

## The Digital Business Ecosystem and Its Implications for Local-Based Tourism Development in North Tapanuli

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### ABSTRACT

The rapid expansion of digital technologies has reshaped the structure and dynamics of the tourism sector, particularly in destinations that rely on local economic and cultural resources. This study examines how digital business ecosystems influence the development of locally based tourism by focusing on digitally mediated interactions among local actors, platforms, and tourists. Employing a qualitative netnographic approach, the research analyzes publicly available online content from social media platforms, digital marketplaces, and travel-related online communities. The findings reveal that digital platforms function as central nodes that enable market access, value co-creation, and narrative construction for local tourism actors. Digital storytelling and interactive engagement enhance visibility and economic opportunities; however, benefits are uneven due to disparities in digital literacy, infrastructure, and platform dependency. The study also identifies socio-cultural implications, including increased cultural visibility alongside risks of commodification and misrepresentation. These findings highlight that digital transformation in tourism is not solely a technological process but a socio-economic and cultural one that requires inclusive governance and capacity-building. The study contributes to the literature on digital ecosystems and community-based tourism by providing empirical insights into how digitalization shapes local tourism development and sustainability.

**Keywords:** digital business ecosystem; local-based tourism; netnography

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### INTRODUCTION

The rapid expansion of digital technologies has fundamentally reshaped how businesses operate, innovate, and compete, positioning digital business ecosystems as a dominant analytical framework in contemporary economic studies. Digital ecosystems enable firms to move beyond firm-centric strategies toward network-based value creation through platforms, cross-sector collaboration, and shared digital infrastructures. Recent literature emphasizes that participation in digital ecosystems enhances innovation capacity, operational efficiency, access to finance, and long-term firm growth, particularly for startups and small enterprises operating in dynamic and uncertain environments (Chen et al., 2023; Dubnitskyi et al., 2023; Ruban, 2022). Consequently, digital ecosystems are increasingly recognized not merely as technological arrangements but as socio-economic systems that integrate firms, governments, financial institutions, and knowledge actors into coordinated value networks.

Digital transformation within these ecosystems extends beyond the adoption of digital tools toward a systemic reconfiguration of value creation and governance mechanisms. Scholars argue that digital transformation entails the redesign of business models, organizational capabilities, and inter-organizational relationships through platformization and data-driven coordination (Chernova, 2021; Gileva et al., 2020; Romanelli, 2018). Platforms function as the core building blocks of digital ecosystems by enabling the accumulation of external resources, orchestrating innovation, and facilitating co-creation among diverse stakeholders (Dubnitskyi et al., 2023; Khotinskaya et al., 2023). However, the sustainability of such ecosystems depends heavily on supportive regulatory frameworks, balanced governance structures, and coordinated public-private collaboration (Vovchenko et al., 2019).

Within this broader context, the tourism sector has emerged as one of the most significantly transformed industries in the digital era, particularly in the post-pandemic period. Digitalization has accelerated the shift toward smart tourism destinations, characterized by the integration of digital infrastructure, data analytics, and interconnected business ecosystems to enhance visitor experiences and destination management (Archi et al., 2023; Pencarelli, 2019; Rodrigues et al., 2022). The smart tourism framework highlights the interdependence of smart destinations, smart experiences, and smart businesses, underscoring the role of digitally connected business ecosystems in achieving sustainability, resilience, and inclusive growth (Amir et al., 2022; Floričić et al., 2023). Nonetheless, empirical studies also caution that digital tourism development is uneven across regions and remains constrained by governance fragmentation, data privacy concerns, and digital divides (Jankova et al., 2023).

The implications of digital ecosystems are particularly salient for local tourism actors such as micro, small, and medium enterprises (MSMEs), community-based tourism initiatives, and indigenous communities. Digital platforms offer opportunities for these actors to expand market access, improve branding, and engage directly with tourists, thereby strengthening local economic resilience (Mafimisebi & Ogunsade, 2021; Puriati & Darma, 2021). However, multiple studies highlight persistent structural barriers, including limited digital literacy, inadequate rural infrastructure, constrained access to finance, and uneven adoption of e-commerce technologies, which hinder effective participation in digital ecosystems (Hanani & Ahsani, 2023; Rahmadani & Dayurni, 2022; Tohir et al., 2023). Without targeted capacity-building and ecosystem-oriented policy interventions, digitalization risks reinforcing existing inequalities rather than empowering local communities.

