

# DIGITAL LITERACY AND LOCAL WISDOM FOR WOMEN-LED MSMEs: PATHWAYS TO SUSTAINABLE RURAL TOURISM IN LAKE TOBA

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*Abstract: Research on digital literacy in MSMEs has gained attention; however, its intersection with women's entrepreneurship and cultural heritage in sustainable tourism remains underexplored. This study seeks to fill this gap by examining how digital literacy and local wisdom jointly influence the sustainability of women-led MSMEs in Lake Toba, Indonesia, a UNESCO Global Geopark. A qualitative approach was applied through in-depth interviews with 50 women entrepreneurs engaged in culinary, handicraft, homestay, and creative sectors, along with officials from the Cooperative and the MSME Office of Samosir Regency. The data were analyzed using thematic coding to uncover patterns of opportunities, constraints, and resilience strategies. The study reveals that women entrepreneurs serve as both economic actors and cultural custodians yet face significant challenges, including low digital literacy, limited financing access, seasonal dependency, and domestic burdens. Despite these barriers, the findings highlight a novel synergy between digital literacy and local wisdom that fosters value creation, eco-friendly innovation, and cultural-based brand storytelling as pathways to sustainability. As this was a single-case qualitative study, the results were context-specific and may not be broadly generalizable. Theoretically, this study integrates digital literacy and cultural heritage into the MSME sustainability discourse. Practically, it provides policy recommendations and training models to promote women's empowerment and sustainable rural tourism.*

*Keywords: Digital Literacy, Women-led MSMEs, Local Wisdom, Sustainable Rural Tourism, Women Empowerment, Sustainable Marketing*

**Abstrak:** Penelitian tentang literasi digital pada UMKM telah mendapat perhatian, namun persimpangannya dengan kewirausahaan perempuan dan warisan budaya dalam pariwisata berkelanjutan masih belum dieksplorasi. Studi ini berupaya mengisi kesenjangan ini dengan mengkaji bagaimana literasi digital dan kearifan lokal bersama-sama memengaruhi keberlanjutan UMKM yang dipimpin perempuan di Danau Toba, Indonesia, sebuah UNESCO Global Geopark. Pendekatan kualitatif diterapkan melalui wawancara mendalam dengan 50 pengusaha perempuan yang bergerak di sektor kuliner, kerajinan, homestay, dan kreatif, bersama dengan pejabat dari Koperasi dan UMKM Kabupaten Samosir. Data dianalisis menggunakan pengkodean tematik untuk mengungkap pola peluang, kendala, dan strategi ketahanan. Studi ini mengungkapkan bahwa pengusaha perempuan berfungsi sebagai pelaku ekonomi dan penjaga budaya, namun menghadapi tantangan signifikan termasuk literasi digital yang rendah, akses pembiayaan yang terbatas, ketergantungan musiman, dan beban domestik. Terlepas dari hambatan ini, temuan menyoroti sinergi baru antara literasi digital dan kearifan lokal, mendorong penciptaan nilai, inovasi ramah lingkungan, dan penceritaan merek berbasis budaya sebagai jalur menuju keberlanjutan. Sebagai studi kualitatif kasus tunggal, hasilnya spesifik konteks dan mungkin tidak dapat digeneralisasi secara luas. Secara teoritis, penelitian ini mengintegrasikan literasi digital dan warisan budaya ke dalam wacana keberlanjutan UMKM. Secara praktis, ini memberikan rekomendasi kebijakan dan model pelatihan untuk memajukan pemberdayaan perempuan dan mempromosikan pariwisata pedesaan yang berkelanjutan.

**Kata Kunci:** Literasi Digital, UMKM Yang Dipimpin Perempuan, Kearifan Lokal, Pariwisata Pedesaan Berkelanjutan, Pemberdayaan Perempuan, Pemasaran Berkelanjutan



## INTRODUCTION

Micro, small, and medium enterprises (MSMEs) have long been recognized as the backbone of emerging economies, accounting for substantial employment generation, poverty reduction, and community resilience. In rural tourism economies, women-led MSMEs are even more important as they simultaneously perform economic functions and safeguard intangible cultural heritage. Therefore, strengthening the sustainability of such enterprises is vital not only for local economic competitiveness, but also for advancing the United Nations' Sustainable Development Goals (SDGs) related to gender equality, decent work, and sustainable consumption (Brush et al., 2021).

