



Implementation of E-PACE Mobile in Improving the Quality of Non-Business Licensing Services in West Papua Province

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Abstract

Digital transformation has become central to improving public service quality, yet evidence on how mobile government applications perform in remote and infrastructure-constrained regions remains limited. This study evaluates the implementation of E-PACE Mobile, a front-end application integrated with the SiCANTIK Cloud ecosystem, at the West Papua Province Investment and One-Stop Integrated Service Agency (DPMPTSP), and assesses its contribution to improving the quality of non-business licensing services in line with SDG 16. A single embedded qualitative case study design was employed, with four sub-units of analysis (application features, institutional framework, infrastructure, and users), supported by document analysis as the primary data collection technique. Primary textual data were obtained from institutional documents of the DPMPTSP, evaluation reports of the Indonesian Ombudsman (2022–2025), documentation of the E-PACE Mobile system, and official statistical data of the BPS, and analyzed using a hybrid deductive–inductive thematic approach framed by the E-GovQual dimensions and the Technology–Organisation–Environment (TOE) framework. The findings indicate that E-PACE Mobile enhances service efficiency through its Digital Approval feature and strengthens transparency via cryptography-based QR code permit verification. However, service reliability is constrained by rural internet access, which stands at only 55.75%. Citizen support remains the weakest dimension due to the absence of an integrated helpdesk, and the organisational capacity paradox (strong political commitment coupled with technical staff limitations) restricts scalability. This study makes three theoretical contributions: (1) the addition of territorial logistical efficiency as a new E-GovQual metric relevant to island and mountainous regions, (2) the proposal of a cultural sub-dimension within the TOE Environment component, and (3) the formalisation of the organisational capacity paradox as a structural pattern of e-government in Indonesia's 3T regions. In practical terms, the expansion of E-PACE Mobile should be approached sequentially, beginning with the reinforcement of 4G telecommunications infrastructure in districts classified as 'red zones', followed by the integration of WhatsApp/SMS-based help desks and community-based digital ambassador programmes. This approach will ensure that the implementation of E-PACE Mobile does not exacerbate existing service inequalities.

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INTRODUCTION

Digital transformation in public services is now a strategic instrument for accelerating the sustainable development and government reform agenda, rather than merely an administrative modernisation project. The 2024 Sustainable Development Goals Report by the UN states that only 17% of SDG targets are on track for achievement, with SDG 16 effective, accountable and inclusive institutions among the least on track (United Nations, 2024a). While global progress on public

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information access has improved 136 countries adopted legal guarantees for access to information in 2022, up from 105 in 2015 weak public trust and institutional inequalities continue to hinder inclusive development (UN DESA, 2024). In Indonesia, the SDG 16 agenda has specific implications for licensing digitalisation: indicator 16.6.2 explicitly measures citizen satisfaction with public services (Fraisl et al., 2025; Pribadi & Kim, 2022). This means that applications such as E-PACE Mobile, which provide real-time application tracking, digital approvals, and QR code-based licence verification, are directly relevant to achieving effectiveness (Target 16.6), responsiveness (Target 16.7), and access to information (Target 16.10). Therefore, examining the quality of digital licensing services in 3T regions is not just a technical matter, but also a practical approach to strengthening fair and reliable public institutions.

In Indonesia, the digital transformation of public services is firmly rooted in a strong normative foundation. Law No. 25 of 2009 on Public Services and Presidential Regulation No. 95 of 2018 on the Electronic-Based Government System (SPBE) direct the integration of digital governance as a means of improving quality, rather than as a replacement for manual processes. Aggregate achievements have indeed improved: Indonesia's E-Government Development Index (EGDI) rose from 77th place in 2022 to 64th place globally in 2024, achieving a score of 0.7991 (United Nations, 2024b). The national SPBE index also exceeded the target set out in the 2020–2024 National Medium-Term Development Plan (RPJMN), reaching 3.12 out of 5 in 2024 compared to the target of 2.60. However, these achievements are not evenly distributed. West Papua Province's SPBE profile stood at just 2.28 in 2023, and the Indonesian Ombudsman awarded it a public service compliance score of 58.12 (33rd out of 34 provinces) in 2024 (Ombudsman Republik Indonesia, 2025, 2026). This score dropped further to 53.40 in the 2025 assessment, published in 2026, with three regencies in the red zone. This confirms that public service issues in West Papua are structural and recurring rather than incidental. Therefore, any digital intervention must be evaluated based not only on its existence, but also on its ability to improve service quality.

