Towards Sustainable Digital Inclusion: Community-Based Practices for Older Adults in Urban China

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Abstract

This study explores community-based digital inclusion practices for older adults in urban China, with a focus on Suzhou. Despite national efforts to promote digital equity, gaps remain in local service implementation. Integrating social support, social capital, and social practice theories, the research examines practices across six districts in Suzhou. Data from policy documents, local reports, and case studies were analysed to evaluate how services provide support, foster social capital, and shape digital use. Findings show that current services effectively offer instrumental support and basic training but lack strategies to build bridging social capital or shift older adults' perceptions of technology. The common one-on-one tutoring model supports skill acquisition but isolates learners, limiting peer connections and weakening the sustainability of digital practices. This study highlights the importance of community-level social dynamics in digital inclusion. It argues for a shift from service delivery to an ecosystem-building approach that encourages peer networks and fosters positive digital identities among older adults. These insights contribute to the understanding of sustainable digital inclusion in ageing societies.

Keywords: digital inclusion, older adults, community-level

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Introduction

Digitisation has fundamentally restructured the socio-economic landscape, mediating essential services from fintech to healthcare. While these advancements promise efficiency, they often exacerbate the digital divide, particularly among older adults whose technological adoption is frequently hindered by cognitive constraints and low self-efficacy (Hunsaker & Hargittai, 2020). This issue is critical in China, where rapid digital transformation intersects with profound demographic ageing. By 2025, China's population aged 60 and above reached 323.38 million (23.0% of the total), signalling its transition into a moderately ageing society (National Bureau of Statistics of China, 2026). At the same time, digital systems have increasingly become the default mode for public administration and everyday consumption. This shift has created new forms of exclusion for older adults. Nearly half of this population remains offline. Internet penetration among seniors has plateaued at 52.0% (China Internet Network Information Centre, 2025). This trend poses a significant challenge to social sustainability.

Current scholarship increasingly views digital inclusion not merely as a technical hurdle, but as a socially embedded process (Helsper, 2021). While China has issued 37 national policy documents and 262 accessibility standards by late 2025 to foster "smart elderly care," a "last-mile" gap persists between macro-policy and community-level implementation. Research suggests that digital engagement is heavily contingent upon social capital and the quality of local support networks (Xie et al., 2021). However, many interventions remain narrowly focused on instrumental support. They often overlook the psychological and relational conditions that shape digital participation. These include technological anxiety and the role of intergenerational social support. Such factors are critical to sustained engagement and the development of long-term digital proficiency (Vroman et al., 2020).

To address this implementation gap, this study examines community-based digital inclusion practices in urban China. Drawing on social support theory, social practice theory and social capital theory, the study explores how local service arrangements enable or constrain digital adoption among older adults. It aims to move the discussion beyond a top-down service delivery model. Instead, it highlights the importance of building sustainable local ecosystems that support resilient digital identities in later life.

Literature Review

Digital inclusion in later life is increasingly recognised as a socially embedded process shaped by support relationships, networked resources and everyday practices (Helsper, 2021; Xie et al., 2021). However, existing research has paid limited attention to how community-based arrangements transform short-term assistance into sustained digital participation. To address this gap, this study integrates social support theory, social capital theory and social practice theory into a unified analytical framework.

Social Support Theory explains the forms and functions of assistance that older adults receive in the process of digital adaptation. Classic work distinguishes instrumental, informational, emotional and appraisal support (House, 1981). In the context of digital inclusion, instrumental and informational support provide practical guidance, such as teaching device use or solving operational problems, whereas emotional and evaluative support reduce frustration, strengthen confidence and affirm competence (Vroman et al., 2020). This distinction is important because many digital inclusion interventions remain focused on functional help while neglecting the psychological conditions required for sustained learning and continued use. Social support also

varies by source. Informal networks, such as family members and peers, often provide trust-based and affective support, whereas formal networks, such as community organisations and service providers, offer structured and professional assistance. These forms of support may operate through both stress-buffering and main-effect mechanisms, reducing exclusion while also promoting broader well-being and engagement (Cohen & Wills, 1985).

