

“Digital budget transparency and perceived budget credibility: Technocratic and normative mechanisms in Indonesian local governments”

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DIGITAL BUDGET TRANSPARENCY AND PERCEIVED BUDGET CREDIBILITY: TECHNOCRATIC AND NORMATIVE MECHANISMS IN INDONESIAN LOCAL GOVERNMENTS

Abstract

Budget credibility is a critical indicator of fiscal reliability in local governments, yet the mechanisms through which digital transparency enhances credibility remain poorly understood. This study examines how digital budget transparency influences perceived budget credibility in Indonesian regency and city governments, using performance information (technocratic mechanism) and procedural justice (normative mechanism) as two parallel mediating pathways. The technocratic mechanism reflects the instrumental application of budget data in planning and decision-making, while the normative mechanism reflects perceptions of fairness and legitimacy in budgeting processes. Using partial least squares structural equation modeling with data from 362 public officials (specifically heads of planning agencies, budget officials, and financial managers) across 33 regencies and city governments in North Sumatera, Indonesia, the study tests these dual pathways. Results show that digital budget transparency has only a modest direct effect on perceived budget credibility ($\beta = 0.118$), but exerts far greater influence through mediation. Procedural justice proved to be the primary mediating mechanism (indirect effect $\beta = 0.081$), with the use of performance information serving as a secondary pathway ($\beta = 0.035$). Multi-group analysis confirms that these relationships hold across both regency and city governments. The findings suggest that digital transparency by itself will not improve budget credibility. Its influence hinges on whether disclosed information actually gets used in decision-making and whether budgeting processes are perceived as fair. Reforms should, therefore, target both information usability and procedural legitimacy if they are to strengthen fiscal discipline in decentralized governance systems.

Keywords

transparency, credibility, performance information, procedural justice, fiscal governance, municipal finance, Indonesia

JEL Classification

H72, H83, D73

INTRODUCTION

Budget credibility has emerged as a critical concern in public sector budgeting, particularly in decentralized government systems where fiscal reliability shapes service delivery and public trust. Current debates increasingly emphasize how budget execution quality and process legitimacy serve as mutually reinforcing outcomes of government decision-making (Battaglio et al., 2019). Perceived budget credibility reflects how public officials assess their government's ability to execute approved revenue and expenditure plans in a consistent and predictable manner (Gootjes & De Haan, 2022). While objective measures of budget credibility focus on the alignment between planned allocations and actual spending (Musiega et al., 2023), the perceptions held by frontline implementers matter significantly because these shape or-



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ganizational behavior, resource allocation decisions, and institutional legitimacy. Understanding what drives these perceptions remains a pressing challenge for fiscal governance research.

Digital budget transparency has been widely promoted as a mechanism to strengthen fiscal accountability and public trust (Pirannejad & Ingrams, 2023). However, transparency does not operate uniformly across contexts. The quality and effects of transparency depend on how information is designed, disclosed, and made usable for decision-making (Grimmelikhuijsen et al., 2020). In Indonesia, fiscal decentralization has created substantial variation in how local governments disclose budget information digitally. The introduction of e-planning systems and integrated planning-budgeting platforms has provided some governments with sophisticated transparency infrastructures, while others rely on minimal disclosure practices (Anindito et al., 2022). This variation raises fundamental questions about whether and how digital transparency influences perceived budget credibility, particularly when information quality, timeliness, and usability differ markedly across jurisdictions.

Yet transparency alone seldom guarantees improved credibility. The effects of digital transparency depend critically on how disclosed information is interpreted and used within organizations. The organizational mechanisms through which transparency shapes credibility perceptions remain unclear. This gap in understanding constitutes a critical challenge for fiscal governance research and reform efforts in decentralized systems.

1. LITERATURE REVIEW AND HYPOTHESES

Scholarly work on public budgeting highlights the linkage between digital budget transparency and perceived budget credibility through two central organizational mechanisms: the use of performance information and procedural justice. Recent research demonstrates how transparency quality affects fiscal discipline outcomes (Brändle & Elsener, 2024), explaining how transparent budget information is interpreted and transformed into perceptions of execution credibility (Gootjes & De Haan, 2022). Understanding these mechanisms proves particularly important in contexts marked by institutional and capacity variation across Indonesian local governments.

The conceptualization of digital budget transparency builds on the notion that transparency generates value only when it is usable. The principle of transparency-by-design emphasizes that budget information must be intentionally structured for user needs: readily accessible, machine-readable, supported by strong data integrity, equipped with metadata, and embedded within feedback loops that allow verification and correction (Matheus et al., 2021). Rather than functioning as passive disclosure, transparency operates as an infrastructural capacity that shapes how information circulates and is applied.

Experimental evidence supports this emphasis on usability, showing that well-designed transparency enhances trust, strengthens perceptions of public sector performance, and increases actors' willingness to comply with policy decisions. Conversely, ambiguous, delayed, or difficult-to-use disclosures generate informational uncertainty and undermine institutional trust (Grimmelikhuijsen et al., 2020). Recent studies confirm that transparency significantly affects how information is received and acted upon (Ripamonti, 2024). Within fiscal research, digital transparency enables fiscal discipline and budget control effectiveness when the quality of openness surpasses a minimum threshold where information is genuinely incorporated into decision processes. The credibility of budget processes depends fundamentally on whether transparency translates into meaningful accountability (Gootjes & De Haan, 2022).

