraid to pay by mobile phone for fear of the safety of their property.

> *"Some old people still take cash to the market to buy groceries. (Others: Yes), they are afraid of fraud if they use smartphone to pay." (FG05-05, M65)*

FG02 also had discussion on concerns for property and finance related applications.

> *FG02-02(F60): When it comes to financial management on smartphones, we might just worry about whether there will be mistakes, right? Maybe you guys (young people) are just more familiar with these things. I don't think there's much (difference) between generations other than that (worries).*
>
> *Researcher: Do you mean the difference in confidence in the use of digital?*
>
> *FG02-02(F60): We sometimes have concerns about the security of using smartphones, but other apps are fine. We have another concern, for example, when we use mobile banking to transfer money, we are afraid of security.*
>
> *FG02-03(F64): (Compared to other older people) we are already "pioneers" in accepting new things, so I don't think there is anything to worry about. However, there are many people who are afraid to use Alipay and WeChat Pay, for example.*

Although mobile payments have been developed for many years, many elderly people are still psychologically difficult to switch from traditional cash to electronic payments, which not only brings them inconvenience, but also hinders their social integration, such as the inability to enjoy the convenience of online shopping. In addition to the shortcomings in the design of apps such as payment tools and e-banks, the traditional mind-set of the older people may also hinder their acceptance of digital payments (Liu & Li, 2022). Lack of confidence in digital payments among older people is common. The results of the group's discussion are consistent with the findings of Liu and Li (2022). Their research found that some older people are unfamiliar with digital payment and are afraid of losing their privacy or property due to fraud, which leads to their reluctance to

change their perceptions. Intergenerational support is encouraged to help older adults to build confidence of digital use (Liu and Li, 2022).

5.2.3 Older adults have lower needs for device

Participants believe that younger people have higher performance requirements for their smartphones and therefore purchasing new phones more frequently. IP013 believes that she only needs her phone to run WeChat and doesn't care about other features of the phone. Participants in focus group also held this view.

> *The amount of information they receive (through smartphones) is different from ours, so their needs for mobile phones are also higher than ours, and they demand a bit more functionality.* (*FG02-02, F60)*

> *For example, some young people play games on their smartphones. There are probably not many people of our age who play games, it's very few. But young people want to play games, and if the phone is too outdated, it might not be able to run (the games). They require a more powerful phone. They are different from people of our age; they are a bit more demanding. Apart from work, their entertainment needs (for the performance of the phone) are also higher. (FG02-03, F64)*

It is a common assumption that that older people have lower needs for devices. Under this age discrimination, older people continue to be not taken for granted as digital users in need. In the interview study, participant IP002 also mentioned that she had 'inherited' smartphones from her daughter and son-in-law.

> *"I have never purchased a phone myself; my children pass them to me. My son-in-law used this one and gave it to me after he bought a new one…It's okay. They bought me a new one once at the beginning when I started using the smartphones. After that one, I've been always using the phone they used." (IP002-F71)*

In China, the proper handling of used mobile phones has once become a hot topic of discussion while many older people are 'inheriting' second-hand smartphones from their children. The question 'should young people hand over their parents the used phones' has once become a hot

topic on social media in China. An instructor who specialises in digital inclusion support for older adults noted that more than half of older adults who come to learn smartphone skills are having used smartphones from their children (PhoenixTech, 2020). In this process, the digital needs of older adults are overlooked. Second-hand mobile phones are often smaller in capacity and slower in response, which brings poorer use experience, leading to a vicious cycle for the digital ability of older adults to improve.

5.2.4 Silver Netizens are only 'partial users' of digital technology while younger people are 'omnipotent users'

During the discussion, participants suggested that young people are using digital technology omnipotently in their work and life, while older people are using it only partially. Young people deal with everything in their lives online, whether it is necessary or not. Whereas older people are using digital technology according to their needs in daily lives. In the focus group discussions, participants offered their diverse views on generational differences.

FG01-01 and FG02-02 point out that young people have highly digitised their daily lives, and can solve all problems by digital means, in contrast to older people:

> *"They (young people) settle their daily lives online. For example, through online shopping and so on. They even solve their children's education problems online. When they encounter any problems, they go online and search, they know, for example, how their children should be educated at a certain age." (FG01-01, F60)*

> *"We are now able to buy medicines online and make appointments for COVID-19 tests on our own. But the difference with your young people is that you can probably do everything through your smartphone and the internet, really. Anything that can be done digitally (you can go online and do it). Maybe that's where the difference between us and you guys lies. There are functions that we just can't figure out and we have to be a bit more careful with certain applications." (FG02-01, M60)*

Participants in FG05 also emphasised generational differences and argued that older adults often consider using new features or applications only when necessary, rather than actively exploring them as much as younger adults:

> *"I think there's still a big difference. They use a lot of functions, they can search or buy things online, on their smartphones. For example, we know about shopping platforms like "JD", but some of us do not use it" (FG05-03, F73)*

> *"We don't use it" FG05-02, F64).*

> *"For us older people, we usually think about using them only when we need them. If we don't need it, then we don't bother to learn new functions and applications as long as the old ones can solve the problem. So, it's quite a big difference. We older people, in general, don't want to learn unless we have to use a specific function or application to solve a problem, and we don't want to learn until we are forced to do so. In other words, we don't need perfect use but just acceptable or tolerable." (FG05-04, F63)*

Moreover, ageing will lead to impairments in memory and cognitive functions (Bishop, Lu & Yankner, 2010; Small, 2002; Morrison & Baxter, 2012). Older people could struggle more than younger people to learn new things. In focus group discussions, study participants stated that younger people can learn and take on new technology faster, while older people need to plod or trudge their way along.

> *"Of course, there is a big difference between them young people and us. Younger people are better thinkers. They take in new things easily. They can learn things much better intellectually than even us older people. Although we also use smartphones, sometimes there are some esoteric technologies that we still don't understand." (FG03-03, M66)*

> *"There may be a gap between us older people and younger people, because younger people are more capable. They use their mobile phones to learn and shop and to do a lot of things. They get information all very quickly too. We old people must take it slowly, step by step, to understand things better." (FG05-02, F64)*

However, the idea that young people can do anything in the digital world is also an age stereotype, all young people are omnipotent digital natives may be a myth rather than reality (Margaryan et al., 2011). Loos et al., (2016) pointed out that there is no empirical evidence that all young people can use digital media without problems in their daily lives. The research results of Herold (2016) and Van Deursen (2016) show that it might not be true to consider that young people can all cope well with new media.

5.2.5 Digital addiction among older users

Participants in the panel discussion also expressed concern about digital addiction with young people. Media ideological differences make people think that their age group's choices and actions are appropriate (Fernández-Ardèvol et al., 2020).

However, it is important to note that the overuse of smartphones is not exclusive to the younger generation. Age stereotypes and digital ageism have caused people to overlook the issue of internet addiction (excessive use of the internet) among older adults. While older adults enjoy the pleasures brought by digital technology, the risks of becoming addicted to the internet are also becoming more apparent. It is reported that 100,000 older adults in China spend more than 10 hours online each day, indicating a severe dependency on smartphones among some seniors (iiMedia Industrial Upgrading Research Centre, 2021b). When they become addicted, they are no different from teenagers with internet addiction. Surveys suggest that older adults commonly experience feelings of loneliness and disconnection in their daily lives, driving them to seek virtual belonging online (Song & Ren, 2021).

Firstly, changes in social population structures, the trend toward smaller family sizes, and the dispersal of family members have led to earlier occurrences of older adults living alone or in empty nests. Additionally, some older adults move to unfamiliar cities to care for their children, exacerbating their sense of loneliness. With fewer opportunities for face-to-face communication, smartphones provide a virtual space for them to express themselves and alleviate mental emptiness, gradually leading to smartphone dependency. It is reported that some older adults exhibit extreme loneliness on mobile networks, spending almost all their time online (Yu, 2020). Secondly, retired older adults often feel anxious and uneasy, deeply entrenched in a sense of social disconnection. Their social roles change after retirement, resulting in feelings of

marginalisation and isolation, particularly among those who have moved to unfamiliar cities. To overcome this disconnection, they yearn to keep up with the times and integrate into their children's lives, with smartphones and virtual networks becoming essential tools for their re-socialisation. Applications use big data to provide personalised content recommendations, bringing warmth and a sense of presence to older adults, embedding their daily lives into the virtual network space (Song & Ren, 2021).

5.3 Digital Leaders among Older Users

Not all young people are digital natives (Loos et al., 2016), and likewise, not all older adults are digital incompetent. The increasing use of digital technology in daily life has transformed a segment of older adults into silver netizens who are digitally savvy (White et al., 2022). Contrary to the common perception in today's rapidly digitalising era that older adults lack technological skills, the reality is quite different. Interviews have revealed the emergence of *Digital Leaders Among Older Users*, typically those who had managed complex technologies during their careers, like IP010. Not only did he use computers at work, but he also continues to learn Photoshop online after retiring. IP010 shared his experience of learning Photoshop online:

> *"I study Photoshop online every day on my computer at home. There is a class every afternoon. Photoshop is quite complex, and that's what I'm currently learning. The course cost was 990 CNY, I decided to record it to review. I start the course on my computer, then I set up my phone here and use it to record the computer screen. This way, I can watch the sessions over again." (IP010-M72)*

He feels a great sense of accomplishment when his skills and abilities are recognised by his peers.

> *"Last month, a classmate of ours passed away. I was the class monitor during college, so I took charge of handling this matter. I posted the news in our class group chat to inform everyone about our classmate's death and called for expressions of remembrance and condolences to his family. We also collected some condolence money. Additionally, I utilised my Photoshop skills, which I learned online, to download suitable wreath materials and edit them. I filled in the background, re-typed the elegiac*

> *couplet, and finally created a digital wreath on behalf of the whole class to express our mourning. The wreath was highly praised by my classmates, who appreciated my technical skills. Due to the pandemic, old age, and bad weather, we were unable to travel to Liuzhou to attend the funeral in person, so we expressed our grief and support in this way." (IP010-M72)*

Besides, as digital savvy, IP010 also has high requirements for smartphones.

> *"This phone I bought three years ago, has 256GB memory, capacity is great. It's Huawei. You see, my phone has three lenses, and the results are very good." (IP010-M72)*

Digital leaders can be *Active Learners*, who continue advancing their digital technology skills in later life, or *Peer Technicians*, who assist their peers in solving digital challenges. In the interviews, IP003, IP008, and IP010 mentioned that they help their peers solve technical problems in their daily lives. Notably, IP010 serves as an instructor in training classes for older adults, teaching photography and Photoshop skills. According to Hunsaker et al. (2020), older adults are not only passive users of technology but also actively provide technical support to their peers. It indicates that peer support is very important within the older adult community, which aligns with the findings of this study. According to findings in 5.1.5, peer digital support is common in the daily lives of older adults. This support not only helps older adults solve technical issues but also enhances their social connections. These digital-savvy peers have the potential to play a key role in providing digital media support, which may be more readily accepted by their peers than support from other age groups (Hunsaker et al., 2020). More concerns and attentions could be laid on exploring the efficiency of peer support in further research.

Conclusion

In the digital age, fostering intergenerational digital interactions is crucial. These interactions enhance understanding and respect across generations, enabling individuals from various age groups to learn about each other's cultures and perspectives. Such dynamics reduce intergenerational conflicts and promote harmonious relations within societies and families. Additionally, they provide emotional support to older adults, alleviating feelings of loneliness. The younger generation plays a key role in helping older adults navigate the challenges of digital technology through sharing, support, encouragement, and intervention. This chapter initially

analyses the intergenerational digital interactions of older adults with the younger generation in their digital daily lives, starting with the digital support provided by the younger generation. Research suggests that older adults often require the support of 'warm experts', Bakardjieva, 2005), who are typically younger family members proficient in technology (Martínez & Olsson, 2022). However, not all elderly have access to reliable warm experts. Studies have identified common challenges among silver netizens, including the younger generation's lack of time or patience, leading them to rely more on their peers for learning and support. Yet, studies have shown that peer support can sometimes be more effective, fostering motivation and courage among older adults to engage with digital technologies. Furthermore, digital technology facilitates the sharing of interests and opinions across generations through social media and other platforms, helping to bridge the generational gap and allowing older and younger people to find common topics of interest, thereby enhancing communication and understanding. Additionally, analysis shows that silver netizens also engage in cultural and knowledge exchange with the younger generation in their digital daily lives. In the shift between postfigurative and prefigurative cultures, the younger generation often leads in technology and information sharing. This dynamic allows older adults to learn from younger people, reversing traditional roles and emphasising the importance of digital literacy and access to information. Subsequent research has found that due to differences in interests and experiences, intergenerational communication takes priority, and intergenerational interactions present challenges. Sometimes, the younger generation may be reluctant to share their digital experiences with older family members, leading to misunderstandings or a lack of engagement. While intergenerational digital interactions provide significant opportunities for learning and understanding between generations, they also bring challenges that need to be managed to enhance the well-being and social integration of older adults. This includes encouraging more empathetic and patient interactions from the younger generation and promoting effective communication strategies to overcome the digital divide.

Section 5.2 analyses some intergenerational digital differences proposed from the perspective of silver netizens. Silver netizens can clearly perceive and explicitly point out the digital differences between generations, noting differences in capability, usage scope, and psychological approach among young people. First, the different purposes of digital use are discussed, with participants noting that young people's lives are almost entirely digitalised. They need to use smartphones and the internet to handle work, while older adults mainly use them for leisure activities in their daily lives. According to Laslett (1989), people in their third age have fewer responsibilities and more opportunities to explore life's possibilities, a point also reflected in focus group discussions on intergenerational digital differences. Furthermore, they note that older adults have less confidence in digital usage, as young people can easily manage digital technology due to their

greater familiarity with it, while older groups may fear making mistakes or being cheated due to their lack of understanding and unfamiliarity. Thus, young people can handle digital technology with ease, while older people dare not take it lightly. The results of the group discussions are consistent with the findings of Liu and Li (2022), whose research found that some older people are unfamiliar with digital payments and fear losing privacy or property due to fraud, leading them to be unwilling to change their perceptions. Intergenerational support is encouraged to help older adults build confidence in digital use. Additionally, silver netizens believe that older adults have lower needs for devices. Participants think that young people have higher performance requirements for their smartphones and therefore replace them more frequently. IP013 believes she only needs her phone to run WeChat and does not care about other phone features. Other focus group members share this view. In China, many older adults are 'inheriting' second-hand smartphones from their children. An instructor specialising in digital inclusion support for older adults noted that over half of the older adults who come to learn smartphone skills are using second-hand smartphones from their children (PhoenixTech, 2020). In this process, the digital needs of older adults are overlooked. Second-hand phones often have smaller capacities and slower responses, leading to a poorer user experience and making it difficult for older people's digital abilities to improve. Finally, participants suggest that silver netizens are only "partial users" of digital technology, while young people are 'omnipotent users. In discussions, participants note that young people use digital technology extensively in their work and lives, while older people use it only partially according to their daily life needs. Nonetheless, the notion that young people can do anything in the digital world is also an age stereotype, and the idea that all young people are omnipotent digital natives may be a myth rather than reality. Multiple studies have proven this point (Margaryan et al, 2011; Herold, 2016; Van Deursen, 2016).

Finally, section 5.3 challenges the stereotype that only younger generations could be digital savvy. It is found that, among older adults, there are digital leaders with a high degree of digital proficiency who not only excel in digital technologies but also lead in promoting and teaching these technologies to their peers. These digital leaders play crucial roles in assisting and guiding their peers in the use of digital technology (Hunsaker et al., 2020). The presence of these leaders significantly alters the traditional view of the relationship between older adults and technology, proving that older adults can indeed be 'warm experts', which challenges the stereotypes associated with digital ageism. In addition, seen from IP010, silver netizens also have their different needs for digital devices. Their personal digital use demands should be seen.

Chapter 6 Digital Inclusion for Silver Netizens

Introduction

Digital inclusion is crucial for the older adults to fully participate in the digital age. It is evident that digital inclusion has a significant positive impact on residents' quality of life and health and contributes to the independence and well-being of older people (Li & Woolrych, 2021; Yang et al., 2022; Sun et al., 2023). However, digital inclusion policies and measures in China lag behind to developed countries. COVID-19 highlighted the social problems caused by digital divide while exacerbated the dual challenge of digital and social exclusion for older adults (Seifert et al., 2020). It was in late 2020, nearly a year after the COVID-19 outbreak, that the Chinese government launched its first digital inclusion initiative targeting older people. As a result, the participants in this study could only share very limited digital inclusion experiences they had.

