

Bridging the Digital Divide: The Role of Local Governments in Fostering SME Digitalization at the Border

**Halim Dwi Putra¹, Samshul Amry Bin Abdul Latif.²,
and Aswandi³**

Politeknik Negeri Bengkalis^(1, 3.), International Islamic University Malaysia ⁽²⁾

Email: halim@polbeng.ac.id

Abstract

The digital divide remains a critical barrier to inclusive economic growth, particularly for small and medium enterprises (SMEs) operating in border regions where infrastructure and policy support are often limited. This study addresses the urgency of understanding how local governments in Muar (Malaysia) and Bengkalis (Indonesia) influence the digital transformation of SMEs amid Industry 4.0 demands. Given the strategic potential of cross-border economic collaboration, assessing government roles in fostering digital inclusion becomes vital. The objective of this research is to explore and compare the extent of government initiatives, stakeholder collaboration, and institutional capacity in supporting SME digitalization in the Muar–Bengkalis border area. A qualitative comparative case study approach was employed, involving in-depth interviews with 20 key informants, including government officials, SME owners, academic experts, and community leaders. Thematic analysis was used to extract patterns of policy effectiveness, barriers, and local innovation practices. Findings indicate that Muar exhibits stronger institutional alignment and more consistent support for SME digital readiness through digital training programs, infrastructure development, and public-private partnerships. In contrast, Bengkalis faces significant challenges in coordination, digital literacy, and stakeholder engagement, reflecting a more fragmented governance approach. The study suggests that a localized and structured Penta-Helix collaboration model can enhance the effectiveness of digital policy implementation in border areas. Future research should consider a mixed-methods design to quantitatively measure digital maturity levels and evaluate the long-term impact of government interventions on SME competitiveness.

Keywords : SME digitalization, local government, digital divide, border economy

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) play a pivotal role in ASEAN economies, yet they continue to face digital exclusion, particularly in peripheral and border regions like Bengkalis (Indonesia) and Muar (Malaysia). Despite accelerating digital growth across Southeast Asia, geographic and policy disparities persist—limiting SMEs’ ability to participate in cross-border trade and value chains (ERIA/OECD, 2024). Significantly, local governments are increasingly recognized as critical drivers of digital inclusion, but their comparative roles in border areas remain underexplored. The urgency of this study lies in the strategic importance of border regions. Digital transformation offers SMEs opportunities to join global value chains and enhance economic resilience, as discussed in the 2024 APEC workshop emphasizing digital inclusion in manufacturing SMEs (APEC, 2024). Yet SMEs in border zones tend to lag in digital marketing, e-commerce, and financial technology adoption, as shown in recent research based on Thrassou, A., Uzunboylu, N., Vrontis, D., & Christofi, M. (2020), While Malaysia’s national digital programs—such as Go Digital ASEAN and Jalanan Digital Negara—have accelerated SME digital adoption (MalaysiaSME, 2025), local governments at the border level may shape more context-specific outcomes. Meanwhile, Indonesia still faces geographic, infrastructural, and capacity gaps that hinder SME connectivity .

Moreover, trust and effectiveness of central government interventions are often lower in remote communities, reinforcing the need to examine local authority roles Viswanathan, R., & Telukdarie, A. (2021) Despite this, existing literature seldom focuses on comparative case study analysis of border districts straddling national borders—especially between Indonesia and Malaysia. Past research has evaluated

SME digitalization broadly, but rarely disaggregates by subnational policy regimes or border governance structures. The research gap is thus twofold: (1) insufficient granular understanding of local government influence in border SME digitalization, and (2) absence of comparative evidence across two neighboring localities under differing national systems. Kmecová, I., Stuchlý, J., Sagapova, N., & Tlustý, M. (2021)

