PUBLIC ADMINISTRATION AND GOVERNANCE

Digital Reforms in the Public Distribution System and Policy Outcomes: An Assessment of Cooperative-Run Fair Price Shops in Tamil Nadu

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Abstract

The Public Distribution System (PDS) has progressively moved from a predominantly manual welfare-distribution arrangement towards a digitally enabled governance system. In Tamil Nadu, this transformation has been supported by electronic Point of Sale (e-POS) devices, Smart Family Cards, Aadhaar-linked authentication, online transaction recording, digital stock monitoring and other technology-enabled administrative mechanisms. The present article examines the policy and governance implications of these reforms through a secondary-data analysis of the PDS, with particular attention to cooperative-run Fair Price Shops in Tamil Nadu. The analysis is based on official administrative information relating to PDS coverage, Fair Price Shops, family cards, digital infrastructure, beneficiary categories, commodity off-take, new ration-card applications and grievance resolution. The selected study districts are Chennai, Coimbatore, Dindigul and Thoothukudi. The evidence indicates a very high level of digital infrastructure coverage: 34,776 operational e-POS devices are reported against 34,916 Fair Price Shops, representing 99.60 per cent coverage. District-level indicators also show extensive integration of mobile-linked records and digital identity information. However, the findings demonstrate that infrastructure coverage should not be equated with effective digital governance. New ration-card processing data show an average and median processing time of seven days against a prescribed maximum of 30 days, but the approval rate declined from 69.25 per cent in 2022 to 49.22 per cent during January–July 2023, while pending applications increased sharply. Similarly, 95.73 per cent of reported grievances had been resolved within the available reporting period, yet POS-device-related grievances constituted 76.25 per cent of all grievances. The article therefore argues that the policy value of digitalisation lies not in technology deployment alone but in the interaction between digital infrastructure, administrative capacity, institutional responsiveness and last-mile service delivery. The study concludes that Tamil Nadu has established a strong digital foundation for PDS governance, but sustained policy outcomes require attention to system reliability, backlog management, grievance prevention and institutional support at the Fair Price Shop level.

Keywords: Public Distribution System; digital governance; e-POS; Fair Price Shops; cooperatives; food security; administrative efficiency; transparency; Tamil Nadu

1 Introduction

The Public Distribution System is one of India's most extensive welfare institutions and remains central to food security, social protection and subsidised access to essential commodities. Its importance arises not simply from the quantity of food grains distributed, but from the institutional relationship it creates between the State and households that depend on public welfare delivery. Fair Price Shops constitute the last-mile interface of this relationship. Consequently, weaknesses in

authentication, stock management, record keeping, transaction processing or grievance handling at the FPS level can directly affect the practical value of a policy that is otherwise well designed.

Historically, the PDS operated through paper-based records, physical ration cards and substantial dealer-level discretion. The literature reviewed in the thesis identifies leakage, diversion, beneficiary identification errors, weak monitoring and information asymmetry as recurring concerns. Digital reforms emerged as a response to these limitations. End-to-end computerisation, Aadhaar-enabled authentication, electronic Point of Sale devices, Smart Family Cards, online allocation and real-time transaction monitoring have progressively altered the administrative architecture of the PDS. The intended governance gains include greater traceability, reduced manual intervention, improved targeting, faster reporting and stronger accountability.

Tamil Nadu provides a relevant setting for examining this transformation. The State has retained a strong welfare orientation through its Universal Public Distribution System while simultaneously adopting extensive digital mechanisms. Cooperative institutions have also played an important role in the operation of Fair Price Shops. This combination makes the State useful for examining a central question: does the expansion of digital infrastructure translate into measurable improvements in administrative and policy outcomes, or does technology primarily create a more visible administrative system whose effectiveness still depends upon institutional capacity?