Arguments in the open government literature reinforce this functional view, contending that data create public value only when supported by an ecosystem that permits integration, analytics, and organizational learning, rather than functioning as a static document repository (Pirannejad & Ingrams, 2023). Digital budget transparency, therefore, serves as an upstream trigger that provides the informational infra-

structure through which both technocratic and normative mechanisms operate within budgeting organizations.

The use of performance information has become central to understanding how transparent data translate into budget quality. Research in public performance management has shifted from focusing on the mere availability of indicators to emphasizing purposeful use (Hong, 2019), which refers to the meaningful application of performance information in setting priorities, negotiating targets, and recalibrating policy. Purposeful use becomes more likely when performance measurement systems are aligned with organizational strategy, backed by leadership support, and equipped with indicators that are relevant, reliable, and easy to interpret (Johnsen et al., 2024).

The conditions facilitating purposeful use are well documented. Experimental studies show that political and administrative actors ascribe greater weight to issues when associated indicators are perceived as credible, comprehensible, and decision-relevant (Belardinelli et al., 2018). Performance measurement systems must align with organizational priorities to drive actual use (Desmidt & Meyfroidt, 2021), reinforcing the rational basis of budget decision-making and contributing to reprioritizations more consistent with policy objectives (Van der Voet & Lerusse, 2024). Reviews of the determinants of performance information use underscore the critical roles of leadership support, task-indicator alignment, analytical capacity, and information system quality (Kroll, 2015). Organizational context shapes performance information adoption (Greve et al., 2016), while compliance-oriented reporting cultures tend to inhibit substantive use of performance data.

Digital budget transparency directly supports these conditions by reducing barriers to performance information use (Matheus et al., 2021). Lower information access costs, more timely data availability, and improved cross-year comparability may facilitate the integration of performance information into budget cycles. Enhanced traceability of performance data also strengthens indicator use during mid-year adjustments. Performance information systems must be designed to facili-

tate managerial decision-making at key junctures (Moynihan & Pandey, 2010), with effective performance management requiring systematic integration of indicators throughout the budget cycle (Van Dooren et al., 2015). The use of performance information, therefore, constitutes the technocratic mechanism through which digital budget transparency may influence perceived budget credibility by improving the rationality of allocations and the consistency of budgeting processes.

While the use of performance information operates through technocratic rationality, procedural justice addresses the normative and social dimensions of budget credibility. Within organizational justice literature, procedural justice explains why fair processes shape policy outcomes and implementation behavior (Colquitt, 2001). Procedures that are consistent, unbiased, based on accurate information, allow for meaningful voice, and adhere to ethical standards enhance the legitimacy of decisions and strengthen compliance, even when policies impose short-term sacrifices on particular units or actors. Contemporary research confirms these procedural justice effects in public sector contexts (Gopinathan et al., 2023). In public service budgeting, procedural fairness proves essential for the acceptance and execution of resource allocations, particularly when reprioritization generates distributional sensitivities across implementing units. Evidence shows that fair procedures reduce uncertainty and build trust in budget processes (Herian et al., 2012).

Transparency plays a critical role in reinforcing procedural fairness. Digital openness documents the rationale behind budget changes, provides traceable decision trails (Cantarelli et al., 2020), and expands voice opportunities through online consultations, reducing perceptions of procedural opacity and increasing acceptance of budget decisions. Public participation research demonstrates that transparency enhances trust in governmental processes (Campbell, 2023), with the relationship between transparency and perceived fairness well-established in public administration literature (Park & Blenkinsopp, 2017). Recent evidence further demonstrates how transparency and fairness jointly strengthen compliance in public administration (Hofer et al., 2024). Procedural justice thus functions as a normative mechanism through

which digital budget transparency influences perceptions of budget credibility by enhancing process legitimacy and encouraging faithful policy execution.

The outcome of these two mechanisms is perceived budget credibility, which refers to bureaucrats' beliefs about the government's ability to execute approved revenue and expenditure plans reliably. Perceptions are grounded in objective indicators often measured through absolute deviations or realization-to-allocation ratios at both the aggregate level and across spending categories, as well as compositional variance across programs. Higher credibility is typically associated with timely cash disbursement, robust procurement planning, and the capacity to manage budget adjustments in a controlled manner. Budget execution indicators provide key measures of fiscal performance (Musiega et al., 2023), with fiscal stress research emphasizing the importance of execution reliability for governmental capacity (Cuadrado-Ballesteros & Bisogno, 2022; Scorsone & Plerhoples, 2010).

Budget credibility assessments require attention to institutional context and measurement quality. Classification inconsistencies, reporting calendars, and data quality variations across jurisdictions can obscure actual execution patterns (Rocco & Kass, 2024). Institutional research emphasizes the need for context-sensitive credibility assessments that account for local capacity constraints and administrative structures (Modell, 2022). External accountability mechanisms, including supreme audit institutions, provide additional disciplinary pressure that reinforces execution reliability (International Budget Partnership & United Nations Department of Economic and Social Affairs, 2023). Frameworks for strengthening budget execution monitoring emphasize the integration of data-driven early-warning systems with procedural safeguards (UN, 2024). Credibility perceptions depend not only on disclosure quality but also on whether information is embedded within legitimate and functional processes that support corrective action.

