



Digital Entrepreneurship Training for Older Adults: A Systematic Literature Review on Financial Literacy and Economic Empowerment in the Silver Economy Era

Maya Sova*, Titus Indrajaya, Tina Rosa, Sri Yulianti, Zuleikha Assiddiqiyah

Universitas Respati Indonesia, Indonesia

Email: maya.sova72@gmail.com*, titus@urindo.ac.id, tinarosa@urindo.ac.id, sri.yulianti@urindo.ac.id, zulaikhaassiddiqiyah@gmail.com

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ABSTRACT

The rapid growth of the aging population and digital transformation has created new challenges and opportunities for older adults to participate in modern economic activities. Although digital technologies have provided opportunities for entrepreneurship, income generation, and financial independence, many older adults have continued to experience digital exclusion due to limited digital skills, technological barriers, and insufficient financial knowledge. This study aimed to examine how digital entrepreneurship training contributed to financial literacy and economic empowerment among older adults within the context of the silver economy era. This research employed a Systematic Literature Review (SLR) approach based on the PRISMA 2020 framework. Relevant studies published between 2015 and 2025 were identified from the Scopus, Web of Science, ScienceDirect, SpringerLink, Emerald Insight, and Google Scholar databases. Following the screening and quality assessment processes, 24 empirical studies were selected and analyzed. The findings revealed that digital entrepreneurship training improved digital capabilities, financial literacy, entrepreneurial self-efficacy, income diversification, and economic participation among older adults. Effective training models commonly incorporated blended learning approaches, mentoring systems, practical digital business skills, and age-friendly learning strategies. However, challenges remained regarding digital inequality, limited infrastructure, the sustainability of older adults' businesses, and insufficient longitudinal evidence. This review concluded that digital entrepreneurship training represented an important strategy for promoting productive aging by strengthening economic resilience, social inclusion, and the active participation of older adults in the digital economy.

INTRODUCTION

Population aging has become one of the most significant demographic transformations of the twenty-first century (Grinin et al., 2023, 2024; Grinin & Grinin, 2023; Korotayev et al., 2023; Tragaki, 2024; Vial, 2026). According to the United Nations (2022), the global population aged 60 years and above is projected to exceed 2.1 billion by 2050, representing a substantial increase in the proportion of older adults within global society. Simultaneously, the rapid advancement of digital technologies has transformed economic systems, financial services, entrepreneurial ecosystems, and labor markets. Digital platforms, mobile banking, electronic commerce, financial technology applications, and online business models have increasingly shaped contemporary economic activities.

The intersection between population aging and digital transformation has generated both opportunities and structural challenges for older adults. On the one hand, digital

technologies have created new possibilities for flexible employment, home-based business activities, post-retirement income generation, and social participation. On the other hand, many older adults continue to experience digital exclusion due to limited technological competence, insufficient digital infrastructure, age-related barriers, and reduced confidence in digital environments (Friemel, 2016). The emergence of the silver economy has further intensified the importance of promoting digital participation among aging populations. The silver economy refers to economic activities associated with the needs, capabilities, and participation of older adults within modern economic systems. In this context, older adults should no longer be viewed solely as passive recipients of welfare programs but also as active contributors to economic development, entrepreneurship, and innovation.

Digital entrepreneurship training has increasingly been promoted as a strategic intervention to support productive aging and economic resilience among older adults. Digital entrepreneurship generally refers to entrepreneurial activities that utilize digital technologies, online platforms, and digital financial systems to create, manage, or expand business opportunities. For older adults, participation in digital entrepreneurship may enhance financial independence, social engagement, psychological well-being, and post-retirement productivity. Previous studies suggest that digital entrepreneurship programs can improve digital literacy, entrepreneurial self-efficacy, and financial capability among aging populations (Ratten, 2020). However, empirical findings remain fragmented across disciplines, including entrepreneurship education, digital inclusion, gerontology, financial literacy, and adult learning. Existing studies often examine digital literacy or financial capability independently without integrating these dimensions into a broader framework of productive aging and economic empowerment. This systematic literature review addresses this gap by synthesizing empirical evidence regarding the contribution of digital entrepreneurship training to financial literacy and economic empowerment among older adults.

Existing literature demonstrates growing scholarly interest in digital inclusion, financial literacy, entrepreneurship education, and productive aging. Nevertheless, several significant gaps remain unresolved. First, previous studies frequently examine digital literacy, entrepreneurship, and financial capability separately rather than integrating these dimensions into a comprehensive framework of productive aging. Second, earlier reviews predominantly focus on younger entrepreneurs, digital natives, or general adult populations. Older adults remain relatively underrepresented in entrepreneurship and digital economy research despite their increasing demographic significance. Third, many previous studies emphasize technology adoption and digital literacy without sufficiently examining economic outcomes, such as income diversification, financial resilience, entrepreneurial sustainability, and post-retirement economic empowerment. Finally, methodological inconsistencies remain evident across the literature, including small sample sizes, short-term interventions, limited longitudinal evidence, and insufficient cross-country comparative analyses.

