A Typology of Digital Complaint-Resolution Systems for Public Accountability

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Abstract
Public organisations increasingly invite citizens to report grievances, service failures, and misconduct through digital channels ranging from municipal 311 hotlines and dedicated grievance-redressal portals to social-media pages and crowdsourced fault-reporting maps. Although these systems are widely promoted as instruments of public accountability, the literature treats them as an undifferentiated category, obscuring important variation in how each design distributes voice, obligates a response, and exposes performance to scrutiny. This paper develops a conceptual typology of digital complaint-resolution systems oriented explicitly toward public accountability. Drawing on scholarship in digital government, e-participation, social accountability, and accountability theory, we derive four analytical dimensions along which such systems differ: (1) the locus of voice and access, (2) the mode of case handling and response obligation, (3) the degree of transparency and traceability, and (4) the sanction and escalation pathway. Crossing the two dimensions most consequential for accountability, response obligation and transparency, yields a four-quadrant typology comprising Suggestion Boxes, Case-Tracking Bureaucracies, Public Ledgers, and Accountability Commons. We describe each type, present it as Table 1 and Figure 1, and map illustrative real-world exemplars to each quadrant. The typology clarifies why superficially similar systems produce divergent accountability outcomes, offers designers and reformers a diagnostic vocabulary, and generates propositions linking design features to answerability and enforceability. We conclude by discussing implications, boundary conditions, and an agenda for empirical validation. The typology is conceptual and awaits testing, but it provides a structured foundation for comparative analysis of digital grievance systems.

Keywords: *digital government; complaint-resolution systems; grievance redressal; public accountability; social accountability; e-participation; typology; citizen feedback*

1. Introduction

Governments and public agencies now routinely offer citizens digital channels through which to lodge complaints about services, report infrastructure faults, and flag official misconduct. These channels are diverse. Some are dedicated grievance-redressal portals with formal case numbers and statutory response deadlines; others are lightweight web forms, mobile applications, social-

media pages, or crowdsourced maps on which residents pin potholes and broken streetlights. A recurring claim in policy discourse and in the scholarly literature is that such systems strengthen public accountability: by lowering the cost of voice, they let citizens signal dissatisfaction, and by recording that signal they create a basis on which officials can be called to answer [1], [2].

Yet the accountability payoff of digital complaint systems is uneven and frequently disappointing. Evidence from social-accountability interventions shows that giving citizens a channel for voice does not, by itself, produce responsiveness; outcomes depend heavily on institutional design, the credibility of sanctions, and whether information actually reaches actors who can act on it [3], [4]. The same reported fault may vanish into an unmonitored inbox in one jurisdiction and trigger a tracked, publicly visible repair in another. This variation is not adequately captured when scholars and practitioners refer generically to "digital complaint systems," "e-grievance," or "citizen feedback platforms" as though these labels denoted a single design class with a single logic of accountability. The problem this paper addresses is conceptual rather than empirical: the field lacks a shared vocabulary for distinguishing among digital complaint-resolution systems in terms that matter for accountability. Existing frameworks are informative but not directly fitted to this object. E-government maturity models describe stages of online service sophistication [5], [6] but say little about how a complaint, once lodged, obligates a response. E-participation frameworks classify the depth of citizen engagement in policy-making [7]–[9] but treat complaint handling only obliquely. Accountability theory offers precise concepts (answerability, enforceability, the account-holder and account-giver relation [10]) but has not been systematically applied to the design space of digital grievance channels.

A typology is the appropriate response to this gap. Typologies are a well-established form of conceptual contribution: they identify the dimensions along which cases of a phenomenon vary, and they use those dimensions to construct a small number of coherent, mutually exclusive types that carry theoretical meaning. A good typology does explanatory work, it tells us why members of one type behave differently from members of another, and it equips practitioners with a diagnostic language. Our aim is to build such a typology for digital complaint-resolution systems, oriented explicitly toward the accountability functions those systems are meant to serve.

The contribution of the paper is threefold. First, we derive from the literature four analytical dimensions (voice and access, response obligation, transparency and traceability, and sanction and escalation) that jointly characterise the accountability design of a digital complaint system. Second, we cross the two most consequential dimensions to produce a parsimonious four-type typology (Suggestion Boxes, Case-Tracking Bureaucracies, Public Ledgers, and Accountability Commons), which we present in Table 1 and Figure 1 and illustrate with real-world exemplars. Third, we articulate propositions and a research agenda that link the types to accountability outcomes, providing a foundation for later empirical testing. The paper is conceptual; it proposes a framework rather than validating it, and we are explicit about that limitation.

Why the object resists existing categories

It is worth dwelling on why digital complaint-resolution systems sit awkwardly across the categories the field already possesses, because that awkwardness is the specific gap the paper fills. A complaint is not a service transaction in the ordinary sense: unlike paying a fee or renewing a licence, lodging a grievance does not complete a defined exchange but opens an open-ended obligation whose fulfilment lies in the future and often in the discretion of the receiving body. Nor is a complaint a contribution to deliberation in the sense studied by participation research, because it concerns a particular, frequently individual, harm requiring case-level handling rather than an

opinion to be aggregated into collective preference. And a complaint is not merely a datum to be published, because its point is not visibility for its own sake but the redress of a specific wrong. Each existing frame (the transactional, the deliberative, the informational) captures one facet of the complaint while missing the feature that makes it distinctive: that it is a demand for an account concerning a specific matter, addressed by an identifiable citizen to an identifiable authority, that carries an implicit claim on that authority to respond. This is precisely the structure that accountability theory describes, which is why we anchor the typology in accountability rather than in service maturity or participatory depth. The object demands a frame built around obligation and answerability, and building that frame is the work of the paper.

