

E-Governance and Public Welfare Delivery: Issues and Challenges in Implementing DBT

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Abstract

Direct Benefit Transfer is fundamentally an e-governance intervention: it seeks to reform public welfare delivery by inserting digital identity, digital payment rails and digital record-keeping between the citizen and the state. Evaluating DBT therefore requires more than an assessment of its fiscal or leakage outcomes; it requires an understanding of why e-governance projects in developing-country settings succeed or fail as information-system interventions. This paper applies the design-reality gap framework developed in the e-governance literature to the specific case of DBT implementation in India, arguing that many of the persistent problems documented in DBT evaluations, including exclusion errors, authentication failures and beneficiary confusion, are best understood not as isolated glitches but as symptoms of a systematic gap between the assumptions embedded in DBT's technical design and the on-the-ground realities of rural infrastructure, institutional capacity and citizen digital literacy. Drawing on the e-governance failure literature and on documented case evidence from Indian welfare programmes, the paper identifies seven recurring dimensions along which design and reality diverge, and argues that closing these gaps, rather than simply expanding DBT's technical footprint, is the central challenge for e-governance-led welfare reform going forward.

Keywords: e-governance, Direct Benefit Transfer, design-reality gap, digital governance, welfare delivery, implementation challenges, India

1. Introduction

E-governance, broadly defined as the use of information and communication technology to improve government processes, citizen services and state-society interaction, has become a central pillar of public administration reform across the developing world. In India, this trend has converged with the country's welfare architecture through Direct Benefit Transfer, which recasts subsidy and benefit delivery as a digitally mediated transaction between a uniquely identified citizen and the state's financial infrastructure. This convergence positions DBT simultaneously as a welfare policy and as an information-systems project, and it is this second, less frequently examined, identity that forms the focus of this paper.

A well-established literature on e-governance in developing countries has long observed that a large share of such projects, by some estimates over one-third, fail outright, with a further share achieving only partial success against their stated objectives. This literature has developed conceptual tools, most notably the design-reality gap framework, to explain why technically sound systems so often fail to deliver their intended developmental outcomes when deployed in resource-constrained,

institutionally uneven settings. This paper brings that framework to bear on DBT, treating the implementation challenges documented in the DBT-specific literature reviewed in the companion paper on DBT policy and practice as instances of a more general phenomenon that e-governance scholarship has studied for over two decades.

The paper proceeds as follows. Section 2 sets out the objectives and methodology. Section 3 introduces the design-reality gap framework as the paper's conceptual lens. Section 4 situates DBT within this framework as an e-governance intervention. Sections 5 and 6 examine, respectively, the technological and infrastructural dimensions and the institutional and human dimensions of the design-reality gap as they manifest in DBT implementation. Section 7 draws on documented case evidence, including from Tamil Nadu, to illustrate these gaps concretely. Section 8 discusses directions for closing the gap, and Section 9 concludes.

2. Objectives and Methodology

This paper aims to apply an established e-governance theoretical framework to the practical implementation challenges of DBT in India; to classify documented DBT implementation problems according to the dimensions of that framework; and to draw out policy-relevant implications for narrowing the gap between DBT's design assumptions and ground-level realities. The paper is conceptual and review-based, drawing on the foundational e-governance failure literature, on empirical DBT implementation studies, and on state-level documentation from Tamil Nadu. No primary data collection was undertaken; the paper is intended to provide the theoretical scaffolding for the district-level empirical evaluation of DBT implementation in Coimbatore District that follows later in this research programme.

3. Conceptual Framework: The Design-Reality Gap

The design-reality gap model, developed by Heeks in the early 2000s specifically to explain e-government project outcomes in developing countries, holds that the success or failure of an information-system intervention depends on the size of the gap between the assumptions built into its design and the actual conditions under which it is implemented. The larger this gap, the greater the likelihood of partial or total failure; the smaller the gap, the greater the likelihood of success (Heeks, 2003).