Theoretically, the relationship between digital budget transparency and perceived budget credibility reflects dynamics of information asymme-

try and accountability (Gootjes & De Haan, 2022). Digital budget transparency reduces information costs, increases data accessibility, and strengthens process accountability, thereby creating conditions that activate two primary pathways. The technocratic mechanism operates through the use of performance information: accessible, timely, and decision-relevant data increase the likelihood that performance indicators are used during allocation, reprioritization, and mid-year adjustments. The normative-institutional mechanism operates through procedural justice: transparent processes, traceable justifications for changes, and broader voice channels reinforce perceived fairness, strengthen implementer commitment, and reduce resistance to budget decisions. When both mechanisms function effectively, perceived budget credibility increases. Control and flexibility in resource management both prove essential for execution success (Raudla & Douglas, 2022).

The Indonesian context makes this framework particularly relevant. Variation in digital readiness, fiscal capacity, and governance quality across local governments produces heterogeneous effects of transparency on both technocratic and normative mechanisms, creating opportunities for comparative testing to identify institutional configurations that strengthen or weaken the influence of digital budget transparency on the use of performance information, procedural justice, and ultimately perceived budget credibility. Indonesian decentralization provides a natural laboratory for examining these dynamics (Anindito et al., 2022), with citizen engagement and transparency initiatives operating differently across varying institutional contexts (Nguyen et al., 2024).

The effectiveness of digital transparency depends on how information is communicated and received. Research on public participation indicates that transparency interacts with social and psychological factors (Ripamonti, 2024). Transparency that is informative yet overly complex can produce information fatigue, whereas communication designs emphasizing clarity and issue relevance enable stakeholders to absorb information, demand execution accountability, and narrow the space for deviations. These findings reinforce the view that digital transparency should be approached as an institutional design intervention, not a compliance exer-

cise, one that strengthens performance information use and enhances perceived procedural fairness.

In summary, existing literature establishes that digital budget transparency serves as an informational infrastructure that can enhance perceived budget credibility through two distinct organizational mechanisms. The technocratic pathway operates through the use of performance information, where transparent data enable evidence-based resource allocation and accountability discussions. The normative pathway functions through procedural justice, where transparency strengthens perceptions of fairness and legitimacy in budget processes. However, empirical evidence on how these mechanisms operate jointly in decentralized government contexts, particularly in settings with varying institutional capacity, remains limited.

This study examines how digital budget transparency influences perceived budget credibility in Indonesian local governments through two organizational mechanisms: the use of performance information and procedural justice. These mechanisms represent technocratic and normative pathways through which transparent budget information shapes perceptions of execution reliability. The paper tests whether these pathways operate independently or synergistically in decentralized settings characterized by varying institutional capacity. Based on this framework, the following hypotheses are proposed:

- H1: Digital budget transparency has a positive effect on perceived budget credibility.*
- H2: Digital budget transparency has a positive effect on the use of performance information.*
- H3: Use of performance information has a positive effect on perceived budget credibility.*
- H4: Digital budget transparency has a positive effect on procedural justice.*
- H5: Procedural justice has a positive effect on perceived budget credibility.*
- H6: Use of performance information mediates the effect of digital budget transparency on perceived budget credibility.*

H7: Procedural justice mediates the effect of digital budget transparency on perceived budget credibility.

2. METHODOLOGY

This study employs an explanatory research design that integrates objective budget execution data with perceptual survey data on digital budget transparency, the use of performance information, and procedural justice. This design enables simultaneous testing of technocratic and normative mechanisms while allowing fiscal credibility to be assessed using indicators that do not rely solely on respondent perceptions.

The primary unit of analysis is the Province of North Sumatera, Indonesia, with additional analysis conducted on its regency and city governments. The 2020–2024 observation window captures the post-pandemic acceleration of digitalized planning and budgeting systems, during which public data portals, performance dashboards, and electronic budget management platforms became more mature and widely institutionalized (Anindito et al., 2022). Objective measures of budget credibility were derived from officially reported realizations matched against approved allocations. Credibility was assessed using absolute deviations and realization-to-allocation ratios for revenues and expenditures, as well as compositional variance across programs or functions. Adjustments were applied to account for differences in account classifications, reporting calendars, and accounting standards to ensure comparability across jurisdictions and years.

The perceptual survey targeted actors directly involved in the budgeting process, including planning and finance officials, heads of local government agencies, members of local legislatures responsible for budgeting, and internal auditors. A stratified purposive sampling approach was used to capture variation in digital readiness and fiscal capacity, with a minimum of two respondents per entity to meet acceptable within-group agreement thresholds for organizational-level aggregation. Data collection procedures ensured respondent anonymity, separated item blocks to reduce evaluation apprehension, and were preceded by a pilot test to assess clarity and completion time.

Survey data were collected from 362 respondents across 33 local governments in North Sumatera Province during 2020–2024. Respondent characteristics are summarized in Table 1.