The urgency of evaluation is heightened at the regional level due to a combination of geographical challenges and the digital divide. West Papua Province encompasses the tip of the Papua Peninsula and the surrounding islands, meaning that distance, settlement distribution and access to continuous services are all important factors. According to data from the Central Statistics Agency (BPS, 2025), 85.51% of households in West Papua accessed the internet in the last three months of 2024. However, there is a significant disparity between urban (97.26%) and rural (80.47%) areas. At an individual level, only 62.96% of people aged five and over accessed the internet — 79.14% in urban areas versus 55.75% in rural areas. Consequently, every digital intervention faces a paradox: on the one hand, it must streamline administrative procedures, but on the other hand, it risks creating new forms of exclusion for residents of remote areas. Against this backdrop, the West Papua Provincial Investment and Integrated Services Agency launched E-PACE Mobile as the official channel for non-business licensing services, covering permits for educational institutions, operational permits for healthcare facilities, permits to establish places of worship, environmental permits, research permits, and socio-cultural recommendations. The app is designed to enhance efficiency, transparency, and accountability through four core features: real-time application tracking, digital approval, QR code-based permit verification, and the ability to print permit documents at home. The key question is whether this application will actually improve service quality for end users amid institutional capacity constraints and digital access inequalities.

The international literature identifies the quality of government digital services as a key predictor of satisfaction, trust, and sustained usage. Several studies converge in finding that efficiency, reliability, user support, transparency, security, and privacy are the primary determinants of citizen satisfaction and loyalty: Pérez-Morote et al. (2020), Nguyen et al. (2020), Alkraihi and Ameen (2021), Li and Xue (2021), and Kanaan et al. (2023). In terms of metrics, Aljukhadar et al. (2022) developed the EGSQUAL scale, while Mao et al. (2023) and Chan et al. (2025) emphasised the importance of information quality, personalisation, and the public value perspective. In the realm of m-government, Mandari & Koloseni (2022) emphasise the importance of mobility and reach for sustained usage, while Zhang et al. (2023) reveal that adoption is heavily influenced by cultural context and levels of technical development. Cross-national comparative studies by Akpan-Obong et al. (2023), Alsaad et al. (2024), and Olumekor et al. (2024) confirm that digitalisation outcomes depend on governance quality, government effectiveness, and infrastructure readiness. Overall, this

body of research reveals a consistent theme: the quality of digital services is a multifaceted concept inextricably linked to institutional and structural contexts.

In the Indonesian context, studies of public administration consistently emphasise the urgent need for digital reform in public services. [Lumbanraja \(2020\)](#) highlights the importance of institutional integration, [Suhartoyo \(2019\)](#) emphasises the need for PTSPs to be time- and cost-efficient, and [Sabani \(2021\)](#) found that transparency significantly influences the adoption of e-government. However, the national literature predominantly focuses on business licensing based on OSS-RBA ([Duri et al., 2024](#); [Rosidi, 2022](#)), which differs substantially from non-business licensing. Regional studies also remain limited. [Yanti & Handayani \(2022\)](#) found that SiCantik Cloud improved service speed in Banda Aceh, a region with relatively stable infrastructure. [Nafi'ah \(2023\)](#) documented the expansion of mobile government post-pandemic. [Syarifah et al. \(2023\)](#) highlighted that aspects of accessibility, security, and integration remain inadequate in Jayawijaya. [Dimas and Fahlevvi \(2024\)](#) emphasised that digital access and skills gaps in rural areas can hinder the success of e-government. What remains under-discussed is how the quality of digital services is shaped by the simultaneous interplay between application design, organisational capacity, and the structural conditions of 3T regions.