The present article narrows the broader thesis into a secondary-data research article. Rather than reproducing the beneficiary-level analysis of the later thesis chapter, it concentrates on administrative evidence that can be examined independently: the scale of the PDS network, digital infrastructure, district-level workload, beneficiary composition, commodity distribution, new ration-card processing and grievance resolution. The objective is to assess what these indicators collectively reveal about transparency, operational efficiency, accountability and the policy implications of digitalisation.

2 Conceptual and theoretical framework

The study is anchored in a governance-oriented understanding of digitalisation. New Public Management provides one strand of the conceptual foundation by emphasising performance, efficiency, standardisation and measurable service delivery. Digital transaction recording and real-time monitoring fit this perspective because they reduce reliance on manual registers and create an administrative trail that can be reviewed by supervisory authorities.

Good Governance Theory provides the second and more important dimension. Transparency, accountability, responsiveness, equity and citizen-oriented service are not achieved simply because a transaction becomes electronic. A digital system becomes governance-enhancing when it reduces information asymmetry, makes administrative actions more traceable, enables timely correction and protects access for intended beneficiaries. Digitalisation is therefore treated as a governance-enabling mechanism rather than a self-sufficient governance outcome.

Table 1 presents the analytical framework of the study.

Table 1. Analytical framework of the study.

Stage	Analytical construct	Secondary indicators
Digital infrastructure	Technology availability and integration	Operational e-POS; mobile-linked and Aadhaar-linked records

Stage	Analytical construct	Secondary indicators
Institutional scale	Administrative workload	FPSs; family cards; beneficiary records; taluks
Beneficiary inclusion	Entitlement composition	NFSA cards; AAY cards
Operational efficiency	Administrative processing	Applications; approval; rejection; pending; processing time
Accountability	Administrative responsiveness	Grievances; resolution time; POS-related grievances
Distribution performance	Physical service-delivery intensity	Rice and wheat off-take per ration card
Policy outcome	Governance implication	Synthesis of transparency, efficiency, accountability and reliability

The framework produces an important analytical distinction. Digital readiness is measured by the availability and integration of digital infrastructure, whereas digital effectiveness is inferred only cautiously from operational and accountability indicators. The difference between these concepts is central to interpreting the evidence.

3 Review of literature

The literature reviewed in the thesis broadly falls into three streams. The first examines the historical weaknesses of the PDS. Khera's work highlighted the extent to which leakage and diversion were associated with weaknesses in implementation, monitoring and institutional capacity. This literature established that the effectiveness of food subsidy programmes cannot be assessed only from policy design; the functioning of the delivery chain is equally important.

The second stream examines digitalisation and authentication. Muralidharan, Niehaus and Sukhtankar (2025) provided influential empirical evidence that identity verification and digitisation can reduce irregularities and diversion. At the same time, the literature records a significant qualification: authentication systems can generate exclusion when beneficiaries face biometric, connectivity or documentation problems. The implication is that digital controls must be accompanied by exception handling and alternative access mechanisms.

The third stream adopts a governance and inclusion perspective. Drèze and Khera emphasise that improvements in record keeping and transparency should not be evaluated independently of accessibility, dignity and beneficiary experience. Recent policy and institutional reports cited in the thesis similarly stress that e-POS, online stock monitoring and digital beneficiary databases can strengthen administrative visibility, while network failures, inadequate digital literacy, authentication problems and weak local support can reduce their practical effectiveness.

The literature therefore points to a consistent conceptual conclusion: technology is necessary but not sufficient. Yet a gap remains in the use of administrative evidence to connect infrastructure coverage with measurable indicators of operational performance and accountability at the last mile, particularly in the context of cooperative-run FPSs in Tamil Nadu. The present article addresses this gap by placing digital infrastructure indicators alongside processing and grievance data rather than treating device deployment as the final measure of reform success.

4 Research gap

Existing research has made substantial contributions to understanding PDS leakage, authentication, digitisation and welfare inclusion. However, much of the literature either evaluates technology-specific interventions or examines beneficiary experience through primary surveys. There is comparatively less integrated secondary-data analysis connecting the scale of the PDS network, digital readiness, administrative workload, case-processing performance and grievance responsiveness within a single analytical framework.