Table 1. Respondent characteristics

Characteristic	Category	n (%)
Gender	Male	214 (59.1)
	Female	148 (40.9)
Age	30–39 years	82 (22.7)
	40–49 years	154 (42.5)
	≥ 50 years	126 (34.8)
Education	Undergraduate	255 (70.4)
	Master's	90 (24.9)
	Doctoral	17 (4.7)
Experience	< 5 years	38 (10.5)
	5–10 years	115 (31.8)
	> 10 years	209 (57.7)
Job Role	Planning/finance	99 (27.3)
	Unit heads	88 (24.3)
	Legislators	77 (21.3)
	Auditors	98 (27.1)
Government	Regency/city	330 (91.2)
	Provincial	32 (8.8)

Note: N = 362.

To assess potential non-response bias, early and late respondents were compared using independent samples *t*-tests (Armstrong & Overton, 1977). Results showed no significant differences across all constructs: digital budget transparency ($F = 2.37, p = 0.125$), use of performance information ($F = 0.14, p = 0.705$), procedural justice ($F = 0.01, p = 0.909$), and perceived budget credibility ($F = 0.04, p = 0.837$), confirming that late respondents did not differ systematically from early respondents.

Common method bias was addressed through procedural and statistical remedies. Procedurally, respondent anonymity was ensured, item blocks were separated, and different scale formats were used. Statistically, Harman's single factor test showed that the first component explained only 30.270% of variance, well below the 50% threshold (Podsakoff et al., 2003). A marker variable test confirmed no significant relationships between the marker and key constructs (all $p > 0.05$) (Lindell & Whitney, 2001). Full collinearity VIF values ranged from 1.000 to 1.122, well below the threshold of 3.3 (Kock, 2015), confirming that common method bias was not a significant concern.

Variable operationalization followed validated instruments from contemporary literature. Digital budget transparency was measured through a structured audit of local budget portals, assessing the availability of core documents across the budget cycle (plans, enacted budgets, in-year reports, year-end reports, and audit explanations), timeliness of updates, data granularity, machine-readable formats, metadata completeness, data dictionaries, and decision traceability. The audit checklist was developed based on principles of digital transparency design and contemporary budget and procurement transparency indices, and was coded by two independent coders with an inter-coder reliability assessment.

Use of performance information was measured using a seven-point Likert scale assessing the extent to which performance indicators were used in planning, budgeting, and program evaluation. The conceptualization of purposeful information use draws on public performance management literature (Johnsen et al., 2024; Kroll, 2015; Van der Voet & Lerusse, 2024). Procedural justice was measured using the procedural subscale of Colquitt's justice instrument (Colquitt, 2001), capturing consistency, bias suppression, information accuracy, voice, correctability, and ethicality. Terminology was adapted to the local government budgeting context, informed by procedural justice applications in public-sector settings (Gopinathan et al., 2023; Park & Blenkinsopp, 2017), and reviewed by expert panels and cognitive interviews with potential respondents. Perceived budget credibility was assessed using items evaluating respondents' confidence in the reliability of budget execution and the extent to which realizations were viewed as consistent with allocations and defensible within their organizations, reflecting contemporary conceptualizations of institutional credibility in performance management contexts (Modell, 2022).

Data analysis used partial least squares structural equation modeling (PLS-SEM). The measurement stage evaluated outer loadings, composite reliability, average variance extracted (AVE), and heterotrait-monotrait ratios to ensure internal reliability, convergent validity, and discriminant validity (Hair et al., 2021). The structural model evaluation examined path coefficients, R^2 and adjusted R^2 values, effect sizes (f^2), and predictive relevance (Q^2). Mediation effects of use of performance information and procedural justice were assessed

using 5,000-sample bootstrapping with bias-corrected confidence intervals.

Additionally, measurement invariance of composite models (MICOM) was performed to test measurement equivalence across high and low digital-readiness groups prior to multi-group analysis. Once invariance was established, multi-group analysis examined potential differences in structural paths across jurisdictions. Data quality procedures included multiple imputation for missing values within acceptable thresholds and winsorization of extreme observations. Ethical considerations were upheld through voluntary participation, strict respondent anonymity, and secure data management in line with public policy research standards. This research design supports replication and potential extension to other regions or periods as additional data become available.

3. RESULTS AND DISCUSSION

Descriptive statistics for the four key variables are presented in Table 2. Means range from 3.96 to 4.17, indicating moderately positive perceptions.

Perceived budget credibility records the highest value (4.17), suggesting that respondents generally view budget execution as reasonably credible. Use of performance information exhibits the lowest value (3.96), reflecting that although performance data are utilized, considerable room remains for strengthening their integration into budgetary decision-making. Skewness and kurtosis values fall within acceptable thresholds for Likert-scale survey data, confirming that the distributions meet prerequisite assumptions for PLS-SEM analysis.