Based on the above synthesis, this research is justified by four critical gaps. Firstly, studies on business licensing (OSS-RBA) or web-based portals dominate the national literature, meaning that mobile app-based non-business licensing services at the provincial level have not yet been examined. Secondly, most studies have been conducted within the context of stable digital infrastructure and have not explained how digital service quality evolves in contexts of limited connectivity and institutional capacity, as in West Papua. Thirdly, research tends to separate service quality from implementation context (organisation, technology, and environment), but in 3T regions, all three factors operate simultaneously. Fourthly, the contribution of licensing applications to the SDG 16 agenda has not yet been formulated in an integrated manner. Building on these gaps, the research's general objective is to analyse how implementing E-PACE Mobile improves the quality of non-business licensing services in West Papua Province, and to demonstrate its relevance to strengthening SDG 16. The research is novel in two ways: (a) shifting the focus from business licensing to non-business licensing, which is directly related to administrative certainty for citizens; and (b) explicitly integrating service quality evaluation and its implementation context within a single analytical framework.

To address these questions, the research draws on two complementary theoretical frameworks. The E-GovQual framework ([Halaris et al., 2007](#); [Papadomichelaki & Mentzas, 2012](#)) was chosen because it offers standardised criteria for efficiency, trust, reliability, and citizen support with which to evaluate the quality of digital service outputs from the perspective of users. The Technology-Organisation-Environment (TOE) framework ([Putri et al., 2025](#)) was chosen as it offers an explanation of the factors that influence adoption, including technological readiness (hardware, networks, and software), organisational capacity (structure, staff competencies, and leadership commitment), and environmental determinants (geography, regulation, culture, and literacy). This combination is necessary because the research question has two parts: first, what is the quality of the E-PACE Mobile service? And second, why is that quality achieved or hindered in the context of West Papua? Thus, both frameworks are initially used as a categorisation tool, remaining open to inductive themes emerging from the data.

METHOD

Research Design

This study employs a single embedded qualitative case study design ([Yin, 2018](#)) and uses document analysis ([Ji, 2024](#); [Morgan, 2022](#)) as its primary data collection technique. The methodological approach is clear: the case study is the primary research strategy, while document analysis is used for data collection and processing. The case study focuses on the implementation of E-PACE Mobile at the DPMPTSP of West Papua Province. Its embedded nature emerges from four sub-units of analysis that were analyzed separately and then synthesised: (1) the application features and architecture sub-unit, (2) the DPMPTSP institutional sub-unit, (3) the digital infrastructure and environment sub-unit, and (4) the service user sub-unit (non-business permit applicants). This

approach was chosen deliberately because E-PACE Mobile cannot be evaluated as a single technological artefact its outcomes depend on the simultaneous interaction between application design, organisational capacity, and regional structural conditions. Epistemologically, the research is grounded in a constructivist paradigm that views digital services as realities shaped by the interaction of policy, organisation, technology, and user context (Villamin et al., 2025; Yamamoto et al., 2024). This paradigm provides an interpretative foundation rather than a detailed description.

Case Location and Context

The West Papua Provincial DPMPTSP was selected based on the following four interconnected considerations: (1) it holds official authority over licensing, including non-business licensing, at provincial level; (2) it is responsible for integrating licensing and investment services; (3) E-PACE Mobile is a relatively new official digital service channel, so limitations in its implementation can still be identified; and (4) this region consistently ranks at the bottom of the national public service quality index, providing a critical context in which to evaluate the role of digital interventions.

Data Sources and Collection

The research data is grouped into four source clusters, all of which are derived from public and official materials. No data involves specific internal requests. The first cluster comprises institutional documents obtained from the official portal of the West Papua DPMPTSP and the publication channels of the Provincial Government (including regulations, SOPs, published internal policies, and service reference documents). The second cluster comprises external evaluation documents downloaded from the official websites of the Indonesian Ombudsman and the Ministry of State Apparatus and Bureaucratic Reform (reports on public service compliance for 2022–2025, as well as SPBE evaluations). The third cluster contains documentation of the E-PACE Mobile system, which was accessed from the developer's (Alfiys Group) website and the West Papua Provincial Government's public channels (feature descriptions, service workflows, and update logs). The fourth cluster comprises secondary supporting data from the Central Statistics Agency, indexed scientific literature, and public releases from relevant agencies (West Papua Provincial BPS for 2024–2025, Garda Papua for 2024, and academic publications for 2019–2025).