The extant literature underscores the transformative role of digital literacy in enabling MSMEs to expand market access, integrate into global value chains, and adopt innovative marketing strategies. In parallel, scholars emphasize the value of local wisdom and cultural heritage as sources of differentiation, particularly in creative and tourism-based enterprises. However, women entrepreneurs in developing contexts continue to face structural barriers, such as limited access to finance, digital exclusion, and socio-cultural constraints, thereby undermining the full realization of their economic potential (Su & Wall, 2022, Cohen & Winn, 2007; Hall et al., 2020).

Despite the proven contributions of women-led MSMEs, especially in cultural tourism settings, their sustainability remains fragile because of low digital adoption, seasonal market dependency, and constrained managerial capacity. In Samosir Regency, home to Lake Toba, a UNESCO Global Geopark, women entrepreneurs dominate handicrafts, culinary traditions, and homestay businesses; yet, their enterprises remain highly vulnerable to market fluctuations and technological disruptions (Hapsari et al., 2021). Previous studies have predominantly analyzed digital literacy in general MSME contexts or explored cultural heritage in isolation. Few studies have examined the intersection of digital literacy, women's entrepreneurship, and cultural heritage within the framework of sustainable rural tourism. This creates a critical gap in the understanding of how these dimensions interact to generate long-term business resilience (Dwivedi et al., 2022).

This study advances the discourse by conceptualizing digital literacy and local wisdom as complementary drivers of sustainability, highlighting how women entrepreneurs can leverage value creation, eco-friendly practices, and cultural-based brand storytelling. Drawing upon empirical evidence from the Samosir Regency, this study introduces a novel framework linking gender empowerment, digital transformation, and cultural heritage in rural tourism MSMEs.

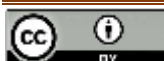
Lake Toba represents a globally significant case, combining natural resources, indigenous Batak Toba culture, and UNESCO recognition. While this context provides vast opportunities for women entrepreneurs, it simultaneously exposes structural vulnerabilities such as reliance on seasonal tourism and uneven digital capacity. The dual role of women as economic actors and cultural custodians makes this setting uniquely suited for examining the synergies and tensions between modernization and tradition (Prasetyo & Sutopo, 2021, Dwivedi et al., 2022).

This study seeks to (1) investigate how digital literacy enhances the market competitiveness of women-led MSMEs, (2) examine how local wisdom contributes to sustainable value creation, and (3) explore the integrative roles of both in strengthening resilience and empowerment in rural tourism economies. This study aims to contribute theoretically by integrating digital literacy and cultural heritage into MSME sustainability frameworks and practically by offering policy insights on women's empowerment, inclusive financing, and sustainable marketing strategies.

## LITERATURE REVIEW

### Digital Literacy and MSME Transformation

Digital literacy has been increasingly positioned as a strategic enabler of micro-, small-, and medium-sized enterprises (MSMEs). Defined as the ability to effectively access, evaluate, and utilize digital tools for communication, marketing, and financial transactions (Nguyen, 2022), digital literacy enables MSMEs to overcome geographical constraints, expand into e-commerce, and integrate with global value chains. Studies in Southeast Asia reveal that MSMEs with strong digital literacy demonstrate greater resilience against external shocks such as the COVID-19 pandemic (Dwivedi et al., 2022). However, rural MSMEs often face significant digital divides owing to infrastructure limitations, high adoption costs, and low technical skills. Research by Rižnar and Puntar (2023)



emphasizes that without adequate digital capacity-building, MSMEs in rural tourism remain locked in low-value segments.

