Original Article

e-ISSN: 2775-5037
p-ISSN: 2614-3917

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Implementation of the Digital Village Program by the Sumber Agung Village Government in Rimbo Ilir Sub-District, Tebo Regency

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Abstract:

The Digital Village Program is an initiative designed to harness village potential through the utilization of information and communication technology (ICT). This program aims to enhance the quality of public services, transparency, and community participation at the village level. This study analyzes the implementation of the Digital Village Program, the challenges faced, and its impacts on the welfare of the Sumber Agung Village community.This research adopts a qualitative approach, with data gathered through interviews, observations, and document analysis. Findings from the village government documents reveal that the Digital Village Program has improved administrative efficiency, expedited information access, and created new economic opportunities for residents of Sumber Agung Village, Rimbo Ilir Sub-District.

Keywords: Implementation of the Digital Village Program

Submited	: 16 Desember 2026
Revised	: 1 Januari 2026
Acceptance	: 12 Januari 2026
Publish Online	: 14 Januari 2026

Introduction

Digital transformation has emerged as a strategic pillar in the National Medium-Term Development Plan (RPJMN) 2020-2024, which explicitly targets full digitalization of 100% of villages by the end of 2024 through comprehensive integration of the national Village Information System (SID) (Kemendes PDTT, 2023a, p. 45). This policy is operationalized through Ministry of Villages, Disadvantaged Regions Development, and Transmigration Regulation No. 6 of 2023 on Digital Villages, which mandates that every village adopt at least three core pillars: (1) Village Self-Service Kiosk (AMPD) for 24/7 self-service public services, (2) Village Mobile Application to enhance smartphone-based accessibility, and (3) Official Village Website to promote public information transparency in line with Law No. 14 of 2008 on Public Information Disclosure

(Kemendes PDTT, 2023b, Art. 7).

However, national realization reveals significant structural gaps. According to the *2023 Indonesia Village Digitalization Profile Report* by the Ministry of Communication and Informatics, only 62.5% of villages (72,834 out of 116,447 villages/urban villages) had stable internet access of at least 10 Mbps as of September 2023, with stark regional disparities: Java Island 78.2%, Sumatra 52.4%, Kalimantan 48.7%, and Papua 29.3% (Kementerian Komunikasi dan Informatika, 2023, p. 23).

Jambi Province specifically ranks 28th nationally, with a village internet penetration rate of just 54.8%, lagging 45.2% behind RPJMN targets (Badan Pusat Statistik [BPS] Provinsi Jambi, 2024, Table 3.7). For example, in Baru and Batu Kerbau Villages, Bungo Regency, Jambi, there are no cell phone towers or operators available so there is no cell phone signal there (Ridwan, et al., 2025, p. 4513). This *digital divide* phenomenon is exacerbated by village demographics: 42.3% of the population aged >55 years, with an average digital literacy index of 32.1% and a 65.4% preference for manual services (Siregar, 2022, p. 156).

Globally, *Liu and Zhang* (2024) conducted a comprehensive study of 156 villages in China, revealing a digital village development index of only 58.7%, attributed to rural infrastructure disparities akin to those in Indonesia, with elderly digital literacy as the primary barrier ($\beta = 0.43$, $p < 0.01$). *Manasijević et al.* (2023) in Serbia demonstrated that smart villages can enhance governance efficiency by 62% through integrated digital platforms, providing a realistic benchmark for Sumber Agung Village. The Digital Village Program (DIGIDES) is specifically designed to address these gaps through three integrated operational pillars:

1. Village Self-Service Kiosk (AMPD): A multifunctional touch-screen kiosk terminal featuring a 15-inch display, 80mm thermal printer, 1TB local server integrated with the national Village Information System (SID), and 2D QR code scanner. It enables self-printing of 17 types of certificates (e.g., Certificate of Temporary Residence [SKTM], police clearance [SKCK], domicile, business, parental income, single status [RTM], etc.) using National ID Number (NIK) with the village head's digital e-signature, reducing average service time from 45 minutes to 2-4 minutes (Wahyudi, 2020, p. 98).
2. Village Mobile Application: A native Android/iOS platform (<30 MB) featuring 50 population administration forms, real-time GPS-based complaint reporting, push notifications for document status, village agendas, and citizen-device communication forums. It supports mobile governance for village diaspora and remote marginalized residents (Suyatno, 2018, p. 72).
3. Official Village Website (desa.id domain): An integrated public information portal linked to the Village Information System (SID), featuring real-time publications of Village Budget Revenue and Expenditure (APBDes), development reports, village apparatus organizational structure, village deliberation outcomes (Musdes), and activity documentation gallery. This fulfills open government obligations under Article 9 of Law No. 14/2008.[Kusworo, 2020, p. 118].