A second gap concerns institutional interpretation. Cooperative-run FPSs form an important component of the Tamil Nadu delivery architecture, but institutional discussions are often separated from numerical analysis. The present study treats the FPS as both a technological endpoint and an institutional unit. This permits a cautious assessment of whether digital infrastructure is accompanied by the administrative conditions required for reliable service delivery.

5 Research methodology

5.1 Research design

The study adopts a descriptive, analytical and comparative research design based exclusively on secondary and administrative data for the empirical article. The approach is appropriate because the selected indicators are generated through official PDS administrative systems and are intended to measure system scale, infrastructure, processing and accountability.

5.2 Study context

The broader thesis covers Chennai, Coimbatore, Dindigul and Thoothukudi. These districts provide contrasting metropolitan, industrial-commercial, agrarian/semi-urban and coastal contexts. For the present article, they are treated as comparative administrative contexts rather than statistically representative samples of Tamil Nadu.

5.3 Sources and period of analysis

The secondary evidence was compiled from official PDS administrative information, Government reports, NFSA-related records, digital infrastructure information, grievance records and new ration-card application reports. The datasets do not all refer to one common date. The state-level dashboard and district-level administrative figures represent the reporting status available in the records collected for the study, while the new ration-card applications cover January 2022 to July 2023 and grievance data extend up to 21 July 2023. This indicator-specific treatment of time is necessary because administrative datasets are generated for different reporting purposes.

5.4 Analytical methods

The analysis uses frequencies, percentages, ratios, averages, comparative indicators and limited trend analysis. No artificial time series has been constructed where comparable historical observations were unavailable. The study also avoids interpreting administrative record ratios as individual beneficiary coverage when the source definitions do not support such an interpretation.

5.5 Objectives

- To assess the scale and digital infrastructure of the PDS in Tamil Nadu.

- To compare selected administrative indicators across Chennai, Coimbatore, Dindigul and Thoothukudi.
- To examine administrative efficiency using new ration-card application and processing indicators.
- To evaluate accountability and responsiveness using grievance-resolution evidence.
- To derive policy implications regarding the relationship between digital infrastructure and effective last-mile PDS governance.

5.6 Hypotheses

Only hypotheses that can reasonably be examined from the available secondary evidence are retained. Hypotheses concerning beneficiary satisfaction or the statistical influence of digital adoption on individual-level perceptions are excluded because those require primary respondent-level analysis.

- **H_{01}:** Digital reforms have not produced measurable improvement in transparency and accountability in PDS administration.
- **H_{02}:** Digitalisation has not improved operational efficiency in PDS administrative service delivery.

The hypotheses are assessed through administrative indicators and comparative evidence rather than conventional inferential significance testing. This qualification is necessary because the secondary datasets do not constitute a controlled pre-reform/post-reform panel with a common measurement structure.

6 Analysis and interpretation

6.1 State-level scale of the PDS

Table 2 presents the state-level scale of the PDS in Tamil Nadu.

Table 2. State-level scale of the PDS in Tamil Nadu.

Indicator	Reported value
Districts	38
Taluks	318
Fair Price Shops	34,916
Family Cards	22,813,033
Beneficiary records*	702,233,830
Aadhaar-linked records	69,704,947
Mobile-linked records	22,810,636
Operational e-POS devices	34,776

Source: Compiled by the Researcher from the Tamil Nadu PDS administrative information.

The scale of the network is itself a governance challenge. With 34,916 FPSs and more than 22.8 million family cards, the system requires continuous coordination among policy authorities, logistics agencies, cooperative institutions, shop-level personnel and beneficiaries. The reported beneficiary-record count should not be treated as a count of unique persons because it is an administrative

record measure. The principal implication is that digital governance is being deployed over a highly decentralised and data-intensive structure.

