

# Gaining Technological Autonomy and Social-emotional Support: A Case Study of How and Why Chinese Older Adults Engage with a Semi-acquaintance Online Community

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Older adults are often underserved and marginalized in technology engagement due to their reluctance and the barriers they face in adopting and engaging with mainstream technology. However, Pinxiaoquan, a social feature of an e-commerce platform in China, has gained a large number of older users. This work investigates how and why Chinese older adults use Pinxiaoquan, aiming to unveil the underlying logic and inspire technology-inclusive design for older adults. To this end, we conducted a mixed-methods qualitative study over two years, which included online observation, and semi-interview. We found that Pinxiaoquan's success among Chinese older adults is mainly due to its ability to inspire technological autonomy and provide social-emotional support. Rather than simply lowering technical barriers or asking them to seek assistance outside the platform, Pinxiaoquan builds a semi-acquaintance online community based on location and social ties that allows older adults to realize technical support mutually. Pinxiaoquan also fulfills their social-emotional needs, such as free online expression, memory creation and preservation, relationship expansion and maintenance, and a sense of value. Our research contributes to the HCI community by highlighting the importance of improving older adults' technology autonomy following their specific social and cultural background and social-emotional needs. This work also provides unique insights and implications for building inclusive technology for the growing aging population.

CCS Concepts: • Human-centered computing → Empirical studies in HCI; Empirical studies in collaborative and social computing.

Additional Key Words and Phrases: older adults, technology adoption, technology engagement, social feature in e-commerce platform, technology-inclusive design, social-emotional support

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## 1 Introduction

The past century has witnessed an increasing trend of population aging worldwide. The United Nations' World Population Aging 2020 report states that in 2021, there were 727 million people aged 65 years or older, accounting for more than 9.62% of the total population. [77]. At the same time, these growing aging populations are marginal users of information and communication technology (ICT) [22, 106, 122], which not only prevents them from enjoying technical benefits, e.g., improving their physical and psychological well-being [57, 67, 118], promoting their cognitive abilities [106], widening their social networks [22], and reducing loneliness [3, 62, 83, 128], but also expose them to social isolation and digital deprivation [5, 14, 61, 122]. For example, in China, mobile payment apps like Alipay and WeChat have become ubiquitous in daily life, used for shopping, public transportation, and medical appointments. Older adults who do not use these apps face significant inconvenience in their daily lives [37, 44, 55, 100, 141]. Therefore, designing aging-friendly mobile platforms to promote ICT inclusion has become an important research topic in the HCI and CSCW communities [31].

Previous work indicates that older adults are often hesitant to use new technology, mainly due to their limited technology usage capabilities [54, 94]. For example, the decline of older adults' physical functions, e.g., visual acuity, and memory loss, causes them to face many barriers while using technology [78, 79]. In addition, older adults' relatively low level of education and less previous experiences with technology can reduce their ability and confidence to adopt new technology [85, 87, 105]. A study by Kerryellen G. in New England found that older adults with higher education levels and more technology experiences are more inclined to use ICT [120]. Rachel Young's research on American older adults discovered that users with less technology use experiences encounter technological discomfort, leading them to discontinue using home-based health information technology [131]. This leads to the Matthew effect of technology use: users with more technical ability are more likely to participate in the new technology iterations, while users with less technical ability are more likely to fall into technological poverty and be excluded from the social welfare of technological updates [74].

Older adults from developing countries typically have a low level of education and little experience using ICT [20]. As a result, these older adults are often viewed as having limited technology usage capabilities. However, in China, we have observed a different phenomenon: Pinduoduo<sup>1</sup> (“拼多多”), one of the largest social e-commerce platforms<sup>2</sup> is quite popular among Chinese older adults. According to research from Quest-Mobile, Pinduoduo had a penetration rate of 31.8% among people over 50 in 2019 [95].<sup>3</sup> By 2021, the penetration rate of Pinduoduo among Chinese older adults had increased to 65.9% [75]. Among all the features of Pinduoduo, Pinxiaoquan (“拼小圈”)<sup>4</sup>, introduced in February 2020 has quickly garnered a significant user base, appealing particularly to the older demographic in China. [124, 140]. Pinxiaoquan merges social networking with e-commerce functionalities, enabling users to participate in group purchases and share product reviews, fostering a vibrant online community [116]. In Pinxiaoquan, older adults can easily share

<sup>1</sup>Pinduoduo, <https://www.pinduoduo.com/>, the largest social e-commerce platform in China, distinguishes itself through its interactive shopping model that combines social networking with group purchasing.

<sup>2</sup>In this paper, social e-commerce platforms refer to those that combine social and shopping features from the very beginning of their design.

<sup>3</sup>The definition of “older adults” in our study corresponds to the legal retirement age in China, which is 60 years for men and varies for women, being 55 for female civil servants and 50 for female workers, as per current regulations [123].

<sup>4</sup>Launched in February 2020, Pinxiaoquan is a feature within the Pinduoduo platform that combines social networking with e-commerce, fostering community engagement among users by enabling them to share shopping experiences and product reviews [116].

their product orders and reviews, effortlessly create photos and videos with low barriers, and share their shopping and even their life stories with people who care about their lives.

Investigating the reasons why Chinese older adults engage with Pinxiaoquan can shed light on designing and improving senior-friendly mobile apps. This can contribute to the literature on senior-friendly work in the HCI community. This work seeks to achieve this goal by analyzing Pinxiaoquan's widespread adoption among Chinese older adults. To the best of our knowledge, few works have explored successful mobile app usage cases of older adults in developing countries [22]. Existing research mainly investigates older adults' non-use of ICT, seldom exploring their active engagement or understanding their motivations [33, 56]. This work uncovers the usage practices and incentives of Chinese older adults using Pinxiaoquan with the following **two research questions:** 1) **How do Chinese older adults use Pinxiaoquan, specifically, how do they share lives and interact with friends on it?** 2) **Why do Chinese older adults like Pinxiaoquan and can use it smoothly?**

To answer these questions, we conducted a qualitative study. This involved conducting online field observations of older adults and semi-structured interviews with 24 individuals aged 63 to 73. Our observations mainly focused on senior users' Pinxiaoquan usage activities, such as their usage behaviors, habits, preferences, and purposes. Through interviews, we aimed to understand their social and economic backgrounds, as well as their perceptions and usage experiences of Pinxiaoquan. Our study finds that Pinxiaoquan builds a semi-acquaintance community based on location and social ties. This community helps Chinese older adults overcome technology barriers by providing timely and user-friendly technical support from neighbors and peers with similar technical capabilities. More importantly, this enables them to *gain technological autonomy*. It also satisfies Chinese older adults' unique *social-emotional needs* related to their social and cultural backgrounds and becomes the inner motivation for Chinese older adults to use Pinxiaoquan. Specifically, the semi-acquaintance community creates a safe, free, and encouraging atmosphere for older adults to express themselves online. In addition, the semi-acquaintance community creates a new interactive experience that seamlessly integrates online and offline interactions, which create and preserve digital memories that they can look back on, maintain and enrich their relationships to resist loneliness and satisfy their desire to regain a sense of value after they have withdrawn from social work.

Based on our findings, we explore technological autonomy and empowerment for older adults, examining how this case can inspire inclusive design. We emphasize that relying solely on external assistance is inadequate for enhancing older adults' use of technology. Instead, promoting their independent use of technology and fostering peer technical support is essential. Moreover, enhancing older adults' technology use should not only focus on reducing technical complexity and addressing their physical limitations but also on viewing them as **competent, independent technology users**. This approach includes using technology to address emotional losses due to aging, such as loneliness, nostalgia, and diminished sense of worth, thereby fulfilling their **socio-emotional needs**. Our findings broaden the comprehension of technology-inclusive design for older adults within the HCI and CSCW communities, underscoring the significance of acknowledging older adults as autonomous technology users and providing emotional support through technology.

## 2 Related Work

In this section, we begin by situating our work within the broader context of literature on *technology adoption and technology engagement* for older adults, which is the primary research area to which our study contributes. Next, we provide an overview of *social e-commerce platforms*, with a particular emphasis on their development in China, as our case study is situated in this

specific context. Finally, we introduce the technology adoption and technology engagement for ***Chinese aging population and the unique cultural context***, providing the backdrop against which our research is conducted.

## 2.1 Technology Adoption and Engagement by Older Adults

**2.1.1 The Importance of Technology Usage for Older Adults.** With the spread of ICTs, it is increasingly necessary for older adults to use them. For example, mobile payments have become a societal infrastructure in China and are widely used for telehealth [135], banking, and e-commerce [55]. During the COVID-19 pandemic, technology has become even more important for older adults to cope with isolation. They use mobile platforms to order groceries online, consult remote physicians, and connect with friends and family [82, 102].

The use of technology among older adults has increased in recent years. For example, Americans aged 65 and older on social media have grown about fourfold since 2010, reaching nearly 42% in 2021 [2]. Previous research has shown that technology use can improve the quality of life for older adults in several ways [6, 37]. Examples include providing healthcare support for diseases [29, 34, 36], improving psychological well-being [57, 67], expanding social networks [22, 90], reducing loneliness [118, 128, 137], and facilitating access to social support from family members, communities, and friends [26, 42, 65, 68]. Despite the benefits, older adults remain marginal users of ICTs, which can bring them many inconveniences [5, 14]. For example, older adults who cannot use mobile payments face challenges in participating in public life and economic activities, such as buying and selling goods and obtaining healthcare services [100, 135].

**2.1.2 Improving the Inclusive Design of Technology for Older Adults.** Many older adults are hesitant to use technology due to the numerous barriers they face when adopting and engaging with mainstream technology platforms [5, 61, 122]. Some encounter difficulties with network connectivity, while others lack appropriate devices [33, 141]. Additionally, older adults may have trouble using technology due to declines in physiological functions, including vision, hearing, memory, cognitive ability, learning ability, and hand muscle control ability [41, 79]. Previous research has focused on advancing the inclusive design of technology for older adults. Some work has taken measures to provide fast and affordable network services and devices [132]. Other work proposes improving the usability of devices and platforms to reduce barriers for older adults [22, 64]. Researchers in the field of HCI have proposed many supportive designs, such as remote learning platforms that provide gesture visualization [112] and conversation interaction [50] for older adults.

Some older adults avoid adopting technology due to a lack of digital literacy [66]. They face challenges in learning new skills [41] and in understanding product instructions or user guidance [66], leading to frustration and low confidence in technology use [4, 119]. Previous research indicates that digital literacy is closely related to one's education and past technology usage experiences [60, 102, 109]. Therefore, older adults with better educational and technological backgrounds are more likely to become proficient technology users compared to those with lower skills [102]. However, many existing work focuses on tech-savvy older adults [60, 109], while those with low digital literacy are rarely noticed. Since older adults with limited education and technology usage experiences make up the majority, especially in developing countries, it is essential to improve the usability of technology for them. This work contributes to the research line by deeply investigating the requirements of older adults with low digital literacy in developing countries.