Data collection took place in five operational stages, which were carried out between 2024 and 2025. (1) defining the scope of the case, the research focus and the criteria for including or excluding documents; (2) creating an inventory of all potential documents from official channels, external evaluations, official statistics and scientific literature; (3) selecting documents based on Bowen's (2009) four criteria for document quality: authenticity, credibility, representativeness and meaning; (4) thoroughly reading the selected documents and compiling a data extraction matrix containing the identity of the document, its publication context, its main content and its relevance to the research focus; (5) cross-verifying the content of the documents through the triangulation procedure described in the following sub-section.

Validity and Reliability

Four strategies are employed to ensure consistency with standards for document-based qualitative research (Jacobson, 2020; Ninan, 2020; Nowell et al., 2017): (1) Credibility is ensured through source triangulation, whereby each key claim is verified against at least two different types of documents. For example, claims regarding compliance scores are cross-checked between the Ombudsman's report, BPS releases, and provincial government publications. (2) Transferability is supported by a detailed description of the context in West Papua, the organisational profile of the DPMPTSP, and the technical characteristics of E-PACE Mobile. (3) Dependability is maintained through audit trail procedures, whereby all coding decisions, code changes, and grouping logic are recorded in a traceable audit log. (4) Confirmability is maintained through independent review by external peer debriefers of the data extraction matrix and final thematic structure. Furthermore, triangulation procedures are carried out at two levels: Source triangulation: comparing claims across institutional documents, external evaluations, and official statistics. Temporal triangulation: comparing the Ombudsman's multi-year reports from 2022 to 2025 to identify recurring versus incidental patterns.

Research Flowchart

Figure 1 presents a visual summary of the research flow from case definition to interpretation of findings. This diagram serves as an operational roadmap explaining the logical interconnections between stages: from defining the case boundaries, inventorying and selecting documents using Bowen's criteria, data extraction into the structural matrix, hybrid coding, to theme construction and interpretation. This flowchart also serves as an instrument of methodological transparency—every claim in the Results section can be traced back to the corresponding stage of analysis, thereby enabling procedural reconstruction by other researchers.

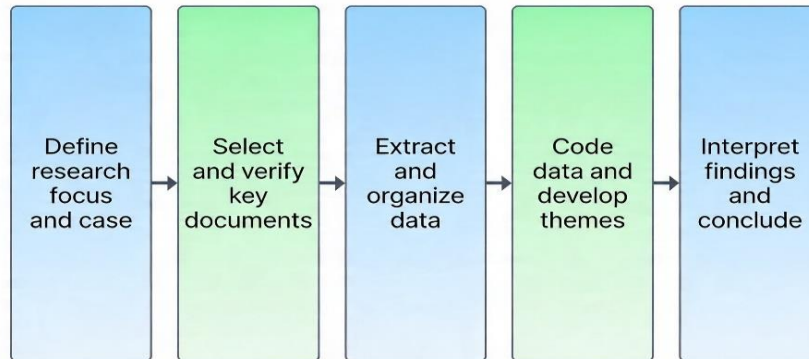


Figure 1. Research Process Flowchart for the E-PACE Mobile Study

RESULTS

Empirical context of licensing services in the province of West Papua Province

Data from the Indonesian Ombudsman's evaluations reveal a recurring pattern: West Papua's public service compliance score was 58.12 (ranked 33rd out of 34) in 2024, falling to 53.40 in the 2025 assessment (Ombudsman Republik Indonesia, 2026). For thematic analysis purposes, the spatial distribution of compliance is important because E-PACE Mobile is designed to address different deficits in each zone. Table 1 summarises this distribution.

Table 1, illustrates the zoning conditions for public service compliance, as outlined in the Ombudsman's 2025 report. This report provides the empirical basis for the urgent implementation of E-PACE Mobile.