6.2 Digital infrastructure: Readiness versus effectiveness

Table 3 presents the digital infrastructure indicators.

Table 3. Digital infrastructure indicators.

Indicator	Number	Derived indicator
Total FPSs	34,916	100.00% base
Operational e-POS	34,776	99.60% of FPSs
Gap	140	0.40% of FPSs
Mobile-linked records	22,810,636	≈99.99% of family-card count*
Aadhaar-linked records	69,704,947	≈305.54% of family-card count*

The 99.60 per cent e-POS figure is one of the strongest indicators of technological penetration in the Tamil Nadu PDS. Nevertheless, a device count is an infrastructure indicator, not an outcome indicator. A device may be installed and still experience connectivity interruptions, authentication failures, software problems or operator-level difficulties. The grievance data examined later provide evidence supporting this distinction.

The mobile-linked ratio is useful only as an administrative-record comparison. The near-equivalence between mobile-linked records and family cards indicates extensive incorporation of mobile information into the PDS database, but it should not be stated as proof that 99.99 per cent of individual beneficiaries possess or actively use linked mobile numbers. The Aadhaar ratio exceeding 100 per cent likewise reflects different administrative units, not impossible coverage.

6.3 District-wise administrative scale

Table 4 presents the district-wise administrative scale.

Table 4. District-wise administrative scale.

District	Taluks	FPSs	FPS share (%)	Family cards	Family cards/FPS
Chennai	19	1,827	34.50	2,273,729	1,244.52
Coimbatore	12	1,401	26.45	1,165,882	832.18
Dindigul	10	1,111	20.98	701,935	631.80
Thoothukudi	10	957	18.07	552,581	577.41
Total	51	5,296	100.00	4,694,127	-

The selected districts contain 5,296 Fair Price Shops across 51 taluks. Chennai has the largest absolute network, accounting for 34.50 per cent of the selected FPS base. The strongest contrast is between Chennai and Thoothukudi: an average FPS in Chennai is associated with approximately 1,244.52 family cards, compared with 577.41 in Thoothukudi, a ratio of about 2.16 to 1. This demonstrates that a common digital platform operates under different administrative workloads.

Higher household loads can imply more authentication events, transactions, stock-management requirements and service pressure.

6.4 Beneficiary composition: NFSA and AAY

Table 5 presents the beneficiary composition: NFSA and AAY cards.

Table 5. Beneficiary composition: NFSA and AAY cards.

District	Family cards	NFSA cards	NFSA %	AAY cards	AAY within NFSA %
Chennai	2,273,729	758,350	33.35	31,567	4.16
Coimbatore	1,165,882	418,765	35.92	49,731	11.88
Dindigul	701,935	372,611	53.08	68,863	18.48
Thoothukudi	552,581	293,057	53.03	59,042	20.15

The beneficiary structure differs substantially. NFSA cards account for about one-third of the family-card base in Chennai and Coimbatore, but more than half in Dindigul and Thoothukudi. AAY concentration is even more differentiated: AAY cards constitute 4.16 per cent of NFSA cards in Chennai but 20.15 per cent in Thoothukudi. Thus, digital service delivery occurs within different entitlement and vulnerability structures. Districts with higher concentrations of priority households may require stronger support and exception-handling mechanisms.

6.5 Commodity distribution intensity

Table 6 presents the rice and wheat off-take per ration card.

Table 6. Rice and wheat off-take per ration card.

District	Rice kg/card	Wheat kg/card	Rice share (%)	Wheat share (%)
Chennai	6.12	0.64	90.58	9.42
Coimbatore	6.87	0.69	90.88	9.12
Dindigul	7.90	0.67	92.14	7.86
Thoothukudi	8.29	1.01	89.14	10.86

Rice remains dominant in the combined rice-and-wheat off-take. Rice intensity ranges from 6.12 kg per ration card in Chennai to 8.29 kg in Thoothukudi. Wheat intensity ranges from 0.64 kg to 1.01 kg. These figures are not direct measures of better or poorer performance because off-take depends on entitlement structure, household composition and actual lifting behaviour. They demonstrate instead that the operational volume handled by an FPS network is context-dependent.

