

From Parking Payment to Public Revenue: Street-Level Transaction Accountability and Revenue-Capture Vulnerability in Kupang City

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Abstract: Municipal parking fees are high-frequency, low-value transactions in which service delivery and fiscal accountability are produced at the same frontline interface. Existing research often explains parking-revenue under-realization through target setting, enforcement, collector compliance, or digital payment, but gives less attention to whether each payment remains traceable from service event to treasury recognition. This qualitative case study examines parking-retribution governance in Kupang City, Indonesia, using 20 purposively selected informants, administrative records, and field observation. The evidence shows persistent target under-realization in 2022–2023 and a partial-year shortfall in 2024; these figures indicate a fiscal performance problem but do not constitute a measured leakage estimate. The analysis identifies a reconciliation gap between payment, ticket, administrative record, deposit, and treasury entry; evidentiary discretion when attendants prioritize traffic flow under peak pressure; and weak external verification when users accept ticketless payment for convenience. Their interaction is conceptualized as co-produced fiscal opacity, a bounded mechanism through which revenue-capture vulnerability emerges without presuming fraud by any single actor. The study extends street-level bureaucracy toward the production of auditable evidence, links transaction traceability to public accountability, and argues that reform should prioritize end-to-end reconciliation, low-friction transaction capture, and risk-based supervision rather than cashlessness alone.

Keywords : street-level bureaucracy; public accountability; municipal revenue; transaction traceability; digital government.

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1. INTRODUCTION

Local governments increasingly rely on dispersed, high-frequency transactions to finance public services, yet their capacity to convert those transactions into auditable public revenue remains uneven. Street-level bureaucracy research shows that frontline workers adapt formal rules under workload, ambiguity, and client pressure, while accountability scholarship emphasizes that discretion must remain attributable, reviewable, and open to correction (Hupe & Hill, 2007; Tummers & Bekkers, 2014; Tummers et al., 2015; Chang & Brewer, 2023; Bauhr & Carlitz, 2021). Digital-government studies further show that technology can constrain, enable, or relocate discretion rather than simply eliminate it (Busch & Henriksen, 2018; Marienfeldt, 2024; Johansson, 2025). The administrative problem is therefore not only whether money is collected, but whether government can reconstruct the sequence linking service use, payment, documentary evidence, recording, deposit, and treasury recognition.

Municipal parking makes this problem unusually visible. On-street parking combines allocation of scarce urban space, rapid service interaction, enforcement, and public revenue collection. Parking research has shown that pricing and enforcement influence turnover, access, congestion, and the financing of local services (Marsden, 2006; Dey et al., 2015; Shoup et al.,

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2017). Recent Indonesian studies also show that parking levies remain administratively difficult to realize and that e-parking or QRIS can improve recorded revenue and transparency while introducing new implementation problems involving digital literacy, infrastructure, attendant acceptance, and supervision (Rahayu et al., 2023; Novaria, 2024; Karim et al., 2025). These studies make the sectoral problem clear: parking is not merely a traffic issue but a repeated fiscal encounter in which a very small transaction record carries substantial accountability weight.

Existing explanations remain fragmented. Studies of local parking revenue frequently emphasize target effectiveness and the contribution of levies to locally generated revenue (Rahayu et al., 2023); implementation studies emphasize illegal parking, supervision, collector compliance, and organizational capacity (Novaria, 2024); and digital-reform studies increasingly promote e-parking or QRIS as a route to more transparent collection (Karim et al., 2025). International parking research similarly focuses on pricing, payment technologies, and program management (Dey et al., 2015; Shoup et al., 2017). Each stream identifies part of the problem, but most locate failure at one point: an unrealistic target, a non-compliant collector, weak enforcement, or obsolete technology. Principal-agent logic is relevant because frontline collectors observe transaction volume more directly than supervisors, yet it cannot fully explain documentary shortcuts that occur when attendants prioritize traffic flow. Tax-compliance logic also fits imperfectly when users have actually paid but do not demand evidence that makes payment fiscally traceable. The unresolved puzzle is relational: how can a parking transaction be socially complete but administratively opaque?

The problem also exposes a distinction between revenue collection and revenue capture. Collection is the immediate exchange in which money is paid for a service; capture requires that the exchange be converted into an attributable, reviewable, and reconcilable public record. Internal-control research in local government shows why that distinction matters: financial accountability depends not only on receiving funds but also on reliable recording, control activities, monitoring, and the capacity to reconcile transactions across administrative stages (Jatmiko et al., 2022). Evidence from municipal finance also shows that actual corruption can reduce local public revenue (Onana et al., 2025), but a weak audit trail cannot by itself establish corruption. A municipality may therefore perform the collection function while remaining unable to determine whether every legitimate payment was captured in public accounts.

This article uses that distinction to sharpen the theoretical puzzle. Street-level bureaucracy explains why frontline actors simplify, sequence, or prioritize tasks under pressure, but it has paid less attention to the evidentiary consequences of those coping practices for public finance. Accountability research explains why records must support answerability and review, but it often begins after an account exists rather than examining how the account is produced in brief citizen-state transactions. Digital-government research explains how technology redistributes discretion, yet reform debates can treat transaction capture as a property of a payment device rather than an organizational accomplishment. Parking connects these blind spots. A receipt that is not issued, a payment that cannot be tied to an authorized location and attendant, or a deposit that cannot be matched backward to transaction events narrows the municipality's ability to distinguish legitimate variation, administrative error, weak collection, and possible informal capture.

