



Digitalising Post-Pandemic Governance of Public Markets: A Smart Card System Model for Participatory Monitoring of Informal Traders

Devy Marjoyo¹, Desita Rahayu^{2*}, Kurnia Cahya Putri³, Mira Susanti Amirrudin⁴

¹²³ Master's Programme in Public Administration, Sekolah Tinggi Ilmu Administrasi Bengkulu, Bengkulu, Indonesia

⁴ Accounting Research Institute (ARI), Universiti Teknologi MARA (UiTM), Malaysia

DOI: <https://doi.org/10.47772/IJRISS.2026.100700321>

Received: 10 July 2026; Accepted: 15 July 2026; Published: 31 July 2026

ABSTRACT

The governance of public markets (pasar rakyat) in Indonesia continues to exhibit structural weaknesses that remained unresolved into the post-pandemic period. This article examines these weaknesses through Panorama Market, the largest traditional market in Bengkulu City, treated as a paradigmatic single case. The market is characterised by limited information transparency, decision-making that frequently marginalises traders, and a civil lawsuit filed by the Bengkulu City branch of the Indonesian Market Traders Association (APPSI) in May 2024. The study adopts an *embedded mixed-methods* design (Creswell & Plano Clark, 2018) in which a systematic literature review (SLR) conducted under the PRISMA 2020 protocol (Page et al., 2021) covering 47 articles indexed in Scopus (Q1–Q3) and SINTA (S1–S2) and published between 2020 and 2025 serves as the dominant method, while an embedded field case study of Panorama Market supplies both qualitative evidence (in-depth interviews, participant observation, and documentary analysis) and quantitative administrative data (levy trends, trader numbers, and locally generated revenue, PAD). The field data show market levy receipts contracting from IDR 800,945,000 in 2020 to IDR 750,000,000 in 2023, with PAD realisation reaching only about 60% of target by August 2024; notably, per-trader levy yield fell by roughly 22.5% even as the registered trader population grew by 20.8%, pointing to systemic leakage rather than a demand shock alone. Synthesising both strands, the authors propose the Smart Card System (Sistem Kartu Pintar, SKP), a conceptual digital governance architecture composed of five interlinked components. The model is offered as a transferable prototype whose replicability should be established through expert validation and pilot implementation before any wider or national roll-out is asserted.

Keywords: digital market governance; smart card system; informal traders; public participation; post-COVID-19; embedded mixed methods.

INTRODUCTION

Public markets occupy a central place in the economic life of Indonesian cities. As of 2024, Statistics Indonesia (BPS, 2024) recorded 17,443 public markets across 514 regencies and cities in 38 provinces, comprising 15,217 managed markets, 1,625 unmanaged markets, and 601 additional markets absent from the original register. This figure revises an earlier estimate of 19,330 units produced through the Market Directory Updating exercise (UDP-24). Collectively, these markets underpin the livelihoods of millions of informal traders and function as the principal nodes for daily food distribution to the public (Ministry of Trade, 2024). For 2025, BPS has not yet released a national Public Market Directory covering the full year.

Despite their sheer number, traditional markets are still administered through conventional management approaches. Reform and decentralisation transferred market-management authority to local governments, yet that shift has not consistently been matched by substantive gains in transparency or trader participation (Malano, 2011). Many markets have instead deteriorated or been converted into commercial malls, marginalising the traders who had depended on them for decades.



At the regulatory level, the legal framework is in fact reasonably adequate. Law No. 7 of 2014 on Trade replaced the term ‘traditional market’ with ‘public market’ (pasar rakyat) to affirm its status as a community-owned space. Minister of Trade Regulation No. 21 of 2021 subsequently classified public markets into four types (A–D) according to operating days, trader capacity, and land area. The difficulty lies in implementation: by early 2024 only a handful of markets had obtained SNI 8152:2021 certification for cleanliness and service standards, most of them concentrated in large cities.

The COVID-19 pandemic of 2020–2022 deepened this vulnerability. Social restrictions eroded purchasing power and lowered transaction volumes, while pre-existing governance problems information asymmetry, opaque levy systems, and narrow channels for trader participation became increasingly visible (Pramusinto et al., 2020). Once the pandemic eased, local governments faced pressure to design market-management models that are more adaptive, open, and participatory. It is precisely here that the use of digital technology as a governance instrument, rather than merely a tool for physical renovation, becomes relevant.

The Context of Bengkulu Province and Panorama Market

Bengkulu Province has 240 public markets distributed across ten regencies and cities (Ministry of Trade, 2024). The largest concentration lies in North Bengkulu Regency, with 41 markets, while Bengkulu City, the provincial capital, hosts 13. Among them, Panorama Market is the largest and busiest. Established in 1982 as a weekly market and now operating daily on a site of roughly 31,000 m², it is managed directly by the Panorama Market Technical Implementation Unit (UPTD) under the Bengkulu City Department of Trade and Industry (Disperdagrin).

UPTD records show a steadily growing population of registered traders, rising from 1,853 in 2020 to 2,238 in 2023, comprising 536 kiosk traders, 1,132 stall (los) traders, and 570 open-yard (pelataran) traders. This count excludes the unregistered vendors who set up along the roadsides and pavements around the market. According to Disperdagrin reports, PAD realisation from the market sector between January and early August 2024 reached only IDR 1.8 billion, or about 60% of the new target of IDR 3 billion (Disperdagrin Kota Bengkulu, 2024).

Panorama Market’s problems do not stop at levy collection. Fieldwork conducted during 2023–2024 documented a layered conflict involving the UPTD, Disperdagrin, the Bengkulu City branch of APPSI, and a third-party group that had partnered with the UPTD. That partnership was signed on 9 February 2023 but came to traders’ attention only some fourteen months later. The demolition of kiosks in Block T in March 2023 proceeded without adequate consultation with their occupants, and notice of a further demolition in November 2023 consisted of nothing more than a letter taped to a kiosk wall. On 2 May 2024, the Bengkulu City branch of APPSI filed a civil suit at the Bengkulu City District Court on behalf of nine traders whose stalls had been demolished.

