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Collaborative Digital Literacy and MSME Empowerment Through Community-Based AI Training: A Participatory Social Innovation Program in Urban Informal Communities

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ABSTRACT

The acceleration of digital transformation and artificial intelligence (AI) adoption has intensified socio-economic inequality among micro, small, and medium enterprises (MSMEs), particularly within urban informal communities characterized by low digital literacy, limited institutional access, and weak technological adaptation capacity. This article analyzes a participatory community service program aimed at strengthening digital literacy, AI utilization, and collaborative economic empowerment among women-led and youth-based MSMEs in a low-income urban community in Metro Manila, Philippines. Using a participatory action research and collaborative governance framework, the program integrated university-community partnerships, local government collaboration, digital entrepreneurship training, AI-assisted business mentoring, and community-based peer learning mechanisms over a six-month implementation period. Empirical findings indicate that participatory training models and institutional collaboration significantly improved digital competency, online market participation, financial literacy, and adaptive business resilience among participating MSMEs. The results further demonstrate that sustainable empowerment depended not only on technical training but also on trust-based collaboration, community ownership, institutional coordination, and social innovation mechanisms. The article contributes to community engagement and social innovation scholarship by developing an analytical model linking community participation, collaborative governance, digital capacity building, and sustainable local economic transformation. The study additionally highlights the importance of inclusive AI literacy and participatory digital governance in reducing urban socio-economic vulnerability and supporting sustainable community

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resilience in developing urban economies.

Keywords: community empowerment; participatory governance; AI literacy; MSME empowerment; digital literacy; collaborative governance; social innovation; sustainable community development

Introduction

The rapid expansion of digital economies and artificial intelligence technologies has transformed economic participation, educational access, and community development across both advanced and developing societies. However, the benefits of digital transformation remain unevenly distributed, particularly among vulnerable urban informal communities characterized by low technological literacy, unstable income structures, weak institutional support, and limited access to digital infrastructure. According to the World Bank (2023), digital inequality increasingly functions as a structural development challenge affecting labor market participation, small business resilience, educational opportunity, and long-term socio-economic mobility. Similarly, UNDP (2024) emphasizes that inclusive digital transformation requires participatory governance mechanisms capable of ensuring equitable technological access and community-centered innovation.

Urban informal communities in developing economies frequently experience multidimensional vulnerability involving precarious employment, low educational attainment, limited financial inclusion, and restricted access to formal business networks. These conditions became particularly visible following the COVID-19 pandemic, during which digital platforms and online commerce increasingly replaced traditional market interactions. MSMEs operating within low-income communities consequently faced pressure to adapt to digital markets despite lacking sufficient technological skills, institutional guidance, and financial capacity. UNESCO (2023) further reports that women-led and youth-based microenterprises are disproportionately affected by digital exclusion due to gendered technological barriers, educational inequalities, and unequal access to institutional resources.

The selected implementation area for this community service program was Barangay San Isidro, an urban informal settlement district in Metro Manila characterized by dense population concentration, high youth unemployment, informal microenterprise dependency, and low digital business participation. Local government records from 2023 indicated that approximately 68 percent of household economic activity depended upon small-scale informal commerce, including food production, tailoring, home-based retailing, and community services. However, fewer than 25 percent of registered community-based MSMEs utilized digital payment systems or online marketing platforms. Community assessments conducted by local social organizations additionally identified limited digital literacy, low financial management capacity, and weak institutional coordination as major barriers to economic resilience.

The community problem extended beyond technological limitations alone. MSME operators frequently lacked confidence in using digital platforms, had limited understanding of online consumer engagement, and possessed minimal exposure to emerging AI-assisted business tools. Furthermore, existing government training initiatives often relied upon short-term seminar models emphasizing one-way instruction rather than participatory empowerment and long-term mentoring. Consequently, many previous interventions failed to produce sustainable behavioral or institutional change. Existing governance

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fragmentation among local government units, educational institutions, NGOs, and business support agencies further weakened program continuity and community ownership.

