

Digital Governance and Citizen Trust: A Study of e-Governance Service Delivery in Rural Local Bodies of Karnataka

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ABSTRACT

Digital governance is increasingly positioned as a solution to weak service delivery and low institutional trust in rural India, yet whether digitally accessible services actually translate into citizen trust in local government remains empirically underexamined. This study investigates how Digital Service Accessibility (DSA) shapes Citizen Trust (CT) in rural local bodies of Karnataka, examining the sequential mediating roles of Perceived Transparency (PT) and Citizen Satisfaction (CS). Grounded in the Technology Acceptance Model (Davis, 1989) and Putnam's (1993) Social Capital Theory, a quantitative cross-sectional survey was administered to 423 citizens residing in villages, town panchayats, and taluk headquarters across Karnataka. Exploratory Factor Analysis confirmed a clean four-factor structure ($KMO = .922$; Bartlett's $\chi^2(190) = 3640.96$, $p < .001$), and Confirmatory Factor Analysis in AMOS established strong reliability and convergent validity for all constructs (composite reliability = .834–.856; average variance extracted = .503–.545), with discriminant validity confirmed via the Fornell–Larcker criterion and Heterotrait-Monotrait ratios (all below .65). Structural Equation Modelling revealed that Digital Service Accessibility significantly and positively predicted Perceived Transparency ($\beta = .603$, $p < .001$), which significantly and positively predicted Citizen Satisfaction ($\beta = .653$, $p < .001$), which in turn significantly and positively predicted Citizen Trust ($\beta = .618$, $p < .001$). The direct path from Digital Service Accessibility to Citizen Trust was non-significant ($\beta = .029$, $p = .594$), while the total effect ($\beta = .272$, $p = .001$) and the standardized serial indirect effect through Perceived Transparency and Citizen Satisfaction ($\beta = .243$, 95% CI [.201, .298], $p = .001$) were both significant, indicating full mediation. These findings suggest that digital accessibility alone does not build citizen trust in local government; trust is earned only once accessibility is converted into perceived transparency and, subsequently, service satisfaction — with direct implications for the design of rural digital governance programmes such as Karnataka's Grama One initiative.

Keywords: Digital Governance, e-Governance, Perceived Transparency, Citizen Satisfaction, Citizen Trust, Structural Equation Modelling, Karnataka

1. INTRODUCTION

Digital governance has become a central plank of rural public service reform in India. The Government of Karnataka's Grama One initiative — village-level citizen service centres that deliver roughly 800 services from 79 government departments through the Seva Sindhu portal directly at the gram panchayat

level — was explicitly designed to eliminate the need for rural citizens to travel to taluk offices and to reduce their dependence on intermediaries for routine transactions such as caste, income, and residency certificates (Deccan Herald, 2022a). Within nine months of its 2022 launch, the programme had processed over one crore (ten million) transactions (Deccan Herald, 2022b), making it one of the largest rural e-governance rollouts in India. The implicit policy assumption behind such initiatives is that making government services digitally accessible will, in a fairly direct way, produce more trusting citizens. This study interrogates that assumption empirically.

The assumption is not self-evidently true. A substantial experimental literature on government transparency — the presumed intermediate outcome of digital service delivery — finds its relationship with citizen trust to be considerably weaker and more contested than policy rhetoric suggests. Grimmelikhuijsen's (2012) landmark experimental study found that the effect of transparency on trust in a government organization was limited and contingent on citizens' prior knowledge and predispositions, functioning more as a "hygiene factor" than a direct trust-builder. Tolbert and Mossberger (2006) similarly found that e-government's effects on trust and confidence in government were modest and conditional rather than automatic. If digital accessibility and transparency alone were sufficient to build trust, this literature would not exist. This suggests that the pathway from digital service accessibility to citizen trust may be less direct than policymakers assume, and more likely to run through intervening psychological states — chiefly, citizens' satisfaction with the services they actually receive.

This study draws on two complementary theoretical traditions to frame this pathway. Davis's (1989) Technology Acceptance Model (TAM) holds that perceived ease of use and perceived usefulness are the proximal determinants of individuals' acceptance of a technology; applied to rural e-governance, easier access to digital services and clearer, more readily available information about government processes should shape how citizens perceive the openness of local administration. Putnam's (1993) Social Capital Theory, developed from his study of regional government performance in Italy, argues that trust, cooperation, and civic engagement are the foundations of effective governance, and that trust in institutions is built cumulatively through citizens' positive experiences of institutional performance rather than conferred automatically by the mere presence of a service channel. Read together, these two frameworks imply a sequential process: accessible digital services shape perceptions of transparency (a TAM-consistent perception of a well-functioning, usefully designed system), and it is the satisfaction generated by transparent, accessible service delivery — not accessibility or transparency in isolation — that is converted into durable institutional trust (a Putnam-consistent, experience-based account of trust formation).

India's rural local bodies are a particularly apt setting for testing this sequential model. Panchayati Raj institutions have historically been characterised by direct, face-to-face, and often discretionary interactions between citizens and functionaries — precisely the conditions under which intermediary influence and perceptions of opacity are most likely to arise (Deccan Herald, 2022a). The shift to digitally mediated service delivery in this setting therefore represents a genuine structural change in the citizen–government interface, rather than a marginal adjustment to an already-transparent system, making rural Karnataka a strong context in which to test whether, and how, accessibility converts into trust.