The stakes of getting the classification right

The absence of a shared vocabulary is not a merely terminological inconvenience; it has practical consequences that motivate the effort. When reformers, funders, and evaluators treat all digital complaint channels as a single class, they draw false equivalences: a jurisdiction that has deployed an unmonitored feedback form can claim, with formal accuracy, to have introduced a citizen-complaint system, and be credited alongside a jurisdiction that has built a tracked, publicly visible, enforceable grievance process, even though the two produce entirely different accountability outcomes. Undifferentiated language thus permits the appearance of reform to substitute for its substance, and it deprives evaluation of the categories it would need to distinguish channels that work from channels that merely exist. A typology grounded in accountability-relevant properties supplies exactly the discriminating vocabulary that such evaluation requires, letting observers ask not whether a channel is digital but whether it obligates a response and exposes that response to a forum able to judge it. In this sense the conceptual contribution is a precondition for honest assessment, and the parsimony of a small number of well-chosen types is a virtue rather than a simplification, because it makes the distinctions that matter usable by the practitioners who must act on them. The remainder of the paper proceeds as follows. Section 2 reviews the relevant literatures. Section 3 sets out the method by which the typology was constructed and the dimensions derived. Section 4 presents the typology and describes each type. Section 5 maps illustrative examples. Section 6 discusses implications and limitations, Section 7 outlines future work, and Section 8 concludes. Contributions on semiconductor, RF/MEMS and microelectronic systems engineering and biomedical imaging inform the framing adopted here [11]. Cognate work addressing enterprise cybersecurity and cyber-defense engineering provides complementary grounding [12].

2. Background and Related Work

2.1 Digital government and service delivery

Research on digital government has long charted the movement of public services online. Stage models such as Layne and Lee's [5] four-stage progression (from cataloguing, through transaction, to vertical and horizontal integration) framed early expectations that governments would mature toward seamless, integrated online provision. West [6] documented how e-government reshaped service delivery and citizen attitudes, while Grönlund and Horan [13] reviewed the field's competing definitions and its shifting emphasis from service efficiency toward governance and democratic value. These accounts establish that placing a transaction online is not the same as transforming the underlying administrative relationship. A complaint form is a transaction; whether lodging it changes what an agency is obligated to do is a separate, governance-level question that maturity models leave largely implicit.

The stage-model tradition is nonetheless instructive for what it reveals about the limits of technological maturity as a proxy for governance value. Progression along a maturity scale describes the sophistication of the interface and the integration of back-office systems, and it is tempting to assume that a more mature system is a more accountable one. But integration and accountability are orthogonal: an agency can achieve seamless, fully integrated online intake of complaints while remaining wholly unobligated to act on any of them, and conversely a technologically primitive channel coupled to a strong duty to respond can deliver more accountability than a sophisticated one that guarantees nothing. The maturity models thus measure a dimension real but different from the one this paper cares about, and their prominence in policy discourse helps explain why the accountability question has been so easily elided. When success is defined as movement up a maturity ladder, the prior question of what a system does with a complaint once received drops out of view, and the classification that follows treats the elaboration of the channel as if it were the fulfilment of its purpose.

2.2 E-participation and citizen voice

A parallel literature examines how digital tools mediate citizen participation. Macintosh [7] distinguished levels of e-participation (e-enabling, e-engaging, and e-empowering) according to how much influence citizens exercise. Sæbø, Rose, and Flak [8] mapped the emerging e-participation research area and its actors, activities, and effects. Fung's [9] "democracy cube" characterised participatory mechanisms along three axes: who participates, how they communicate and decide, and what authority the process carries. These frameworks are valuable because they insist that participation varies in consequence, not merely in form. Complaint systems are a species of participation, but a distinctive one: the citizen input is a specific, often individual, grievance requiring case-level handling rather than deliberative aggregation, and its intended effect is redress and answerability rather than policy formation. Yang and Pandey [14] caution that participation leads to good outcomes only under particular conditions, reinforcing the point that channel provision is not self-executing. The distinctiveness of the complaint as a form of participation repays closer attention, because it explains why the depth-of-engagement frameworks, valuable as they are, do not map cleanly onto grievance handling. Deliberative participation aims at influence over collective choices, and its frameworks accordingly measure how much authority a process grants citizen over policy. A complaint aims at something narrower and, in a sense, more demanding: not a share in a collective decision but a specific remedy for a specific harm, delivered to a specific person. The relevant question is therefore not how much collective authority the channel confers but whether the individual input compels an individual response, and this is a property that the participatory-depth axis does not capture, because a channel can rank low on deliberative empowerment while imposing a strong and enforceable duty to resolve each case it receives. Complaint handling also inverts the temporality of deliberation: where participation feeds into decisions not yet made, a complaint responds to something that has already gone wrong, and its accountability logic runs backward, from an existing failure to the obligation to explain and repair it. These differences are why we treat complaint systems as a distinct species requiring their own analytical dimensions rather than as a point on an existing participation scale.

2.3 Coproduction and citizen-sourcing

Digital complaint reporting is increasingly analysed through the lens of coproduction. Linders [15] proposed a typology of citizen coproduction in the social-media age, distinguishing citizen-to-government, government-to-citizen, and citizen-to-citizen configurations. Clark, Brudney, and

Jang [16] studied the coproduction of government services through new information technologies such as 311 systems, warning of distributional biases in who reports and whose problems get attention. Mergel [17] documented how public agencies adopt social media and the tactics that follow. This work shows that fault-reporting and complaint channels are sites where citizens actively contribute to the production of public value, but also that participation is socially skewed, an equity concern any accountability-oriented typology must acknowledge.