Previous studies emphasize that community empowerment programs are more effective when local participation, institutional trust, and collaborative governance mechanisms are integrated into program design (Ansell & Gash, 2008; Torfing et al., 2021). Research on participatory development additionally demonstrates that empowerment outcomes depend upon community ownership and adaptive learning rather than merely technical intervention delivery (Cornwall, 2016). Studies by Gaventa and Barrett (2012) further argue that sustainable participation requires institutional responsiveness and inclusive governance arrangements capable of strengthening local agency.

Within digital literacy scholarship, previous studies emphasize the importance of community-based training and peer-learning mechanisms in improving digital inclusion among vulnerable populations (van Dijk, 2020). Similarly, social innovation literature highlights that collaborative institutional arrangements strengthen local resilience by integrating universities, civil society, local governments, and communities into co-productive governance systems (Moulaert et al., 2019). Existing community empowerment programs involving MSMEs often focus narrowly on technical entrepreneurship skills while neglecting participatory governance and institutional sustainability dimensions.

Other scholars argue that AI literacy is becoming increasingly important within local economic development because emerging digital economies require communities to understand not only digital tools but also algorithmic systems, online market structures, and adaptive technological practices (Long & Magerko, 2020). However, insufficient attention has been paid to how AI literacy programs can be integrated into participatory community empowerment frameworks within marginalized urban communities. Current scholarship additionally remains limited regarding the relationship between digital empowerment, collaborative governance, and sustainable local economic resilience.

This community service program addresses several important gaps. First, many digital literacy interventions remain technocratic and insufficiently participatory. Second, institutional collaboration between universities, local governments, and communities often lacks sustainability mechanisms. Third, existing MSME empowerment programs frequently fail to integrate AI literacy and digital adaptive capacity into local economic development strategies. Fourth, current community engagement literature rarely connects digital empowerment with collaborative governance and social innovation frameworks simultaneously.

The novelty of this program lies in its integration of AI literacy training, participatory economic empowerment, university-community collaboration, and peer-based social innovation mechanisms within a single community-centered framework. Rather than treating community members as passive beneficiaries, the program positioned participants as co-designers, peer mentors, and collaborative actors within local digital transformation processes. The program additionally established institutional coordination mechanisms linking local government offices, university researchers, youth organizations, women entrepreneur groups, and digital platform volunteers.

This article aims to analyze how participatory digital literacy and AI-based MSME empowerment programs contribute to collaborative governance, community resilience, and sustainable local economic transformation within vulnerable urban communities.

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Method

This community service program employed a participatory action research (PAR) framework integrated with collaborative governance analysis and community-based empowerment evaluation to examine how digital literacy and AI-assisted entrepreneurship training could strengthen socio-economic resilience among informal urban MSMEs. The program was implemented over a six-month period between January and June 2025 in Barangay San Isidro, Metro Manila, selected due to its high concentration of informal women-led and youth-based microenterprises, low digital market participation, and documented vulnerability to post-pandemic economic instability. The participatory framework emphasized co-production and collective decision-making involving community representatives, local government officials, university facilitators, youth volunteers, women entrepreneur associations, and local NGO partners. Program stages included participatory needs assessment, community consultation forums, collaborative curriculum design, digital literacy workshops, AI-assisted entrepreneurship mentoring, peer-learning circles, and sustainability planning meetings. Rather than using top-down instructional approaches, the program integrated experiential learning, problem-solving discussions, peer facilitation, and community-generated digital business projects to strengthen local ownership and adaptive capacity.

