

## Digitalization Development Strategy in Remote Areas: A Case Study in Puloe Breuh, Aceh Besar

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**Abstract:** *This study examines digitalization development strategies in remote areas, using the case study of Puloe Breuh, Aceh Besar Regency. Digitalization is an urgent need to drive social, economic, educational, and public service development, but its implementation in an island region faces various challenges. This study used qualitative descriptive methods through field observations, interviews with the community and village officials, and analysis of relevant documents. The results indicate that the main obstacles to digitalization development in Puloe Breuh are limited internet network infrastructure, unstable electricity distribution, and low digital literacy among the community. On the other hand, there is significant potential in the form of support from the younger generation, opportunities to utilize technology for marketing seafood and marine tourism, and the local government's commitment to expanding access to information technology. The proposed strategy includes the development of telecommunications infrastructure based on public-private partnerships, human resource capacity building through digital literacy training, and the use of technology for local economic development. This study concludes that successful digitalization in Puloe Breuh requires an integrated approach involving all stakeholders to create independence and community well-being in remote areas.*

**Keywords:** Digitalization Strategy; Remote Areas; Puloe Breuh; Telecommunications Infrastructure; Digital Literacy

### 1. Introduction

Digitalization plays a crucial role in accelerating development across various sectors, particularly in areas with limited access and services. In island regions, the application of digital technology can strengthen access to education, public services, and economic activities. Puloe Breuh, an island in Aceh Besar, is an example of a remote island region where technology adoption rates have not been comparable to those of mainland regions. Geographical isolation, limited transportation access, and weak infrastructure are key obstacles to effective digital transformation.

The urgency of digital development in remote areas is based on the importance of equal access to information and technology for all communities. Digital technology can reduce regional disparities, improve the efficiency of public services, and increase local economic opportunities. For islands whose economies depend on the maritime sector and tourism, digitalization serves as a promotional tool, strengthens communication, and

encourages innovation in technology-based services.

This research aims to formulate a digitalization development strategy in remote island regions through a case study of Puloe Breuh. The research focuses on identifying barriers, analyzing local potential, and formulating strategic recommendations to support sustainable digital transformation. Furthermore, this research supports the government's efforts to achieve equitable and inclusive technological development. Overall, this study contributes to deepening the understanding of the factors influencing the digitalization process in isolated areas and provides strategic guidance for policymakers, community leaders, and private sector actors involved in digital infrastructure development in remote areas.

### **Literature Review**

Digitalization is understood as the application of digital technology to improve organizational performance, public services, and community productivity. Various studies have demonstrated that digital transformation has a significant impact on increasing information access, service efficiency, and economic growth (Davis, 1989; Turban et al., 2005). However, the success of digitalization is largely determined by adequate infrastructure and human resource readiness. Remote areas face challenges such as weak internet connections, unstable electricity, and low digital literacy. In island regions, these challenges are exacerbated by high costs and limited access to maritime transportation. Yudha et al. (2022) emphasize that digitalization strategies in such areas must be tailored to local capacity and government support.

Several studies also highlight the importance of cross-sector collaboration to accelerate the digitalization process. Leedy and Ormrod (2005) emphasized that a good literature review should highlight the shortcomings of previous research and identify opportunities for new theoretical development. In the context of island regions, a research gap still exists in the lack of practical models for digital development that are appropriate to the socio-economic characteristics of island communities. This study aims to address gaps regarding tailored strategies for island regions such as Puloe Breuh, which possess unique characteristics compared to remote mainland areas.

## **2. Methods**

This research uses a descriptive qualitative approach aimed at understanding social phenomena in depth, particularly regarding digitalization development strategies in remote island areas. This approach was chosen because it can depict real-world conditions from the perspectives of the community and stakeholders directly involved in the digitalization process. Qualitative research allows researchers to explore the experiences, views, and perceptions of the Puloe Breuh community regarding digitalization efforts, so that the results can provide a comprehensive picture of the challenges and opportunities that exist.

### **Sampling**

This research was conducted in Puloe Breuh, Aceh Besar, an island region with limited infrastructure. The research informants included:

- a. Village government officials, who understand local policies and infrastructure;
- b. The general public, who actively use digital technology in their daily lives;
- c. Local business actors, such as those in the fisheries and tourism sectors, to assess the potential of a digital-based economy;

- d. Representatives of educational institutions and youth representatives, as the groups most responsive to technological innovation.

Sampling was carried out intentionally to select informants who have relevant knowledge and experience related to technology implementation in the region.

#### **Data Collection**

Data collection was conducted through:

- a. Field observations to assess the condition of digital infrastructure, internet connectivity, and understand the current state of technology utilization;
- b. Interviews with residents and village government officials to explore community perceptions and experiences in exploring the challenges and potential of digitalization.
- c. Documentation, as supplementary material, in the form of archives, reports, and photographs of digitalization activities in Puloe Breuh.