Kupang City provides theoretical leverage because own-source revenue pressure intersects with a parking system that remained substantially manual during the study period. The source records report targets of Rp1.20 billion in 2022 and Rp1.50 billion in 2023, with realizations of Rp850 million (70.8%) and Rp1.03 billion (68.6%). For 2024, Rp1.840782060 billion was recorded against a Rp3.00 billion annual target as of July, or 61.36% of the annual target (Badan Pusat Statistik Kota Kupang, 2024; Dinas Perhubungan Kota Kupang, 2022-2024). These figures establish a performance concern, not the monetary amount actually lost.

A budget target is a managerial benchmark rather than a measured counterfactual of feasible revenue, and the 2024 observation is partial-year. Treating the target-realization gap as proven leakage would therefore exceed the evidence.

This article asks: How do administrative arrangements, frontline discretion, and user practices interact to create vulnerability to uncaptured municipal parking revenue, and what governance response follows from that interaction? Using a qualitative single-case design with 20 informants, administrative records, and field observation, the article argues that vulnerability is produced through a broken reconciliation chain rather than by one actor alone. It makes three contributions. First, it extends street-level bureaucracy from substantive discretion to evidentiary discretion: practical latitude over whether documentary steps are completed contemporaneously with service. Second, it extends public-accountability analysis by conceptualizing co-produced fiscal opacity, in which organizational delay, frontline coping, user convenience, and limited supervision jointly thin the audit trail. Third, it qualifies techno-optimistic reform by making end-to-end reconciliation (not cashlessness or device adoption) the relevant unit of digital redesign. These are bounded mechanism claims; the study does not estimate an exact leakage rate or infer fraud without direct evidence.

2. LITERATURE REVIEW

Street-Level Discretion and Public Accountability

Street-level bureaucracy begins from the premise that policy is not implemented mechanically. Frontline workers translate general rules into concrete action while managing queues, incomplete information, scarce time, and competing demands. Discretion can support responsiveness, but it can also make outcomes less reviewable when coping routines substitute for formal procedure (Lipsky, 2010; Tummers & Bekkers, 2014; Tummers et al., 2015; Chang & Brewer, 2023). In parking collection, this duality matters because an attendant may prioritize traffic movement at the same moment that a documentary step is weakened. The same observable practice, such as ticketless payment, can therefore arise from opportunism, workload, inadequate materials, user refusal, or a normalized routine. A credible explanation must discriminate among these possibilities rather than infer motive from the outcome.

Accountability scholarship specifies what is lost when the trace disappears. Accountability requires actors to explain conduct to a forum capable of questioning and consequences (Bovens, 2007), while street-level accountability is distributed across hierarchical, professional, political, and citizen-facing relationships (Hupe & Hill, 2007; Schillemans, 2016). In a cash-based fee system, traceability is the material precondition for those relationships. If a transaction cannot be reconstructed, supervisors cannot compare, audit, or attribute variance. Record integrity is therefore not clerical housekeeping but an enabling condition of public accountability.

For high-frequency fee systems, accountability therefore has a temporal as well as institutional dimension. The closer verification occurs to the transaction, the easier it is to attribute who acted, under what rule, for what amount, and with what documentary consequence. As verification is postponed and transactions are aggregated, the organization becomes increasingly dependent on retrospective summaries produced by the same administrative chain it is expected to supervise. This creates what can be understood as a reconciliation problem before it becomes an audit problem. The relevant question is not simply whether officials eventually report a total, but whether the reported total can be decomposed and reassembled from lower-level evidence. Schillemans (2016) emphasizes that accountability becomes effective when feedback can be translated into meaningful correction. In the parking context, that correction is difficult when the underlying transaction cannot be located, compared, or reconstructed.

Digital Traceability and the Parking Transaction Interface

Digitalization is frequently proposed as the solution to weak traceability, yet digital-government research rejects technological determinism. ICT can shift discretion from street-level workers toward system designers, create new workarounds, or coexist with legacy routines (Bovens & Zouridis, 2002; Busch & Henriksen, 2018; Mergel et al., 2019; Marienfeldt, 2024; Crusoe et al., 2024). Local-government studies similarly show that transformation depends on organizational redesign, system quality, and leadership rather than device adoption alone (Pittaway & Montazemi, 2020; Tangi et al., 2021; Sausi et al., 2021). The relevant policy question is thus not whether parking becomes cashless, but whether each transaction becomes easier to verify from service event to treasury entry.

Parking adds a distinctive implementation condition because the transaction occurs in contested public space and at variable speed. Attendants combine fee collection with traffic management, while users value convenience and rapid exit. Parking-program research shows that payment technologies can improve revenue management and enforcement, but their value depends on how technology is integrated into the wider operational system (Dey et al., 2015). Indonesian evidence reaches a similar conclusion. E-parking in Medan was associated with improved realized receipts after implementation, while QRIS-based parking in Surabaya and Mataram has been linked to greater transparency and convenience but also to digital-literacy, connectivity, incentive, and implementation challenges (Rahayu et al., 2023; Novaria, 2024; Karim et al., 2025). The transaction interface can therefore generate a tension between service continuity and evidentiary discipline. The citizen is not only a payer but also a potential verification actor whose demand for evidence can strengthen or weaken the transaction trace.