Whereas social support theory clarifies the nature of assistance, social capital theory explains the structure of relationships through which such assistance becomes available. Social capital is commonly understood in terms of network connections, reciprocity norms and trust (Putnam, 2000; Woolcock & Narayan, 2000). In the context of elderly digital inclusion, these dimensions are highly relevant. The structural dimension concerns whether older adults are embedded in supportive family and community networks. The relational dimension refers to norms of reciprocity that sustain repeated helping behaviours. The cognitive dimension centres on trust, which is especially important for reducing perceived risk in online environments. Social capital can be further differentiated into bonding and bridging forms. Bonding capital, typically found in close family ties, provides immediate support and emotional security. Bridging capital, often formed through community programmes and weak-tie networks, expands access to new information, services and learning opportunities (Putnam, 2000; Woolcock & Narayan, 2000). Sustainable digital inclusion depends on both private family support and broader community-based relational resources.

To examine how digital engagement becomes durable in everyday life, this study also draws on social practice theory. Rather than treating technology use as an individual choice, practice theory understands participation as the ongoing performance of socially organised practices (Reckwitz, 2002; Schatzki, 2002; Shove et al., 2012). Following Shove et al. (2012), this study focuses on three elements: materials, competences and meanings. Materials refer to devices, internet access and community spaces that make digital participation possible. Competences refer to the practical know-how developed through repeated use and guidance. Meanings refer to the symbolic significance attached to technology, including whether older adults view digital participation as empowering or burdensome. This perspective is particularly valuable because it shifts attention from one-time adoption to the stabilisation of digital practices in daily life.

Although these three theoretical traditions have each been widely applied, they are rarely integrated in studies of elderly digital inclusion. Existing research has primarily examined older adults' digital inclusion in relation to individual capability, interpersonal or family-based support, and broader structural provision such as access, services and inclusion policy (Helsper, 2021; Hunsaker & Hargittai, 2020; Vroman et al., 2020). Less is known about how different forms of support, types of social capital and elements of practice interact at the community level to produce sustainable digital participation. This represents an important gap, particularly in rapidly ageing and highly digitalised urban contexts.

Accordingly, this study proposes an integrated framework for analysing how community-based support enables sustained digital inclusion among older adults. Social support theory identifies the forms of assistance required, especially the shift from functional support to emotional and evaluative support. Social capital theory explains the network structures that shape access to such support, particularly the interplay between bonding and bridging capital. Social practice theory examines whether materials, competences and meanings are aligned in everyday life. Together, these perspectives suggest that digital inclusion becomes sustainable only when older adults receive adequate support, are embedded in trustworthy and resource-rich networks and

are able to incorporate digital technologies into meaningful daily practices. This framework guides the case analysis of community-based digital inclusion practices in urban China.

Methodology

This study employs a multiple-case design to examine digital inclusion practices for older adults in urban China. Suzhou was selected as the research site because its ongoing digital transformation, diverse community structures, and relatively rapid population ageing provide a suitable context for examining age-related digital divides. To capture variation across urban contexts, the study covers six districts in Suzhou: Gusu District, Huqiu District, Wuzhong District, Xiangcheng District, Suzhou Industrial Park, and Wujiang District. These districts represent distinct urban contexts, including the historic urban core (Gusu), high-tech development zones (Suzhou Industrial Park and Huqiu), established residential and mixed-use areas (Wuzhong and Xiangcheng), and a rural–urban transition zone (Wujiang). This district-level coverage supports a broad analytical scope and captures variation across different community contexts.

Data were collected from four sources: (1) official policy documents obtained from government archives; (2) authoritative media reports offering longitudinal coverage of digital inclusion initiatives; and (3) community WeChat official accounts documenting grassroots activities. The dataset includes materials published up to June 30, 2025. After applying screening criteria to remove duplicate and incomplete records, the final dataset includes 133 valid cases. This sample set provides sufficient coverage to capture the local characteristics of Suzhou and to identify broader tendencies relevant to digital inclusion in urban China.

Content analysis was employed to examine the dataset through a three-stage procedure. First, a theoretically grounded coding framework was developed based on three established perspectives. Drawing on social support theory, four dimensions were specified: instrumental support (direct assistance), informational support (knowledge and advice), emotional support (empathy and encouragement), and appraisal support (feedback and affirmation). Based on social capital theory, a distinction was made between bonding capital (ties with family and close friends) and bridging capital (connections with community members and volunteers). From social practice theory, three additional dimensions were identified: materials (hardware, software, and facilities), competencies (skills and confidence), and meanings (motivations and attitudes toward technology use). Second, each of the 133 cases was subjected to systematic textual coding. In addition to the identification of each dimension, its intensity was assessed using an ordinal scale of high, medium, low, or absent. In doing so, a more nuanced evaluation of variation across cases was achieved. Third, a cross-case comparative analysis was conducted to synthesise the coding results. Through this process, recurring patterns of digital inclusion in Suzhou were identified, while local strengths and broader systemic shortcomings were also revealed. Overall, qualitative case narratives were transformed into a structured dataset through this multi-dimensional analytical strategy, thereby providing a robust foundation for the subsequent findings.