Against this backdrop, integrating digital business ecosystems into locally based tourism development requires a contextualized and inclusive approach. The literature increasingly emphasizes the need for ecosystem strategies that align digital innovation with local cultural values, sustainability objectives, and community well-being, moving beyond purely efficiency-driven models toward value co-creation and public value generation (Coca-Stefaniak, 2020; Gretzel, 2021). Public policy plays a critical role in orchestrating these ecosystems through infrastructure investment, digital literacy programs, fintech integration, and adaptive governance mechanisms that balance innovation with social protection (Schilirò, 2021; Vovchenko et al., 2019)). Understanding how digital business ecosystems operate within local tourism contexts therefore remains a crucial research agenda for advancing sustainable and inclusive tourism development.

## METHOD

This study employs a **qualitative netnographic research design** to explore the structure and dynamics of digital business ecosystems and their implications for locally based tourism. Netnography is particularly appropriate for examining digitally mediated interactions, narratives, and practices within online communities and platforms where tourism-related economic activities are produced, promoted, and negotiated. The data were collected from publicly accessible digital platforms commonly used by local tourism actors, including social media platforms, digital marketplaces, and online travel communities. These platforms function as key nodes of the digital ecosystem, facilitating interactions among micro, small, and medium enterprises (MSMEs), community-based tourism initiatives, tourists, and supporting institutions. Data sources included textual content (posts, captions, reviews, comments), visual materials, and interaction patterns that reflect how local tourism products, cultural identities, and business strategies are represented and exchanged in digital spaces.

Data analysis followed established netnographic procedures consisting of data familiarization, coding, thematic categorization, and interpretive analysis. The analytical process focused on identifying recurring themes related to digital value creation, stakeholder interaction, market access, and challenges faced by local actors within the digital ecosystem. To enhance analytical rigor, triangulation was conducted by comparing patterns across different platforms and types of digital interactions. Ethical considerations were addressed by using only publicly available data, anonymizing user identities, and adhering to principles of responsible digital research. This approach enables an in-depth understanding of how digital ecosystems shape locally based tourism practices while capturing the socio-cultural and economic meanings embedded in online interactions.

## RESULTS AND DISCUSSION

### Results

#### Structure of the Digital Business Ecosystem in Local-Based Tourism

The netnographic analysis reveals that the digital business ecosystem supporting local-based tourism is composed of multiple interconnected actors operating through digital platforms. These actors include local MSMEs, community-based tourism organizations, destination managers, tourists, and intermediary platforms such as social media networks and online travel marketplaces. Digital platforms function as central nodes that mediate communication, transactions, and value exchange among ecosystem participants. Rather than operating in isolation, local tourism actors increasingly rely on these platforms to access broader markets and visibility beyond geographical boundaries.

The findings indicate that social media platforms play a dominant role in ecosystem formation, particularly in marketing, storytelling, and community engagement. Local tourism businesses utilize visual content, short-form videos, and interactive features to promote attractions, accommodations, and cultural experiences. This digital presence allows local actors to construct narratives of authenticity, locality, and cultural uniqueness, which are critical for attracting experience-oriented tourists. However, reliance on platform algorithms also creates dependency, influencing visibility and engagement levels.

In addition to social media, digital marketplaces and travel platforms act as transactional infrastructures within the ecosystem. These platforms enable bookings, payments, and customer reviews, which significantly affect trust and reputation. User-generated content, especially reviews and ratings, emerges as a key mechanism shaping tourist decision-making and competitive positioning among local providers. The ecosystem thus combines social interaction, economic exchange, and reputational dynamics within a digitally mediated environment.

Despite the apparent connectivity, the ecosystem remains asymmetrical in terms of power and resource control. Platform owners possess significant influence over data access, algorithmic visibility, and monetization rules, while local actors often lack strategic control. This imbalance affects how value is distributed within the ecosystem and highlights the vulnerability of small-scale tourism actors within platform-dominated digital environments.