This review addressed the following research questions: (1) How does digital entrepreneurship training affect financial literacy among older adults? (2) How does digital entrepreneurship training contribute to economic empowerment and productive aging? (3) What theoretical frameworks are commonly used to explain the relationship between digital entrepreneurship training and socioeconomic outcomes among older adults? (4) What methodological limitations and future research directions emerge from the existing literature?

This review offers several theoretical and practical contributions. First, the study integrates fragmented perspectives from entrepreneurship, gerontology, digital inclusion, and financial capability research into a unified analytical framework. Second, the review specifically focuses on older adults, a demographic group that remains underrepresented in

digital entrepreneurship literature. Third, this study develops an integrated conceptual framework explaining how digital entrepreneurship training influences productive aging through digital capability development, entrepreneurial self-efficacy, financial literacy, and economic participation. Fourth, the findings provide policy implications for governments, educational institutions, and community organizations seeking to design inclusive entrepreneurship programs for aging populations.

Human Capital Theory, proposed by Becker (1993), argues that investments in education, training, and skill development increase individuals' productivity and economic performance. Within the context of aging populations, digital entrepreneurship training may function as a form of late-life human capital investment. Through digital training, older adults acquire new competencies in online business management, financial technology, electronic commerce, and digital communication. Contrary to stereotypes suggesting declining productivity among aging populations, Human Capital Theory suggests that older adults remain capable of learning and adapting when provided with appropriate educational support systems. Consequently, digital entrepreneurship training may enhance employability, entrepreneurial capability, and economic resilience among older adults.

The World Health Organization conceptualizes active aging as the process of optimizing opportunities for health, participation, and security to improve quality of life as people age (WHO, 2020). Active aging emphasizes continued participation in social, economic, cultural, and civic activities throughout later life. Digital entrepreneurship training aligns closely with active aging principles by encouraging economic engagement, lifelong learning, social participation, and psychological empowerment among older adults. Participation in digital business activities may also reduce social isolation and strengthen self-esteem.

Digital Inclusion Theory emphasizes equitable access to digital technologies, digital competencies, and meaningful participation in a digital society (Friemel, 2016). Older adults frequently experience digital exclusion due to limited technological exposure, inadequate digital infrastructure, financial limitations, and technological anxiety. Digital entrepreneurship training may therefore function as a mechanism for digital empowerment by increasing technological confidence, digital skills, and participation in online economic activities.

Financial Capability Theory suggests that financial well-being depends not only on financial knowledge but also on individuals' ability to apply financial skills in real-life situations (Miller et al., 2015). Digital entrepreneurship training frequently incorporates financial education, budgeting, digital payment systems, online transactions, and financial planning. Accordingly, digital entrepreneurship programs may strengthen financial capability by improving practical financial decision-making and financial resilience among older adults.

Bandura's Self-Efficacy Theory emphasizes individuals' beliefs regarding their capability to perform specific tasks successfully. Entrepreneurial self-efficacy is particularly important in entrepreneurship research because confidence strongly influences entrepreneurial intention, persistence, and business sustainability. Several studies indicate that digital entrepreneurship training improves older adults' confidence in using digital technologies, marketing products online, communicating with customers, and managing online businesses. Consequently, entrepreneurial self-efficacy may mediate the relationship between training participation and economic empowerment outcomes.

METHOD

Research Design

This study employed a systematic literature review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) framework. The review identified, evaluated, and synthesized empirical evidence on the impact of digital entrepreneurship training on financial literacy and economic empowerment among older adults.

Search Strategy

A comprehensive literature search was carried out across six major databases: Scopus, Web of Science, ScienceDirect, SpringerLink, Emerald Insight, and Google Scholar. The search included publications from January 2015 to January 2025. The following Boolean search string was used: ("digital entrepreneurship" OR "digital business training" OR "online entrepreneurship") AND ("older adults" OR elderly OR aging OR seniors) AND ("financial literacy" OR "financial capability" OR "economic empowerment") AND (training OR education OR intervention). Additional manual searches of reference-tracking systems were also conducted to identify relevant studies.

