Digital Literacy as Family Capital: Bridging the Generational Gap Toward Smart and Dignified Aging in Southeast Asia

Nilasari Siagian[1*], Mayasari Hasibuan[2], Sarifah Aini Nasution[3], Jul Afnijar[4], Oktavia Zulni Putri[5]

[1-5] Institut Agama Islam Daar Al-Uluum (IAIDU) Asahan, Sumatera Utara, Indonesia

*Email: nilasarisiagian@iaidu-asahan.ac.id, nilasarisiagian@yahoo.co.id, mayasarihsb11@gmail.com, sarifahaininst041@gmail.com, julafnijar92@gmail.com, oktaviazulniputri@iaidu-asahan.ac.id

Abstract: *Southeast Asia is undergoing two simultaneous transitions: rapid population ageing and accelerating digital transformation. Within this context, the family remains the primary unit of support for older adults, yet the intergenerational digital divide increasingly challenges the family's capacity to fulfil this role. This conceptual paper aims to develop a theoretical framework positioning digital literacy as a form of family capital that bridges the generational gap in support of smart and dignified aging. Through a literature-based conceptual analysis, this study synthesizes Family Resilience Theory, the layered Digital Divide framework, the concept of digital literacy as cultural and social capital, and the World Health Organization's Healthy Ageing framework. The synthesis proposes that family digital literacy mediates the relationship between family adaptive capacity and older adults' quality of life in the digital era, operating through three stages: transmission, meaning negotiation, and institutionalization of digital practices within the household. The discussion further highlights that the extended-family and collectivist character of Southeast Asian societies shapes this transmission process, while labour migration and transnational family arrangements introduce new challenges to face-to-face digital mentorship. The paper cautions that unmanaged dependency on younger family members for digital mediation may undermine older adults' autonomy and dignity, contrary to the principle of dignified aging. It concludes with policy implications for strengthening family and community resilience in the digital era, in line with Sustainable Development Goals 3 and 10, and proposes directions for future empirical research across Southeast Asian countries*

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Key Words: *digital literacy; family resilience; generational gap; smart aging; sustainable development*

INTRODUCTION

Southeast Asia is experiencing two major transitions concurrently: a demographic transition toward an ageing population structure and a technological transition toward a digital society. United Nations projections indicate that the proportion of the population aged 60 and above in the region will rise substantially over the coming decades, while

internet and device penetration continues to grow rapidly among younger generations. This dual transition creates new spaces of interaction within the family, in which older and younger generations must adapt to an increasingly technology-mediated everyday life.

In many developing countries across the region, the family remains the principal provider of support for older adults, encompassing financial, emotional, and functional dimensions, given that formal social protection systems have not yet reached the entire older population. However, the family's capacity to perform this role is now confronted by the intergenerational digital divide, that is, disparities in access, skills, and use of digital technology between older and younger family members. Older adults who lack adequate digital literacy risk social exclusion, restricted access to telemedicine and digital public services, and diminished participation in social life that is increasingly mediated by digital platforms.

The concept of smart and dignified aging, promoted across multidisciplinary forums, emphasizes that technology integration for older populations should not be oriented merely toward efficiency, but must also safeguard dignity, autonomy, and subjective wellbeing. Within this context, the family plays a strategic role as a mediator capable of bridging the digital divide through the intra-family transmission of digital literacy. Nevertheless, scholarship that explicitly positions digital literacy as a form of family capital remains limited, particularly in developing Southeast Asian contexts characterized by extended kinship structures and collectivist cultural values.

Building on this conceptual gap, this paper aims to: (1) develop a theoretical framework integrating family resilience, digital divide, and dignified aging concepts; (2) analyze the mechanism through which digital literacy functions as family capital bridging the generational gap; and (3) formulate policy implications for strengthening family and community resilience in the digital era from a sustainable development perspective. This paper is structured as a conceptual analysis synthesizing recent academic literature to construct theoretical propositions for further empirical testing.

RESEARCH METHODS

This study employs a conceptual research method based on a systematic literature synthesis (library research), rather than primary field data collection. The analytical procedure comprised three stages. First, a targeted literature search was conducted using academic databases (Scopus-indexed journals, PubMed/PMC, JMIR, and Google Scholar) with keywords including "digital literacy older adults", "family resilience digital transformation", "intergenerational digital divide", and "smart and dignified aging Southeast Asia", prioritizing peer-reviewed sources published within the last five years. Second, the retrieved literature was thematically analyzed and categorized according to four theoretical pillars: Family Resilience Theory, Digital Divide Theory, digital literacy as family capital, and the Healthy Ageing framework. Third, the categorized findings were synthesized into an integrative conceptual model describing the mechanism by which family digital literacy bridges the generational gap in support of dignified aging, followed by the derivation of policy implications and propositions for future empirical research.