6.6 Administrative efficiency: New ration-card applications

Table 7 presents the outcomes of new ration-card applications, January 2022–July 2023.

Table 7. Outcomes of new ration-card applications, January 2022–July 2023.

Outcome	Number	Percentage
Applications received	892,481	100.00

Outcome	Number	Percentage
Approved	563,246	63.11
Rejected	271,091	30.37
Pending	31,984	3.58
Reopened	26,160	2.93

Source: Official new ration-card application report, January 2022–July 2023.

The application data provide a useful indicator of administrative efficiency because digital governance should improve traceability and processing visibility. Of 892,481 applications, 563,246 were approved and 271,091 were rejected. The system therefore continues to involve substantive administrative scrutiny; digitalisation does not transform the application process into automatic approval.

The processing-time indicators are more positive. The prescribed maximum period is 30 days, whereas the reported average and median processing time are both seven days, with a minimum of one day and a maximum of 30 days. For completed cases, this suggests relatively rapid processing. However, the temporal pattern reveals an important limitation.

Table 8 presents the comparison of new ration-card application outcomes, 2022 and January–July 2023.

Table 8. Comparison of new ration-card application outcomes, 2022 and January–July 2023.

Indicator	Jan-Dec 2022	Jan-Jul 2023	Analytical change
Applications	618,960	273,521	Lower volume
Approved	428,620	134,626	Lower absolute number
Approval rate	69.25%	49.22%	−20.03 percentage points
Pending	6	31,978	Sharp increase
Rejected	177,687	93,404	Lower absolute number

The approval rate declined by approximately 20 percentage points between the two reporting periods. More strikingly, pending applications increased from only six in the first period to 31,978 in January–July 2023. The July 2023 position recorded only 1,576 approvals against 22,294 pending applications. The evidence therefore distinguishes case-level processing speed from system-level flow efficiency. Digital systems may enable rapid processing of completed cases while backlogs still emerge because of administrative workload, scrutiny or capacity constraints.

6.7 Grievance resolution and accountability

Table 9 presents the grievance resolution status.

Table 9. Grievance resolution status.

Resolution status	Number	Percentage
Resolved within one week	45,430	89.48
Resolved within two weeks	1,286	2.53

Resolution status	Number	Percentage
Resolved within three weeks	300	0.59
Resolved after three weeks	1,588	3.13
Pending within one week	2,166	4.27
Total	50,770	100.00

Source: Official grievance information available up to 21 July 2023.

The grievance figures provide direct evidence on administrative responsiveness. Of 50,770 grievances, 45,430, or 89.48 per cent, were resolved within one week. When all resolved categories are combined, 95.73 per cent had been resolved within the reporting period, leaving 4.27 per cent pending within one week. This indicates substantial grievance-disposal capacity.

At the same time, the category of grievance matters. POS-device-related complaints numbered 38,710, representing 76.25 per cent of total grievances. This creates a governance paradox. The PDS has achieved 99.60 per cent e-POS infrastructure coverage, yet POS-related issues dominate the grievance register. The policy question is therefore no longer simply whether an FPS possesses a digital device, but whether the device, connectivity, authentication and transaction process function reliably at the point of service.

6.8 Assessment of the objectives and hypotheses

Table 10 presents the assessment of the objectives.

Table 10. Assessment of the objectives.