The coproduction lens adds a further insight that bears directly on the typology: the citizen who reports a fault is not a passive complainant but a supplier of information the state could not cheaply obtain otherwise, and the value of that information depends on the state's capacity and willingness to act on it. A pothole map is worthless as coproduction if no agency reads it, and richly valuable if an agency has arranged to route each report into a work order. This dependence of coproductive value on the receiving institution's response is the same dependence that the accountability literature identifies between voice and responsiveness, and it reappears in the typology as the response-obligation dimension. The equity concern compounds the point. Because the propensity to report is unevenly distributed (shaped by digital access, language, confidence in officialdom, and the time to engage) a channel that responds faithfully to whatever it receives will still allocate public attention unequally, directing resources toward the neighbourhoods and groups that report most. An accountability-oriented classification cannot treat this as incidental, because a system that maximises responsiveness to a skewed input may deepen rather than redress inequality of public provision, and the high-transparency, high-obligation types are precisely the ones in which this risk is most acute.

2.4 Public accountability, transparency, and social accountability

The accountability literature supplies the paper's theoretical anchor. Bovens [10] defines accountability as a relationship in which an actor is obliged to explain and justify conduct to a forum that can pose questions, render judgement, and impose consequences, decomposing accountability into information, discussion, and consequences. This tripartite structure maps directly onto complaint handling: a lodged complaint is a demand for an account, the handling process is the discussion, and any remedy or sanction is the consequence. Transparency is a necessary but insufficient enabler: Hood and Heald [18] show that transparency has many faces and does not automatically yield better governance, and Grimmelikhuijsen and Meijer [19] demonstrate experimentally that transparency's effect on trust is conditional. Meijer, Curtin, and Hillebrandt [20] distinguish the "vision" and "voice" dimensions of open government, underscoring that openness must be coupled with responsiveness.

Work on social accountability sharpens these insights for the citizen–state grievance relationship. Ackerman [21] argues for "co-governance" mechanisms that go beyond exit and voice by embedding citizens in the state's own accountability processes. Björkman and Svensson [22] provide experimental evidence that community-based monitoring can improve service outcomes, while Gaventa and McGee [3] and Joshi [4] synthesise mixed evidence on transparency and accountability initiatives, concluding that impact depends on whether information is actionable and whether credible enforcement exists. Peixoto [23] cautions that open data and disclosure do not translate mechanically into accountability, and Peixoto and Fox [2] find that ICT-enabled citizen voice leads to government responsiveness only when the state has both the capacity and the incentive to act. Together these strands motivate a typology built on the accountability-relevant properties, obligation to respond and visibility of the response, rather than on surface technology.

It is worth making explicit how Bovens's tripartite decomposition, developed for institutional accountability relationships generally, maps with unusual precision onto the micro-process of handling a single complaint, because that mapping is the theoretical hinge of the paper. The information phase corresponds to the lodging of the complaint and the agency's acknowledgement of it: the citizen supplies an account of what has gone wrong, and the agency renders an account of what it knows and intends. The discussion phase corresponds to the handling process itself, the investigation, the classification, the exchange in which the agency justifies its assessment and the citizen may contest it. The consequences phase corresponds to the remedy, the sanction for non-response, or the escalation that follows if the complaint is neglected. A complaint system can implement any subset of these phases, and the typology is in effect a map of which subsets it implements. This is why we regard the framework as more than a convenient organising device: it identifies, from first principles, the components a complaint process must contain to qualify as an accountability mechanism, and it thereby tells us which design choices are decorative and which are constitutive of accountability itself.

2.5 The synthesis: from surface features to accountability properties

Read together, the four literatures point toward a common conclusion that the paper takes as its foundation: the accountability performance of a digital complaint system is determined not by the technology through which voice is collected but by what the system is obliged to do with that voice and by who is able to watch it do so. Digital-government research shows that putting a service online does not transform the underlying administrative relationship. Participation research shows that the depth of a channel's consequence, not its mere existence, is what varies. Coproduction research shows that citizen input creates value only when a receiving institution acts on it, and that the propensity to supply that input is unequal. Accountability and social-accountability research show, most directly, that voice produces responsiveness only where an obligation to answer meets a forum capable of judging the answer and, where necessary, imposing consequences. Each literature, approaching from its own direction, converges on the same two properties, the obligation to respond and the visibility of the response, as the levers that convert a complaint channel into an instrument of accountability. This convergence is what licenses the analytical move of the next section: to derive a small set of dimensions from these properties and to build the typology on the two that the literatures jointly identify as decisive.

Contributions on foundational information-society, ICT-for-development, digital-learning and forecasting literature inform the framing adopted here [24]–[58]. Cognate work addressing financial analytics, planning, and enterprise decision systems provides complementary grounding [59]–[62].

3. Method: Constructing the Typology

The typology was constructed through a structured, theory-driven procedure rather than through empirical clustering of observed systems. This is appropriate for a conceptual contribution whose purpose is to organise a design space and generate testable propositions. The procedure comprised four steps.

Step 1: Delimiting the object. We define a *digital complaint-resolution system* as any technology-mediated channel through which members of the public submit case-specific reports of service failures, grievances, rights violations, or official misconduct to a public organisation, with the expectation of acknowledgement, resolution, or redress. This definition deliberately excludes

purely deliberative e-participation platforms (which aggregate opinions on policy rather than handle individual cases), one-way information portals, and internal whistleblowing systems restricted to employees, while including externally facing grievance portals, 311/citizen-relationship-management systems, crowdsourced fault-reporting applications, and official social-media complaint channels.

Step 2: Deriving candidate dimensions. We reviewed the literatures summarised in Section 2 and extracted recurring properties that authors treat as consequential for whether voice yields accountability. From e-participation and coproduction research we drew the properties of access and who may speak [9], [15]. From accountability theory we drew the obligation to answer and the presence of consequences [10], [21]. From the transparency literature we drew visibility and traceability [18], [20], [23]. Candidate properties were retained only if they varied observably across real systems and had a defensible theoretical link to accountability.