Table 2. Descriptive statistics

Construct	Mean	Std. Deviation	Skewness	Kurtosis
Digital Budget Transparency	4.087	1.982	-0.041	-1.173
Use of Performance Information	3.956	2.061	0.072	-1.298
Procedural Justice	4.122	1.948	-0.038	-1.184
Perceived Budget Credibility	4.168	1.997	0.025	-1.215

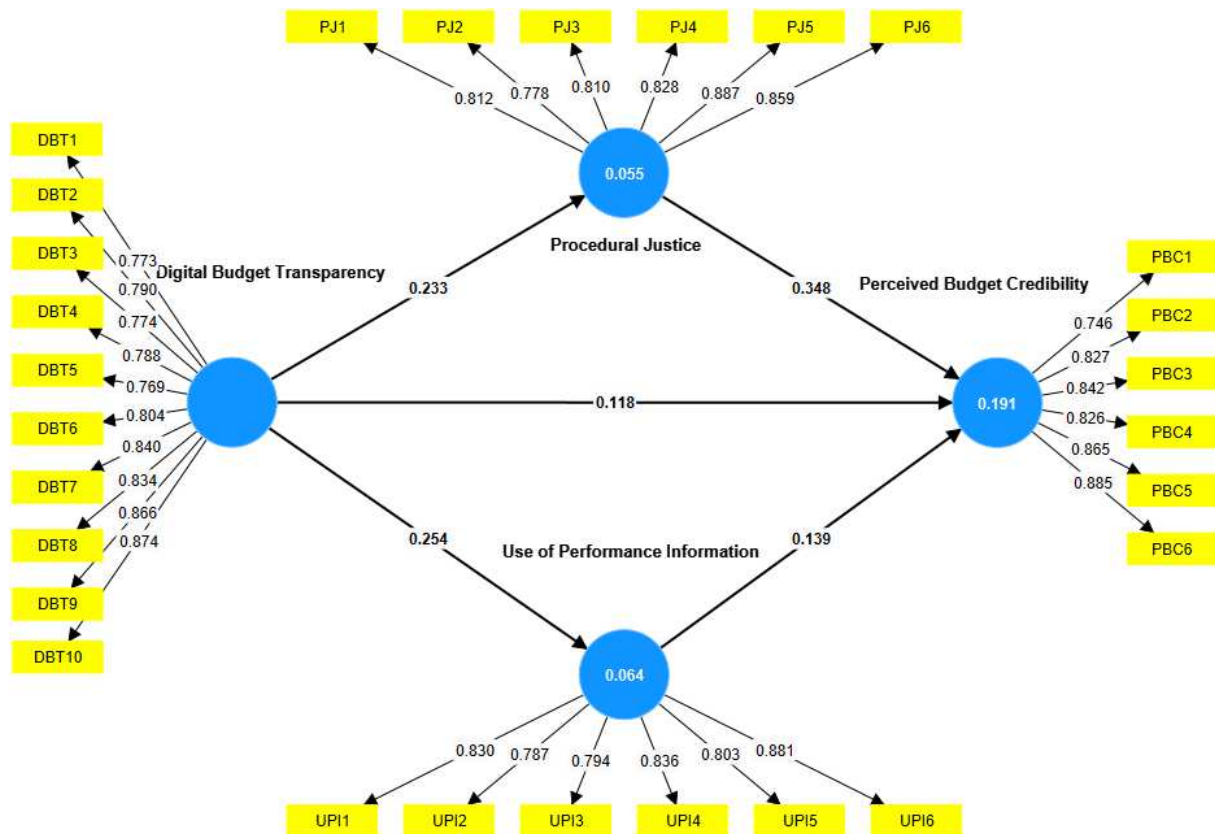


Figure 1. Measurement model

The measurement model was assessed to ensure that all indicators accurately represent their respective latent variables. The evaluation covered convergent validity, internal consistency reliability, and discriminant validity. A visual depiction of the relationships between indicators and latent variables is presented in Figure 1.

The measurement model evaluation is summarized in Table 3, reporting outer loadings, Cronbach's alpha (CA), composite reliability (CR), and average variance extracted (AVE).

All indicators demonstrate strong relationships with their respective constructs, with loadings exceeding the 0.70 threshold. The measurement model exhibits adequate convergent validity (AVE > 0.50) and robust internal consistency (CA and CR > 0.80) across all measures (Hair et al., 2019).

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT) and the

Fornell-Larcker criterion, with results presented in Table 4.

All HTMT ratios fall well below the 0.90 benchmark, and \sqrt{AVE} consistently exceeds inter-construct correlations, satisfying both criteria and confirming adequate discriminant validity.

With the measurement model validated, structural relationships were examined using partial least squares structural equation modeling (PLS-SEM). Path coefficients, *t*-statistics, effect sizes (f^2), and 95% confidence intervals are reported in Table 5.

All structural paths achieve statistical significance, providing robust empirical support for the proposed dual-mechanism framework through which digital budget transparency shapes perceptions of budget credibility.

The results reveal several patterns warranting interpretation. Digital budget transparency exerts

Table 3. Measurement model evaluation

Construct	Item Range	Loading Range	CA	CR	AVE
Digital Budget Transparency (DBT)	DBT1–DBT10	0.769–0.874	0.942	0.951	0.659
Perceived Budget Credibility (PBC)	PBC1–PBC6	0.746–0.885	0.911	0.931	0.694
Procedural Justice (PJ)	PJ1–PJ6	0.778–0.887	0.909	0.93	0.688
Use of Performance Information (UPI)	UPI1–UPI6	0.787–0.881	0.905	0.926	0.677

Table 4. Discriminant validity (HTMT and Fornell–Larcker criterion)

Construct	DBT	PBC	PJ	UPI
Digital Budget Transparency (DBT)	0.812	0.247	0.247	0.265
Perceived Budget Credibility (PBC)	0.247	0.833	0.424	0.216
Procedural Justice (PJ)	0.247	0.424	0.829	0.110
Use of Performance Information (UPI)	0.265	0.216	0.110	0.823

Note: Diagonal values represent \sqrt{AVE} . Values below the diagonal represent HTMT ratios, while values above the diagonal represent inter-construct correlations. HTMT values below 0.90 and \sqrt{AVE} values greater than the corresponding correlations confirm discriminant validity.