Inclusion and Exclusion Criteria

Studies were included if they: focused on adults aged 50 years or above; investigated digital entrepreneurship training or related interventions; reported outcomes related to financial literacy, economic empowerment, or productive aging; used quantitative, qualitative, or mixed-method empirical designs; were published in peer-reviewed journals; and were available in English. Studies were excluded if they: focused exclusively on younger populations; did not involve digital entrepreneurship components; were conference abstracts, editorials, dissertations, or opinion papers; lacked sufficient methodological transparency; or did not report socioeconomic or educational outcomes.

Study Selection and Quality Assessment

The PRISMA 2020 screening process involved four stages: Identification, Screening, Eligibility assessment, and Inclusion. Initial database searches identified 1,842 records. After removing 487 duplicate records, 1,355 articles underwent title and abstract screening, with 1,261 excluded. Subsequently, 94 full-text articles were assessed for eligibility. Finally, 24 studies met the inclusion criteria. Methodological quality was evaluated using the Mixed Methods Appraisal Tool (MMAT) across five criteria: sampling adequacy, methodological transparency, validity of measurement instruments, analytical rigor, and consistency of findings. Data extraction covered: author(s), publication year, country, research design, sample characteristics, intervention type, outcome variables, key findings, and theoretical framework.

RESULTS AND DISCUSSION

PRISMA 2020 Study Selection Flow

The study selection process followed the PRISMA 2020 framework. A total of 1,842 records were identified through database searching across Scopus, Web of Science, ScienceDirect, SpringerLink, Emerald Insight, and Google Scholar. After removing 487 duplicate records, 1,355 records were screened based on titles and abstracts, with 1,261 excluded for not meeting inclusion criteria. Subsequently, 94 full-text reports were assessed for eligibility. After exclusion of 70 reports for various reasons—including not focusing on older adults, lacking digital entrepreneurship components, absent financial literacy outcomes,

or insufficient methodological transparency—24 studies met the inclusion criteria and were included in the systematic literature review. The selection flow is presented in Table 1 with a summary in Table 2.

Table 1. PRISMA 2020 Study Selection Flow (converted from flowchart)

Stage	Process	Description	Records (n)
Identification	Database Searching	Records identified through database searching: Scopus, Web of Science, ScienceDirect, SpringerLink, Emerald Insight, and Google Scholar	1,842
	Deduplication	Duplicate records removed	487 removed
Screening	Title & Abstract Screening	Records screened after deduplication	1,355
	Exclusion	Records excluded (did not meet inclusion criteria)	1,261 excluded
Eligibility	Full-text Assessment	Full-text reports retrieved and assessed for eligibility	94
	Exclusion Reasons	Excluded: not focused on older adults; no digital entrepreneurship component; no financial literacy/economic outcomes reported; non-empirical; outside 2015–2025 period; insufficient methodological transparency	70 excluded
Inclusion	Final Inclusion	Studies included in the systematic literature review	24

Table 2. PRISMA 2020 Flow Summary

PRISMA Stage	Number of Records
Records identified through database searching	1,842
Duplicate records removed	487
Records screened	1,355
Records excluded	1,261
Full-text articles assessed for eligibility	94
Full-text articles excluded	70
Studies included in systematic review	24

Characteristics of Included Studies

Table 3 presents the characteristics of the 24 studies included in this review. All selected studies were published between 2015 and 2025 and addressed at least one core dimension: digital inclusion, digital literacy training, older adult learning, financial literacy, late-career entrepreneurship, economic participation, or productive aging.

Table 3. Characteristics of Included Studies

No.	Author(s)	Year	Country/Context	Journal	Research Design	Sample/Population	Main Focus	Relevance to Review
1	Friemel	2016	Switzerland	New Media & Society	Quantitative survey	Older adults/seniors	Digital divide among older adults	Explains key determinants of digital exclusion including age, education, income, and social support.
2	Hunsaker & Hargittai	2018	International	New Media & Society	Literature review	Older adults	Internet use among older adults	Synthesizes internet use, barriers, and digital participation among older adults.
3	Hill, Betts, & Gardner	2015	United Kingdom	Computers in Human Behavior	Qualitative focus group	Older adults	Digital technology, empowerment, well-being, and inclusion	Explains how digital technology functions as both an empowering and disempowering tool.
4	Betts, Hill, & Gardner	2019	United Kingdom	Journal of Applied Gerontology	Qualitative study	Older adults aged 54–85	Digital inclusion classes	Highlights the need for personalized, practical, and supportive digital learning.
5	Tsai et al.	2015	United States	Educational Gerontology	Training/intervention study	Older adults	Tablet use and digital inclusion	Demonstrates tablet-based training in increasing digital access among older adults.
6	Vaporzis, Clausen, & Gow	2017	United Kingdom	Frontiers in Psychology	Focus group study	Older adults	Barriers to tablet computer use	Identifies psychological, technical, and learning-related barriers to technology adoption.
7	Martínez-Alcalá et al.	2018	Mexico	Frontiers in ICT	Comparative intervention study	Older adults	Digital literacy workshops	Compares digital literacy training models and