By 2025, the situation continued to evolve. The Bengkulu City Government announced plans to revitalise Panorama Market through a Presidential Instruction (Inpres) scheme, with the UPTD reporting 35 vacant kiosks and 150 awning units (auning) still available for traders who had been selling outside the market grounds (Disperdagrin Kota Bengkulu, 2025; UPTD Pasar Panorama, 2025). Even so, structural questions trader involvement in the redevelopment, transparency of levy management, and dispute-resolution mechanisms remained unanswered by this physical agenda.

Earlier studies of Panorama Market have largely focused on physical revitalisation or on evaluations of Disperdagrin’s performance, but few have probed the potential of digital technology as an instrument of participatory governance.

This is the gap the present study seeks to fill, pursuing three objectives: (1) to map Panorama Market’s post-pandemic governance problems through the lenses of good local governance and the ladder of participation; (2) to review recent literature on the use of smart-card technology and e-governance in informal-market management; and (3) to formulate a conceptual model the Smart Card System (SKP) whose transferability to other public markets can subsequently be tested.

THEORETICAL FRAMEWORK

Two conceptual frameworks serve as the study's analytical lenses. The first is the New Ladder of Participation developed by Muluk (2007) as a contextualisation of Arnstein's (1969) Ladder of Citizen Participation for Indonesian local government. Arnstein arranged eight rungs, ranging from manipulation and therapy at the lowest level where participation is merely tokenistic rising through informing, consultation, and placation, up to partnership, delegated power, and citizen control, which place citizens in command. Muluk (2007) adapted this gradation to gauge how far citizens here, traders genuinely influence public decisions rather than merely serving as objects of dissemination.

The second is the set of good local governance principles articulated by the UNDP (1997), encompassing eight dimensions: transparency, accountability, participation, the rule of law, responsiveness, equity, effectiveness, and strategic vision. This framework offers a normative yardstick for assessing the quality of market management as a public space. By combining the two frameworks, the study can simultaneously locate traders' position on the ladder of participation and diagnose which governance dimensions are most deficient at Panorama Market, and then use that diagnosis as the foundation for designing the SKP model.

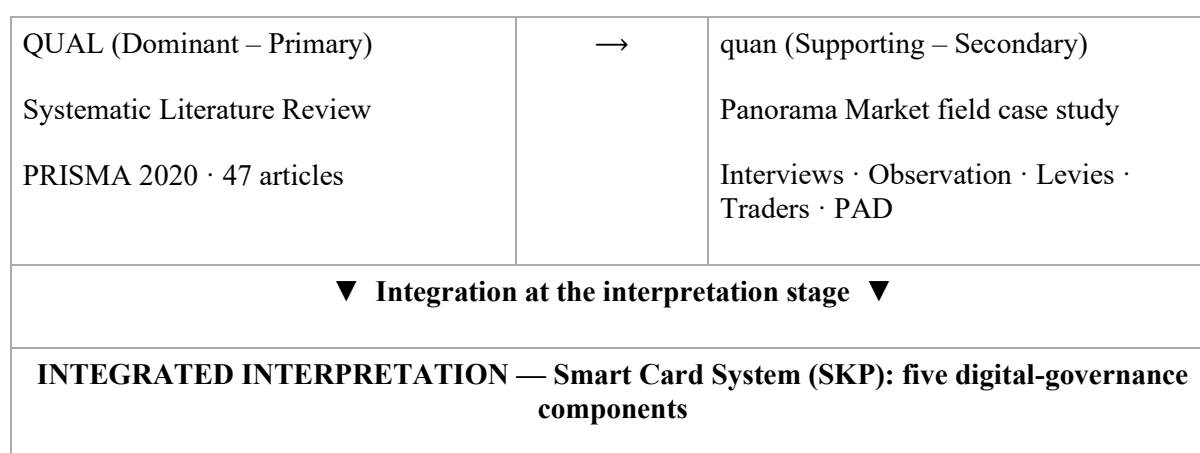
RESEARCH METHODS

Research Design

The study employs an *embedded mixed-methods* design as formulated by Creswell and Plano Clark (2018). In this design, one method acts as the dominant method that sets the overall direction of the research, while the other is embedded as a supporting method to enrich, validate, or contextualise the findings of the dominant method (Creswell & Plano Clark, 2018, p. 69). Here, a systematic literature review (SLR) conducted under the PRISMA 2020 protocol (Page et al., 2021) is designated the dominant method, because the principal aim is to formulate the conceptual SKP model from a synthesis of scholarly evidence across developing-country contexts. Embedded within it is a single-case field study of Panorama Market that itself draws on two kinds of data: qualitative evidence (in-depth interviews, participant observation, and documentary analysis) and quantitative administrative data (levy trends, trader growth, and PAD realisation). The field case study functions as the supporting component, supplying a concrete and measurable empirical context for the model derived from the SLR.

Three methodological considerations underpin this embedded design. First, the complexity of public-market governance demands a conceptual framework woven from global literature yet grounded in a measurable local reality. Second, the field data from Panorama Market are not extensive enough to stand alone as the dominant method, but they are highly valuable as a paradigmatic case that reinforces the model's relevance. Third, integrating the two strands at the interpretation stage rather than at data collection allows each to work to its strengths before they are brought together to yield holistic recommendations (Creswell & Plano Clark, 2018).

Figure 1. Embedded mixed-methods design (adapted from Creswell & Plano Clark, 2018)



Source: adapted from Creswell & Plano Clark (2018, p. 69); authors' elaboration.

Rationale for the Embedded Design

Creswell and Plano Clark (2018) identify three conditions that justify an embedded design: (1) the researcher needs data from one paradigm to answer the main research question, but that evidence would be stronger if supported by another paradigm; (2) a single method cannot capture all the information required; and (3) the researcher wishes to embed one type of data within a larger methodological procedure. All three conditions are met here. The central question how to design a digital-governance architecture capable of addressing the participation deficit in Indonesia's public markets can be answered only through a systematic synthesis of the global literature, yet such a synthesis would lose relevance without a concrete empirical anchor. Panorama Market, with levy data documented from 2020 to 2024, a governance conflict that escalated into litigation, and a population of 2,238 registered traders, provides exactly the setting needed to ground the model derived from the SLR.