Step 3: Consolidating dimensions. Candidate properties were consolidated into four analytical dimensions, chosen to be conceptually distinct and jointly to span the accountability logic of a complaint system:

- **D1, Voice and access:** who can lodge a complaint and how open the entry point is, ranging from narrow, identity-gated channels to open, low-friction, anonymous ones.
- **D2, Response obligation and case handling:** whether a lodged complaint triggers a defined, obligatory handling process with acknowledgement, ownership, and (often) a deadline, versus a discretionary process with no guaranteed response. This operationalises Bovens's [10] "information and discussion" components.
- **D3 (Transparency and traceability:** whether the complaint, its status, and its resolution are visible) to the complainant only, or publicly, and whether performance data are aggregated and disclosed. This operationalises the visibility dimension [18], [20].
- **D4, Sanction and escalation:** whether unresolved complaints escalate to a higher authority, an ombudsman, or public exposure, and whether consequences attach to non-response. This operationalises Bovens's [10] "consequences" component.

Step 4: Selecting typology axes. A four-dimensional space is too fine-grained for a parsimonious typology. Following standard typological practice, we selected the two dimensions that most directly govern accountability outcomes as the axes of a 2×2 matrix, and treated the remaining two as descriptive attributes that vary within and across the resulting types. We chose **D2 (response obligation)** and **D3 (transparency and traceability)** as axes, because accountability in Bovens's [10] sense requires both an obligation to answer (D2) and a forum able to observe and judge the answer (D3). Voice/access (D1) and sanction/escalation (D4) are theoretically important but tend to co-vary with, and reinforce, the two chosen axes; we therefore fold them into the description of each type. Crossing D2 (low/high) with D3 (low/high) yields the four types presented next. We note that the axes are continua dichotomised for exposition; real systems occupy positions along them.

On the choice of a theory-driven rather than empirical construction. A typology can be built in two broadly different ways: inductively, by gathering many instances and clustering them on observed features, or deductively, by reasoning from theory to the dimensions that ought to matter and constructing types as combinations of those dimensions. We have chosen the deductive route deliberately, and the choice has consequences worth stating. An inductive typology describes the

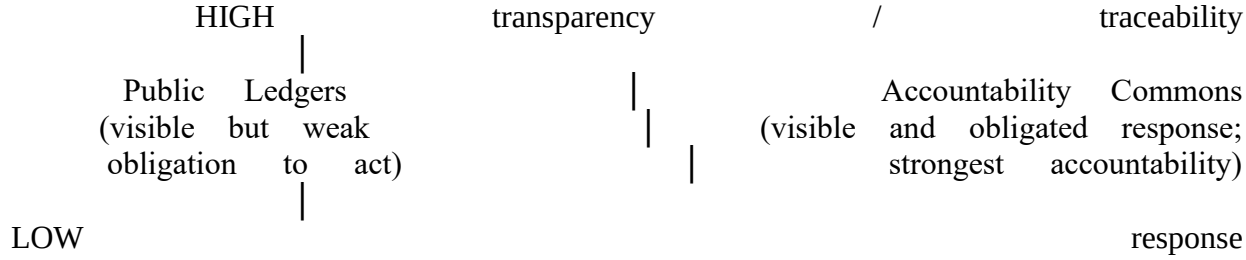
systems that happen to exist and risks reifying the accidents of current practice, if most deployed systems cluster in one region of the design space, an empirical clustering will draw its categories there and may miss theoretically important types that are simply rare. A deductive typology, by contrast, describes the space of possible designs and can name a type that is currently uncommon but theoretically coherent, which is valuable precisely because it shows reformers a destination that present practice has not yet reached. The cost of the deductive approach is that its types are analytical constructs whose empirical prevalence is unknown until tested, and we accept that cost openly; the types are hypotheses about how the design space is organised, offered for the empirical validation set out in Section 7. The virtue is that the resulting categories carry theoretical meaning by construction: each type is defined by the combination of accountability components it activates, so that knowing a system's type tells us something about how it should behave, which is the explanatory work a good typology is meant to do.

Why two axes and not more. The decision to reduce four dimensions to a two-dimensional matrix is a genuine analytical sacrifice, and it is defensible only if the two retained axes carry most of the accountability variance while the two folded in largely co-vary with them. That is the claim we make and that later work should test. Response obligation and transparency are, on the theory, the two properties that jointly constitute the core of an accountability relationship, an obligation to answer and a forum able to observe and judge the answer, and they are also, in practice, substantially independent of each other, so that crossing them produces four genuinely distinct combinations rather than two disguised as four. Voice and access, by contrast, tends to accompany transparency: systems that expose complaints publicly are typically open at intake as well, so folding access into the description of each type loses little. Sanction and escalation tend to accompany both obligation and transparency, since consequences for non-response presuppose both a duty that can be breached and a forum that can register the breach. Treating these two as descriptive attributes rather than axes therefore preserves parsimony without discarding much explanatory power, though we acknowledge in Section 6 that contexts exist where enforcement is the binding constraint and a different axis choice would be warranted.
Contributions on public-sector accounting, audit, and financial reporting inform the framing adopted here [63], [64]. Cognate work addressing enterprise IT systems, cloud migration, and service management provides complementary grounding [65], [66].

4. The Typology

Table 1 summarises the four types produced by crossing response obligation (D2) against transparency and traceability (D3). Figure 1 depicts the same structure as a 2×2 quadrant map, with response obligation on the horizontal axis and transparency on the vertical axis; each quadrant names a type and indicates its characteristic accountability logic.

Figure 1. A 2×2 typology of digital complaint-resolution systems (schematic).