Lack of appeal is one reason why some older people do not use technology. Specifically, they may not perceive its benefits and lack the motivation to use it [17, 47]. The perceived benefits of technology for older adults are closely related to their socio-economic and cultural background, as well as their past life experiences [108]. For example, Kanayama explored the online experiences of

Japanese older adults and found that they enjoy interacting in a variety of language forms, ranging from haiku to emoticons. By combining traditional text-based Japanese culture with a new virtual culture, older adults are attracted to engage [59]. Therefore, when designing technology for older adults, it is important to consider their personal and socio-technical context of use [31].

In this work, we observe and analyze Chinese older adults to identify factors that attract them to actively use Pinxiaoquan, a social feature of a mobile e-commerce platform. We show how this online community is well-suited to the social, cultural, and economic context demands of Chinese older adults, thereby promoting technology inclusively.

**2.1.3 The Role and Influence of Social Support in Older Adults' Technology Adoption and Engagement.** Previous research has highlighted the importance of technical support from various social networks, such as family members and friends, in helping older adults adopt new technology. He et al. and Tang et al. have found that family members, such as spouses, children, and grandchildren, play a central role by acting as a cushion for older adults who struggle with the rapid pace of technological change [44, 115]. Family members can assist when older adults encounter challenges in technology use [49]. Family members can play the role of the “warm expert” and can provide better support than “cold expert”, such as professional technique trainers, since family members know older adults better [43]. Furthermore, family members can provide continuous support due to their strong emotional and positional associations with the learners [43, 111].

However, it is worth noting that providing technical support can sometimes lead to a form of proxy use. This occurs when a family member takes on the responsibility of performing daily digital tasks for an older adult. In some cases, young adults even monitor and control the technology usage behavior of older adults [111, 115]. This reliance on family members can ultimately limit an older adult's autonomy in technology use [30, 43, 99]. As a result, some older adults are reluctant or pretend to use technology due to a strong sense of self-respect [111]. Some intentionally do not share their true opinions or preferred content to avoid criticism from young family members, like children or even grandchildren [111]. Therefore, it is essential to prioritize technology autonomy for older adults. In our work, we found that Pinxiaoquan, a social feature of Pinduoduo, is mainly used by older adults independently, beyond the control of other family members. Through a deep study, we aim to understand why Pinxiaoquan empowers older adults to use technology independently. Based on our findings, we hope to inspire the design of more inclusive technology for older adults.

## 2.2 Social E-commerce Platforms

Social e-commerce refers to e-commerce that utilizes social media or relationships to increase economic transactions [13, 15, 27]. There are two types of social e-commerce. The first type is business activities conducted through social media, such as WeChat and Facebook [73, 86, 134]. The second type integrates social functions into the design of e-commerce platforms and promotes shopping through social ties. Pinduoduo, the largest social shopping company in China, is an example of this type of platform. Social e-commerce provides deep integration of e-commerce and a wide range of services that go beyond shopping, such as interacting with friends and posting content [96].

Social e-commerce has grown rapidly in China and worldwide in recent years [96]. For instance, in 2022, social e-commerce generated about 724 billion U.S. dollars in revenue [28]. In 2021, global social e-commerce sales reached \$492 billion, accounting for 16.7% of the total e-commerce market worth \$7 trillion. It is expected that by 2025, social e-commerce sales will nearly triple to reach \$1.2 trillion [28, 76]. China currently leads in social e-commerce, both in terms of size and maturity [96].

As of 2021, China's social e-commerce market size had expanded to CNY 2.5 trillion (over \$374 billion), with nearly 800 million participants [53].

Numerous research focuses on the role that social features play in driving users to engage with social e-commerce platforms. Cao et al. discover the rapid user growth via invitation cascade and high rates of user proximity and loyalty in social e-commerce [15]. Xu et al. reveal that users make purchases with significantly fewer item explorations, and purchase decisions are more affected by social factors in social commerce [126]. Chen et al. examine how the social e-commerce platform Beidian leverages existing real-world social relationships for product promotion and sales. They reveal how social relationships promote the purchase decision-making processes of instant messaging-based social e-commerce and shape the shopping experience of users [19]. Piao et al. demonstrate that incorporating friends' recommendations into the social e-commerce loop can alleviate algorithmic homogeneity and provide users with more accurate and diverse recommendations. This ultimately leads to a better user experience and increased user engagement [88]. Xu et al. identify the effectiveness of social e-commerce platform mechanisms such as social enrichment, social proof, and better matching of goods to social groups, and promote good buying for customers [127]. Wen-Kuei Wu point out that traditional Guanxi ("关系")<sup>5</sup> facets (i.e., Renqing "人情"<sup>6</sup> and Mianzi "面子"<sup>7</sup>) between buyer and seller affect buyers' trust in seller, recommendation, and purchase intention in social commerce [125].

Recently, researchers have found that social e-commerce has benefits for underserved regions and groups. Chen et al. demonstrate that social commerce provides a virtual bazaar experience for customers in developing regions of China, promoting technology engagement and equality [18]. Tang et al. reveal how live streaming in social e-commerce attracts and empowers rural Chinese women [113]. According to a report by Mobile, Pinduoduo boasts a high market penetration rate of 65.9% among Chinese elderly aged over 50, significantly surpassing the other two major Chinese e-commerce platforms, Taobao with 54% and JD.com with 35.5%. This work aims to reveal the reasons why social e-commerce platforms are technologically inclusive by studying why Pinduoduo can attract older adults with low digital literacy.

### 2.3 Technology Adoption by Older Adults in China

Chinese older adults have become a significant and steadily growing group of internet users due to increasing internet penetration and the widespread adoption of smartphones. The Global Mobile Market Report 2021 stated that the smartphone ownership rate among people aged 65 years and over was around 53% [81]. According to the 49th China Statistical Report on Internet Development by CNNIC, as of June 2022, Chinese netizens over 60 years old have exceeded 119 million, accounting for roughly 11.3% of all online users [21]. Chinese older adults tend to use various applications. For example, they use social media platforms, such as WeChat, QQ, and Douyin, to communicate with friends and family members, access information, and entertain themselves [100]. Additionally, Chinese older adults frequently use online shopping apps. Many e-commerce platforms, such as Taobao, JD, and Pinduoduo, offer discounts and promotions, particularly for older adults [21].

<sup>5</sup>Guanxi("关系") a central element in Chinese social and business culture, can be defined as a complex network of interpersonal connections and reciprocal relationships, which are cultivated for mutual benefit and play a critical role in facilitating business transactions and social interactions [12, 92].

<sup>6</sup>Renqing("人情"), a pivotal concept in Chinese social relations, can be academically defined as the intricate system of social norms and expectations governing interpersonal interactions, encompassing the exchange of favors, maintenance of social harmony, and the recognition of implicit social debts and obligations [101].

<sup>7</sup>Mianzi("面子"), in the context of Chinese societal interactions, can be defined as the concept of 'face' or social prestige, representing an individual's reputation and dignity, deeply rooted in maintaining interpersonal harmony and social status within the community. [52, 91].

Despite the above trend, Chinese older adults still face numerous obstacles in technology use due to low levels of education and lack of technology experience [17, 55, 100, 104, 133]. According to the China Longitudinal Aging Social Survey, around 30.10% of Chinese older adults are illiterate, with only 15% having acquired an older adult high school degree or higher [84]. Additionally, since they are digital immigrants who did not grow up with technology, Chinese older adults may struggle to use complex interfaces or unfamiliar software [55, 56, 108]. This makes it hard for them to feel confident when using new mobile platforms [33, 55, 130].

Chinese people generally have closer family relationships than those in the West. They emphasize Xiaoshun (“孝顺”)<sup>8</sup>, which includes respect, obedience, and care towards older family members [45]. In the information age, the younger family members provide support for older adults in the family to adopt technology, which has become a new way of showing Xiaoshun [115].

However, digital proxies from family members can significantly limit self-exploration and technological learning for older adults, affecting their digital autonomy [43]. In addition, family support is facing new challenges due to changes in family structure in China [45]. Factors, such as rural-urban mobility, which separates the young generation from older adults [23, 24], and the reduction of family size due to the “one-child policy”, make it difficult for older adults to seek help from younger family members [35]. The limited availability of family members means that seeking help for technical problems can only be delayed or done remotely by telephone, leading to big challenges for older adults and making them the “left-behind” generation in technology use [23, 80, 139].

This generation of Chinese older adults is heavily influenced by collectivism and traditional Chinese culture, such as Mianzi, Guanxi, Renqing. Chinese older adults also value a frugal lifestyle and view the ability to purchase quality goods at low prices as a valuable skill [138]. These factors shape Chinese older adults’ usage behaviors and requirements for technology [33]. Therefore, understanding the cultural context of the Chinese aging population is essential when examining technology adoption. By considering this, researchers and designers can create inclusive online platforms that cater to the unique requirements of Chinese older adults and develop more effective strategies to promote technology adoption. This work aims at achieving this goal by exploring the specific user behaviors and experiences of Pinxiaoquan among older adults in China.

### 3 Background

In this section, we will first provide background information on Chinese older adults to help readers understand their requirements. We will then briefly introduce the features of Pinxiaoquan to help readers understand the usage behaviors of Chinese older adults.

#### 3.1 Chinese Older Adults

Our study focuses on active Pinxiaoquan users who were born in the 1950s or 1960s. This generation is the first round of “baby boomers” in China and accounts for about 280 million people [103]. They have lived through significant historical events and policy changes, such as Mao’s era, the economic and social reforms of the 1980s, rapid industrialization, and societal changes of present-day China [16].

When they were children, they endured the Great Famine of 1959-1961. As teenagers, they endured the Cultural Revolution of 1966-1976, which closed schools and sent them to the countryside to be called “sent-down youths” [16]. As a result, this generation received limited education. When

<sup>8</sup>Xiaoshun (“孝顺”), a fundamental concept in Chinese culture, be defined as the embodiment of filial piety, characterized by deep respect, care, and obedience towards one’s parents and ancestors, reflecting a moral duty and social ethos deeply ingrained in Confucian philosophy [129].