Research Setting and Data-Collection Sites

The field study was conducted at Panorama Market, Bengkulu City a Type A public market under Minister of Trade Regulation No. 21 of 2021. The site was selected for three reasons. First, its characteristics are representative of large traditional markets in provincial capitals: it operates daily, hosts more than 2,000 registered traders, and occupies roughly 31,000 m². Second, its conflict history is legally documented, including the civil suit APPSI Bengkulu filed at the Bengkulu City District Court on 2 May 2024, providing rich material for examining the relevance of the SLR findings. Third, the resulting SKP model has clear potential for adaptation to other markets, which the study frames as a hypothesis for future testing rather than an established outcome.

Data collection was not confined to the market itself. In order to capture the full governance network, fieldwork was carried out across several sites: Panorama Market and its trading blocks; the Panorama Market UPTD office; the office of the Rafflesia Traders Forum (Forum Pedagang Rafflesia); the Bengkulu City Department of Trade and Industry (Disperdagrin); the Mayor's Office; the Bengkulu City APPSI office; the Panorama sub-district (kelurahan) office; the Singaran Pati district (kecamatan) office; and the office of the third-party partner (MP Group). Conducting fieldwork across these sites enabled triangulation of accounts from regulators, market managers, trader organisations, the partner firm, and the surrounding community.

Research Procedure

Following Creswell and Plano Clark (2018), the embedded mixed-methods procedure was carried out in five stages:

1. **Establishing the dominant method (QUAL).** The SLR under PRISMA 2020 was set as the dominant method because the core aim is to formulate the conceptual SKP model from a synthesis of global evidence. This method governs the research-question framework, the primary search design, and the overall direction of analysis.
2. **Embedding the supporting field case study.** Qualitative and quantitative data from Panorama Market interviews, observation, documents, levy trends (2020–2024), trader growth by category, and PAD realisation were embedded within the SLR procedure as an empirical case that frames and contextualises the literature synthesis.
3. **Collecting both data strands concurrently.** The literature search across five databases ran in parallel with fieldwork from March 2023 to May 2025. The two streams proceeded independently, each under its own protocol.
4. **Analysing each strand separately.** The SLR corpus was synthesised through convergent thematic narrative synthesis using the Mixed Methods Appraisal Tool (MMAT) 2018, while the field qualitative data were analysed through the interactive model of Miles, Huberman, and Saldaña (2014) and the administrative data through descriptive trend analysis, with Muluk's (2007) New Ladder of Participation and the UNDP's (1997) good local governance principles as interpretive lenses.

5. **Integrating the results at the interpretation stage.** The SLR findings and the field data were brought together through merging, connecting, and embedding (see §3.7), producing an SKP model that is at once theoretical and empirically grounded.

Dominant Method: Systematic Literature Review (PRISMA 2020)

Search Strategy and Database Selection

A structured search was conducted across five academic databases: Scopus, Web of Science, Google Scholar, Garuda (Indonesia's national academic repository), and SINTA. The search string combined four thematic domains using Boolean operators:

("smart card" OR "RFID" OR "NFC" OR "digital governance" OR "e-governance" OR "smart city") AND ("market management" OR "informal traders" OR "traditional market" OR "pasar rakyat" OR "street vendors") AND ("participation" OR "accountability" OR "transparency" OR "conflict resolution") AND ("developing countries" OR "Indonesia" OR "Southeast Asia" OR "Global South")

The search was restricted to scholarly articles published between January 2020 and December 2025, written in English or Indonesian, and indexed in Scopus (Q1–Q3) or SINTA (S1–S2). This temporal window was set deliberately to capture digital-governance evidence from the post-pandemic era, which marks a significant turning point in the global trajectory of digital transformation.

Inclusion and Exclusion Criteria

Table 1. SLR inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Indexed in Scopus Q1–Q3 or SINTA S1–S2	Conference proceedings without journal indexing
Published January 2020 – December 2025	Publications before January 2020
Addresses digital governance, smart cards, e-governance, market management, or informal-trader governance	Unrelated to governance, digital systems, or market management
Written in English or Indonesian	Other languages without validated translation
Full text accessible	Abstract-only or restricted access
Focused on developing-country, Asian, or Indonesian contexts with transferability analysis	Exclusively developed-country (OECD) contexts without transferability analysis
Clear and documented research methods	Opinion pieces, editorials, and non-empirical commentary

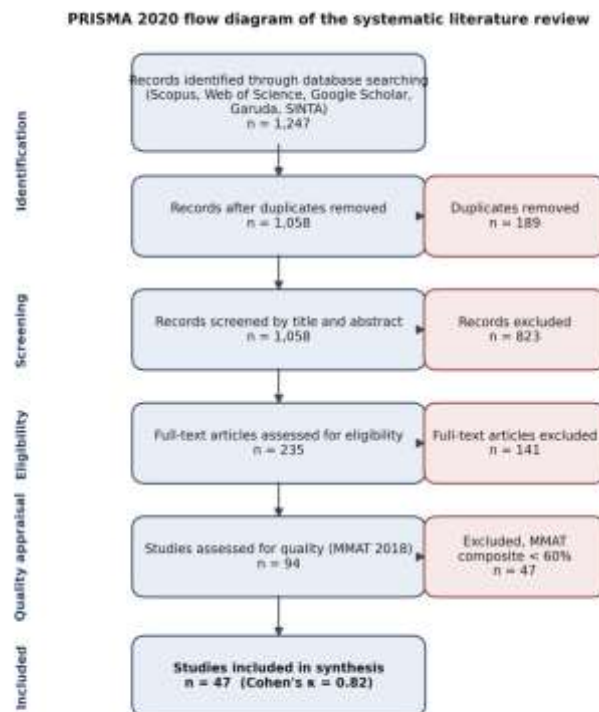
Source: authors' elaboration, 2026.

PRISMA 2020 Screening Process

The initial search retrieved 1,247 records. After removing duplicates ($n = 189$), screening titles and abstracts ($n = 823$ excluded), and assessing full-text eligibility ($n = 141$ excluded), 94 articles advanced to quality appraisal using MMAT 2018. Articles scoring below 60% on the MMAT composite were excluded ($n = 47$),

leaving a final synthesis corpus of 47 articles: Indonesia (n = 18), Vietnam (n = 6), Kenya (n = 5), India (n = 5), the Philippines (n = 4), Bangladesh (n = 3), and multi-context comparative studies (n = 6). Two independent reviewers performed the screening and synthesis, with a final inter-rater reliability of Cohen's $\kappa = 0.82$ (Landis & Koch, 1977). The full selection process is depicted in the PRISMA 2020 flow diagram (Figure 2).