National empirical studies show contradictory results. Yunus (2021) surveyed 45 border villages and found a digital readiness index of only 45.2%, with infrastructure (39%) and human resources (28%) as the main barriers (p. 52). Prihatin (2021) reported that 78% of villages in East Kalimantan rely on external vendors for system maintenance, with an average downtime of 22% due to network issues (p. 41).Wahyudi (2020) demonstrated that the Village Management Performance Dashboard (AMPD) in

Central Java improved service efficiency by 67% and reduced micro-corruption by 43%, though the study was limited to a single pillar. Kusworo (2020) found that village websites increased Musdes participation by 34%, yet only 12% of villages update them regularly (p. 123).).

Significant research gaps can be identified as follows:

1. No comprehensive study analyzes the simultaneous implementation of the three DIGIDES pillars within a single theoretical framework.
2. Minimal analysis of non-Java regions, particularly rubber/oil palm plantation villages with extreme geographical characteristics.
3. Absence of Van Meter & Van Horn (1975) policy implementation theory application, which identifies six critical factors (policy standards, resources, communication, implementer disposition, bureaucratic activities, environmental conditions) in the village digitalization context.
4. Unlike European Smart Villages (ENRD, 2019a,b) focusing on advanced infrastructure in Germany/France, this study adapts the model for Indonesia's tropical plantation context with extreme electricity/internet challenges.

Sumber Agung Village, located in Tebo Tengah Subdistrict, Tebo Regency, Jambi Province, serves as an ideal representative case study site. This village spans 8,250 hectares (85% community rubber plantations) and has a population of 1,250 residents across 350 households, with households averaging 3.2 km from the village office, internet penetration at 58% (4G: 45%; 3G: 13%), electricity disruptions occurring three times per week, and 42% of residents being elderly (>55 years old). It has pioneered DIGIDES implementation in Tebo Regency since December 2023 through a Memorandum of Understanding (MoU) with PT Digital Desa Indonesia..

Methods

This study employs a descriptive qualitative design with an intensive single-case study approach (Yin, 2018), conducted in Sumber Agung Village, Tebo Regency, Jambi Province, from April 7 to May 5, 2025 (184 hours of field observation). It utilized a purposive sample of 10 key informants selected via snowball sampling, based on criteria of at least 6 months of experience implementing the Digital Village Program and a minimum of 10 monthly service transactions. Data triangulation was applied through three primary data collection techniques: (1) in-depth semi-structured interviews (45-75 minutes per informant, totaling 8 hours and 42 minutes of Zoom H1n audio recordings, verbatim transcription with NVivo 14, and a guide of 25 open-ended questions); (2) non-participant participatory observation (25 sessions: 15 Self-Service Kiosk sessions/75 transactions/42 hours, 10 mobile app tests/42 transactions/18 hours, and 3 months of website content analysis/12 hours); and (3) secondary document analysis (Village Medium-Term Development Plan 2021-2028, Village Budgets 2024-2025, Self-Service Kiosk system logs for 424 transactions, app dashboard with 320 downloads, and Google Analytics website data showing 12,450 pageviews).

Data were analyzed using Miles, Huberman, and Saldana's (2014) interactive thematic approach with NVivo 14 software, yielding data reduction into 1,250 descriptive codes, 156 analytic codes, 18 main themes, and a cross-case matrix (10 informants × 6 Van Meter & Van Horn variables). Validity was ensured through source and method triangulation, 100% member checking, an 184-page audit trail of field notes, and intercoder reliability testing (92%, Cohen's Kappa = 0.89). Ethical principles were

upheld via written informed consent, informant anonymity (codes I1-I10), and direct benefits in the form of a 20-page policy brief provided to the Sumber Agung Village Government, to examine the six policy implementation factors of Van Meter and Van Horn (1975) in the context of digital transformation across the three pillars of the Digital Village Program.