Results

The findings reveal substantial district-level variation in the design and delivery of digital inclusion services for older adults, although a limited emphasis on appraisal support was evident across all six districts. Service models were shaped by local institutional arrangements and resource endowments, producing distinct patterns of intervention. The Suzhou High-tech

Zone primarily focused on foundational digital skills through one-to-one and hands-on teaching. Gusu District presented a more diversified and culturally embedded service portfolio, including innovative and activity-based formats. Xiangcheng District emphasized the combination of party-building leadership and digital empowerment, with relatively strong community interaction and interest-oriented learning. The Industrial Park relied more heavily on collaborations with enterprises and university volunteers, giving its services a comparatively scaled and professionalised character. Wuzhong District foregrounded system-level integration through smart eldercare platforms and age-friendly digital infrastructure. Wujiang District, by contrast, was characterised by micro-classroom provision in rural communities, with an emphasis on anti-fraud education and basic smartphone use. Despite these contextual differences, formal recognition of older adults' learning progress and achievements remained weak throughout, making the lack of appraisal support a shared limitation across districts. Beyond the overview of the six districts, the study also identifies the following key insights.

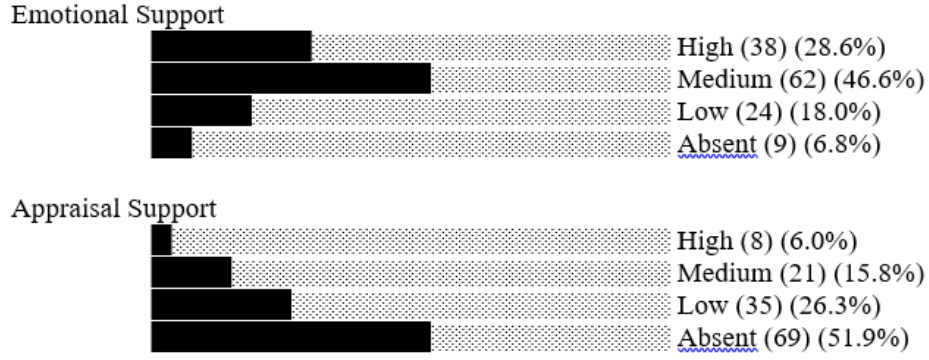
Uneven Support Structures

The findings reveal a markedly uneven support structure, in which instrumental and informational support were consistently well developed, whereas emotional and appraisal support remained comparatively limited (Figure 1). Instrumental and informational support were coded as high in more than 95% of the 133 cases. Most initiatives provided concrete operational assistance, such as guidance on mobile payment, online medical registration, and WeChat use, alongside practical information on app functions and fraud prevention. These findings suggest that community-based digital inclusion efforts in Suzhou have been highly effective in addressing older adults' immediate functional and informational needs.

By contrast, emotional support was substantially weaker. Only around 30% of cases were coded as high on this dimension, with most falling into the medium or low categories. Emotional support, where present, was typically inferred from indirect descriptions, such as volunteers' patience or older adults' expressions of satisfaction, rather than being embedded in a systematic care-oriented design. Appraisal support was even more limited, with the majority of cases coded as low or absent. Only about 10% of cases included explicit recognition mechanisms, such as certificates or formal commendation, for example through community-level certificates and completion ceremonies.

Figure 1

Distribution of Emotional and Appraisal Support Across Cases



Note. The figure presents the number of coded cases at four levels of support provision (high, medium, low, and absent). Emotional support and appraisal support were coded based on the presence and intensity of supportive elements identified in each case.

Taken together, these results indicate that current community services have prioritized skill training and information dissemination while paying insufficient attention to emotional care and achievement recognition.

Uneven Social Capital

The findings also indicate that community-based digital inclusion initiatives were more effective in strengthening bonding capital than in fostering bridging capital. Bonding capital, referring primarily to older adults' connections with family members and close acquaintances, was coded as medium or high in approximately 85% of the cases. This pattern reflects the strong emphasis placed on communication-related digital skills, such as WeChat video calls and voice messaging, which enabled participants to maintain or enhance family contact through everyday digital practices.