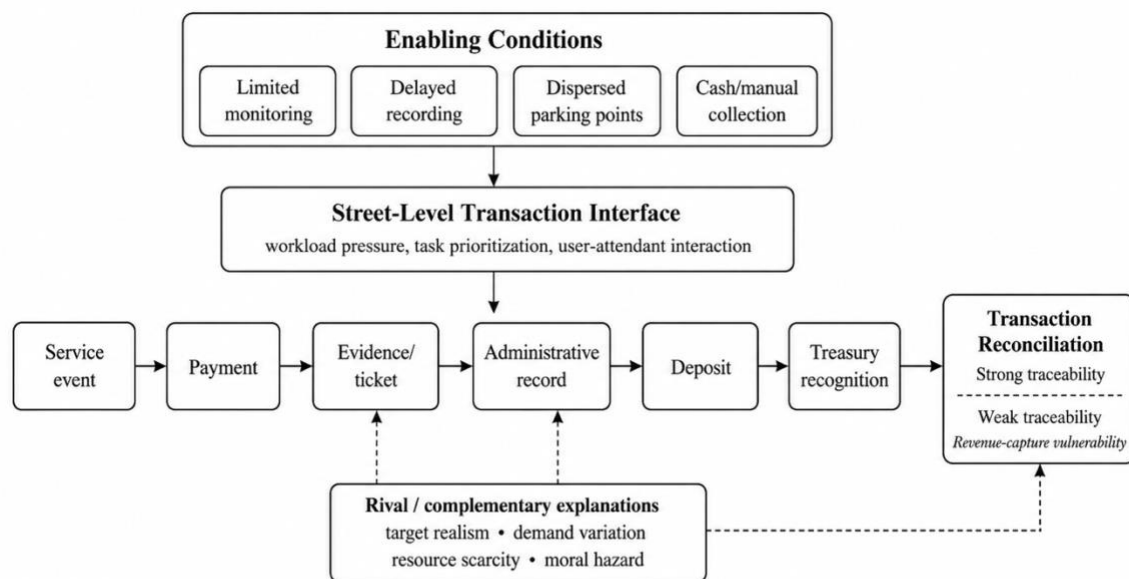
This perspective also qualifies the common assumption that cashlessness is equivalent to accountability. A digital payment can reduce cash-handling risk while leaving other gaps intact if the payment record is not linked to the authorized parking point, tariff, service event, collector, settlement, and treasury recognition. Conversely, a cash transaction can be relatively auditable when it automatically generates a unique evidence trail and is reconciled promptly. The central design variable is therefore not the payment medium itself but the integrity of the transaction chain. Mergel et al. (2019) and Pittaway and Montazemi (2020) treat digital transformation as organizational redesign, while Crusoe et al. (2024) show how formal digital initiatives can decouple from actual routines. Applied to local revenue, these insights imply that a technically modern front end can coexist with institutional opacity when manual workarounds, delayed settlement, or unlinked databases remain behind it.

Sensitizing Research Framework and Rival Explanations

The research framework distinguishes enabling conditions, the street-level transaction interface, and the reconciliation outcome. Enabling conditions include cash handling, dispersed parking points, delayed records, and limited monitoring. The transaction chain runs from service event and payment to evidence, administrative record, deposit, and treasury recognition. The key outcome is not 'theft' but reconciliation strength: the municipality's ability to link these stages and locate unexplained variance. Rival explanations remain explicit. Unrealistic targets can generate aggregate shortfalls; demand variation can change transaction volume; resource scarcity can reduce monitoring; and moral hazard can produce hidden action. The preferred mechanism is credible only if evidence shows how weak documentary links persist beyond what any one rival can explain.

The framework sets a conservative claim boundary. Interviews and field observation can identify recurrent practices, actor reasoning, and plausible process links, while administrative records can establish recorded targets and realizations. They cannot independently establish the true citywide counterfactual amount that should have been collected. The study therefore

explains revenue-capture vulnerability and transaction opacity, but does not estimate an exact leakage rate, prove individual fraud, or identify a causal treatment effect of digitalization.



Claim boundary: mechanism-oriented qualitative explanation, not an estimate of exact leakage.

Figure 1. Analytical framework for transaction traceability and rival explanations

Source: Authors' construct, 2026.

Note: solid arrows represent the focal transaction sequence; the dashed path denotes rival or complementary explanations rather than a deterministic causal effect.

3. METHODOLOGY

Research Design, Case Logic, and Unit of Analysis

The study uses a qualitative single-case design with embedded actor perspectives. The unit of analysis is the governance of municipal parking-retribution collection in Kupang City; the units of observation are officials, administrative employees, parking attendants, parking users, civil-society observers, a supporting municipal actor, documents, and field situations. A case design is appropriate because the research question concerns interactions and implementation processes that cannot be separated meaningfully from their institutional and street-level context (Yin, 2018). The analytical orientation is mechanism-oriented rather than causal in the experimental sense: it traces recurring links among administrative arrangements, actor practices, and transaction traceability without claiming a unique or deterministic cause.

Kupang was selected purposively as a resource-constrained provincial capital where high-frequency, low-value transactions are dispersed across urban space and mediated by frontline collectors. The case is not statistically representative of Indonesian municipalities. Its analytical value lies in the combination of cash intensity, manual reconciliation, transaction pressure, dispersed locations, and limited real-time supervisory visibility. These features define the boundary conditions for analytical generalization to comparable municipal fee systems.

Informant Architecture and Evidence Corpus

Twenty informants were selected purposively on the basis of institutional position, direct involvement in parking management, experiential knowledge of street-level transactions, or capacity to provide an external accountability perspective. The sampling architecture sought information power rather than statistical representation: the focused research question, specific case, cross-actor variation, and participants' direct knowledge increased the analytical value of

a relatively small sample (Malterud et al., 2016). Parking-user inclusion required direct experience of the municipal parking service under study; NGO and public-policy observers were included for their capacity to provide independent views on transparency and implementation; and the cross-sector local-government informant was included to clarify institutional boundaries in road-space governance. The archived research record does not consistently document whether first contact occurred through formal invitation, a gatekeeper, or direct approach, and it does not preserve a verified count of invitees who declined. These details are therefore not retrospectively reconstructed. This limitation is made explicit because it may have affected who was available and willing to participate.