Table 5. Path coefficient results

Code	Path	β	$\mu\beta$	$\sigma\beta$	t-statistics	f^2	95% CL	Remarks
H1	DBT → PBC	0.118	0.119	0.054	2.181	0.015	[0.009; 0.221]	Yes
H2	DBT → UPI	0.254	0.259	0.049	5.171	0.058	[0.147; 0.340]	Yes
H3	UPI → PBC	0.139	0.143	0.052	2.703	0.069	[0.031; 0.234]	Yes
H4	DBT → PJ	0.233	0.238	0.051	4.612	0.141	[0.131; 0.327]	Yes
H5	PJ → PBC	0.348	0.350	0.045	7.674	0.022	[0.255; 0.431]	Yes
H6	DBT → UPI → PBC	0.035	0.037	0.016	2.252	–	[0.009; 0.070]	Yes
H7	DBT → PJ → PBC	0.081	0.083	0.020	4.045	–	[0.045; 0.123]	Yes

Note: DBT = Digital Budget Transparency; PBC = Perceived Budget Credibility; PJ = Procedural Justice; UPI = Use of Performance Information.

a positive direct effect on perceived budget credibility ($\beta = 0.118$; $t = 2.181$; $f^2 = 0.015$), though the magnitude remains modest. Local governments that improve digital transparency through upgraded portals, accelerated disclosure timelines, or enhanced data granularity will see limited credibility gains when these changes operate without broader institutional reforms. Digitally enabled transparency contributes to perceptions that budget execution aligns with approved allocations, yet cannot single-handedly ensure credible budgeting. Cross-national analysis demonstrates that fiscal rules require budget transparency to function effectively (Gootjes & De Haan, 2022). The present findings align with this view: transparency serves as an enabling condition rather than a sufficient driver of fiscal discipline. Recent survey evidence confirms that transparency materializes into fiscal outcomes only when accompanied by accountability practices and corrective mechanisms (Brändle & Elsener, 2024). The weak unmediated effect observed here ($f^2 = 0.015$) clarifies why transparency reforms in decentralized systems often disappoint when implemented without complementary organizational changes. Accessible, machine-readable, and traceable information alone cannot deliver results without corresponding adjustments in internal processes and bureaucratic behavior.

The mediating mechanisms reveal more substantial effects. Digital transparency significantly enhances both the use of performance information ($\beta = 0.254$; $t = 5.171$; $f^2 = 0.058$) and procedural justice ($\beta = 0.233$; $t = 4.612$; $f^2 = 0.141$). Transparency improvements lead officials to integrate performance data more systematically into planning cycles and perceive budget processes as fairer. Procedural justice proves more sensitive to transparency reforms, suggesting that such initiatives influence normative perceptions more powerfully than analytical practices. When performance information is routinely used during budget formulation and midyear reviews, perceptions of credibility strengthen ($\beta = 0.139$; $t = 2.703$; $f^2 = 0.069$). Performance measurement systems facilitate use when they connect strategy formulation to actual decision-making (Johnsen et al., 2024), and this mechanism operates in Indonesian local governments with quantifiable effects on credibility perceptions. Information becomes valuable only through active integration into planning,

reprioritization, and program evaluation (Kroll, 2015). Experimental evidence shows that decision-makers weigh performance information when it appears credible and decision-relevant (Van der Voet & Lerusse, 2024). The present field-based results complement those experimental findings by demonstrating similar dynamics in real budget settings.

Procedural justice exhibits a substantially stronger effect on credibility ($\beta = 0.348$; $t = 7.674$; $f^2 = 0.022$), roughly 2.5 times larger than performance information use. When officials perceive budget processes as consistent, unbiased, and allowing meaningful voice, credibility perceptions increase markedly. A local government ensuring transparent decision trails, documented justifications for revisions, and consultation opportunities will achieve far greater credibility gains than one focusing solely on performance reporting systems. Organizational justice frameworks establish that procedural dimensions predict acceptance of resource allocation decisions (Colquitt, 2001). The present findings extend this framework by showing that these dynamics operate with particular force in fiscal contexts where execution deviations generate distributional conflict. Fair processes strengthen compliance and legitimacy across public sector contexts (Gopinathan et al., 2023). This study specifies the relationship in budgeting: procedural justice emerges as the dominant mechanism through which transparency influences credibility. This pattern may reflect institutional environments where trust deficits and capacity constraints amplify the importance of process legitimacy. Procedural fairness moderates how uncertainty affects evaluations of governance quality (Herian et al., 2012). The present results confirm and extend this insight by showing that in environments marked by fiscal uncertainty and frequent budget revisions, procedural fairness becomes essential in determining whether officials view execution as credible. Transparency creates value when internalized into performance-informed decision-making and perceived as part of a fair and legitimate process.