This chapter, relying primarily on data from focus group discussions, delves into the digital inclusion experiences of Chinese silver netizens based on the results of focus group discussions. It is divided into two parts. The first section 6.1, focuses on the older adults' experiences and suggestions regarding digital inclusion, analysing community-based digital support services and their role in better integrating older adults into digital life but also examines how organisations and institutions serving retirees provide necessary support to foster digital inclusion. The second section 6.2 explores the perspectives of elderly internet users on their expectations and suggestions for future digital co-inclusion. This includes their specific hopes for digital inclusion and their attitudes towards continuing to learn and adapt to new technologies. Through these analyses, this study aims to gain a comprehensive understanding of the current support for digital inclusion among Chinese older population, identify issues and problems they perceive, and provide a basis for future policymaking and practice.

6.1 Chinese Silver Netizens' Digital Inclusion Experience

In the focus group FG04, participants acknowledged the commendable efforts of communities in some cities. They specifically highlighted the efficient management of communities, particularly exemplified by the experiences in Guangzhou. One participant shared their first-hand experience of joining a community that conducted surveys targeting older residents. Based on the survey

results, the community offered ten different programme options, including dance classes, smartphone training, holiday events, and fitness programs. Of these, smartphone training came in fifth in the ranking of needs, indicating considerable demand from older people. The community promptly responded to the residents' needs by organising training sessions according to the preferences indicated in the survey.

> *"The community management in Guangzhou is very good. Our community did a survey some time ago, specifically for elderly residents. They gave us 10 training programmes to choose from, such as singing, dancing, smartphone training, and some kind of fitness programme. The smartphone training for older adults came in fifth place...It seems that the demand for smartphone training is still quite high." (FG04-03, F62)*

Community-based digital inclusion training can be conducted directly in the context in which older people live, and face-to-face communication can make training more directly and specifically address the needs of older people. This not only reduces the difficulty of participation, but also increases their sense of participation. This practice makes training more accessible to older people who may find it difficult to participate due to poor transportation or unfamiliarity with remote technology, which is also the approach advocated by the Ministry of Industry and Information Technology of China (MIIT, 2021).

Some organisations also provide digital skills training service for their retirees. During the discussion of focus group FG05, participants also shared their experiences regarding the provision of smartphone training by their former workplaces and acknowledged the effectiveness of such initiatives and appreciated the support provided. The participant, FG05-03, used to be a staff member at the university, which offers smartphone training courses for retired people every semester, including one-to-one training and training in the form of lectures. These trainings are facilitated by volunteers, including university students and students from the divisional university.

> *"We also received smartphone training once or twice a semester from the retirement office now. One-to-one support... They have a training course, which is equivalent to running a tutorial.*
>
> *(Others: Yes, tutorials. Basically, it's one-to-one.)*

> *Volunteers are all university students, yes... supporting you on a one-to-one basis. The support that the university provides for us is quite good... They organise this kind of training every year." (FG05-03, F73)*

Participants discussed the role of volunteers in promoting digital inclusion as well. They believe that many people in China are actively participating in digital inclusion activities, and communities and organisations also provide excellent volunteer services. Participants emphasised that well-trained volunteers are an essential component of digital inclusion, especially in areas such as smart device operation and assisting others. Since 2011, the 'Sunset Reborn' community in Beijing has been conducting digital inclusion activities for the older people, organising university students and young volunteers to communities, teaching the older adults how to use computers and smartphones through one-on-one support (Nanfang Plus, 2021). Under the Chinese government's initiative to 'help older adults bridge the digital divide', university students are encouraged to volunteer and provide digital inclusion support for the older generations (Wanyan, 2020).

6.2 Silver Netizens' Suggestions for the Future Digital Inclusion

6.2.1 silver netizens' expectations of digital inclusion:

(1) Promoting digital inclusion through local communities: Based on the suggestions provided by older adults regarding digital inclusion, there is a strong preference for face-to-face services based on community support. Participants in FG01 and FG02 emphasised the convenience and effectiveness of community-based training and services, highlighting the presence of dedicated staff members who can provide guidance and support. They mentioned the importance of both online and offline approaches, acknowledging that some older adults may have limited experience with digital technologies and would benefit from in-person interactions. The community was recognised as a crucial platform for learning and engagement, particularly for those who may not have frequent access to family support. Participants expressed the need for deeper involvement of community services and emphasised the significance of collaborative efforts between families and communities to enhance digital inclusion for older adults.

> *"In the community, there are a lot of older people who meet up and hang out. So, community-based training is quite good. If there are specialised staff to teach (us), (we) are definitely willing to learn." (FG01-04)*

> *"The neighbourhood communities are very important (for providing services), because the retirees are all managed and served by the communities." (FG02-05, M60)*

(2) Preference for Face-to-Face Training: Participants generally believe that face-to-face digital skills training is a more elderly-friendly learning approach. They proposed the importance of community-organised offline training and note that the majority of retirees actively participate in community activities. Participants in FG02 mentioned that learning independently at home through smartphones is an option, but they express a preference for face-to-face teaching in community settings.

> *"At home, we can learn (digital skills) on our own through smartphones, and it would be better if the community can organise (digital skills training) to teach older people, face to face." (FG02-03, F64)*

Participant FG05-03 also highlighted that some older adults may have limited engagement with online activities, necessitating the presence of volunteers in community spaces for offline interactions. They meanwhile emphasised the need for well-trained volunteers who can provide guidance and assistance in using digital devices and technologies. Training for volunteers was seen as crucial to avoid any potential negative consequences that may arise from improper device operation. The involvement of trained volunteers in one-on-one offline interactions was particularly valued. However, limited volunteer availability still causes low efficiency of older adults' digital skills learning.

> *"Doctor Li (a friend of participant's), who is living in a nursing home, has volunteers who go to help them one-on-one. . . However, the volunteers only visit on weekends (not frequently), which means he is taught (with digital skills) today but might likely have forgotten all about the skills before next weekend (when the volunteers come back to him)". (FG05-03, F73)*

Participant FG04-04 believed that older adults are inclined towards face-to-face training, as it facilitates better understanding and mastery of digital skills, while online learning may present challenges in terms of digital literacy and comprehension, as well as sense of boredom.

> *"Face-to-face teaching is much more efficient. My friend learned a new app called 'CapCut'. He said it was easy, so I wanted try it too. I purchased an (online) course, but I gave up after only three lessons. It would have been easier for me to learn if there was someone teaching me face-to-face. I feel that (online courses) are sometimes boring and I can't continue with them." (FG04-04, M63)*

In addition, they felt that online learning was not user-friendly if they were to learn smartphone operation. For example, they needed to use their smartphones to watch instructional videos before they could practice operating their smartphones. If there is only one smartphone, it is difficult for them to learn and operate at the same time.

> *"It's hard to learn how to operate your smartphones or APPs if you're not learning while operating... (For examples), if you watch the instructional video with your smartphone and try to operate it later, you might not remember what the instructional video has told you at all." (FG04-04, M63)*

Participants overwhelmingly agreed that face-to-face digital skills training is more suitable for older adults. Offline training by community organisations is deemed crucial as many retirees actively participate in community activities. Simultaneously, participants highlighted challenges associated with online learning for older age groups. Limited participation in online activities necessitates experienced volunteers for offline interactions. Trained volunteers providing guidance on digital devices are considered essential. Face-to-face training is deemed more efficient as it enhances understanding and mastery of digital skills. Although participants expressed a preference for face-to-face training, a blend of online and offline courses may be more efficient. Martinez-Alcala et al.'s (2018) study showed improved digital literacy in both face-to-face and blended workshops, with participants in blended workshops demonstrating higher digital literacy.

(3) Prompt Provision of Elderly-Friendly Digital Inclusion Measures: Participants expressed that despite the implementation of relevant policies by the government, they had limited exposure to

'digital inclusion measures' and emphasised the need for government agencies to promptly provide digital inclusion services suitable for older adults.

> *"I heard about these (digital inclusion policies and measures) for the first time today. If they are targeted at those of us who are aged 60 or above, you see, we are already 60 now, and by the time the policies and measures launched, we will be more than 60. We certainly hope that (the Government) can implement them faster, and it would be even better if we can have access to these services next year." (FG05-05, M65)*

For older people, applications easier to learn and use are more responsive to their needs. Participants suggested that apps and platforms could be developed specifically for older people and that such services would be more responsive to their needs and looked forward to more age-friendly digital tools and services in the future. They expected these applications to be user-friendly and not overly complex, considering their advanced age, limited memory capacity, and diminished cognitive abilities, which make it easier for them to forget what they have learned. One participant noted that older people can face memory problems and suffer from a tendency to forget learnt digital skills. They felt this was due to ageing and hoped that future digital inclusion measures would take this into account and address it, providing older people with applications that easier to use.

Additionally, participants believed that support services for digital inclusion should be enhanced in terms of frequency. They expressed the view that the government and social organisations should establish specialised departments to organise volunteers who can provide more frequent digital support services for older adults. They mentioned a desire for personalised assistance, particularly in areas involving new technologies in daily life. They hoped that volunteers would be available on a regular basis to offer assistance, as the cognitive abilities of older adults decline, necessitating repeated learning, revision, and guidance.

(4) Maintaining Non-Digital Services: It is important to maintain non-digital services. Participants highlighted the difficulty older adults face in adapting to digital technologies, which limits their ability to engage in activities outside their homes. Registering in the community and on public transportation were mentioned as examples where non-digital registration methods can be beneficial, as not all older adults are comfortable with digital interfaces. During the discussion

on digital skills training, participants also specifically mentioned their concerns and apprehensions about not turning 'digital skills training' into a mandatory activity for older adults, as this would create pressure and worry among them.

6.2.2 Silver netizens' attitude to continued learning

Participants' attitudes towards continuing to learn digital skills in later life were complex and diverse. While most participants recognised the importance of continuing to learn digital skills, they also expressed some practical difficulties and their need to 'get good rest in later year'.

6.2.2.1 Unwilling to bear the burden of learning in later life

In FG04, participants indicated that while they agreed that older people also need to progress with the digital age, this is only a positive aspiration. They pointed out that despite society's advocacy of digital learning, ageing may lead to difficulties in learning digital skills, and some may give up due to laziness or unwillingness to learn.

> *"For example, compare us now with ourselves when we were young. When we were young, we wanted to learn everything, and we learned it very quickly. But now, when we are older, we may react slower. Our minds can be a little bit lazier. Yes, it can be (lazier)." (FG04-01, F66)*

In addition, participants felt that older people may have developed fixed habits and lifestyles and would be reluctant to adapt to new digital technologies or skills. They gave examples of some older people's disinterest or unwillingness to learn about new things. As they age, some older people are more interested in easy rest and comfort rather than in learning new skills. Participants attributed this to the fact that they had reached an age where they needed to rest and were no longer willing to spend too much energy on updating themselves. Furthermore, ageing may lead to an increased sense of burden in learning, as slower thinking responses make it more difficult to learn digital skills. Participants noted that learning new things may be slower and more effective in later life compared to when they were younger. Finally, older people may be more cautious when learning digital skills and may be more attentive to safety considerations, especially when it comes to privacy and security of property.

During the discussion, participants expressed some concerns about continuing to learn. Although there are many active users among older adults, some older adults worry that technology and learning might add extra burdens to their lives. Even though some digital technologies can help older adults manage their health better and maintain their independence, health issues and other limitations can also affect their willingness to adopt technology (Kadylak & Cotten, 2020). Yang et al. (2022) emphasised that the older adults 'must have the right attitude' to overcome social exclusion. However, in the focus groups of this study, participants felt it was important to retain non-digital services. They highlighted the difficulties faced by older seniors in adapting to digital technology, arguing that not all seniors can operate digital systems. It is acknowledged that not everyone is obligated to integrate into the digital society. Therefore, the development of technology should also safeguard the right of individuals to say 'no' to digitisation. In this regard, the government should provide and maintain traditional offline services for older people who choose to stay away from the internet and technology, meeting their needs rather than insisting on complete digitisation. In addition, it is mentioned that measures must be taken to promote information access and social participation for 'digital refugees' to prevent the digital divide from widening further and even affecting social equity and stability (Yang et al., 2022). However, the term 'digital refugees' is questionable as it carries negative connotations and may emphasise a discriminatory perspective, which can be seen as digital ageism. Additionally, older adults, due to physical and educational limitations, might not be able to seamlessly integrate into the digital era. From the perspective of building a truly inclusive society, when formulating policies for digital inclusion, governments should provide an alternative for this demographic rather than viewing them as 'digital refugees' in need of pity and patronisation. Therefore, future research on digital inclusion may need to carefully consider the needs and rights of different social groups to ensure inclusive digital development.

6.2.2.2 Older people need to continue learning and be able to adapt to social developments

Participants' attitudes towards continuing to learn digital technology showed diversity. Participants in FG01 and FG02 expressed a positive willingness to learn, believing that as society develops, learning digital technology is an inevitable choice to keep up with the trend, and that even older people should catch up so as to adapt to the changes in society.

> *"It's the evolution of society, the evolution of technology. You have to adapt to this society. Now society has developed, but you are still stuck in the old days, so you are definitely inconvenienced (in your daily life)." (FG01-03, F66)*

> *"I think there is a need to continue learning, anyway, we (retired) have a lot of time to learn (new technology). Learning is a very important thing, especially we older people should have to learn. Anything we didn't learn when we were young, we can learn it now." (FG02-02, F60)*

Participants demonstrated diverse attitudes toward acquiring digital skills. While the majority recognised the importance of these skills, some expressed reluctance to undertake the learning process in later life, believing that acquiring new skills becomes more challenging as they age. Conversely, a subset of participants had a positive outlook, emphasising the need for older adults to continually learn and adapt to social development, viewing learning as an essential choice to cope with societal changes. It can be argued that attitudes toward continued learning vary among older adults. Some are willing to actively adapt to social changes, while others feel less burdened by learning new skills. These findings align with other scholars' research, indicating that older people may resist acquiring more operational skills, perceiving digital abilities as exclusive to the younger generation (Ma et al., 2022). Nevertheless, Martinez-Alcala et al. (2018) found that older adults believe implementing digital inclusion support systems is beneficial for developing their digital abilities, emphasising that strong motivation and awareness of ICT benefits enable them to learn and acquire digital literacy skills. Betts et al., (2017) also found that older people are interested in acquiring more digital skills and want to gain knowledge through personalised one-to-one learning sessions.

Participants argued that older people cannot rely on young people with digital use issues. Therefore, with the progress of the digital development of society, it should focus on reducing the difficulty of operating digital devices and applications to provide older adults with more freedom, simplicity and convenience to use them.

> *"All we can say is to keep up with the social situation...Society (development) forces you to learn, and older people have to liberate themselves, to take the initiative to learn new things, to improve their adaptability. We can't keep complaining (that the development of society*

has made us lag behind) because society is moving forward, and you have to keep up. I think there are two important aspects. On the one hand, it is necessary to develop adaptable software for older adults, and on the other hand, older adults should also take the initiative to learn." (FG05-01, F60)

Participants suggested that older people may give up learning too complex technology as they get older. This view was shared by some groups older than the participants - they no longer wanted to continue learning nor think too much. They recognised that this was a result of increasing age. They are currently in the 'younger senior' stage, during which their age still allows them to learn new technologies.

6.2.3 silver netizens' attitudes on the future of technology

6.2.3.1 Expecting the advancement of voice-based operating system

Considering the special needs of older adults, especially factors such as diminishing eyesight, participants felt that intelligent voice technology (e.g., voice recognition, voice input, voice commands, etc.) should be highly considered and strongly developed in the future, especially in technology products whose customer base is older adults. They felt that the design of devices such as smartphones should be simplified, and that the development of products with 'voice-only' interaction systems to improve the usability and friendliness of the devices for older population.

"I think for older adults, the operating system of the smartphone must be simplified, and it is better to use the voice-only operating system, which will be better (and simpler) than the touch screen operation. Elderly people's eyesight has deteriorated, so they can't read the screen, and they can't read when they handwrite (text input through handwriting on the screen). Therefore, the best (age-friendly) is the voice-based operating system." (FG02-01, M60)

For older people, voice control can provide an easy way to access digital services, however, Jakob (2022) argues that older adults encounter challenges due to inaccuracies in voice command recognition, or the lack of visual display indicating the commands' input and output. Besides, concerns related to privacy and data protection are also main barriers for them while using the voice-controlled system.

6.2.3.2 Technology should be 'smart enough' to accommodate older people

Participants suggested that in order to better serve older people, technologies need to achieve a high level of intelligent and automatic. This means that these technology products can be smart enough so that older people can operate them smoothly. They expect smart devices such as robots to simplify everyday tasks such as cleaning and cooking. However, the operating systems and steps should not be too complicated. They believe that older people also want to be able to learn and operate tech devices on their own, rather than just relying on younger generations to help them. Therefore, technology products should be designed to be 'smart enough', that is, simple and easy to understand so that older people can learn and use them independently.