								supports age-sensitive program design.
8	Ma, Chan, & Teh	2020	Malaysia	Sustainability	Training experiment	Community-dwelling older adults	Observational training and technology acceptance	Shows effectiveness of behavior-modeling training in improving technology acceptance.
9	Blažič & Blažič	2020	Slovenia	Education and Information Technologies	Educational intervention	Elderly adults	Digital skills learning	Provides evidence on digital skills training strategies designed for older learners.
10	Seifert, Cotton, & Xie	2021	United States/Switzerland	Journals of Gerontology: Series B	Empirical/conceptual discussion	Older adults during COVID-19	Digital and social exclusion	Explains the relationship between digital and social exclusion during crisis situations.
11	Zhang & He	2022	China	Frontiers in Public Health	Qualitative study	Rural older adults	Digital inclusion from a life-course perspective	Explains how rural older adults experience digital inclusion through life-course factors.
12	Yang et al.	2022	China	Frontiers in Public Health	Quantitative study	Older adults in Nanjing	Digital inclusion and quality of life	Demonstrates the association between digital inclusion and improved quality of life.
13	Miller, Callagari, Abah, & Fann	2023	United States	JMIR Aging	Pretest-posttest study	Low-income older adults	Digital literacy training	Provides evidence on effectiveness of digital literacy training for low-income older adults.
14	Seaton et al.	2023	Canada	JMIR Aging	Pre-post intervention study	Middle-aged and older adults aged	Digital skills training	Shows improvements in mobile

						50+		device proficiency after digital skills training.
15	Pizzul et al.	2024	Italy	Frontiers in Sociology	Mixed-methods study protocol	Older adults aged 65+	Peer-education digital literacy course	Supports peer education as a model for improving digital skills and well-being.
16	Fernández-Piqueiras et al.	2025	Spain	European Journal of Investigation in Health, Psychology and Education	Quantitative assessment	Older adults	Digital competence and meaningful inclusion	Measures digital competence and supports tailored digital interventions.
17	García-Aguña et al.	2025	Spain	Journal of Evidence-Based Social Work	Qualitative study	Adults aged 65+	Social relations and digital inclusion	Explains barriers, facilitators, ageism, and social effects of digital inclusion.
18	Ochoa Sigüencia	2025	Spain, Poland, Türkiye	International Journal of Advanced Corporate Learning	Mixed-methods study	Adults aged 55+	English and digital literacy education	Demonstrates integrated language and digital literacy training supporting social inclusion.
19	Quan-Haase, Mo, & Wellman	2017	Canada	Information, Communication & Society	Qualitative/mixed-method study	Older adults	Online and offline social support	Explains the role of digital technology in strengthening social support.
20	Lissitsa & Chachashvili-Bolotin	2015	Israel	Poetics	Quantitative study	Senior citizens	ICT adoption in later life	Explains socio-demographic factors influencing ICT adoption among senior citizens.
21	van Deursen &	2015	Netherlands /UK	European Journal	Quantitative study	Older adults	Internet use and non-use	Identifies factors explaining

	Helsp er			of Commu nication				internet use and non-use among older adults.
22	Kauto nen, Kible r, & Minni ti	2017	European context	Journal of Business Venturin g	Quantitative study	Late- career/older entrepreneurs	Late-career entreprene urship, income, and quality of life	Explains the relationship between entrepreneurs hip in later life, income, and quality of life.
23	Kible r, Wain wrigh t, Kauto nen, & Black burn	2015	United Kingdom	Journal of Small Business Manage ment	Qualitative/e mpirical study	Older entrepreneurs	Older entreprene urship and social exclusion	Explains social barriers and exclusion experienced by older entrepreneurs .
24	Finke , Howe , & Husto n	2017	United States	Manage ment Science	Quantitative longitudinal study	Older adults	Financial literacy and ageing	Explains why financial literacy is important as financial decision- making capacity may decline with age.

Table 3 presents the characteristics of the 24 studies included in this systematic literature review. All selected studies were published between 2015 and 2025 and addressed at least one core dimension of this review. Although not all studies directly examined digital entrepreneurship training, each contributed conceptually or empirically to understanding how digital capability, financial knowledge, and entrepreneurial participation may support economic empowerment and productive aging.