Objective	Major Finding
Objective 1: To examine the nature, scope and institutional design of digital reforms implemented in the Public Distribution System of Tamil Nadu.	Tamil Nadu has developed a comprehensive digital PDS framework incorporating Smart Family Cards, Aadhaar-enabled authentication, e-POS devices, digital beneficiary databases, online allocation, stock monitoring and transaction recording. The State-level network covers 38 districts, 318 taluks and 34,916 Fair Price Shops, with 34,776 operational e-POS devices, indicating 99.60% e-POS coverage. The finding establishes that digital infrastructure has been extensively institutionalised across the PDS.
Objective 2: To analyse the extent to which digitalisation has influenced operational efficiency, transparency and accountability in PDS service delivery.	Digitalisation has contributed to measurable improvements in administrative traceability and service processing. New ration-card applications recorded an average and median processing time of 7 days, against a prescribed maximum of 30 days. Further, 95.73% of recorded grievances had been resolved by 21 July 2023. However, the persistence of pending applications and the concentration of grievances around e-POS devices indicate that digital infrastructure alone does not eliminate operational bottlenecks.
Objective 3: To assess changes in PDS performance outcomes, particularly leakage reduction, beneficiary inclusion and transaction reliability following the introduction of digital technologies.	The available secondary evidence indicates stronger transaction monitoring and beneficiary authentication through digital systems. Mobile linkage was close to complete in the selected districts, while Aadhaar-linked records demonstrate extensive integration of beneficiary databases. However, the available aggregate data do not permit a direct causal estimate of leakage reduction. The high proportion of POS-related grievances (76.25%) also indicates that transaction reliability remains dependent on the functioning of frontline digital infrastructure.

Objective	Major Finding
Objective 4: To evaluate the role and effectiveness of cooperative societies in the implementation and governance of digitally enabled PDS operations in Tamil Nadu.	Cooperative-run Fair Price Shops function as the crucial last-mile institutional mechanism connecting the digital PDS architecture with beneficiaries. The selected districts collectively account for 5,296 FPS, demonstrating the substantial operational role of cooperative outlets. However, differences in family-card workload per FPS-from approximately 578 cards per FPS in Thoothukudi to 1,245 in Chennai-suggest that the same digital system operates under substantially different institutional workloads.
Objective 5: To critically examine the policy outcomes of digital PDS reforms with respect to governance quality, beneficiary access and sustainability of food-security mechanisms.	The evidence indicates that digital reforms have strengthened traceability, administrative monitoring, grievance tracking and transaction-level accountability. Nevertheless, variations in workload, pending applications and POS-related grievances demonstrate that technology must be supported by adequate institutional capacity, infrastructure maintenance and responsive grievance mechanisms. Thus, the overall policy outcome is positive but conditional: digitalisation strengthens governance, but technology by itself does not guarantee effective last-mile delivery.

Table 11 presents the assessment of the hypotheses.

Table 11. Assessment of the hypotheses.

Hypothesis	Evidence	Assessment
H_{01}: No measurable improvement in transparency/ accountability	99.60% e-POS coverage; extensive digital linkage; 95.73% grievance resolution	Not supported by descriptive evidence; digitalisation is associated with stronger traceability and responsiveness, subject to reliability constraints.
H_{02}: No improvement in operational efficiency	7-day average/median processing versus 30-day limit; but approval rate fell and pending cases rose sharply	Not supported in a blanket sense; processing speed is favourable but backlog management remains weak.

7 Discussion

The combined evidence presents a more nuanced picture of digital PDS reform than either a wholly positive or wholly negative assessment. The infrastructure base is extensive. Nearly every FPS has an operational e-POS device, digital identity and communication records are deeply embedded in the administrative system, and grievance disposal is rapid for the large majority of registered cases. These indicators are consistent with the literature associating digitisation with improved transaction traceability, administrative visibility and reduced dependence on manual records.

At the same time, digitalisation does not remove the institutional problems associated with large-scale welfare administration. The high share of POS-related grievances indicates that technical reliability remains a practical issue. The decline in the new-card approval rate and the sharp increase in pending cases indicate that digital registration and tracking do not automatically solve administrative bottlenecks. Technology changes the information environment, but institutions determine how effectively that information is converted into public service.