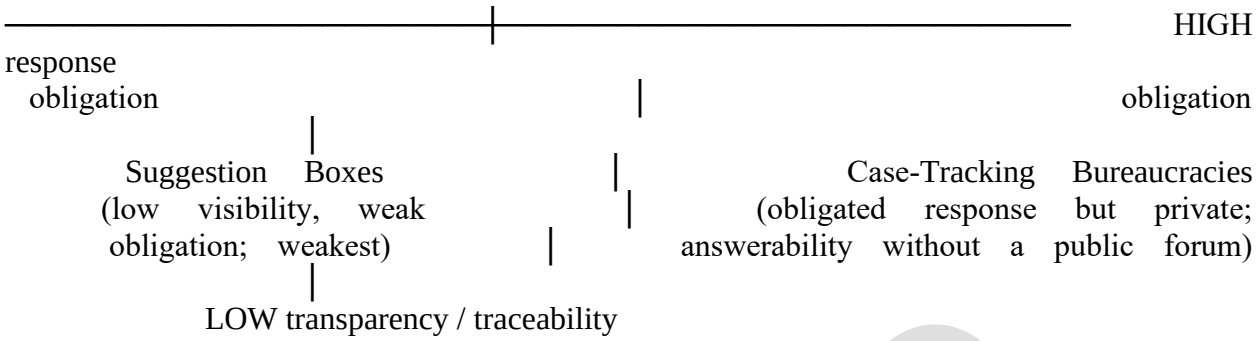


Table 1. Dimensions and characteristics of the four types.

Attribute	Suggestion Box	Case-Tracking Bureaucracy	Public Ledger	Accountability Commons
D2 Response obligation	Low (discretionary, no guaranteed reply	High) defined workflow, acknowledgement, deadlines	Low, posting visible but action discretionary	High, defined workflow *and* enforced follow-through
D3 Transparency / traceability	Low (private, no status tracking	Moderate) status visible to complainant (case ID)	High, complaints and status publicly visible	High, public complaints, status, and aggregate performance
D1 Voice / access (typical)	Open, anonymous, low friction	Identity-gated, structured intake	Open, often app- or map-based	Open, with verified and community layers
D4 Sanction / escalation (typical)	None	Internal escalation, ombudsman referral	Reputational (public visibility)	Reputational *plus* institutional escalation
Bovens component emphasised	(Information only, weak)	Information + discussion	Information + weak public discussion	Information + discussion + consequences
Characteristic failure mode	Black-hole inbox	Closed-loop opacity; "closed" ≠ resolved	Visibility theatre; no duty to fix	Elite capture; unequal voice

4.1 Suggestion Boxes (low obligation, low transparency)

Suggestion Boxes are the digital analogue of the physical comment box: a web form, email address, or unmonitored social-media inbox that accepts complaints but neither guarantees a response nor exposes what happens next. Access is typically open and anonymous (high on D1), which is their principal virtue, friction is minimal. But because there is no case identifier, no tracked status, and no obligation to act, the complaint may disappear into an administrative "black hole." In Bovens's [10] terms, information is transmitted but no discussion or consequence is

assured. Suggestion Boxes can still have value as sensing instruments, alerting managers to emerging problems, but their accountability contribution is weak and easily overstated. They are common precisely because they are cheap to deploy.

The pathology of the Suggestion Box is instructive because it is so easily mistaken for its opposite. To an agency, deploying such a channel feels like an act of openness (the door has been opened, the public invited to speak) and the volume of submissions can be reported as evidence of engagement. But from the citizen's side the experience is the reverse: a message sent into silence teaches that voice is futile, and repeated over time this lesson corrodes the very disposition to complain that accountability depends on. The Suggestion Box can thus be actively counterproductive, generating not merely an absence of accountability but a positive erosion of trust, because it solicits an expectation of response that it does not meet. This is why the type deserves to be named and marked rather than dismissed as a harmless minimum: its danger lies in resembling accountability closely enough to be counted as such while delivering none of it, and in the disillusionment, it breeds when citizens discover the resemblance to be hollow. Where a Suggestion Box does add value, it is as a sensing instrument for managers attentive enough to read it, not as a mechanism through which citizens can call officials to account.

4.2 Case-Tracking Bureaucracies (high obligation, low/moderate transparency)

Case-Tracking Bureaucracies impose a defined handling workflow. A lodged complaint receives an identifier, an owner, and often a statutory or policy deadline; the complainant can track status privately, and internal escalation routes exist for overdue cases. These are the mature grievance-redressal portals characteristic of formal e-government [5], embodying the information-and-discussion components of accountability [10]. Their limitation is that visibility is confined to the individual case and the administrative hierarchy. Aggregate performance is not exposed to a public forum, so patterns of neglect are hard for outsiders to detect. A well-known failure mode is closed-loop opacity: a case is marked "resolved" or "closed" to meet a target without the underlying problem being fixed, and no external actor can contest the classification. Answerability exists, but the forum is internal. The Case-Tracking Bureaucracy is in many respects the workhorse of formal grievance redress, and its strengths are real: it converts a complaint into a tracked obligation with an owner and a deadline, which is a genuine accountability advance over the Suggestion Box, and it does so through mechanisms (case identifiers, workflow, escalation) that scale and that can be audited internally. Its characteristic weakness follows directly from the confinement of the forum. Because the only parties who can observe the handling of a case are the complainant and the administrative hierarchy, the pressure to resolve genuinely, rather than merely to close, depends entirely on internal discipline. Where performance is managed by closure targets, the incentive structure can perversely reward the premature marking of cases as resolved, since the metric rewards the classification rather than the outcome, and no external actor is positioned to contest the discrepancy. The complainant may know that the pothole remains, but a single dissatisfied individual facing a closed case has little leverage, and the aggregate pattern of hollow closures, which would reveal the problem, is visible only to the agency that has an interest in not seeing it. The Case-Tracking Bureaucracy thus delivers answerability to the individual while withholding it from the public, and its accountability ceiling is set by the fact that the body being held to account is also the body that judges whether it has been.