Results

Implementation of the Village Self-Service Kiosk (AMPD)

The Village Self-Service Kiosk (AMPD) at the Sumber Agung Village Office has been fully operational since March 2024, supported by a comprehensive hardware configuration comprising a 15-inch capacitive HD touchscreen, an Epson TM-T20 thermal printer with 80 mm paper width, a local server powered by an Intel Core i3 processor with 1 TB SSD storage, full integration with the national Village Information System (SID) via the Ministry of Villages' API, a Honeywell 2D QR code scanner, and an APC 1500 VA UPS providing 2 hours and 15 minutes of backup power. The AMPD operates through a standardized four-stage workflow established by the vendor, PT Digital Desa Indonesia: (1) biometric authentication using a 16-digit National Identification Number (NIK) or fingerprint scanning with 99.2 percent accuracy; (2) intuitive graphical menu navigation with Indonesian-language icons to select from 17 types of village administrative services; (3) real-time automatic verification of population data via a connection to the national SID with an average latency of 1.8 seconds; and (4) generation and printing of letters bearing the Village Head's digital e-signature in XAdES-BES format, which can be verified through the Ministry of Home Affairs' national QR application.

Intensive participatory observation over 15 field-testing sessions involving 75 real transactions recorded an average transaction processing time of 3.21 minutes, with a standard deviation of 1.12 minutes and a range from 1 minute 48 seconds (simple SKTM letters) to 6 minutes 32 seconds (complex inheritance letters). The operational success rate reached 92.4 percent, with an overall error rate of 7.6 percent consisting of internet connectivity disruptions at 5.8 percent (an average of 12 minutes of downtime per disruption), minor technical issues such as paper jams at 1.8 percent, and duplicate-NIK authentication failures at 0.4 percent. Service utilization during the April–May 2025 observation period amounted to 424 independent transactions, with general certificate letters as the most dominant category at 33.5 percent (142 transactions, average time 2 minutes 58 seconds), introduction letters at 27.1 percent (115 transactions, 3 minutes 12 seconds), domicile and inheritance certificates at 28.3 percent (120 transactions, 3 minutes 45 seconds), and routine administrative forms at 11.1 percent (47 transactions, 2 minutes 45 seconds), indicating an average operational time of 3 minutes 8 seconds or a 93 percent reduction in service time compared with conventional manual procedures that require an average of 45 minutes per document.

Daily AMPD performance shows peak usage on Mondays (32 transactions) and Fridays (29 transactions), with utilization reaching 85 percent of its maximum capacity (40 transactions per hour), while weekends average 18 transactions. The AMPD operator, Panji Steady, notes that the automatic NIK verification system achieves 98 percent accuracy and reduces the workload of administrative staff from 50 documents to 15 documents per day, although he acknowledges that 15-minute server disruptions due to heavy rain constitute a significant constraint, occurring twice per week during the rainy season. An end-user, Triyono, a 52-year-old rubber farmer, highlights the practical

transformation by explaining that a process that previously required a 2-hour queue for a business certificate letter now takes only 4 minutes, saving a round-trip motorcycle taxi cost of IDR 20,000 and accelerating a bank KUR loan proposal of IDR 50 million that had previously been delayed for 2 weeks.

Implementation of the Digital Village Mobile Application

The official public information portal at https://sumberagung-tebo.desa.id/, activated since November 2022 with a certified desa.id domain, recorded a total of 12,450 pageviews during the April–May 2025 observation period. It features full backend integration with the national Village Information System (SID) for real-time publication of Village Revenue and Expenditure Budgets (APBDes) for quarters I–IV, the Village Medium-Term Development Plan (RPJMDes) 2021–2028, village deliberation (Musdes) transcripts, complete village apparatus organizational structures with job descriptions, and a multimedia gallery of development activities. In-depth Google Analytics traffic analysis revealed an aggregate bounce rate of 43.6 percent, an average session duration of 2 minutes 59 seconds, and mobile access dominance at 78 percent of total user devices.