By contrast, bridging capital, which refers to the formation of weaker ties among older learners, volunteers, and other community members, was considerably less developed. Its strength was closely associated with the organisational format of the training. Cases relying on one-to-one instruction were typically coded as low on this dimension, as they offered limited opportunities for peer interaction. In contrast, cases incorporating group learning, interactive games, or WeChat group building were more likely to achieve medium or high levels of bridging capital. Overall, more than 60% of cases were coded as low or medium in bridging capital, suggesting that most services did not effectively promote horizontal social networks within the older population.

These results suggest that current service provision has been successful in reinforcing family-based ties, but has paid insufficient attention to the deliberate cultivation of weaker community connections.

Practical Orientation in Social Practice

The analysis shows clear variation across the three elements of social practice. Materials and competencies were consistently well developed. Meanings remained comparatively underarticulated. The materials dimension was coded as high in the vast majority of cases, as most initiatives relied on older adults' own smartphones, widely used applications, and accessible community-based venues. Competencies were likewise predominantly coded as high, since training activities were largely designed to address practical operational problems, and participants' immediate difficulties were typically resolved through hands-on instruction.

By contrast, the meanings dimension was more often coded as medium. In most cases, the underlying message was primarily utilitarian, emphasising that digital skills were useful for everyday life, rather than fostering deeper orientations such as digital confidence, technological belonging, or a positive sense of digital identity. Only a limited number of cases were coded as high on this dimension. For example, some initiatives explicitly conveyed the idea that older adults could actively participate in, and even help shape, digital life through intergenerational learning programmes and empowering community slogans.

These findings indicate that current services have established a relatively solid foundation in terms of material access and practical skill development, but have been less effective in cultivating affirmative meanings around digital participation.

Integrated Service Design

A small number of high-performing cases demonstrate that integrated service design can generate more comprehensive outcomes in older adults' digital inclusion. These cases achieved high scores across multiple dimensions, particularly emotional support, appraisal support, bridging capital, and meanings. For example, these initiatives combined practical training with recognition, emotional engagement, intergenerational interaction, volunteer support, and the message that technology can empower and support older adults.

These cases shared several common features, including group-based or intergenerational interaction, symbolic forms of recognition, active emotional feedback, and the communication of values that extended beyond instrumental usefulness. Their balanced performance across theoretical dimensions suggests that digital inclusion is more effective when service provision moves beyond isolated skill training and adopts a multidimensional empowerment approach.

Service Format and the Accumulation of Social Capital

Emotional and appraisal support appeared to be positively associated with bridging capital, with service format playing a decisive role in shaping these outcomes. Cases organised around one-to-one instruction and some home-based training activities, were typically characterised by low or absent bridging capital. Although this format sometimes generated a moderate level of emotional support through individualized attention, appraisal support was almost entirely absent. In contrast, group- or classroom-based formats, including community training sessions and senior learning programs, more often produced medium levels of bridging capital, while also enhancing emotional support through shared interaction. However, appraisal support remained limited in most of these cases. The strongest overall performance appeared in highly interactive or ritualised formats, such as certificate ceremonies, intergenerational activities, and fun competitions. In these cases, bridging capital frequently reached a high level, and both emotional and appraisal support were correspondingly stronger.

These patterns indicate that the cultivation of bridging capital depends heavily on participatory and interaction-oriented service design. One-to-one skills instruction may be effective for targeted teaching, but it does little to foster horizontal ties among older adults. By contrast, formats involving group learning, intergenerational co-creation, public recognition, and opportunities for shared participation are more conducive to the development of weaker social ties, while simultaneously strengthening emotional engagement and evaluative affirmation. This suggests that future services should move beyond one-way transmission and adopt a more collaborative approach to digital inclusion, in which older adults engage as learners and community members.

Discussion

This study advances current understandings of digital inclusion by showing that community-based services for older adults vary across local institutional arrangements, resource endowments, forms of support, network relations, and the meanings they generate in practice. Consistent with prior research, digital inclusion is better understood not as a one-off outcome of access or adoption, but as a socially embedded and practice-based process shaped by the interaction of support, capital, and everyday routines (Seifert et al., 2021; van Deursen, 2020).

The findings show that current initiatives focus mainly on instrumental and informational support, with emotional reinforcement and achievement recognition remaining underdeveloped. This confirms that many digital inclusion services still operate through a functional logic centred on immediate skill acquisition. However, recent research suggests that later-life digital engagement depends on operational assistance, confidence, encouragement, and supportive learning environments (Quan-Haase et al., 2018; Tsai et al., 2022). In the present study, emotional support was often implicit rather than systematically designed, and appraisal support was absent in most cases. This imbalance helps explain why skill acquisition may not automatically translate into sustained engagement. Without positive feedback and recognition, older adults may acquire basic competences while remaining uncertain about their ability to participate independently in digital life.