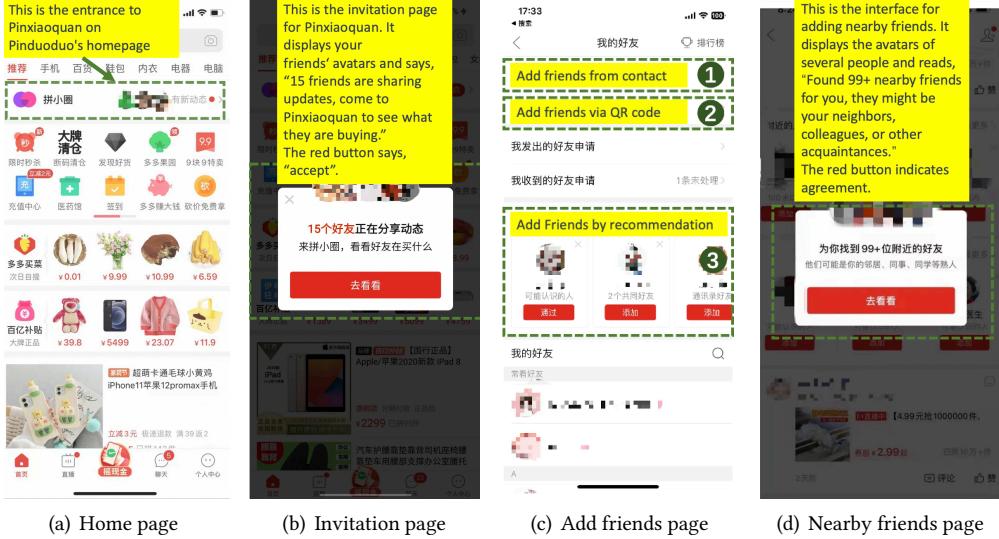


Fig. 1. Screen shots of Pinxiaoquan. These screenshots are captured in April 2022. Figure 1(a) shows the entry point of Pinxiaoquan. Figure 1(b) shows the pop up window which invites/attracts users to use Pinxiaoquan. Figure 1(c) shows that users can add friends in three ways, *i.e.*, phone contacts ①, QR codes ②, and friend recommendations ③. Figure 1(d) shows that users can add nearby people as friends.

they began to marry, they were told to defer their marriage better. In 1979, the government proposed the One-Child Policy, which was effective until 2015. This policy resulted in a diminution of the Chinese family network. [8, 35]. As they enter middle age, many of them suffer the consequences of state-owned enterprise reforms that result in sudden layoffs. Thus, their hard life experiences made their value of frugality.

At the same time, this generation did not grow up during the popularization of digital technology and was not introduced to digital tools at an early age. Different from the older adults in developed countries, most people of this generation did not have the chance to gradually transition from PCs to mobile services, nor did they experience confusion when faced with the development of information technology. Furthermore, a lack of education makes it difficult for them to gain a digital understanding and the ability to use new technology. Due to social, economic, educational, and other historical reasons, this generation is often referred to as “digital refugees” in China’s current social development situation [8].

### 3.2 Pinxiaoquan Features Introduction

This section introduces the social e-commerce platform, Pinduoduo, and its main social feature, Pinxiaoquan. We focus on the key features of Pinxiaoquan and how users interact with it. It is important to note that Pinxiaoquan is continuously updated. We describe the features of May 2022, which was the period when we conducted our research activities.

Pinxiaoquan was launched in February 2020 as a social feature in Pinduoduo. Users can easily access this feature by clicking directly on the home page, as shown in Figure 1(a). Pinduoduo also attracts users to use Pinxiaoquan by popping up a window as shown in Figure 1(b) once a user opens the app and he/she is not adopting this feature. Pinxiaoquan allows users to share content and interact with friends. In Pinxiaoquan, users can share content in five categories, *i.e.*, “Shopping

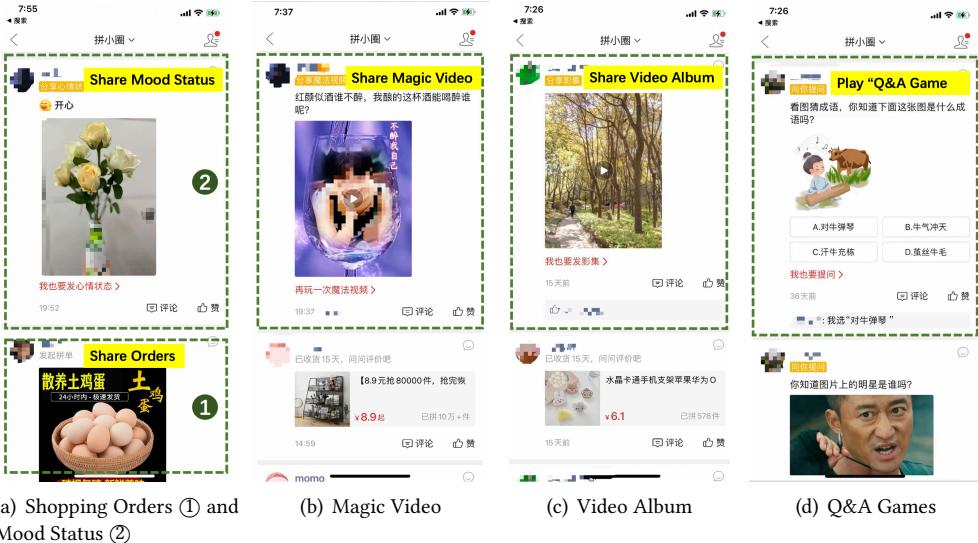


Fig. 2. Screenshots of Pinxiaoquan. These screenshots were captured in April 2022.

Orders”, “Mood Status”, “Magic Video”, “Video Album”, and “Q&A Games”, as shown in Figure 2. When users buy products or write comments, the shopping orders and product reviews are automatically shared on Pinxiaoquan, allowing friends to view the comments and make informed purchase decisions by clicking on the shared links. The last four categories require active sharing, but Pinxiaoquan provides many templates to assist users, making the operation barriers quite low. For “Mood Status”, users can share texts, emojis, and at least one picture. For “Magic Video”, Pinxiaoquan provides a magic camera for users to take and post photos with magic effects. For “Video Album”, users can select one or more pictures from their albums and add music and dynamic effects to make a video post. “Q&A Games” include quizzes, voting, shopping discussions, topic PK, guessing pictures, guessing songs, brain teasers, and more. Users can play “Q&A Games” alone or invite friends to join. Users’ answers will be automatically shared as comments on the game. Users can interact with each other on Pinxiaoquan by liking or commenting on shared content.

In Pinxiaoquan, users can add friends through four channels, *i.e.*, “Phone Contact”, “QR Codes”, “Nearby People”, and “Friend Recommendation”, as shown in Figure 1(c) and Figure 1(d). Adding friends via “Phone Contact” helps users maintain old relationships. By scanning “QR Codes”, users can quickly and conveniently add offline friends, helping them create new relationships with people belonging to the same life or work circles. The “Nearby People” feature enables users to discover and connect with people nearby, allowing them to build a location-based social network and share experiences with their neighbors. The “Friend Recommendation” feature recommends friends based on users’ previous interactions, such as helping someone get a discount on another platform like WeChat or participating in a buy-together deal. This allows users to expand their social network by adding friends who share similar interests or experiences. These four mechanisms work together to create a semi-acquaintance community in Pinxiaoquan, characterized by location-based, social-ties-based, and interest-based connections. This nurtures a sense of belonging and camaraderie among older adults, ultimately fostering strong social ties within the community.

## 4 Methods

To better understand the behaviors and experiences of Chinese older adults using Pinxiaoquan, we conducted a qualitative study from July 2020 to April 2022. Our methodology included observations and semi-structured interviews with 24 elderly participants aged 63-73(born from 1950 to 1960).

### 4.1 Observations

**4.1.1 Participant Recruitment.** Our study aimed to explore the experiences of Chinese active elderly users in Pinxiaoquan. The primary criterion for participant recruitment was age and user experience. We defined “older adults” corresponds to the legal retirement age in China, which is 60 years for men and varies for women, being 55 for female civil servants and 50 for female workers, as per current regulations [123]. Active users were defined as those who had used Pinxiaoquan for more than 6 months shared content every week, and shared more than 30 posts on it.

Initially, we reached out to older adults in our existing networks who met these criteria. We also posted messages for participants on relevant online forums and community groups frequented by older adults. In these ways, we recruited 23 participants. To further broaden our participant base, we asked initial recruits to refer any acquaintances who also met our criteria. This approach not only helped in gathering a diverse group of participants but also leveraged the trust within their social circles, thereby encouraging more candid and in-depth responses during the research. Then, through their introductions, we recruited 38 more active elderly users. Additionally, we ensured that our recruitment messages clearly communicated the purpose of the study and the voluntary nature of participation, respecting the privacy and consent of all potential participants. In total, we recruited 61 active elderly users aged 60 years or older as participants using purposive sampling method [7].

**4.1.2 Observation Progress.** To mitigate the effect of the observation on users’ behaviors, we expanded our observation period to 4-6 months. After participants’ posting behaviors became regular, the first author took screenshots of users’ sharing, including shopping orders, product comments, pictures, videos, and Q&A games, with participants’ permission. The first author also took field notes to summarize their interactions with friends. Additionally, we closely monitored how users utilized various features of Pinxiaoquan, such as creating and sharing posts and interacting with others. Our observations extended to the dynamics of interactions among friends on the platform. This included noting how users responded to each other’s posts, the nature of conversations sparked by shared content, and the frequency and types of interactions. To understand the meanings and patterns of their posting behaviors underlying the users’ choices, we balanced subjective and reflexive observations[40] with an objective and open-minded perspective. Special attention was paid to patterns of sharing and interaction, such as peak activity times, popular topics, and commonly used features among older adults. Overall, we recorded 5432 posts of our participants, including 3269 shopping order posts and 2163 others. These observations allowed us to gain a specific understanding of what participants shared on their Pinxiaoquan and served as a recruitment funnel for the following in-depth interviews.

### 4.2 Semi-structured Interviews

**4.2.1 Participant.** We used the semi-structured interview method to investigate in-depth why older adults frequently use Pinxiaoquan. We invited 61 older adults who had participated in the observation study to be interviewed and received positive responses from 24 of them. Table 1 presents the socio-demographic characteristics of the 24 participants. Among them, 13 were female and 11 were male, ranging in age from 63 to 73 years. Only 3 of the participants had experience using

Table 1. Participant Sociodemographics, Technology Background, and Pinxiaoquan Usage Information

Name	Sex	Age	Education	Previous Job	YS	US	YP	MP	PN	FN
Jianliang	M	70	PS	Mechanic	6	S	3	17	99+	67
Qiaofeng	F	65	PSD	Worker	6	S	4	21	99+	75
Fen	F	66	PSD	Worker	3	S	2	11	99+	59
Xingda	M	64	TSS	Public servant	5	P	3	20	65	43
Fengying	F	63	SHS	Staff	5	P	4	20	99+	72
Liangdi	F	71	SHS	Teacher	5	S	3	17	73	52
Guirong	F	70	JC	Teacher	6	P	4	17	69	65
Ying	F	65	JHS	Accountant	8	S	6	23	99+	198
Xuerong	M	73	PSD	Accompanist	5	S	4	20	78	48
Guoying	F	71	PS	Worker	5	S	4	20	99+	61
Qin	F	67	PS	Tailor	6	S	5	22	99+	211
Chunli	M	63	SHS	Merchant	6	S	5	21	99+	35
Chen	M	69	JHS	Merchant	8	S	4	17	99+	47
Guoxian	M	71	PSD	Worker	7	S	5	22	99+	56
Renbiao	M	73	JHS	Projectionist	7	S	4	18	99+	65
Baokang	M	66	PS	Merchant	8	S	5	18	99+	57
Baoru	F	63	PSD	Agent	7	S	5	22	99+	56
Yan	F	72	JHS	Merchant	8	S	5	18	99+	123
Wang	M	68	JHS	Worker	6	S	5	21	99+	97
Liu	F	64	SHS	Accountant	6	S	5	17	99+	64
Xiuli	F	73	JHS	Worker	7	S	5	19	86	38
Yin	M	69	JHS	Worker	6	S	5	20	78	47
Fumin	M	71	JHS	Worker	6	S	5	19	99+	79
Huafang	F	67	TSS	Nurse	9	S	6	26	99+	135

\* YS, Years of Smartphone experiences. \* US, The Use of Smart Devices (\* S, only use the smartphone.\* P, have used the PC before and now use the smartphone.) \* YP, Years of Pinduoduo experiences. \* MP, Months of Pinxiaoquan experiences. \* PN, The number of dynamic posts posted in Pinxiaoquan. \* FN, Number of friends in Pinxiaoquan. \* F, Female. \* M, Male. \* PS, Primary school. \* PSD, Primary school dropout.\* TSS, Technical secondary school. \* SHS, Senior high school. \* JC, Junior college. \* JHS, Junior high school. (These statistics are as of April 2022. And all names are aliases.)