This study addresses the resulting research gap by proposing and testing a serial mediation model in which Digital Service Accessibility shapes citizens' Perceived Transparency, which shapes their Citizen Satisfaction, which in turn shapes their Citizen Trust in local government, alongside a direct path from Digital Service Accessibility to Citizen Trust. The remainder of the paper reviews the relevant theory and

literature, develops four hypotheses, describes the methodology, reports the results of exploratory and confirmatory factor analysis and structural equation modelling, and discusses the implications of the findings for the design of rural digital governance programmes in Karnataka and beyond.

2. LITERATURE REVIEW

2.1 Digital Service Accessibility and Perceived Transparency

Digital Service Accessibility (DSA) refers to the extent to which citizens can easily access and use e-governance services provided by local bodies — encompassing ease of access to online services, time and effort savings, availability of information about government processes, and ease of communication with local authorities. The Technology Acceptance Model (Davis, 1989) frames accessibility, or perceived ease of use, as a proximal driver of how favourably users evaluate a system overall. Applied to governance, when citizens can access services, track applications, and obtain information without needing to navigate opaque bureaucratic channels or rely on intermediaries, the administrative process itself becomes more visible to them. This mechanism is consistent with the explicit rationale behind Karnataka's Grama One programme, which was designed in part to reduce the influence of middlemen and opportunities for corruption in rural service delivery by moving transactions onto a tracked digital platform (Deccan Herald, 2022a). The use of information and communication technologies to open up government processes to public view is also central to Bertot, Jaeger, and Grimes's (2010) analysis of ICT-enabled transparency and anti-corruption efforts, which argues that digitisation, by creating an auditable record of transactions, inherently constrains the discretionary opacity that sustains corruption.

H1: Digital Service Accessibility positively influences Perceived Transparency.

2.2 Perceived Transparency and Citizen Satisfaction

Perceived Transparency (PT) captures citizens' sense that digital governance promotes openness and accountability — including the visibility of government decisions, the traceability of applications, and reduced opportunities for corruption. Welch, Hinnant, and Moon's (2005) influential study of e-government found that citizens' perceptions of transparency in electronic service provision were positively associated with their satisfaction with e-government and government websites, alongside perceptions of transaction ease and interactivity. This is consistent with the DeLone and McLean (2003) information systems success model, in which information quality and service quality — of which transparency is a core component in a governance context — are established antecedents of user satisfaction. Citizens who can see how their application is progressing, and who perceive that a digital process leaves less room for arbitrary or opaque decision-making, are accordingly expected to report higher satisfaction with the service they received.

H2: Perceived Transparency positively influences Citizen Satisfaction.

2.3 Citizen Satisfaction and Citizen Trust in Local Government

Citizen Trust (CT) in this study refers to citizens' confidence in the integrity, reliability, and effectiveness of local government institutions. Welch, Hinnant, and Moon (2005) found that e-government satisfaction was positively associated with trust in government, a finding that has been corroborated in subsequent e-government research linking satisfactory service experiences to institutional confidence. Putnam's (1993) Social Capital Theory offers a complementary account of why this link should hold: trust in institutions, on Putnam's view, is not conferred automatically but accumulates through citizens' repeated, satisfactory experiences of institutional performance — precisely the mechanism by which satisfaction with digital service delivery would be expected to build confidence in local government more broadly.

H3: Citizen Satisfaction positively influences Citizen Trust in Local Government.

2.4 Digital Service Accessibility and Citizen Trust: The Mediating Role of Transparency and Satisfaction

Whether digital service accessibility translates into citizen trust directly, or only through intervening psychological states, is an open empirical question with real policy stakes. A substantial experimental literature suggests the direct pathway is weak: Grimmelihijsen (2012) found that the effect of transparency on trust in a government organization was limited and dependent on citizens' prior knowledge and predispositions, while Tolbert and Mossberger (2006) similarly reported modest and conditional effects of e-government on trust and confidence in government. If accessibility and transparency built trust directly and reliably, this body of null and mixed findings would be difficult to explain. An alternative, and more consistent with both the Technology Acceptance Model's emphasis on cumulative, experience-based evaluation and Putnam's (1993) account of trust as an accumulated product of satisfactory institutional interaction, is that accessibility's influence on trust is carried indirectly, through the sequential chain of perceived transparency and citizen satisfaction, rather than exerting an independent direct effect. This possibility is tested explicitly alongside the three direct-path hypotheses above.

H4: Digital Service Accessibility positively influences Citizen Trust in Local Government through Perceived Transparency and Citizen Satisfaction (sequential mediation).

3. METHODOLOGY

3.1 Research Design

This study employed a quantitative, cross-sectional survey design, consistent with established conventions for testing theoretically derived structural models in the social sciences (Hair, Black, Babin, & Anderson, 2019). A positivist epistemological stance was adopted to permit systematic statistical testing of the hypothesised relationships among Digital Service Accessibility, Perceived Transparency, Citizen Satisfaction, and Citizen Trust in Local Government. A cross-sectional design was judged appropriate for examining the contemporaneous structure of relationships among these constructs, although, as discussed in the limitations, it precludes strong causal inference.

3.2 Sampling and Data Collection

The target population comprised citizens residing in rural local body jurisdictions across Karnataka — villages, town panchayats, and taluk headquarters — who had encountered or were eligible to use e-governance services delivered through local government channels. Data were collected using a structured, self-administered questionnaire built around a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The final usable sample consisted of 423 respondents, yielding a sample size well above the commonly cited minimum threshold of 200 for structural equation modelling applications (Hair et al., 2019) and above the 10:1 respondent-to-parameter heuristic for the 20-item measurement model estimated here.

