

Digital Integration and Institutional Trust: The Mediating Role of E-Government Transparency in Enhancing Citizen Satisfaction

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ABSTRACT: Digital transformation in local governance has increasingly been positioned as a catalyst for building public trust and enhancing citizen satisfaction. However, empirical evidence on how digital integration translates into trust-based outcomes through transparency mechanisms remains underexplored, particularly in developing-country contexts. This study examines the mediating roles of e-government transparency and institutional trust in linking digital integration to citizen satisfaction within decentralized governance structures.

Using data from 280 active users of integrated digital services in Malang City, Indonesia, collected between August and September 2025, this research employs Structural Equation Modeling (SEM) to test a sequential mediation model. Findings reveal that digital integration significantly enhances e-government transparency ($\beta = 0.51, p < 0.001$), which in turn fosters institutional trust ($\beta = 0.48, p < 0.001$). Institutional trust emerges as the strongest predictor of citizen satisfaction ($\beta = 0.62, p < 0.001$), with full mediation confirmed via bootstrapping.

The study contributes to digital government literature by demonstrating that technology-enabled transparency functions as a trust-building mechanism rather than merely an information disclosure tool. Theoretically, the research extends trust-based governance frameworks by positioning e-government transparency as an **interactive accountability interface** that bridges technological capability and citizen confidence. Practically, the findings suggest that local governments should prioritize digital platforms that enable real-time monitoring, two-way communication, and responsive feedback systems to cultivate sustained institutional trust.

KEYWORDS: Citizen satisfaction, Digital integration, Digital governance, e-government transparency, Institutional trust, Local government.

INTRODUCTION

Trust has long been regarded as the cornerstone of the relationship between governments and their citizens, an elusive yet essential element that underpins how individuals perceive, evaluate, and engage with public institutions. In democratic societies, trust is not merely a byproduct of effective governance but a constitutive force that legitimizes authority, sustains compliance, and nurtures civic confidence (Porumbescu, 2021). As governance systems increasingly decentralize, the need to cultivate and maintain institutional trust becomes even more pressing. Local governments, endowed with greater autonomy in service delivery, now operate at the frontline of citizen experience, where trust mediates the transformation of administrative performance into public satisfaction (Grimmelikhuijsen & Feeney, 2017).

Amid these structural changes, the digital transformation of government has redefined the channels through which state and citizen interactions occur. The proliferation of e-government platforms, digital service integration, and online transparency portals has introduced new mechanisms of accountability, accessibility, and responsiveness (Wirtz & Müller, 2021). These innovations promise to close the traditional gap between bureaucratic systems and civic engagement by enabling real-time information flow, integrated service access, and citizen feedback loops. Yet, a critical question persists: do digital innovations genuinely strengthen the relational qualities of governance, such as transparency, trust, and satisfaction, or do they simply introduce procedural efficiencies without reshaping citizens' perceptions of legitimacy and fairness?

Existing scholarship on digital governance has tended to bifurcate along two primary trajectories. One stream focuses on the technical dimension of e-government, emphasizing factors like system usability, interoperability, and user experience (Mergel et al., 2019). The other examines administrative outcomes such as efficiency, cost reduction, and productivity gains (Scholta et al.,

2021). While both have enriched our understanding of digital transformation, they remain largely technocratic, offering limited insight into how digitalization reconfigures the relational architecture of governance, particularly in contexts where citizen trust and institutional legitimacy are fragile. The psychological and social mechanisms linking digital integration, transparency, and trust remain underexplored, especially in developing countries where digital maturity is uneven and public skepticism toward institutions often persists (Porumbescu, 2021).

To address this conceptual gap, the present study integrates two complementary theoretical perspectives, namely the **Digital Government Theory (DGT)** and the **Trust-Based Governance Framework (TBGF)**, into a unified conceptual model. Digital Government Theory emphasizes how technological integration transforms public service ecosystems through interoperability, data connectivity, and citizen-centric design (Mergel et al., 2019). In contrast, the Trust-Based Governance Framework focuses on the relational and psychological dimensions of governance, positing that transparency, fairness, and integrity are the primary antecedents of institutional trust (Grimmelikhuijsen & Feeney, 2017). While these theories have often evolved in parallel, their intersection offers a powerful lens for understanding digital governance as a socio-technical trust system. Digital Government Theory provides the technological foundation—the infrastructure and capability enabling openness—whereas the Trust-Based Governance Framework explains the relational translation, showing how transparency and perceived accountability convert technological visibility into institutional trust.

This integration represents the **key novelty** of the present research. Specifically, this study introduces an explicit theoretical synthesis that merges DGT and TBGF into a single **sequential mediation model** demonstrating how digital integration influences citizen satisfaction through e-government transparency and institutional trust. This theoretical contribution is significant because such an integrated relational model has not been empirically tested in developing-country contexts, where digital maturity and institutional legitimacy are still evolving. Moreover, the study advances the conceptualization of **transparency as interactive accountability**, framing it not merely as a passive act of information disclosure but as a dynamic, two-way mechanism for building institutional confidence—an emerging and *cutting-edge* paradigm in digital governance literature. By doing so, this study extends prior research by integrating DGT and TBGF into a unified relational model that explains how technological capability is translated into relational legitimacy through transparency and trust mechanisms.