PCs, while the rest had exclusively used smartphones. On average, these participants had been using smartphones for 5.91 years, ranging from 3 to 9 years. And Pinduoduo is in their top three most frequently used apps. Our participants had a diverse range of socioeconomic backgrounds, with previous jobs including administrative staff, accountants, insurance agents, teachers, tailors, engineers, merchants, projectionists, opera accompanists, and general workers. Their educational levels varied from primary school dropout to junior college, with 5 primary school dropouts, 4 primary schools, 8 junior high schools, 4 senior high schools, 2 technical secondary schools, and 1 junior college. All participants lived in urban areas of China, including cities and towns, and were retired with a stable pension income.

**4.2.2 Interview Progress.** Our semi-structured interviews were conducted from May 2021 to April 2022. 8 interviews were conducted via video or audio conferencing, while 16 were conducted face-to-face. All participants gave permission for audio recording. Each interview lasted 53 to 90 minutes and had three stages. In the first stage, we collected socio-demographic information, previous

technology usage experiences, and the e-commerce and social media applications used by participants. In the second stage, we asked about the usage patterns of Pinduoduo, specifically Pinxiaoquan. We inquired about the time they spent on Pinduoduo each day, how often products were purchased, when they began using Pinxiaoquan, why they used it, how many friends they had in Pinxiaoquan, and whether they had any friends to frequently interact with.

In the third stage, we inquired about their motivations and experiences in using the app. We asked about the types of content they typically shared on Pinxiaoquan, their reasons for sharing, the kind of feedback they usually received, their most memorable sharing and interaction experiences, and their reasons for choosing not to share these contents on other platforms such as WeChat<sup>9</sup>, Taobao<sup>10</sup>, and JD.com<sup>11</sup>. The guarantee of anonymity allowed participants to express themselves more freely.

### 4.3 Data Analysis

We collected data through observations and interviews. To ensure data trustworthiness, we kept a reflective journal to record our thoughts, assumptions, and potential biases throughout the research process. The data we collected included screenshots, hundreds of pages of field notes, and 26.4 hours of audio recordings. The records were transcribed into text and manually checked for accuracy. Since the texts were in Chinese, we translated key passages into English for this publication while trying to stay as faithful as possible to the meaning of the original.

After becoming familiar with the collected data, we analyzed it using grounded theory approaches [25, 40]. We used a three-stage systematic coding method [25] with Nvivo 11.0 [10]. In the first stage, we read through the data, labeled each sentence, and completed *open coding*. Example codes included “out of children’s control”, “recommendations from semi-familiar acquaintances to use”, “even failure less punishment” and “nearby people teaching me”. In the second stage, we iteratively refined the first-level codes and compared them, clustering related ones to generate *axial codes*. Examples that emerged during this period included “Having the motivation to technology trying”, “Having the freedom to experiment with technology”, and “Having access to diverse technological support”. In the third stage, we extracted codes into high-level themes that represented our prominent findings, as described in the sections below. During this period, we wrote down representative stories and cross-case memos and highlighted the text that triggered “aha” moments in our findings. Through the analysis, two overarching themes emerged, “**technological autonomy**” and “**social-emotional needs**”, these are the main motivation for Chinese older adults’ adoption and actively engaged in Pinxiaoquan. And we further extracted the important sub-themes from the data. These findings suggest the varied and complex reasons behind older adults’ sharing behaviors in Pinxiaoquan.

During the data analysis phase, two authors independently reviewed excerpts and transcripts to assess inter-coder reliability, subsequently comparing their codes to ensure consistency in data interpretation. When discrepancies arose, we revisited the data, refined the coding, and employed triangulation until consensus was achieved. Throughout the paper-writing process, we ensured that translations were accurate, concepts were consistently defined, and that our write-ups authentically represented respondents’ narratives without the intrusion of our perspectives. This study adopts a qualitative methodology and does not aim to generalize its findings. Rather, it examines the sharing and interactive behaviors of Chinese older adults on Pinxiaoquan, providing a detailed understanding of how older adults adopt and engage with a new technology platform.

<sup>9</sup>WeChat, the largest social media platform in China.

<sup>10</sup>Taobao, (<http://taobao.com>). The largest e-commerce platform in China.

<sup>11</sup>JD.com, (<http://jd.com>), one of the mainstream e-commerce platforms in China.

The study seeks to trace the journey of these adults as they evolve into independent technology users.

#### 4.4 Research Position Statement

The first author has been using Pinduoduo since May 2016 and became a Pinxiaoquan user in July 2020. With a decade of experience using e-commerce platforms and eight years of using Pinduoduo specifically, she has developed a deep familiarity with both e-commerce apps and social e-commerce apps. Furthermore, the first author, responsible for collecting observation and interview data, dedicated a significant amount of time to closely observing the interactions of older adults within the Pinxiaoquan community from 2020 to 2022. This extended involvement granted her extensive insights into the complete journey of how older adults adopt and engage within online communities. All authors involved in the observations, interviews, and data analysis are native to China, having grown up immersed in Chinese traditional culture and the lifestyle of its people. This deep cultural familiarity proved invaluable in grasping the subtleties of participant interactions and responses. To maintain objectivity and minimize cultural bias in data interpretation, the research team regularly engaged in reflexivity sessions. These sessions were designed to identify and address potential personal biases and preconceptions, particularly those stemming from their cultural backgrounds and personal experiences.

### 5 The Way Chinese Older Adults Use Pinxiaoquan

Previous studies suggest that older adults tend to prefer weak interaction behaviors in social media, such as giving a “thumbs up”, and being hesitant to adopt new social platforms [6, 122]. However, this research found that Chinese older adults actively engage with Pinxiaoquan. For example, some participants, such as Qin, Liu, Liangdi, and Fen, use Pinxiaoquan as a daily routine. Others, like Fen, Yan, Yin, and Xu Ying, spend several hours each day using it. Chinese older adults not only use Pinxiaoquan to search for product information to make shopping decisions but also to share details about their daily lives. Most participants have used all the features of Pinxiaoquan, including sharing products and photos, making magic videos and albums, playing games, and interacting with friends via liking or commenting on their posts, to preserve memories, maintain existing friendships, and meet new friends. To demonstrate how our participants use Pinxiaoquan in detail, we combined their usage details to create two stories. The story was based on real experiences we learned through our interviews and observations.

*Mr. Shen is a 67-year-old Pinduoduo user who began exploring the digital world in 2018. As a former general worker, his exposure to technology was limited throughout his career. It wasn't until 2018 that he started using a smartphone. After mastering WeChat, Pinduoduo became the second app he actively learned and became proficient in, and it has gradually turned into one of his most frequently used apps. In June 2020, he saw a pop-up window inviting him to join Pinxiaoquan, which showed “20 friends are sharing on Pinxiaoquan, join to see what they are buying?” He recognized his sister and two other familiar friends since Pinxiaoquan showed their WeChat avatars. Therefore, Mr. Shen clicked “Go see it” to join Pinxiaoquan.*

*On Pinxiaoquan, Mr. Shen saw his sister's photos of flowers and birds and praised her, saying “Your flowers are so well cared for!” He also saw an old friend's video album of his trip to Yunnan, which explained why he hadn't seen the friend in the neighborhood lately. A few days later, they met and chatted about his trip. Mr. Shen also bought some jujubes after seeing his friend's praise of them on Pinxiaoquan and found them to be good.*

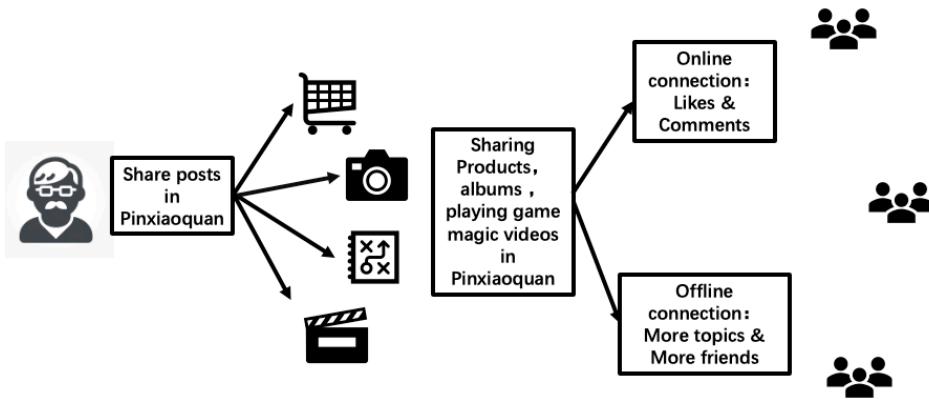


Fig. 3. Example diagram of how elderly Chinese users use Pinxiaoquan

*Mr. Shen loves gardening and met many gardening enthusiasts in Pinxiaoquan, including some neighbors who recommended based on location. Pinxiaoquan showed him the addresses of nearby strangers, which increased his trust, and he added them as friends. He often bought potted plants, soil, and watering cans and wrote detailed comments on them, which were automatically synchronized to Pinxiaoquan. As a result, he made many flower-loving friends in the neighborhood and exchanged tips on growing plants. This relationship gradually extended offline, making it convenient for them to exchange flowers and soil. Mr. Shen now has a group of happy gardening neighbors.*

In the example above, Mr. Shen started using Pinxiaoquan because he saw the information about offline friends in the invitation message. He mainly used Pinxiaoquan to share products and interact with friends. Using Pinxiaoquan allowed him to better understand the recent lives of his old friends, build new relationships with nearby people sharing similar interests, and promote online and offline interaction.