Table 1. Key Actors and Their Roles in the Digital Tourism Ecosystem

| Actor                          | Primary Role                     | Digital Platform Utilized       |
|--------------------------------|----------------------------------|---------------------------------|
| Local MSMEs                    | Product and service providers    | Social media, e-marketplaces    |
| Community-based tourism groups | Cultural and experience curation | Social media, websites          |
| Tourists                       | Consumers and content creators   | Social media, review platforms  |
| Platform providers             | Infrastructure and orchestration | Social media, OTA platforms     |
| Local government               | Promotion and regulation         | Official websites, social media |

#### Digital Practices of Local Tourism Actors

The analysis of online content reveals that local tourism actors actively adopt digital practices focused on promotion, engagement, and customer relationship management. Visual storytelling is the most prominent strategy, with frequent use of images and videos showcasing landscapes, cultural rituals, traditional cuisine, and community activities. These practices aim to differentiate local tourism offerings from mass tourism by emphasizing authenticity and emotional connection. Digital narratives are often framed around heritage, nature, and communal values, reinforcing local identity.

Engagement practices extend beyond promotional content to interactive communication with potential visitors. Local actors respond to comments, inquiries, and feedback, creating a sense of accessibility and personalized service. This interaction strengthens trust and contributes to positive

brand perception. However, engagement intensity varies significantly across actors, often reflecting differences in digital literacy and resource availability.

Another significant digital practice involves the use of platform analytics, albeit in a limited and informal manner. Some actors monitor engagement metrics such as likes, shares, and follower growth to assess promotional effectiveness. Nevertheless, advanced data-driven decision-making remains uncommon, indicating a gap between digital presence and strategic digital capability. This limitation constrains the potential benefits of ecosystem participation.

Collaboration among local actors is also visible in digital spaces, particularly through content sharing and joint promotions. Cross-tagging, shared hashtags, and collaborative campaigns reflect attempts to create collective visibility for destinations. Such practices demonstrate early-stage ecosystem coordination, although they remain largely informal and dependent on individual initiative rather than structured governance.

Table 2. Dominant Digital Practices Observed

| Digital Practice           | Description                            | Observed Frequency |
|----------------------------|----------------------------------------|--------------------|
| Visual storytelling        | Photos and videos of local attractions | High               |
| Interactive engagement     | Responding to comments and messages    | Medium             |
| Collaborative promotion    | Cross-posting and shared hashtags      | Medium             |
| Data monitoring            | Use of basic platform analytics        | Low                |
| Strategic digital planning | Formal digital marketing strategies    | Very Low           |

### Value Creation and Economic Implications

The findings suggest that digital business ecosystems contribute significantly to local economic value creation by expanding market access and reducing transaction barriers. Digital platforms enable local tourism providers to reach national and international audiences without relying on traditional intermediaries. This direct-to-consumer interaction increases revenue potential and enhances pricing flexibility. Several actors report increased booking inquiries following consistent digital engagement. Economic benefits also manifest through diversification of income sources. Local actors integrate digital sales of complementary products such as handicrafts, local food items, and cultural services alongside tourism offerings. This diversification enhances economic resilience, particularly during periods of reduced physical travel. Digital ecosystems thus function as mechanisms for sustaining local livelihoods beyond seasonal tourism cycles.

However, economic gains are unevenly distributed across actors. Those with higher digital competence and more consistent content production tend to benefit disproportionately. Smaller actors with limited digital skills struggle to convert online visibility into tangible income. This disparity underscores the role of capability development in shaping economic outcomes within digital ecosystems.

Moreover, platform-related costs, such as commission fees and paid promotions, reduce net income for local providers. While platforms offer visibility, they also extract value from transactions, reinforcing dependency relationships. This dynamic raises questions about long-term economic sustainability and the need for alternative or complementary ecosystem models that prioritize local value retention.

Table 3. Economic Impacts of Digital Ecosystem Participation

| Impact Dimension       | Positive Effects      | Identified Challenges        |
|------------------------|-----------------------|------------------------------|
| Market access          | Wider audience reach  | Platform dependency          |
| Revenue generation     | Increased bookings    | Commission fees              |
| Income diversification | Digital product sales | Limited scalability          |
| Economic resilience    | Reduced seasonality   | Unequal benefit distribution |

## Socio-Cultural Implications of Digitalization

Beyond economic outcomes, the digital ecosystem significantly influences socio-cultural dynamics within local tourism. Digital platforms enable communities to showcase cultural practices, rituals, and narratives to external audiences. This visibility contributes to cultural recognition and pride, reinforcing community identity. Online representation often emphasizes values such as hospitality, tradition, and environmental stewardship.