#### **Measures**

The research instruments consist of interview guidelines and observation sheets used to assess:

- a. Digital infrastructure conditions
- b. Community digital literacy levels
- c. Economic and social readiness
- d. Government and stakeholder support

These methods provide a comprehensive understanding of the digitalization context in the island area.

### **3. Result and Discussion**

#### **Result**

Based on the results of observations and interviews conducted in Puloe Breuh, three main obstacles were identified in the digitalization process in the region, namely limited internet infrastructure, unstable electricity supply, and low digital literacy among the community.

- a. Limited Internet Infrastructure

Internet access in Puloe Breuh remains very limited. Most areas only receive a weak signal, and some villages lack a stable network at all. This situation makes it difficult for people to access online services such as digital education, technology-based public administration, and digital economic activities like online marketing.

- b. Instability of Electricity Supply

Electricity distribution in Puloe Breuh is inconsistent. Blackouts frequently occur, especially at night, disrupting activities that rely on electronic devices. This limitation slows technology adoption and reduces the effectiveness of digital devices.

- c. Low Public Digital Literacy

Most people, especially the elderly, are not yet accustomed to using digital technology. They have difficulty operating devices such as smartphones and computers, resulting in low internet usage for productive activities.

However, the research also found several supporting factors that provide potential for digitalization development, namely:

- a. However, the research also found several supporting factors that provide potential for digitalization development, namely:
- b. Youth Enthusiasm for Technology. Young people demonstrate a high level of interest in technology and actively use social media and digital platforms.
- c. Local Economic Potential. The fisheries and tourism sectors offer significant opportunities for development through digital media.
- d. Local Government Support. Local governments demonstrate a commitment to strengthening digital infrastructure and improving community skills through training programs.

## Discussion

The research results show that the main barriers to digitalization in Puloe Breuh are closely related to infrastructure and human resources. This finding aligns with the findings of Turban et al. (2005) and Yudha et al. (2022), who emphasize that digital transformation depends not only on the availability of technology but also on the community's readiness to use it. Strengthening community capacity through digital literacy training programs, community participation is essential to ensure the sustainability of digitalization initiatives. Unstable electricity supplies hinder the optimal use of digital devices. This has implications for low public motivation to adapt to new technologies. Furthermore, low digital literacy limits people's ability to utilize the internet for productive economic activities, such as marketing seafood and promoting tourism.

To address these obstacles, this study proposes three main strategies:

- a. Developing Telecommunications Infrastructure Through Public-Private Collaboration. Strategic collaboration is needed to expand internet networks in island regions. The government can provide incentives for telecommunications service providers to encourage investment in remote areas.
- b. Improving Digital Literacy Through Community Programs. Community-based training, especially for youth and productive groups, can improve their ability to access digital information and run technology-based businesses.
- c. Utilizing Technology for Local Economic Development. The implementation of digital platforms such as e-commerce, online tourism promotion, and digital marketing can help improve the welfare of the Puloe Breuh community.

A collaborative, locally-based approach is believed to be able to create a sustainable digital ecosystem and reduce the digital divide between urban and island areas.

## 4. Conclusion

This research shows that the success of digitalization in Puloe Breuh is heavily influenced by three main factors: internet infrastructure, stable electricity supply, and the community's digital literacy level. These three factors are interrelated and determine the extent to which the community is able to utilize technology effectively. Network limitations and unstable electricity are major obstacles to implementing digital transformation in this archipelago. In addition to these obstacles, the research also identified important potential that can form the basis for developing sustainable digitalization: the enthusiasm of the younger generation for technology, digital-based economic opportunities, and the local government's commitment to strengthening

technological infrastructure. By leveraging this potential, digitalization can be an instrument for improving community welfare and narrowing the gap between mainland and island regions. Overall, the results of this research confirm that digitalization in remote areas requires an integrated approach that encompasses technical, social, and economic aspects to be effective.

## 5. References

- Aceh Besar Government Commitment to Internet Connectivity. (2025, January 12).
- Arifin, Z. (2025). Digital Governance: Studi Kasus Digitalisasi Pelayanan Publik. *SosTech Journal*, 12(1), 45-62.
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319-340.
- Leedy, P. D., & Ormrod, J. E. (2005). *Practical Research: Planning and Design* (8th ed.).
- Peran Teknologi Informasi dalam Meningkatkan Pelayanan Publik di Daerah Terpencil. (2025, October 25).
- Sikumbang, F. S. (2025). BAB I. Regional Development and Digital Services in Indonesia.
- Turban, E., et al. (2005). *Information Technology for Management: Transforming Organizations in the Digital Economy*. Wiley.
- Wahyudi, Y., & Nugroho, H. (2022). Strategi Digitalisasi Daerah Terpencil dengan Pendekatan Kapasitas Lokal. *Jurnal Teknologi dan Inovasi*, 8(2), 134-150.