Table 1. Informant categories, number, and selection rationale

Code	Informant category	n	Rationale for selection
I-01	Head of the Kupang City Transportation Agency	1	Strategic direction, targets, oversight, and inter-unit coordination.
I-02-I-03	Heads of relevant divisions	2	Operational management, traffic and parking supervision, and translation of policy into procedure.
I-04-I-07	Administrative and technical staff	4	Ticket administration, recording, reporting, deposit verification, and reconciliation.
I-08-I-12	Parking attendants	5	Frontline collection, ticketing, deposits, workload pressure, and street-level discretion.
I-13-I-17	Parking service users	5	Payment practice, receipt demand, tariff transparency, and convenience at the transaction interface.
I-18-I-19	NGO and public-policy observers	2	External perspective on transparency, informal practice, enforcement, and public oversight.
I-20	Cross-sector local-government informant	1	Road-space governance, institutional boundaries, and cross-sector coordination.
Total	Seven informant categories	20	Cross-actor triangulation across the full transaction-accountability chain.

Primary evidence came from semi-structured face-to-face interviews conducted in April 2026. The retained source record verifies quotation dates between 8 and 18 April and additional field material later in the month. Interviews addressed parking potential, target setting, ticket administration, collection and deposit routines, supervision, public behaviour, data integration, and reform options. Interview recording was undertaken with participant permission. However, the archived file does not consistently preserve interview duration, interview language, a transcript-by-transcript translation log, or formal member-checking records; those details are therefore not inferred after the fact. The analysis uses only quotations and source details that can be verified in the retained corpus. Passive observation focused on transaction flow, ticket issuance, workload and queue pressure, and user-attendant interaction, with field notes used as contextual evidence. The archival record does not preserve a single verified count of observation points or a standardized duration for every observation episode, so the study does not estimate prevalence from observation. Documentary evidence comprised Transportation Agency target-realization records for 2022-2024, municipal administrative material, BPS contextual statistics, and the national legal framework for regional taxes and retributions. Document claims were checked for source, year, internal consistency, and agreement with other available records before being used analytically.

Data Analysis, Credibility, and Ethics

The analysis followed an abductive qualitative logic in which empirical patterns were iteratively compared with plausible theoretical explanations (Miles et al., 2014; van Hulst & Visser, 2025). NVivo was used to organize interview transcripts, field notes, and documentary materials; support coding and retrieval; compare evidence across actor categories and source types; and maintain an auditable record of category development. The analysis proceeded through first-cycle descriptive and process coding, second-cycle pattern comparison, and abductive concept refinement. This approach was preferred to a formal grounded-theory sequence because the study sought to explain a theoretically informed administrative mechanism rather than generate grounded theory.

The coding unit was a meaning-bearing segment, typically a sentence or short passage referring to an actor, transaction stage, practice, documentary trace, stated rationale, or consequence for traceability. First-cycle descriptive codes captured actors, administrative objects, and transaction stages, while process codes identified practices such as prioritizing traffic flow, delaying ticket issuance, aggregating deposits, and accepting payment without documentary evidence. In NVivo, codes were organized into nodes and linked to source attributes representing managers, administrative staff, parking attendants, users, external observers, field observations, and documentary records. Coding frequency was not treated as equivalent to analytical significance.

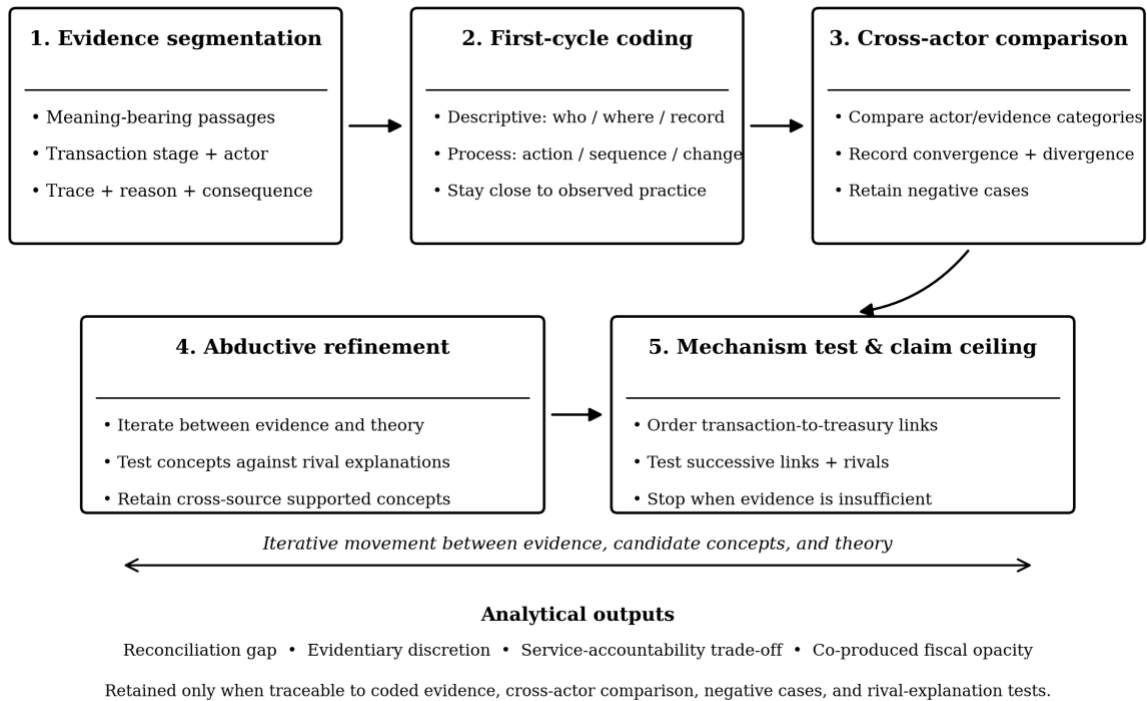
Second-cycle analysis compared coded material within and across actor categories and evidence types. Triangulation was used to test claims rather than require universal agreement (Tracy, 2010). Convergence strengthened an inference when at least two different actor categories, or an actor account together with documentary or observational evidence, supported the same process link. Divergent accounts were retained to identify competing explanations. Administrative accounts of delayed recording, for example, were compared with managerial descriptions of oversight, attendants' workload experiences, users' receipt practices, and external observers' transparency concerns. Ticket omission was not automatically interpreted as opportunism but differentiated according to workload pressure, administrative constraints, user indifference, and potentially self-serving behaviour. Negative evidence, including attendants' accounts of attempts to comply under imperfect conditions, further constrained overgeneralization.