By synthesizing these frameworks, this study argues that digital integration exerts its impact on citizen satisfaction through a relational cascade in which integrated technologies first enhance perceived transparency by making government operations more visible and traceable. This transparency, in turn, signals accountability and cultivates institutional trust, and trust ultimately shapes citizen satisfaction by reinforcing confidence in government competence and benevolence. Thus, digital transformation functions not merely as a technical modernization project but as a **trust-enabling process** that binds citizens and institutions through visible, reliable, and responsive digital interactions.

This theoretical integration reorients scholarly attention from functional performance to relational quality in digital governance. Rather than treating digital integration, transparency, and trust as discrete or sequentially unrelated constructs, this research conceptualizes them as **interdependent components of a socio-technical governance ecosystem**, each enabling and amplifying the others. In this model, technology is not an end in itself but a medium through which governments express transparency and earn trust, thereby enhancing citizen satisfaction.

Empirically, the study situates this model in **Malang City, Indonesia**, a mid-capacity local government undergoing progressive digital transformation through integrated licensing systems, digital civil administration, and public information portals. Indonesia's post-2001 decentralization reforms have produced wide variation in local digital capacity, rendering Malang an instructive case for examining how digital integration operates within developing-country contexts characterized by evolving technological infrastructure and diverse citizen engagement levels. This contextual grounding allows the study to test whether the hypothesized relationships between digital integration, transparency, trust, and satisfaction hold in settings where institutional legitimacy and digital readiness are still consolidating.

Accordingly, the research investigates the extent to which digital integration enhances e-government transparency in decentralized governance, how transparency influences institutional trust among citizens, whether institutional trust mediates the relationship between transparency and citizen satisfaction, and what the sequential mediation pathways linking digital integration to citizen satisfaction through transparency and trust reveal about the relational mechanisms of digital governance. By addressing these interrelated questions, this research contributes both theoretically and empirically. Theoretically, it bridges DGT and TBGF into a

cohesive explanatory framework, clarifying that the true value of digital integration lies not in efficiency gains but in its capacity to foster **interactive transparency** and **relational trust**. Empirically, it offers rare evidence from a developing and decentralized context, enriching the global discourse on digital governance that remains disproportionately centered on high-capacity Western settings. Ultimately, the study advances the proposition that effective digital governance is relational at its core, and its legitimacy rests not on technological sophistication alone, but on the **trust it engenders through transparency-driven citizen engagement**.

RESEARCH METHODOLOGY

This study employs a quantitative cross-sectional research design to examine the sequential mediation pathways linking digital integration to citizen satisfaction through e-government transparency and institutional trust. The methodological approach was chosen to allow for systematic testing of hypothesized relationships among latent constructs while providing statistical precision in estimating direct and indirect effects. Cross-sectional survey data, combined with Structural Equation Modeling (SEM), offer an appropriate framework for capturing citizen perceptions of digital governance mechanisms and for assessing the extent to which these perceptions align with theoretical predictions derived from Digital Government Theory and Trust-Based Governance frameworks.

The research was conducted in Malang City, a regionally significant municipality in East Java, Indonesia, with a population of approximately 850,000 residents. Malang represents a medium-capacity local government that has progressively adopted integrated digital service platforms over the past five years, including e-licensing systems, digital civil registration, online complaint mechanisms, and public information portals accessible through a unified municipal website. The city's ongoing digital transformation, coupled with its moderate administrative capacity and diverse citizen demographic profile, positions it as an ideal setting for exploring how digital integration shapes transparency, trust, and satisfaction in decentralized governance contexts. Unlike high-capacity metropolitan areas where digital infrastructure is fully mature, or low-capacity regions where technological adoption remains nascent, Malang occupies an intermediate developmental stage that mirrors the experiences of many local governments across Southeast Asia and other developing regions.

The target population for this study comprised adult residents of Malang City who had interacted with municipal digital services within the six months preceding data collection. Focusing exclusively on active digital service users was essential to ensure that respondents possessed direct experiential knowledge of the city's e-government platforms, thereby enhancing the validity and reliability of their perceptions regarding digital integration, transparency, and trust. From a broader dataset of 400 respondents collected as part of a larger research initiative on decentralized governance, we extracted a purposive subset of 280 individuals who met the inclusion criteria: adults aged 18 to 60 years, current residents of Malang City, documented use of at least one municipal digital service within the past six months, and provision of complete responses across all survey items. This subset selection strategy aligns with established methodological guidance on sampling for perception-based research, which emphasizes the importance of restricting samples to individuals with relevant lived experience when measuring attitudes toward specific institutional practices (Wirtz & Müller, 2021).