Figure 2. PRISMA 2020 flow diagram of the study-selection process



Source: authors' elaboration following Page et al. (2021).

Table 2. Summary of the PRISMA 2020 screening

Screening stage	Excluded	Retained
Records identified (Scopus, WoS, Google Scholar, Garuda, SINTA)	—	1,247
Duplicate removal	189	1,058
Title and abstract screening	823	235
Full-text eligibility assessment	141	94
Quality appraisal (MMAT $\geq 60\%$)	47	47
Final synthesis corpus (Cohen's $\kappa = 0.82$)		47 articles

Source: authors' elaboration, 2026.

Quality Appraisal and Synthesis

Quality appraisal drew on the MMAT 2018, which weighs the clarity of the research question, the appropriateness of the design, the quality of data collection, and the validity of the findings. Two reviewers



appraised each article independently, and discrepancies were settled by consensus. The synthesis proceeded through convergent thematic narrative synthesis, which identified recurring patterns across studies, grouped them into five thematic clusters, and mapped their relevance to the governance deficiencies observed at Panorama Market.

Supporting Method: Field Case Study

Informants and Sampling Strategy

Informants were selected through purposive (criterion-based) sampling, on the reasoning that governance knowledge is unevenly distributed and concentrated among actors directly involved in managing, regulating, or contesting the market. The sample was subsequently extended through snowball sampling to reach less visible actors, such as unregistered vendors and rank-and-file traders. Informants spanned the full governance network:

- The Acting Mayor (PJ Walikota) and the former Deputy Mayor of Bengkulu City;
- The Head of the Bengkulu City Department of Trade and Industry (Disperdagrin) and the Head of the Panorama Market UPTD;
- Members of the Bengkulu City Regional Legislative Council (DPRD);
- Staff of Disperdagrin and of the Panorama Market UPTD;
- The Chair of APPSI Panorama Market and the Chair of the Rafflesia Traders Forum (Forum Pedagang Rafflesia);
- The field coordinator of the third-party partner (MP Group);
- Traders of Panorama Market across the kiosk (kios), stall (los), and open-yard (pelataran) categories; and
- Members of the Panorama sub-district (kelurahan) community.

This composition was designed to balance the perspectives of the state (regulators and managers), organised civil society (trader associations), the private partner, and the wider community, thereby reducing the risk of a single-actor bias in the reconstruction of events.

Data Collection Techniques

Three complementary techniques were used. First, semi-structured in-depth interviews explored informants' accounts of the conflict at Panorama Market; the degree of trader participation in market management; the efforts already undertaken by Disperdagrin and the UPTD to open channels for public aspiration; and the enabling and constraining factors bearing on public participation in market management from a good local governance perspective. Second, participant and non-participant observation documented trading activity, the physical condition of the market, the dynamics of levy collection, and events that unfolded during the research process. Third, documentary analysis covered UPTD trader records (2020–2023), annual levy receipts (2020–2024), Disperdagrin PAD-realisation reports (2023–2025), records of conflicts and disputes, the civil-suit file at the Bengkulu City District Court, and relevant media reporting.

Qualitative Analysis and Trustworthiness

The qualitative data were analysed using the interactive model of Miles, Huberman, and Saldaña (2014), which comprises three concurrent activities data condensation, data display, and conclusion drawing and verification. Interview transcripts, observation notes, and documents were coded thematically, with codes organised deductively around the rungs of Muluk's (2007) New Ladder of Participation and the eight dimensions of UNDP (1997) good local governance, while remaining open to inductively emerging themes. Trustworthiness was pursued through source triangulation (cross-checking accounts across state, association, partner, and



community informants), technique triangulation (comparing interview, observation, and documentary evidence), member-checking of key interpretations with selected informants, and the maintenance of an audit trail linking claims to their evidentiary basis.

Quantitative Analysis and the Limits of Inferential Testing

The administrative data were examined descriptively and, where informative, through derived indicators: year-on-year percentage change, the compound annual rate of change in levy receipts, and a per-trader levy-yield ratio (annual receipts divided by the registered trader count). These indicators allow the levy trend to be interpreted net of trader growth, which is analytically important for distinguishing a demand shock from systemic leakage. Inferential (hypothesis-testing) statistics were considered but judged inappropriate for this dataset: the levy and PAD figures are annual population records for a single market rather than observations sampled from a defined population, and the series is too short (four to five annual points) to support meaningful significance testing, regression inference, or time-series modelling. The quantitative strand is therefore reported as descriptive trend evidence and triangulated with the qualitative findings, in keeping with the supporting role assigned to it in the embedded design. Studies seeking to test the SKP's effects should generate panel or pre-/post-intervention data amenable to inferential analysis.

Data Integration: Three Mechanisms of Convergence

In keeping with Creswell and Plano Clark's (2018) embedded-design principles, the SLR findings and the field data were integrated at the interpretation stage through three complementary mechanisms.

- **Merging - combining the two datasets.** SLR evidence on the effectiveness of smart-card systems (for instance, a 34% reduction in levy embezzlement in a Vietnamese market reported by Nguyen et al., 2021) is juxtaposed directly with the decline in Panorama Market's levy receipts from IDR 800,945,000 (2020) to IDR 750,000,000 (2023). This juxtaposition sharpens the case for the SMRD component of the SKP model.
- **Connecting - one strand steering the other.** The continued decline in levies even after the pandemic eased steered the SLR synthesis toward the cluster on levy leakage and informal exactions; conversely, the SLR finding on online dispute resolution steered the interpretation of the field data toward the chronology of the Block T conflict and the failed mediation of July 2024.
- **Embedding - one dataset underpinning another.** The Panorama Market data serve as an index case that anchors the SLR findings in a concrete empirical setting, demonstrating that the governance deficiencies identified in the global literature are not abstractions but a measurable, verifiable reality on the ground.