Abductive refinement involved repeated comparison between these patterns and the literatures on street-level bureaucracy, public accountability, digital government, parking governance, and internal control. Candidate concepts were retained only when they were supported by identifiable coded evidence, recurred across more than one actor category or evidence type, offered greater explanatory precision than a descriptive theme, and remained credible after consideration of rival explanations and negative cases. Four concepts were operationalized accordingly. A reconciliation gap denoted a break between adjacent transaction stages where records could not be reliably linked through a shared identifier or contemporaneous evidence. Evidentiary discretion referred to variation in completing ticketing or recording while the substantive parking service continued. The service-accountability trade-off captured situations in which maintaining traffic or service flow displaced documentary completion. Co-produced fiscal opacity required evidence that payment occurred but its trace became incomplete through the combined effects of organizational routines, frontline practices, user behaviour, and limited supervisory reach.

The final stage assessed these concepts across the transaction sequence from service event and payment to ticketing, administrative recording, deposit, and treasury recognition. Rival explanations were examined at each stage. Unrealistic targets may explain aggregate under-realization but not recurring breaks between payment and documentary evidence; moral hazard may account for some ticketless transactions but not convergent workload-related accounts; and resource scarcity may explain monitoring limitations without explaining why

documentary links are structurally weak. Process tracing was therefore used in a bounded, mechanism-oriented sense to assess whether evidence supported successive links and whether rival explanations could account for the same sequence, rather than to claim deterministic causality (Beach, 2016).

Figure 2. Abductive coding, cross-actor comparison, and mechanism-building procedure



Source: Authors' construct, 2026.

Note: the figure summarizes the analytical procedure described in Section 3.3; it is not a frequency model or a claim of deterministic causality.

The inferential boundary remained deliberately conservative. The evidence supports a plausible mechanism through which administrative fragmentation, frontline coping, user behaviour, and limited supervisory reach weaken transaction traceability. It does not support a precise leakage estimate, proof of fraud, or a causal estimate of digitalization effects. Analytical credibility rests on transparent coding procedures, NVivo-assisted auditability, cross-source triangulation, explicit treatment of divergent and negative evidence, rival-explanation testing, and conservative inference. Participation was voluntary, interviews were recorded with permission, and formal research authorization was obtained. A specific ethics-approval number is not reported because it could not be independently verified in the retained research record.

Table 2. Analytical matrix linking transaction stages, actors, practices, evidence, and consequences

Transaction stage	Primary actor(s)	Observed or reported practice	Evidence used	Analytical consequence
Service event	Parking attendant; user	Vehicle enters/leaves; attendant manages space and flow	Observation; attendant and user accounts	Establishes that a service event occurred but not whether it was fiscally captured

Transaction stage	Primary actor(s)	Observed or reported practice	Evidence used	Analytical consequence
Payment	User; attendant	Cash or payment handed over during a brief interaction	User and attendant accounts	Confirms social completion of the exchange while leaving attribution dependent on evidence
Evidence/ticket	Attendant; user	Ticket may be issued, delayed, or omitted under pressure	Attendant accounts; user reports; observation	Operationalizes evidentiary discretion and weak external verification
Administrative record	Administrative staff; attendant	Daily records compiled after field transactions	Administrative staff accounts; forms/records	Operationalizes the reconciliation gap when records lack a persistent transaction identifier
Deposit/settlement	Attendant; administrative staff	Amounts aggregated and deposited after collection	Deposit and administrative records; interviews	Creates a stage at which unmatched variance may become difficult to locate
Treasury recognition	Agency/financial administration	Recorded revenue enters official accounts	Target-realization and treasury-facing records	Makes aggregate performance visible but does not reconstruct every underlying transaction

4. RESULTS

The findings are presented in three empirical steps. The first identifies the gap between visible fiscal under-realization and the municipality's ability to reconstruct individual transactions. The second shows how peak-period service pressure affects documentary completion at the street level. The third adds user behaviour and supervisory limits to explain how weak traces persist. The integrated theoretical interpretation is developed separately in the Discussion section.

Visible Shortfall, Invisible Loss: The Fiscal Paradox and Reconciliation Gap

The first finding is a paradox of visibility. Kupang's records show repeated under-realization against parking-retribution targets, yet they do not reveal how much of the gap reflects target realism, demand variation, administrative error, weak collection, or uncaptured revenue. Table 3 reproduces the parking-specific figures. The 2024 realization is recorded only through July and is not comparable with full-year outcomes. More importantly, the annual target is a managerial expectation, not an independently measured counterfactual. The defensible empirical starting point is therefore persistent fiscal under-performance combined with diagnostic uncertainty.