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4.3 Public Ledgers (low obligation, high transparency)

Public Ledgers make complaints and their status openly visible, typically as a map or feed of reports that anyone can browse, without imposing a strong obligation on any agency to act. Crowdsourced fault-reporting platforms exemplify this type: residents pin problems, others see them, and the resulting public record creates reputational pressure. Transparency is high (D3), aligning with the openness ideal of open government [20], and access is usually broad (D1). But because responsibility for resolution is diffuse or voluntary, visibility can substitute for action rather than compel it. Peixoto [23] and Hood and Heald [18] warn precisely against assuming that disclosure produces accountability; the Public Ledger's characteristic failure mode is "visibility theatre," in which the display of problems is mistaken for their redress. Public Ledgers work best where a receptive agency chooses to monitor and respond, converting reputational pressure into action. The Public Ledger inverts the weakness of the Case-Tracking Bureaucracy: where the latter obligates without exposing, the former exposes without obligating. This inversion clarifies why transparency and obligation are genuinely separate axes rather than two labels for the same underlying virtue. A Public Ledger can make a jurisdiction's every unrepaired fault visible to anyone, and yet, if no agency is bound to act, that visibility may accomplish nothing beyond documenting neglect in higher resolution. The mechanism through which a Public Ledger can nonetheless produce accountability is reputational: public visibility raises the political cost of inaction, and an agency sensitive to that cost may respond even without a formal duty. But this mechanism is contingent and unreliable. It depends on the existence of an audience that notices, on that audience's capacity to translate noticing into pressure, and on the agency's sensitivity to the pressure, conditions that hold in some polities and moments and fail in others. Where they fail, the Public Ledger settles into visibility theatre, an elaborate public display of problems that substitutes the appearance of accountability for its substance. The type is therefore best understood as accountability made available but not guaranteed: it supplies the forum that the Case-Tracking Bureaucracy lacks, but leaves open whether that forum has any purchase on the body it observes.

4.4 Accountability Commons (high obligation, high transparency)

Accountability Commons combine an obligatory handling workflow with public visibility of complaints, statuses, and aggregate performance. A report is publicly posted, assigned and tracked like a formal case, and unresolved items escalate through both reputational exposure and institutional channels, approximating Ackerman's [21] co-governance, in which citizens are embedded in the state's own accountability process. This type most fully realises Bovens's [10] triad of information, discussion, and consequences, and it is where ICT-enabled voice is most likely to yield responsiveness, provided the state has capacity and incentive to act [2], [22]. Accountability Commons are the most demanding to sustain and carry their own risk: because participation is socially skewed [16], open, high-salience channels can amplify the voice of already-advantaged groups, producing elite capture unless access is deliberately equalised.

The Accountability Commons is the type toward which accountability-minded reform aspires, but it is important not to romanticise it, because its demands and its risks scale with its ambition. Sustaining the combination of public visibility and enforced follow-through requires administrative capacity that many agencies lack: cases must be genuinely resolved rather than merely closed, resolutions must be posted honestly even when they are unflattering, and aggregate performance must be exposed in a form that permits outside judgement. Each of these is organisationally costly, and each creates incentives to backslide toward the cheaper, less accountable types, to quietly relax the duty to respond, or to curate the public record so that it

flatters. The type's equity risk deserves particular emphasis because it is intrinsic rather than incidental. Precisely because the channel is open and high-salience, and precisely because it converts reported problems into public resources, it rewards those most able to report, and in the absence of deliberate counter-measures it can direct disproportionate public attention to the already-advantaged, entrenching inequality behind a facade of open participation. The Accountability Commons therefore realises the fullest accountability of the four types and simultaneously carries the sharpest distributional hazard, and its design is best understood as the ongoing management of that tension rather than as a fixed state to be achieved and left alone.
Contributions on internal audit, risk governance, and financial-sector controls inform the framing adopted here [67]–[70]. Cognate work addressing Salesforce platform engineering and CRM governance provides complementary grounding [71]–[73].

5. Illustrative Examples Mapped to the Typology

To demonstrate the typology's discriminating power, we map familiar categories of real-world systems to the four types. These mappings are illustrative and category-level; a given deployment may sit closer to a boundary than the label suggests, and platforms evolve.

Suggestion Box. A government department's generic "contact us" email address or an unmonitored official social-media inbox that accepts grievances without acknowledgement or tracking is a Suggestion Box. Many agencies' first foray into social media functions this way, accepting messages faster than they build the capacity to answer them [17]. The channel gathers voice but guarantees nothing.

Case-Tracking Bureaucracy. National centralised public-grievance portals that issue a registration number, route the case to the responsible office, impose response timelines, and let the complainant check status privately exemplify this type. India's centralised public grievance mechanism and comparable national grievance-redress portals follow this design: strong on obligation and private traceability, weak on public visibility of aggregate performance. Municipal 311 citizen-relationship-management systems, which log service requests into a tracked workflow, sit near this quadrant as well [16], edging toward Public Ledger where request data are opened.

Public Ledger. Crowdsourced fault-reporting platforms such as FixMyStreet (and comparable civic "report-a-problem" maps) publicly display resident-submitted reports of potholes, broken streetlights, and similar faults, forwarding them to the relevant council but without binding any authority to act within a fixed period. Their power is reputational visibility rather than obligation, placing them in the high-transparency, low-obligation quadrant.