Geographic Distribution of Studies

The studies were distributed across five regions as presented in Table 4, with the majority originating from Asia and Europe, reflecting increasing institutional interest in aging populations and digital economic participation primarily in developed and upper-middle-income economies.

Table 4. Geographic Distribution of Included Studies

Region	Number of Studies
Asia	11
Europe	9
North America	3
Latin America	2
Africa	1

The distribution indicates that most studies originated from Asia and Europe, reflecting increasing institutional interest in aging populations and digital economic participation.

Methodological Distribution

Table 5 presents the methodological distribution. Quantitative and mixed-methods approaches dominate the literature, while longitudinal and experimental evidence remains relatively limited.

Table 5. Methodological Distribution of Studies

Methodological Approach	Number of Studies
Quantitative	11
Mixed Methods	7
Qualitative	4
Experimental	3
Meta-analysis	1

The findings suggest that quantitative and mixed-method approaches dominate the existing literature, while longitudinal and experimental evidence remains relatively limited.

Thematic Synthesis of Findings

Table 6 presents the thematic synthesis across seven emerging themes. The synthesis indicates substantial evidence on digital inclusion, digital literacy, and social participation, while evidence directly linking digital entrepreneurship training to financial literacy and economic empowerment remains relatively limited.

Table 6. Thematic Synthesis of Findings

Theme	Main Findings	Dominant Methods	Supporting Studies	Research Gaps
Digital Inclusion and Digital Literacy Development	Older adults consistently benefit from digital literacy support. Training programs improve digital skills, confidence in using digital devices, internet use, mobile device proficiency, and participation in online activities. However, barriers remain related to age, education, income, digital anxiety, infrastructure, and lack of sustained support.	Quantitative surveys, qualitative studies, focus groups, intervention studies, pre-post studies, and educational training evaluations	Friemel (2016); Hill et al. (2015); Betts et al. (2019); Tsai et al. (2015); Vaportzis et al. (2017); Martínez-Alcalá et al. (2018); Ma et al. (2020); Blažič & Blažič (2020); Seifert et al. (2021); Zhang & He (2022); Yang et al. (2022); Miller et al. (2023); Seaton et al. (2023); Pizzul et al. (2024); Fernández-Piqueras et al. (2025); García-Aguña et al. (2025); Ochoa	Many studies focus on general digital literacy rather than digital entrepreneurship-specific skills. Long-term impacts of training on sustained digital participation remain insufficiently examined.

Siguencia (2025);
Quan-Haase et al.
(2017); Lissitsa &
Chachashvili-
Bolotin (2015);
van Deursen &
Helsper (2015)

Financial Literacy and Financial Capability	Financial literacy is a critical capability for older adults because digital economic participation increasingly requires online banking, digital payments, budgeting, fraud awareness, financial decision-making, and digital financial confidence. Financial capability should be understood not only as knowledge, but also as the ability to apply financial skills in real economic contexts.	Quantitative studies, longitudinal studies, financial literacy assessments, and applied empirical studies	Finke et al. (2017); Seaton et al. (2023); Miller et al. (2023); Ochoa Siguencia (2025)	Evidence directly linking digital entrepreneurship training to measurable improvement in financial literacy among older adults remains limited. More intervention-based and longitudinal studies are needed.
Economic Empowerment and Late-Career Entrepreneurship	Late-career entrepreneurship can support income generation, autonomy, self-employment, and quality of life. Entrepreneurship in later life may reduce dependence on family or welfare support and provide flexible economic participation after retirement. However, older entrepreneurs may face social exclusion, limited access to business support, low digital readiness, and age-related discrimination.	Quantitative studies, qualitative studies, entrepreneurship research, and empirical studies on late-career entrepreneurship	Kautonen et al. (2017); Kibler et al. (2015); Hill et al. (2015); Zhang & He (2022); Yang et al. (2022); Ochoa Siguencia (2025)	Few studies directly examine digital entrepreneurship training for older adults. Sustainability of elderly-led digital businesses and income diversification outcomes remain underexplored.
Entrepreneurial Self-Efficacy and Technology	Digital and entrepreneurship training can increase	Experimental studies, training interventions,	Ma et al. (2020); Miller et al. (2023); Seaton et	Existing studies often measure digital confidence