*Ms. Yang, who is 70 years old, started using Pinduoduo 5 years ago. Before retiring, she was an active cultural amateur in her unit. After retiring, she joined a square dance team in her community. They not only dance together but also travel and dine together. In April 2020, the square dance team started using Pinxiaoquan, with which many people around Ms. Yang made video albums of their travels and parties. Ms. Yang liked these albums, so she started using this function.*

*Ms. Yang added many familiar neighbors and old classmates to Pinxiaoquan. She enjoyed seeing their shared products and shopping experiences and purchased based on their recommendations. Ms. Yang liked to read their shared life stories, such as fishing, puppies being born at home, and the places they have visited. She enthusiastically commented on her friends' posts, and her friends actively responded by saying hello, sending likes, and giving compliments. As a result, her homepage of Pinxiaoquan was full of compliments from friends, such as "good at shopping" and "very kind". The compliments she constantly received made her happy each time*

*she opened Pinxiaoquan. Ms. Yang also enjoyed the “Magic Video” feature, where she can easily upload a photo and transform into a fairy or put on a military cap and feel young again.*

The above example shows that Ms. Yang learned about Pinxiaoquan through offline friends. She primarily used it to make magic videos and video albums. She also liked to know friends better by reading their posts in Pinxiaoquan and interacting with them. Through their interactions, Ms. Yang gained compliments and positive feedback from her friends, which made her happy. In the magic videos produced by Pinxiaoquan, Ms. Yang can see a younger and more beautiful version of herself, which brings back valuable memories of her youth.

The two stories above illustrate how Chinese older adults discover and engage with Pinxiaoquan. Existing social connections successfully introduce Pinxiaoquan into older adults' lives, helping them develop trust in the platform. Location-based friend recommendations provide older adults with an opportunity to expand their social circles both online and offline. By sharing their shopping experiences and various aspects of their daily lives on Pinxiaoquan, older adults have found a way to preserve their precious memories and snippets of their daily lives. Interacting with friends also helps them maintain strong relationships.

## 6 The Reasons for Chinese Older Adults to Use Pinxiaoquan

Our findings show that Pinxiaoquan provides a *semi-acquaintance community* based on location and social ties. We found that Chinese older adults actively use Pinxiaoquan for two main reasons: 1) The semi-acquaintance community provides timely and user-friendly technical support for older adults, which enhances their technical confidence, technical ability, and mainly most importantly, inspires their *technological autonomy*. (section 6.1). 2) The semi-acquaintance community satisfies their unique *social-emotional needs* by allowing free expression, creating and preserving digital memories, constructing supportive relationships, and regaining a sense of value (section 6.2). In the following, we elaborate on each of these reasons in detail.

### 6.1 Gaining Technological Autonomy in the Semi-acquaintance Community

Pinxiaoquan, through social connections among friends, recommendations from past interactions, and geographically based friend recommendations, has created a semi-acquainted community that feels familiar and comfortable for Chinese older adults. In this semi-acquainted community, Chinese older adults encounter not only a group of users who are geographically close and have similar technical backgrounds but also semi-acquaintances who feel relatively close in their hearts. These semi-acquaintances refer to friends who are not close kin, but who have overlapping relationships or share common community ties and past memories (for example, old classmates, neighbors, former colleagues, etc.). This concept of a semi-acquainted community aligns with the relationship pattern of Chinese seniors born in the era of China's work unit system. During their formative years, most of their relationships were based on such rules.

The semi-acquainted community is not merely a family based on kinship, which helps avoid the supervision and control typically found among family members. It is sustained by shared interests, culture, and memories, cultivating trust and amicable interactions among individuals. In this community setting, free from direct monitoring and characterized by positive encouragement, Chinese older adults gain increased confidence in using new technology. They receive ample technical support and are encouraged to experiment with technology. Consequently, they gradually achieve technological autonomy and become independent technology users within the semi-acquainted community.

**6.1.1 Having Motivation to Technology Trying.** Previous research often views older adults as passive technology recipients, typically lacking the drive to experiment with new tech. [4, 6]. In the semi-acquaintance community like Pinxiaoquan, the willingness of Chinese seniors to try new technology is significantly driven by the influence of the semi-acquaintance community. The recommendations within this community, along with the adoption of technology by their acquaintances, demonstrate the value of the technology to them, thus sparking their motivation to experiment with Pinxiaoquan.

Qiaofeng is a 65-year-old retired worker who has always been skeptical about the usefulness of social media. Her perspective shifted when she noticed his long-time neighbor, Mrs. Zhang, who is also in her late 70s, using Pinxiaoquan with ease and joy. Mrs. Zhang, who had similar reservations about technology, was introduced to Pinxiaoquan by her previous college. She found it surprisingly interesting and started connecting with other older adults in her community. Witnessing her enthusiasm and how she reconnected with old friends and made new ones, Qiaofeng became curious and decided to try it herself. Liangdi, a 70-year-old retired teacher, was initially apprehensive about venturing into the realm of new social platforms. The concept seemed overwhelming to her at first. However, her perspective began to shift during a party at her local community center, where several acquaintances shared their positive experiences with Pinxiaoquan. They enthusiastically recounted stories of rekindling connections with former colleagues and engaging in groups that aligned with their personal interests and hobbies. Motivated by these heartfelt accounts and observing the genuine happiness of her peers, Liangdi's hesitation gave way to curiosity. She decided to explore Pinxiaoquan for herself.

These instances demonstrate how the semi-acquaintance community can actively transform older adults from hesitant observers to engaged users, underscoring the power of social influence and familiar endorsements in adopting new technology. In our research interviews, all 24 interviewees indicated that their initial participation in using Pinxiaoquan was influenced by recommendations from semi-acquaintances in their vicinity, including former colleagues, old classmates, neighbors, etc. Seeing these semi-acquaintances around them adopt Pinxiaoquan and receive positive feedback greatly encouraged them to try out this new technology.

**6.1.2 Having the Freedom to Experiment with Technology.** In Pinxiaoquan, being a semi-acquaintance community and not a tightly-knit family network, there is no supervision or control over the elderly's use of technology from family members as is often the case. Previous literature has shown that while many seniors receive technical assistance from family members, it frequently results in technological proxying or oversight of their actions [111, 115]. The assistance offered by family members tends to limit their autonomy in experimenting with technology, depriving them of the opportunity to independently explore and learn through trial and error [30, 43, 99]. The semi-acquaintance community of Pinxiaoquan provides such an opportunity. Here, seniors can freely experiment with less fear of technological repercussions.

Ying shared her past experience: In WeChat, where she had added her children as friends, her attempts to explore new mini-programs and share her activities on WeChat Moments were noticed by her children, who would call to caution her against such explorations, citing potential risks. This surveillance created a restrictive environment for Ying, hindering her from freely experimenting with the app's features. This surveillance created a restrictive environment for Ying, hindering her from freely experimenting with the app's features. In stark contrast, her experience in Pinxiaoquan was liberating. The absence of her children on this platform meant no overwatch on her activities. This freedom allowed Ying to dive into experimentation without hesitation. She enthusiastically embraced this newfound autonomy, often posting over a dozen updates on Pinxiaoquan within

just an hour. She engaged with various features and experimented with different special effects in the magic photo section, gradually becoming adept at using the platform's functionalities.

Another example is Mr.Wang, a 68-year-old former worker. On WeChat and Taobao, he felt overwhelmed and cautious, particularly with his grandchildren warning him about online scams and privacy issues. This caution stifled his willingness to explore. In contrast, in Pinxiaoquan, he found a community of semi-acquaintance with similar experiences and concerns. This familiar environment encouraged him to experiment with the platform's features, from sharing product reviews to trying every feature in Pinxiaoquan. And whenever Wang tries out new features or posts updates in Pinxiaoquan, he receives likes from friends. In semi-acquaintance communities, older adults are willing to give each other positive feedback and engage in interactions. Wang's attempts in Pinxiaoquan receive encouragement, significantly boosting his confidence in using the platform and his desire to explore new features. His engagement in this less monitored and more semi-acquaintance-oriented space allowed him to learn at his own pace, making technology use a more enjoyable and less intimidating experience.

This sentiment was strongly reinforced by a significant majority of our interviewees. Twenty out of the twenty-four participants emphasized this particular aspect of their experience with Pinxiaoquan. They noted that the platform, free from the scrutiny of their children and younger relatives, provided a space where they felt more comfortable to explore and experiment with technology. In this environment, devoid of familial oversight, they experienced a sense of relaxation and freedom that allowed them to engage with the digital world more openly and confidently. This setting fostered their ability to discover and embrace technology in a manner that resonated with their own pace and learning style.

**6.1.3 Having Access to Diverse Technological Support.** In Pinxiaoquan, the semi-acquaintance community can provide diverse technological support for Chinese older adults, and help them to gain the technology abilities. Firstly, in the semi-acquaintance community, older adults can meet a lot of semi-acquaintance with similar ages and technological backgrounds, which can become an efficient source of technical support for older adults. Our work found that most of the older adults in our interviews had experience learning from their peers or teaching their peers how to use technology.

Existing work points out that younger family members are the main source of technical support for older adults [44, 115]. However, our work finds that the significant difference between the technical abilities of young and old adults causes young adults to operate too quickly to be effective at teaching older adults. For example, Guoying said: *"My granddaughter taught me how to use a smartphone. However, she tends to operate it too quickly. Even if she slows down and demonstrates it to me multiple times, I still find it challenging to remember. I watch her fingers swiping across the screen, and suddenly, I am on a page that I don't comprehend."* Whereas, peers operate at a slower pace and teach with more patience. They usually guide beginners step-by-step, enabling older adults to learn and adapt more easily. Furthermore, peers who share similar technical and educational backgrounds have undergone comparable exploration and learning processes. As a result, they can better understand the challenges that older adults may encounter during the initial learning stage, as well as where errors may arise. This enables them to provide more effective technical support. Liangdi shared an experience where she faced difficulty switching templates while creating video albums. She said: *"My daughter had never used this feature before. She struggled for a while and didn't know how to solve it. However, when I asked one of my friends for help, the problem was quickly resolved. She had encountered this issue before and taught me how to fix it."*

Semi-acquaintances with similar technical abilities also can explain complex technologies in a language that older adults can understand. Qiaofeng initially attended a smartphone training

course for older adults in her community but found the professional terms used by young teachers confusing. Terms like “homepage” and “long press” were too high-tech and unfamiliar. Even after attending several courses, her level of smartphone usage remained the same. However, her neighbors taught her how to use Pinxiaoquan using “old people’s language” and avoiding technical terms. For example, they referred to the magic video in Pinxiaoquan as a “little camera”, checked the homepage as “returning to your own home”, and visited the homepage of their friends as “visiting other people’s homes”. These cultural metaphors are close to older adults’ daily lives, making it easy for them to understand these functions and learn how to use them.