> *"I think there will be a need for a high-tech level to serve older adults in the future. Without the support of fully intelligent, automated devices, it is difficult for people in their 80s and 90s to enjoy the convenience of digital technology. At present, older adults often have to rely on the younger generation to operate these high-tech products. If technology companies can push us into the age of full intelligence, it will be much easier for older adults to operate high-tech products. At that point, they may be able to operate the device with the push of a button or the use of voice commands, which will greatly simplify their digital experience. This has to be done with "intelligence," which is high-tech, right?" (FG02-01, M60)*

The participant shared an article he once read that introduced him to the high-tech kitchen in tech giant Bill Gates' home. Although he was not sure of the veracity of this article, he explained what 'high technology' is expected in daily life with this story.

> *"I once read an article about the daily life of Bill Gates. This article introduced Bill Gates' kitchen as the most advanced kitchen in the world. Every morning, when he enters the kitchen, the 'high technology' will tell Bill Gates what his health condition is today and what he should eat today. This is technology, technology... It's not like traditional Chinese medicine, where you need a doctor to take your pulse to diagnose you, and you don't need an x-ray like in Western medicine. It just relies on high technology and diagnoses (your state of health) just by scanning you." (FG02-01, M60)*

There were also participants who were concerned about the specific applications of digital technology, mentioning that smarter applications and robots may become popular in the future, and they particularly emphasised that in their old age, as the parents of only-one children, they may rely more on digital technology and smart devices in their later years, and therefore older people need to adapt in advance.

> *We are all parents of only-one children, and when we grow old, we may all be served by robots. For example, the current sweeping robots, the operation of this machine should be as simple as possible. The cooking robots (in the future) should be smarter. It would be appreciated if the next generation could design and develop robots for us, because they (our children) are far away from us and can't come home (to take care of us). (FG03-02, F72)*

In the discussion, participants believe that humanoid robots could be the future trend in providing home services, particularly in home care. It is considered that humanoid robots are safer and more reliable than human caregivers, avoiding potential embarrassing issues. Related research supports this perception. Pino et al. (2015) found that cognitively impaired older adults recognise the potential of socially assistive robots (SAR) to support home health and social care. Ejdys & Halicka (2018) noted that men generally have a more positive attitude toward humanoid robots than women, consistent with the findings of this study. Respondents did not believe humanoid robots would intentionally harm older adults. These attitudes align with participants' beliefs in the safety and reliability of humanoid robots. Generally, there are positive expectations and perceptions regarding the use of nursing robots in the future. However, Pino et al. (2015) caution that current research on SAR does not guarantee older adults are ready to receive care from robots, and various challenges need addressing before SAR can be introduced as a home care assistant.

6.2.3.3 Simpler design and simple operation- to Report emergencies within one click/press

In the focus group, participants had a lively discussion on how future technology can assist in the healthcare of older adults. Their expectations for technology in healthcare for older adults centred on improving the efficiency of emergency care and optimising the development of

community healthcare. Participants were most concerned about emergency care, especially for 'emergencies' that occur in the midnight or outdoors in the absence of a familiar companion. Participants felt that there is an urgent need for a function (or an app) that can be used to provide first aid via smartphones. Discussions touched upon the possibility of using location-based devices and functions, as well as the convenience of being able to simply press a button on a smartphone (or other smart devices) to call for help in an emergency.

> *"The key thing is to report sudden illness. How can you call for first aid through a simple function on your mobile phone when you have a sudden illness? For example, if you have an illness in the middle of the night or when you are walking outdoors, and there is no familiar person around, what should I do? Can there be a function (application or button) on the smartphone that allows me to call for first aid through a simple operation? Such as doing it within only one 'click/press'...Since there is no way to do more when a person has already had an attack (the previous participant mentioned functions such as 'sending a location'), it would be ideal if there was only one 'click/press' required...I agree, it would be good if only one click/press is required to handle emergency calls. For example, many older adults who are at home alone may find it difficult to make emergency calls." (FG04-04, M63)*

In addition, participants in FG04 mentioned the possibility and importance of technology-assisted community healthcare services. They believed that for people who cannot report their exact location on their own, such as older adults living alone, simple devices and buttons can be used to send the call for help to the community or other healthcare organisations. Participants pointed out in the discussion that all this requires not only technical support but also coordination at the policy and social levels. In addition to technological development, there is a need to establish professional medical rescue organisations, formulate relevant regulations, and promote the popularity of community medical services.

6.2.3.4 Concerns about the future

Participants expressed their concerns when discussing the future development of digital technology. First, they were concerned about personal privacy. For example, in the future, some intelligent and automated operations may require users to share more personal data, and

participants were concerned that it would be difficult to protect their privacy effectively. Second, there are participants concerned about the possible health impacts of technological development, such as the potential radiation damage that could be caused by the constant use of smartphones in daily life. In addition, cybersecurity is an important issue for older people, including protection against phone harassment and online scams. Besides, participants also expressed concerns about the negative impact of smartphones on younger generations, particularly regarding digital addiction.

> *"This smartphone has practically harmed an entire younger generation in China. Nowadays, most people don't leave their homes because their phones can lock them inside. People stay at home, glued to their phones, rarely stepping out. One unique feature of smartphones is that their content is never repetitive. When you're using it, there's always something new being pushed to you. Smartphones are incredibly powerful, keeping you hooked with endless fresh content, constantly attracting your attention. It's just like opium." (FG02-01, M60)*

Furthermore, they were also concerned that future technology would become too complex, making it impossible for older adults to keep up with the use of new technology.

> *I'm just worried about the complexity. It might be so complicated that we can't keep up (with technological advances), like some of us older people can't keep up. So, there are two sides to the coin. It (future digital technology) must be easy to use. Convenient and simple is ideal. So that our elderly people can also use it. (FG05-F73)*

Older people not only expect technology products to be easy to use but also to be able to learn and operate on their own, rather than just relying on the younger generation for help. These results reflect participants' expectations for the simplicity of technology products and concerns about complexity. It must be admitted that improving the ease of use and simplicity of technology products is very important for 'elder-friendly,' as older people will be anxious about complex technology and refuse to use them. Tsai et al. (2015) pointed out that limited access and low technology self-efficacy are the key reasons why some groups, especially older adults, are excluded from the digital world. In their research, they found that the ease of use of smart devices helps address the lack of technological self-efficacy. Technophobia, or technology anxiety, which is 'fear or dislike of modern technologies and complex technical devices or discomfort with them' (Nimrod, 2018, p. 148), could hinder older adults' use of technology and digital involvement (Kim

et al., 2023). In addition, participants in this study raised concerns about future technological developments from a security and privacy perspective. Some studies have pointed out that privacy is the biggest concern of older adults (Yusif et al., 2016).

6.3 Suggestions for Digital Inclusion

Based on the findings analysed in this study, the following recommendations are made with regard to digital inclusion. Firstly, from the perspective of enhancing the digital independence of the older adults, it is necessary to help them improve their capability of digital use. Provide them with the necessary digital skills training to enhance the older population's use of smartphones and proficiency in application operation, so as to remove the gap between the older population's digital use needs and their actual capabilities. In providing digital inclusion training, face-to-face and one-to-one approaches are suggested, which can help older persons better learn and understand the operations and skills. Currently, Chinese older people are keen to use short video platforms such as Tiktok and Kuaishou. Short video is also a hot topic of discussion among participants in the focus groups. Short videos may be a tool to stimulate the learning motivation of the older people, promoting them to take the active role of learning digital skills. Moreover, before providing digital inclusion training to the older adults, research should be conducted on their daily life needs to understand the skills they really need, and the training should be delivered according to their needs, providing the useful ones rather than the 'good' ones. Also, influences from peer "warm experts" could be considered to encourage the older people to participate in the digital society.

Secondly, the attention of all social sectors to the digital use of the older population should be raised. For their children, it is suggested that they could play the role of 'warm experts' more often in older adults' daily lives and pay attention to the digital needs of the older adults. At present, some digital platforms in China, e.g., Taobao and Alipay, have launched the function of 'family account', which allows children to act as guardians and participate in the digital use of the older adults when necessary. However, caution should be taken not to interfere with older people's independent decisions and their own agency, and to respect their right to use digital technologies independently, giving them reminders and guidance appropriately.

At the same time, the government should strengthen online regulation to prevent online fraud. Participants in the study were widely concerned about digital use and financial security, and online fraud triggered discussion and sympathy among the focus groups. Finally, academics should further study the digital use of older population provide reference for the developments of age-friendly products and social services.

Conclusion

Differences in lifestyle between generations are magnified by digital divide. While younger generations are enjoying the benefits of digital technology, older persons are struggling to cope with the basic requirement of being a digital citizen in the digital age. The benefits of technology development are quite promising, but the bewildering interface and complex operation flow could sometimes be a deterrent for older persons, cutting them off from an active digital life. In this case, to build an equal and inclusive digital society, digital inclusion measures are indispensable. The development of digital inclusion in China falls far behind that of developed countries. In end of 2020, almost a year after the outbreak of COVID-19, the Chinese government launched its first digital inclusion initiative for older people. In the focus groups, participants provided limited but valuable insights based on their digital inclusion experiences.

In the focus groups, participants shared their experiences and opinions on digital inclusion. They recognised the positive efforts of some urban communities in digital inclusion. In one community in Guangzhou, for example, they provide various training services to residents based on survey, while there is a greater demand for training on the use of smartphones. On the other hand, some organisations also provide digital skills training services for their retirees. In the discussion, participants recognised the effectiveness of these training initiatives and appreciated the support they received, considered the volunteers (including college students and students from district universities) as positive role in promoting digital inclusion.

Anticipating future technological developments, participants expressed concerns about technology product operation simplification in focus group discussions. Firstly, they worry that future technology may become overly complex, leaving older people unable to keep up with the use of new technology. Older adults strongly expect technology to be user-friendly and simple, hoping that future digital technologies will be convenient, straightforward, and easy to use. Secondly, participants expect technology to streamline the emergency call process, especially in emergencies. They hope that future technology will provide a ‘report emergency within one click/press’ function, making it easy for seniors to seek help in urgent situations. Additionally, participants mentioned that technology products need to achieve a high degree of intelligence and automation to ensure that older adults can operate smoothly. They believe that smart

devices such as robots should simplify daily tasks, but the operating system and steps should not be too complicated.

In general, participants worry that digital advancements will bring more learning burdens while hope that future smart technologies can help solve their one-child parents' caring problems in later years. Based on this, easy-to-use high-tech products meet their expectations. Regarding digital inclusion, it is suggested that the formulation of digital inclusion policies and services should meet the daily needs of older adults, providing targeted service content to ensure that digital inclusion is useful and does not impose extra learning burdens.

Chapter 7 Conclusion

Advances in technology have created opportunities and challenges and led to the widespread adoption of digital solutions. However, the digital divide has emerged as a new form of social inequality, referring to differences in access to, use of and benefit from digital technologies. Older people face challenges and inequities in the digital age, which is known as the 'grey digital divide'. Factors such as age, education, income and regional development contribute to this divide. However, appropriate digital participation can contribute to the well-being of older people in later life, but not all older people have equal access to these benefits due to the digital divide. Older people face many obvious or potential difficulties in the digital age, including financial, technological and psychological barriers. However, an increasing number of older people are actively participating in the digital world. Older people are no longer seen as digitally disadvantaged, but as part of the population that can actively participate in and benefit from the digital world. Understanding and exploring the digital experiences and needs of older people is crucial for researchers, policy makers and service providers. By delving into the experiences of older people, their needs can be better met, and inclusive digital environments can be created. This understanding can help develop more digital technologies and services for older people and enhance their digital experience, promoting their active participation in the digital world.

This project explores the experience of older adults on using digital technologies in their everyday lives. Under the mixed methods consisting of qualitative and qualitative methods, it conducted questionnaires, interviews and focus groups to make some insights into the daily digital lives of the silver netizens in China. Acknowledging the exists of generational digital differences, the study lays more emphasis on finding out the significances of daily digital experience to the silver netizens. Four research questions were explored: (1) What are the key dimensions (activities/functions) and venues (places/spaces) of Chinese silver netizens' digital everyday life? (2) What digital experiences (practice and user experience) do Chinese silver netizens have in their everyday life? (3) How do older adults perceive intergenerational digital interactions and differences? (4) What suggestions do Chinese silver netizens have towards a better digital living? Based on quantitative and qualitative research, the four questions are explored and answered in chapters 4, 5, and 6.

7.1 Conclusion of the research results

7.1.1 What are the key dimensions (activities/functions) and venues (places/spaces) of Chinese silver netizens' digital everyday life?

Primarily, the research illustrates the most important activities and places in older people's digital daily lives, showing how they can be active and enjoy diverse lives in the digital world. Firstly, in terms of digital daily activities, older people engage in a wide range of digital activities in their daily lives. From social activities, leisure, and entertainment to health management, older adults can have various interactions based on digital facilities such as smartphones and mobile internet. Participants frequently talked about their digital social interactions and engagements in their daily lives in the interviews. They stay socially connected through news and entertainment apps, shop, and engage in leisure and entertainment activities through online platforms. Their integration of digital technologies into these daily life activities not only reveals the active participation of older adults in the digitalisation process but also reflects their ability and interest in adopting digital technologies. Secondly, in terms of the adoption of applications and platforms, the acceptance and use of various digital platforms by older users demonstrate their adaptability and positive attitude towards new technologies. Older adults not only heavily use social applications such as WeChat but also actively adopt information, e-commerce, and financial service platforms such as Baidu (search engine), Taobao and Pinduoduo (shopping platforms), and Alipay (payment application). Additionally, some of them use platforms like Xiaohongshu and Xuexi for learning and knowledge expansion or tools like Gaode Maps and Didi to solve practical life needs. This diverse use of apps demonstrates older people's exploration in the use of technology and shows that they are able to effectively utilise different digital tools to solve practical problems, thus enriching and facilitating their lives. Besides, this research also highlights the heterogeneity in digital use among older adults, showing the individuality and diversity in their digital activities and application choices. These insights challenge prevalent assumptions about older adults' technology use and support scholarly arguments emphasising the diversity of older populations in the digital age.

7.1.2 What digital experiences (practice and user experience) do Chinese silver netizens have in their everyday life?

The use of digital technology is closely intertwined with and inseparable from the everyday lives of older adults. For silver netizens, smartphones and other smart devices are no longer just communication tools but gateways to the digital world. Using digital technology means living in the digital world for them. They are not just like the visitors described by White and Le Cornu (2011), who see digital devices and applications as tools; they are more like residents (White & Le Cornu, 2011) who live in the digital world.

Firstly, the development of smart phones and mobile Internet not only enables the older adults to break through the limitations of technology and knowledge, but also provides them with a more convenient digital communication platform. Smartphones have become an integral part of the daily lives of older adults. According to participants, the first thing they do when they wake up each morning is checking their smartphones. Smartphones play a central role in social interaction and entertainment and are inextricably linked to the daily lives of older adults. It can be said that smartphones are not only a part of their lives, but also a gateway that brings them into a deeply integrated physical and digital reality. Unlike other research findings, silver netizens in China rarely switch between smartphones and other devices. This reflects that in the digital process of China's urbanisation, almost every aspect of life needs the support of portable smart phones and mobile Internet, and smartphones have become an important bridge for older adults to participate in the digital society and maintain daily life functions.

Secondly, living in the digital world, silver netizens lead personalised and diverse digital lives. They have their personalised 'living room', 'study room', 'playground' and 'tool shed' according to their needs. For example, digital life of the silver netizens starts from checking the smartphone every day, involving social interaction, access to news information, online shopping, leisure and entertainment. For them, these activities have become a daily routine of digital life, rather than challenges. On the social side, digital technology not only helps them keep in touch with their families, especially those who live in different cities, but also facilitates them to communicate with friends and organise social events. Through WeChat groups, silver netizens can easily organise or participate in activities and get information related to their interests. Digital social networks make retirement no longer about being forgotten or isolated by society. In terms of entertainment, older adults enjoy music, games and reading in a unique way through digital technology, showing their personalised needs and adaptive ways. For example, they explore

music through a variety of digital means, not limited to a specific music app or platform. In addition, online romance novels have also attracted the interest of older female readers. Digital technology allows them to personalise and meet their interests and needs. In addition, the function of the smartphone as a wallet has significantly changed the way payments and banking are processed by older adults. Almost all participants said they would use online payments, and some seniors even adopted the latest facial recognition payment technology, showing their trust and comfort with the new payment methods. They manage money and wealth through mobile banking apps and online payment platforms, illustrating the important role of digital technology in daily life management.

These digital activities and spaces not only enrich their social networks, but also provide a rich variety of options for their entertainment lives. Digital use brings convenience to the daily lives of silver netizens and enhances their well-beings.