### **Women's Entrepreneurship and Economic Empowerment**

The role of female entrepreneurs has gained scholarly attention as an essential factor in inclusive growth. Women-led MSMEs contribute not only to household income but also to social cohesion and cultural continuity (Brush et al., 2021). However, barriers persist, such as gender bias in access to finance, limited managerial training, and double burdens of domestic responsibilities. Empirical evidence from South Asia (Torres et al., 2022) shows that women entrepreneurs are often excluded from formal credit channels, compelling them to rely on informal savings. Human capital theory (Becker, 1964) highlights that investment in women's education and skills, particularly digital skills, generates long - term productivity gains. However, empowerment requires more than skill development; it requires institutional support, inclusive financial systems, and gender-sensitive policies.

### **Cultural Heritage and Local Wisdom in Tourism-Based MSMEs**

Cultural heritage and local wisdom are vital to the differentiation of rural tourism products. In contexts such as Lake Toba, cultural assets such as Batak Toba ulos weaving, culinary traditions, and ritual practices provide MSMEs with unique symbolic and experiential values. According to the value creation theory (Porter, 1985; Vargo & Lusch, 2016), cultural heritage adds both tangible and intangible worth to products, elevating them beyond functional utility. Research on sustainable tourism (Su & Wall, 2022) shows that tourists increasingly seek authenticity- and experience-based offerings, where local traditions and community participation become critical drivers of satisfaction. However, local products face challenges in modernization, design innovation, and intellectual property protection, limiting their competitiveness in international markets (UNCTAD, 2023).

### **Sustainable MSMEs in Rural Tourism Economies**

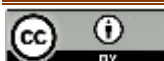
The sustainability of MSMEs in tourism economies depends on their ability to balance their economic viability, cultural preservation, and environmental responsibility. The literature on sustainable entrepreneurship (Cohen & Winn, 2007; Hall et al., 2020) stresses the importance of eco-friendly practices, waste reduction, and the use of biodegradable packaging to align with consumer preferences for responsible tourism. In rural Indonesia, female-led MSMEs are central actors in advancing sustainable consumption and production patterns (SDG 12). Nevertheless, empirical studies reveal persistent obstacles, such as dependence on seasonal tourism, low innovation capacity, and weak market linkages (Hapsari et al., 2021). Without integration into wider tourism value chains, MSMEs risk remaining peripheral players.

### **The Interplay of Digital Literacy, Women's Entrepreneurship, and Local Wisdom**

Few studies have attempted to integrate the three dimensions of digital literacy, women's entrepreneurship, and cultural heritage into a unified sustainability framework. Social Cognitive Theory (Bandura, 1986) offers a useful lens: Women entrepreneurs with digital competence gain greater self-efficacy, enabling them to leverage cultural narratives for business growth. Similarly, the Planned Behavior (Ajzen, 1991) explains how attitudes toward technology, social norms, and perceived behavioral control influence women's intentions to adopt digital platforms. The empirical evidence from Torres et al. (2022) confirms that when women entrepreneurs combine digital literacy with cultural-based products, they are better positioned to penetrate premium markets. However, the lack of systematic support structures remains a critical limitation, particularly in rural areas, where digital ecosystems are underdeveloped.

### **Empirical Studies in Rural Tourism Contexts**

Research on developing economies highlights diverse pathways for MSME sustainability. Nguyen et al. (2022) found that digital adoption among women-led tourism enterprises in Vietnam improved visibility and sales, but outcomes were moderated by education level and family support. Garcia et al. (2023) documented that integrating cultural storytelling into digital platforms in the Philippines enhanced tourists' willingness to pay premium prices. Meanwhile, studies in Indonesia (Prasetyo & Sutopo, 2021) confirm that MSMEs in cultural tourism face structural weaknesses in financing, marketing, and capacity building, requiring multi-stakeholder interventions. Collectively, these findings indicate that while digitalization offers new opportunities, contextual factors, such as gender roles, cultural assets, and local governance, strongly influence outcomes.