Data collection took place between August and September 2025 through face-to-face structured surveys administered by trained enumerators at municipal service centers and public facilities. The survey instrument was developed in Indonesian and underwent rigorous translation-back-translation procedures to ensure linguistic accuracy and conceptual equivalence. Before full-scale deployment, the instrument was pilot-tested with 40 digital service users to identify potential ambiguities, refine item wording, and confirm the comprehensibility of instructions. Respondents were informed of the study's objectives, assured of anonymity and confidentiality, and provided voluntary informed consent before participation. No personally identifiable information was collected, and all responses were aggregated for analysis. The final sample exhibited balanced demographic characteristics, with 51 percent female and 49 percent male respondents, and education levels ranging from secondary schooling to postgraduate degrees, with 42 percent holding at least a bachelor's degree. Age distribution spanned the full 18 to 60 years range, reflecting the diversity of Malang's digitally active citizenry.

The survey instrument operationalized four latent constructs through multi-item scales adapted from validated measures in prior digital government research. Digital integration was assessed using six items that captured respondents' perceptions of platform interoperability, online service accessibility, and the seamlessness of digital interactions across municipal departments. These items were adapted from Mergel et al. (2019) and Wirtz and Müller (2021), whose conceptualizations emphasize the technological and



user-experience dimensions of e-government systems. A sample item read, "The city's digital services are well-integrated and easy to access through a unified platform." E-government transparency was measured through seven items reflecting perceptions of information openness, procedural clarity, real-time communication, and the availability of performance data via digital channels. Drawing on Grimmelikhuijsen and Feeney (2017), the scale operationalized transparency not merely as static disclosure but as interactive accessibility, with items such as "The government provides clear and timely information about service processes through its digital platforms. Institutional trust, comprising six items, captured respondents' confidence in local government integrity, competence, and benevolence, adapted from Porumbescu (2021) and Song and Lee (2016). A representative item stated, "I trust that the local government acts in the best interest of citizens." Finally, citizen satisfaction was assessed through five items evaluating overall satisfaction with service quality, responsiveness, and outcomes, informed by Scholta et al. (2021). All items employed a five-point Likert scale ranging from strongly disagree to strongly agree, a format widely recognized for its balance between granularity and cognitive simplicity in attitudinal measurement.

Reliability and validity assessments conducted during pilot testing demonstrated strong internal consistency, with Cronbach's alpha coefficients exceeding 0.85 for all constructs. Subsequent confirmatory analyses using the full sample further validated these properties, yielding alpha values between 0.87 and 0.91, composite reliability scores between 0.90 and 0.93, and average variance extracted values ranging from 0.65 to 0.72. These indicators surpass commonly accepted thresholds and confirm that the measurement instruments reliably captured the intended constructs (Hair et al., 2021). Discriminant validity was established through both the Fornell-Larcker criterion, which requires that the square root of each construct's average variance extracted exceed its correlations with other constructs, and the Heterotrait-Monotrait ratio, with all values below 0.85, thereby ensuring that the four constructs were empirically distinct (Henseler et al., 2015).

Data analysis was conducted using SmartPLS 4.0, a software package designed for Partial Least Squares Structural Equation Modeling, which is particularly well-suited for research involving complex models, latent constructs, and moderate sample sizes. PLS-SEM offers flexibility in handling non-normal data distributions and emphasizes predictive accuracy, making it an appropriate choice for exploratory and confirmatory analyses of mediation pathways (Hair et al., 2021). The analytical procedure followed a two-stage process. In the first stage, the measurement model was evaluated to confirm that the observed indicators adequately represented their respective latent constructs. This involved assessing indicator loadings, internal consistency reliability, convergent validity, and discriminant validity. All factor loadings exceeded 0.70, and composite reliability and average variance extracted values met or surpassed recommended benchmarks, confirming the robustness of the measurement framework.

In the second stage, the structural model was estimated to test the hypothesized relationships among digital integration, e-government transparency, institutional trust, and citizen satisfaction. Path coefficients were calculated via bootstrapping with 5,000 resamples, a resampling technique that generates empirical sampling distributions and enables accurate estimation of standard errors and confidence intervals without assuming normality (Hayes, 2018). Mediation analysis employed the product-of-coefficients method, which evaluates indirect effects by multiplying the path coefficients of sequential relationships and testing their significance through bias-corrected bootstrap confidence intervals. This approach aligns with contemporary best practices in mediation analysis and provides more statistically rigorous inference than traditional causal steps approaches (Hayes, 2018). Model fit was assessed using the Standardized Root Mean Square Residual and the Normed Fit Index, while predictive relevance was evaluated through Stone-Geisser's Q^2 values, which indicate the model's capacity to predict observed data.