Besides, the semi-acquaintance community like Pinxiaoquan allows elderly users to meet online friends who live nearby and then can receive timely and continuous offline technical assistance. In China, significant population migration has resulted in many older adults no longer living with their descendants. As a result, they cannot always get timely help from the younger generation. Remote technical assistance often relies on telephone or other remote means, which can be significantly less effective. Wang and his friends sought help from those around them to solve their problems. Wang explained: *“It’s too much trouble to ask the children for help. They are busy with work, and I don’t want to disturb them. We only meet once a week, so I try to remember the questions I need to ask them, but I often forget when I finally see them. Seeking help from people nearby is more convenient. We meet every day, and if I don’t know something, they can teach me.”* Huafang lives alone. She meets with her nearby friends more often than she sees her son, believing that her friends can solve her problems more quickly. She said: *“If I wait for my son to help me, then I won’t be able to use my phone.”*

The semi-acquaintance community like Pinxiaoquan also facilitates the creation of a long-term informal learning environment. Learning through use doesn’t easily lead to fatigue and frustration caused by the design of phased goals and organized classes. For instance, Liangdi said: *“My friends teach me how to use Pinxiaoquan better than in class. For example, we took several pictures yesterday. Then, a friend made a great album with them. I asked her to teach me, and she showed me how to do it when we had lunch together. I didn’t feel any pressure during the whole process. If I still didn’t understand, it was okay. She would teach me again when we have fun together. It’s not a serious study. I prefer this way of learning.”* Qin and Ying have also benefited from this informal learning. The learning process is integrated into their interactions on Pinxiaoquan, enriching the experience by adding a gamified element.

In summary, in semi-acquaintance communities like Pinxiaoquan, Chinese older adults are motivated to explore new technologies through recommendations from semi-familiar connections. Moreover, being away from the control and supervision of family members in Pinxiaoquan allows them the freedom to engage in technological exploration with encouragement from semi-acquaintances. Additionally, within semi-acquaintance communities, they can provide each other with more timely and sustained technical support that is easier for them to learn and understand within their cultural context. Through this process, Chinese older adults gradually become technologically independent users in the semi-acquaintance community of Pinxiaoquan.

## 6.2 Meeting the Social-emotional Needs of Older Adults

Older adults continue to engage with Pinxiaoquan because it satisfies their ***unique social-emotional needs***. First, the semi-acquaintance community based on social ties creates a safe, free, and encouraging atmosphere for older adults to express themselves online. Then, the semi-acquaintance community based on location has created a new interactive experience that seamlessly integrates online and offline interactions. This allows older adults to create and preserve digital memories that they can look back on, maintain and enrich their relationships to resist loneliness, and satisfy their desire to regain value after they have withdrawn from social work.

**6.2.1 Free Online Expression.** Our research shows that older people have a desire to express themselves online. However, many social media platforms of acquaintance, like WeChat, can not provide them with a safe and encouraging atmosphere, which limits their expression. Previous work finds that older adults are monitored by their children on WeChat [44, 115]. Our research confirms this and further reveals that younger generations not only regulate the content posted by their elderly parents but also monitor their usage time and behaviors. For example, Liu's son told her that excessive posts and photo sharing on WeChat Moments are inappropriate and impolite. Qin's daughter called her not to use her phone too late after Qin shared a link on WeChat Moment after 1 am. When Huafang converses with people in her community's WeChat group, her son advises her not to add unfamiliar individuals. Younger generations also limit their parents from exploring new features by deleting mini-programs.

We find that the supervision and control from younger generations suppress the self-expression of older adults on acquaintance community platforms like WeChat. For instance, Liu is hesitant to share things on WeChat because she fears being criticized by her son. Qin has become aware that her behavior on WeChat has exposed her, so she avoids sending messages too late and shares less on the platform. Because young people rarely use Pinxiaoquan, older adults can use this platform to explore technology and express themselves freely without their children's supervision and control.

In Pinxiaoquan, older adults do not need to carry the burden of maintaining social images as they do in using acquaintance social platforms like WeChat. For example, Xingda, a former leader, rarely shares his personal life on WeChat worrying about being perceived by his former colleagues and subordinates. However, in Pinxiaoquan, where none of his former subordinates are present, he feels more relaxed and discards his former work identity. He becomes a person who simply loves to buy seafood and go fishing. Guirong, a retired teacher, often shares educational articles on WeChat to maintain her professional image. However, in Pinxiaoquan, she freely displays her personal life and shares her cooking and gardening activities with other older adults.

Compared to stranger social platforms like Douyin and Weibo, Pinxiaoquan, the semi-acquaintance platform, has a more friendly atmosphere, which encourages older adults to share more. Xiuli used to be a long-time user of Douyin but gradually lost interest in it because she encountered people who left sarcastic comments on her videos, which made her feel unhappy. Yan has also experienced the same situation. She shared videos of her gatherings with friends on Douyin, and strangers left comments like "*You are too showing off!*" "*Why do you always go to parties at your age? You should stay at home and take care of your children and grandchildren.*" "*You don't look like a good Chinese woman.*" "*You look like eighty years old. You are too old to go out.*" "*Your clothes looks like a bedsheet, so ugly!!!*". These nasty comments ruined her good mood for sharing her life and gradually caused her to share less in Douyin. Receiving nasty comments seems unavoidable on public platforms with strangers. However, in Pinxiaoquan, where everyone is in a semi-acquaintance relationship, the comments are more polite, encouraging, and positive. Yan said, "*I feel more comfortable sharing on Pinxiaoquan. There are more positive comments, and none of those messy comments.*"

In conclusion, Pinxiaoquan is a semi-acquaintance community that strikes a balance between strangers and familiar relationships, which creates a casual and inviting atmosphere that allows older adults to interact and share their thoughts without the pressure of family monitoring or social role expectations, leading to an enriching and enjoyable experience.

**6.2.2 Creating and Preserving Digital Memories.** Previous studies have shown that social media can facilitate autobiographical memory by providing a means for people to store information about their daily lives [46, 58, 89]. This is particularly important for older adults, as memory decline can be a common issue at their age. Pinxiaoquan provides older adults with a way to store memories for later retrieval. For example, Ying likes to share photos of gatherings on Pinxiaoquan, which

capture her joyful moments. When she feels tired from doing housework, she can re-watch these photos to recall a time of relaxation and happiness. She said: “*I can't find old photos from my broken phone, which is a pity. However, I was pleasantly surprised to find that I had saved them in Pinxiaoquan. Looking back at these photos makes me happy.*” The photos of Ying’s children make her feel less lonely when they are not around. Similarly, the digital traces left by formerly unconscious synchronized sharing can become cherished memories. Chunli and his wife are a “Double Income No Kids” (DINK) couple. In 2005, they brought home a puppy named Nuo and treated him like their own child. Unfortunately, Nuo passed away in a car accident in 2021. The orders, photos, and videos of Nuo that were synchronized and stored in Pinxiaoquan have become precious memories for Chunli and his wife to treasure and reminisce over.

For many older adults, interacting online is too superficial to create meaningful connections, making it difficult for them to generate deep and rich memories [11]. More memory creation requires more information exchange [58]. Therefore, for older adults, more diverse forms of interaction are needed. Pinxiaoquan builds a semi-acquaintance community based on location, which allows older adults to interact offline with their online friends. Offline interaction can supplement related details and better enrich and stimulate the memory of older adults.

Due to geographical connectivity, older adults can receive offline responses to their shares on Pinxiaoquan, leading to more interactions and creating more memories. For example, Fumin often shares the flowers and birds he raises on Pinxiaoquan. He didn’t expect that these shares would not only receive online comments but also become a topic of offline conversation, triggering more interaction between him and his acquaintances. He said, “*A neighbor saw the flowers and plants I shared on Pinxiaoquan and knew I loved gardening. He then gave me a potted plant, which I also shared on Pinxiaoquan. Even after he moved away, I would see the plant and its photos on Pinxiaoquan and think of him.*” Pinxiaoquan is a feature of the social e-commerce platform Pinduoduo. Users can share their shopping records to promote offline interactions. For example, Chen shared the record of the fishing gear he purchased in Pinxiaoquan. Some of his online friends noticed that he likes fishing and is good at it. They asked for his opinion on which fishing gear was better and invited him to go fishing together on weekends since they lived close to each other. Chen said: “*It's enjoyable when we get together and see the fishes we catch. Looking back, I have a sense of nostalgia for those times. It gives me a great life memory.*”

The offline interactions can also deepen and awaken the good memories of older adults. For example, Yin mentioned that he sometimes shares in Pinxiaoquan the food he cooked and the parties he attended. When he met his friends in Pinxiaoquan offline, they praised his cooking and lively parties, which resulted in deep memories of these events.

**6.2.3 Constructing Supportive Relationships.** Relationships have a significant impact on the physical and mental health of older adults and ultimately affect their overall quality of life [39, 67, 107]. The current generation of Chinese older adults grew up in a social environment where collectivism was overemphasized. Therefore, relationships that help build a sense of belonging and identity are highly valued. However, with the development of urbanization in China, many young people leave their parents to work in big cities, leaving their parents to live alone or move to new cities and communities. Moreover, the transition into old age brings changes in their social circles. For instance, retirement may cause older adults to distance themselves from colleagues. These changes cause old relationships to fade and create the need for new connections. Pinxiaoquan is a platform that can fulfill both of these needs effectively.

Pinxiaoquan helps older people maintain relationships through online interactions. It recommends friends via users’ contacts and friend relationship chains. Thanks to Pinxiaoquan, some of our participants have reconnected with old friends. Renbiao shared this story: “*I ran into an old*

*classmate on Pinxiaoquan whom I hadn't seen for years. It was a pleasant surprise and we were all excited about this. By looking at the shopping records and photos of food and parties he shared, I was able to catch up on his recent situation and we had more topics to talk about."*

Frequent interactions on Pinxiaoquan, such as likes and comments, can bring old friends closer, enhance mutual affection, and convey feelings of care. Yan shared a personal experience: "I am very grateful to an old friend. She is a former colleague whom I haven't seen in many years. We are friends on Pinxiaoquan, where she always gives a thumbs-up and comments on my posts. I really appreciate her support and enjoy her comments. Even though we haven't met face-to-face in years, our interactions on Pinxiaoquan make me feel much closer to her."

Pinxiaoquan can help older adults build new online relationships that provide important social and emotional support. For example, Qiaofeng has been living alone since her husband passed away from depression. Although her daughter visits her once a week, Qiaofeng often feels very lonely. During the pandemic, her daughter couldn't visit as often due to lockdown policies, and they could only check on each other's safety by phone. As a result, Qiaofeng became even more lonely. However, this changed when she made some friends her age in Pinxiaoquan. Qiaofeng said, "Before, my life was boring. It seemed like all I did every day was wait for meals. But now, there's always something to do every day. I wake up and check my phone for videos and photos my friends share. Time passes quickly, and my life has become more colorful."

Pinxiaoquan's online interactions can be transferred offline, which helps older adults fit into new environments by establishing local social ties. Ying came to a new city to take care of her grandson, but she didn't know anyone there and felt very discombobulated. Luckily, through Pinxiaoquan's recommendation, she added many nearby friends. They gradually got to know each other and started putting orders on Pinxiaoquan together, shopping offline, and even taking short trips together. Ying said: "I made friends with people who live nearby through Pinxiaoquan. We are of similar age and like to chat with each other. We eat together and hang out together. Once we went to the West Lake. It was my first trip with my friends. We took a lot of photos at that time. I am so happy that I can have my friends in this city."