Table 3. Parking-retribution target and recorded realization

Year	Annual target (Rp)	Recorded realization (Rp)	Achievement	Interpretive note
2022	1,200,000,000	850,000,000	70.8%	Full-year administrative record
2023	1,500,000,000	1,030,000,000	68.6%	Full-year administrative record
2024	3,000,000,000	1,840,782,060	61.36%	Recorded through July; not full-year comparable

Managers themselves recognize the diagnostic problem. The Head of the Transportation Agency described parking as a significant potential source of local revenue but emphasized

that the agency cannot ensure that every point is consistently recorded and monitored. The issue is not evidence of diversion in itself; it is the inability to decompose the fiscal signal into verifiable components.

"Parking has very large potential for Kupang City's local revenue ... but our problem is supervision. We cannot yet make sure that all points are consistently recorded and monitored. It is still manual and still depends on people in the field, so the reports that come in do not always reflect actual conditions." (I-01, Head of Transportation Agency, 8 April 2026)

The administrative mechanism behind this ambiguity is delayed reconciliation. Staff explained that daily deposit records from multiple points are brought to the office, compiled, and checked manually. Transactions have therefore occurred before the organization possesses an integrated representation of them. Because a service event, ticket, amount collected, attendant, deposit, and treasury entry do not share a common transaction identifier, they are administratively related but not technically self-reconciling.

"Everything is still manual. Parking attendants bring daily deposit records, then we collect the data and check it one by one. It takes time when there are many parking points, and reporting can only be completed after the data are compiled." (I-05, administrative staff, 11 April 2026)

Service-Accountability Trade-Off: Evidentiary Discretion under Transaction Pressure

The second finding moves from the back office to the street. Parking attendants simultaneously organize vehicles, reduce congestion, communicate with users, collect fees, issue evidence, and maintain records. Under peak demand, they described prioritizing physical traffic flow. Ticketing is not formally abolished; it becomes a secondary task that can be postponed or omitted. The process link is therefore transaction pressure -> task prioritization -> weaker documentary completion. The evidence does not establish that pressure is the only explanation, but it shows why weak evidence can arise without assuming deliberate misconduct.

"In the morning it is usually very busy. Vehicles arrive at the same time, so we have to move quickly so they do not pile up. In that situation tickets cannot always be given one by one because the focus is arranging the vehicles. When it becomes quieter, we tidy the records." (I-10, parking attendant, 12 April 2026)

"We try to follow the rules for deposits, but when several vehicles come at once the records cannot always be one hundred percent neat." (I-09, parking attendant, 12 April 2026)

We term this recurring pattern evidentiary discretion: practical latitude over documentary steps while the substantive parking service continues. Its immediate consequence is a service-accountability trade-off. A transaction can be operationally successful because vehicles move and the user leaves quickly, yet institutionally weak because the trace is incomplete. The evidence does not show that workload is the only cause of ticket omission; rather, it shows a recurrent condition under which documentary completion becomes secondary to service flow.

Co-Produced Fiscal Opacity: User Convenience, Weak Verification, and Limited Supervision

The third finding adds the citizen side of the transaction. Users generally described paying the requested fee, but several did not regard a missing ticket as important enough to contest when they were in a hurry. This is analytically different from non-payment. The user

complies with the immediate exchange but does not demand the evidence that would allow the payment to be independently verified. Convenience therefore removes an external checkpoint from a chain that is already administratively fragile.

"I usually just pay the attendant directly because I am in a hurry. We are not always given a ticket, so we do not make a big issue of it." (I-13, parking user, 16 April 2026)

"If there is a ticket, we feel more secure because it is clear and official. But often we are not given one, so we do not know whether the money we pay goes to the government or directly to the officer." (I-14, parking user, 16 April 2026)

The user evidence reveals a paradox: low documentary demand does not mean high institutional trust. The transaction is socially complete because money changes hands and the parking service ends, but it can remain fiscally incomplete from the municipality's perspective. Periodic rather than real-time supervision cannot consistently reconstruct these weak traces. External observers consequently described a system in which every individual transaction cannot be verified after the fact.

"With a manual and non-integrated system, there is no way to ensure that every transaction in the field is fully recorded. Supervision is periodic, not real time." (I-18, NGO/public-policy observer, 18 April 2026)

We conceptualize this observed condition as co-produced fiscal opacity. Four empirical attributes were present: payment was reported as having occurred; documentary traceability was incomplete; organizational routines, frontline choices, and user behaviour all contributed to the thin trace; and periodic supervision could not reliably reconstruct every transaction afterward. The evidence does not establish collusion or embezzlement. It establishes a governance condition in which legitimate payments may occur without a sufficiently discriminating record to verify their complete capture as public revenue.

5. DISCUSSION

Interpretation, Comparison with Prior Studies, and Theoretical Contributions

Taken together, the findings form a sequential mechanism rather than a deterministic causal chain. Under-realization creates a fiscal signal, but the absence of a verified transaction denominator makes that signal ambiguous. Manual aggregation creates a reconciliation gap; peak pressure activates evidentiary discretion; user acceptance of ticketless payment weakens external verification; and limited supervisory reach allows the incomplete trace to persist. These links culminate in co-produced fiscal opacity and revenue-capture vulnerability. This interpretation agrees with local-revenue studies that emphasize information quality, internal control, and digital traceability, but it goes further by locating the critical problem in the relationship among transaction stages rather than in aggregate target achievement alone (Ali et al., 2021; Jatmiko et al., 2022; Sausi et al., 2021). It also remains consistent with evidence that genuine corruption can reduce municipal revenue while refusing to infer corruption from an unreconciled transaction record alone (Onana et al., 2025).