RESULTS AND DISCUSSION

Family Resilience Theory, developed by Froma Walsh, conceptualizes the family as a functional system possessing a collective capacity to recover from and adapt to adversity, organized around three domains: family belief systems, organizational patterns, and communication processes (Walsh, 2016). These domains are directly relevant to understanding how families respond to digital transformation: belief systems shape openness toward technology adoption, organizational patterns determine who assumes the role of digital mediator within the household, and communication processes serve as the channel through which digital skills are transmitted among family members.

The Digital Divide framework advanced by Van Dijk (2020) extends beyond physical access to devices (first-level divide) to encompass disparities in usage skills (second-level divide) and disparities in the benefits derived from technology use (third-level divide). This layered framework is essential for understanding that merely providing devices to older adults does not automatically produce digital inclusion; disparities at the skill and outcome levels often matter more for the quality of an older adult's digital participation than access alone. Recent empirical evidence reinforces this point: a systematic review of digital literacy measurement among older adults found that most instruments inadequately capture higher-order competencies such as critical evaluation and content creation, focusing disproportionately on basic operational skills (Oh et al., 2021).

Extending Bourdieu's (1986) notion of capital and Livingstone's (2018) work on digital literacy, digital competence can be understood not merely as an individual attribute but as a form of cultural and social capital that can be accumulated and distributed within the family unit. When younger family members transmit digital skills to older relatives, a phenomenon documented in the literature as intergenerational learning, this literacy functions as collective family capital that strengthens the household's overall adaptive capacity. Empirical studies from rural China demonstrate that structured family-based intergenerational learning programs measurably narrowed the digital skills gap among rural older adults (Cheng et al., 2022), while Malaysian evidence shows that intergenerational instructional strategies fostered confidence, digital inclusion, and stronger family bonds among older participants (Farag et al., 2024; Ahmad et al., 2025).

The World Health Organization's Healthy Ageing framework defines healthy ageing as the process of developing and maintaining the functional ability that enables wellbeing in older age, encompassing the capacity to meet basic needs, to build and maintain relationships, and to contribute to society (World Health Organization, 2020). The concept of smart and dignified aging extends this framework by insisting that the integration of smart technology into older adults' lives must remain subordinate to human dignity, respecting autonomy, privacy, and agency rather than treating older persons merely as passive objects of technological intervention. This concern is echoed in recent scholarship on ethical design, which warns that surveillance-oriented smart home technologies for eldercare, if poorly designed, may erode precisely the privacy and dignity they are meant to protect (Joseph, 2025), and in reviews showing that most current assistive technologies for older adults still fail to adequately balance dignity, independence, and social support in their design (Harris et al., 2022).

Integrating these four theoretical pillars, this paper proposes that family digital literacy mediates the relationship between family adaptive capacity and the quality of smart and dignified aging experienced by older family members. This mechanism unfolds through three stages. First, the transmission stage involves reciprocal learning in which younger family members teach older relatives basic digital skills, such as using instant messaging applications, digital health services, or electronic payment platforms. Second, the meaning negotiation stage involves the family interpreting these technologies through its cultural belief system, for instance, understanding video calls as an extension of traditional practices of maintaining kinship ties. Third, the institutionalization stage occurs when these digital practices become embedded in daily family routines and communication patterns, so that digital literacy ceases to be an individual competency and becomes part of the family's collective capital.

The extended-family and collectivist character of Southeast Asian households provides a distinctive context for this transmission mechanism. This collectivist orientation is not merely an abstract cultural trait; it is embodied in concrete kinship and mutual-assistance systems documented across the region. In the Indonesian context, for instance, the Batak Toba kinship principle of Dalihan Na Tolu and the customary practice of mutual cooperation (marsiadapari) function as durable social structures that organize obligation, reciprocity, and collective action within the extended family and community, and have been shown to translate directly into collective capacity for managing shared resources such as community-based tourism (Harahap, 2025). The same underlying logic, whereby culturally embedded norms of mutual obligation convert individual competence into shared, community-level capital, offers a plausible sociocultural mechanism through which digital literacy, once acquired by younger family members, becomes redistributed as family-level capital rather than remaining an individual asset. Unlike more individualistic societies where formal institutions often bear greater responsibility for elder care, families across much of Southeast Asia remain the principal actors in caring for older relatives, making family digital literacy a key determinant of older adults' access to the benefits of digital transformation, including digital health services, app-based social assistance, and participation in the digital economy. A realist review of intergenerational digital programs, drawing partly on Singaporean evidence, similarly found that such programs reduce loneliness and social isolation among older adults primarily when they are embedded within trusted, ongoing relationships rather than delivered as one-off technical training (Phang et al., 2023). However, high rates of domestic and international labour migration in the region have also given rise to transnational family arrangements, in which the younger relatives who would typically serve as digital mediators no longer reside with older family members, requiring the transmission mechanism to adapt through remote modalities such as video-based guidance or community-based digital support programs (Cheng et al., 2022; Appel et al., 2022).