The findings further suggest that current services are better at reinforcing close and familiar relationships than at cultivating broader and more diverse social connections. Communication-oriented activities, especially those involving WeChat and video calls, clearly reinforced family-based ties. Yet weaker ties among older learners, volunteers, and community actors remained underdeveloped, particularly in one-to-one instructional formats. This matters because digital inclusion is sustained through intimate support from family members and broader networks that facilitate repeated learning, peer exchange, and access to new resources (Ariztía, 2017; Welch & Yates, 2018). Recent studies similarly show that social connectedness and digitally mediated participation are closely intertwined in later life, and that peer-based or community-based engagement can reduce exclusion more effectively than individualized teaching alone (Hunsaker et al., 2023; Seifert et al., 2021). The results therefore suggest that service design should be assessed not only in terms of teaching efficiency, but also in terms of its capacity to generate sustainable relational infrastructures.

The findings highlight that material provision and competence development are important foundations, but by themselves they do not guarantee sustainable digital inclusion. Most cases performed well in providing devices, accessible settings, and practical know-how, but the meanings attached to digital participation were often framed narrowly in utilitarian terms. In many services, technology was presented as useful for solving everyday problems, but less often as a source of autonomy, belonging, or positive digital identity. This aligns with recent work arguing that digital inequalities increasingly reflect differences in the quality, relevance, and continuity of engagement rather than mere first-level access (Büchi et al., 2022; van Deursen, 2020). From a practice perspective, durable digital participation requires material access, competence, and meanings that make technology worth integrating into everyday life (Shove et al., 2012). Where such meanings remain weak, digital practice may remain fragile and vulnerable to interruption.

Importantly, the high-performing cases in this study suggest that sustainable digital inclusion is most likely when support, capital, and practice are jointly addressed. Cases involving intergenerational interaction, symbolic recognition, active emotional feedback, and positive value framing achieved more balanced outcomes across emotional support, appraisal support, bridging capital, and meanings. These findings resonate with recent scholarship emphasising that age-inclusive digital participation depends on relational, contextual, and identity-related conditions, rather than on skills training alone (Gallistl et al., 2021; Rosales & Fernández-Ardèvol, 2020). The study therefore contributes by showing that digital inclusion among older adults is more appropriately conceptualized as sustainable digital social integration. For policy and practice, this implies that future interventions should move beyond one-way knowledge transmission and develop more participatory, trust-based, and meaning-centred service models.

Conclusion

This study examined how community-based digital inclusion services for older adults are organised and practiced in Suzhou, with particular attention to the interplay of social support, social capital, and social practice. The findings show that while local initiatives have made substantial progress in reducing immediate operational barriers, current service provision remains uneven and primarily skills-centred. Across districts, instrumental and informational support were consistently strong, but emotional and appraisal support were underdeveloped. Likewise, services were more effective in reinforcing bonding capital through family-oriented communication than in fostering bridging capital among peers, volunteers, and broader community actors. From a social practice perspective, materials and competences were generally well established, whereas meanings associated with digital participation were often framed in narrowly utilitarian terms.

These results suggest that digital inclusion for older adults cannot be adequately understood as a matter of access or training alone. Rather, sustainable inclusion depends on whether older adults are supported in using technologies and in developing confidence, recognition, social connectedness, and a positive sense of belonging in digital life. The high-performing cases in this study point to the value of integrated service models. These models combine practical instruction with emotional feedback, symbolic recognition, intergenerational interaction, and affirmative value framing. Together, they can generate more comprehensive outcomes. This indicates that digital inclusion is most effective when conceived as a multidimensional process of social integration rather than a narrow intervention in digital skills.

The study adds to the literature by highlighting how later-life digital inclusion is shaped by local service ecologies and community relations. It also contributes to practice by highlighting the limitations of one-way, transmission-based service models and the need for more participatory and relational approaches.

Several limitations should be acknowledged. The study focuses on one city and is based primarily on documented community cases, which may not fully capture older adults' subjective experiences or longer-term outcomes. Future research could incorporate interviews, longitudinal designs, and comparative analysis across cities or rural–urban settings to test the broader applicability of the findings. Despite these limitations, the findings indicate that sustainable digital inclusion in later life depends on more than access and skills alone. It also relies on the broader social conditions that support digital participation.

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