Table 1. Mapping of Public Service Opinions in 2025 in West Papua Province

No.	Zoning Category	District/City	Dominant Service Issues
1	Green Zone (High)	Manokwari, Kaimana	Minimum standards met; SPBE innovation hampered by reliance on central server
2	Yellow Zone (Moderate)	Fakfak	Inconsistent counter opening hours; short operating hours
3	Red Zone (Low)	Arfak Mountains, South Manokwari, Wondama Bay, Bintuni Bay.	Service fees are unclear (potential for bribery), processing times are uncertain, no integrated complaints unit

Source: Compiled by Author, 2026

This mapping is instrumental in analysing the dimensions of public support and service reliability in the Discussion section. Red zones indicate structural institutional deficits, such as the absence of complaint units, while green zones indicate limitations in innovation. These are two types of deficits to which E-PACE Mobile should respond differently. In terms of digital access, the BPS (2025) report highlights a significant urban–rural divide: 97.26% of households in urban areas have internet access, compared to 80.47% in rural areas, and 79.14% of individuals in urban areas have access, compared to 55.75% in rural areas. This 23.4 percentage point gap at the individual level poses a significant challenge to the reliability of E-PACE Mobile within the infrastructure sub-unit.

Features and System Architecture of E-PACE Mobile

Developed by the [Alfiys Group \(2025\)](#), E-PACE Mobile is a more responsive, mobile-based front-end interface that supports the non-business licensing system at the DPMPTSP West Papua Province. The application is integrated with the SiCANTIK Cloud ecosystem for back-end administration management. Table 2 summarises the application's main features and how they operate.

Table 2. Key Features of the West Papua Province DPMPTSP E-PACE Mobile

No.	User Module	System Feature	Operational Functions
1	DPMPTSP Executive/Management	Real-Time Monitoring	Visualization of permit application tracking; management can identify bottlenecks at specific verifier desks
2	DPMPTSP Executive/Management	Digital Approval	Instant approval of encrypted documents via authorized officials' mobile devices, including whilst outside the province
3	DPMPTSP Executive/Management	Executive Dashboard	Aggregation of non-business licensing data; supports data-driven policy formulation
4	Public Services Module (Community)	Authenticity Verification (QR Code Scanner)	Asynchronous matching of permit document hash values against the DPMPTSP server database
5	Public Service Module (Community)	Self-Printing of Documents	Self-printing of permit documents; eliminating the need to visit the central office for reissuance

Source: Compiled by author, 2026

Data from the West Papua Non-OSS Public Satisfaction Survey for the second half of 2025 shows that the transparency of service costs via SiCANTIK achieved a satisfaction score of 93.58%. In contrast, clarity of document information and service product publication received scores of only 80–81% ([Garda Papua, 2024](#)). This discrepancy of more than 12 points indicates a gap in interaction between the digital interface and the communication practices of field officers one of the key shortcomings that E-PACE Mobile should address.

The Digital Implementation Gap and Its Implications for E-PACE Mobile

The SPBE profile for West Papua (2.28, 'adequate' category) compared to the national score (3.12, 'good' category) is not just a backdrop; it is an empirical indicator that the conditional framework for adoption (TOE) in West Papua is structurally weaker. In practice, this low SPBE score correlates with three operational limitations that are directly relevant to E-PACE Mobile: (a) the DPMPTSP's limited internal data governance capacity, which restricts optimisation of Executive Dashboard features; (b) the small number of civil servant system administrators, which prolongs response times during disruptions; and (c) sub-optimal interoperability with central systems (SIAP Dukcapil, OSS-RBA and other ministerial services), which restricts automation of applicant document verification. Therefore, the low SPBE score is not due to external variables, but rather to internal constraints that explain why the application's technical features do not automatically result in high service quality.

DISCUSSION

This section interprets the findings by explicitly linking the E-GovQual output dimensions (efficiency, trust, reliability and citizen support) with the determinant dimensions of the TOE (technology, organisation and environment). This approach is adopted because empirical findings show that the quality of each E-GovQual output dimension is shaped and constrained by specific TOE conditions.

Efficiency Dimension: Digital Consent and the Emergence of Territorial Logistical Efficiency

The findings confirm that E-PACE Mobile improves the efficiency of non-business licensing services within the E-GovQual dimensions. The Digital Approval feature allows authorised officials to approve licensing documents electronically via mobile devices, even when they are outside the province. Documentation of the E-PACE Mobile service workflow and the West Papua DPMPTSP's quarterly performance reports show that, before implementation, reliance on wet signatures

resulted in piles of documents remaining on administrators' desks for several weeks while officials were away on business. This pattern is consistent with [Suhartoyo's \(2019\)](#) empirical findings that the effectiveness of PTSPs depends on time certainty and procedural simplicity.