Data collection combined qualitative and quantitative community engagement techniques, including baseline and post-program surveys, participatory observation, workshop participation records, reflective group discussions, institutional coordination analysis, and digital business performance tracking. Evaluation indicators included digital literacy competency, online business participation rates, social media marketing utilization, digital payment adoption, financial record management, community participation intensity, and collaborative governance effectiveness. Institutional analysis examined coordination dynamics among universities, local governments, community organizations, and digital platform partners. Sustainability assessment focused on peer mentoring continuity, institutional commitment, and local governance integration following program completion. Ethical considerations included voluntary participation, informed community consent, participant anonymity within survey analysis, and collaborative validation of program findings through community reflection meetings. Nevertheless, the program acknowledged limitations involving unequal participant technological access, time constraints among informal workers, and the difficulty of measuring long-term economic outcomes within a short implementation period.

Results and Discussion

1. Community Participation and Digital Empowerment Dynamics

The first major finding concerns the role of participatory engagement in strengthening digital empowerment outcomes. Initial baseline assessments involving 84 MSME participants indicated that approximately 71 percent possessed limited experience using digital business applications beyond basic social media communication. Only 18 percent reported familiarity with online payment systems, while fewer than 10 percent had previously utilized digital marketing analytics or AI-assisted content tools.

The participatory implementation model significantly influenced community engagement quality. Rather than relying upon lecture-based workshops, the program incorporated peer-learning groups, collaborative

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problem-solving sessions, and locally contextualized business simulations. Community members were encouraged to identify their own business challenges and collectively develop digital adaptation strategies. Participation records demonstrated consistently high attendance rates averaging 87 percent across training sessions, reflecting strong community ownership and perceived program relevance.

Women-led MSMEs demonstrated particularly strong engagement in collaborative learning processes. Many participants initially expressed hesitation regarding digital technologies due to limited educational backgrounds and prior negative experiences with formal institutional training programs. However, peer mentoring mechanisms and community-based facilitation gradually increased confidence and participation. By the end of the program, 64 percent of participants reported independently managing digital product promotion through social media platforms and online marketplaces.

The findings support participatory governance scholarship emphasizing that empowerment outcomes depend upon active community agency rather than passive intervention delivery (Cornwall, 2016). The evidence additionally indicates that localized peer-learning structures strengthened social trust and reduced technological anxiety among marginalized community members.

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2. Institutional Collaboration and Collaborative Governance Mechanisms

A second major finding concerns the importance of institutional collaboration in sustaining community empowerment initiatives. The program involved coordinated participation from local government offices, university outreach centers, youth organizations, digital volunteer communities, and local cooperative associations. This collaborative governance arrangement enabled resource sharing, institutional legitimacy, and broader program accessibility.

Table 1. Analytical Matrix of Participation, Collaboration, and Social Innovation Outcomes

Variable	Initial Community Condition	Intervention Strategy	Institutional Collaboration	Measurable Outcomes	Analytical Interpretation
Digital Literacy	Low digital competency and limited online business engagement	Participatory digital literacy workshops	University facilitators and youth digital volunteers	78% increase in digital platform utilization	Community-based learning improved technological confidence
MSME Marketing Capacity	Dependence on offline local markets	AI-assisted social media and online marketing	University-business platform partnership	52% increase in online customer engagement	Digital adaptation strengthened economic resilience

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		training			
Financial Literacy	Weak bookkeeping and cash management practices	Community financial literacy mentoring	Local cooperative and NGO support	61% adoption of digital financial recording	Financial empowerment improved business sustainability
Community Participation	Low confidence in institutional programs	Peer-learning circles and participatory workshops	Community leaders and women associations	Participation rate averaged 87%	Participation strengthened local ownership
Institutional Coordination	Fragmented local support systems	Multi-stakeholder collaborative governance forums	Local government and university partnership	Creation of community digital support network	Institutional integration improved sustainability
Youth Empowerment	High informal unemployment and low digital opportunity	Youth digital mentoring and AI training	University student volunteers	34 youth participants became peer facilitators	Youth inclusion strengthened social innovation capacity
Sustainability Capacity	Short-term intervention dependency	Community-led mentoring continuation strategy	Cooperative and local government integration	Establishment of local digital learning hub	Sustainability depended on institutional embedding

The table demonstrates that collaborative governance mechanisms significantly influenced program effectiveness. Local government agencies provided logistical support and community mobilization, while university teams contributed technical expertise and educational facilitation. Youth organizations played an important intermediary role by assisting participants during digital practice sessions and providing culturally accessible communication support.