Recognizing the potential for common method bias—a threat to validity that arises when data for independent and dependent variables are collected from the same respondents using the same instrument—we implemented both procedural and statistical remedies. Procedurally, survey items were randomized to prevent response patterns driven by question order, respondents were assured of anonymity to reduce social desirability bias, and construct items were interspersed throughout the survey rather than grouped by variable. Statistically, we conducted Harman's single-factor test, which involves loading all items into an exploratory factor analysis to determine whether a single factor accounts for the majority of variance. Results indicated that no single factor explained more than 35 percent of total variance, well below the threshold of concern. Additionally, full collinearity variance inflation factors for all constructs remained below 3.0, further confirming that common method bias did not compromise the integrity of the findings (Podsakoff et al., 2012).

Ethical considerations were observed throughout the research process. Participation was entirely voluntary, and respondents were free to withdraw at any point without consequence. The study received institutional approval from the relevant ethics review board,

and all data handling procedures complied with privacy regulations. Survey instruments contained no personally identifiable information, and data files were securely stored with access restricted to the research team. These measures ensured that the research adhered to the highest standards of research ethics while generating data of sufficient quality and validity to address the study's theoretical and empirical objectives.

RESULTS

The analysis commenced with a comprehensive evaluation of the measurement model to establish that the observed indicators adequately represented their respective latent constructs before proceeding to structural hypothesis testing. All four constructs—digital integration, e-government transparency, institutional trust, and citizen satisfaction—exhibited robust psychometric properties that met or exceeded conventional standards for reliability and validity in survey-based research. Cronbach's alpha coefficients ranged from 0.87 to 0.91, well above the minimum threshold of 0.70, indicating high internal consistency within each scale (Hair et al., 2021). Composite reliability values similarly ranged from 0.90 to 0.93, further confirming the stability and coherence of the measurement instruments. Average variance extracted values, which reflect the proportion of indicator variance captured by each construct, spanned 0.65 to 0.72, comfortably surpassing the recommended minimum of 0.50 and suggesting that the constructs explained a substantial majority of their indicators' variance (Fornell & Larcker, 1981). Individual item loadings ranged from 0.76 to 0.91, with each indicator loading strongly onto its intended construct and none exhibiting problematic cross-loadings. These figures collectively affirm that the measurement model possessed sufficient reliability to support subsequent structural analysis. Discriminant validity, which ensures that each construct captures a distinct conceptual domain rather than overlapping excessively with others, was assessed through two complementary criteria. First, the Fornell-Larcker criterion, which requires that the square root of each construct's average variance extracted exceed its correlations with all other constructs, was satisfied across all pairwise comparisons. The square roots of average variance extracted values—0.82 for digital integration, 0.85 for e-government transparency, 0.83 for institutional trust, and 0.81 for citizen satisfaction—consistently exceeded the inter-construct correlations, the highest of which was 0.67 between institutional trust and citizen satisfaction. Second, Heterotrait-Monotrait ratios, which provide a more stringent test of discriminant validity by comparing the average correlations between indicators of different constructs to the average correlations within constructs, were calculated for all construct pairs. All ratios remained below 0.82, comfortably beneath the conservative threshold of 0.85, thereby confirming that the four constructs were empirically distinct and not redundant (Henseler et al., 2015). These validation results established the integrity of the measurement framework and provided confidence that subsequent structural estimates would reflect genuine relationships among conceptually meaningful constructs rather than artifacts of measurement error or construct conflation.

With the measurement model validated, attention turned to the structural model, which tested the hypothesized relationships among digital integration, e-government transparency, institutional trust, and citizen satisfaction. The model demonstrated strong explanatory and predictive capabilities, as evidenced by variance explained and predictive relevance statistics. Digital integration accounted for 26 percent of the variance in e-government transparency, a substantial proportion given that transparency perceptions are shaped by multiple factors beyond technological integration alone. E-government transparency and its upstream predictors explained 58 percent of the variance in institutional trust, indicating that the model captured the majority of systematic variation in citizens' confidence in local government. Most impressively, the full model explained 71 percent of the variance in citizen satisfaction, suggesting that the theorized pathways from digital integration through transparency and trust provided a comprehensive account of satisfaction formation. Predictive relevance, assessed through Stone-Geisser's Q^2 statistic, yielded values ranging from 0.22 to 0.48 across the three endogenous constructs, all comfortably above zero and thereby confirming that the model possessed meaningful out-of-sample predictive capacity (Hair et al., 2021). Model fit indices further corroborated the adequacy of the structural specification, with the Standardized Root Mean Square Residual at 0.061, well below the threshold of 0.08 that demarcates acceptable fit, and the Normed Fit Index at 0.92, exceeding the conventional benchmark of 0.90 (Hu & Bentler, 1999). The structural path estimates revealed a clear sequence of relationships consistent with the hypothesized mediation model. Digital integration exerted a strong and statistically significant positive effect on e-government transparency, with a standardized path coefficient of 0.51 and a highly significant test statistic ($t = 9.34, p < 0.001$). This finding indicates that citizens who perceive municipal digital services as well-integrated, accessible, and interoperable are substantially more likely to evaluate the government as transparent in its operations and communications. The magnitude of this effect underscores the pivotal role that technological

infrastructure plays in shaping citizens' perceptions of governmental openness, extending beyond mere technical functionality to influence broader assessments of information accessibility and procedural clarity (Grimmelikhuijsen & Feeney, 2017).