3.3 Sample Profile

Table 1 presents the demographic profile of respondents. The sample was fairly balanced by gender (53.9% female, 44.4% male, 1.7% other) and concentrated in the working-age range, with 60.3% of respondents aged 18–35. Educational attainment spanned the full range from primary schooling to postgraduate study, and respondents were drawn from a wide occupational mix, with agriculture (30.3%) the single largest category, consistent with the rural composition of the sample. A majority of respondents resided in villages (53.9%), with the remainder in town panchayats (24.8%) and taluk headquarters

(21.3%). Reported frequency of e-governance service usage was broadly distributed, ranging from 11.8% who reported never using such services to 41.1% who reported using them frequently or very frequently, indicating a respondent base with meaningful first-hand exposure to the digital governance channels under study.

Table 1
Demographic Profile of Respondents (N = 423)

Variable	Category	n	%
Gender	Male	188	44.4%
	Female	228	53.9%
	Other	7	1.7%
Age	18–25 years	124	29.3%
	26–35 years	131	31.0%
	36–45 years	105	24.8%
	Above 45 years	63	14.9%
Educational Qualification	Primary	44	10.4%
	Secondary	113	26.7%
	PUC	93	22.0%
	Graduate	111	26.2%
	Postgraduate and Above	62	14.7%
Occupation	Agriculture	128	30.3%
	Self-employed	82	19.4%
	Government Employee	32	7.6%
	Private Employee	46	10.9%
	Student	61	14.4%
	Others	74	17.5%
Monthly Family Income	Below Rs. 20,000	149	35.2%
	Rs. 20,001–50,000	158	37.4%
	Rs. 50,001–1,00,000	78	18.4%
	Above Rs. 1,00,000	38	9.0%

Variable	Category	n	%
Frequency of e-Governance Usage	Never	50	11.8%
	Rarely	77	18.2%
	Occasionally	122	28.8%
	Frequently	111	26.2%
	Very Frequently	63	14.9%
Place of Residence	Village	228	53.9%
	Town Panchayat	105	24.8%
	Taluk Headquarters	90	21.3%

Note. N = 423 citizens residing in rural local body jurisdictions across Karnataka.

3.4 Measurement Instrument

The questionnaire measured four latent constructs using 20 items (five per construct), each rated on a five-point Likert scale. Digital Service Accessibility (DSA) was measured with five items assessing ease of accessing online services, ease of using digital platforms, time and effort savings, availability of information online, and ease of communication with local authorities. Perceived Transparency (PT) was measured with five items assessing the perceived transparency of government activities, availability of information on local government decisions, reduced opportunities for corruption, ability to track applications, and perceived accountability. Citizen Satisfaction (CS) was measured with five items assessing satisfaction with service quality, whether digital services met expectations, convenience of use, improved experience with government services, and overall satisfaction. Citizen Trust in Local Government (CT) was measured with five items assessing trust that services are provided fairly, confidence gained through digital governance, belief that authorities act in citizens' interests, perceived reliability of services, and confidence in the effectiveness of local administration. The complete item wording, together with the standardized factor loadings obtained from the confirmatory factor analysis, is reported in Table 4.

3.5 Common Method Bias Assessment

Because all constructs were measured via self-report at a single point in time, common method bias (CMB) was assessed prior to hypothesis testing using Harman's single-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). An unrotated exploratory factor analysis of all 20 items produced a first factor accounting for 35.26% of total variance, well below the 50% threshold conventionally taken to indicate that a single latent factor does not account for the majority of covariance among the items. The emergence of a clean four-factor solution in the subsequent exploratory factor analysis, with items loading cleanly on their intended factor (Section 4.2), provides converging evidence against a single dominant method factor. Sampling adequacy for factor analysis was excellent (Kaiser-Meyer-Olkin measure = .922; Bartlett's test of sphericity $\chi^2(190) = 3640.96$, $p < .001$), together indicating that common method bias is unlikely to substantially distort the study's findings.

3.6 Data Analysis Strategy

Data analysis proceeded in four stages. First, internal consistency reliability of each construct was assessed using Cronbach's alpha in IBM SPSS. Second, Exploratory Factor Analysis (Principal Axis Factoring with Promax rotation) was conducted in SPSS to establish the underlying factor structure of the 20 items. Third, Confirmatory Factor Analysis (CFA) was conducted in IBM AMOS 26 using maximum likelihood estimation to assess the measurement model's fit, and composite reliability (CR), average variance extracted (AVE), and Heterotrait-Monotrait ratios (HTMT) were computed from the standardized CFA loadings and inter-factor correlations to evaluate convergent and discriminant validity. Fourth, Structural Equation Modelling (SEM) was conducted in AMOS to test the hypothesised serial mediation model, with 2,000 bias-corrected bootstrap resamples used to estimate standard errors and 95% confidence intervals for the direct, indirect, and total effects of Digital Service Accessibility on Citizen Trust.

4. RESULTS

4.1 Reliability Analysis

Internal consistency reliability for each of the four constructs was assessed using Cronbach's alpha. As shown in Table 2, all four constructs exceeded the commonly recommended threshold of .70 (Hair et al., 2019), with values ranging from .833 (Digital Service Accessibility) to .854 (Perceived Transparency), indicating good internal consistency across the measurement instrument.