At the same time, the commodification of culture emerges as a recurring concern. Certain cultural elements are selectively highlighted to appeal to tourist preferences, potentially simplifying or altering their original meanings. This selective representation may lead to cultural standardization and performance-driven authenticity. Such dynamics illustrate the tension between cultural preservation and market-driven digital visibility.

Community participation in digital content creation varies across actors. While some initiatives involve collective storytelling and youth engagement, others are dominated by individual entrepreneurs. The absence of coordinated cultural governance increases the risk of misrepresentation and internal conflict. This finding highlights the importance of inclusive digital governance mechanisms within tourism ecosystems.

Digital interaction also reshapes relationships between tourists and host communities. Online engagement fosters pre-visit familiarity, influencing visitor expectations and behavior. Positive digital narratives can enhance mutual understanding, but misaligned expectations may also generate dissatisfaction. Thus, socio-cultural outcomes depend heavily on how digital narratives are constructed and managed.

## Challenges and Constraints in Digital Ecosystem Participation

Despite the opportunities offered by digital ecosystems, several structural challenges constrain effective participation by local tourism actors. Limited digital literacy remains a primary barrier, particularly among older entrepreneurs and community leaders. Many actors rely on trial-and-error approaches, lacking formal training in digital marketing, content strategy, or platform analytics. This limitation reduces strategic consistency and long-term impact.

Infrastructure constraints further exacerbate digital inequality. Inconsistent internet connectivity and limited access to digital devices hinder content production and real-time engagement. These constraints disproportionately affect rural and remote areas, reinforcing spatial inequalities within the digital tourism ecosystem. Infrastructure limitations also affect tourists' digital experiences, influencing satisfaction levels.

Another major challenge relates to governance and coordination. The absence of formal ecosystem orchestration leads to fragmented initiatives and duplication of efforts. Without clear roles and shared strategies, collaboration remains sporadic and unsustainable. This fragmentation limits the potential for collective branding and destination-level competitiveness.

Finally, concerns related to data privacy, platform dependency, and algorithmic uncertainty create additional risks. Local actors have limited understanding of data governance and platform policies, exposing them to sudden changes in visibility or access. These risks highlight the need for capacity-building and supportive policy frameworks to ensure sustainable ecosystem participation.

Table 4. Key Challenges Identified in the Digital Tourism Ecosystem

| Challenge Category  | Description                   | Impact Level |
|---------------------|-------------------------------|--------------|
| Digital literacy    | Limited skills and knowledge  | High         |
| Infrastructure      | Poor connectivity and access  | High         |
| Governance          | Fragmented coordination       | Medium       |
| Platform dependency | Algorithm and policy risks    | Medium       |
| Data awareness      | Low understanding of data use | Low–Medium   |

## Emerging Patterns and Ecosystem Implications

The synthesis of findings reveals several emerging patterns characterizing digital business ecosystems in local-based tourism. First, digital participation is driven more by necessity than strategic planning, resulting in reactive rather than proactive ecosystem engagement. Second, platforms serve as both

enablers and gatekeepers, shaping access, visibility, and value distribution. These dual roles define the structural conditions under which local tourism actors operate.

Third, ecosystem benefits are maximized when digital practices align with local values and collective action. Collaborative storytelling and destination-level branding show higher engagement and perceived authenticity. Conversely, isolated efforts yield limited impact and reinforce competition rather than cooperation. This pattern underscores the importance of ecosystem-level coordination.

Finally, the findings suggest that digital ecosystems have transformative potential only when supported by inclusive governance, capacity development, and infrastructure investment. Without these conditions, digitalization risks reproducing existing inequalities and marginalizing less digitally capable actors. The results thus provide empirical grounding for policy and managerial interventions aimed at fostering sustainable and inclusive digital tourism ecosystems.