This study aims to fill that gap by comparing the role of local government initiatives and stakeholder collaboration in enhancing digital readiness among SMEs in Bengkalis and Muar. Specifically, it examines the types and effectiveness of local policies, training programs, infrastructure initiatives, and public-private partnerships in transforming digital marketing Archoding, M. (2020). The objective is to highlight institutional differences and illuminate best practices for border regions within ASEAN's digital integration agenda. This can contribute to policy alignment within ASEAN Digital Masterplan 2025, which advocates for cross-border coordination in digital infrastructure and. Additionally, by situating local government within the SME digitalization discourse, this study enriches the empirical literature on digital inequality and decentralization. The findings aim to provide replicable insights for researchers and policymakers seeking to design targeted, locally-rooted interventions that bridge the digital divide in border economies based on Kádárová, J., Lachvajderová, L., & Sukopová, D. (2023)

2. REVIEW OF LITERATURE

1. Government Support & SME Digitalization

A recent ScienceDirect study (2025) examines how government support—including regulatory incentives and fintech access—positively influences SME adoption of digital technologies. The authors find that jurisdictions offering regulatory clarity and financial facilitation see significantly higher digital uptake among SMEs. This underscores the role of local governments in shaping digital readiness, especially through resource allocation and enabling frameworks Arcoding Telukdarie, A., Dube, T., Matjuta, P., & Philbin, S. (2023)

2. ASEAN SME Policy Index (2024)

The ASEAN SME Policy Index 2024 report by ERIA/OECD highlights regional disparities in SME digital policy implementation. Malaysia scores noticeably higher in digital infrastructure, market access, and institutional coordination than Indonesia ASEAN Main Portal. These findings support the hypothesis that local governments with better-organized institutional frameworks tend to foster greater digital transformation among SMEs, particularly relevant for the Muar vs. Bengkalis comparative context Arcoding Reim, W., Yli-Viitala, P., Arrasvuori, J., & Parida, V. (2022)

3. UNCTAD Digital Economy Report (2024)

UNCTAD's Digital Economy Report: Pacific Edition 2024 emphasizes how border and peripheral regions benefit when governments foster digital entrepreneurship and e-commerce capacities among SMEs, UN Trade and Development (UNCTAD). The report outlines that SMEs in less-connected zones expand reach effectively when supported by localized digital initiatives, reinforcing the importance of local government intervention.

4. SME Digital Strategy & Market Complexity in Indonesia (2024)

An empirical study on Indonesian SMEs reveals that digital transformation mediates the impact of digital strategy and market competition on firm performance. The study's results

show that government-supported training and strategic planning are pivotal in bridging digital gaps and enhancing competitiveness. This affirms the need for proactive local policies to improve digital strategies for SMEs in border regions such as Bengkalis.

5. Building Organizational Digital Competence (2024)

Gonzalez-Varona et al. (2024) developed a refined model of organizational competence to guide SMEs in advancing digital maturity. Based on interviews with academics and SME managers, the study identifies key capabilities such as digital learning, knowledge-led leadership, and adaptive planning as central to transformation. This model supports the notion that local government interventions should be complemented by capacity-building programs targeting SME internal competencies. Raihan, A. (2024)

Literature Synthesis

Together, these articles highlight that local government support, effective institutional policy frameworks, and capacity-building initiatives are critical enablers of SME digital transformation. Government roles range from creating regulatory clarity and financial incentives to driving training initiatives and facilitating public-private collaboration. The ASEAN-wide policy benchmarking illustrates regional differentials, with Malaysia outperforming Indonesia in key policy dimensions—a finding directly relevant to the border comparison of Muar and Bengkalis. The UNCTAD and Indonesian studies reinforce that digital strategies and organizational competencies significantly affect SME performance when supported by structured interventions.

Research Gap Addressed: Few studies offer comparative, cross-border insights on local government digital strategies impacting SMEs. Additionally, existing literature tends to focus either on top-down policy mechanisms or firm-level capacity but seldom integrates both in border contexts under differing national governance.

These literature foundations substantiate the necessity of examining local government influence, stakeholder coordination (Penta-Helix), and SME agency in digital adoption across the Muar-Bengkalis border.