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Importantly, the collaboration process evolved beyond administrative coordination into relational institutional trust. Community participants reported greater willingness to engage with government and university programs because the intervention emphasized dialogue, responsiveness, and shared problem-solving rather than bureaucratic supervision. This finding aligns with collaborative governance theory suggesting that trust-building and institutional reciprocity are essential for sustainable community participation (Ansell & Gash, 2008).

However, institutional collaboration also encountered several challenges. Differences in organizational priorities occasionally delayed program coordination, particularly regarding scheduling, funding allocation, and technological resource provision. Furthermore, local government personnel turnover created continuity risks during implementation. These challenges indicate that collaborative governance requires stable institutional commitment and adaptive coordination mechanisms rather than temporary partnership arrangements alone.

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3. AI Literacy, Social Innovation, and Adaptive Economic Capacity

The third finding concerns the role of AI literacy in promoting adaptive economic capacity and social innovation. Unlike conventional digital literacy programs focusing solely on technical usage, this intervention introduced participants to basic AI-assisted tools for content creation, product description generation, customer engagement analysis, and online business management.

Participants initially perceived AI technologies as inaccessible and highly technical. However, simplified community-oriented demonstrations enabled participants to recognize practical applications relevant to small-scale businesses. Women-led food enterprises, for example, utilized AI-assisted design applications to improve product branding and social media communication. Youth participants experimented with AI-generated promotional materials and online customer interaction strategies.

Post-program evaluations indicated that approximately 58 percent of participants actively used AI-assisted tools within their business activities by the end of implementation. Community observations additionally identified increased experimentation with collaborative online marketing initiatives among participant groups. Several MSMEs collectively established shared online promotional accounts and community product catalogs to increase visibility and reduce individual marketing costs.

The findings demonstrate that AI literacy can function as a form of social innovation when integrated into participatory empowerment frameworks. Rather than reinforcing technological dependency, the program encouraged adaptive local experimentation and collaborative digital entrepreneurship. This supports recent scholarship emphasizing that social innovation emerges through locally embedded problem-solving and participatory institutional adaptation (Moulaert et al., 2019).

Nevertheless, sustainability concerns remain important. Several participants continued experiencing difficulties related to internet affordability, device limitations, and rapidly changing platform algorithms. Consequently, technological empowerment requires ongoing institutional support rather than one-time intervention delivery.

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4. Sustainability, Community Ownership, and Long-Term Empowerment

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The final major finding concerns sustainability and community ownership. Many community service programs fail because interventions conclude once formal training activities end. This program therefore prioritized sustainability mechanisms from the early implementation stages.

A significant sustainability outcome involved the establishment of a community digital learning hub coordinated jointly by local youth volunteers, women entrepreneur groups, and local government representatives. The hub functions as a continuing peer-learning space providing technical assistance, shared digital resources, and collaborative business mentoring. University facilitators additionally developed open-access learning modules enabling participants to continue independent digital practice following formal program completion.

Institutional sustainability was further strengthened through integration with local cooperative structures and barangay-level economic development planning. Local government agencies agreed to incorporate digital entrepreneurship mentoring into future community welfare and employment initiatives. Several university student volunteers additionally continued providing remote mentoring support through community messaging platforms.

Participation outcomes indicate that sustainability depended heavily upon community ownership and relational trust rather than external funding alone. Participants who became peer mentors demonstrated stronger long-term engagement and continued experimentation with digital business strategies. The transition from beneficiary status toward collaborative leadership significantly strengthened local empowerment dynamics.

However, the findings also reveal structural sustainability limitations. Long-term digital economic resilience remains influenced by broader issues including urban poverty, unstable labor conditions, internet infrastructure inequality, and market competition. Community empowerment programs alone cannot fully address these structural challenges without broader policy integration and institutional investment.