7.1.3 How do older adults perceive intergenerational digital interactions and differences?

This study analyses the intergenerational digital interactions of older adults with the younger generation in their digital daily lives, starting with the digital support provided by the younger generation. Digital technology facilitates the sharing of interests and opinions across generations through social media and other platforms, helping to bridge the generational gap and allowing older and younger people to find common topics of interest, thereby enhancing communication and understanding. Additionally, analysis shows that silver netizens also engage in cultural and knowledge exchange with the younger generation in their digital daily lives. However, it has found that due to differences in interests and experiences, intergenerational communication takes priority, and intergenerational interactions present challenges. Not every older adult has access to reliable warm experts. Studies have identified common challenges among silver netizens, including the younger generation's lack of time or patience, leading them to rely more on their peers for learning and support. Sometimes, the younger generation may be reluctant to share their digital experiences with older family members, leading to misunderstandings or a lack of engagement.

The research also analyses intergenerational digital differences proposed from the perspective of silver netizens. Silver netizens can clearly perceive and explicitly point out the digital differences between generations, noting differences in capability, usage scope, and psychological approach among young people. First, the different purposes of digital use are

discussed, with participants noting that young people's lives are almost entirely digitalised. Furthermore, they note that older adults have less confidence in digital usage, as young people can easily manage digital technology due to their greater familiarity with it, while older groups may fear making mistakes or being cheated due to their lack of understanding and unfamiliarity. Additionally, silver netizens believe that older adults have lower needs for devices. In China, many older adults are 'inheriting' second-hand smartphones from their children. In this process, the digital needs of older adults are overlooked. Finally, participants suggest that silver netizens are only 'partial users' of digital technology, while young people are 'omnipotent users. In discussions, participants note that young people use digital technology extensively in their work and lives, while older people use it only partially according to their daily life needs. Nonetheless, the notion that young people can do anything in the digital world is also an age stereotype, and the idea that all young people are omnipotent digital natives may be a myth rather than reality. Multiple studies have proven this point (Margaryan et al, 2011; Herold, 2016; Van Deursen, 2016). Moreover, interviews have revealed the emergence of 'silver digital leaders'. The presence of these leaders significantly alters the traditional view of the relationship between older adults and technology, challenging the stereotypes associated with digital ageism. Studies find that silver netizens also have their different needs for digital devices, and their personal digital use demands should be considered by families and society.

7.1.4 What suggestions do Chinese silver netizens have towards a better digital living?

The digital inclusion experiences of Chinese silver netizens based on the results of focus group discussions. During the group discussions, participants provided insights into their experiences with digital inclusion. They applauded the efforts of some urban communities. Moreover, certain organisations offer digital skills training for retirees, with these initiatives receiving positive feedback for their effectiveness and the support provided by volunteers, including college and university students. Looking ahead, older adults expressed concerns about the potential complexity of future technologies. They emphasised a desire for user-friendly and straightforward digital tools, advocating for technologies that simplify and expedite tasks, especially in emergencies. Furthermore, there's a call for highly intelligent and automated systems that ensure ease of use without complex operations, suggesting that while smart devices like robots could simplify daily life, they must remain easy to operate.

7.1.5 Research Contributions

Firstly, this study explores the digital daily lives of older adults, sketching a landscape of silver netizens' digital world. It challenges digital ageism by highlighting that older adults' lives are not only rich but also include digital leaders within them, stating that silver netizens could be digital residents rather than immigrants or refugees. The study also highlights the diversity and heterogeneity of digital use among silver netizens, emphasising age is not the solely factor that influences digital use, their cultural background, life course and gender should be taken into account. It also points out the potential overuse of digital technology among older adults, which warrants attention. This breaks the stereotype of older adults lagging in digital technology, proving their importance and potential in the digital society.

Moreover, the study seeks to lean silver netizens experience of intergenerational digital interactions and differences. It identifies a potential lack of 'warm experts' in Chinese families, leading to a lack of support for older adults in using digital technology. The impatience or lack of time from their children to provide support can reduce older adults' enthusiasm for using digital technology. However, excessive intervention and control by children can also lead to over-dependence, preventing older adults from using digital technology independently. It calls for a balance in providing technical support, helping older adults overcome technical challenges without stripping them of their independence. The study also found that older adults hold inclusive understanding and attitudes towards intergenerational digital differences. They focus more on their own digital daily life rather than emphasis the inequalities or disparities between them and the younger generations.

Furthermore, the study summaries the experiences of silver netizens with digital inclusion and their expectations for the development of digital technology. On one hand, they worry that digital advancements will bring more learning burdens; on the other hand, as parents of only children, they hope that future smart technologies can help solve their caring problems in later years. Based on this, easy-to-use high-tech products meet their expectations. This provides valuable guidance for policymakers and technology developers, helping them design digital products and services that better meet the needs of older adults. The study also offers suggestions for digital inclusion. In general, the formulation of digital inclusion policies and services should meet the daily needs of older adults, providing targeted service content to ensure that digital inclusion is useful and does not impose extra learning burdens.

Additionally, in terms of research methodology, this study emphasises the importance of qualitative research. In exploring the digital daily lives of older adults, qualitative research methods help to see the trees (individuals) within the forest (whole ageing group), allowing for an in-depth understanding of each older adult's unique experiences and perceptions in the digital world, and constructing their understanding and meaning of their digital daily lives. Through in-depth interviews and focus group discussions, the research is able to capture the personalisation and diversity of older adults' digital lives, as well as collective generational opinions, providing more comprehensive and specific insights into the study of digital use among older adults.

Overall, this study not only deepens the understanding of the digital lives of older adults but also provides practical recommendations for improving their digital technology usage experience. It challenges the existing digital ageism stereotypes, reveals the lack of intergenerational support, emphasises the importance of digital inclusion, and proposing policy and practice suggestions, contributing to the older adults' digital use research field, providing evidence to the digital ageism studies, as well as helping older adults better integrate into the digital society.

7.2 Reflection and limitation

7.2.1 The turn of the research perspective

Over the course of a four-year study, my perspectives and approach have evolved. Initially, this study was primarily leaning on exploring the digital generation gap among older adults, however, turn towards understanding the digital experience of silver netizens. The original research design aimed to examine differences in digital abilities within the older adult population and across age groups, with a particular focus on the 'digital divide' encompassing aspects such as access, competence, and impact levels. Previous plans considered older adults as a digitally disadvantaged group with lower digital skills. However, the adjusted study placed greater importance on the construction of a digital 'experience' among older adults. Silver netizens were viewed as active participants in the digital realm, with their own unique digital culture, customs, and specific digital needs. The problem of digital divide seems to have received increasing higher attention and concerns from the academy and been studied thoroughly in possible domains. With the advancement of social development and infrastructure construction, the popularization and accessibility of the digital technologies will be gradually improved even in the under-developed and remote area based on the inference of the existing Internet development data (UN, 2020). When access is no longer the greatest challenge for the older adults, researchers should focus more on understanding how they engage with digital technology in their daily lives.

7.2.2 Limitations in the Study Population

This study explores the daily lives of older digital users and suggests that their digital usage can be diverse and enriching. However, the findings of Quan-Haase et al. (2016) indicate that while the third age is typically characterised by retirement, increased leisure time, and opportunities to explore new life paths (Laslett, 1989), this optimistic view of retirement does not apply to all individuals over 60. Many older adults need to continue working beyond the age of 65 to make a living. Consequently, issues of inequality significantly affect the digital participation experience in this age group. Future research needs to pay closer attention to how structural factors such as socioeconomic status, family structure, and employment impact older adults' decisions to adopt information and communication technology and their experiences using it. Additionally, the oldest participant in this study was 73 years old, meaning the research did not reach to the oldest older adults who are aged 80 and 90+ (Vincent, 2023). Participants in this study believe that the oldest older adults encounter more difficulties in using digital technology compared to the younger older adults. As human lifespans continue to increase and digital technology continues to penetrate the older population, the digital daily lives of these age groups need to be explored and understood.

7.2.3 Online questionnaire as an age-unfriendly research method

In addition, the limitations of this research method are worth considering. In the quantitative research stage, it collected data using an online questionnaire, which was distributed via the Qualtrics platform in accordance with researcher's university's regulations. However, some older participants reported that it was very inconvenient to fill out the questionnaire on a mobile phone— not only they were unfamiliar with the operating system, but the font was also too small, despite adjustments had been made to the font size during the questionnaire design. The results of the questionnaire showed that although 160 people started Part A, only 126 completed Part D, with 34 dropping out midway (see Appendix D for detailed statistics on 'who left the online questionnaire halfway'). Considering that most older users in China rely on smartphones and rarely use computers, future studies involving older groups should avoid using online questionnaires or should consider selecting age-friendly questionnaire platforms, to prevent digital unfriendliness during the research process. Moreover, the online questionnaire feedback also highlighted issues of digital ageism, such as the design of some digital platforms being primarily for their 'ideal users,' without considering that the older population might also use their products. Additionally, while discussing intergenerational digital interaction and differences, this

study focused only on the perspective and experience of silver netizens. However, for a mutual understanding of the intergenerational digital divide, including the perspective of the younger generation would be necessary. It might be beneficial to invite younger family members of the silver netizens to participate in the research, exploring the intergenerational differences from their viewpoint to gain more insights.

7.2.4 Limitations on Research Scope

This study focuses on older adults residing in Guilin, a Tier 3 city in economic development and a Type II large city by population size in China, aiming to provide insights into the digital daily lives of seniors in urban areas. Guilin's demographic, economic, and digital development characteristics position it as a representative site for studying urban older adults in cities of similar scale and context. However, the findings may not fully generalise to older adults in Tier 1 cities (e.g., Beijing, Shanghai) or rural areas, where economic conditions, technological infrastructure, and cultural attitudes toward digital technology might differ significantly. While the emphasis on Guilin allows for a detailed exploration of a typical mid-sized urban environment, future research could expand the geographic scope to include more diverse settings to enhance the representativeness of the results.

Additionally, my positionality has inevitably influenced the research design, setting boundaries for the scope of exploration and shaping the lens through which the findings are interpreted. As a Chinese researcher born during the one-child policy era and currently living outside China, my perspectives are influenced by cultural values, such as filial piety, and personal experiences of witnessing intergenerational digital interactions within my own family. This background has provided a unique lens through which I approach the topic, allowing for empathy and cultural understanding. However, it may also have introduced biases, such as assumptions about the role of younger family members as warm experts and the importance of digital equity and inclusion.

7.3 Suggestion for future research

'Daily life', as the starting point of research topics and questions as well as the site in which researchers participate (Jorgensen, 1989), it is the source of understanding human nature in anthropology. The focus of participant observation is to understand the insider's understanding of human life. To describe the daily life of a group from the insider's perspective is the basic reality of anthropological participant observation (Jorgensen, 1989). Defining or constructing the

meanings and significances of their daily lives from the perspective of the older group is the aim of the project, after all, 'welfare is a people's right to determine for themselves what their own welfare should be' (Miller & Horst, 2012, p. 20). To study the digital practice and experience in people's daily lives, digital anthropological observation could be a good method. As an extension of anthropology in the digital age, *digital anthropology* enables researchers to combine anthropological methods to explore the question of 'what does digital technology mean to human beings?' For example, a European Research Council funded project directed by Daniel Miller named *The Anthropology of Smartphones and Smart Ageing* (ASSA) was conducted across 9 countries by 10 anthropologists to investigate the changes of the relationship to age and health associated with the global rise of the smartphone, thereby understanding the contemporary nature of age and the impact of new media, as well as to use this knowledge to help make mobile health interventions more effective (ASSA Blog, 2022). In digital ethnographic studies, both online and offline research sites are acceptable, even required. The researchers can participate in the participants' daily lives to observe them, 'digitally tracking them', or invite them to share their activities online. Ethnographic writings in the study can even be replaced by videos, photos, and blogs (Pink et al., 2016). The combination of online and offline observations could be proposed in future study. Based on the latest research, 'social media' could be a good choice of research site for online observations. For a study of Chinese, the WeChat Group is a good place to observe the activities and interactions among members (Wang & Liu, 2021; Zhou & Xiang, 2021). Through the digital ethnographic observations, researcher can investigate the daily digital lives of Chinese silver netizens.

Moreover, while this study provides valuable insights into the digital experiences of older adults in urban China, focusing on Guilin as a representative case, it is important to acknowledge that rural areas remain underexplored in this context. Older adults living in rural regions often face unique challenges in their digital engagement, shaped by differences in infrastructure, economic conditions, education levels, and cultural practices compared to their urban counterparts. In addition, intergenerational relationships among rural left-behind older adults, particularly those whose children and grandchildren have migrated to urban areas for work, warrant further exploration. These dynamics may significantly influence rural older adults' digital adoption, as younger family members often serve as key sources of technical support and motivation. Future research could examine how these intergenerational connections impact the digital practices, emotional well-being, and social inclusion of rural older adults. By investigating these aspects, future studies could provide a more comprehensive understanding of digital inclusion across diverse geographic and social contexts in China. Such research would also inform targeted strategies for bridging the rural-urban digital divide and fostering equitable digital access for all.

Last but not the least, further attention to older and lower-economic-status older adults is advocated. This will help to more comprehensively understand the position and challenges of older adults in the digital society, thus promoting more effective support measures.

Appendix A Chinese Silver Netizens' Daily Digital Experience Study Semi-Structured Interview Guide

Note: *Participants will be interviewed according to the following outline, but the order and selection of questions and follow-up questions may vary from person to person depending on their background.*

Theme	**Topic**	**NO.**	**Question**	**Possible Follow-up Questions**	**Aims**
Part-1	Digital use history & motivation	0	Has COVID-19 exerted any impact on your daily life?	What is that? Why?	Warming up
Digital Access & Use in Everyday Life		1	Can you describe your history of using smart devices and the Internet?	Why did you decide/start to use them?	To understand the history and motivation of the interviewees' digital use
		2	Is it difficult for you to use them?	Do you feel timid/afraid of technologies? How did you deal with the difficulties?	To understand the interviewees' perceived ease of use of digital technology

	Daily digital use	3	Can you introduce your current smartphone and describe its merits and demerits?	Did you choose/purchase it yourself? Why you choose/purchase it?	To understand the interviewees' comments on smartphones
		4	Can you briefly describe your daily activities and how they relate to digital technologies?	Do you prefer to conduct these activities online or offline? why?	To understand the interviewees' daily using behaviours, habits and motivations for digital using
		5	Can you outline your daily digital technologies usage patterns?	When and what do you use them for? why? How much you spend on it? (e.g., social & participation / leisure & entertainment/ shopping & business / transportation & travel/ health and medical care)	
	Digital skills & Inclusion	6	How do you feel about your smartphone skills? (Compared to peers/young people)	Why? Can you give me any example of your weakness/superiority?	To understand the interviewees' evaluation of their own digital skills
		7	Have you ever had trouble with digital use?	Who do you turn to for these troubles/problems? Why? What are their attitudes and consequences?	To understand the views of older adults on digital support

		8	Is there anyone encourage or discourage you from using the Internet or smartphone?	Who are they? Why they encourage/prevent you to do so?	To understand the support of older adults family members for the older population to use the Internet
		9	Do you have any other path to learn how to use or deal with digital technologies problems?	What is that? Why?	To find out what older people think about digital inclusion channels
Part-2 Digital Using Impacts	Impacts of digital use	10	Has digital using generated impacts on your daily life?	In what aspects and how you are affected? (e.g. social & participation / leisure & entertainment/ shopping & business / transportation & travel/ health and medical care)	To understand the impacts of digital using on participants, including pros and cons, dilemmas and achievements.
		11	In general, has digital using generated more positive or negative impacts on you?	Why?	
		12	Can you briefly introduce the impacts of digital use on your participation, health, and security?	Why?	

	Attitudes towards future developments	13	Is there any digital application, device, service that you have never used but would like to try?	Will you try to learn and use it in the future? Why? How?	To understand participants' attitudes and plans towards future digital development
		14	What is your attitude towards the future digital technology development?	Why?	

Appendix B Chinese Silver Netizens' Daily Digital Experience Study Focus Group Discussion Guide

PART ONE: WARMING UP

Purpose: To warm up and provide an overview of the impact from Covid-19. There will be repeating/similar questions in each area, researcher will adjust questions according to the participants' responses.

1. What is the most obvious impact of COVID-19 on older groups?
2. Has COVID-19 made digital technology more important in the daily lives of older people? Why?
3. Do those older people who are capable to use digital technologies lead better lives than their counterparts during and post the COVID-19?