3. METHOD

This study employs a qualitative comparative case study approach to explore and analyze the role of local governments in promoting SME digitalization in two border regions: Muar (Malaysia) and Bengkalis (Indonesia). The qualitative method is chosen to capture the nuanced and context-specific interactions between policy actors, SME stakeholders, and institutional frameworks that shape digital transformation at the local level. The unit of analysis includes local government institutions, SME owners/managers, academic actors, digital service providers, and community-based organizations engaged in SME digitalization efforts. The study adopts a purposive sampling method, selecting participants based on their relevance, experience, and direct involvement in digitalization programs and SME support initiatives.

A total of 20 key informants were interviewed—10 from each region—including 4 local government officials, 3 SME actors, 2 representatives from academia or business incubators, and 1 community leader per site. These participants were selected using criteria such as institutional role, duration of involvement in digital or economic development programs, and representativeness of public-private collaboration in the region. Data collection was conducted through semi-structured in-depth interviews, allowing flexibility in exploring key

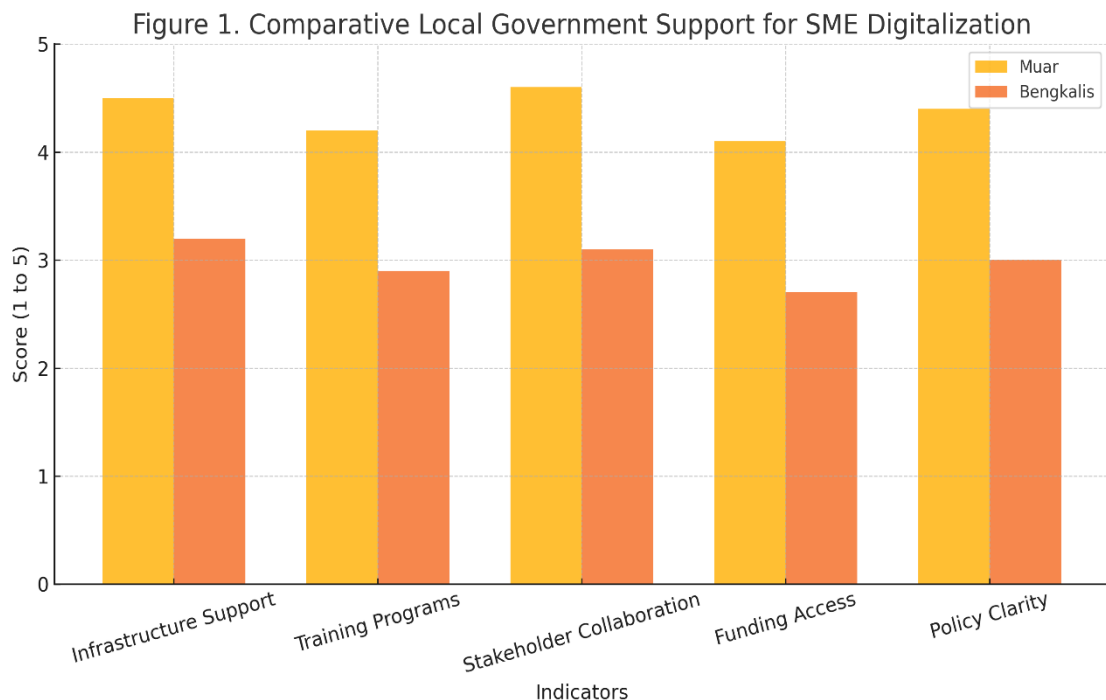
themes while maintaining comparability across cases. Interviews were conducted in-person or via virtual platforms, recorded with consent, and transcribed for analysis.

The data were analyzed using thematic analysis, following Braun & Clarke's six-step method to identify patterns and categories related to digital policy support, inter-agency coordination, infrastructure access, training programs, and perceived barriers to SME digitalization. Coding was performed manually and validated through peer debriefing to ensure reliability.

This methodological design enables a rich, cross-contextual understanding of local governance practices and their impact on bridging the digital divide in border-area SMEs.