E-government transparency, in turn, demonstrated a robust positive influence on institutional trust ($\beta = 0.48, t = 8.72, p < 0.001$), confirming that citizens' perceptions of government openness translate directly into confidence in the integrity, competence, and benevolence of local public institutions. This relationship substantiates theoretical arguments that transparency functions not merely as an information provision mechanism but as a trust-building signal that conveys governmental willingness to be held accountable (Porumbescu, 2021). The strength of this path coefficient suggests that transparency operates as a primary antecedent of trust formation in digital governance contexts, supporting the notion that visible, accessible information environments cultivate psychological foundations for institutional confidence.

Institutional trust emerged as the most influential predictor of citizen satisfaction, with a standardized coefficient of 0.62 ($t = 12.18, p < 0.001$), far surpassing the magnitude of any other direct effect in the model. This finding reveals that citizens' overall satisfaction with public services is profoundly shaped by their trust in government rather than by specific service attributes or technical features alone. The dominance of trust as a satisfaction driver aligns with trust-based governance perspectives, which posit that trust operates as a psychological currency that shapes how citizens interpret and evaluate governmental performance. When citizens trust their government, they are more inclined to perceive services favorably, attribute positive motives to public officials, and express satisfaction even when service delivery encounters occasional inefficiencies (Song & Lee, 2016).

Interestingly, e-government transparency also exhibited a modest but statistically significant direct effect on citizen satisfaction ($\beta = 0.18, t = 2.91, p < 0.01$), independent of its indirect influence mediated through institutional trust. This dual pathway—both direct and trust-mediated—suggests that transparency contributes to satisfaction through multiple mechanisms: it fosters trust, which in turn enhances satisfaction, and it also provides intrinsic value by enabling citizens to understand processes, anticipate outcomes, and exercise informed oversight. The relatively smaller magnitude of the direct effect compared to the trust-mediated pathway indicates that transparency's primary contribution to satisfaction operates through its capacity to build institutional confidence rather than through direct functional benefits alone.

The mediation analysis, conducted using bias-corrected bootstrap confidence intervals derived from 5,000 resamples, provided decisive evidence of sequential mediation. The indirect effect of digital integration on institutional trust, mediated through e-government transparency, yielded a standardized coefficient of 0.24 with a 95 percent confidence interval spanning 0.18 to 0.31, a range that excludes zero and thereby confirms significant mediation ($p < 0.001$). This result indicates that approximately half of digital integration's total effect on institutional trust operates indirectly through its enhancement of perceived transparency, underscoring transparency's role as a critical intermediary mechanism linking technological capacity to relational outcomes (Hayes, 2018).

Similarly, the indirect effect of e-government transparency on citizen satisfaction, mediated through institutional trust, was substantial ($\beta = 0.30, 95\% \text{ CI } [0.23, 0.37], p < 0.001$), accounting for a larger share of transparency's total effect on satisfaction than the direct pathway. This finding reinforces the interpretation that transparency influences satisfaction primarily by cultivating trust rather than by offering standalone functional advantages. Citizens who perceive government as transparent develop greater confidence in institutional integrity, and it is this confidence that ultimately translates into satisfaction with service quality and outcomes.

Most compellingly, the analysis confirmed full sequential mediation from digital integration to citizen satisfaction through the two-stage pathway of e-government transparency and institutional trust. The total indirect effect of digital integration on satisfaction, traversing first through transparency and then through trust, yielded a coefficient of 0.15 (95% CI [0.10, 0.21], $p < 0.001$). Although modest in absolute magnitude, this sequential indirect effect is theoretically significant because it demonstrates that the influence of digital technologies on citizen satisfaction operates primarily through relational rather than purely technical channels. Digital integration enhances satisfaction not because it makes services faster or more convenient per se, but because it enables transparency, which fosters trust, which in turn generates satisfaction. This cascade of effects reveals a fundamentally relational logic underlying digital governance, one in which technological investments achieve their full value only when they strengthen the psychological and social bonds connecting citizens to their government.

The absence of a significant direct path from digital integration to citizen satisfaction in preliminary model specifications—omitted from the final model due to statistical insignificance and theoretical redundancy—further corroborates the mediation interpretation.



Digital integration does not directly satisfy citizens; rather, it creates conditions for transparency, which builds trust, which yields satisfaction. This pattern aligns with recent scholarship emphasizing that e-government success depends less on technological sophistication and more on whether digital systems facilitate meaningful relational exchanges between government and citizens (Scholta et al., 2021).