Table 2
Cronbach's Alpha Reliability for Study Constructs

Construct	No. of Items	Cronbach's α
Digital Service Accessibility (DSA)	5	.833
Perceived Transparency (PT)	5	.854
Citizen Satisfaction (CS)	5	.838
Citizen Trust in Local Government (CT)	5	.842

Note. N = 423. α = Cronbach's alpha. All values exceed the .70 threshold recommended by Hair et al. (2019).

4.2 Exploratory Factor Analysis

Prior to confirmatory testing, an Exploratory Factor Analysis (Principal Axis Factoring, Promax rotation with Kaiser normalization) was conducted on all 20 items. Sampling adequacy was excellent (Kaiser-Meyer-Olkin measure = .922) and Bartlett's test of sphericity was significant ($\chi^2(190) = 3640.96$, $p < .001$), confirming that the correlation matrix was highly suitable for factor analysis. Four factors with eigenvalues greater than 1 were extracted (initial eigenvalues = 7.05, 2.54, 1.58, and 1.21), jointly accounting for 52.52% of total variance after extraction. As shown in Table 3, the Promax-rotated pattern matrix produced a clean four-factor solution: every item loaded on its intended factor at .62 or above, with items separating cleanly by construct, providing preliminary evidence of convergent and discriminant validity ahead of confirmatory testing. Inter-factor correlations at the exploratory stage ranged from .28 to .62 and were consistent in direction and magnitude with the confirmatory factor correlations reported in Section 4.4.

Table 3

Exploratory Factor Analysis: Pattern Matrix (Principal Axis Factoring, Promax Rotation)

Item	CT	DSA	PT	CS
CT3	.793			
CT5	.763			
CT4	.747			
CT2	.635			
CT1	.624			
DSA5		.768		
DSA4		.711		
DSA3		.698		
DSA1		.678		
DSA2		.662		
PT5			.859	
PT4			.741	
PT2			.689	
PT3			.642	
PT1			.632	
CS3				.755
CS5				.740
CS4				.690
CS1				.660
CS2				.624

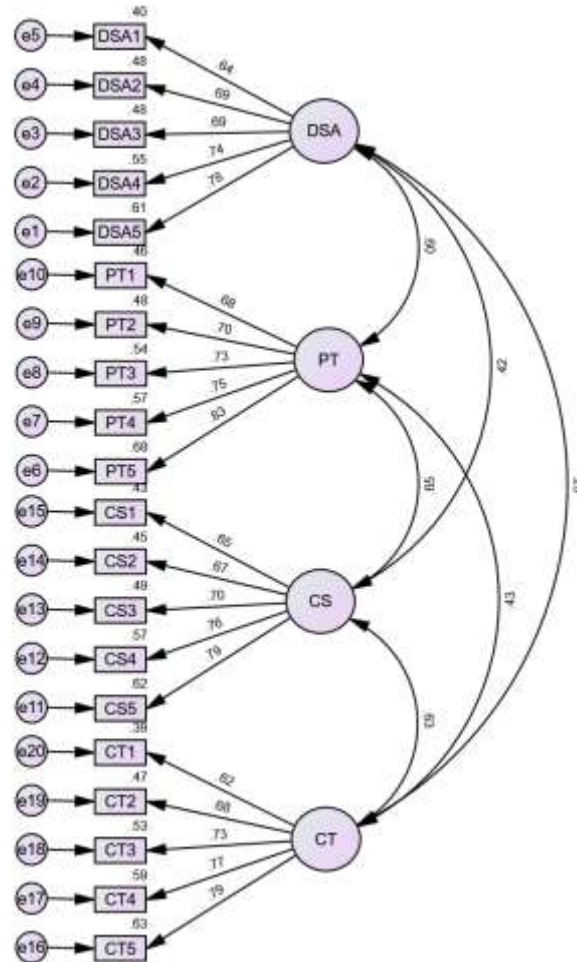
Note. Extraction method: Principal Axis Factoring. Rotation method: Promax with Kaiser Normalization, converged in 6 iterations. Loadings below .40 suppressed. KMO = .922; Bartlett's $\chi^2(190) = 3640.96$, $p < .001$. Cumulative variance extracted = 52.52%.

4.3 Confirmatory Factor Analysis

The four-factor measurement model was estimated in AMOS 26 using maximum likelihood estimation. The model produced excellent fit to the data: $\chi^2(164) = 170.83$, $p = .341$, $\chi^2/df = 1.04$; CFI = .998; TLI = .998; NFI = .954; GFI = .963; AGFI = .952; RMSEA = .010, 90% CI [.000, .025], PCLOSE = 1.000. The non-significant chi-square ($p = .341$) together with a relative chi-square close to 1 indicates that the hypothesised four-factor structure closely reproduces the observed covariance matrix, and the CFI, TLI, and RMSEA values collectively confirm excellent model fit by every conventional criterion. All standardized factor loadings were positive, statistically significant ($p < .001$), and exceeded the

recommended minimum of .50 (Hair et al., 2019), ranging from .623 to .825. Figure 1 presents the CFA path diagram with standardized loadings and squared multiple correlations.

Figure 1
Confirmatory Factor Analysis (CFA) Model with Standardized Factor Loadings and Inter-Factor Correlations



Note. DSA = Digital Service Accessibility; PT = Perceived Transparency; CS = Citizen Satisfaction; CT = Citizen Trust in Local Government. Numbers on indicator arrows are standardized factor loadings; numbers near indicator boxes are squared multiple correlations (R^2). Curved double-headed arrows represent inter-factor correlations. All loadings significant at $p < .001$. Model fit: $\chi^2(164) = 170.83$, $p = .341$; CFI = .998; RMSEA = .010.