The literature synthesis also identifies a risk: when the transmission of digital literacy is not reciprocal and sustained, the intergenerational digital divide may weaken, rather than strengthen, family resilience. Excessive reliance by older adults on younger relatives for every digital interaction, without a corresponding increase in older adults' own digital competence, may produce an asymmetric power relation that diminishes autonomy and dignity, contrary to the principle of dignified aging. This concern is consistent with findings that low self-efficacy and fear of technological complexity

remain persistent barriers to independent digital engagement among older adults even where family support is available (Ahmad et al., 2025; Kärnä et al., 2022). Strengthening family resilience in the digital era therefore requires an approach that goes beyond merely providing access to technology, extending to the reinforcement of older adults' digital agency through age-friendly technology design and digital literacy programs that engage older adults as active subjects rather than passive recipients of assistance.

These findings carry several implications. For policymakers in developing Southeast Asian countries, strengthening family resilience in the digital era should be directed toward programs that facilitate intergenerational digital literacy transmission at the household and community level, rather than individually oriented digital training for older adults alone. This need for a stronger, more binding policy instrument mirrors a pattern already observed in adjacent areas of health governance in Indonesia: analysis of the Healthy Regencies/Cities (KKS) program shows that a two-decade-old joint ministerial regulation, once adequate, has become an insufficiently authoritative basis for coordinating an initiative that now involves more than nine ministries, prompting a proposal to elevate it to a Presidential Regulation to secure stronger legal standing and cross-sectoral coordination (Setiaji, 2025). By analogy, family- and community-based digital inclusion programs for older adults are also inherently cross-sectoral, spanning health, social affairs, communication and information technology, and local government, and are therefore similarly vulnerable to fragmented, under-authorized implementation unless anchored in a comparably robust and binding policy instrument rather than left to isolated sectoral initiatives. For the design of public digital services, particularly digital health and social assistance platforms, an age-inclusive design approach is needed so that older adults can access these services directly without persistent reliance on mediation by younger family members. For labour and migration policy, the potential impact on the family's digital mediation function should be considered, given that high labour migration in the region may weaken the direct, face-to-face transmission of digital literacy within families.

CONCLUSION

This paper proposes a conceptual framework positioning digital literacy as a form of family capital that bridges the generational gap in support of smart and dignified aging, particularly in the context of developing countries in Southeast Asia. By synthesizing Family Resilience Theory, Digital Divide Theory, the concept of digital literacy as capital, and the Healthy Ageing framework, this paper demonstrates that the family holds a strategic role as the mediating unit of digital transformation for older adults, a role that must nonetheless be managed carefully to avoid creating dependency that diminishes older adults' autonomy and dignity. Strengthening family and community resilience in the digital era, in line with the sustainable development agenda, requires policies that simultaneously build cross-generational digital literacy capacity within families and promote inclusive technology and public service design that treats older adults as active subjects of development. Future empirical research, particularly comparative household surveys and qualitative case studies across Southeast Asian countries, is needed to test and refine the propositions advanced in this conceptual synthesis.

REFERENCES

Ahmad, N. A., Mohd Ali, M. A., & Tengku Shahdan, T. S. (2025). Intergenerational instructional strategies and elderly preferences for digital applications: A Malaysian case study. PLOS ONE, 20(8), e0328481. https://doi.org/10.1371/journal.pone.0328481

Appel, L., Lewis, S., Kisonas, E., & Recknagel, J. (2022). VRCHIVE: Experiences conducting an online workshop teaching intergenerational participants to create virtual reality films about their lives during the COVID pandemic. Educational Gerontology, 48(7), 305–330. https://doi.org/10.1080/03601277.2022.2040860

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), Handbook of theory and research for the sociology of education (pp. 241–258). Greenwood Press.