PART TWO: Digital differences between old and young generations in China:

1. Will there be any difference between the digital world of the young and the old? (Why? If there is a 'boundary' between older adults and the young in the use of digital technology? e.g., hardware and equipment; system and software; information and content).
2. Have digital technologies exacerbated or bridged that between young and old? (Culture, thought, insight, economy, etc.)
3. Who do you usually have more daily digital connections with？ (Why?)
4. How does the digital life of older people intersect with that of younger people? Mainly in what fields of life (Why?)
5. Would your younger family members influence your use of digital technologies? (Why? How?)
6. Regarding the use of digital technologies, in what fields are older people more experienced than younger people? (Why?)

PART THREE: Digital inclusion for the Chinese older population

1. Do you know the call of ‘Improve the digital media literacy of older adults, help them better use smart media, and bridge the digital divide’? What do you think of it?
2. Do you know what ‘digital literacy’ is? Is ‘digital literacy’ important? (Why?)
3. What kind of obstacles will the digital technologies bring to life? (Why?)
4. What should society do to better help older adults on digital inclusion? (Why? Is it more important to serve the engagement of older adults in the digital age, or is it more important to retain the space for ‘retreat’ and improve offline services?)
5. How does digital technologies influence the relationship between older people and the society? (Why?)

End of the focus group. *Thanks again to the participants and stop video-audio recording*

Appendix C Chinese Silver Netizens' Digital Experience Study Questionnaire

Part A: Personal background

A1. Your gender

Male

Female

Other

I prefer not to say

A2. Your year of birth_____

A3. Your current highest level of education is:

Without any education

Old-style Private schools/Old-style literacy classes

Primary school

Junior high school

Vocational high school/general high school

Junior College/Bachelor

Postgraduate and above

other

A4. Are you retired?

Yes, I've retired

No, I'm still working

A5. The type of organization/company you are currently/retired from is:

Party or government organization

Enterprise

Public Institution

Social organizations

Community Neighborhood Committee / Village Committee

The army

I am unemployed

I am self-employed

other

A6. What is your family's average monthly income (the combined income of you and your spouse/partner)?

Less than 3000 RMB

3000-5999 RMB

6000-9999 RMB

10000-14999 RMB

More than 15000 RMB

A7. Do you think your current health status is:

Very unhealthy

Not very healthy

Ordinary

Healthy

Very healthy

A8. Are you currently living with your spouse/partner?

Yes

No

A9. Are you currently living with your children?

Yes

No

A10. Are you currently living with your grandchildren?

Yes

No

Part B: Digital Access

B1. Have you ever accessed the Internet in the past three months, including using smartphones, tablets, computers and other devices?

Yes..... Jump to the B3 question

No..... Jump to the B2 question

B2. What is the main reason you don't use the Internet?

I don't know what is Internet

I have no need or no interest to use it

I'm afraid of technology

I don't know how to use it/no one teaches me/I find it difficult to use it

Age-related health problems

It was too expensive to use

There is no Internet infrastructure in my area

I don't have any devices to use it

other

B3. How long has it been since you first accessed to the Internet?

Less than 1 year

1 to 2 years

3-4 years

5 years or above

B4. Do you have Internet access at home?

Yes

No

B5. How many Internet-enabled devices (including smartphones, tablets, computers, smart appliances, etc.) do you have at your disposal?

1

2

3

4

5 or more

B6. Which of the following smart devices do you use most frequently to surf the Internet?

Smart phone

Tablet

Laptop computer

Desktop computer

Other

Part C: Digital Use Pattern and Capacity

C1. How many hours per day do you spend using digital devices such as smartphones and computers?

Less than 1 hour

1 to 2 hours

3 to 4 hours

5 hours and above

C2. How often do you use digital technologies for the following?

Always *(several times per day)*

Often *(at least once per day)*

Sometimes *(at least once per week)*

Seldom *(once a month or several times a year)*

Never

1. Social Activities (e.g. communicate with family, friends, interest groups and make new friends through WeChat, QQ, email, etc.);
2. Self-Expression (for example, use WeChat Moments, Qzone and TikTok as self-display platforms to record and share your contents);
3. Leisure entertainment (e.g., playing games, listening to music, watching videos, reading novels, etc.);
4. Get information (e.g., search for information, browse news, etc.);
5. Medical care (such as online consultation, online appointment registration, searching or reading health knowledge, etc.);
6. Business and Payments (such as online transfer, payment, online shopping, financial management, etc.);

C3-1 What additional features have you used on your phone or tablet? (Multiple options

The camera

The flashlight

The calendar

Clocks (including alarm clocks, timers, etc.)

The weather forecast

The calculator

Recording function

Other features

C3-2 What basic settings on phones and tablets can you do independently?

Volume

Screen brightness

Font size

Turn on or off the WIFI

Turn on or off the cellular data

Set or switch the input method

Other

C3-3 Can you download and install new apps (software) on devices like smartphones or tablets?

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-4 Can you search online and find the information you need? For example, using Baidu Search, 360 Search, WeChat Search, etc., on your smartphone, tablet, or computer.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-5 Can you browse news online? For example, through platforms like Tencent News, NetEase News, Toutiao, or WeChat public accounts on your smartphone, tablet, or computer.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-6 Can you make online payments? For example, using apps like Alipay, WeChat Pay, Cloud QuickPass, or online banking for online payments or transfers.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-7 Can you shop online? For example, purchasing goods you need from platforms like Taobao, JD.com, Pinduoduo, or Meituan using your smartphone or tablet.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-8 Can you use WeChat, QQ, or similar platforms to chat and interact with family and friends?

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-9 Can you post your own content on platforms like WeChat Moments, QQ Zone, or Douyin? For example, posting text, photos, or videos in Moments.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-10 Can you watch short videos online? For example, on platforms like Douyin, Kuaishou, or WeChat Video Channels on your smartphone, tablet, or computer.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-11 Can you watch TV shows, movies, or variety shows online? For example, using apps like Tencent Video, Youku, or iQiyi on your smartphone, tablet, or computer.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-12 Can you use your smartphone for navigation? For example, using apps like Baidu Maps or Gaode Maps for location and navigation.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-13 Can you book a taxi using your smartphone? For example, through platforms like Didi Chuxing or Shenzhou Zhuanche.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-14 Can you book train tickets, flight tickets, or hotels online? For example, through platforms like 12306, Ctrip, Qunar, or Fliggy on your smartphone, tablet, or computer.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-15 Can you schedule a doctor's appointment online? For example, using a hospital's WeChat public account or mini program to register or book an appointment.

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-16 Can you display your Health Code on your smartphone when entering public places?

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-17 Can you complete the annual "survival certification" (facial recognition) for retirees' social security?

I can do it easily and independently.

I can do it basically by myself with some effort.

I can do it but need some help with this.

I can't do it.

I do not need it/ I do not want it.

I totally do not know what it means.

C3-18 Which of the following input methods can you use? (Multiple choice)

Pinyin Input

Handwriting Input

Voice Recognition Input

Other (with a blank field to specify)

None of the Above

C3-19 Do you agree with the following statement: When I see "breaking news" or "urgent notifications" shared online (e.g., in WeChat groups, Moments, or Weibo), I verify the information before believing it.

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

I Don't Know

C3-20 When making online payments or transactions, I check the safety of the environment (e.g., whether the payment link is secure) to decide whether to proceed with the payment or transaction.

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

I Don't Know

C3-21 If I purchase unsuitable or poor-quality products online, I know how to request a refund from the seller or the e-commerce platform and complete the return process (e.g., arranging a courier pickup or sending the package myself).

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

I Don't Know

C3-22 When I see giveaways, promotions, or cash rewards online, I always click to participate. For example, free-order activities or invite-a-friend-for-cash activities on platforms like Pinduoduo.

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

I Don't Know

C4. What do you think is your overall application ability of digital technology (such as smart devices and Internet)?

I can't use it at all (very poor)

I can use a little bit but my digital capacity is poor (poor)

I can use it basically but my digital capacity is not very good (average)

I can use it well and my digital capacity is good (good)

I can use it very well and my digital capacity is very good (very good)

C5. Do you want to learn and manage the latest/most popular digital skills?

Yes, I want to

No, I don't want to

I don't know

C6. How do you learn the latest/most popular digital skills? (multiple choice)

I have no access at all

I study on the Internet (by watching articles/videos/online courses, etc.)

My spouse/partner/peer teaches me

My children/grandchildren teach me

Training services provided by my organizations/communities/seniors' universities/public libraries

Training services provided by university staffs and students

Training services provided by people from tech companies

Training services provided by other organizations in the community

other

C7. In the future, what channels do you want to learn the latest/most popular digital skills? (Multiple choice)

I want to learn on the Internet (by watching articles/videos/online courses, etc.)

I hope my spouse/partner/peer can teach me

I hope my children/grandchildren can teach me

I hope that my organization/community/seniors' universities/public libraries can provide me with training services

I hope that university staffs and students can provide me with training services

I hope people from tech companies can provide me with training services

I don't know

Part D: Digital Use Impacts

1-Social Relationships

D1. In general, what influence do you think the Internet and other digital technologies have on the quality of your relationships, social activities, and social engagements?

Positive influences

No influence

Negative influences

D2. Which statements do you agree with? (multiple choice)

Online social activities have brought me closer to my families.

Online social activities have alienated me from my families.

Online social activities have brought me closer to my friends.

Online social activities have alienated me from my friends.

Online social activities have made me a lot of new friends.

Online social activities have taken up too much of my time and energy, which affected my offline social relationships.

2-Social Participation

D3. Overall, what influence do you think the Internet and other digital technologies have on your social participation frequencies and qualities?

Positive influences

No influence

Negative influences

D4. Which statements do you agree with? (multiple choice)

The Internet and other digital technologies have increased my chances and conveniences to participate the social activities.

The Internet and other digital technologies have increased the diversity of my social participation.

The Internet and other digital technologies set more technical barriers for me to participate the social activities.

Online social activities have taken too much of my time which reduced my offline social participation.

3-Privacy and Security

D5. Overall, what influence do you think the Internet and other digital technologies have on your privacy and security?

Positive influences

No influence

Negative influences

D6. Which statements do you agree with? (multiple choice)

The big data algorithm makes me feel that my privacy is violated

The Internet and smart devices allow my family to monitor my location and security status in real time.

Online payment makes me worry about the security of my property.

Online payment allows me not to worry about receiving counterfeit money or losing cash.

4-Health and medical condition

D7. Overall, what influence do you think the Internet and other digital technologies have on your health and medical condition?

Positive influences

No influence

Negative influence

D8. Which statements do you agree with? (multiple choice)

I've learned a lot of useful health and wellness information on the Internet.

Online medical knowledge and online consultation services have saved me time going to the hospital.

The smart devices help me and my family keep track of my health status.

The screen time is making my eyesight worse.

Using smart phone and other devices for a long time makes my shoulders, neck and back stiff, sore and painful.

Online appointments and registration have brought more technical barriers to medical treatment

D9. Which statements do you agree with? (multiple choice)

The Internet brings me a lot of useful and interesting information and knowledge.

The Internet has exposed me to more scams.

The Internet has lowered my cost of living.

Online shopping allows me to buy more varied products.

Online shopping allows me to buy more cost-effective products.

I spend too much time on electronic devices and online entertainment.

Online shopping makes me buy more low-quality or fake products.

Online shopping makes me consume too many unnecessary products.

D10. What influence do you think the current development of digital technologies (such as smart phones, Internet and other digital technologies and services) have on the daily lives of the senior citizens in China?

Positive influences

No influence

Negative influences

D11. What is your attitude towards the overall development of digital technologies (such as smart phones, Internet and other digital technologies and services) in the future?

Very positive attitude. Digital technology has greatly improved my life and I am looking forward to the further development of digital technology in the future.

Positive attitude. Digital technology has brought some convenience to my life.

Neutral attitude.

Negative attitude. Digital technology will bring some trouble to my life.

Very negative attitude. Digital technology has brought great difficulties and obstacles to my life. I hope the future won't be too digital.

Appendix D Who Left the Questionnaire Halfway?

According to the *Qualtrics* back-end data, excluding data entries with a 'duration' of more than 60 minutes (the excessive duration due to participants leaving in the middle of the questionnaire), participants took an average of 16 minutes to complete the entire online questionnaire. It is to be admitted that completing such a relatively tedious 'online task' requires a certain amount of patience. Thus, a whimsical question emerged here: ***who left the questionnaire midway***? This question is worth exploring, because the digital questionnaire itself, which needs to be completed on a smartphone, as well as requires certain digital competence to understand and operate, could also be counted into a format of 'digital divide'. Consequently, will ***age*** and ***education***, which are key factors in digitalization, affect people's patience and tolerance for online questionnaires?

Which age group is more likely to leave the questionnaire midway?

As presented in Table 5, among the 160 people who initially started the questionnaire, there were 74 people in the 60-64 age group, 64 of them completed the entire questionnaire while 10 left halfway, and the percentage of those who left was 13.5% in this group; There were 56 participants in the 65-69 age group, 43 of them completed the entire questionnaire while 13 left halfway, and the percentage of those who left was 23.2%; There were 30 participants over 70 years old who started the questionnaire, 19 of them finally completed it, 11 of them left midway, and the percentage of those who left of this group was 36.7%. As shown in Figure 36, the percentage of those who left the questionnaire increased with age.

Table 5 The number of participants who left the online questionnaire in each age group

Age Group	**Number of who finished Part-A**	**Number of who finished Part-D**	**Number of 'Who left the questionnaire'**	**Percentage of 'Who left the questionnaire'**
60-64	74	64	10	13.50%
65-69	56	43	13	23.20%

70+	30	19	11	36.70%

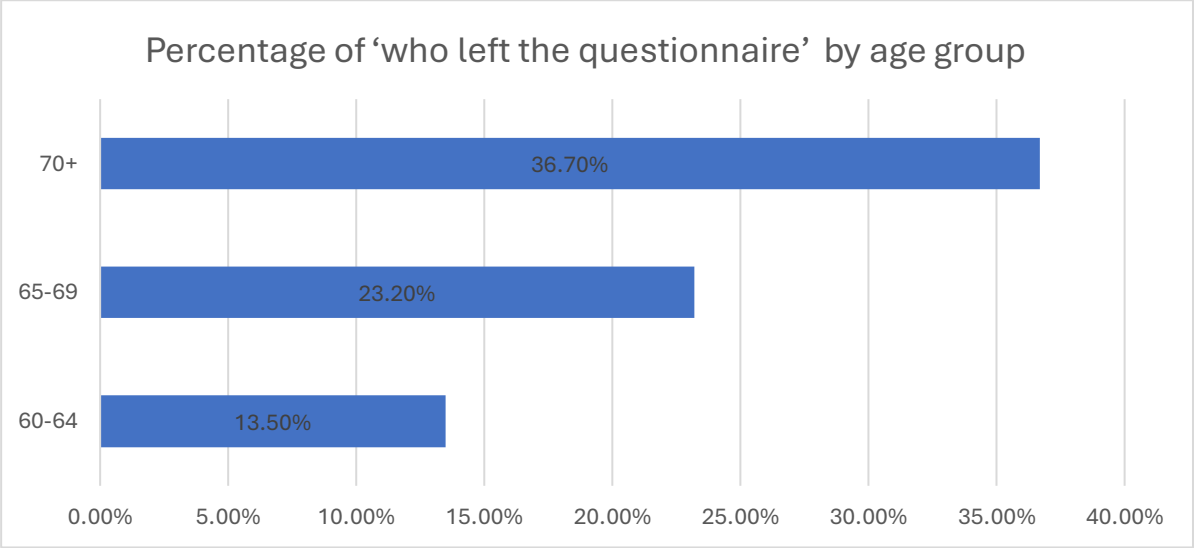


Figure 36 The percentage of participants who left the online questionnaire in each age group

Will education level affect people's patience and tolerance for online questionnaire?

According to the result in Table 6, there were 13 participants with primary or under education level started the questionnaire while 5 of them left halfway, and the percentage of those who left was 38.5% in this group; There were 69 participants with a background of secondary or high school education while 16 of them left halfway, and the percentage of those who left in this group was about 23.2%; the number of participants who received undergraduate or higher level of education is 78, 13 of them left the questionnaire midway, and the percentage of those who left of this group was 16.7%. As shown in Figure 37, the percentage of those who left the questionnaire decreased with education level.