Model Validation Approach

The SKP was derived inductively from the SLR synthesis and refined iteratively against stakeholder input gathered during fieldwork. The governance problems the model is designed to address were corroborated in interviews and consultations with the UPTD, Disperdagrin, APPSI Bengkulu, the Rafflesia Traders Forum, and traders themselves; in this sense the conceptual model has undergone a first, consultative layer of face validation. The authors are careful, however, not to overstate this: no controlled pilot has yet been conducted, and the model's effects on transparency, participation, and levy compliance remain hypotheses.

To move the SKP from a conceptual to an empirically validated model, the study proposes a three-stage validation protocol as an explicit research agenda. First, expert validation through a Delphi panel of public-administration scholars, digital-governance practitioners, and market managers would test the model's completeness, internal consistency, and feasibility. Second, a stakeholder co-design workshop with traders, APPSI, the UPTD, and local government would assess acceptability, equity, and the risk of unintended exclusion. Third, a bounded pilot implementation for example, in a single trading block would permit a pre-/post-evaluation of levy compliance, conflict-resolution time, and participation indicators, generating the quantitative evidence needed for inferential analysis and for any claim of wider applicability.



Ethical Considerations

The SLR protocol was pre-registered with the Open Science Framework before data collection began. Interviews were conducted with the informants' oral consent, and identities were protected through informant codes. The administrative data used were either public documents or obtained through official channels from the relevant agencies. Because the proposed SKP would process traders' personal and transactional data, the study also treats data protection as an ethical not merely technical requirement, discussed in §4.8 with reference to Law No. 27 of 2022 on Personal Data Protection.

RESULTS AND DISCUSSION

Panorama Market in the National Context

Panorama Market's position within the national landscape can be read from the classification set out in Minister of Trade Regulation No. 21 of 2021, summarised in Table 3.

Table 3. Classification of public markets under Minister of Trade Regulation No. 21 of 2021

Type	Operating days	Trader capacity (min.)	Land area (min.)	Notes
A	Daily (every day)	≥ 400 traders	≥ 5,000 m ²	Large / city market
B	≥ 3 days/week	≥ 275 traders	≥ 4,000 m ²	Medium market
C	≥ 2 days/week	≥ 200 traders	≥ 3,000 m ²	Small market
D	≥ 1 day/week	≥ 100 traders	≥ 2,000 m ²	Village market

Source: Minister of Trade Regulation No. 21 of 2021; BPS Public Market Directory 2024.

On this basis, Panorama Market qualifies as a Type A public market: it operates every day, hosts more than 2,000 registered traders, and occupies roughly 31,000 m².

Trends in Trader Growth and Levy Receipts

Table 4. Number of traders at Panorama Market, Bengkulu City, 2020–2023

Year	Kiosk traders	Stall (los) traders	Open-yard (pelataran) traders	Total
2020	530	950	373	1,853
2021	536	1,100	382	2,018
2022	536	1,132	500	2,168
2023	536	1,132	570	2,238

Source: UPTD Pasar Panorama, Bengkulu City, 2023.



Table 4 shows that the registered trader population grew by about 20.8% between 2020 and 2023, with the sharpest rise among open-yard traders (from 373 to 570). This growth signals the market's economic vitality, but it also breeds problems, since it was not matched by adequate spatial planning.

Table 5. Levy receipts at Panorama Market, 2020–2024

No.	Year	Total levy receipts	Notes
1	2020	IDR 800,945,000	Before the full pandemic
2	2021	IDR 787,935,000	Pandemic
3	2022	IDR 769,843,000	Early recovery
4	2023	IDR 750,000,000	Post-pandemic
5	2024 (Jan–Aug)	≈ IDR 1.8 billion (60% of target)	New target IDR 3 billion

Source: UPTD Pasar Panorama (2020–2023); Disperdagrin Kota Bengkulu (2024).

Although the absolute decline in receipts between 2020 and 2023 is modest (about 6.4% overall, or roughly –2.2% per year on a compound basis), reading the trend net of trader growth reveals a far sharper deterioration. Per-trader levy yield fell from approximately IDR 432,000 in 2020 (IDR 800,945,000 over 1,853 traders) to approximately IDR 335,000 in 2023 (IDR 750,000,000 over 2,238 traders) a decline of about 22.5%. In other words, the market gained roughly one-fifth more registered traders yet collected less in absolute terms, so the yield per trader contracted by nearly one-quarter.

This divergence cannot be explained by the pandemic alone. Had the pandemic been the sole cause, receipts should have rebounded as economic activity recovered in 2022–2023; instead, the decline continued. Several mutually reinforcing factors are at work: unregistered vendors draw customers away from the official trading area; some registered traders relocate to informal roadside spots; UPTD officers struggle to enforce levy compliance; and informal exactions by parties outside the UPTD erode the formal revenue base (Disperdagrin Kota Bengkulu, 2024; Saputra, 2025). The per-trader indicator is therefore consistent with systemic leakage rather than a demand shock, and it strengthens the rationale for a digitalised, auditable levy system.

Six Interlocking Governance Problems

Documentary analysis and field observation identified six governance problems at Panorama Market that lock into one another.

Limited information transparency

The UPTD does not openly disclose important information to traders. The UPTD third-party partnership signed on 9 February 2023 became known to traders only around April 2024, by which time the Block T conflict had already reached the courts. Notice of the November 2023 demolition was likewise merely a letter taped up, with no prior deliberation.

Decision-making that sidelines traders

Several strategic decisions the Block T partnership, the appointment of the Zone 6 parking coordinator, and changes to security personnel were taken without consulting APPSI Bengkulu or other trader organisations. APPSI was likewise excluded from drafting Bengkulu City Regional Regulation No. 6 of 2020 on Public Market Management.

Weak bargaining position of trader organisations

APPSI Bengkulu has reasonable organisational capacity: it is affiliated with the national APPSI, is capable of pursuing legal avenues, and serves as an umbrella for several trader organisations. Even so, its institutional bargaining position is not yet strong enough to shape governance outcomes through administrative channels. The civil suit of 2 May 2024, brought on behalf of nine traders whose stalls had been demolished, was a last resort after audiences with the Acting Mayor and the Regional Legislative Council (DPRD) had failed to produce a resolution.

A dispute-resolution mechanism that does not work

The confrontation of 19 March 2023 in Block T, which left one trader injured, exposed the breakdown of early-detection and pre-conflict deliberation mechanisms. The court-ordered mediation of 17 July 2024 also reached an impasse because the City Government did not halt construction in Block T while the process was under way.