## RESEARCH METHODS

### Research Design

This study adopted a qualitative research design to explore the interplay between digital literacy, women's entrepreneurship, and local wisdom in shaping the sustainability of women-led MSMEs in rural tourism. A qualitative approach is considered appropriate as it allows for capturing rich contextual insights into lived experiences, sociocultural dynamics, and institutional frameworks that influence women entrepreneurs in Lake Toba, Indonesia. This study is guided by interpretivist philosophy, recognizing that knowledge is socially constructed and shaped by individual and collective perceptions.

### Research Setting and Context

This research was conducted in Samosir Regency, Lake Toba, a UNESCO Global Geopark, and a National Strategic Tourism Area (KSPN). This setting is highly relevant because of its dual character: (1) a vibrant cultural landscape dominated by Batak Toba traditions (ulos weaving, culinary heritage, homestays) and (2) its rapid exposure to global tourism markets and digital transformation initiatives. Women entrepreneurs are central actors in this context, as they balance economic survival with cultural preservation.

### Sampling and Respondents

A purposive sampling strategy was employed to ensure the representation of the key stakeholders. The study involved 50 women entrepreneurs from diverse sectors—culinary, handicraft, homestay, and creative industries—alongside officials from the Cooperative and the MSME Office of Samosir Regency. The inclusion criteria were as follows: (1) ownership or co-ownership of a business, (2) active participation in rural tourism value chains, and (3) at least two years of business operation. This purposive design ensured data richness and contextual relevance.

### Data Collection Methods

Primary data were collected in July 2025 using the following equation:

1. In-depth semi-structured interviews were conducted with women entrepreneurs and government officials, focusing on their experiences with digital platforms, cultural product development, financing, and sustainability challenges.
2. Field observations: Documented business practices, production processes, and interactions with tourists to validate the interview findings.
3. Secondary data analysis: Drawing from government documents (RPJMD 2025–2029, Ministry of Tourism reports), policy frameworks, and international references on MSME development.

Interviews lasted between 60 and 90 minutes, were conducted in Bahasa Indonesia, and were transcribed verbatim before translation into English for analysis.

### Data Analysis Procedure

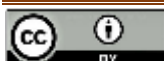
Data were analyzed using thematic coding following Braun and Clarke's (2006) six-step framework: familiarization, initial coding, theme generation, theme review, theme definition, and reporting. NVivo software was employed to manage transcripts, code patterns, and establish linkages between digital literacy, women's entrepreneurship, and cultural heritage. Quantitative elements such as frequency counts of recurring themes were integrated to provide descriptive support.

## RESULTS AND DISCUSSION

### Women Entrepreneurs as Economic Actors and Cultural Custodians

The findings clearly demonstrate that women-led MSMEs in the Samosir Regency play a dual role as economic actors and cultural custodians. In economic terms, women dominate sectors closely tied to tourism and cultural heritage, including culinary businesses and handicrafts such as ulos weaving, homestays, and creative tourism products. These businesses not only generate household income but also absorb local labor, contributing to poverty reduction and inclusive growth.

From a cultural perspective, women's entrepreneurial activities reinforce Batak Toba's identity and serve as mechanisms of intergenerational cultural transmission. For instance, ulos weaving is not merely a commercial product, but also a symbol of kinship, spirituality, and social status in Batak society. Similarly, the traditional Batak cuisine offered by women entrepreneurs does more than meet tourist demand; it preserves intangible cultural heritage that strengthens the cultural economy.





This dual contribution reflects the principles of the Cultural Economy Theory (Pratt, 2009), which posits that economic practices are deeply embedded within cultural systems. In line with Human Capital Theory (Becker, 1964), women's entrepreneurial participation not only enhances household welfare but also represents a form of investment in cultural continuity. Moreover, their role in tourism-based entrepreneurship aligns with the sustainable livelihood framework as they simultaneously diversify household income sources while ensuring the resilience of local traditions.