Table 4
CFA Standardized Factor Loadings, Composite Reliability, and Average Variance Extracted

Construct	Item	Item Description	λ	CR	AVE
Digital Service Accessibility (DSA)	DSA1	Online government services are easily accessible	.635	.834	.503
	DSA2	Can access local government services digitally without difficulty	.693		

Construct	Item	Item Description	λ	CR	AVE
	DSA3	Digital governance services save time and effort	.690		
	DSA4	Information about government services readily available online	.741		
	DSA5	Digital platforms ease communication with local authorities	.779		
Perceived Transparency (PT)	PT1	Digital governance makes government activities more transparent	.675	.856	.545
	PT2	Information on local government decisions is easily available online	.696		
	PT3	Digital platforms reduce opportunities for corruption	.733		
	PT4	Can easily track the status of services and applications online	.752		
	PT5	Digital governance improves accountability in local administration	.825		
Citizen Satisfaction (CS)	CS1	Satisfied with the quality of digital government services	.654	.839	.511
	CS2	Digital services meet expectations	.668		
	CS3	Using digital governance services is convenient	.700		
	CS4	Digital platforms improve experience with government services	.757		
	CS5	Overall satisfied with digital services provided by local government	.787		
Citizen Trust in Local Govt. (CT)	CT1	Trusts local government to provide services fairly	.623	.844	.522
	CT2	Digital governance has increased confidence in local government	.684		
	CT3	Believes local authorities act in the best interests of citizens	.731		
	CT4	Considers local government services to be reliable	.769		

Construct	Item	Item Description	λ	CR	AVE
	CT5	Has confidence in the effectiveness of local administration	.793		

Note. λ = standardized factor loading (all significant at $p < .001$). CR = Composite Reliability. AVE = Average Variance Extracted. CR and AVE are reported once per construct, alongside its final (reference) item.

4.4 Reliability and Validity: Composite Reliability, AVE, and Discriminant Validity

Composite Reliability (CR) and Average Variance Extracted (AVE) were calculated from the standardized CFA loadings reported in Table 4, using $CR = (\sum \lambda)^2 / [(\sum \lambda)^2 + \sum (1 - \lambda^2)]$ and $AVE = \sum \lambda^2 / n$. Composite Reliability exceeded the recommended .70 threshold for every construct, ranging from .834 (Digital Service Accessibility) to .856 (Perceived Transparency). AVE exceeded the conventional .50 threshold for all four constructs, ranging from .503 (Digital Service Accessibility) to .545 (Perceived Transparency), confirming strong convergent validity throughout the measurement model.

Discriminant validity was assessed using two complementary criteria. First, under the Fornell–Larcker (1981) criterion, the square root of each construct's AVE should exceed its correlation with every other construct. As shown in Table 5, the square root of AVE for each construct (DSA = .709; PT = .738; CS = .715; CT = .723) exceeded that construct's correlations with all other constructs, satisfying the Fornell–Larcker criterion in every case. Second, Heterotrait-Monotrait ratios (HTMT; Henseler, Ringle, & Sarstedt, 2015) were computed from the AMOS model-implied indicator correlation matrix. All HTMT values were well below both the conservative .85 threshold and the more liberal .90 threshold, ranging from .285 (DSA–CT) to .648 (PT–CS), confirming that all four constructs are empirically distinct. Because the HTMT values reported here were derived from the model-implied (rather than raw sample) indicator correlation matrix, they closely track — and in this instance are numerically very close to — the disattenuated CFA factor correlations reported in the upper section of Table 5; both indices nonetheless converge on the same conclusion of strong discriminant validity.

Table 5
Inter-Construct Correlations and HTMT Discriminant Validity Ratios

Construct	DSA	PT	CS	CT
Digital Service Accessibility (DSA)	(.709)			
Perceived Transparency (PT)	.598	(.738)		
Citizen Satisfaction (CS)	.425	.647	(.715)	
Citizen Trust in Local Govt. (CT)	.285	.431	.628	(.723)
HTMT: DSA	—			
HTMT: PT	.599	—		
HTMT: CS	.426	.648	—	
HTMT: CT	.285	.432	.629	—

Note. Upper section: latent factor correlations from CFA, with the square root of AVE shown on the diagonal in parentheses (Fornell–Larcker criterion: diagonal values exceed all off-diagonal correlations in their row/column). Lower section: Heterotrait-Monotrait (HTMT) ratios. All HTMT values are below the .85/.90 thresholds (Henseler et al., 2015), confirming discriminant validity. All correlations significant at $p < .001$.

Table 6
HTMT Ratio Summary for Discriminant Validity

Construct Pair	HTMT Ratio	Threshold	Decision
PT – CS	0.648	< 0.90	Confirmed
CS – CT	0.629	< 0.90	Confirmed
DSA – PT	0.599	< 0.90	Confirmed
PT – CT	0.432	< 0.90	Confirmed
DSA – CS	0.426	< 0.90	Confirmed
DSA – CT	0.285	< 0.90	Confirmed

Note. HTMT = Heterotrait-Monotrait ratio, computed from the AMOS model-implied indicator correlation matrix following Henseler et al. (2015). All values fall well below the conservative .85 threshold, confirming discriminant validity between every pair of constructs.