Cheng, H., Lyu, K., Li, J., & Shiu, H. (2022). Bridging the digital divide for rural older adults by family intergenerational learning: A classroom case in a rural primary school in China. International Journal of Environmental Research and Public Health, 19(1), 371. https://doi.org/10.3390/ijerph19010371

Facchinetti, G., Petrucci, G., Albanesi, B., De Marinis, M. G., & Piredda, M. (2023). Can smart home technologies help older adults manage their chronic condition? A systematic literature review. International Journal of Environmental Research and Public Health, 20(2), 1205. https://doi.org/10.3390/ijerph20021205

Farag, Y., Narra, G., Balasubramaniam, D., & Boyd, K. (2024). Improving the digital literacy and social participation of older adults: An inclusive platform that fosters intergenerational learning. In Proceedings of the 10th International Conference on Information and Communication Technologies for Ageing Well and e-Health (ICT4AWE 2024).

Guu, T.-W., Muurling, M., Khan, Z., Kalafatis, C., Aarsland, D., & Brem, A.-K. (2023). Wearable devices: Underrepresentation in the ageing society. The Lancet Digital Health, 5(6), e336–e337. https://doi.org/10.1016/S2589-7500(23)00069-2

Harahap, M. A. K. (2025). Integrating local wisdom into sustainable ecotourism development strategies: A case study in the Lake Toba region, Samosir. Serumpun International Conference Proceedings (SICP), 1(1), 378–387.

Harris, M. T., Blocker, K. A., & Rogers, W. A. (2022). Older adults and smart technology: Facilitators and barriers to use. Frontiers in Computer Science, 4, 835927. https://doi.org/10.3389/fcomp.2022.835927

Joseph, J. (2025). Designing for dignity: Ethics of AI surveillance in older adult care. Frontiers in Digital Health, 7, 1643238. https://doi.org/10.3389/fdgth.2025.1643238

Jung, S. O., Son, Y. H., & Choi, E. (2022). E-health literacy in older adults: An evolutionary concept analysis. BMC Medical Informatics and Decision Making, 22, 28. https://doi.org/10.1186/s12911-022-01761-6

Kärnä, E., Aavikko, L., Rohner, R., Gallistl, V., Pihlainen, K., Müller, C., Ehlers, A., Bevilacqua, R., Maranesi, E., Cerna, K., Hengl, L., Kolland, F., Waldenberger, F., Naegele, G., Park, S., Hess, M., Reuter, V., Frewer-Graumann, S., & Korjonen-Kuusipuro, K. (2022). A multilevel model of older adults' appropriation of ICT and acquisition of digital literacy. International Journal of Environmental Research and Public Health, 19(23), 15714. https://doi.org/10.3390/ijerph192315714

Kim, S., & Choudhury, A. (2021). Exploring older adults' perception and use of smart speaker-based voice assistants: A longitudinal study. Computers in Human Behavior, 124, 106914. https://doi.org/10.1016/j.chb.2021.106914

Livingstone, S. (2018). Digital literacy and media literacy: A review of the concepts and their relevance to policy debates. Media, Culture & Society, 40(4), 511–528. https://doi.org/10.1177/0163443718772909

Lu, X., Yao, Y., & Jin, Y. (2022). Digital exclusion and functional dependence in older people: Findings from five longitudinal cohort studies. eClinicalMedicine, 54, 101708. https://doi.org/10.1016/j.eclinm.2022.101708

Oh, S. S., Kim, K. A., Kim, M., Oh, J., Chu, S. H., & Choi, J. (2021). Measurement of digital literacy among older adults: Systematic review. Journal of Medical Internet Research, 23(2), e26145. https://doi.org/10.2196/26145

Phang, J. K., Kwan, Y. H., Yoon, S., Goh, H., Yee, W. Q., Tan, C. S., & Low, L. L. (2023). Digital intergenerational program to reduce loneliness and social isolation among older adults: Realist review. Journal of Medical Internet Research, 25, e39848. https://doi.org/10.2196/39848

Setiaji, B. (2025). Strengthening the policy on the implementation of Healthy Regencies/Cities (KKS). Serumpun International Conference Proceedings (SICP), 1(1), 374–377.

United Nations, Department of Economic and Social Affairs, Population Division. (2023). World population ageing 2023: Highlights. United Nations.

Van Dijk, J. A. G. M. (2020). The digital divide. Polity Press.

Walsh, F. (2016). Strengthening family resilience (3rd ed.). Guilford Press.

World Health Organization. (2020). Decade of healthy ageing: Baseline report. World Health Organization.