Collectively, these findings paint a coherent picture of digital governance as a trust-building enterprise. Digital integration serves as the technological foundation that enables transparency; transparency functions as the relational mechanism that signals governmental openness and accountability; trust emerges as the psychological response to perceived transparency; and satisfaction represents the evaluative outcome of sustained institutional confidence. Each element in this sequence plays a distinct and indispensable role, and the strength of the sequential mediation pathway demonstrates that disruptions at any stage—insufficient digital integration, inadequate transparency practices, or failures to cultivate trust—would undermine the ultimate objective of citizen satisfaction. The model's high explanatory power and predictive relevance suggest that these relationships are not merely statistically significant but substantively meaningful, capturing the core dynamics through which digital technologies reshape citizen-government relationships in decentralized governance contexts.

DISCUSSION

The findings of this study illuminate a sequential relational architecture through which digital technologies reshape citizen-government relationships in decentralized governance contexts. Rather than operating as isolated functional improvements, digital integration, e-government transparency, and institutional trust form an interdependent ecosystem wherein each element derives its influence from its capacity to activate the next. The empirical confirmation of sequential mediation—digital integration fostering transparency, transparency cultivating trust, and trust generating satisfaction—challenges prevailing assumptions in digital government scholarship that privilege technical efficiency over relational dynamics. This section interprets these findings through critical engagement with theoretical frameworks, empirical precedents, and practical imperatives, ultimately arguing that the transformative potential of digital governance lies not in technological sophistication per se but in its capacity to reconfigure the psychological and social foundations of governmental legitimacy.

The substantial effect of digital integration on e-government transparency ($\beta = 0.51$) affirms that technology functions as an enabler of visibility, yet this relationship warrants deeper reflection than mere confirmation of functional capability. Digital Government Theory has long posited that integrated platforms enhance service accessibility and administrative efficiency (Mergel et al., 2019; Wirtz & Müller, 2021), but the present findings suggest a more profound mechanism at work. In Malang City, where unified portals for licensing, civil administration, and public information have been progressively implemented, digital integration has created what might be termed a *visibility infrastructure*—a sociotechnical environment in which governmental operations become observable, traceable, and interrogable in ways that traditional bureaucratic systems never permitted. This visibility extends beyond passive information disclosure to encompass real-time tracking, procedural clarity, and performance accountability, thereby transforming citizens from passive recipients of services into informed observers of governmental processes.

This interpretation both extends and departs from conventional understandings of digital transparency. Scholta et al. (2021) conceptualize e-government evolution as a progression from fragmented systems toward integrated "no-stop shops" where citizens access services seamlessly without navigating multiple touchpoints. While this framing emphasizes convenience, the present study reveals that integration's deeper value lies in its capacity to render governmental activity legible. When citizens can track application statuses, access procedural guidelines, and retrieve performance metrics through a single portal, they gain epistemic access to processes that were previously opaque. This epistemic transformation—from uncertainty about "what is happening" to confidence that "I can see what is happening"—constitutes the psychological foundation upon which transparency perceptions rest. The finding that digital integration explains 26 percent of transparency variance suggests that while technology is necessary for visibility, it is not sufficient; other factors, such as communication quality, data presentation, and institutional responsiveness, also shape transparency perceptions. Nevertheless, the strong direct effect underscores that digital infrastructure operates as a prerequisite for modern transparency regimes.

Critically, the relationship between digital integration and transparency invites reconsideration of what transparency means in digital governance contexts. Grimmelikhuijsen and Feeney (2017) distinguish between *passive transparency*—the mere availability of information—and *interactive transparency*—systems that enable citizens to query, verify, and contest information. The Malang

case exemplifies this distinction: digital platforms do not simply publish data but facilitate bidirectional engagement wherein citizens can request clarification, monitor progress, and provide feedback. This interactivity transforms transparency from a one-way communication mechanism into a participatory accountability interface, aligning with emerging perspectives on digital accountability that emphasize citizen agency rather than bureaucratic disclosure (Gil-Garcia et al, 2020). However, this reconceptualization also surfaces a tension: if transparency depends on interactive capability, do passive disclosure mechanisms—commonly employed in less technologically mature settings—fail to cultivate the same trust-building effects? This question suggests that transparency's operationalization must adapt to technological context, a nuance that future research should explore systematically.

The robust pathway from e-government transparency to institutional trust ($\beta = 0.48$) provides empirical validation for the Trust-Based Governance Framework, yet it also complicates instrumental accounts of transparency that treat openness primarily as an accountability tool. Porumbescu (2021) argues that transparency influences trust by signaling governmental competence and benevolence, but the present findings suggest an additional mechanism: transparency functions as *credibility signaling*. When governments operate transparently through digital platforms, citizens interpret this openness as evidence that officials are willing to be scrutinized and have "nothing to hide." This inference process—from observable transparency to attributed trustworthiness—operates at a symbolic level that transcends the informational content of disclosed data. Even if citizens do not actively scrutinize every piece of information, the mere *availability* of transparent systems conveys institutional integrity.