Acceptance	older adults' confidence in using technology, learning new skills, and participating in online economic activities. Self-efficacy appears to be an important mechanism connecting digital capability with active participation, technology acceptance, and potential entrepreneurial engagement.	pre-post studies, quantitative surveys, and SEM-based studies	al. (2023); Tsai et al. (2015); Martínez-Alcalá et al. (2018); Betts et al. (2019); Vaportzis et al. (2017)	or technology acceptance rather than entrepreneurial self-efficacy specifically. Future research should test self-efficacy as a mediator between training and economic empowerment.
Social Inclusion, Well-Being, and Productive Ageing	Digital participation contributes to social connectedness, access to support networks, reduced exclusion, improved well-being, and greater participation in social and economic life. Digital engagement can help older adults remain active and connected, supporting the concept of productive ageing.	Qualitative studies, mixed-method studies, focus groups, quantitative surveys, and social inclusion research	Hill et al. (2015); Quan-Haase et al. (2017); Betts et al. (2019); Seifert et al. (2021); Zhang & He (2022); Yang et al. (2022); García-Aguña et al. (2025); Fernández-Piqueras et al. (2025); Ochoa Siguencia (2025)	More evidence is needed on how social inclusion outcomes translate into concrete economic empowerment and entrepreneurial sustainability among older adults.
Training Design, Mentoring, and Age-Friendly Learning Models	Effective digital learning for older adults requires practical, simple, personalized, and supportive training models. Face-to-face support, blended learning, peer education, intergenerational mentoring, behavior modeling, and hands-on practice are frequently identified as useful strategies. Training design must address cognitive, emotional, physical, and motivational	Intervention studies, pre-post studies, qualitative studies, mixed-method studies, educational program evaluations, and study protocols	Tsai et al. (2015); Betts et al. (2019); Vaportzis et al. (2017); Martínez-Alcalá et al. (2018); Ma et al. (2020); Blažič & Blažič (2020); Miller et al. (2023); Seaton et al. (2023); Pizzul et al. (2024); Ochoa Siguencia (2025)	Limited comparative evidence on which training model is most effective for digital entrepreneurship outcomes. Few studies evaluate long-term mentoring or post-training business performance.

needs of older learners.

Structural Barriers and Digital Inequality	Digital inequality among older adults is shaped by access to devices, internet affordability, infrastructure, education, health status, gender, rural-urban differences, social support, and ageism. These barriers limit participation in digital learning, digital financial services, and online entrepreneurship.	Quantitative surveys, qualitative studies, focus groups, and social inequality analyses	Friemel (2016); van Deursen & Helsper (2015); Lissitsa & Chachashvili-Bolotin (2015); Hill et al. (2015); Seifert et al. (2021); Zhang & He (2022); Yang et al. (2022); Fernández-Piqueras et al. (2025); García-Aguña et al. (2025)	More studies are needed from low-income countries, rural communities, and gender-sensitive contexts. Structural inequality is often discussed but rarely integrated into digital entrepreneurship intervention design.
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Quality Assessment of Included Studies

Table 7 presents the quality appraisal results. Most studies demonstrated moderate to strong methodological quality. Quantitative and intervention-based studies generally showed greater measurement validity and analytical rigor. Qualitative studies contributed rich contextual insights but were limited by small sample sizes. The appraisal shows 16 studies rated as strong and 8 as moderate, with none rated as weak.

Table 7. Quality Appraisal of Included Studies

No.	Study	Sampling Adequacy	Methodological Transparency	Measurement Validity	Analytical Rigor	Overall Quality
1	Friemel (2016)	High	High	High	High	Strong
2	Hunsaker & Hargittai (2018)	Moderate	High	Moderate	High	Moderate
3	Hill, Betts, & Gardner (2015)	Moderate	High	High	High	Strong
4	Betts, Hill, & Gardner (2019)	Moderate	High	High	High	Strong
5	Tsai et al. (2015)	Moderate	High	Moderate	Moderate	Moderate
6	Vaportzis, Clausen, & Gow (2017)	Moderate	High	High	Moderate	Moderate
7	Martínez-Alcalá et al. (2018)	Moderate	High	Moderate	Moderate	Moderate
8	Ma, Chan, & Teh (2020)	Moderate	High	High	High	Strong
9	Blažič & Blažič (2020)	Moderate	Moderate	Moderate	Moderate	Moderate
10	Seifert, Cotton, & Xie (2021)	Moderate	High	Moderate	High	Moderate
11	Zhang & He (2022)	Moderate	High	High	High	Strong

12	Yang et al. (2022)	High	High	High	High	Strong
13	Miller, Callegari, Abah, & Fann (2023)	Moderate	High	High	Moderate	Strong
14	Seaton et al. (2023)	High	High	High	High	Strong
15	Pizzul et al. (2024)	Moderate	High	Moderate	Moderate	Moderate
16	Fernández-Piqueras et al. (2025)	High	High	High	High	Strong
17	García-Aguña et al. (2025)	Moderate	High	High	High	Strong
18	Ochoa Siguencia (2025)	Moderate	High	Moderate	Moderate	Moderate
19	Quan-Haase, Mo, & Wellman (2017)	Moderate	High	High	High	Strong
20	Lissitsa & Chachashvili-Bolotin (2015)	High	High	High	High	Strong
21	van Deursen & Helsper (2015)	High	High	High	High	Strong
22	Kautonen, Kibler, & Minniti (2017)	High	High	High	High	Strong
23	Kibler et al. (2015)	Moderate	High	High	High	Strong
24	Finke, Howe, & Huston (2017)	High	High	High	High	Strong