Limited digital-participation infrastructure

The Bengkulu City Government makes active use of social media to disseminate information, but this channel runs only one way. Citizens' comments do not consistently receive a response, and there is no documented evidence that social-media content substantively shapes governance decisions.

Leakage of levy receipts

PAD realisation in the market sector reaching only 60% of target by August 2024 points to systemic leakage. Part of this stems from informal exactions on street vendors by unauthorised parties, and part from disorderly trader-registration administration.

Literature Synthesis: Five Clusters of Digital Market-Governance Innovation

Reviewing the 47 Scopus- and SINTA-indexed articles (inter rater reliability Cohen's $\kappa = 0.82$) yielded five thematic clusters relevant to Panorama Market.

First, smart-card technology based on RFID or NFC has been shown to raise the transparency of fee management and levy collection. A study of Vietnamese wholesale markets recorded a 34% reduction in levy embezzlement after a smart-card system was integrated (Nguyen et al., 2021), while a study of urban Kenyan markets found informal exactions shrinking (Okello et al., 2022). In Bangladesh, digital trader registration reduced incidents of harassment by market officials (Jamal et al., 2022).

Second, e-participation platforms become effective only when they are genuinely woven into the administrative decision making flow, rather than standing alone as consultative channels (Wirtz et al., 2021). Kholil et al. (2024) document how a WhatsApp based community governance platform formally recognised within sub district administrative processes dampened conflict in a traditional market in East Java.

Third, integrating IoT sensors and data analytics supports real-time market monitoring. Setiawan et al. (2022) tested a project in Yogyakarta that used sensors to track stall occupancy and visitor flows, while Rahman and Kusuma (2023) showed that blockchain based levy recording in a West Java pilot could eliminate disputes over payment histories. Fourth, online dispute resolution shortens the time needed to settle conflicts. Rao et al. (2023) recorded a reduction from more than a year to a matter of months across three Indian states, while Purbaya et al. (2023) identified the absence of a neutral mediator as the chief driver of escalation in Indonesian traditional-market disputes.

Fifth, the successful adoption of technology among informal traders hinges on user-friendly platform design, a mobile first interface, and peer to peer learning that draws on the social trust embedded in existing trader organisations (Winarno, 2021; Ramadhani et al., 2023).



The Smart Card System (SKP) Model for Panorama Market

Drawing the empirical findings and the literature synthesis together, the authors propose the Smart Card System (SKP) as an integrated digital governance architecture built from five complementary components.

Smart Trader Card (KPC)

Every registered trader receives a card embedded with an RFID/NFC chip carrying a unique identification number. The card stores the trader's identity, stall status, levy payment history, and record of participation in digital forums. Records are kept in a centralised, cloud based ledger, so that traders, the UPTD, Disperdagrin, and APPSI can access information according to their respective permissions.

Digital Levy Management System (SMRD)

The SMRD replaces cash levy collection with a digital payment platform linked to the KPC. Each payment is recorded instantly, generates a digital receipt, and appears on a transparency dashboard. Integration with Bengkulu City's Regional Financial Management Information System (SIPKD) allows the public to audit the flow of PAD from the market sector.

Participatory Governance Platform (PTKP)

The PTKP is the official channel bridging traders and decision-makers. It comprises four modules: an information module that openly displays market-management decisions; a consultation module that lets traders feed into policy formulation, with a binding obligation to follow up; a conflict reporting module with clear response deadlines; and an organisational-coordination module that gives APPSI and other trader organisations a safe space to coordinate.

Market Intelligence Dashboard (DIP)

The DIP aggregates data from IoT sensors, KPC transactions, SMRD payments, and PTKP engagement into a dashboard that displays differently according to the user's role. The UPTD obtains operational data, Disperdagrin monitors compliance data, APPSI uses it as a basis for advocacy, and the public can follow general indicators of market governance.

Digital Dispute Resolution Module (MPSD)

The MPSD institutionalises four stages of conflict resolution: data-driven mapping of disputes, structured negotiation with response deadlines, mediation by certified mediators drawn from a list jointly maintained by government and civil society, and digital arbitration whose decisions can be administratively enforced.

Implementation Framework and Projected Impact

Table 6. SKP implementation framework in three phases

Phase	Period	Key activities	Success indicators
Phase 1: Foundation	Months 1–6	KPC issuance; SMRD installation; PTKP beta launch; training for UPTD and APPSI staff	100% of registered traders hold a KPC; SMRD operational; trader digital literacy $\geq 60\%$
Phase 2: Participation	Months 7–18	Activation of all PTKP modules; MPSD launch; public transparency dashboard live	Active PTKP adoption $> 60\%$; conflict-resolution time down $\geq 50\%$; trader satisfaction $> 70\%$



Phase 3: Integration	Months 19– 36	Full SIPKD integration; DIP optimisation; revision of Perda 6/2020; replication plan	Levy compliance > 90%; at least two new policies emerging from PTKP consultation
---------------------------------	------------------	--	---

Source: authors' elaboration, 2026. The success indicators are design targets to be tested during piloting, not empirical results.

If implemented and validated, the SKP is intended to shift traders' position on Muluk's (2007) New Ladder of Participation from the manipulation/therapy rungs toward informing, consultation, and ultimately partnership: through the SMRD, traders would gain information previously withheld; through the PTKP, consultation would become administratively binding; and with APPSI's formal involvement in the DIP, the relationship between managers and traders could rise to the level of partnership. These are projected effects that the validation agenda in §3.8 is designed to test.

Ethics, Cybersecurity, Digital Inclusion, and Implementation Cost

Because the SKP would collect, store, and process personal and transactional data, its governance benefits cannot be assessed in isolation from its risks. Four issues warrant explicit treatment.

Data privacy. The KPC and SMRD would hold traders' identity data and payment histories, bringing the system squarely within Law No. 27 of 2022 on Personal Data Protection (PDP). Compliance requires a lawful basis for processing, data minimisation, purpose limitation, defined retention periods, and respect for data subject rights (access, correction, and erasure). The authors recommend designating a data controller within Disperdagrin, conducting a Data Protection Impact Assessment before deployment, and embedding privacy by design principles so that role based permissions restrict each actor to the minimum data necessary for its function.