The offline social ties built through Pinxiaoquan can become an important source of emotional support and timely help for older adults. For example, Qiaofeng and her neighbors became friends through Pinxiaoquan. She said, "Whenever I need something, they are always ready to help. Once, I wanted to buy some hooks for my shower curtain. As soon as I shared it on Pinxiaoquan, my neighbor Zhang saw it and told me not to buy them. She had some extra ones and brought them over to me. This kind of care and concern is truly invaluable."

Similarly, Guoying lived on the upper floor of a young couple who left for work early and returned home late, so they did not know each other well. However, after Guoying added them as friends on Pinxiaoquan, they became familiar with each other. Guoying offered to pick up their delivery packages during the day, and they taught her how to buy flowers and plants. Once they saw that Guoying had purchased herbs for better sleep, they gave her a pillow that they had made themselves.

Pinxiaoquan can also help older adults meet nearby people with similar hobbies and become friends with them. Common interests can lead to more offline interactions that enrich their lives. For example, after retiring, Jianliang became obsessed with fishing and spent five days a week on it. He likes to buy fishing equipment on Pinduoduo. Every time he receives the products, Jianliang takes photos, writes comments, and shares them on Pinxiaoquan. His detailed and thoughtful comments not only receive likes from online strangers but also allow him to meet many fishing enthusiasts in Pinxiaoquan. They interact online and eventually develop into a fishing interest group that goes fishing together. Their shared interest has made them close friends, who can keep each other company and count on each other for support.

In conclusion, Pinxiaoquan is a social tool that helps older adults maintain existing relationships while also building new ones. It creates a semi-acquaintance community based on location, which helps older adults connect both online and offline. The rich interactions facilitated by Pinxiaoquan are important for older adults to receive the necessary social-emotional support. Additionally, relationships formed through Pinxiaoquan are self-selected by older adults, allowing them to make friends with nearby people they get along with well. This high-quality social connection can provide a strong emotional support system for them.

**6.2.4 Regaining a Sense of Value.** We found that many of our participants regained a sense of value by sharing in Pinxiaoquan. Retirement takes older adults out of social work and interrupts social relations, leading to changes in social status and life focus that can ultimately cause a decline in their self-worth. Many older adults have a strong desire to regain their sense of value, and Pinxiaoquan fulfills this need.

Most of our participants stated that participating in the Hongbao incentive activity in Pinxiaoquan makes them feel like they still have the ability to earn money. Hongbao, or a red envelope, is typically a gift of money inserted into an ornate red paper pocket. They are usually given on important occasions, such as Chinese New Year, birthdays, and weddings in China and some other Asian countries, as a way to send good wishes. Pinxiaoquan gives users electronic Hongbao as corresponding cash rewards if they post and interact with others. Fengying explained the self-worth she gained from participating in this activity: *"I really like this virtual Hongbao. Even though I can only earn seven or eight yuan a month, it makes me feel that I can still earn money at my retirement. That is a way to demonstrate my ability."* During their participation in this work, older adults gain a sense of self-worth by not withdrawing from the labor force of society.

Being capable of using new technologies enhances older adults' sense of empowerment. For them, new technology is a symbol that they are keeping pace with the times. Wang, 68, was an ordinary worker before retiring. He saw that young people started to share their lives with videos. He also started to try to record his life with videos. He shared about 100 pieces of videos on sports, cooking, and gathering time with friends in Pinxiaoquan. Wang said: *"Do not underestimate these short videos. The music and editing are quite exquisite. When I was young, I liked to watch movies. Now, making these videos gives me a feeling that I am making a movie. It also makes me feel that I am still young."* To facilitate users creating videos, Pinxiaoquan offers rich templates and video effects. With this, Wang can focus on enjoying the process of creating.

In addition to fostering a sense of self-identification among older adults, recognition from friends also imparts a sense of accomplishment, which is particularly significant for this demographic. Having dedicated their lives to caring for their families, older adults now find themselves with the opportunity to focus more on their interests. They can pursue their dreams, engage in activities they missed out on in their younger years, and achieve self-empowerment.

Some participants mentioned that their shopping ability is recognized by friends in Pinxiaoquan, giving them a sense of success. For instance, Qin has hundreds of friends in Pinxiaoquan, most of whom are neighbors living nearby. Whenever she shares shopping orders, dozens of people follow her lead. Many even ask for her opinion before making purchases, which makes her feel proud. Qin stated: *"Since becoming old and retired, I never expected to help others or be praised by people around me. Now, many people purchase things following my recommendation. It's a kind of trust. It brings me great joy when they tell me that my recommendations are very helpful. I am so happy, and words cannot express the happiness I feel in my heart."* Before retiring, Qin led a tailoring team of a dozen workers in a factory. After retiring, she felt lost. However, becoming a shopping expert in Pinxiaoquan gives her a sense of purpose, similar to when she was a team leader.

For this generation of older adults in China who have experienced severe material shortages life, thrift is an admirable ability and a sign of “knowing how to live”. When older adults share products of good quality and low prices, their friends praise them: “*You’re good at being thrifty. The things you pick out are always cheaper than what we buy in the supermarket.*” These compliments make them happy. Guirong usually buys groceries on Pinxiaoquan. Once, she bought a small part of a broken kettle, allowing it to be useful again. She solved a problem that would have cost 80 yuan with only 2.5 yuan. Guirong shares these practical tips on Pinxiaoquan, and her friends think she is knowledgeable in saving money. They praise her both online and offline.

Using Pinxiaoquan also allows users to be recognized for their technical abilities, which can give them a feeling of respect. For instance, Fen is a 66-year-old woman who did not finish primary school. She spent most of her life taking care of her family. However, doing household chores was hardly appreciated by her family members. When Fen shared some cooking videos on Pinxiaoquan, she received tons of compliments from her relatives. These were things she never experienced before. Fen said: “*Both of my sisters-in-law are educated, but they don’t know how to make videos with Pinxiaoquan yet. During dinner, they complimented me on the beautiful videos I shared, and I offered to teach them how to make one themselves. I felt especially proud, as they had previously thought I was uneducated and had never shown me any appreciation before.*”

## 7 Discussion

Technological empowerment can be of great value in providing social-emotional support to older adults. However, the elderly are a vulnerable group when it comes to technology adoption. To gain insights into inclusive technology design improvements, we conducted a qualitative study to investigate why Chinese older adults actively use Pinxiaoquan, the social feature of a social e-commerce platform. Our findings indicate that Pinxiaoquan successfully establishes a semi-acquaintance community based on location and previous social ties, which is particularly meaningful for Chinese older adults. It provides them with an appropriate channel for self-expression and interaction with others, both online and offline, thus giving Chinese older adults adequate **technological autonomy** and **social-emotional support**. Based on these findings, we discuss the autonomy of technology and technology-empowered work for seniors, and how this case can inspire inclusive design for older adults. We also emphasize the importance of cultural contexts in inclusive design to provide social-technical support. Finally, we propose design implications to improve older adults’ technology adoption.

### 7.1 Technology Empowerment and Inclusive Design for Older Adults

In the HCI and CSCW communities, the technology empowerment of older adults have been a hot research topic [32, 48, 142]. Previous studies have proposed two main ways of improving older adults’ technology adoption: reducing technical barriers and providing external support [31, 63, 112, 115]. However, oversized fonts and excessively loud voices can reinforce technological shame in older adults [131]. While young family members are often seen as suitable for helping older adults learn to use and engage with technology [55], their over-involvement can lead to excessive control and intervention in seniors’ self-learning, self-exploration, and self-expression. All of these factors can limit the confidence and willingness of older people to actively use technology [1, 5, 98, 121].

Technology autonomy among older adults refers to the ability of these individuals to independently choose, control, and effectively use technology according to their own needs and preferences. [110]. It encompasses not just the ability to operate technological devices or platforms, but also the freedom to adapt and repurpose these technologies in ways that align with their personal lifestyles and social contexts.

In our study, the elderly users' interaction with Pinxiaoquan exemplifies technological autonomy. Originally an e-commerce platform without an explicit social networking function, Pinxiaoquan was adapted by these users for social sharing and interaction. This adaptation demonstrates that older adults are not merely passive recipients of technology; instead, they actively reshape it to suit their social contexts. Rather than using traditional social media platforms, they transformed an e-commerce site into a semi-acquaintance social space with which they are familiar. This form of socialization is particularly appealing to older users as it fosters a sense of community and belonging while maintaining a comfortable level of distance and privacy.

In HCI literature, technology autonomy among older adults is a growing area of interest. Studies indicate that when given the opportunity and the right tools, older adults can and do exercise agency in technology use, often in innovative ways [114]. This challenges the stereotype of older adults as technologically inept or resistant. Instead, it highlights their ability to adapt technologies for personal empowerment and social engagement. Our findings align with this perspective, demonstrating that when older adults are not limited by rigid technology designs, they can creatively repurpose platforms like Pinxiaoquan to fulfill their social needs, thereby enhancing their quality of life and social well-being.

Enabling older adults to achieve technological autonomy can be challenging, as they often possess lower levels of education and lack technical experience. However, our research has demonstrated that the formation of technical mutual assistance groups, facilitated by Pinxiaoquan, is an effective way to help older adults become independent in their use of technology. These groups enable older adults to assist each other without depending on younger individuals. Peer support proves more effective because peers use language that older adults find familiar, understand their technological challenges better, and provide more timely assistance. In addition, Pinxiaoquan provides older adults with social and emotional support, meeting the growing demands of older adults as described by Maslow's hierarchy of needs theory [117]. Specifically, older adults can find groups where they belong, both online and offline, gain respect and recognition, pursue personal interests, express themselves freely, and ultimately achieve self-satisfaction. By meeting these needs, older adults are empowered to attain technological autonomy.

This shift towards technology autonomy among older adults underscores the need for designing inclusive and adaptable technological solutions. Such designs should not only cater to the functional needs of older users but also consider their social and emotional aspirations, enabling them to exercise autonomy and agency in their digital interactions. The social and emotional needs of older adults in China are closely tied to their specific social and cultural context. In the following, we will discuss how older adults' usage behaviors and obtaining social-emotional support via Pinxiaoquan align with the specific social and cultural backgrounds of this generation of Chinese older adults.

## 7.2 Social and Cultural Backgrounds Influence the Usage Behaviors

**7.2.1 Sharing Purchases in Pinxiaoquan to Project an Image of Thrift.** During the Maoist era, frugality became a central tenet of Maoist thought due to the lack of material resources [16, 69, 93]. Beyond simply saving money, thrift even represents a social moral concept, disposition, and set of practices [38]. These experiences have made Chinese older adults cautious about spending and afraid of flaunting their consumption of expensive items. Therefore, when older adults share purchases on social platforms like WeChat, they fear being judged by others. Since Pinxiaoquan is a feature of a cheap e-commerce platform, sharing purchases allows older adults to project an image of frugality without fear of criticism.