Table 6 The number of participants who left the online questionnaire in each education level

EDU Level	**Number of who finished Part-A**	**Number of who finished Part-D**	**Number of 'Who left the questionnaire'**	**Percentage of 'Who left the questionnaire'**

Primary & Under	13	8	5	38.50%
Secondary & high school	69	53	16	23.20%
Undergraduate & Above	78	65	13	16.70%

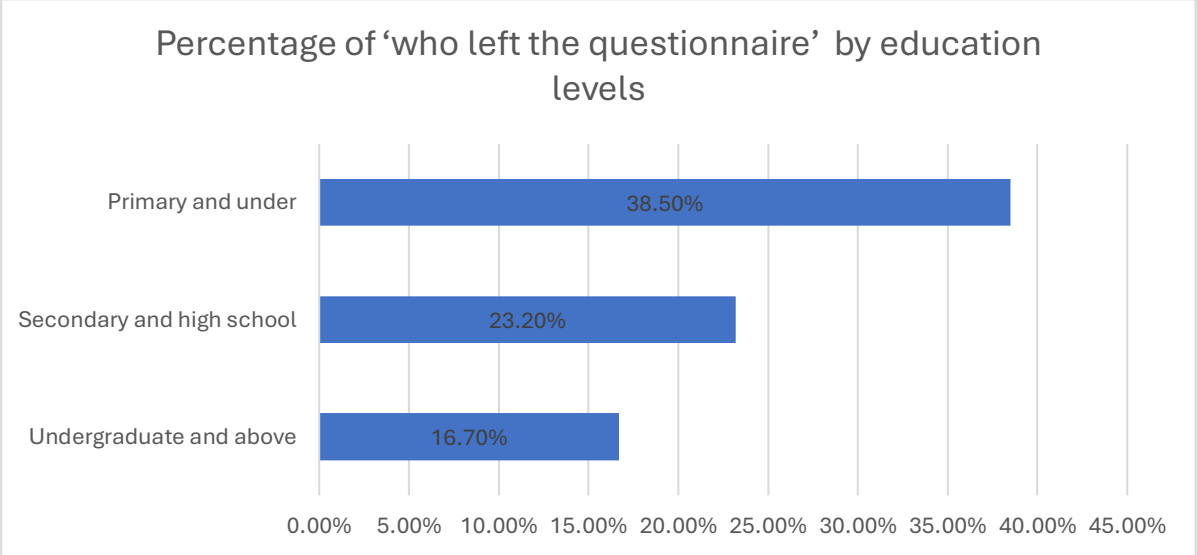


Figure 37 The percentage of participants who left the online questionnaire in each education level

Are there more males or females leaving the questionnaire?

According to the followed Table 7 and Figure 38, there was little difference in the percentage of left between the gender groups.

Table 7 The number of participants who left the online questionnaire in each gender group

Gender	**Number of respondents who finished**	**Number of respondents who finished**	**Number of the leaving respondents**	**Percentage**

	Part-A	**Part-D**		
Male	64	52	12	18.8%
Female	92	74	18	19.6%

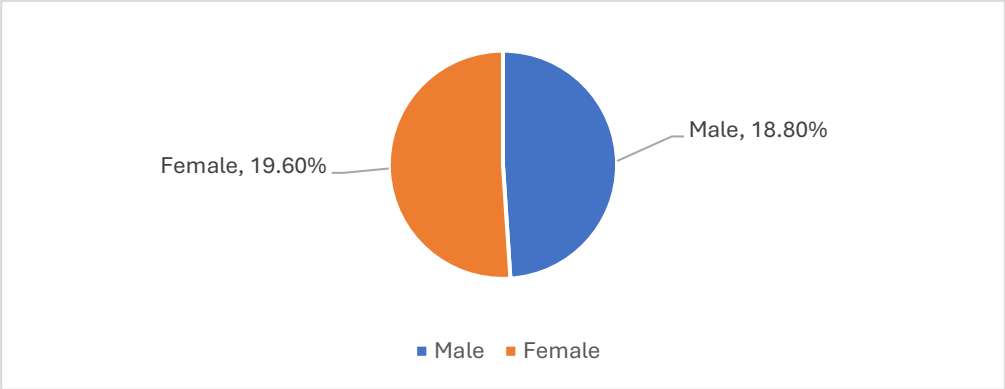


Figure 38 The percentage of participants who left the online questionnaire in each gender group

This result does not fully explain the effect of individuals' 'age' and 'education' on their use of 'digital/online questionnaires' because we cannot determine whether these influences are unique to 'digital questionnaire' or it also works on the offline paper questionnaires. However, this result is in line with the findings of studies related to the digital divide that age and education affect people's digital use, while gender has little to do with it. Furthermore, can digital/online questionnaires be used as a research instrument for older Internet users? What are the differences between it and paper-based questionnaires for older participants? These questions deserve to be demonstrated in future studies to further explore the research methodology of the digital divide.

Appendix E Internet Society Module of CGSS2017 From Question C37 to C66

Access to CGSS2017 Full Questionnaire: http://cgss.ruc.edu.cn/info/1014/1019.htm

网络社会

C37.您第一次上网是哪一年（通过电脑、手机等电子设备上网都算）？

记录：|__|__|__|__|年 →**跳问 C39**

【访员注意】0.从来没上过网、9998.不知道、9999.拒绝回答

C38.您没有上网的主要原因是什么？

不知道什么是上网	01	→**跳问 C51**
费用太贵	02	→**跳问 C51**
没有上网的地方	03	→**跳问 C51**
没有上网的设备	04	→**跳问 C51**
不会/没有人教/用起来很困难	05	→**跳问 C51**
年龄原因/老年人	06	→**跳问 C51**
残疾	07	→**跳问 C51**
害怕高科技	08	→**跳问 C51**
以前工作需要，现在不工作了	09	→**跳问 C51**
以前上学需要，现在不上学了	10	→**跳问 C51**

对上网不感兴趣..... 11 →跳问 **C51**
没有用的必要..... 12 →跳问 **C51**
保护隐私，怕自己个人信息泄露..... 13 →跳问 **C51**
其他，请注明(_____) ..... 14 →跳问 **C51**
不知道..... 98 →跳问 **C51**
拒绝回答..... 99 →跳问 **C51**

C39.从您第一次上网，到目前为止大约有几年了？
记录：[____|____]年
【访员注意】1. 向上取整；2. 98.不知道、99.拒绝回答

C40.您每周平均上网时间大概有多少小时？
记录：[____|____|____]小时
【访员注意】1. 向上取整；2. 98.不知道、99.拒绝回答

C41.以下描述是否符合您的情况？【出示示卡 **23**】

	非常符合	符合	无所谓符合不符合	不符合	非常不符合	不知道	拒绝回答
1.我会使用电脑打开网站	1	2	3	4	5	98	99
2.我会使用智能手机下载安装 **APP**	1	2	3	4	5	98	99
3.在网上查找自己想要的信息并不难	1	2	3	4	5	98	99
4.网上（如微信、微博）看到周围人转发的重要消息，我会先验证再相信	1	2	3	4	5	98	99
5.当我想在网上表达自己的想法时，我知道怎么操作	1	2	3	4	5	98	99
6.在网上进行支付或者交易时，我会观察使用环境来确定是否使用	1	2	3	4	5	98	99

C42.在过去的一年里，您因为下列事情而上网的频繁程度是？【出示示卡 **24**】

	从不	很少	有时	经常	总是	不知道	拒绝回答
1.社交活动（如：通过 **Email**、**QQ**、微信、**Skype** 等与人交流）	1	2	3	4	5	98	99
2.自我展示（如：将微信朋友圈、**QQ** 空间、微博等作为自我展示的平台，记录与分享自己的心情）	1	2	3	4	5	98	99
3.网络行动（如：通过网络维护自己权益，或为他人伸张正义）	1	2	3	4	5	98	99
4.休闲娱乐（如：游戏、音乐、视频等）	1	2	3	4	5	98	99

	从不	很少	有时	经常	总是	不知道	拒绝回答
5.获取信息（如：搜索信息、浏览新闻等）	1	2	3	4	5	98	99
6.商务交易（如：网上转账、支付、网购等）	1	2	3	4	5	98	99

C43.人们会通过互联网了解很多信息，您做下列事情的频繁程度是？【出示示卡 24】

	从不	很少	有时	经常	总是	不知道	拒绝回答
1. 浏览已有信息	1	2	3	4	5	98	99
2. 转发已有信息	1	2	3	4	5	98	99
3. 评论已有信息	1	2	3	4	5	98	99
4. 自己发布信息	1	2	3	4	5	98	99

C44.有些网站要求您注册个人信息之后才能登录，当需要注册时，您填写的个人信息真实度为：

都是真实的 1
大部分都是真实的 2
一半是真实的 3
大部分都是虚构的 4
几乎全都是虚构的 5
不知道 98
拒绝回答 99

C45.互联网在多大程度上改变了您和以下这些人的交往？【出示示卡 25】

	更亲密	亲密	没变化	疏远	更疏远	不知道	拒绝回答
1. 和您有共同爱好的人	1	2	3	4	5	98	99
2. 和您政见相同的人	1	2	3	4	5	98	99
3. 和您有共同宗教信仰的人	1	2	3	4	5	98	99
4. 家人	1	2	3	4	5	98	99
5. 朋友	1	2	3	4	5	98	99
6. 同事	1	2	3	4	5	98	99

C46.一般情况下，从周一到周五，您每天通过网络联系的人大概有多少？

没有 1
0-4 2
5-9 3
10-19 4
20-49 5
50 人及以上 6
不知道 98
拒绝回答 99

C47.您有没有作为群主建立过 **QQ** 群？

没有使用过 QQ 1
使用过 QQ 但是没有作为群主建过群 2
作为群主建过 QQ 群（共建立过[____|____]个群） 3
不知道 98
拒绝回答 99

C48.您有没有作为群主建立过微信群？

没有使用过微信 1
使用过微信但是没有作为群主建过群 2
作为群主建过微信群（共建立过[____|____]个群） 3
不知道 98
拒绝回答 99

C49.下列描述在多大程度上符合您自己的实际情况？【出示示卡 **26**】

	非常符合	比较符合	无所谓符合不符合	比较不符合	非常不符合	不知道	拒绝回答
1. 和以前相比，我上网的时间越来越长了	1	2	3	4	5	98	99
2. 当我感觉心情不好时，我就上网，这样我会感觉好一些	1	2	3	4	5	98	99
3. 我上网的时间常常比计划的时间更长	1	2	3	4	5	98	99
4. 因为上网，我的日常生活受到了影响	1	2	3	4	5	98	99
5. 因为上网，我的工作受到了影响	1	2	3	4	5	98	99
6. 因为上网，我和周围的人变得更疏远了	1	2	3	4	5	98	99
7. 如果有一段时间不上网，我就会坐立不安	1	2	3	4	5	98	99
8. 因为上网，我外出活动的时间越来越少了	1	2	3	4	5	98	99
9. 因为上网，我的视力变差了	1	2	3	4	5	98	99
10. 因为上网，我的肩膀和颈椎都痛	1	2	3	4	5	98	99
11. 家人抱怨我花了太多时间在网上	1	2	3	4	5	98	99

C50.目前您个人拥有多少可以上网的设备（含台式机、笔记本电脑、平板电脑、智能手机手表、电子书等）？

记录：[____|____]台

【访员注意】1. 0.没有；2. 98.不知道、99.拒绝回答

C51.您家里能上网吗（通过电脑、手机等电子设备上网都算）？

能 1
不能 2
不知道 98
拒绝回答 99

C52. 如果您自身权利受到侵害，您会考虑使用互联网维护自身权利吗？

会，依靠自身力量网络维权 1
会，依靠亲朋好友力量网络维权 2
会，借助网络“大 V ”力量网络维权 3
不会，互联网没有提供特别的维权优势 4
不会，不熟悉互联网操作 5
其他（请注明：_____） 6
不知道 98
拒绝回答 99

C53. 您会参与、支援他人发起的互联网维权行动吗？

会，亲身参与他人的网络维权 1
会，动员周围亲朋好友参与网络维权 2
不会，互联网没有提供特别的维权优势 4
不会，不熟悉互联网操作 5
其他（请注明：_____） 6
不知道 98
拒绝回答 99

C54. 您觉得在互联网上，谁的影响力最大？

政府 1
网络“大 V ” 2
普通网民群体 3
其他（请注明：_____） 4
不知道 98
拒绝回答 99

C55. 您同不同意下列关于网上购物的说法？

	同意	不同意	不知道	拒绝回答
1. 时间更加自由，想什么时候买就什么时候买	1	2	98	99
2. 花的时间更多了，挑选和退换货都很费时费力	1	2	98	99
3. 节约时间，免去了逛街的时间	1	2	98	99
4. 随时随地购物，购物更加疯狂	1	2	98	99
5. 可以买到海内外各类商品，可选择范围变广了	1	2	98	99
6. 网上商品的信息量过大，总感到无从挑选	1	2	98	99
7. 可以直接买到原产地的东西	1	2	98	99
8. 感觉人与人之间的距离拉近了	1	2	98	99
9. 网上商品很多评价都是刷单造假，让人难辨真伪	1	2	98	99
10. 网上购物假货和仿货较多，更愿意去实体店买	1	2	98	99

C56. 在您一周的工作中，需要使用互联网的工作大概占多大比例？

记录：[____|____|____]%

【访员注意】0.工作中完全不使用互联网→跳问 **C58**、998.不知道、999.拒绝回答
【CAPI】**A58==1** 时本题出现

C57.您的工作单位使用网络来（多选）：

寻找客户 1
和客户沟通 2
优化工作流程 3
培训 4
减少繁文缛节 5
提高工作效率 6
其他（请注明：_____） 7
不适用 97
不知道 98
拒绝回答 99

【CAPI】**A58==1** 时本题出现
“不适用”、“不知道”与“拒绝回答”不得与其他选项同时选择

C58.您认为在未来，借助互联网开展远距离办公，是否会一定程度替代直接的面对面办公？

完全可以 1
有可能实现 2
未来怎样不好评判 3
不太可能实现 4
无法替代 5
不知道 98
拒绝回答 99

C59.您认为在家上网办公与在单位面对面办公的最根本差异是什么？

看不到客户的表情神态 1
公事公办不必难为情 2
增加办事效率 3
不必受单位章程约束 4
时间支配更加自由 5
没什么差异 6
其他（请注明：_____） 7
不知道 98
拒绝回答 99

C60.您同不同意这一说法：互联网的一大优势就是让越来越多的人都能够获取到信息。

非常不同意 1
不同意 2
既不同意也不反对 3
同意 4
非常同意 5
不知道 98
拒绝回答 99

C61.您同不同意下面这些说法？【出示示卡 **27**】

	非常不同意	不同意	无所谓同意不同意	同意	非常同意	不知道	拒绝回答
1. 互联网使人们可以有更多的政治权利	1	2	3	4	5	98	99
2. 互联网使人们可以更多讨论政府事务	1	2	3	4	5	98	99
3. 互联网使像您这样的人可以更好的理解政治	1	2	3	4	5	98	99
4. 互联网使政府工作人员可以更好的关心大众的想法	1	2	3	4	5	98	99
5. 互联网能让越来越多的人都能够获取到更多社会资源	1	2	3	4	5	98	99
6. 互联网能促进社会公平	1	2	3	4	5	98	99
7. 互联网能打破社会阶层固化状况	1	2	3	4	5	98	99

C62.以下描述是否符合您的情况？【出示示卡 **28**】

	非常不符合	不符合	无所谓符合不符合	符合	非常符合	不知道	拒绝回答
1. 我积极保护我的网上个人隐私	1	2	3	4	5	98	99
2. 我担心在网上我的个人隐私被泄露	1	2	3	4	5	98	99
3. 我觉得我可以很好地保护我的在线隐私	1	2	3	4	5	98	99
4. 我担心政府查看我在网上的行为	1	2	3	4	5	98	99
5. 我担心公司查看我在网上的行为	1	2	3	4	5	98	99

C63.请问平均起来，您每周在以下这些活动上大约要花费多长时间？

1. 看电视　记录：[____|____|____]小时

2. 听广播　记录：[____|____|____]小时

3. 看报纸　记录：[____|____|____]小时

【访员注意】

1. 向上取整；

2. 997.不看电视/不听广播/不看报纸、998.不知道、999.拒绝回答

C64.请问平均一周，除工作和学习时间外，您和朋友面对面交流的时间有多少？

记录：[____|____|____]小时

【访员注意】

1. 向上取整；

2. 997.不和朋友面对面交流、998.不知道、999.拒绝回答

C65.请问平均一周，您和家人面对面交流的时间有多少？

记录：[____|____|____]小时

【访员注意】

1. 向上取整；

2. 997.不和家人面对面交流、998.不知道、999.拒绝回答

C66.请问平均一周，您和朋友在网上交流的时间有多少？

记录：[____|____|____]小时

【访员注意】

1. 向上取整；

2. 997.不和朋友网上交流、998.不知道、999.拒绝回答

Appendix F Thematic Analysis Codebook

Main topic	Settled Down in The Digital World: Silver Netizens' Digital Use Experience Before Retirement		
Theme	**Code**	**Definition**	**Examples from Transcription**
Limited Experience With Computer And Internet Before Retirement	Hardware Use History-Computer	Experience using computers before retirement	*We didn't have QQ on our phones that time, we only used it from the computers. (IP006-F66)*
	Software Use History- Work	Use of software for professional purposes	*When I was supervising students in writing their dissertations and communicating with them for other issues, most of the communications were done through QQ because it was more convenient. (IP003-M64)*
	Software Use History-Entertainment	Engagement with digital tools for entertainment	*I often stayed up late at night to steal others' vegetables. (IP006-F66)*
	Software Use History-Email Use	Participants' previous experiences with using email software or platforms	*"Initially, I used email, but later I felt that email was not as convenient as QQ." (IP003-M64)*