The framework identifies seven dimensions along which such gaps commonly arise, summarised by the acronym ITPOSMO: information (the data the system assumes it can access, versus the data actually available); technology (the infrastructure the system assumes, versus what exists on the ground); processes (the workflows the system assumes, versus how work is actually organised); objectives and values (the goals embedded in system design, versus the goals and incentives of the people who must operate it); staffing and skills (the human capacity assumed, versus actual capacity); management systems and structures (the organisational arrangements assumed, versus existing ones); and other factors, including political, cultural and resource constraints not captured by the preceding six dimensions (Heeks, 2001, 2003). Subsequent scholarship has extended this framework to explain not only outright failures but also cases where systems are technically well implemented yet still fail to achieve their underlying policy objectives, a distinction directly relevant to DBT, which is frequently deployed successfully as a payment technology while still failing some of its intended beneficiaries (Masiero, 2016a).

4. DBT as an E-Governance Intervention

Viewed through this lens, DBT's design embeds a specific and demanding set of assumptions. It assumes that every intended beneficiary can be uniquely and reliably identified through Aadhaar biometric authentication; that every beneficiary has access to a functioning, correctly linked bank account; that rural banking and connectivity infrastructure is dense and reliable enough to support real-time or near-real-time transaction processing; that beneficiaries and the frontline functionaries who assist them possess sufficient digital literacy to navigate the system; and that the administrative databases feeding the system, from ration card records to pension rolls, are accurate and current. Each of these assumptions constitutes a design element that must match an on-the-ground reality for the system to function as intended, and the literature reviewed in the following sections documents that each is, in practice, imperfectly met across significant parts of the country.

5. Technological and Infrastructural Dimensions of the Gap

The most extensively documented design-reality gaps in DBT implementation concern the technology and information dimensions of the ITPOSMO framework. Research on last-mile social protection delivery in India identifies inadequate rural banking infrastructure, under-staffed banking access points, connectivity failures affecting both internet and electricity supply, and outright biometric authentication failures as recurring barriers that prevent otherwise-eligible beneficiaries from completing DBT transactions (Dvara Research, 2024). These are technology-dimension gaps in the strict sense of the framework: the system's design assumes a level of network reliability and device functionality that does not uniformly exist in the areas where beneficiaries live.

A related information-dimension gap concerns the accuracy and currency of the underlying beneficiary databases that DBT systems query. Where Aadhaar numbers are incorrectly seeded against bank accounts, where names or demographic details are mismatched across databases, or where beneficiary records have not been updated to reflect death, migration or changed eligibility, the system's assumption of a clean, authoritative data layer breaks down, producing failed or misdirected transactions regardless of how well the payment technology itself performs. Large-scale evaluations of biometric authentication reforms confirm that these information and technology gaps carry real welfare costs, finding that millions of legitimate beneficiaries lost access to benefits at some point during a stringent authentication rollout, with the adverse effects traced substantially to how the technical transition was managed rather than to any inherent flaw in the payment mechanism itself (Muralidharan et al., 2020).

6. Institutional and Human Dimensions of the Gap

Beyond technology and information, the design-reality gap framework directs attention to process, staffing, and management-structure dimensions that are equally consequential but less visible in purely quantitative evaluations. On the process dimension, DBT's design assumes a linear workflow, that eligibility determination, database updating, authentication and payment disbursement occur in a coordinated and timely sequence, whereas in practice these steps are frequently handled by different departments, different levels of government, and different information systems that do not reliably synchronise with one another.

On the staffing and skills dimension, the literature notes that frontline functionaries responsible for enrolling and assisting beneficiaries are often themselves under-trained in the specific digital tools DBT requires, and that limited digital literacy among elderly, disabled, or manual-labouring

beneficiaries compounds the difficulty of navigating authentication and correction procedures when something goes wrong. On the objectives-and-values dimension, incentive misalignment can arise where the metrics used to evaluate DBT's success, such as the volume of funds disbursed or the number of accounts seeded, do not directly reward the harder-to-measure outcome of ensuring that genuinely eligible beneficiaries are not excluded, creating a structural risk that implementation effort concentrates on visible throughput rather than on last-mile inclusion.