**7.2.2 Feeling Free to Share Information about Themselves in the Semi-acquaintance Community.** Pinxiaoquan has built a semi-acquaintance community where people share information about themselves. In China, the tradition of the acquaintance society places a strong emphasis on personal relationships [9]. This generation of Chinese older adults who were born in 1950-1960, grew up in a collectivist environment where people's self-construction is interdependent [70, 71]. This means that people's self is grounded in their social relationships, and the most meaningful aspects of oneself emerge in relation to others [71]. As a result, this generation of Chinese older adults tends to trust and rely on their existing personal relationships, even when using technology. However, they do not have a strong sense of belonging and trust in unfamiliar social relationships. They also prefer not to be scrutinized or controlled by family members or acquaintances. They feel more at ease sharing personal information and interacting with friends within social circles of semi-acquaintances, which are formed based on longstanding relationships and geographic proximity. This insight is crucial for designing technologies that promote social connectivity and facilitate interactions among older adults in a manner that aligns with their patterns of trust.

**7.2.3 Enjoying Playing Games in Pinxiaoquan Due to Finding Meanings in it.** This generation of older adults in China lived in an era of extreme material scarcity, with very limited cultural and recreational activities [16]. At that time, people were expected to work hard and not engage in leisure activities [70]. As a result, Chinese older adults believe in the value that "Achievement is founded on diligence and wasted upon recklessness" and may even feel ashamed of engaging in leisure activities [51]. To engage in leisure activities, they needed to find justification and legitimacy. In Pinxiaoquan, almost all usage behaviors, such as playing games, trigger a reward of virtual Hongbao, which makes elderly users feel that they are participating in a valuable activity or form of work rather than wasting time playing. This can help legitimize their participation in using Pinxiaoquan's platform. By giving meaning to play, it can be destigmatized and allow users to enjoy it.

### 7.3 Social and Cultural Backgrounds Affect Older Adults' Preferred Social-emotional Support Methods

Chinese older adults have a strong need for social and emotional support from nearby people, which is shaped by their social and cultural backgrounds. Due to the One-Child Policy, many of this generation of Chinese older adults have only one child [35]. With the deepening of urbanization and modernization in China, many children move to different cities for work [23, 24]. This has led to the breakdown of the traditional Chinese family structure, in which children live with their parents. As a result, many elderly people live alone without support from their children, making them increasingly reliant on support from their neighbors. However, the transformation of Chinese cities has led to the demolition of some neighborhoods, and with it the disappearance of the traditional structure of large group living and neighborhood support networks [72]. This not only leaves older people without support in their daily lives but also means they lose their deep emotional connections and become more lonely. Additionally, in China, some elderly people need to move to new cities with their children after they retire to help raise the third generation [136]. This leads them to cut ties with their past and urgently need to build new support networks.

Pinxiaoquan has built a semi-acquaintance community based on location and previous social ties, which provides older adults with a platform for online and offline interaction and obtaining social-emotional support. To build trust among users, Pinxiaoquan provides location information, mutual friends, and WeChat avatars during friend recommendations. This trust facilitates older adults to add friends and makes them feel comfortable self-disclosing and interacting with friends. Self-disclosure provides an opportunity for people to learn about other people's recent lives and

past experiences. As described by Goffman, acquaintanceship is formed when individuals gradually come to know about each other and acknowledge this fact [97]. At the same time, interaction can also strengthen bonds between older adults and their friends and make them experience emotional intimacy, increasing their sense of belonging and connection. Therefore, providing an emotional social space nearby is what Chinese older adults really need. The potential of online communities to influence offline social life offers us the possibility of harnessing the power of the Internet to connect nearby communities.

The relationships that older adults form within the semi-acquaintance community in Pinxiaoquan are self-selected, which is of great significance to them. Chinese collectivism emphasizes community and group-oriented values. Until at least the late 1980s, all urban Chinese lived in collective units where there was very little division between public and private life. All acquaintances were colleagues from their work units, and their social life outside of family was almost exclusively limited to workplace gatherings. This means that during the era of large collectives, individuals had limited choice in choosing their acquaintances as their social world was dominated by the collective structure. However, in Pinxiaoquan, older adults have the ability to actively choose their relationships. Having spent much of their lives within the previous strict social structures, many older adults welcome voluntary sociality from online to offline platforms. This newfound freedom is a great inspiration for them as they are no longer defined by kinship roles or as cogs in the revolutionary machine. Instead, they are free to find others who share similar interests and do something that gives them personal happiness.

## 7.4 Design Implications

As mentioned above, one of the main reasons why Pinxiaoquan is popular among older adults in China is because it fits well with their specific social and cultural background. Therefore, when designing an inclusive platform for the elderly, it is important to fully understand their backgrounds, and then delve deeper into their corresponding technology usage habits and social-emotional needs. Furthermore, this article provides some other general design inspirations below.

**7.4.1 Taking Advantage of Features of Existing Apps.** Pinxiaoquan's success is partly attributed to WeChat, the most popular social media app in China, which has successfully penetrated the aging population. Pinxiaoquan recommends friends by providing their aliases and profile photos on WeChat, which increases users' trust and makes it easier to be accepted. Moreover, Pinxiaoquan uses its features as a shopping app to provide delivery address information in automatic friend requests, further enhancing mutual trust. The virtual *Hongbao* feature in Pinxiaoquan also combines the payment function of WeChat, allowing users to withdraw money and make purchases conveniently. This suggests that when designing new platforms for older adults, developers can make good use of the devices and platforms that they are already familiar with and have accepted. On the one hand, using information from existing platforms can increase the trust of older adults and attract them to the new platform. This is important because older people lack confidence in technology and are therefore very cautious when using new platforms. On the other hand, new platforms can also design and realize their features based on those of existing platforms. For example, by coordinating the functions of old and new platforms through binding, the elderly can have a richer overall experience. The new platform can also expand the features of old ones by considering older adults' unique requirements, such as more emphasis on collaborative assistance and filtering of malicious comments.

**7.4.2 Building Location-based Peer Networks.** This study shows that using technology alongside peers increases older adults' trust in new platforms and improves their confidence in technology. Peer support, especially from those nearby, can help older adults overcome barriers to technology

adoption, providing them with more opportunities for exploration and social interaction. Therefore, creating location-based social networks for older adults may be a helpful solution. Apps with this feature can help older adults find peers nearby and interact with them, providing both technical assistance and social and emotional support to prevent loneliness and isolation. The apps can recommend friends based on location and age and offer several communities on various topics, such as technical support, shopping, and fishing. Since these communities are location-based, users can interact both online and offline, which is important for older adults. These apps can also allow users to make appointments online, such as arranging meeting places and times, bridging the gap between online and offline interactions, and providing a more convenient social experience.

**7.4.3 Using the Language Familiar to Older Adults.** This study suggests that using concrete, real-world examples that older adults are familiar with can help them understand how to use a platform based on their life experiences. For instance, *Hongbao* is more acceptable than the *Commission* because Chinese older adults consider *Hongbao* as a warm reward for their contributions while the *Commission* is only a cold concept. When teaching each other how to use Pinxiaoquan, Chinese older adults refer to visiting someone's homepage as visiting their home. This expression, which is close to their daily life, reduces cognitive burden and facilitates learning and acceptance. The above examples show that Linking technology design to real-world objects can enhance older adults' familiarity and promote their comprehension. The spontaneous cultural creations of older adults can inform the design and help developers create more accessible products. Therefore, we propose using language familiar to older adults to promote their technology adoption. For instance, in page descriptions, phrases like "last year today" and "visit the home page" can be translated into more easily understood terms like "past stories" and "visit other people's homes" based on the language habits of older adults.

**7.4.4 Creating Free and Rich Expression Space for Older Adults.** Unlike social media platforms like WeChat, where family members and acquaintances may monitor or even control older adults, Pinxiaoquan's semi-acquaintance community provides a space for older adults to express themselves freely. This freedom is an important factor in promoting the use of such platforms. Inspired by this, we propose to design a sharing space that is more self-manageable for older adults, where they can easily block their online friends at specific times and with varying degrees of granularity. For example, the platform should identify malicious comments related to the sharing time and content, and filter them automatically for older adults or allow them to block with one click. Additionally, the platform could recommend more of their shared content to friends with whom they interact frequently, and explore more heartwarming memories of interaction between them. We suggest fostering a positive and inclusive community atmosphere by promoting respectful interactions, providing guidelines for constructive feedback, and encouraging empathy and mutual support. This work also shows that various sharing channels, such as pictures and albums, have increased the willingness of older adults to share. Therefore, we propose designing more diverse sharing forms and creating intuitive tools to help older adults easily create and preserve valuable digital memories. Furthermore, it may be useful to provide features that remind older adults of important milestones or memories, such as anniversary notifications, "Today in previous years" reminders, or personalized memory highlights. Finally, developers can implement intelligent algorithms or recommendations to help older adults rediscover old memories they may have forgotten or overlooked.

## 7.5 Limitations and Future Work

While our study provided comprehensive insights into the practices and motivations of Chinese older adults participating in a social feature of an e-commerce platform, some limitations need

to be addressed in future work. First, our findings are specific to a culturally specific social e-commerce platform and provide insights into the participation and motivation of older adults in China. We cannot draw general conclusions about whether these findings apply to older adults in other regions or from different demographics. Second, all the older adults in our study lived in cities or towns and had a stable retirement allowance. Future studies could explore older adults from different economic backgrounds, such as those from rural areas, to gain a different perspective. Third, we found differences among the elderly population in our study, such as between those with different ages, classes, and genders. However, we did not delve into these differences in detail due to the content and length of the study. Future work could further subdivide the elderly group and provide richer insights for senior studies in the HCI and CSCW research. Fourth, future work could explore the downsides and potential improvements of location- and social ties-based online communities. Doing so would better inform the design for older adults and create more positive experiences.

## 8 Conclusion

This study aims to gain insights into the reasons why older adults actively use Pinxiaoquan, to inspire inclusive design for them. We conducted an in-depth qualitative study over 2 years, with ethnography and 24 semi-structured interviews. Instead of treating older adults as a technologically incapable group and promoting their use through traditional methods such as lowering technological barriers and increasing external support, we found that the success of Pinxiaoquan lies in its ability to inspire older adults' ***technological autonomy***. Specifically, Pinxiaoquan treats them as a group that can provide mutual technological support to each other, thus addressing usage challenges. Then, by building an online and offline collaborative ***Semi-acquaintance community***, Pinxiaoquan satisfies the inner ***social-emotional needs*** of older adults in the specific social and cultural context of China, such as supplementing their ***memory, establishing new relationships, regaining a sense of value, and free self-expression***. This helps them cope with emotional needs such as ***forgetfulness, loneliness, and a sense of meaninglessness and inspires their internal enthusiasm to use technology***. The semi-acquaintance interaction provides Chinese older adults with a familiar social interaction mode from nearby, which is lacking in the rapidly changing urban life in China.

Based on this study, we discuss technology autonomy and empowerment for older adults and its potential for inspiring inclusive design. Our discussion offers new insights and practical recommendations for designing technologies that meet the needs of the growing aging population. By examining technology usage motivations among older adults outside the Western world, we contribute to the HCI and CSCW communities. Specifically, we provide valuable insights for building systems that are friendly to the elderly and deepen the understanding of how the demand for social and emotional support affects older adults' technology usage behavior.

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