	Limited Experience	Minimal interaction with digital technologies during their working years	*"At that time, I would occasionally read news (on the computer), but not very much… Back then, online work was just starting to emerge, and I think WeChat wasn't around yet. Before I retired, I remember there definitely weren't smartphones." (IP005-M68)*
	High Cost	The limited availability and lack of widespread adoption of computers and internet services resulted in high costs associated with digital use	*You know, not every household could have a telephone installed that time; only homes of high-level cadres had them, and a telephone line could cost you 600 RMB, which was not cheap." (IP010-M72)*
It Is Too Difficult To Do The Typing	Pinyin	Challenges with the pinyin input method	*I chose to learn five-stroke (Wubi) typing because my pinyin is not very good. If I am not allowed to use Pinyin, it would be difficult for me to type correctly. (IP011-M60)* *… and I don't know how to use Pinyin for inputting… (IP014-M69)*
	Wubi (5-Stroke)	Difficulties with the wubi stroke-based input method	*I did face some challenges when I first started learning to type…. I still remember that it took me a long time to memorise that five-stroke components coding list. This would have been around 2002 or 2003, when computers and the Internet first became popular. (IP011-M60)*

	Other	Other issues with typing	*…but I don't really know how to type in text… (IP014-M69)*
Main topic	Smartphones: A Gateway to the Digital Everyday Life		
Theme	**Code**	**Definition**	**Examples from Transcription**
Some Improvements Brought By Smartphones	Easier To Input	Smartphones simplify text input compared to traditional typing methods	*Smartphone is much easier (than computers) to operate, especially for its direct 'handwriting input. (IP014-M69)* *In the past, the operation of computers was not as convenient as smartphones nowadays, and you can now directly input Chinese with handwriting, which was not available before. (IP009-F62)*
	Easier To Get Connected	Smartphones provide more accessible and seamless internet connectivity	*Smartphones have made it much easier to access the Internet. (IP009-F62)*
Start Every Day With Smartphones	Check My Phone Immediately Upon Waking Up	Immediately checking the smartphone upon waking up	*As soon as I wake up, I grab my phone to check it. (IP014-M69)* *When I wake up in the morning, the first thing I do is check my phone and handle various tasks. (IP012-F70)*
	Morning Greeting	Using the smartphone to send or receive morning greetings as part of a daily routine	*I also chat and send greetings to my friends. Our friends send each other morning greetings every day, like saying 'Good morning'…*

			Every morning when we wake up, my close friends and I exchange greetings with each other. (IP012-F70) *I have a few family members who definitely send me a greeting every day. Yes, they do it every day. If one day they don't, I will wonder what happened? Why didn't they send me a WeChat message this morning? (IP009-F62)*
Everyday Lives Reliant on Smartphones	Felt Anxious Without Smartphone	Feelings of unease or anxiety when the smartphone is unavailable	*I would definitely feel uneasy if I didn't have my smartphone with me, because it would cause a lot of inconvenience. (IP004-M67)* *If I go out without my phone, it will make me feel have 'nothing at all'…It's like being completely helpless. (IP015-M62)* *After getting used to the smartphone, I don't feel good while not having it in my hand. (IP013-F68)*
	Cannot Cope With Daily Task Without A Smartphone	Dependence on smartphones for organising and handling daily activities such as payments, reminders, or communication.	*For example, if I left my smartphone at home, I wouldn't be able to pay for my shopping, right? Similarly, I won't be able to access public transport or the shared bikes, as these require payment by smartphones. As for driving, without the navigation provided by my phone, I may not be able to find my way. (IP004-M67)* *Without my phone, I can't make payments, can't check the news, nor navigate to my destination. (IP015-M62)* *All my work and activities rely on this phone…Without it, I literally can't move a step… (IP012-F70)*

Main topic	Silver Netizens as Digital Residents- Digital Activities as Everydayness		
Theme	**Code**	**Definition**	**Examples from Transcription**
Digital Activities As Everydayness -Social Connection	*Keeping In Touch With Families*	Using digital tools to stay in touch with family members through calls, messaging, or video chats	*I usually contact my mom and my family around 10 am. She and I will have a video call. (IP001-F64)* *Do you know the 'shared albums' in the Apple system? It's free and great for family members to share photos with each other. You can save thousands of photos in the shared albums." (IP004-M67)*
	Contacting Friends and Organising Social Activities	Engaging with friends through social media, messaging apps, or video conferencing.	*Without the internet, participating in sports activities would be impossible. I need to check their WeChat group daily to see if anyone is playing. (IP003-M64)* *I'm the one who sends out the event notifications, I invite everyone. We have several WeChat groups, and I send out event invitations in these groups, to several groups at once… (IP006-F66)*
Digital Activities As Everydayness -Getting Information & News	*Browsing News*	Accessing daily news through websites, apps, or social media platforms	*Every morning, the first thing I do when I get up is read a WeChat official account called Feng Zhan Zhang's Home (Feng Zhan Zhang Zhi Jia). It sends out a voice post every morning with a slogan 'Three Minutes a Day to Know Everything around the World', but actually, it usually lasts about ten minutes. It mainly covers major domestic and international news, daily updates on the COVID-19 situation, and ends with some health and wellness tips and advice." (IP003-M64)*

			'I have to browse Toutiao every day and probably spend at least two hours a day on Toutiao.' (IP015-M62)
	Accessing Information of Interest and Needs	Acquiring specific information or updates on various topics online	*I subscribe to some WeChat official accounts related to diabetes, such as 'Tencent Health' and 'Stable Blood Sugar Community'. These official accounts and communities provide me with a lot of useful information. (IP015-M62)*
	Searching Useful Information	Use digital tools to look up practical or relevant information needed for daily tasks or decision	*"When you run into technical difficulties, just go and ask on Baidu. Someone will teach you. Sometimes, there are features I don't know how to use. For instance, when I first started using a Huawei phone, I found that its method of taking screenshots was completely different from the iPhone's. I had no idea how to do it, but then I searched on Baidu and figured it out right away." (IP009-F62)*
Digital Activities As Everydayness -Entertainment	Music	Listening to songs, playlists, or streaming services for entertainment	*I use QQ Music on my phone to sing along. While many might think of online karaoke, I actually spend more time listening. I repeatedly listen to a song several times and then learn to sing it. (IP016-F60)* *I usually search for music resources on various platforms. For example, you can search for content about the Vienna concert on Toutiao… I often find a lot of good new songs and music videos. (IP014-M69)*

	Gaming	Playing games on smartphones, computers or tablets for leisure and relaxation	*"I play games like Happy Elements and card games like ZiPai. I often play card games, especially ZiPai and poker. I play these card games every day. However, since these games involve money, I only play the free opportunities they provide each day, and I stop playing once these are used up. I only play ZiPaiwith friends I know." (IP012-F70)* *I usually play ZiPai on my phone for about 1 to 2 hours a day because I don't need to work, so I play when I am bored. (IP013-F68)*
	Web Romance Novels	Using digital platforms or apps to read romance or other genres of novels	*I also like to read other things on the Internet, especially novels. I often use a reading platform called Midu, which has a lot of free novels to choose from. (IP002-F71)*
Digital Activities As Everydayness -Payment & Finance Management	Online Payments	Making payments or purchases through/with digital payment platforms/ tools	*This (mobile payment) is convenient, you can pay directly with one click. Scan the code, then you can pay. It's convenient. (IP006-F66)* *Because this (smartphone) is like a wallet. If you forget your phone, you forget your wallet, that's what it means. (IP005-M68)*
	Paying with New Method	Exploring or adopting advanced payment methods like face id payment without a phone with you	*You can get discounts by using Alipay's Face ID payment feature at convenience stores near my home. (IP009-F62)* *Yes, I've tried Alipay's Face ID payment... This method of payment not only saves time but also prevents the inconvenience of forgetting your payment tools. (IP012-F70)*

	Money And Wealth Management	Using apps or platforms to manage personal finances, savings, and investments	*See, I have a lot of banking (apps) here, basically all my bank accounts have mobile banking apps. I also buy investment products online, basically I rarely go to the bank counters now. (IP002-F71)* *I handle all (investments) through my smartphone. I think it's still relatively easy, you basically don't have to go to the bank now. (IP015-M62)*
Digital Activities As Everydayness - Healthcare & Disease Management	Online Health Information	Searching for health-related advice, symptoms, or medical information on the internet	*I have a thyroid nodule and the doctors suspect this could be a malignant tumour. So, I looked up the information on Toutiao. (IP002-F71)* *For example, I read about the treatment and care of enterogastritis on Xiaohongshu. (IP003-M64)*
	Managing Chronic Disease	Using digital tools or apps to monitor and manage chronic illnesses or health routines	*The hospital's endocrinology department has also set up a WeChat group for us diabetic patients, which is very helpful. (IP015-M62)*
Digital Activities As Everydayness – Learning & Self-Development	Skills Learning	Acquiring or improving practical digital skills.	*"I study Photoshop online every day on my computer at home. There is a class every afternoon. Photoshop is quite complex, and that's what I'm currently learning." (IP010-M72)*
	Art & Culture Enrichment	Exploring and appreciating art, literature, and cultural content as interest development.	*"I browse content about calligraphy and painting on WeChat official accounts every day. It includes famous paintings and*

			artists from ancient to modern times, both domestic and international, as well as calligraphy appreciation." (IP003-M64)
Digital Activities As Everydayness – Transportation	Car Hailing	Hailing rides, such as using ride-hailing apps like Didi.	*"When we went to visit West Lake, we used Didi for booking rides." (IP006-F66)*
Digital Activities As Everydayness – Map& Navigation	Map-Navigation	Using a map app to navigate to a destination.	*"I need navigation when I travel. I drive less often now, but if I need to drive, I rely on navigation. " (IP005-M68)*
	Map-Search	Searching for locations or nearby facilities.	*Sometimes you can use navigation while walking. For example, if you're looking for a place, like a bank, the map app will tell you where the nearest one is.*
Main topic	Silver Netizens as Digital Residents- Most Important Digital Venues in Everyday Life		
Theme	**Code**	**Definition**	**Examples from Transcription**
The most used apps	Alipay	A widely used mobile payment and lifestyle platform offering financial services, utility bill payments, and e-commerce support in China.	*I use Alipay more often; I also use WeChat Pay, but I'm more accustomed to using Alipay (IP002-F71)*

	Baidu	China's leading search engine, providing internet search, maps, AI-powered services, and online encyclopedia content.	*I even verify rumours on Baidu. If I come across something questionable, I can search on Baidu, and it will immediately tell you whether it's true or not. That's one of its features. (IP005-M68)*
	Baidu Map	A navigation app offering map services, real-time traffic updates, and public transport guidance tailored to Chinese users.	*(For navigation, what do you use?)* *"Baidu Maps." (IP005-M68)*
	Didi	A ride-hailing app providing taxi, carpool, and chauffeur services across urban and rural China.	*"When we went to visit West Lake, we used Didi for booking rides." (IP006-F66)*
	Gaode Map	A detailed navigation and mapping app with live traffic updates and location-based services widely used in China.	*"I now use Gaode Map more frequently." (IP015-M62)*
	iQIYI	A popular video streaming platform offering movies, TV shows, and original content for Chinese audiences.	*"I occasionally watch popular TV dramas; I use iQIYI to watch them." (IP005-M68)*
	JD	A major Chinese e-commerce platform specializing in electronics, appliances, and fast delivery services.	*"I buy appliances and such on JD." (IP009-F62)*

	Meituan	A multifunctional app for food delivery, hotel bookings, ticket purchases, and local services in China.	*"Typically, I use Meituan. Meituan has everything (for hotel and tickets bookings). And even within WeChat, Meituan is also available there." (IP008-M63)*
	Pinduoduo	A social e-commerce platform that focuses on group buying to offer discounts on products.	*"I think there are more counterfeit products on Pinduoduo." (IP005-M68)*
	QQ	One of China's oldest messaging platforms, offering chat, file sharing, and gaming services.	*"I also use QQ for photos, mainly to view pictures of my grandchildren through the QQ." (IP002-F71)*
	Taobao	A leading e-commerce platform for individuals and businesses to buy and sell a wide variety of products.	*"I usually use Taobao for shopping." (IP008-M63)*
	TikTok	A short-video platform for creating, sharing, and discovering entertaining videos, widely popular among younger users.	*After dinner, I go for a walk, and when I return, I watch TikTok. Sometimes, I even edit the photos I've taken into short videos and upload them to TikTok. (IP006-F66)*
	Toutiao	A personalised news and content aggregation app powered by AI to deliver customised reading experiences.	*"I make it a habit to check Toutiao every day, probably spending at least two hours reading today's updates on Toutiao." (IP015-M62)*

	WeChat	China's most popular social media and messaging app, integrating payment, gaming, and various lifestyle services.	*"I stay in touch and communicate with my former colleagues and old friends through WeChat video calls." (IP001-F64)*
	Xiaohongshu	A social commerce app combining user-generated lifestyle content and e-commerce, focused on fashion, beauty, and travel.	*For example, I read about the treatment and care of enterogastritis on Xiaohongshu. (IP003-M64)*
	Xuexi	A learning app developed by the Chinese government, offering educational content, news, and ideological material.	*"Xuexi is designed for CPC members. It is strongly encouraged by the state that all CPC members complete certain courses on the platform." (IP001-F64)*
	Others	Other applications used in daily life	*"I often use Ctrip and eLong (for booking hotels). Before the pandemic, I would usually book hotels in advance before traveling." (IP003-M64)*
The 'Good Places' in the Digital World	Living Room-to meet friends	Digital spaces for connecting with family and friends, fostering relationships and maintaining social bonds, akin to traditional "living rooms"	*Once they left, we might never see each other again. But now, with WeChat, especially in recent years, we've been able to reconnect with those old comrades in-arms. Like I mentioned earlier, the comrades from my unit where I was a company commander in 1987 have gradually been able to reconnect through WeChat." (IP008-M63)*

	Living room-to meet family		*“I mainly stay in touch (with my daughter and grandchild) through phone calls and WeChat. WeChat now also has voice and video call functions.” (IP003-M64)*
	Study room- to work	Platforms or tools used for self-development, work, and study, where individuals can achieve personal and professional growth, resembling a “study room”	*I edit my works on MeiPian. In this article, I’ve chronicled my experiences year by year. Look, here are the photos from when I enlisted in the late seventies. I turned my photos into a photo album… (IP008-M63)*
	Study Room- to learn and develop		*“I study Photoshop online every day on my computer at home. There is a class every afternoon. Photoshop is quite complex, and that’s what I’m currently learning.” (IP010-M72)*
	Playground-to relax and entertain	Spaces for entertainment and leisure, providing opportunities for relaxation and enjoyment, much like a “playground”	*We usually browse TikTok. On TikTok, I generally watch local and nearby content. Some friends post their content there. However, I don't post on TikTok myself. Sometimes, I share my photos on WeChat Moments. We have a group for retired classmates, and we often organise outings where we eat, chat, play cards, and take photos together. Afterwards, we share the photos in that group.” (IP015-M62)*

			for example, when friends go out and share photos on WeChat Moments, you can like or comment on their posts, and they will feel happy. On WeChat Moments, TikTok, and WeChat Channels, we can 'like' and comment on others' posts, simply by sharing our own opinions...(IP004-M67)
	Tool shed	Digital tools and applications that assist with managing daily life tasks and administration, streamlining practical aspects of everyday living.	*"For example, when my gas runs out, I can pay for it through my phone. I also check my electricity and water bills online. Water, electricity, gas, and mobile bills are all managed on the internet." (IP015-M62)*
Main topic	Intergenerational Digital Interactions & Differences		
Theme	**Code**	**Definition**	**Examples from Transcription**
Intergenerational interactions	Receive Supports from Younger Generations	Digital support provided by younger generations to assist older adults with technology	*"Yes, my daughter helped me set up my Alipay account. She helped me set up the account and taught me how to use Alipay and WeChat. Now I can operate all these apps. For example, I can now use WeChat to send messages whenever I want." (IP002-F71)*
	Exchange with Younger Generations	Sharing of ideas and knowledge between generations, fostering mutual understanding	*We can read the thoughts of older people, and we can read the thoughts of younger people. On the internet we can also see what young people are thinking nowadays, so it also facilitates our communication with each other. (FG01-01, F60)*