Thus, women entrepreneurs in Samosir are not passive economic agents; they are key drivers of sustainable rural tourism, blending economic resilience with cultural preservation. This synergy underscores their strategic role in realizing Samosir's vision as both an inclusive economic hub and a cultural tourism destination within the UNESCO Global Geopark of Lake Toba..

#### **Barriers to Sustainability: Digital Literacy, Finance, and Market Dependency**

Despite their importance, women entrepreneurs in the Samosir Regency continue to face structural and systemic barriers that limit the sustainability of their businesses, and low digital literacy remains the most pressing challenge. Many respondents indicated that while they owned smartphones, their capacity to utilize these devices for entrepreneurial purposes was minimal. Basic skills, such as creating digital catalogs, using online payment platforms, and managing social media advertisements, are not widely mastered. This finding corresponds with the Technology Acceptance Model (Davis, 1989), which argues that adoption is highly dependent on perceived ease of use and perceived usefulness. Without structured training and mentoring, women entrepreneurs perceive digital tools to be complex and intimidating. Consequently, they remain dependent on traditional face-to-face sales or local bazaars, limiting access to wider markets and weakening their resilience against disruptions such as the COVID-19 pandemic.

Restricted access to financing is another barrier that significantly undermines business growth. The study found that most women rely on personal savings, rotating savings groups (Arisan), or informal lending networks to fund operations. Access to bank credit is constrained by strict collateral requirements, high interest rates and bureaucratic procedures. This aligns with the empirical findings of Torres et al. (2022), who highlight persistent gendered exclusion from formal credit systems across South Asia. Although government schemes such as Kredit Usaha Rakyat (KUR) exist, many women reported challenges in their application due to limited literacy in financial documentation and lack of legal business registration.

Seasonal dependence on tourism further undermines business sustainability. Respondents emphasized that the demand for handicrafts, culinary products, and homestays fluctuates sharply depending on holiday seasons and tourist arrivals. During off-peak months, revenues drop drastically, forcing some entrepreneurs to reduce production or rely on alternative income sources, such as small-scale farming. This vulnerability supports Cohen and Winn's (2007) argument that entrepreneurial sustainability is constrained by structural market imperfections. Moreover, reliance on seasonal tourism creates a precarious cycle, where women entrepreneurs are unable to stabilize cash flow or plan long-term investments.

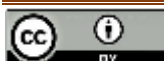
Beyond these three primary constraints, the data highlight other critical challenges.

1. Limited innovation and certification: Few entrepreneurs have access to product design training, intellectual property rights, or halal certification, which restricts their ability to penetrate premium markets.
2. Environmental issues: Some businesses continue to rely on single-use plastics or unsustainable raw materials, raising concerns about alignment with green economic standards.
3. Double burden of domestic responsibilities: Many women juggle household care, farming, and business activities simultaneously, reducing their capacity to scale up their enterprises.

These barriers reveal that, while women-led MSMEs in Samosir hold significant potential, their sustainability is hindered by systemic exclusion from digital ecosystems, financial structures, and stable market integration. Overcoming these barriers requires holistic interventions that combine digital skill development, inclusive financing models, product innovation, and social protection mechanisms tailored to female entrepreneurs.

#### **Opportunities Through Digital Literacy and Local Wisdom Integration**

This study reveals the strong potential of combining digital literacy with local wisdom as a foundation for sustainable competitive advantage. Entrepreneurs who successfully adopted digital



platforms, even in a limited capacity, experienced a wider market reach by embedding cultural narratives into their product positioning. For example, ulos weaving was not marketed merely as a traditional textile but reframed as cultural storytelling—a symbol of kinship, love, and social identity among the Batak people. Similarly, Batak culinary products such as saksang and naniura gained authenticity and appeal when contextualized as part of the Lake Toba tourism experience rather than as ordinary food commodities.