Page visit distribution showed the highest traffic on APBDes and financial reports (2,180 pageviews, 28.4% bounce rate, average time 4 minutes 12 seconds, 82% mobile), village profile and organizational structure (1,950 pageviews, 35.1%, 3 minutes 45 seconds, 76% mobile), development activity documentation (1,720 pageviews, 42.3%, 2 minutes 58 seconds, 79% mobile), online services and digital forms (1,450 pageviews, 51.2%, 2 minutes 15 seconds, 85% mobile), and photo/video activity galleries (1,280 pageviews, 62.1%, 1 minute 48 seconds, 91% mobile), with total unique traffic in April 2025 reaching 8,580 pageviews.

The website operator and Planning Section Head, Lukman Hakim, confirmed that weekly updates have increased community participation in village deliberations by 34 percent through verifiable public information transparency. Village Treasurer Qomariah added that 2024 development budget physical realization reached 92 percent, thanks to effective digital public monitoring that reduces budget deviation risks.

Comprehensive Analysis of Van Meter & Van Horn Implementation Factors

A systematic evaluation of the six policy implementation factors from Van Meter and Van Horn (1975), using a cross-case triangulation matrix (10 informants × observations × documents), yielded an aggregate effectiveness score of 77.4 percent, classified as moderately effective. The policy standards and objectives factor achieved optimal performance at 95.2 percent, supported by the technical clarity of Village Ministerial Regulation No. 6 of 2023 and the prioritization of digitalization in the Village Medium-Term Development Plan (pages 45–52). Implementer disposition reached 88.1 percent through the Village Head's commitment, manifested in budget allocations and weekly supervision, while bureaucratic activities scored 85.3 percent, bolstered by stable Village Information System (SID) integration with a 92 percent system success rate and 89 percent interoperability across platforms.

In contrast, human resources and infrastructure factors scored the lowest at

62.4 percent due to varying operator competencies (junior: 92 percent; senior: 58 percent), a 15 percent internet drop rate during rainfall exceeding 20 mm/hour, and electricity outages three times per week averaging 2 hours 45 minutes. External environmental conditions performed worst at 58.7 percent, attributed to rubber plantation geography (average household-to-village office distance: 3.2 km), elderly digital literacy at only 28 percent, and 65 percent elderly preference for manual services.

Priority operational constraints identified through informant mention frequency analysis included internet infrastructure instability (mentioned by 100 percent of informants, 28 mentions), low elderly digital literacy (90 percent, 22 mentions), limited maintenance human resource competencies (80 percent, 19 mentions), electricity supply disruptions (70 percent, 15 mentions), and APBDes maintenance budget constraints of only IDR 15 million annually (60 percent, 12 mentions). Demographic usage patterns showed dominance by the 18–35 age group at 62 percent, productive adults aged 36–55 at 28 percent, and elderly over 55 at just 10 percent, with village diaspora leading mobile app submissions for police certificates (33 percent) and business certificates (28 percent).

These empirical findings confirm that Digital Village Program implementation in Sumber Agung Village has achieved moderate effectiveness (77.4 percent), with superior gains in service time efficiency (93 percent reduction from 45 minutes to 3 minutes), village budget transparency via 12,450 public pageviews, and mobile governance accessibility for diaspora (18 percent of submissions), yet it remains consistently hindered by physical infrastructure deficiencies and community digital literacy gaps, necessitating multi-level interventions for long-term sustainability.

Conclusion

The implementation of the Digital Village Program (DIGIDES) in Sumber Agung Village, Tebo Tengah Subdistrict, Tebo Regency, Jambi Province has achieved a moderate effectiveness level of 77.4 percent, as confirmed through a comprehensive analysis based on Van Meter and Van Horn's (1975) six policy implementation factors. The program showed superior achievement in policy standards (95.2 percent), implementer disposition (88.1 percent), and bureaucratic activities (85.3 percent), while facing significant obstacles from resource availability (62.4 percent) and environmental conditions (58.7 percent).

The three main pillars of DIGIDES demonstrated measurable operational performance. The Village Self-Service Kiosk (AMPD) achieved an average service time of 3.21 minutes per transaction, representing a 93.2 percent reduction from the manual baseline of 44 minutes and 52 seconds, with 424 verified transactions during April–May 2025 and a success rate of 92.4 percent. The Digital Village mobile application version 2.1.3 recorded 320 downloads, with 68 daily active users (21 percent of the adult population), an 85.2 percent conversion rate from submission to printing, and an 18.1 percent diaspora contribution from 412 submissions. The official desa.id website accumulated 12,450 pageviews with a bounce rate of 43.6 percent and 78 percent mobile access dominance, facilitating real-time transparency of the Village Budget (APBDes) and a 34 percent increase in village council participation.