Perhaps more importantly, the self-printing feature eliminates logistical obstacles for people living in remote areas. For applicants from Pegunungan Arfak Regency, for instance, travelling to the central office to collect permit documents could result in transport costs equivalent to several weeks' household income. While this finding aligns with [Yanti and Handayani's \(2022\)](#) argument that SiCantik Cloud expedites services in Banda Aceh, this study highlights a significant contextual difference. Unlike Banda Aceh, where infrastructure is relatively stable, the efficiency of E-PACE Mobile in West Papua is heavily influenced by network availability a condition of TOE technology, which will be discussed in the 'Reliability' sub-section.

In theory, this finding extends the efficiency dimension of E-GovQual by incorporating the concept of territorial logistical efficiency, which is defined as the capacity of digital systems to eliminate the costs and time associated with physical travel when accessing government services. This concept is particularly relevant in regions with archipelagic or mountainous characteristics, and it can be operationalised using measurable indicators such as savings in applicants' transport costs, reduced waiting times for document collection and the proportion of applications processed without a physical visit.

Trust and Security Dimension: Cryptographic QR Codes as an Anti-Corruption Tool

In terms of trust, the E-PACE Mobile app uses cryptography-based QR code verification to introduce a crowdsourced fraud detection mechanism. The public, village officials and law enforcement officers can verify the authenticity of permit documents directly from the DPMPTSP database. In the context of West Papua, where there are very few law enforcement personnel relative to the size of the territory, this feature goes beyond administrative functions to serve as an anti-corruption governance instrument, particularly in preventing the forgery of environmental permit documents. This has long facilitated the illegal extraction of natural resources. This finding is consistent with the work of [Mukhlis et al. \(2024\)](#), who highlight security and privacy as key factors in building trust in e-government.

However, it is important to distinguish between the two overlapping layers of trust often referred to in literature: trust in the system, i.e. whether the technology works as claimed, and trust in the institution, i.e. whether the DPMPTSP is consistent and fair in its service delivery. Cryptographic QR codes address only the former. The second layer, which [Alkraihi & Ameen \(2021\)](#) emphasised must be continuously nurtured to build user loyalty, remains vulnerable. The Ombudsman's 2025 evaluation report notes that three regencies in West Papua are still in the red zone, with uncertainty regarding service costs being the dominant complaint. This suggests that good technological tools do not automatically generate institutional trust and that their impact on citizen loyalty requires longitudinal post-implementation studies. In practice, these findings can be replicated: a digital, cryptography-based verification system could be implemented in other 3T regions that are struggling with the authenticity of administrative documents.

Reliability Dimension: Connectivity as a Determinant of TOE-Specific Technology

Of the three dimensions, the reliability dimension reveals the deepest structural vulnerabilities. It is important to understand that the reliability of E-PACE Mobile as a technological artefact does not exist in isolation it depends on the regional ICT infrastructure layer. Geospatial profiles show that stable internet connectivity is mostly found along the coasts of Manokwari and Sorong ([Gainau, 2023](#)). Evidence of specific system failures can be seen in the E-PACE Mobile service logs, which indicate data synchronisation failures with the SiCANTIK Cloud in 2G network areas and blank-spot zones. These were reported in the West Papua Non-OSS Service Management Report (SKM) for the second half of 2025 as the primary cause of complaints from applicants in the Arfak Mountains and Wondama Bay. In other words, rural users' perception of the reliability of E-PACE Mobile is not merely a reflection of the application's quality, but rather an accumulation of synchronisation failures that users attribute to the application.

From a TOE perspective, this situation falls within the technology dimension. The availability of telecommunications networks is an absolute prerequisite that cannot be replaced by even the best

application design. This finding supports the argument of [Khan et al. \(2021\)](#) that the sustainability of e-government depends on infrastructure readiness and builds on the work of [Syarifah et al \(2023\)](#). in the 3T region of Jayawijaya by extending it to the context of West Papua with a focus on non-business services. In practical terms, E-PACE Mobile expansion must proceed in parallel with accelerated BTS and 4G network construction in red-zone districts, rather than as a separate programme.