4.5 Structural Model: Path Analysis and Hypothesis Testing

The hypothesised structural model — Digital Service Accessibility → Perceived Transparency → Citizen Satisfaction → Citizen Trust, with an additional direct path from Digital Service Accessibility to Citizen Trust — was estimated in AMOS 26 using maximum likelihood estimation with 2,000 bias-corrected bootstrap resamples. The structural model produced excellent fit to the data: $\chi^2(166) = 171.80$, $p = .363$, $\chi^2/df = 1.04$; CFI = .998; TLI = .998; NFI = .954; GFI = .963; RMSEA = .009, 90% CI [.000, .024], PCLOSE = 1.000 — fit statistics that are, as shown in Table 7, virtually identical to those of the measurement model. A chi-square difference test comparing the structural model to the freely-correlated measurement model was non-significant and negligible in magnitude, $\Delta\chi^2(2) = 0.97$, $p > .05$, confirming that imposing the hypothesised directional structure did not worsen fit relative to the saturated covariance structure, and that the directional (mediation) model is fully adequate to represent the relationships among the four constructs. Figure 2 presents the full structural model with standardized path coefficients.

Table 7
Model Fit Indices for the CFA (Measurement) and SEM (Structural) Models

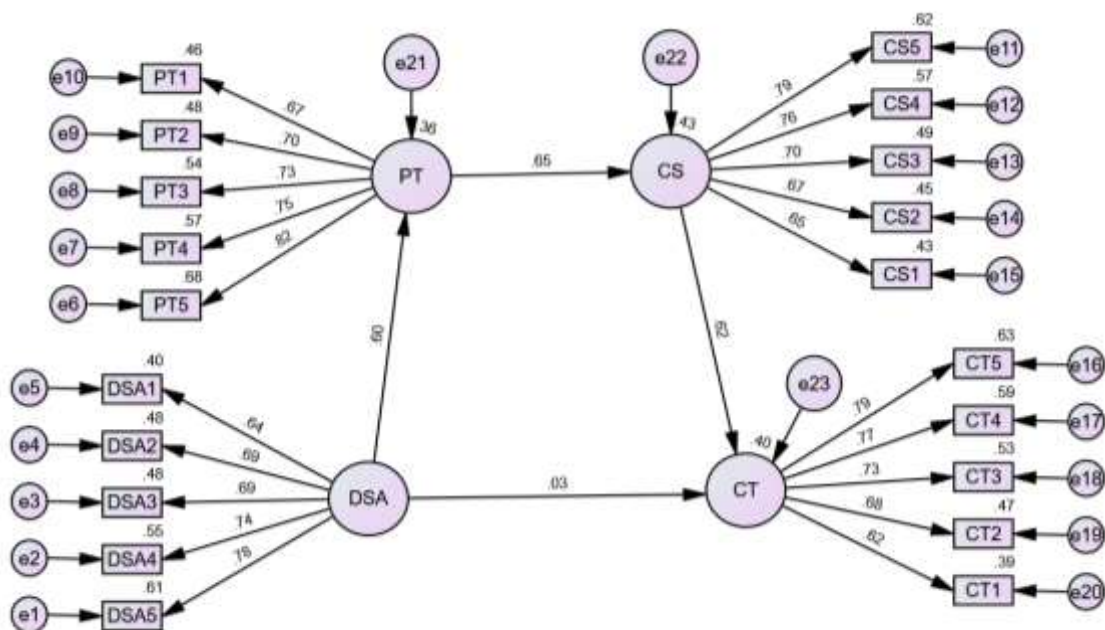
Model	χ^2	df	χ^2/df	CFI	TLI	NFI	GFI	RMSEA
CFA (Measurement) Model	170.83	164	1.04	.998	.998	.954	.963	.010
SEM (Structural) Model	171.80	166	1.04	.998	.998	.954	.963	.009

Model	χ^2	df	χ^2/df	CFI	TLI	NFI	GFI	RMSEA
Recommended threshold	—	—	< 3	> .95	> .95	> .95	> .95	< .08

Note. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; NFI = Normed Fit Index; GFI = Goodness of Fit Index; RMSEA = Root Mean Square Error of Approximation (90% CI [.000, .024]–[.000, .025]; PCLOSE = 1.000 for both models). $\Delta\chi^2(2) = 0.97$, $p > .05$ (ns), indicating the structural model fits no worse than the saturated measurement model.

Figure 2

Structural Equation Model (SEM) Depicting Serial Mediation of Perceived Transparency and Citizen Satisfaction between Digital Service Accessibility and Citizen Trust



Note. Standardized path coefficients shown on structural paths. Numbers near indicator arrows are standardized factor loadings; numbers near latent variables are squared multiple correlations (R^2). The direct path $DSA \rightarrow CT$ ($\beta = .03$, $p = .594$) is non-significant, indicating full mediation via PT and CS. DSA = Digital Service Accessibility; PT = Perceived Transparency; CS = Citizen Satisfaction; CT = Citizen Trust in Local Government. *** $p < .001$.