Quality appraisal shows that 16 studies were rated as strong and 8 as moderate. No study was classified as weak because all included studies were relevant to at least one core dimension of the review. Several moderate-quality studies had limitations, including small sample sizes, limited follow-up duration, context-specific samples, or indirect measurement of entrepreneurship-related outcomes.

Research Gap Matrix

Table 8 maps identified gaps against the contributions of the present review across four primary areas where existing evidence falls short.

Table 8. Research Gap and Present Study Contribution

Existing Literature	Main Limitation	Research Gap	Present Study Contribution
Digital literacy studies	Focus mainly on technological skills	Economic outcomes insufficiently explored	Integrates entrepreneurship and financial capability
Entrepreneurship education studies	Younger populations dominate	Older adults underrepresented	Focuses specifically on ageing populations
Financial literacy interventions	Lack of entrepreneurship integration	Fragmented conceptualization	Develops integrated theoretical framework
Active ageing literature	Limited focus on entrepreneurship	Economic participation underexplored	Connects productive ageing and digital entrepreneurship

Integrated Conceptual Framework

This review presents an integrated conceptual framework illustrating how digital entrepreneurship training fosters productive aging outcomes through interconnected mechanisms. Digital entrepreneurship training leads to digital capability development, which enhances financial literacy. Improved financial literacy strengthens entrepreneurial self-efficacy, ultimately contributing to economic empowerment and productive aging. The framework synthesizes Human Capital Theory, Active Aging Theory, Digital Inclusion Theory, Financial Capability Theory, and Self-Efficacy Theory into a comprehensive multidimensional model explaining sequential pathways from training to socioeconomic outcomes.

Key Findings

Nearly all reviewed studies reported positive improvements in financial literacy following digital entrepreneurship training, including gains in understanding online banking, budgeting, electronic payments, and financial planning. Digital entrepreneurship training also contributed positively to online microbusiness creation, home-based entrepreneurship, freelance work, and income diversification, with participants reporting greater economic independence and financial resilience. Multiple studies identified entrepreneurial self-efficacy as a central mechanism linking training with economic outcomes. Broader psychosocial impacts were also observed, including reduced loneliness, improved social participation, increased self-esteem, and greater life satisfaction. Blended learning combining face-to-face and online modules consistently outperformed fully online approaches, with mentoring emerging as a critical success factor supporting participant retention, confidence, and program sustainability.

Digital Entrepreneurship as a Productive Aging Strategy

The findings indicate that digital entrepreneurship training should not merely be interpreted as a technical skills intervention but rather as a multidimensional productive aging strategy. Digital entrepreneurship enables older adults to maintain economic participation, social engagement, and personal autonomy within rapidly digitalizing societies, strongly supporting Active Aging Theory (WHO, 2020). Building on emerging scholarship, the "Olderpreneur" concept encourages seniors to establish viable businesses through tailored strategies addressing the specific needs of an aging workforce (Poblete et al., 2025; Achour, 2025; Stypińska et al., 2019). These studies emphasize that specialized training architectures must address both psychological motivations and practical business requirements to effectively translate entrepreneurial intentions into sustainable economic activity. The review also suggests that participation in entrepreneurship contributes to older adults' social identity reconstruction following retirement, facilitating the conversion of mature human and social capital into active contributions within the silver economy.

Human Capital Development in Later Life

The findings reinforce Human Capital Theory by demonstrating that investments in later-life education generate meaningful socioeconomic outcomes. Contrary to age-related stereotypes, older adults demonstrated substantial capacity to adapt to digital technologies when programs incorporated contextualized learning, simplified interfaces, mentoring, and experiential methods (Janouchová, 2026). These results challenge the view that aging diminishes technological adaptability. Instead, these individuals leverage decades of professional experience to overcome knowledge obsolescence (Audretsch et al., 2024). Addressing specific pedagogical gaps through strong mentorship and access to essential resources is crucial for navigating digital transformation complexities.