Cybersecurity. A centralised ledger of payments and identities is an attractive target. Salient risks include unauthorised access, data breaches, tampering with the levy record, payment fraud, denial of service disruption, and insider misuse. Mitigations include encryption in transit and at rest, tokenisation of card identifiers, role based access control with audit logging, regular penetration testing, a tamper-evident (for example, permissioned distributed ledger) transaction record, and alignment with national frameworks for electronic government (SPBE) and with guidance from the National Cyber and Crypto Agency (BSSN). Security must be treated as an operating commitment, not a one off configuration.

Digital inclusion. Many Panorama Market traders are older or have limited digital literacy, so a poorly designed system could deepen, rather than close, participation gaps. The design therefore prioritises a mobile first, low literacy interface; a simple NFC 'tap' fallback for traders without smartphones; assisted onboarding kiosks staffed during the transition; local language support; and peer 'digital champions' recruited from within APPSI and the Rafflesia Traders Forum to provide trusted, face to face help. Non-digital channels should remain available throughout the transition so that no trader is excluded from the market by the reform intended to empower them.

Implementation cost. A candid appraisal must acknowledge that the SKP entails real cost across five categories: hardware (RFID/NFC cards, readers, and IoT sensors); software development and cloud hosting; integration with SIPKD; training and change management; and recurring operation and maintenance. The present study does not fabricate a precise budget; a formal cost benefit analysis is required as part of the validation agenda. It is reasonable to expect, however, that part of the outlay could be offset by the recovery of leaked levy revenue documented in §4.2, and that phased implementation would spread the capital cost. Funding options include the municipal budget (APBD), national market revitalisation funds (APBN), and transparent public private partnership, provided the last is designed competitively and with clear safeguards for traders.

Comparison with International Digital Governance Experience beyond Southeast Asia

Situating the Panorama case in a broader international frame guards against parochial conclusions. Beyond Southeast Asia, comparable reforms offer instructive parallels and cautions. In Kenya, the digitisation of market and public-service payments has been associated with reduced informal exactions and greater transparency (Okello et al., 2022), echoing the leakage problem documented here. In India, online dispute resolution has compressed the time needed to settle informal economy conflicts from years to months (Rao et al., 2023), directly relevant to the failed Block T mediation. In Bangladesh, digital trader registration curbed harassment by officials (Jamal et al., 2022), underscoring how a verifiable identity record can rebalance power between traders and administrators.

Two widely documented cases from outside the developing country market literature sharpen the comparison further. Estonia's interoperable e-governance architecture built on a secure data exchange layer that lets agencies share information under strict access controls illustrates the security and interoperability standard to which the SKP's SIPKD integration and role based dashboards should aspire. Brazil's participatory budgeting tradition, pioneered in Porto Alegre, demonstrates that citizen participation becomes consequential only when it is institutionalised within binding administrative and fiscal processes rather than left as optional consultation (Wampler, 2007). This is precisely the design principle behind the PTKP's 'binding obligation to follow up'.

Read together, the international evidence suggests that the SKP's distinctive contribution lies less in any single component than in their integration: it combines transaction transparency (as in Kenya and Vietnam), a verifiable digital identity (as in Bangladesh, India, and Estonia), and institutionalised participation (as in Brazil) within one architecture tailored to the informal-market context. It also suggests a caution: none of these reforms succeeded on technology alone; each depended on legal mandate, administrative commitment, and sustained attention to inclusion conditions that must be met at Panorama Market as well.

CONCLUSION

This study examined the post-pandemic governance problems of Panorama Market, Bengkulu City, and formulated the Smart Card System as an alternative digital governance architecture. Empirically, the market faces six interlocking problems: limited information transparency, decision-making that sidelines traders, the weak bargaining position of trader organisations, a dispute-resolution mechanism that does not work, limited digital-participation infrastructure, and the leakage of levy receipts. Read through Muluk's (2007) New Ladder of Participation and the UNDP's (1997) good local governance principles, traders sit on the manipulation/therapy rungs, with deficiencies across nearly every dimension of good governance.

Theoretical Contribution

The study enriches the literature on digital public administration in two ways. First, it combines Muluk's (2007) New Ladder of Participation with the UNDP's good local governance principles in the context of post-pandemic traditional markets a context still rarely addressed in the international literature. Second, it offers a conceptual SKP model that unites smart card technology, an e-participation platform, IoT monitoring, and digital dispute resolution within a single integrated architecture.

Practical Implications

For market managers and local governments, the findings underline three points: (1) physical revitalisation alone will not suffice without more transparent and participatory governance reform; (2) market PAD can plausibly recover if the levy system is made transparent and digitalised, given the leakage evidenced by the per-trader yield analysis; and (3) involving trader organisations from the policy formulation stage onward reduces the risk of conflict escalating into litigation.

Policy Recommendations

The Bengkulu City Government should consider three steps: (1) revising Bengkulu City Regional Regulation No. 6 of 2020 to add binding provisions on digital governance and trader participation; (2) making APPSI

Bengkulu an official partner in market management through a documented memorandum of understanding; and (3) designing a transparent, competitive public–private partnership framework. Any wider application should proceed cautiously and incrementally. Rather than asserting immediate provincial or national roll-out, the study recommends that the SKP first be piloted and evaluated in one or two comparable markets beginning, for instance, with a high-density market in North Bengkulu Regency so that evidence from multiple sites can establish its transferability before scaling. Only once such evidence accumulates would it be appropriate for the Ministry of Trade to consider incorporating SKP components (particularly the SMRD) into the conditions for disbursing APBN revitalisation funds.

Limitations and Future Research Agenda

Several limitations should be acknowledged candidly. First, the study rests on a single case, so its generalisation is analytical rather than statistical; findings should be read as transferable propositions, not as nationally representative results. Second, the SKP model is conceptual and has not been empirically tested, so its projected effects on transparency, participation, and levy compliance remain hypotheses. Third, the quantitative series comprises short administrative population records rather than sampled data, which precludes inferential testing and confines the analysis to descriptive and derived indicators. Fourth, the MMAT threshold and the English/Indonesian language restriction may bias the SLR corpus toward methodologically conventional and regionally proximate studies. Fifth, no structured trader survey was administered, so the qualitative evidence, though drawn from a broad range of informants, is non-probabilistic.