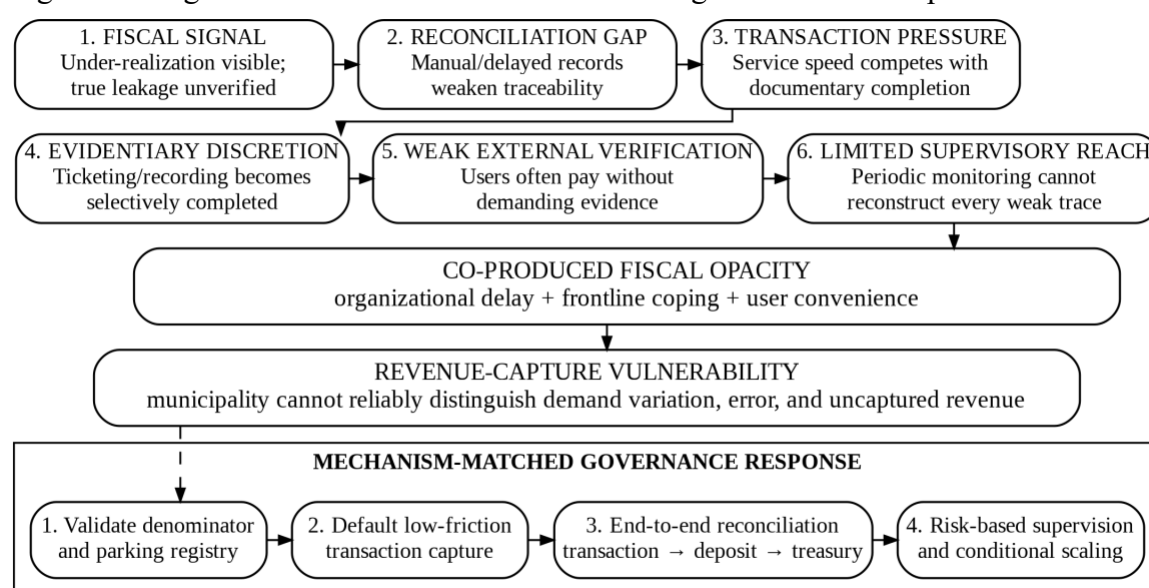
Table 4. Finding-to-literature synthesis and theoretical implications

Finding / stage	Closest international studies	Relation to prior literature	Theoretical implication
Fiscal paradox and reconciliation gap	Ali et al. (2021); Jatmiko et al. (2022); Sausi et al. (2021); Onana et al. (2025)	Extends	Separates fiscal visibility from fiscal verifiability and locates information asymmetry in the transaction architecture.

Finding / stage	Closest international studies	Relation to prior literature	Theoretical implication
Evidentiary discretion under pressure	Tummers et al. (2015); Chang & Brewer (2023); Marienfeldt (2024); Johansson (2025)	Refines	Extends street-level discretion from substantive decisions to production of auditable evidence.
Co-produced fiscal opacity	Nabatchi et al. (2017); Allen et al. (2020); Bauhr & Carlitz (2021); Kalesnikaitė et al. (2023)	Complements / new mechanism	Shows how organizational delay, frontline coping, and user convenience jointly weaken a paid transaction trace.
End-to-end reform logic	Dey et al. (2015); Rahayu et al. (2023); Novaria (2024); Karim et al. (2025); Crusoe et al. (2024)	Qualifies techno-optimism	Makes reconciliation, not device adoption or cashlessness, the relevant unit of digital reform.

The theoretical contribution is hierarchical. First, the study confirms that discretion and information asymmetry remain central to frontline revenue collection. Second, it refines street-level bureaucracy through evidentiary discretion: coping affects not only substantive service decisions but also the production of the evidence through which completed transactions become auditable. This extends the implications of coping research (Tummers et al., 2015; Chang & Brewer, 2023; Marienfeldt, 2024) without treating every documentary shortcut as opportunism. Third, co-produced fiscal opacity extends accountability and coproduction research by showing an inverse form of citizen participation. Users can comply with payment while unintentionally weakening the audit trail by accepting a transaction without proof, so ordinary convenience becomes part of a relational accountability problem (Nabatchi et al., 2017; Allen et al., 2020). Fourth, the study qualifies digital-government optimism: the operative reform unit is end-to-end reconciliation, not cashlessness alone. This is consistent with parking-program and Indonesian e-parking studies showing that payment technology is effective only when organizational routines, user adoption, incentives, and information systems align (Dey et al., 2015; Rahayu et al., 2023; Novaria, 2024; Karim et al., 2025).

Figure 3. Integrated mechanism model: from fiscal signal to revenue-capture vulnerability



Source: Authors' construct, 2026. Note: the model represents a bounded process explanation for high-frequency, low-value municipal transactions; arrows indicate theoretically plausible sequence links rather than deterministic causal effects.

The model in Figure 3 orders the concepts to avoid redundancy. The reconciliation gap is an organizational condition in the information architecture; evidentiary discretion is a frontline mechanism activated when documentary tasks compete with service demands; and co-produced fiscal opacity is the emergent relational condition produced when weak organizational records, frontline coping, user convenience, and limited supervision accumulate. Revenue-capture vulnerability is the downstream governance consequence: legitimate payments may exist, but the municipality lacks sufficiently discriminating evidence to classify all variance. The mechanism should be strongest where transactions are brief, numerous, spatially dispersed, low in individual value, mediated by frontline collectors, and weakly linked to real-time records. It should weaken where evidence is generated automatically, identifiers persist across stages, users can verify transactions easily, and exceptions trigger timely review.