	Learn from Younger Generations	Older adults learning digital skills from younger family members	*"I've followed a young writer's official account on WeChat, and his articles are excellent. I'm impressed by the perspectives of young people. Previously, many believed that young people, due to a lack of life experience, couldn't view issues comprehensively or sharply. However, the articles have made me realise that although young people may not have as much experience as older adults, their knowledge base is often much broader." (IP009-F62)*
	Limited Interactions	Older adults felt that digital interactions with their younger family members are limited	*"We rarely communicate with people of different age groups. We also don't engage in conversations with younger people. They discuss different things, and they are not interested in what we are talking about. They are not willing to be with older people. Similarly, young people may not be willing to engage in conversations with you." (FG04-02, M67)*
Sources of Digital Support	I support myself	Independently addressing digital challenges or acquiring digital skills by exploring on one's own or searching for information online.	*"Baidu explains things in great detail. If I download an app but don't know how to use it, I'll look it up there."(IP001-F64)*

	My children support me	Receiving digital support specifically from one's children or grandchildren.	*"My daughter is very patient. She tells me to take a photo of anything I don't understand and send it to her. She then demonstrates the steps for me. No matter how busy she is, she always helps me solve the problem." (IP005-M68)*
	My peers support me	Receiving digital support from colleagues, friends, or others within a similar social group.	*"We ask each other, like among friends or colleagues, those who know how to use it. For example, paying bills on a smartphone—once you've done it the first time, you'll definitely know how to do it." (IP013, F68)*
	Technical staffs & professionals	Receiving digital support from technical staff, sales representatives, or professionals affiliated with technology companies or other organisations.	*"I learned about using 'UnionPay' (YUNSHANFU) from the bank staff. There's a bank branch downstairs from my home, and they suggested it to me." (IP009-F62)*
	Other people support me	Receiving digital support from community staff, volunteers, or other individuals outside one's immediate family, peers, or professional groups.	*"For things like creating PPTs for classes, if I encounter any issues, I'll ask younger colleagues for help." (IP003-M64)*
Warm & Cool Experts	My child supports me patiently	Children who provide digital support with enthusiasm, patience, and a positive attitude, and are willing to help and guide	*"My daughter is very patient. She tells me to take a photo of anything I don't understand and send it to her. She then demonstrates the steps for me. No matter how busy she is, she always helps me solve the problem." (IP005-M68)*

		older adults in using digital technology and solving digital issues.	
	My child did it for me instead of teaching me	Children who actively assist with digital issues but prefer to take over tasks rather than guide older adults how to use digital technology or solve problems themselves.	"My daughter always books doctor appointments online for me; I've never done it myself." (IP001- F64)
	My child is impatient to support	Children who assist with digital problems but do so with a poor attitude, showing impatience or reluctance to help at times.	*"My granddaughter helped me with that problem. When I asked her how she did it, she wouldn't tell me. She said, 'You're too dumb, I won't explain.' She handles it for me, and there's nothing I can do about it. Now, I don't try to learn unless I encounter a problem, and then I ask her. Sometimes when I ask her on WeChat, she can't explain it clearly either." (IP012-F70)*
	My child is too busy to support	Children who are unable to provide digital support due to being too busy or other reasons.	*"The young people in the family are really busy; they don't have the time, and there's no need to ask them." (IP004-M67)*
Intergenerational digital differences	Different purposes	Variations in how different generations use digital technologies for different purpose like work, leisure, or communication	*"Young people use their smartphones mainly for work" (FG01-02, M64)* *"We (the older group) are different, we are interested in 'where to go outing' or what news there is about senior living…We (older adults) are all about leisure and entertainment." (FG01-02, M64)*

	Less confident	Older adults felt less confident using digital devices	*"Some old people still take cash to the market to buy groceries. (Others: Yes), they are afraid of fraud if they use smartphone to pay." (FG05-05, M65)*
	Lower needs	Older adults have simpler needs for digital devices compared to younger users	*The amount of information they receive (through smartphones) is different from ours, so their needs for mobile phones are also higher than ours, and they demand a bit more functionality. (FG02-02, F60)*
	Partial users & fully engaged users	Older adults are perceived as limited/partial users in their digital engagement, while younger users are seen as fully engaged users	*"They even solve their children's education problems online. When they encounter any problems, they go online and search." (FG01-01, F60)* *"We are now able to buy medicines online and make appointments for COVID-19 tests on our own. But the difference with your young people is that you can probably do everything*

			through your smartphone and the internet, really. Anything that can be done digitally." (FG02-01, M60)
Digital Leaders among Older Users	Active learners	Older adults who are willing to continuously learn and adapt to emerging technologies.	*"Photoshop is quite complex, and that's what I'm currently learning. The course cost was 990 CNY, I decided to record it to review. I start the course on my computer, then I set up my phone here and use it to record the computer screen. This way, I can watch the sessions over again." (IP010-M72)*
	Peer Technicians	Digitally proficient older adults who lead and help their peers in using technology	*"I go out with my old classmates, and among us, 2-3 of us will book tickets online, helping others purchase train tickets." (IP003-M64)* *"After our outings, I organised the photos and videos and created a little digital album with music to share with everyone, spreading joy." (IP010-M72)*
Main topic	Chinese Silver Netizens' Digital Inclusion Experience and Suggestions		
Theme	**Code**	**Definition**	**Examples from Transcription**

Silver netizens' expectations of digital inclusion	Community digital inclusion	A desire for programs and initiatives led by local communities to promote digital literacy and access among older adults.	*"The neighbourhood communities are very important (for providing services), because the retirees are all managed and served by the communities." (FG02-05, M60)*
	For Face-to-Face Training	Prefer in-person training sessions, where trainers provide hands-on guidance to meet their needs	*"At home, we can learn (digital skills) on our own through smartphones, and it would be better if the community can organise (digital skills training) to teach older people, face to face." (FG02-03, F64)*
	Prompt Provision of digital inclusion	Participants emphasised the importance of timely and accessible digital inclusion measures to address their immediate needs	*"I heard about these (digital inclusion policies and measures) for the first time today. If they are targeted at those of us who are aged 60 or above, you see, we are already 60 now, and by the time the policies and measures launched, we will be more than 60. We certainly hope that (the Government) can implement them faster, and it would be even better if we can have access to these services next year." (FG05-05, M65)*
	Non-digital services to be maintained	The need to retain traditional, non-digital service options for older adults who struggle with or prefer not to use digital systems	*"Now the government has also recognised this issue. Currently, for elderly people taking the bus who cannot present a health QR code, they are allowed to register on a paper form instead." (FG01-03, F66)*

Silver netizens' attitude to continued learning- Unwilling to bear the burden of learning in later life	Learning becomes challenging	As people age, older adults felt less motivated and find it more challenging to learn new skills	*"But now, when we are older, we may react slower. Our minds can be a little bit lazier. Yes, it can be (lazier)." (FG04-01, F66)*
	Rest rather than training	Participants preferred relaxation and leisure over participating in training programs	*"Those older than us have basically reached the age of rest. They just want to relax more or live more comfortably and don't feel the need to burden so much anymore." (FG03-02, F72)*
Silver netizens' attitude to continued learning- Older people need to continue learning and be able to adapt to social developments	Adapt to social evolution	The need to adapt to social and technological advancements to maintain relevance and independence	*"It's the evolution of society, the evolution of technology. You have to adapt to this society. Now society has developed, but you are still stuck in the old days, so you are definitely inconvenienced (in your daily life)." (FG01-03, F66)*
	Keep lifelong learning	The value of continuous learning to enhance personal growth and social inclusion	*"I think there is a need to continue learning, anyway, we (retired) have a lot of time to learn (new technology). Learning is a very important thing, especially we older people should have to learn. Anything we didn't learn when we were young, we can learn it now." (FG02-02, F60)*

Silver netizens' attitudes on the future of technology develop and design- Expecting the advancement of voice-based operating system	Voice-based operating system-increase accessibility	Voice-based systems can improve accessibility and ease of use of high-tech products	*"Another simpler solution is the 'voice function,' as aging may affect vision and make it less convenient or flexible to navigate and touch smartphone screens. Being able to transmit instructions or information through speech is very important for older adults, as they often face many inconveniences." (IP011, M60)*
	Voice-based operating system-Development of voice-based operating system	Participants called for further development of voice-activated technologies to meet the needs of older adults	*"I think for older adults, the operating system of the smartphone must be simplified, and it is better to use the voice-only operating system, which will be better (and simpler) than the touch screen operation. Elderly people's eyesight has deteriorated, so they can't read the screen, and they can't read when they handwrite (text input through handwriting on the screen). Therefore, the best (age-friendly) is the voice-based operating system." (FG02-01, M60)*

Silver netizens' attitudes on the future of technology develop and design- Technology should be 'smart enough' to accommodate older people	Adopt robot	Participants envisioned the use of robotics to assist with daily tasks and caregiving responsibilities.	*We are all parents of only-one children, and when we grow old, we may all be served by robots. For example, the current sweeping robots, the operation of this machine should be as simple as possible. The cooking robots (in the future) should be smarter. It would be appreciated if the next generation could design and develop robots for us, because they (our children) are far away from us and can't come home (to take care of us). (FG03-02, F72)*
	Fully intelligent high-tech	Participants expressed interest in highly automated, intuitive technology to simplify their lives	*"I think there will be a need for a high-tech level to serve older adults in the future. Without the support of fully intelligent, automated devices, it is difficult for people in their 80s and 90s to enjoy the convenience of digital technology. (FG02-01, M60)* *"At present, older adults often have to rely on the younger generation to operate these high-tech products. If technology companies can push us into the age of full intelligence, it will be much easier for older adults to operate high-tech products." (FG02-01, M60)*
Silver netizens' attitudes on the future of technology	One-button operation	Simplified operation of device that allow essential tasks to be executed with a single button press.	*At that point, they may be able to operate the device with the push of a button or the use of voice commands, which will greatly simplify their digital experience. This has to be done with "intelligence," which is high-tech, right?". (FG02-01, M60)*

develop and design-			
Simpler design and simple operation- to report emergencies within one click/press	One-click function	Simplified, user-friendly interfaces designed to minimise complexity and enable tasks, such as emergency assistance, to be performed with a single click.	*"Can there be a function (application or button) on the smartphone that allows me to call for first aid through a simple operation? Such as doing it within only one 'click/press'…Since there is no way to do more when a person has already had an attack (the previous participant mentioned functions such as 'sending a location'), it would be ideal if there was only one 'click/press' required…I agree, it would be good if only one click/press is required to handle emergency calls. For example, many older adults who are at home alone may find it difficult to make emergency calls." (FG04-04, M63)*
Concerns about the future	Worry about complexity of future technology	Concerns about future technologies becoming too complex for older adults to use.	*I'm just worried about the complexity. It might be so complicated that we can't keep up (with technological advances), like some of us older people can't keep up. So, there are two sides to the coin. It (future digital technology) must be easy to use. Convenient and simple is ideal. So that our elderly people can also use it. (FG05-F73)*
	Worry about online fraud	Fear of being scammed or defrauded online.	*"Older adults still lack adequate awareness and skills to prevent internet scams, and many are unaware of the risks associated with online fraud." (FG02-01, M60)*
	Worry about privacy & security	Concerns about personal information being exposed or misused online	*"Therefore, security must be taken into consideration…This includes personal content on my phone that I don't want others to see. Sometimes, even though I've set up privacy settings, if I'm not*

			careful or forget to enable them, my privacy can still be compromised."
	Worry about addiction	Anxiety about overusing digital devices by themselves or younger generations	*"This smartphone has practically harmed an entire generation in China. Nowadays, most people don't leave their homes because their phones can lock them inside. People stay at home, glued to their phones, rarely stepping out. One unique feature of smartphones is that their content is never repetitive. When you're using it, there's always something new being pushed to you. Smartphones are incredibly powerful, keeping you hooked with endless fresh content, constantly attracting your attention. It's just like opium—it can be addictive." (FG02-01, M60)*

Glossary of Terms

Alipay..... A mobile and online payment platform established by Alibaba Group. It is one of the most widely used payment methods in China, offering services like online payments, money transfers, and bill payments.

Baidu ..... A Chinese multinational technology company specialising in internet-related services and products and artificial intelligence. It is best known for its search engine, the largest in China

Digital Divide..... The gap between those who have easy access to digital technologies and the internet and those who do not. This term highlights the disparities in digital access, usage and outcomes, often influenced by factors such as age, generation, socioeconomic status, education, and geographic location.

Digital Experience ..... The range of interactions and activities an individual engages in within the digital world. This encompasses the various ways people use digital technologies, from basic tasks like emailing to complex activities like online banking, social networking, and content creation.

Digital Inclusion ..... Efforts and policies aimed at ensuring all individuals have access to, and can effectively use, digital technologies and the internet. Digital inclusion seeks to bridge the digital divide by providing resources, training, and support to marginalised groups, ensuring equitable access to digital tools and online services.

Digital Residents ..... Individuals who see the digital world as an integral part of their lives and maintain a continuous online presence. They use digital platforms for social interaction, self-expression, and building relationships, often leaving a lasting digital footprint through social media profiles, blog posts, and other online activities.

Digital Visitors.....Individuals who see digital technology as a tool to accomplish specific tasks and do not leave a lasting digital footprint. They use the internet for specific needs, such as checking email or looking up information, and then log off without engaging further or creating online profiles.

Everyday Life .....The routine activities and experiences that make up an individual's daily existence. This includes all the regular tasks and interactions people engage in, such as working, socialising, managing health, and

leisure activities, which can increasingly involve digital technologies for many individuals, including older adults.

Pinduoduo..... A Chinese e-commerce platform that allows users to participate in group buying deals. It emphasises social shopping, where users can invite friends and family to join in on discounts and deals.

QQ .....A popular Chinese instant messaging software service and web portal developed by Tencent. QQ offers a variety of services, including text messaging, voice and video calls, online games, music, shopping, and microblogging, making it a versatile platform for communication and entertainment.

Silver Netizens .....Older adults who have connected to the internet using digital devices such as smartphones or computers. They actively engage with the digital world, using various online platforms and technologies to enhance their daily lives.

Taobao .....A Chinese online shopping website, similar to eBay and Amazon, operated by Alibaba Group. It offers a wide variety of products, allowing consumers to purchase directly from retailers and small businesses.

Tencent .....A leading Chinese multinational technology and entertainment conglomerate. Tencent is known for its various internet-related services and products, including social networks, music, web portals, e-commerce, mobile games, and smartphones.

TikTok ..... A social media app for creating and sharing short videos, known for its wide range of content and viral trends. It is popular worldwide and known as Douyin in China.

Toutiao .....A popular Chinese news and information content platform. It uses algorithms to deliver personalised news feeds to its users based on their preferences and behaviour.

Warm experts .....Individuals, often family members or close friends, who provide informal technical support and guidance to older adults. They play a crucial role in helping older adults navigate digital technologies and build their confidence in using these tools.

WeChat .....A multi-purpose messaging, social media, and mobile payment app developed by Tencent. It is also known as Weixin in China. It is widely

used in China for communication, social networking, online shopping, and payment services, which could be considered as an infrastructure in China.

WeChat Group ..... A chat feature in WeChat that allows multiple users to communicate within a single conversation. Users can create groups for various purposes, such as family, friends, work, or interest-based discussions, facilitating group communication and coordination.

WeChat Moments .....A feature within the WeChat app that allows users to share photos, videos, and status updates with their contacts. It functions similarly to a social media feed, enabling friends to like and comment on each other's posts.

WeChat Official Account... A feature within WeChat that allows businesses, organizations, and individuals to create public profiles. These accounts can be used to share news, updates, articles, and promotional content with followers, providing a platform for official communication and engagement.

Xiaohongshu..... Also known as Little Red Book, it is a Chinese social media and e-commerce platform. Users share product reviews, travel blogs, and lifestyle stories, making it a popular destination for discovering new products and trends.

Ximalaya ..... A popular Chinese online audio platform, known for providing a wide range of audio content such as audiobooks, podcasts, radio dramas, and educational programs. Users can listen to and share audio content on various topics, making it a comprehensive platform for audio entertainment and learning.

Xuexi Qiangguo .....A Chinese app developed by the Publicity Department of the Communist Party of China. It is designed to promote political education and awareness by providing users with access to news, articles, videos, and quizzes related to government policies, Communist Party activities, and general knowledge. Users can earn points and rewards by engaging with the content on the app.

Didi..... A Chinese ride-hailing app that provides various transportation services, including taxi hailing, private car rides, bike sharing, and carpooling. It is similar to Uber and is widely used in China for convenient and efficient travel.

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