Accountability Commons. Where a fault-reporting platform is coupled with an agency's committed workflow, public reports that are formally assigned, tracked to closure with visible status changes, and reported in aggregate performance dashboards, the system approaches an Accountability Commons. Some SeeClickFix and integrated 311 deployments in which cities publish open service-request data and commit to visible resolution move toward this quadrant, as do community-monitoring initiatives that pair public scorecards with institutional follow-up [22]. The determining feature is the joining of public visibility to an enforced duty to respond.
These mappings show that systems built on similar technology can occupy different quadrants: a 311 system is a Case-Tracking Bureaucracy when its data stay internal and an Accountability

Commons when it publishes and commits. The typology thus directs attention to the design choices, obligation and transparency, that actually shift a system's accountability logic, rather than to the underlying technology.

The mappings also expose the boundaries and hybrids that a clean four-cell matrix might seem to deny, and confronting these strengthens rather than weakens the framework. Consider the municipal citizen-relationship-management system that logs service requests into a tracked workflow. Kept internal, it is a Case-Tracking Bureaucracy; the moment its request data are published and its resolutions committed to publicly, the same underlying platform migrates toward the Accountability Commons without a line of its code changing. The determining difference is not technological but institutional, a decision to open the data and to bind the agency to visible follow-through, which is exactly the kind of design choice the typology is built to make salient. Similarly, a crowdsourced fault-reporting map begins as a Public Ledger and edges toward an Accountability Commons only when a receptive council agrees to route each report into an obligated work order and to report its performance back. That such systems can move between quadrants through changes in policy rather than in software is the central practical lesson of the exercise: the accountability character of a digital complaint system is a governance variable, largely independent of the platform, and therefore available to reformers who cannot change their technology but can change what they commit to do with it.

A second observation concerns the direction and difficulty of movement between quadrants. The typology implies not merely a static classification but a rough topography of reform. Moving rightward, toward stronger obligation, requires an agency to accept a binding duty and the administrative load of honouring it; moving upward, toward greater transparency, requires it to expose its handling and its performance to outside view. These two movements are of different political characters. Adding tracking and deadlines is largely an internal, managerial change that an agency can undertake unilaterally, whereas opening status and performance data surrenders control over the narrative and invites external judgement, which is politically harder and more often resisted. The typology thus predicts an asymmetry in how systems evolve, that agencies will more readily build Case-Tracking Bureaucracies than Public Ledgers, and will reach the Accountability Commons, if at all, more often by adding transparency to an existing tracked process than by adding obligation to an existing public one. These are conjecturing the framework generates and that comparative empirical work could test, and they illustrate how a typology meant as a static map can also structure hypotheses about dynamics.

Contributions on health-system strategy, financing, and data-driven transformation inform the framing adopted here [74], [75]. Cognate work addressing procurement and supply-chain delivery in energy and infrastructure settings provides complementary grounding [76]–[79].

6. Discussion

6.1 Implications for accountability

The central implication of the typology is that the accountability yield of a digital complaint system is governed less by its technological sophistication than by two design choices: whether a complaint obligates a response, and whether the complaint and its handling are visible to a forum able to judge them. This reframes a common policy assumption. Agencies frequently invest in channel proliferation (more forms, more apps, more social-media presence) on the premise that expanding voice expands accountability. The typology suggests that adding Suggestion Boxes multiplies voice without multiplying answerability, and that moving a system rightward (toward obligation) and upward (toward transparency) is what changes its accountability character. This

aligns with evidence that voice yields responsiveness only under enabling institutional conditions [2]–[4]. The typology also yields diagnostic propositions for empirical work. First, *ceteris paribus*, systems in the Accountability Commons quadrant should exhibit higher resolution rates and greater perceived responsiveness than systems in the Suggestion Box quadrant, because they activate all three of Bovens's [10] components. Second, Public Ledgers should outperform Suggestion Boxes on problem visibility but not necessarily on resolution, since visibility without obligation may not compel action [23]. Third, Case-Tracking Bureaucracies should show high nominal closure rates but be vulnerable to closed-loop opacity, so that the gap between "closed" and "genuinely resolved" widens as external transparency falls. Fourth, because open channels attract socially skewed participation [16], the accountability gains of high-transparency types may be captured by advantaged groups unless access is actively equalised. These propositions are stated so that future research can test, refine, or refute them.

For designers and reformers, the framework offers a vocabulary and a route map. A jurisdiction can locate its current system in the matrix, identify which dimension is constraining accountability, and target the corresponding change: adding tracking and deadlines (rightward movement) or opening status and performance data (upward movement). It also clarifies trade-offs (transparency may deter candid or sensitive reporting, and obligation imposes administrative cost) so that movement between quadrants is a deliberate choice rather than a default.

These trade-offs deserve emphasis because they qualify the otherwise natural conclusion that the Accountability Commons is simply the goal toward which all systems should move. Transparency, the paper's second axis, is not costless or universally benign. For certain classes of grievance (allegations of misconduct, reports touching on personal circumstances, complaints from vulnerable individuals who fear retaliation) public visibility can deter reporting altogether, so that the very openness that strengthens accountability in the aggregate suppresses the particular voices most in need of it. A design that maximises transparency for potholes may be actively harmful applied to whistleblowing, which is one reason the paper deliberately excluded internal whistleblowing systems from its scope and why practitioners should not read the typology as prescribing maximal transparency for every complaint type. Obligation carries its own costs: a binding duty to respond within a deadline, imposed without the capacity to honour it, produces either the hollow closures that afflict the Case-Tracking Bureaucracy or a backlog that discredits the system. The framework's practical counsel is therefore not to drive every system toward the top-right quadrant but to match the quadrant to the nature of the grievance and to the agency's genuine capacity, treating each movement as a considered choice with its own risks rather than as an unqualified improvement.