Third, the indirect effects clarify how technocratic and normative pathways operate. The mediation through performance information use is significant ($\beta = 0.035$; $t = 2.252$), indicating that digital

transparency improves the timeliness, comparability, and credibility of performance indicators, making them more readily integrated into decision-making processes. This effect occurs because such data facilitate decisions by reducing uncertainty and enhancing problem-solving capacity (Moynihan & Pandey, 2010). Local governments that routinely draw on these indicators for planning and midyear adjustments consequently experience smaller execution deviations. Such patterns reflect the principle that effective performance management requires systematic integration throughout the budget cycle (Van Dooren et al., 2015), with system design serving as a critical link between strategy formulation and actual use (Johnsen et al., 2024). The stability of this pathway across regencies and cities, confirmed through measurement invariance and multi-group analysis, further reinforces its generalizability.

Fourth, the mediation through procedural justice ($\beta = 0.081$; $t = 4.045$) is substantially larger, identifying it as the dominant normative mechanism. Transparent systems accompanied by traceable decision records, documented justifications for changes, and expanded voice channels strengthen perceptions of fairness and improve acceptance of budget decisions. This result aligns with evidence that disclosure effects depend heavily on how information is perceived through the lens of identity and trust (Park & Blenkinsopp, 2017). Moreover, public support for participatory processes increases when actors perceive meaningful opportunities to influence outcomes (Hofer et al., 2024), a dynamic equally applicable to bureaucratic implementers. The strong procedural justice effect indicates that among Indonesian local governments, such perceptions depend heavily on whether budgeting processes are seen as consistent, unbiased, accurate, and correctable. These findings resonate with longstanding concerns that openness initiatives often fail when they neglect the institutional conditions necessary for generating accountability (Hood & Heald, 2006). Piotrowski et al. (2022) reinforce this view, emphasizing that effective re-

forms require multistakeholder partnerships ensuring legitimacy and trust alongside disclosure.

Finally, the relative magnitude of coefficients demonstrates that these mechanisms operate in parallel and complement each other rather than forming a sequential chain. Transparent budgeting facilitates performance-based rationality while strengthening fairness perceptions, with both shaping credibility through distinct channels. This dual operation reflects broader institutional dynamics in which measurement and legitimacy function as autonomous dimensions shaped by different logics (Modell, 2022). The present findings advance transparency scholarship by clarifying that reforms must address both analytical capacity and procedural legitimacy to influence fiscal credibility in decentralized systems.

Cross-validated redundancy (Q^2) and adjusted R^2 values assess the predictive capability of the structural model. Q^2 evaluates predictive relevance through blindfolding procedures, while adjusted R^2 indicates the proportion of explained variance (Hair et al., 2021). Results are presented in Table 6.

Perceived budget credibility demonstrates moderate predictive relevance, with digital budget transparency and the mediating mechanisms accounting for approximately 18% of variance. The two mediators exhibit smaller but positive predictive capacity, confirming that the model achieves acceptable predictive performance across all endogenous variables.

To ensure that constructs were measured equivalently across respondent groups, the measurement invariance of composite models (MICOM) procedure was conducted. The assessment tests compositional invariance (Step 2) and equality of means and variances (Step 3), with results summarized in Table 7.

All constructs exhibit very high original correlations (≥ 0.998), with permutation p -values exceed-

Table 6. Cross-validated redundancy (Q^2) and adjusted R^2

Dependent Construct	SSO	SSE	Q^2	Adjusted R^2	Predictive Relevance
Perceived Budget Credibility	2,172	1,891.004	0.129	0.184	Moderate
Procedural Justice	2,172	2,093.842	0.036	0.052	Small
Use of Performance Information	2,172	2,082.962	0.041	0.062	Small

Table 7. MICOM (measurement invariance assessment) results

Construct	Original Correlation	p-value (Step 2)	Original Difference (Mean / Variance)	p-value (Step 3)
DBT	0.998	0.329	-0.047 / 0.189	0.695 / 0.118
PBC	0.999	0.768	-0.146 / 0.272	0.211 / 0.020
PJ	0.999	0.839	0.010 / 0.034	0.948 / 0.775
UPI	0.998	0.676	0.059 / 0.097	0.601 / 0.417

Note: DBT = Digital Budget Transparency; PBC = Perceived Budget Credibility; PJ = Procedural Justice; UPI = Use of Performance Information.

ing 0.05 for both compositional invariance (Step 2) and equality of means and variances (Step 3). This establishes full measurement invariance across regency and city governments, allowing valid structural path comparisons between groups free from measurement bias.

Multi-group analysis assessed whether structural relationships differed between government types using two-tailed permutation tests. Results appear in Table 8.

No statistically significant differences were found between regency and city governments (all $p > 0.05$), with path coefficients proving highly comparable. For instance, transparency's effect on credibility perceptions (0.125 vs. 0.081) and procedural justice's effect (0.342 vs. 0.383) demonstrate consistency across both administrative settings, indicating that these structural relationships are stable and generalizable within North Sumatera. This uniformity suggests that reforms promoting transparency, performance-informed budgeting, and fair procedural practices can be implemented without requiring substantial adjustments for administrative structure, making transparency a cross-cutting priority that can support coherent policy adoption at the regional level.