The Dimension of Citizen Support: Institutional Deficits and the Risk of Social Backlash

The study found that citizen support is the weakest aspect of E-PACE Mobile. [The Indonesian Ombudsman's Report \(2025\)](#) explicitly states that the absence of an integrated complaints unit in West Papua is the main reason for the low compliance scores. The current E-PACE Mobile interface does not offer interactive helpdesk services, a self-service chatbot, or the option to consult DPMPTSP staff online. Only standard email support from the developer is available. The consequences of this shortfall are twofold. Firstly, administratively, when the system experiences disruptions, applicants lack a rapid resolution channel, thereby increasing the risk of service failure and reducing the rate of timely application processing. Secondly, socially, applicants who encounter digital dead ends tend to revert to conventional face-to-face channels. This creates space for bureaucratic intermediary practices, or 'permit brokers' ([Poornima, 2017](#)), precisely the phenomenon that digitalisation was intended to eliminate. These findings imply that inadequate user support reduces satisfaction and revives the structural issues that the application aims to resolve. This pattern aligns with the findings of [Demarest and Veenendaal \(2024\)](#), who identified user support as the primary determinant of satisfaction.

TOE Determinant: Technology—Cross-System Interoperability

In terms of the technology aspect of TOE, the primary technical challenge for E-PACE Mobile lies in ensuring interoperability and synchronising data between systems via APIs. Ideally, verification of the applicant's identity would be carried out directly through integration with the Population Administration Information System (SIK) of the Directorate General of Civil Registration and Population at the Ministry of Home Affairs. Without full interoperability, applicants must repeatedly upload scanned copies of physical documents, creating bureaucracy that runs counter to the principle of electronic simplification. This pattern corroborates [Rosidi's \(2022\)](#) observations on the OSS-RBA in Subang. However, this finding also adds a new nuance: E-PACE Mobile has already successfully addressed front-end-back-end integration with SiCANTIK Cloud, meaning the remaining gap is horizontal integration between ministries and agencies.

Determinants of TOE: Organisation—The Paradox of Organisational Capacity

The organisational dimension reveals a paradoxical situation. On the one hand, there is a shortage of civil servant programmers and systems analysts in remote districts of West Papua. This results in slow recovery times when the application experiences server disruptions. Conversely, the West Papua Provincial Government is subject to strong political impetus, with direct oversight from the Ministry of State Apparatus and Bureaucratic Reform (KemenPANRB) and the Corruption Eradication Commission (KPK). This ensures that applications are not neglected post-launch. This differs from the pattern identified by [Duri et al. \(2024\)](#), where political commitment was not matched by technical capacity. In the case of E-PACE Mobile, however, political commitment acted as a partial compensator, ensuring the continued operation of the application. This study formalises this condition as the organisational capacity paradox: a recurring structural configuration in Indonesia's 3T regions, where high political commitment coexists with low technical capacity. This results in e-government applications surviving, but not operating optimally.

Determinants of TOE: Environment—Culture, Digital Literacy, and the Risk of New Exclusion

In the context of West Papua, the environmental dimension of the TOE is the most significant factor. A traditional bureaucratic culture that prioritises face-to-face meetings and kinship-based dialogue can create psychological barriers to adopting digital services. Based on an ethnographic study by [Andry and Sawir \(2024\)](#), as well as documentation from the West Papua Provincial Government's public service reports, several traditional leaders and religious figures who use

smartphones to process permits for places of worship have reported experiencing cultural distortion. They perceive the mechanical process as lacking empathy, as it eliminates the ritual of showing direct respect to local decision-makers. This claim is based on a combination of ethnographic literature and public releases, rather than normative generalisations. Cultural values emphasising relational reciprocity, whereby the legitimacy of public decisions is derived from face-to-face interaction, mean that a wholly impersonal digital interface may be perceived as a breach of institutional etiquette. This is a mechanism of cultural resistance to digitalisation that is often overlooked by conventional TOE frameworks.

Furthermore, with just 55.75% of rural residents having access to the internet, educated urban dwellers in Manokwari or Sorong are set to monopolise the full benefits of E-PACE Mobile, leaving rural residents behind on two counts: weak conventional services and unaffordable digital services. These findings support Mensah (2020) thesis that the digital divide is a barrier to e-government success and contradict Mandari & Koloseni's (2022) Tanzanian findings that mobility drives m-government adoption. In West Papua, cultural factors and the digital divide simultaneously reduce the benefits of app mobility.