6.2 Limitations

Several limitations follow from the paper's conceptual character. First, the typology is proposed, not validated; its types are analytical constructs, and their empirical prevalence and their predicted associations with outcomes remain to be tested. Second, reducing a four-dimensional space to a 2×2 matrix necessarily sacrifices nuance: real systems fall along continua, hybrids exist, and a single platform may present different faces to different users. Third, by selecting response obligation and transparency as axes we foreground certain properties and background others, notably voice/access and sanction/escalation, which a different theoretical lens might elevate. Fourth, the illustrative mappings are category-level and time-bound; specific deployments evolve and may migrate between quadrants, so the examples should be read as demonstrations of the typology's logic rather than as fixed classifications. Fifth, the framework is drawn largely from

literature centred on particular institutional contexts; its transferability across administrative cultures and levels of state capacity is an open question, given evidence that capacity and incentives condition whether voice produces responsiveness [2].

A sixth limitation concerns the level of analysis. The typology classifies systems, but accountability is ultimately experienced by individual complainants whose cases may be handled better or worse than the system's type would predict. A well-designed Accountability Commons may fail a particular complainant through error or neglect, and a nominal Suggestion Box may, through the conscientiousness of a single official, deliver redress the type does not promise. The framework speaks to the propensities that design creates, not to the outcome of any individual case, and it should not be read as determining what happens to any one complaint. Relatedly, the framework is static in its basic form: it offers a snapshot classification and only gestures, in the discussion of quadrant movement, toward the dynamics by which systems change. A fuller account would model the forces (political, administrative, technological) that push systems between quadrants over time and that may cause a system to decay from a stronger type toward a weaker one as attention and resources fade. These limitations do not undermine the typology's purpose, which is to organise a design space and generate propositions, but they mark the edges within which its claims should be read and point toward the extensions the next section proposes.

Contributions on financial analytics, audit, IT-risk and governance across the wider research portfolio inform the framing adopted here [80]–[106]. Cognate work addressing the broader external academic literature on analytics, machine learning, security, and digital systems provides complementary grounding [107]–[155].

7. Future Work

The typology invites several lines of further research. The most immediate is empirical validation: a coding scheme operationalising the four dimensions could be applied to a sample of real digital complaint systems to test whether the four types recur, whether hybrid forms cluster near boundaries, and how systems are distributed across the matrix. A second line is outcome testing, linking a system's quadrant to measurable accountability outcomes such as acknowledgement rates, time-to-resolution, verified (as opposed to nominal) resolution, and citizen-perceived responsiveness [19], to evaluate the propositions in Section 6.1. A third line is longitudinal: tracing how systems migrate across quadrants over time, for instance as 311 data are opened or as reputational platforms negotiate service commitments, would illuminate the political and administrative conditions under which movement occurs. A fourth line concerns equity, examining whether high-transparency, high-obligation types deliver accountability equally across social groups or reproduce the participation biases documented in coproduction research [16], and what design interventions mitigate capture. Finally, the typology could be extended by re-selecting axes (treating sanction/escalation as a third dimension, for example) to generate a richer classification for contexts where enforcement is the binding constraint [21].

Beyond these lines, two methodological priorities would strengthen the programme as a whole. The first is the development of a robust coding instrument for the four dimensions, with explicit indicators and decision rules that different coders can apply to the same system and reach the same classification. Because the axes are continua dichotomised for exposition, the hardest coding decisions will fall near the thresholds, the system that acknowledges but does not commit to resolve, the one that publishes counts but not individual cases, and an instrument that specifies how such borderline systems are to be placed is a precondition for any credible empirical test. Establishing that independent coders converge on the same placements would also address the

concern that the types, being theoretically derived, might prove too fuzzy to apply to messy real systems; demonstrating that they can be applied reliably is itself a contribution.

The second priority is comparative and cross-contextual research. Because much of the anchoring literature was developed in particular institutional settings, the typology's transferability across administrative cultures, levels of state capacity, and degrees of digital access cannot be assumed. A programme that applied the framework across jurisdictions differing in these respects would test whether the four types recur universally or whether some are artefacts of particular contexts, and whether the accountability advantages the typology predicts for the high-obligation, high-transparency quadrant survive in settings where state capacity is thin or where the reputational mechanism that gives transparency its force is weak. Such comparative work would also illuminate the equity question at the heart of the framework, revealing whether the distributional hazards of the open, high-salience types manifest similarly everywhere or vary with the social structure of participation. Together these priorities would move the typology from a conceptual proposal toward a validated instrument for the comparative study of how digital voice becomes public accountability.

Contributions on cybersecurity, data governance, and IT-risk management inform the framing adopted here [156]–[158]. Cognate work addressing the foundational and directly cited literature underpinning the present study provides complementary grounding [1]–[10], [13]–[23].

8. Conclusion

Digital complaint-resolution systems are widely deployed as instruments of public accountability, yet the field has lacked a shared framework for distinguishing among them in accountability-relevant terms. This paper has addressed that gap by deriving four analytical dimensions (voice and access, response obligation, transparency and traceability, and sanction and escalation) from the digital-government, e-participation, coproduction, and accountability literatures, and by crossing the two most consequential dimensions to produce a parsimonious typology of four types: Suggestion Boxes, Case-Tracking Bureaucracies, Public Ledgers, and Accountability Commons. The typology explains why superficially similar systems yield divergent accountability outcomes, supplies designers and reformers with a diagnostic vocabulary and a route map for improvement, and generates testable propositions linking design to answerability and enforceability. Its contribution is conceptual, and it awaits empirical validation; but by grounding classification in the accountability functions these systems are meant to serve, rather than in the technology they happen to use, it offers a structured foundation for comparative research on how digital voice becomes public accountability.

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