7. Case Illustrations

Case-study evidence lends concrete texture to these abstract dimensions. A widely cited study of the Ration Card Management System in Kerala found that even where a digital system was well implemented from a technical standpoint and reached a critical mass of users, discrepancies between the system's design logic and the core accountability purpose it was meant to serve caused the project to fall short of its underlying policy objectives, illustrating that design-reality gaps can persist even in cases of nominal technical success (Masiero, 2016b). Related work extending this analysis to India's broader anti-poverty delivery system argues that digital governance reforms recast, rather than simply remove, the accountability relationships between citizens, intermediaries and the state, and that this recasting can produce new forms of exclusion even as it removes older forms of leakage (Masiero, 2016a).

State-level documentation from Tamil Nadu, discussed at greater length in the companion paper on DBT policy and practice, similarly shows that even in a state with comparatively strong administrative capacity, banking-partnership infrastructure and dedicated digital-literacy outreach have been necessary complements to the core DBT technology, and that data-privacy management and Aadhaar-database correction continue to require sustained administrative attention rather than being resolved once at the point of initial rollout (Yoganandham, 2019). This suggests that closing design-reality gaps is not a one-time technical fix but an ongoing administrative task, a conclusion directly relevant to the district-level evaluation of DBT implementation in Coimbatore that follows in this research programme.

8. A Stress Test: DBT during the COVID-19 Emergency

The COVID-19 lockdown of March 2020 provided an unplanned but instructive stress test of DBT's design-reality fit, since the Pradhan Mantri Garib Kalyan Yojana relief package required the system to rapidly disburse cash and in-kind support to tens of millions of households under conditions of acute urgency. Survey-based evaluations of this rollout found that the substantial majority of surveyed rural households, in one study 89 to 94 per cent, received at least one component of the package, and that direct cash transfers appeared to reach beneficiaries with fewer delays and lower transaction costs than the in-kind components of the same package, a result consistent with the technology and process advantages DBT is designed to deliver (Varshney et al., 2021).

At the same time, policy assessments of the same rollout identified a design-reality gap of a different kind: the absence of a unified, real-time vulnerability-assessment mechanism made it difficult for the system to quickly identify and include households that had newly fallen into poverty because of the pandemic itself, since DBT necessarily disburses against pre-existing beneficiary lists rather than against dynamically updated need. Fragmentation across the multiple departmental databases feeding different scheme components further slowed beneficiary updates during precisely the period when speed mattered most. The episode therefore illustrates both DBT's genuine comparative advantage in

disbursement speed once a beneficiary is correctly identified, and the continuing information-dimension gap that arises when the system's static data assumptions meet a rapidly changing on-the-ground reality, reinforcing the case made in Sections 5 and 6 that closing design-reality gaps in DBT requires attention to data currency and inter-departmental coordination, not only to payment technology.

9. Towards Closing the Design-Reality Gap: Policy Directions

The e-governance literature converges on the general prescription that design-reality gaps are narrowed less by adding further layers of technology than by adapting system design to documented ground realities, and by building in mechanisms for continuous feedback and correction during and after implementation, rather than treating rollout as a single completed event (Heeks, 2003). Applied to DBT, this suggests several directions: strengthening offline or assisted-authentication fallback options for areas with unreliable connectivity; investing in continuous database-cleaning and grievance-redressal processes rather than one-time seeding drives; expanding frontline functionary training specifically on DBT troubleshooting; and, critically, incorporating exclusion-rate monitoring, not just disbursement-volume monitoring, into the metrics by which DBT schemes are judged successful.

10. Conclusion

Understanding DBT as an e-governance intervention, rather than purely as a fiscal or administrative reform, clarifies why the same technology can perform impressively on aggregate leakage-reduction metrics while simultaneously failing a meaningful minority of intended beneficiaries. The design-reality gap framework suggests that this is not a contradiction but an expected outcome whenever a digitally mediated system's design assumptions diverge from the infrastructural, institutional and human realities of the environment in which it operates. Because the size of this gap is likely to vary considerably across districts, depending on local banking density, administrative capacity and beneficiary literacy, a national or state-level assessment of DBT's e-governance performance cannot substitute for district-level evaluation. This is precisely the gap that the district-level study of DBT effectiveness in Coimbatore District undertaken later in this research programme is designed to address.

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