This integration is consistent with Service-Dominant Logic (Vargo & Lusch, 2016), which highlights that value is not embedded in products alone, but is co-created through customer experiences and shared meanings. Quantitative evidence supports this claim; women entrepreneurs who used digital storytelling in their online branding reported significantly higher customer engagement and sales growth (Garcia et al., 2023). From the perspective of a green economy, several entrepreneurs began experimenting with eco-friendly packaging, organic ingredients, and sustainable textile production. These initiatives resonate with Sustainable Entrepreneurship Theory (Cohen & Winn, 2007), which posits that ecological awareness can be transformed into long-term competitive advantage. Respondents noted that environmentally conscious practices are increasingly demanded by tourists, especially international visitors.

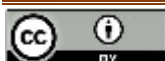
The findings also point to opportunities in experience-based and cultural tourism where visitors seek immersive engagement with local traditions. By integrating digital literacy, women entrepreneurs can transform homestays, culinary tours, and weaving workshops into marketable experience-based packages, while simultaneously enhancing revenue and cultural preservation.

At the policy and institutional levels, government programs (RPJMD 2025–2029) and triple helix collaborations—involving government, universities, and private sector actors—provide additional opportunities for capacity building. The initiatives include digital marketing training, cooperative-based financing, and brand certification, which support MSMEs in reaching both domestic and international markets. Digital platforms do not merely function as distribution channels; they amplify the symbolic and cultural value of heritage-based products, transforming them into competitive assets in the global markets. This synergy positions women-led MSMEs in Samosir to capitalize on emerging niches, such as sustainable fashion, eco-tourism, and experiential cultural tourism, thereby reinforcing both economic viability and cultural resilience.

### **Environmental and Sustainability Dimensions**

Another theme emerging from the data was the limited but growing awareness of eco-friendly practices among women-led MSMEs in Samosir. Several entrepreneurs have begun experimenting with biodegradable packaging, eco-friendly food containers, and natural dye processes for ulos. These initiatives are still at an early stage but represent a shift towards integrating sustainability principles into production and marketing. Such practices resonate with Sustainable Entrepreneurship Theory (Cohen & Winn, 2007), which emphasizes aligning business models with ecological responsibility as a way to generate both competitive advantage and social legitimacy.

Field data further revealed that a small segment of culinary MSMEs have already experimented with organic ingredients sourced from local farms, while some handicraft producers highlight the use of natural fibers and plant-based dyes to differentiate their products in the sustainable fashion market. This corresponds with empirical studies in Indonesia that confirm that green practices are positively correlated with consumer trust, loyalty, and willingness to pay premium prices (Prasetyo & Sutopo, 2021). Nevertheless, its adoption remains uneven and fragmented. Many MSMEs continue to rely on single-use plastics, chemical dyes, and non-renewable materials, primarily because of cost considerations, lack of technical knowledge, and weak enforcement of environmental standards. Entrepreneurs have reported that eco-friendly materials are often more expensive and less accessible in rural areas, making it difficult to maintain profitability. Additionally, limited awareness of global green economy trends and sustainable tourism certification further hamper wider adoption. This research also highlights a broader challenge: waste management and environmental degradation linked to tourism development in Lake Toba. Respondents noted that an increase in visitors, while economically beneficial, also amplified waste generation, especially plastic packaging and food waste. Without systematic intervention, MSMEs are viewed as contributors to environmental harm rather than as partners in sustainable tourism.



These findings suggest that while women-led MSMEs in Samosir have started to embrace eco-friendly practices, their capacity remains constrained by costs, knowledge gaps, and infrastructural limitations. However, the growing consumer demand for sustainable products and policy directions under RPJMD 2025–2029—emphasizing environmental awareness and sustainable local industries—creates momentum for scaling up. Strengthening eco-friendly innovation through government training, university–industry collaboration, and access to green financing schemes could position women entrepreneurs as pioneers of a circular economy in Lake Toba by combining cultural preservation with environmental stewardship.

#### **Theoretical Integration: Novel Synergy of Digital Literacy and Local Wisdom**

The central contribution of this study lies in identifying the novel synergy between digital literacy and local wisdom as a dual driver of MSME sustainability. The findings show that digital literacy and cultural heritage are not parallel but mutually reinforcing assets, which together establish a competitive foundation for women-led enterprises in the Samosir Regency.