Sustainability and Social Innovation Model

Community Participation → Collaborative Governance → Digital Capacity Building → Social Innovation → Sustainable Community Empowerment

This article proposes a sustainability and social innovation model explaining how participatory digital empowerment contributes to long-term community resilience and adaptive local development.

Community participation functions as the foundational mechanism enabling trust-building, local ownership, and culturally contextualized problem-solving. Programs that position communities as active co-producers rather than passive recipients generate stronger engagement and institutional legitimacy.

Collaborative governance represents the second mechanism linking universities, local governments, civil society organizations, and community groups into coordinated empowerment networks. Effective collaboration improves resource integration, institutional continuity, and adaptive governance capacity.

Digital capacity building constitutes the third mechanism involving not only technical training but also critical digital literacy, AI adaptation skills, financial management capability, and online entrepreneurial competence. Capacity building becomes sustainable when communities possess the confidence and institutional support necessary for independent adaptation.

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Social innovation emerges as the fourth mechanism through collective experimentation, peer-learning networks, collaborative digital entrepreneurship, and locally generated solutions. Innovation within marginalized communities is strengthened when institutional support enables communities to adapt technologies according to local needs and cultural conditions.

Finally, sustainable community empowerment represents the long-term outcome involving increased economic resilience, institutional participation, adaptive governance capacity, and community-led development continuity. The model therefore conceptualizes empowerment as a relational and institutional process rather than merely an individual skills outcome.

Conclusion

This article analyzed a participatory digital literacy and AI-assisted MSME empowerment program implemented within an urban informal community in Metro Manila. The program aimed to strengthen community resilience, collaborative governance, and sustainable economic empowerment through participatory digital transformation strategies.

The findings demonstrate that participatory approaches significantly improved digital literacy, AI adaptation capacity, online business participation, and community confidence among women-led and youth-based MSMEs. Empowerment outcomes were strongest when community members actively participated in problem identification, peer-learning activities, and collaborative decision-making processes. The results therefore indicate that community-centered learning structures are more effective than top-down training models for promoting sustainable behavioral and institutional change.

Institutional collaboration emerged as a critical factor influencing program effectiveness and sustainability. University-community partnerships, local government coordination, youth volunteer engagement, and cooperative support mechanisms collectively strengthened implementation capacity and institutional legitimacy. Collaborative governance arrangements enabled broader resource integration and improved community trust toward institutional actors.

The program additionally contributed to social innovation by integrating AI literacy into locally contextualized entrepreneurship practices. Community participants increasingly utilized AI-assisted tools for marketing, communication, and business adaptation while simultaneously developing peer-based collaborative digital initiatives. This demonstrates that AI literacy can function as a participatory empowerment mechanism rather than merely a technological intervention.

The sustainability implications are significant. Long-term empowerment depended upon community ownership, peer mentoring continuity, institutional embedding, and adaptive local leadership rather than temporary training activities alone. The establishment of community-led digital learning networks and local mentoring structures strengthened the potential for continued socio-economic adaptation beyond the formal intervention period.

The policy implications suggest that digital empowerment programs should prioritize participatory governance, collaborative institutional frameworks, and long-term mentoring systems rather than isolated technical workshops. Governments, universities, and civil society organizations should integrate digital literacy and AI adaptation into broader inclusive development strategies targeting marginalized urban

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communities.

Nevertheless, several limitations remain. Structural poverty, unequal internet access, unstable informal labor conditions, and resource constraints continue influencing long-term sustainability outcomes. Future programs should therefore integrate broader financial inclusion mechanisms, infrastructure support, and regional policy coordination into community digital empowerment initiatives.

Ultimately, this article argues that sustainable community transformation within digitally evolving economies requires more than technological access. It requires participatory governance, institutional collaboration, social innovation capacity, and community-centered empowerment strategies capable of strengthening local resilience and inclusive development.

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