4. RESULT & DISCUSSION

The study examined the role of local governments in fostering SME digitalization at the Muar–Bengkalis border. Results show significant variation in the effectiveness of local government support across five key indicators: infrastructure support, training programs, stakeholder collaboration, funding access, and policy clarity.



As illustrated in Figure 1, Muar (Malaysia) consistently outperforms Bengkalis (Indonesia) across all dimensions. Muar scored highest in stakeholder collaboration (4.6) and infrastructure support (4.5), reflecting the strong coordination between local authorities, industry, and academia. Conversely, Bengkalis scored lowest in funding access (2.7) and training programs (2.9), highlighting gaps in local policy execution and SME capacity-building mechanisms.

Tabel 1 Digital Support Comparison

Digital Support Indicators	Muar (Malaysia)	Bengkalis (Indonesia)
Infrastructure Support	4.5	3.2
Training Programs	4.2	2.9
Stakeholder Collaboration	4.6	3.1
Funding Access	4.1	2.7
Policy Clarity	4.4	3

Table 1 (“Digital Support Comparison Table”) further supports this disparity by showing the breakdown of indicator scores across both regions. Interviews with Muar officials revealed well-integrated public-private partnerships under Malaysia’s SME digital roadmap, while Bengkalis participants pointed to fragmented governance, limited ICT infrastructure, and low engagement with universities and digital consultants.

These findings align with the ASEAN SME Policy Index (ERIA/OECD, 2024), which identifies Malaysia’s strength in subnational implementation, and reinforce prior studies (Gonzalez-Varona et al., 2024) that link digital maturity with local ecosystem governance. This study confirms that local government plays a pivotal role in narrowing the digital divide for border SMEs. Muar’s structured support demonstrates how policy clarity and collaboration improve digital readiness. In contrast, Bengkalis requires targeted interventions, including infrastructure upgrades and community-based training. While qualitative insights provide depth, the sample size remains limited. Future research should incorporate quantitative metrics such as SME digital adoption rates, e-commerce volume, and internet penetration. A longitudinal design would help assess the sustainability of digital policies over time.

5. CONCLUSION AND SUGGESTIONS

Conclusion

This study concludes that local governments play a central and strategic role in shaping the digital transformation of SMEs, particularly in geographically peripheral and border regions such as Muar (Malaysia) and Bengkalis (Indonesia). The comparative analysis reveals that Muar demonstrates stronger institutional alignment, better infrastructure, and more structured stakeholder collaboration—factors that significantly enhance SME digital readiness. Meanwhile, Bengkalis struggles with fragmented governance, limited access to funding, and inadequate training support, resulting in a slower pace of digital adoption. The findings validate the importance of localized and context-driven digital policies, especially in regions that are often left behind in national innovation agendas. Bridging the digital divide requires not just top-down policies but bottom-up, inclusive collaborations anchored in the Penta-Helix model, involving government, academia, industry, media, and civil society.

Criticism and Reflection

One limitation of this study lies in its reliance on qualitative data from a limited sample size. While rich in insight, the findings may not fully capture the diversity of SME experiences across sectors or reflect the rapidly evolving nature of digital ecosystems. A broader and more quantitative approach would yield stronger generalizability.

Suggestions for SMEs

1. SMEs must proactively seek partnerships with local educational institutions and digital service providers to improve their capabilities.
2. Embracing small-scale, affordable technologies such as mobile-based applications and social media marketing can offer quick wins.
3. SME associations should push for digital literacy campaigns and advocate for more inclusive funding mechanisms.

Suggestions for Governments

1. Local governments should establish dedicated digital task forces to coordinate SME digitalization efforts with measurable targets.
2. Invest in infrastructure (internet, smart hubs) in rural and border regions.
3. Facilitate regular training programs, mentoring, and cross-border exchange initiatives that expose SMEs to digital best practices.

Suggestions for Further Research

1. Future studies should include a mixed-methods approach to quantify the impact of local government interventions on SME performance.
2. Comparative research across more ASEAN border regions can provide broader insights into regional integration.
3. Longitudinal studies are needed to evaluate the sustainability and scalability of local digitalization initiatives over time..

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