These results underscore the importance of orienting transparency toward usefulness rather than

compliance. Budget information that is accessible, interpretable, and analytically meaningful provides far greater value than static documents uploaded merely to satisfy reporting requirements. When systems enable actionable disclosure, they improve decision relevance, facilitate internal coordination, and support more credible fiscal execution.

Achieving this requires attention to traceability. Performance indicators and budget revisions must include clear audit trails so that changes, justifications, and data sources are verifiable. Without adequate traceability, metrics cannot reliably guide prioritization or program evaluation. Fair procedures complement data quality by ensuring that bureaucratic actors have meaningful opportunities to express their views, that information used in deliberations is accurate, and that correction mechanisms are transparent and dependable. When processes are perceived as fair, acceptance of budget decisions increases while resistance during implementation decreases.

Regional budget portals should incorporate revision logs, searchable decision histories, and integrated metadata to enhance accountability and mitigate execution deviations, though data infrastructure alone cannot ensure effective use. Capacity-building efforts that improve officials' ability to interpret and apply performance infor-

Table 8. Multi-group analysis (MGA) results

Structural Path	β (Regency Government)	β (City Government)	p-value (two-tailed)	MGA Decision
DBT → PBC	0.125	0.081	0.766	Not different
DBT → PJ	0.226	0.287	0.568	Not different
DBT → UPI	0.259	0.254	0.999	Not different
PJ → PBC	0.342	0.383	0.674	Not different
UPI → PBC	0.140	0.148	0.911	Not different

Note: DBT = Digital Budget Transparency; PBC = Perceived Budget Credibility; PJ = Procedural Justice; UPI = Use of Performance Information.

mation prove equally necessary, as technical competence determines whether data are genuinely incorporated into planning and evaluation.

The findings advance transparency scholarship by demonstrating that disclosure influences credibility through two distinct mechanisms: a technocratic pathway via performance information use and a normative pathway via fair procedures. These mechanisms function independently, showing that performance-informed reasoning and fairness perceptions are not merely complementary but separate channels that translate openness into credible budget execution. Fair procedures emerge as particularly influential in developing-country bureaucracies, where fragmented organizational environments heighten the importance of legitimacy, trust, and compliance.

Several limitations qualify these findings. Reliance on perceptual measures introduces the possibility of response bias, especially for procedural dimensions. Future research could incorporate behavioral data such as system logs or audit trails to provide more objective insights. The cross-sectional design limits the ability to capture temporal dynamics. Longitudinal or panel designs would offer stronger evidence on how re-

forms shape budgeting outcomes across election cycles and fiscal years.

Contextual factors may moderate the observed relationships. Variations in fiscal capacity, political orientation, bureaucratic quality, and dependence on central transfers could influence transparency's effectiveness, suggesting that future studies should examine these moderators to identify conditions under which openness has stronger or weaker impacts. The operationalization of transparency in this study relies primarily on portal features, while non-technical factors such as data culture, internal governance, and interdepartmental coordination may also shape how disclosure influences budgeting practices.

External validity remains constrained by the single-province focus. Comparative research across provinces or developing countries would strengthen the model's generalizability. Future research could explore more complex mediation configurations or employ experimental designs to test how variations in information design affect perceptions of fairness and data use, deepening understanding of how transparency, information use, and procedural legitimacy interact to shape budget credibility.

CONCLUSION

This study examined how digital budget transparency influences perceived budget credibility in Indonesian regency and city governments, with the use of performance information and procedural justice positioned as parallel mediating mechanisms. Results from 362 public officials across 33 local governments revealed that digital budget transparency exerts only a modest direct effect on perceived budget credibility, but operates substantially through two mediating pathways. Procedural justice emerged as the dominant mechanism with the strongest indirect effect, while the use of performance information served as a secondary pathway. Multi-group analysis confirmed that these relationships hold consistently across both regency and city governments.

The findings yield several important conclusions. Digital transparency alone does not strengthen fiscal credibility in decentralized governance systems. The weak direct effect suggests that simply making budget information accessible through digital platforms fails to improve perceptions of fiscal reliability among public officials. What matters instead is whether disclosed information actually gets used in decision-making processes and whether budgeting procedures are perceived as fair and legitimate. The dominance of procedural justice as a mediating mechanism indicates that perceptions of budget credibility depend more on normative evaluations of fairness than on technocratic information use.

These conclusions have direct implications for reform design. Transparency initiatives must attend explicitly to both information usability and procedural legitimacy. Governments seeking to improve bud-

get credibility through digital disclosure need to ensure that information is integrated into organizational decision-making routines and that budgeting processes incorporate fairness-enhancing elements. Without these institutional conditions, digital transparency platforms will remain symbolic gestures that fail to generate meaningful improvements in fiscal credibility.

AUTHOR CONTRIBUTIONS

Conceptualization: Renny Maisyarah.

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Investigation: Renny Maisyarah.

Methodology: Renny Maisyarah.

Validation: Renny Maisyarah.

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Writing – review & editing: Renny Maisyarah.

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