Digital literacy equips women with the capacity to access broader markets, adopt financial technology, and engage in digital storytelling. Women entrepreneurs who have mastered digital tools could transform ulos weaving and Batak culinary traditions into globally marketable products by utilizing social media, e-commerce platforms, and mobile payment systems. As highlighted in the field data, those who received government-led digital training were more confident in managing online branding, reflecting the role of digital competence in strengthening self-efficacy as proposed by Social Cognitive Theory (Bandura, 1986).

Meanwhile, local wisdom provides cultural authenticity, symbolic meaning, and product differentiation, which resonates strongly with both domestic and international tourists. For example, ulos is not only a textile but also a cultural artifact representing kinship and identity, while Batak culinary products embody traditions of hospitality and rituals. This confirms Service-Dominant Logic (Vargo & Lusch, 2016), where value is co-created through cultural narratives and shared experiences rather than embedded in physical products alone.

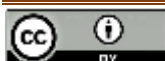
Together, digital literacy and local wisdom create pathways for sustainable marketing, value creation, and resilience. Digital platforms amplify the symbolic value of Batak culture, allowing MSMEs to reposition themselves within the premium segments of sustainable fashion, eco-tourism, and experience-based tourism. This integration extends the Theory (Ajzen, 1991) by showing how digital competence (perceived behavioral control) interacts with cultural norms (subjective norms) to shape entrepreneurial intentions and practices.

From a policy perspective, the synergy between digital skills and cultural heritage reflects the strategic direction of RPJMD Samosir 2025–2029, which emphasizes digital inclusion, women's empowerment, and sustainable local industries. The findings also demonstrate the relevance of the Triple Helix Model (Etzkowitz & Leydesdorff, 2000), as collaborative interventions between the government, universities, and the private sector are essential for building training systems, certification schemes, and digital infrastructure that enable women to leverage cultural assets through digital tools.

This theoretical integration advances the MSME sustainability discourse by positioning women entrepreneurs as transformative agents who bridge traditions and modernization. By leveraging digital literacy as an enabler and local wisdom as a differentiator, women-led MSMEs in Samosir can align economic competitiveness with cultural preservation and ecological responsibility, thereby contributing to both academic theory and practical pathways for rural tourism development..

## **CONCLUSION**

This study set out to explore how digital literacy and local wisdom jointly shape the sustainability of women-led MSMEs in Samosir Regency, Lake Toba, UNESCO Global Geopark. Guided by qualitative inquiry with 50 women entrepreneurs and government officials, this study achieved three objectives: (1) to examine how digital literacy enhances the competitiveness of women-led MSMEs, (2) to investigate how local wisdom contributes to sustainable value creation, and (3) to integrate both dimensions into a framework of resilience and empowerment in rural tourism economies.



The findings demonstrate that women entrepreneurs function not only as economic actors, but also as cultural custodians, reinforcing the Batak Toba identity while generating income and employment. However, their sustainability is constrained by low digital literacy, restricted financial access, seasonal dependency, and domestic burdens, confirming the structural barriers highlighted in the literature. At the same time, this study identifies a novel synergy between digital literacy and local wisdom, enabling entrepreneurs to transform cultural assets into competitive advantages through digital storytelling, eco-friendly innovation, and cultural-based brand positioning.

Theoretically, this research advances sustainability discourse by integrating Social Cognitive Theory, Service-Dominant Logic, and Human Capital Theory, showing how women's digital self-efficacy interacts with cultural authenticity to drive resilience. Practically, it provides policy directions for capacity-building in digital skills, inclusive financing models, eco-friendly innovation, and triple-helix collaborations that link the government, academia, and industry.

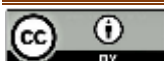
Overall, the study highlights that the pathway to sustainable women-led MSMEs in rural tourism lies not in digitalization or tradition alone, but in their strategic integration, bridging modernization with cultural preservation to ensure both economic competitiveness and social resilience.

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