This interpretation contrasts with technocratic views that assume transparency's value lies solely in enabling citizen monitoring and detection of malfeasance. While oversight capabilities matter, the present study demonstrates that transparency's primary contribution to trust formation operates through psychological perception rather than active surveillance. Citizens develop trust not necessarily because they verify every governmental action but because they *could* verify if they chose to, and because governmental willingness to expose operations suggests confidence in institutional legitimacy. This distinction is consequential for policy design: governments need not assume that citizens will exhaustively engage with transparency platforms; rather, the existence of such platforms—and their reliability, consistency, and accessibility—suffices to cultivate trust.

However, this finding also raises a critical question: does transparency always build trust, or does its effect depend on contextual factors such as prior trust levels, political culture, or the nature of disclosed information? Song, C., & Lee, J. (2016). caution that transparency can backfire when disclosed information reveals governmental incompetence or corruption, potentially eroding rather than enhancing trust. The Malang case, situated in a relatively stable governance environment where digital services function adequately, may represent a best-case scenario wherein transparency reinforces positive perceptions. In contexts characterized by systemic dysfunction or widespread distrust, transparency might expose problems that undermine confidence. This contextual contingency suggests that transparency's trust-building capacity is not universal but conditioned by the quality of underlying governance. Future research employing comparative designs across high- and low-performing governments could illuminate the boundary conditions under which transparency fosters versus undermines trust.

The dominance of institutional trust as a predictor of citizen satisfaction ($\beta = 0.62$) reorients attention from technical performance to relational confidence, challenging instrumentalist assumptions that pervade e-government literature. Much scholarship has emphasized system usability, processing speed, and service quality as direct drivers of satisfaction (Wirtz & Müller, 2021), yet the present findings demonstrate that these technical attributes influence satisfaction primarily through their effect on trust. This mediation reveals a fundamentally relational logic: citizens evaluate services not merely on functional merits but through the interpretive lens of trust. When citizens trust their government, they are predisposed to view services favorably, attribute positive intentions to officials, and overlook occasional inefficiencies. Conversely, absent trust, even technically proficient services may fail to generate satisfaction because citizens remain skeptical of governmental motives and competence.

This finding resonates with broader scholarship on trust as a psychological heuristic that simplifies complex evaluations. In situations where citizens lack complete information or expertise to assess governmental performance—common in public service contexts—trust operates as a cognitive shortcut that shapes interpretations. A trusted government receives the benefit of the doubt; a distrusted government faces scrutiny and suspicion. The magnitude of trust's effect on satisfaction (accounting for 71 percent of variance) underscores its centrality as an evaluative framework through which citizens process experiences with public institutions. This insight carries profound implications: improving citizen satisfaction may require less focus on marginal technical enhancements and greater emphasis on trust cultivation through transparent, consistent, and responsive governance practices.



Building on this, the sequential mediation from digital integration through transparency and trust to satisfaction reveals a *relational cascade* wherein each stage activates the next, and disruptions at any point undermine the entire chain. This cascade logic challenges linear models that treat technology, transparency, trust, and satisfaction as independent dimensions, instead positioning them as mutually constitutive elements within an integrated governance system. Digital integration enables transparency by creating visibility infrastructures; transparency cultivates trust by signaling governmental openness and accountability; trust generates satisfaction by shaping interpretive frameworks through which citizens evaluate services. The total indirect effect of digital integration on satisfaction ($\beta = 0.15$), operating entirely through transparency and trust, demonstrates that technology's value lies not in direct functional improvements but in its capacity to enable relational transformations.

This theoretical contribution bridges Digital Government Theory and Trust-Based Governance Framework, two literatures that have historically developed in parallel with limited cross-fertilization. Digital government scholarship has emphasized technological capability, system design, and user experience (Mergel et al., 2019), while trust research has focused on psychological antecedents and institutional legitimacy (Porumbescu, 2021). By demonstrating empirically that digital integration influences satisfaction through transparency and trust, this study synthesizes these perspectives into a unified framework wherein technology operates as an enabler of relational outcomes. This synthesis advances understanding of digital governance as a sociotechnical phenomenon wherein technological and relational mechanisms jointly produce value, neither reducible to the other, yet each dependent on the other for full realization.

Moreover, the empirical validation of institutional trust as a mediator rather than merely an outcome refines existing theoretical models by specifying causal sequencing. Prior research has treated trust as an end-state resulting from transparency (Grimmelikhuijsen & Feeney, 2017) or as a moderator conditioning transparency's effect (Porumbescu, 2021), but less attention has been devoted to trust as a *transmission mechanism* that translates transparency into satisfaction. The present findings establish trust as a critical intermediary variable that carries forward the effects of upstream factors, suggesting that governance reforms aimed at enhancing satisfaction must strategically target trust formation rather than assuming that transparency or technology will directly yield satisfaction. This causal clarification contributes conceptual precision to governance theory by disentangling the distinct roles of antecedents, mediators, and outcomes within causal chains.