These limitations define a clear agenda. Future research should (1) validate the model through a Delphi expert panel; (2) co-design it with traders and stakeholders to secure acceptability and equity; (3) pilot it in a bounded setting with a pre/post evaluation generating data amenable to inferential analysis; (4) conduct a formal cost benefit and data-protection assessment; and (5) undertake multi-site comparative study across Bengkulu's 240 public markets and beyond, so that any claim of wider or national applicability rests on evidence from diverse locations rather than on extrapolation from a single case.

REFERENCES

1. Antara Bengkulu. (2025, April). Pemkot Bengkulu revitalisasi Pasar Panorama gunakan skema Inpres. <https://bengkulu.antaranews.com>
2. Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, 35(4), 216–224. <https://doi.org/10.1080/01944366908977225>
3. Badan Pusat Statistik. (2024). *Direktori Pasar Rakyat 2024, Buku I: Sumatera*. Jakarta: BPS.
4. Badan Pusat Statistik. (2024). *Direktori Pasar Rakyat 2024, Buku II: Jawa*. Jakarta: BPS.
5. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications.
6. Disperdagrin Kota Bengkulu. (2024). *Laporan realisasi PAD sektor pasar Kota Bengkulu*. Bengkulu: Disperdagrin Kota Bengkulu.
7. Disperdagrin Kota Bengkulu. (2025). *Pernyataan resmi tentang penataan kawasan Pasar Panorama*. Bengkulu: Disperdagrin Kota Bengkulu.
8. Jamal, M., Rahman, A., & Islam, S. (2022). Digital identity systems for informal traders: Evidence from Bangladesh market governance reform. *Development Policy Review*, 40(3), e12587. <https://doi.org/10.1111/dpr.12587>
9. Kholil, M., Suyatna, I., & Handayani, T. (2024). WhatsApp based community governance and traditional market conflict management: Evidence from East Java. *Jurnal Ilmu Administrasi Publik*, 12(1), 45–67.
10. Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159–174. <https://doi.org/10.2307/2529310>
11. Malano, H. (2011). *Selamatkan pasar tradisional: Potret ekonomi rakyat kecil*. Jakarta: Gramedia Pustaka Utama.
12. Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage Publications.

13. Muluk, M. R. K. (2007). *Menggugat partisipasi publik dalam pemerintahan daerah*. Malang: Bayumedia Publishing.
14. Nguyen, T. H., Tran, L. P., & Pham, V. D. (2021). RFID-based market management systems and informal trader governance: Evidence from Vietnamese wholesale markets. *Asian-Pacific Economic Literature*, 35(2), 123–145.
15. Okello, J., Muriuki, J., & Ndungu, P. (2022). Digital market management and governance transparency: Evidence from urban Kenyan markets. *Journal of African Business*, 23(4), 891–912.
16. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
17. Peraturan Daerah Kota Bengkulu Nomor 6 Tahun 2020 tentang Pengelolaan Pasar Rakyat.
18. Peraturan Menteri Perdagangan Nomor 21 Tahun 2021 tentang Pedoman Pembangunan dan Pengelolaan Sarana Perdagangan.
19. Pramusinto, A., Kumorotomo, W., & Yani, Y. M. (2020). Digital governance in Indonesian local government: Progress and challenges. *Policy & Governance Review*, 4(3), 175–188.
20. Purbaya, A. A., Sulisty, H., & Maharani, D. (2023). Conflict resolution mechanisms in Indonesian traditional market governance: An institutional analysis. *Jurnal Administrasi Publik*, 20(2), 113–134.
21. Rahman, D., & Kusuma, B. (2023). Blockchain-based retribution management in traditional markets: A West Java pilot study. *Indonesian Journal of Computing and Cybernetics Systems*, 17(1), 34–48.
22. Ramadhani, F., Setiawan, A., & Wahyuni, S. (2023). Digital capacity building for trader organizations in traditional markets: Evidence from Central Java. *Jurnal Kebijakan dan Administrasi Publik*, 27(1), 56–78.
23. Rao, P. K., Singh, A., & Tripathi, R. (2023). Online dispute resolution for informal economy conflicts: Evidence from Indian urban markets. *Government Information Quarterly*, 40(2), 101810.
24. Saputra, D. E. (2025, February). Optimalisasi retribusi Pasar Panorama Kota Bengkulu demi kemajuan ekonomi lokal. *Kumparan*. <https://kumparan.com>
25. Setiawan, B., Dewi, R., & Haryanto, T. (2022). Smart market monitoring systems and informal trader management: A Yogyakarta pilot evaluation. *Jurnal Perencanaan Wilayah dan Kota*, 33(3), 201–221.
26. Standar Nasional Indonesia 8152:2021 tentang Pasar Rakyat. Badan Standardisasi Nasional.
27. Undang-Undang Nomor 7 Tahun 2014 tentang Perdagangan.
28. Undang-Undang Nomor 27 Tahun 2022 tentang Pelindungan Data Pribadi.
29. UNDP. (1997). *Governance for sustainable human development: A UNDP policy document*. New York: United Nations Development Programme.
30. UPTD Pasar Panorama Kota Bengkulu. (2023). *Data jumlah pedagang Pasar Panorama 2020–2023*. Bengkulu: UPTD Pasar Panorama.
31. UPTD Pasar Panorama Kota Bengkulu. (2024). *Data retribusi Pasar Panorama Kota Bengkulu 2020–Mei 2024*. Bengkulu: UPTD Pasar Panorama.
32. UPTD Pasar Panorama Kota Bengkulu. (2025). *Keterangan pers tentang ketersediaan kios dan auning Pasar Panorama*. Bengkulu: UPTD Pasar Panorama.
33. Wampler, B. (2007). *Participatory budgeting in Brazil: Contestation, cooperation, and accountability*. University Park, PA: Pennsylvania State University Press.
34. Winarno, B. (2021). Digital adoption patterns among traditional market traders in Java: Implications for e-governance design. *Jurnal Ilmu Sosial dan Ilmu Politik*, 25(1), 1–19.
35. Wirtz, B. W., Weyerer, J. C., & Geyer, C. (2021). Artificial intelligence and the public sector: Applications and challenges. *International Journal of Public Administration*, 42(7), 596–615.