The district comparisons add another layer. Family cards per FPS vary from 577.41 in Thoothukudi to 1,244.52 in Chennai. Beneficiary composition also differs considerably, with AAY concentration much higher in Thoothukudi and Dindigul. A uniform digital platform therefore operates across non-

uniform administrative environments. Policy monitoring should incorporate workload and beneficiary vulnerability rather than relying on a single statewide infrastructure indicator.

8 Major findings

- Tamil Nadu reports 34,776 operational e-POS devices against 34,916 FPSs, equivalent to 99.60 per cent infrastructure coverage.
- Family cards per FPS range from 577.41 in Thoothukudi to 1,244.52 in Chennai, showing major differences in administrative workload.
- Digital linkage is extensive, but administrative-record ratios must not be interpreted as individual-level coverage rates.
- NFSA and AAY composition varies substantially across districts, indicating different beneficiary and vulnerability structures.
- Rice remains the dominant commodity in selected district off-take, although commodity intensity differs across districts.
- New ration-card processing has an average and median time of seven days against a prescribed maximum of 30 days.
- The approval rate declined from 69.25 per cent in 2022 to 49.22 per cent during January–July 2023, while pending cases increased sharply.
- 95.73 per cent of reported grievances had been resolved within the available reporting period.
- POS-device-related grievances account for 76.25 per cent of all grievances, demonstrating that infrastructure availability does not guarantee technical effectiveness.
- Overall, digitalisation improves administrative traceability and visibility, but policy outcomes remain dependent on institutional capacity and last-mile reliability.

9 Suggestions and policy implications

- Shift performance monitoring from e-POS coverage to e-POS reliability, including uptime, transaction success, authentication failure, connectivity interruption and restoration time.
- Develop a district/FPS workload index combining family cards per FPS, transaction volume, beneficiary composition and grievance incidence.
- Treat POS-related grievances as preventive-maintenance signals and undertake root-cause analysis of devices, connectivity, power supply, software and operator training.
- Monitor application backlog alongside processing time. A seven-day average for completed cases should not be presented as complete efficiency when pending applications are accumulating.
- Strengthen exception-handling and alternative authentication for beneficiaries facing biometric or connectivity problems.

10 Limitations

- The secondary datasets were generated for different administrative purposes and do not share one common reporting period.
- e-POS availability measures infrastructure readiness, not actual transaction quality, uptime or beneficiary experience.

- The district comparison is confined to four selected districts and is not statistically representative of all Tamil Nadu.
- The article excludes the beneficiary-level primary survey evidence contained in the wider thesis; satisfaction and perception-based hypotheses therefore require separate analysis.

11 Conclusion

Digital reform has fundamentally altered the administrative architecture of the Public Distribution System in Tamil Nadu. The evidence demonstrates that the State has moved well beyond a pilot-stage digital system. With 99.60 per cent reported e-POS coverage and extensive digital integration of beneficiary administration, the technological foundation for digitally enabled PDS governance is firmly established.

The more important question is what happens after infrastructure is installed. The secondary evidence shows that digitalisation is associated with improved traceability, rapid grievance disposal and relatively short processing times for completed ration-card applications. At the same time, the sharp increase in pending applications during 2023 and the dominance of POS-related grievances reveal that technological deployment does not automatically eliminate administrative and operational constraints.

The central conclusion is therefore that digital PDS reform should be understood as an institutional transformation rather than a technology-installation exercise. The effectiveness of e-POS, digital authentication and online administrative systems depends upon infrastructure reliability, the capacity of cooperative institutions and FPS personnel, administrative responsiveness and the ability to protect beneficiary access when digital processes fail.

For policy, future evaluation should move beyond counting devices and linked records. A mature performance framework should combine infrastructure uptime, transaction reliability, workload, backlog, grievance recurrence, resolution time and beneficiary access. Tamil Nadu has established a strong digital foundation; the next phase of reform should concentrate on converting digital readiness into consistent digital effectiveness at the last mile.

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