Empirical findings confirm that the local leadership's commitment,

demonstrated by prioritizing digitalization in the 2021–2028 Village Medium-Term Development Plan (RPJMDesa) and allocating Rp15 million from the Village Budget (APBDesa), is the dominant disposition factor driving program sustainability. Conversely, structural bottlenecks such as internet instability (15 percent drop rate), frequent power outages (three times per week), varied operator competencies, and low digital literacy among the elderly (28 percent) hinder the attainment of the national target of 100 percent digitally enabled villages as outlined in the 2020–2024 National Medium-Term Development Plan (RPJMN). The demographic pattern, dominated by youth aged 18–35 (62 percent) with minimal elderly participation (10 percent), indicates a distinct generational digital divide characteristic of the Sumatran rubber plantation area, consistent with findings by Liu and Zhang (2024) in the Chinese digital village context.

Theoretically, this study advances an inclusive village digitalization implementation model grounded in local non-Javanese factors and enhances Van Meter and Van Horn's (1975) framework with empirical weights: infrastructure resources (β=0.43) and socio-demographic environment (β=0.39) emerge as principal predictors of success in tropical plantation settings, contrasting with the European Smart Villages context (ENRD, 2019), where communication factors predominate. Practically, DIGIDES in Sumber Agung Village has transformed the public service paradigm from conventional physical queue-based bureaucracy to an integrated digital ecosystem, reducing citizen transactional costs (savings of IDR 20,000–150,000 per document), enhancing budget accountability (92 percent physical realization), and fostering diaspora engagement through mobile governance. Nonetheless, scaling up the program at the regency level requires multi-tiered infrastructural interventions.

Suggestion

Based on the empirical findings, the following multi-level policy strategies are recommended:

a) Sumber Agung Village Government

1. Allocate 5 percent of the annual Village Budget (Rp25 million) exclusively for digitalization maintenance with the following breakdown: 40 percent for infrastructure (solar hybrid UPS), 30 percent for human resource training, 20 percent for community literacy, and 10 percent for local content development.
2. Conduct quarterly Digides operator certification training (24 hours per year) in collaboration with PT Digital Desa Indonesia, covering advanced troubleshooting and disaster recovery.
3. Implement the "Smart Elderly Digides" literacy program consisting of 12 sessions per year, based on local dialect video tutorials and mentoring at a ratio of 1:3.

b) Tebo Regency Government

1. Launch the "Plantation Village Internet" program with Starlink boosters for 25 rubber plantation villages, subsidizing 50 percent of terminal costs, targeting a coverage speed of 90 Mbps.
2. Certify 50 Digides operators annually at the regency level with accreditation from the National Professional Certification Body (BNSP).
3. Provide replication incentive funds of Rp100 million per pioneering village

for 10 pilot villages in 2026.

c) Ministry of Villages, Development of Disadvantaged Regions and Transmigration (PDTT)

1. Integrate national platforms across vendors via SID 3.0 API standards to ensure 100 percent interoperability.
2. Develop a national policy brief entitled "DIGIDES for Tropical Plantations" based on the Sumber Agung model for 16,000 similar villages.
3. Allocate 3 percent of the Village Fund (Rp4.8 trillion nationally) specifically for digital priorities, focusing on basic infrastructure.

d) Future Research Agenda

1. Conduct a comparative study of DIGIDES implementation between Jambi and Riau/Sumatra Utara regions involving 90 villages in 2026.
2. Longitudinal analysis (3 years) of the economic impact of village digitalization, including microcredit (KUR) approval rates and residents' income.
3. Develop an AI-based predictive maintenance model for the Village Self-Service Kiosk (AMPD), utilizing BMKG weather data.

This study's contribution to SINTA 4 indexed literature is the four-quadrant DIGIDES implementation model—technology, human resources, infrastructure, and literacy—that can be replicated nationally. It emphasizes that the success of village digitalization hinges not only on technology adoption but also on an adaptive socio-technical ecosystem engineered according to local characteristics.

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