E-GovQual × TOE Relationship Matrix

Table 3 summarises the specific TOE conditions that explain each output dimension of E-GovQual. This matrix answers reviewers' questions about the relationship between the two frameworks. Rather than standing in parallel with E-GovQual, TOE serves as an explanatory condition for why each E-GovQual dimension is achieved or hindered.

Table 3. Matrix of Relationships between E-GovQual Dimensions and TOE Conditions in the Implementation of E-PACE Mobile

No.	E-GovQual Dimensions	Achievement Status	Determining TOE Conditions	Causal Mechanism
1	Efficiency	High	Organisation (leadership commitment) + Technology (application design)	Digital approval breaks the chain of wet signatures; self-printing eliminates logistics costs
2	Trust	Medium-High	Technology (QR cryptography)	Crowdsourced verification; however, institutional trust remains weak due to a lack of public support
3	Reliability	Low	Technology (network infrastructure) + Environment (geography)	Synchronisation fails in 2G zones/blank spots; accumulated synchronisation failures are perceived as a weakness of the application
4	Citizen support	Very Low	Organisation (technical staff) + Environment (literacy)	No helpdesk; risk of a return to bureaucratic intermediaries

Source: Compiled by the author based on an integrative thematic analysis (2026).

LIMITATION

This study has three limitations that must be openly acknowledged. Firstly, while document analysis provides a comprehensive institutional record, it fails to capture the direct experiences of end users. Follow-up studies combining in-depth interviews and usage observations would enrich the findings. Secondly, the single embedded case study design limits statistical generalisation to other provinces, although theoretical transferability remains possible through the detailed descriptions provided. Thirdly, as longitudinal data on user adoption rates and post-implementation satisfaction scores are not yet publicly available, the dynamics of change over time cannot yet be measured — a relevant area for future quantitative research.

CONCLUSION

This study analyses the impact of E-PACE Mobile on the quality of non-business licensing services at the DPMPTSP of West Papua Province, in relation to SDG 16. Three key findings can be summarised as follows: Firstly, the application enhances efficiency through digital approval and self-

printing whilst strengthening accountability via cryptographic QR code verification. This serves as an anti-corruption tool, which is a significant achievement in a region with consistently low public service compliance scores (58.12 in 2024 and 53.40 in 2025). Secondly, however, this transformative potential is constrained by three systemic barriers: low reliability due to uneven telecommunications infrastructure; very weak citizen support due to the absence of an integrated helpdesk; and an organisational capacity paradox that limits scalability. Thirdly, the TOE framework confirms that no application design can compensate for the combined effects of infrastructure disparities, rural digital literacy of just 55.75%, and cultural resistance rooted in Papua's traditional governance traditions.

This research's core contribution to the literature is threefold: the addition of territorial logistical efficiency as a new E-GovQual metric for island and mountainous regions; the addition of a cultural sub-dimension within the TOE Environment component; and the formalisation of the organisational capacity paradox as a structural pattern of e-government in Indonesia's 3T regions.

Two priority policy implications can be derived. Firstly, telecommunications infrastructure must be strengthened, with the construction of BTS and 4G networks in red-zone districts (Arfak Mountains, South Manokwari, Wondama Bay and Bintuni Bay) being prioritised. Without reliable connectivity, investment in application features will not yield equitable benefits. The second is the development of community-based citizen support services, integrating SMS gateways and WhatsApp Business APIs, combined with a digital ambassador programme involving traditional leaders and religious figures as agents of change. This will ensure that the adoption of digital services does not undermine existing cultural legitimacy. Without intervention at both these levels simultaneously, E-PACE Mobile risks exacerbating the service inequalities it seeks to correct and failing to realise its potential as an instrument of inclusive governance in line with SDG 16.

AUTHOR CONTRIBUTIONS

Y.R.M. conceived and designed the study, conducted the investigation, analyzed the data, and prepared the original draft of the manuscript. T.L.S. contributed to the research methodology, validated the findings, and critically reviewed and revised the manuscript. J.Y. assisted with data collection, data curation, and visualization. E.M.Y.K. supported the investigation, validated the results, and contributed to the review and editing of the manuscript. M.S. supervised the research, contributed to the conceptual development of the study, and reviewed and edited the manuscript.

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