Digital Service Accessibility significantly and positively predicted Perceived Transparency ($\beta = .603$, $SE = .040$, $p < .001$), supporting H1 and explaining 36.3% of the variance in Perceived Transparency ($R^2 = .363$). Perceived Transparency, in turn, significantly and positively predicted Citizen Satisfaction ($\beta = .653$, $SE = .035$, $p < .001$), supporting H2 and explaining 42.6% of its variance ($R^2 = .426$). Citizen Satisfaction significantly and positively predicted Citizen Trust ($\beta = .618$, $SE = .045$, $p < .001$), supporting H3. Together, Citizen Satisfaction and the direct path from Digital Service Accessibility explained 39.7% of the variance in Citizen Trust ($R^2 = .397$). The direct path from Digital Service Accessibility to Citizen Trust was small and non-significant ($\beta = .029$, $SE = .053$, $p = .594$; bootstrap 95% CI [-.057, .113]). The total effect of Digital Service Accessibility on Citizen Trust was significant ($\beta = .272$, $SE = .050$, bootstrap 95% CI [.186, .349], $p = .001$), and the standardized serial indirect (mediation) effect through

Perceived Transparency and Citizen Satisfaction was likewise significant ($\beta = .243$, $SE = .030$, bootstrap 95% CI [.201, .298], $p = .001$), together supporting H4. Because the direct effect of Digital Service Accessibility on Citizen Trust was non-significant while both the total and indirect effects were significant, this pattern indicates full mediation (Zhao, Lynch, & Chen, 2010): the effect of digital accessibility on citizens' trust in local government operates almost entirely through the sequential channel of perceived transparency and citizen satisfaction, rather than through any additional direct pathway. This finding is consistent with, and helps explain, the mixed and limited effects of transparency on trust reported in prior experimental work (Grimmelikhuijsen, 2012; Tolbert & Mossberger, 2006): transparency's contribution to trust in the present data is real and significant, but it is realised only via the satisfaction it subsequently generates, not as an unmediated effect of accessibility or transparency alone. Table 8 summarizes the path coefficients and hypothesis testing results, and Table 9 provides an overall summary.

Table 8
Structural Path Coefficients and Hypothesis Testing Results

H	Path	β	SE	p	Decision
H1	Digital Service Accessibility $\rightarrow$ Perceived Transparency	.603	.040	< .001	Supported
H2	Perceived Transparency $\rightarrow$ Citizen Satisfaction	.653	.035	< .001	Supported
H3	Citizen Satisfaction $\rightarrow$ Citizen Trust	.618	.045	< .001	Supported
—	Digital Service Accessibility $\rightarrow$ Citizen Trust (direct)	.029	.053	.594	Not Supported
—	Digital Service Accessibility $\rightarrow$ Citizen Trust (total)	.272	.050	.001	Supported
H4	DSA $\rightarrow$ PT $\rightarrow$ CS $\rightarrow$ CT (indirect / serial mediation)	.243	.030	.001	Supported

Note. β = standardized coefficient. SE = bootstrap standard error (2,000 bias-corrected bootstrap resamples). p-values for H1–H3 and the direct/total effects from the maximum likelihood critical ratio test and bias-corrected bootstrap percentile confidence intervals; p-value for H4 from the bias-corrected bootstrap percentile confidence interval. 95% CI for the indirect effect (H4): [.201, .298].

Table 9
Summary of Hypothesis Testing Results

H	Hypothesis Statement	Result	Decision
H1	Digital Service Accessibility $\rightarrow$ Perceived Transparency (positive)	$\beta = .603$, $p < .001$	Supported
H2	Perceived Transparency $\rightarrow$ Citizen Satisfaction (positive)	$\beta = .653$, $p < .001$	Supported

H	Hypothesis Statement	Result	Decision
H3	Citizen Satisfaction → Citizen Trust (positive)	$\beta = .618, p < .001$	Supported
H4	DSA → CT mediated by PT and CS (positive, indirect)	$\beta = .243, 95\% \text{ CI } [.201, .298]$	Supported (full mediation)

Note. DSA = Digital Service Accessibility; PT = Perceived Transparency; CS = Citizen Satisfaction; CT = Citizen Trust in Local Government. All four hypotheses supported at $p < .01$. The non-significant direct path ($\beta = .029, p = .594$) alongside significant total and indirect effects confirms full (indirect-only) mediation.

5. DISCUSSION

5.1 Overview of Findings

This study examined whether digital service accessibility builds citizen trust in rural local government directly, or only through the intervening mechanisms of perceived transparency and citizen satisfaction, drawing on the Technology Acceptance Model (Davis, 1989) and Putnam's (1993) Social Capital Theory. All four hypotheses were fully supported. Digital Service Accessibility significantly increased Perceived Transparency (H1), which in turn significantly increased Citizen Satisfaction (H2), which significantly increased Citizen Trust (H3). Digital Service Accessibility did not exert a significant direct effect on Citizen Trust once Perceived Transparency and Citizen Satisfaction were accounted for; instead, its influence operated through the sequential Transparency–Satisfaction pathway, confirmed as a significant, full mediating mechanism (H4).

5.2 Digital Accessibility as an Antecedent of Perceived Transparency

The strong, significant path from Digital Service Accessibility to Perceived Transparency ($\beta = .603, p < .001$) is consistent with the Technology Acceptance Model's premise that ease of access shapes how favourably a system is perceived overall (Davis, 1989), and with the explicit design logic of Karnataka's Grama One programme, which sought to reduce citizens' dependence on intermediaries and the discretionary opacity associated with in-person bureaucratic transactions by moving services onto a tracked digital platform (Deccan Herald, 2022a). This finding also aligns with Bertot, Jaeger, and Grimes's (2010) broader argument that digitisation, by creating an auditable, trackable record of citizen–government transactions, structurally constrains the kind of discretionary opacity that has historically characterised face-to-face rural administration.