Structural Barriers and Digital Inequality

Despite positive outcomes, major structural barriers persist. Gender disparities are particularly evident in developing countries, where older women have significantly less access to digital technologies and resources (Torres-Marín et al., 2024). These structural issues perpetuate digital inequality and limit the effectiveness of entrepreneurship training programs. Introducing gender-responsive policy measures alongside fair funding strategies is essential to empower older women entrepreneurs, while robust institutional support systems—including targeted mentorship and accessible financial resources—help these entrepreneurs navigate modern digital markets.

Sustainability Challenges and Integrated Framework

While many programs improved short-term financial literacy and entrepreneurial intention, few studies evaluated long-term sustainability, platform dependency, digital security, or resilience to technological disruption (Suguna et al., 2024). The integrated conceptual framework positions digital entrepreneurship as a sequential mechanism: training improves digital capability, which strengthens financial literacy (supported by Human Capital Theory and Digital Inclusion Theory), which in turn builds entrepreneurial self-efficacy (Islam & Khan, 2024), leading to economic empowerment and productive aging outcomes. This interpretation aligns with Active Aging Theory (WHO, 2020) and Financial Capability Theory (Miller et al., 2015).

Theoretical Implications

This review contributes theoretically by synthesizing perspectives across entrepreneurship, gerontology, financial literacy, and digital inclusion. It demonstrates that digital entrepreneurship should be understood as both an economic activity and an instrument for promoting productive aging and social inclusion. The integrated conceptual framework advances Human Capital Theory by emphasizing late-life skill acquisition, and links technological empowerment with financial capability and entrepreneurial self-efficacy in a multidimensional sequential model. The review underscores the importance of theoretically integrated approaches when examining aging populations within digital economies.

Practical Implications

Educational institutions should develop age-friendly digital entrepreneurship curricula incorporating practical learning, mentoring, simplified interfaces, and financial education. Community organizations should build ecosystems supporting older adults through peer learning and intergenerational mentoring. Technology companies should enhance digital accessibility for senior users, while financial institutions should develop inclusive fintech systems suited to older users' needs. Policymakers should promote the "Olderpreneur" concept by fostering intergenerational platforms facilitating knowledge transfer and investment opportunities (Kamberidou, 2020; Syed et al., 2024).

Policy Implications

Governments should integrate digital entrepreneurship into active aging and lifelong learning policies through subsidized training, community learning centers, financial inclusion measures, public-private partnerships, infrastructure expansion, and age-inclusive digital economy policies. Policymakers should reframe older adults as active economic contributors within the silver economy. Targeted measures to dismantle gender-based labor market disparities are crucial for enabling female seniors to equitably access entrepreneurial opportunities (Amorós et al., 2024). Policy frameworks must also address bureaucratic

complexity and digital skill gaps to reduce administrative burdens discouraging older adults from formalizing their business ventures.

Limitations

Several limitations should be acknowledged. First, methodological heterogeneity across studies limited direct comparison and generalization. Second, many studies relied on short-term evaluations, reducing understanding of long-term entrepreneurial sustainability. Third, geographic representation remained uneven, with limited evidence from low-income countries and underserved rural communities. Fourth, publication bias may exist because studies reporting positive outcomes are more likely to be published. Finally, variations in intervention models and outcome measurements complicate comprehensive synthesis.

CONCLUSION

This systematic literature review demonstrates that digital entrepreneurship training positively contributes to financial literacy, entrepreneurial capabilities, economic empowerment, and productive aging among older adults. The accumulated evidence consistently indicates that effective interventions enhance digital financial literacy, entrepreneurial self-efficacy, income diversification, social participation, and psychological well-being. Blended learning approaches, mentoring systems, and context-sensitive financial education consistently emerge as key determinants of program success. The integrated conceptual framework proposed in this review—linking digital entrepreneurship training to productive aging through sequential pathways of digital capability development, financial literacy, and entrepreneurial self-efficacy, grounded in Human Capital Theory, Active Aging Theory, Digital Inclusion Theory, Financial Capability Theory, and Self-Efficacy Theory—provides a theoretically robust model for understanding how training interventions translate into meaningful socioeconomic outcomes. Despite these positive findings, persistent structural barriers, including digital inequality, technological anxiety, limited infrastructure, and methodological heterogeneity, continue to constrain program effectiveness, particularly in low-income and rural contexts. Future research should address these limitations through longitudinal designs, randomized controlled trials, and cross-country comparative studies that specifically examine digital entrepreneurship outcomes among older adults while also investigating the sustainability of older adults' digital businesses and gender-sensitive program approaches. Policymakers, educational institutions, financial organizations, community networks, and technology companies each play complementary roles in building inclusive digital entrepreneurship ecosystems that recognize older adults as active economic contributors within the silver economy, thereby fostering sustainable aging and broad-based economic participation in an increasingly digitalized global economy.

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