From a practical standpoint, these findings suggest that local governments pursuing digital transformation must adopt holistic strategies that address technological, informational, and relational dimensions simultaneously. Investing in digital infrastructure without corresponding attention to transparency practices may yield technical capability that fails to enhance citizen perceptions of openness. Similarly, promoting transparency without cultivating trust may generate information overload or skepticism rather than confidence. The sequential logic implies that interventions should be sequenced and integrated: first, develop robust digital platforms that enable seamless information access; second, institutionalize transparency practices that leverage these platforms to disclose processes and performance; third, maintain consistency and reliability in transparency to build trust over time; and finally, recognize that satisfaction emerges from sustained trust rather than from isolated technical improvements.

However, several limitations and unresolved questions temper these conclusions. The cross-sectional design precludes definitive causal inference; while the hypothesized causal sequence aligns with theoretical logic and statistical mediation tests, longitudinal data tracking changes in digital integration, transparency, trust, and satisfaction would strengthen causal claims. The focus on active digital service users potentially overestimates transparency's effects, as digitally excluded or less engaged populations may not experience the same trust-building dynamics. Future research should examine whether transparency-trust mechanisms operate differently across digital literacy levels, socioeconomic strata, or generational cohorts, addressing equity concerns in digital governance. Additionally, institutional trust was measured as a unidimensional construct, yet trust scholarship distinguishes competence-based, integrity-based, and benevolence-based trust dimensions (Grimmelikhuijsen & Feeney, 2017). Disaggregating trust facets could reveal which dimensions are most responsive to digital transparency, offering more targeted policy guidance.

Comparative research across cities with varying digital maturity, governance capacity, and political cultures would test the generalizability of the sequential mediation model and illuminate contextual contingencies. Experimental designs manipulating transparency features—such as real-time updates versus static reports, visual dashboards versus text-based disclosures—could identify which design elements most effectively build trust, providing evidence-based guidance for platform development. Exploring moderating variables such as prior trust levels, political cynicism, or partisan identity may reveal conditions under which transparency strengthens or weakens trust, addressing the boundary conditions of transparency's effects.



Ultimately, this study demonstrates that the promise of digital governance lies not in technological prowess but in technology's capacity to reconfigure the relational foundations of governmental legitimacy. Digital integration matters because it enables transparency; transparency matters because it cultivates trust; and trust matters because it shapes how citizens interpret and evaluate governmental performance. Recognizing this relational logic requires shifting from technocentric to citizen-centric governance paradigms, wherein success is measured not by system capabilities but by relational outcomes—transparency, trust, satisfaction, and ultimately, the legitimacy that sustains democratic governance in an era of decentralization and digital transformation.

CONCLUSION

This study demonstrates that digital integration influences citizen satisfaction not through direct functional improvements but through a sequential relational pathway: technology enables transparency, transparency cultivates trust, and trust generates satisfaction. The empirical validation of this cascade reveals that effective digital governance operates fundamentally as a trust-building enterprise; wherein technological capabilities derive their value from enabling relational transformations rather than merely enhancing administrative efficiency. These findings challenge instrumentalist perspectives that privilege technical performance, instead positioning transparency as an interactive accountability mechanism and trust as the psychological currency through which citizens evaluate governmental legitimacy.

Theoretically, the research advances digital governance scholarship by integrating Digital Government Theory with the Trust-Based Governance Framework, demonstrating empirically that these previously parallel literatures converge in explaining how technology reshapes citizen-government relationships. The specification of sequential mediation—wherein transparency and trust operate as distinct yet interdependent intermediaries—contributes conceptual precision by clarifying causal pathways through which digital transformation produces public value. The reconceptualization of e-government transparency from passive information disclosure to interactive accountability interface extends emerging debates on digital accountability, offering a more nuanced understanding of transparency's relational functions in technologically mediated governance contexts.

For practitioners, the findings underscore that digital transformation strategies must address technological, informational, and relational dimensions simultaneously. Local governments should prioritize integrated platforms that enable real-time transparency, design systems for bidirectional citizen engagement rather than unidirectional information flow, and maintain consistency in transparency practices to cultivate sustained institutional trust. Recognizing that trust mediates transparency's effects on satisfaction, administrators should monitor citizen confidence as a leading indicator of service quality perceptions, enabling proactive governance adjustments before dissatisfaction crystallizes.

The study's limitations suggest promising avenues for future research. The cross-sectional design warrants longitudinal investigation of how transparency-trust dynamics evolve as digital systems mature. The focus on active digital users necessitates exploration of whether these mechanisms operate differently across digital literacy levels, addressing equity concerns in digital governance. Comparative research across varying governance contexts would test the model's generalizability, while experimental designs manipulating transparency features could identify which design elements most effectively build trust. Despite these limitations, the Malang City case illustrates that even medium-capacity governments can leverage strategic digital integration to strengthen citizen-government relationships, offering a template for decentralized governance reform in developing nations where technological capability and institutional legitimacy must advance together. As governments worldwide confront declining public trust, understanding how digital technologies can rebuild confidence through transparency becomes both a scholarly imperative and a governance necessity for sustaining democratic legitimacy in an increasingly digital age.

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