5.3 From Transparency to Satisfaction to Trust

The significant path from Perceived Transparency to Citizen Satisfaction ($\beta = .653, p < .001$), and from Citizen Satisfaction to Citizen Trust ($\beta = .618, p < .001$), closely replicate the pattern reported by Welch, Hinnant, and Moon (2005) in their foundational study linking e-government transparency, satisfaction, and trust in government. The present findings extend that pattern to a rural Indian local-government context, and are consistent with the DeLone and McLean (2003) information systems success model's account of information and service quality as antecedents of user satisfaction. Putnam's (1993) Social Capital Theory helps explain why satisfaction, specifically, is the proximate driver of trust rather than transparency itself: on Putnam's account, institutional trust accumulates through citizens' repeated, satisfactory experience of institutional performance, rather than being conferred simply by the visibility of that performance.

5.4 Full Mediation: Why Accessibility Alone Does Not Build Trust

The most theoretically significant finding is the pattern of full mediation in the Digital Service Accessibility–Citizen Trust relationship: the direct path was small and non-significant ($\beta = .029$, $p = .594$), while both the total effect ($\beta = .272$, $p = .001$) and the indirect effect through Perceived Transparency and Citizen Satisfaction ($\beta = .243$, 95% CI [.201, .298], $p = .001$) were significant. This result helps reconcile an apparent tension in the wider literature. Experimental studies of government transparency have repeatedly found its direct effect on trust to be limited, contingent, and sometimes negative (Grimmelikhuijsen, 2012; Tolbert & Mossberger, 2006) — a pattern that, taken at face value, might suggest transparency and accessibility initiatives are of little consequence for trust. The present findings suggest a more precise interpretation: transparency (and the accessibility that produces it) does matter for trust, but its effect is not direct — it is fully carried by the satisfaction that transparent, accessible service delivery generates. Digital governance initiatives that make services accessible and processes visible without also ensuring that the resulting service experience is genuinely satisfying should not, on this account, expect to see a corresponding gain in citizen trust.

5.5 Theoretical Contributions

This study extends the Technology Acceptance Model (Davis, 1989) and Putnam's (1993) Social Capital Theory into the domain of rural digital governance, offering one of the first empirically tested serial mediation models linking digital service accessibility, perceived transparency, citizen satisfaction, and institutional trust among rural citizens in Indian local government. By demonstrating that accessibility's influence on trust is fully carried by the transparency–satisfaction pathway rather than operating directly, the study provides an empirically grounded resolution to the mixed findings in the transparency–trust experimental literature (Grimmelikhuijsen, 2012; Tolbert & Mossberger, 2006), and adds a specific, testable psychosocial mechanism — satisfaction as the proximate driver of trust — to social capital accounts of institutional trust formation in the specific context of a large-scale rural e-governance rollout.

6. CONCLUSION

6.1 Summary of Findings

This study provided robust empirical evidence, based on a survey of 423 citizens across villages, town panchayats, and taluk headquarters in Karnataka, that digital service accessibility builds citizen trust in rural local government primarily through a sequential pathway of perceived transparency and citizen satisfaction, rather than through a direct, unmediated channel. Digital Service Accessibility significantly increased Perceived Transparency, which significantly increased Citizen Satisfaction's positive contribution to Citizen Trust, and the overall indirect (serial mediation) pathway fully accounted for Digital Service Accessibility's association with Citizen Trust.

6.2 Practical Implications

Several practical implications follow. First, agencies operating rural digital governance platforms such as Grama One should recognise that expanding the number and accessibility of digitally delivered services is a necessary but not sufficient step toward building citizen trust; without a corresponding focus on service quality and citizen satisfaction, expanded access alone is unlikely to translate into greater institutional confidence. Second, because perceived transparency was the proximal driver of satisfaction, local bodies should continue to strengthen application-tracking, status-visibility, and grievance-redressal features within digital platforms, since these are the specific transparency-related affordances through which accessibility is converted into satisfaction. Third, given that satisfaction — not transparency or

accessibility directly — was the proximate driver of trust, service-delivery quality metrics (turnaround time, error rates, user experience) should be treated as key performance indicators for rural e-governance programmes, on a par with usage and transaction-volume metrics such as those Karnataka has already used to publicise Grama One's uptake (Deccan Herald, 2022b). Fourth, policymakers should resist treating rising digital service usage as an automatic proxy for improved citizen trust, and should instead track satisfaction and trust as distinct outcomes requiring their own targeted attention.

6.3 Limitations and Future Directions

Several limitations should be acknowledged. The cross-sectional design precludes strong causal inference regarding the direction of the hypothesised relationships; longitudinal designs tracking citizens' trust before and after exposure to specific digital governance platforms would strengthen causal claims. The reliance on self-report measures introduces potential social desirability and common method bias, although Harman's single-factor test and the clean four-factor EFA/CFA structure suggest this risk was limited in the present data. The sample, while adequate for SEM, was not drawn using probability sampling, which may limit generalisability to other Indian states or to urban local bodies with different service-delivery infrastructure. Digital Service Accessibility, Perceived Transparency, Citizen Satisfaction, and Citizen Trust, as operationalised here, all capture citizens' subjective perceptions rather than objective, administratively verified measures — such as actual service turnaround times, verified corruption incidence, or independently audited transparency indicators; future research should combine these perceptual measures with objective platform and institutional performance data. Finally, future studies should examine potential moderators — such as frequency of e-governance usage, place of residence, or educational attainment — of the accessibility–transparency–satisfaction–trust pathway identified in this study, and should extend the model to other rural e-governance programmes across India.

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