## Discussion

The findings of this study confirm that digital business ecosystems play a central role in reshaping locally based tourism by enabling new forms of value creation, interaction, and market access. This result aligns with prior studies that conceptualize digital ecosystems as interconnected networks of actors coordinated through digital platforms and shared infrastructures (Dubnitskyi et al., 2023; Ruban, 2022). Similar to the observations of Chen et al (2023), the present study shows that local tourism actors leverage digital platforms not only for promotion but also for co-creation of value through user-generated content and interactive engagement. However, the dominance of platform providers observed in this study reinforces earlier concerns regarding power asymmetry and dependency within digital ecosystems (Khotinskaya et al., 2023; Schilirò, 2021).

The prominence of social media-driven storytelling identified in this research supports the smart tourism literature emphasizing digital narratives as a key mechanism for enhancing destination attractiveness and visitor engagement (Pencarelli, 2019; Rodrigues et al., 2022). Consistent with Archi et al (2023), the findings indicate that visual and experience-oriented content strengthens perceptions of authenticity and emotional connection, which are critical in community-based tourism contexts. Nevertheless, this study also echoes Jankova et al (2023), who caution that selective representation of local culture in digital spaces may lead to commodification and symbolic simplification. Thus, while digital storytelling enhances visibility, it simultaneously introduces socio-cultural tensions that require careful governance.

From an economic perspective, the results corroborate earlier research highlighting the capacity of digital ecosystems to expand market reach and improve income opportunities for small-scale tourism actors (Mafimisebi & Ogunsade, 2021; Vovchenko et al., 2019). The observed diversification of income streams through digital sales and complementary services mirrors findings by Gileva et al (2020), who argue that ecosystem participation enhances firm resilience and adaptability. However, as noted in previous studies, economic benefits remain unevenly distributed due to disparities in digital literacy and resource endowment (Rahmadani & Dayurni, 2022; Tohir et al., 2023). This reinforces the argument that digital transformation alone does not guarantee inclusivity without targeted capability development.

The socio-cultural implications identified in this study further extend existing debates on sustainability and community empowerment in digital tourism. In line with Coca-Stefaniak (2020) and Gretzel (2021), the findings suggest that digital ecosystems can foster community pride and cultural visibility when aligned with local values and participatory practices. At the same time, the absence of structured cultural governance, as also observed by Zvirbulė et al (2023), increases the risk of misrepresentation and internal contestation. These dynamics highlight the need to move beyond technology-centric models toward ecosystem approaches that integrate social norms, cultural safeguards, and collective decision-making.

Finally, the challenges related to digital literacy, infrastructure limitations, and fragmented governance identified in this research resonate strongly with prior regional and global studies on digital ecosystem implementation (Hamani, Yessi., 2019; Nikitaeva et al., 2021; Yakimova & Pankova, 2023). Similar to the findings of Nanchen et al (2021), the lack of ecosystem orchestration constrains collaboration and destination-level competitiveness. The discussion thus reinforces the argument that effective digital

business ecosystems in local tourism require active public-sector involvement, inclusive policy frameworks, and sustained investment in human capital. Without such interventions, digitalization risks reinforcing existing structural inequalities rather than serving as a catalyst for sustainable and locally grounded tourism development.

## CONCLUSION

This study concludes that digital business ecosystems have become a critical enabler of locally based tourism development by facilitating market access, value co-creation, and interactive engagement among diverse stakeholders. Through digital platforms, local tourism actors are able to promote cultural assets, diversify income sources, and strengthen economic resilience within their communities. However, the findings also demonstrate that ecosystem benefits are unevenly distributed, as participation and value capture are strongly influenced by digital literacy, platform dependency, and governance structures. Without strategic coordination and capacity-building, digital ecosystems may reproduce existing inequalities rather than fostering inclusive growth.

Furthermore, the study highlights that the sustainability of digital tourism ecosystems depends not only on technological adoption but also on socio-cultural alignment and institutional support. Digitalization can enhance cultural visibility and community identity when embedded within participatory governance and locally grounded narratives. Conversely, weak ecosystem orchestration, infrastructure gaps, and limited regulatory support constrain long-term impact. Therefore, policies and managerial strategies should prioritize ecosystem-based approaches that integrate digital capability development, inclusive governance, and cultural sustainability to ensure that digital transformation contributes meaningfully to locally based and sustainable tourism development.

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