5.2. Practical Implications for Global South Municipal Revenue Governance

The practical implication is especially relevant to municipalities in the Global South, where cash-intensive frontline collection, uneven connectivity, fragmented records, limited supervisory reach, and informalized service routines often coexist. The reform sequence should therefore follow the mechanism rather than begin with procurement. First, the municipality must validate the denominator: legal parking points, authorized attendants, tariffs, operating periods, and baseline transaction flows. Second, each transaction should generate low-friction evidence by default, including an offline-capable identifier or receipt where connectivity is weak. Third, transaction, tariff, location, settlement, bank-deposit, and treasury records must be reconciled so unexplained variance can be located by stage. Only after these foundations work under peak conditions should the system be scaled and supervision become anomaly- and risk-based. Indonesian experience with e-parking and QRIS reinforces the need for such sequencing: digital payment can improve transparency, but adoption is constrained when attendant incentives, digital literacy, devices, connectivity, and organizational coordination are not addressed simultaneously (Rahayu et al., 2023; Novaria, 2024; Karim et al., 2025).

Table 5. Phased end-to-end reconciliation architecture for resource-constrained municipalities

Phase	Core action	Decision gate / principal risk
0-90 days: establish visibility	Validate parking-point registry, attendants, tariffs, operating periods, and baseline flow.	Proceed only when the transaction denominator and process map are auditable; risk: incomplete registry.
3-6 months: capture transactions	Pilot default transaction evidence with offline synchronization and user confirmation.	Proceed if capture remains reliable under peak load and outages; risks: workaround and digital exclusion.
6-12 months: reconcile end-to-end	Match transaction, tariff, location, settlement, bank deposit, and treasury data; create exception dashboard.	Proceed when unexplained variance can be located by stage; risk: parallel manual systems.
12+ months: scale and supervise by risk	Expand conditionally; use anomaly indicators for field audits, corrective action, and public reporting.	Scale only after pilot evidence; risks: illegal-parking displacement, gaming, and privacy overreach.

6. CONCLUSION

This study reframes municipal parking under-realization as a transaction-accountability problem rather than assuming that the difference between budget targets and recorded revenue is measured leakage. In Kupang, a visible fiscal shortfall meets a weak transaction denominator; manual and delayed aggregation creates a reconciliation gap; peak-period service

pressure produces evidentiary discretion; user convenience weakens documentary verification; and limited supervisory reach allows incomplete traces to persist. Revenue-capture vulnerability therefore refers to the municipality's limited capacity to distinguish demand variation, target error, administrative mistake, and uncaptured revenue at the level of individual transactions.

The study makes three explicit contributions. Theoretically, evidentiary discretion extends street-level bureaucracy from substantive decisions to the documentary production of accountability, while co-produced fiscal opacity explains how organizational delay, frontline coping, and user behaviour can jointly weaken the trace of a transaction that has actually been paid. Analytically, the study separates fiscal visibility from fiscal verifiability by showing why aggregate revenue data are insufficient when lower-level records cannot be decomposed and reconciled. Practically, it reframes digital reform around end-to-end transaction integrity rather than device adoption alone. These contributions are intentionally bounded to brief, dispersed, low-value transactions with weak default evidence and limited real-time reconciliation; they do not imply fraud and should not substitute for direct audit evidence.

The policy implication follows directly from the mechanism. Kupang should not treat e-parking as a stand-alone procurement project or respond to shortfalls mainly by raising targets. Reform should proceed from a validated parking-point and attendant registry to default transaction capture, transaction-to-deposit reconciliation, exception reporting, and risk-based supervision, with scaling contingent on evidence that the system remains reliable under peak demand and connectivity failure. For comparable Global South municipalities, the broader lesson is that accountable digitalization requires institutional redesign around traceability, not merely a shift from cash to electronic payment.

Several limitations qualify these claims. First, the target-realization series cannot establish the counterfactual amount that should have been collected, and the 2024 figure is partial-year. Second, the cross-sectional interview design is vulnerable to recall and self-presentation. Third, the archived research record does not consistently preserve recruitment pathways, refusal counts, interview duration and language, formal member-checking documentation, or a standardized observation-point count and duration; these gaps constrain replication and assessment of selection bias. Fourth, the study examines one city and does not test whether the proposed mechanism operates similarly where parking is fully digitalized or supervision is stronger. Future research should pre-specify observation windows, combine transaction identifiers with independent vehicle-event counts, examine audit exceptions longitudinally, and evaluate phased digital pilots using stronger comparative or quasi-experimental designs. Positive cases in which high transaction pressure does not produce fiscal opacity would provide a particularly demanding test of the proposed mechanism and its boundary conditions.

Author Contribution

Conceptualisation and research design, A.S.J.; methodology, A.S.J.; formal analysis and data interpretation, A.S.J.; investigation and field data collection, I.P.Y.B.P.; writing-original draft preparation, W.D.; writing-review and editing, I.P.Y.B.P. All authors have read and approved the submitted version of the manuscript.

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Data Availability Statement

The interview corpus contains potentially identifiable organizational and frontline accounts and is therefore not publicly deposited. De-identified supporting material may be made available by the corresponding author upon reasonable request where consistent with participant consent and institutional requirements.

Declaration of Generative AI and AI-Assisted Technologies

Generative artificial intelligence (OpenAI ChatGPT) was used during manuscript revision for language editing, structural reorganization, consistency checking, and assistance in identifying relevant literature. It was not used to generate empirical data, conduct interviews, determine factual findings, or replace author judgment in qualitative interpretation. All AI-assisted text and references were reviewed and verified by the authors, who retain full responsibility for the accuracy, integrity, and originality of the manuscript.

Conflict of Interest Declaration

The authors declare no conflict of interest.

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