

Digital Transformation of Examination Management and Its Role in Enhancing Transparency and Accountability in Academic Evaluation

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Abstract

E-governance has become a defining feature of contemporary educational administration, reshaping how institutions manage admissions, finance, examinations and stakeholder communication. This study examines the role of e-governance in strengthening transparency and accountability within educational institutions, and compares the perceptions of respondents affiliated with public and private institutions. Data were collected from a sample of 400 respondents comprising administrators, faculty members and students drawn from both public and privately managed institutions, using a structured questionnaire measured on a five-point Likert scale. The suitability of the data for multivariate analysis was confirmed through the Kaiser-Meyer-Olkin measure of sampling adequacy ($KMO = 0.912$) and Bartlett's test of sphericity ($\chi^2 = 5420.36$, $df = 780$, $p < 0.001$). Analytical procedures included descriptive statistics, one-sample and independent samples t-tests, Pearson correlation analysis and simple linear regression. The findings indicate that perceived transparency in e-governance systems is significantly above the hypothesised benchmark value ($M = 3.01$, $t = 14.82$, $p < 0.001$), and that respondents from private institutions report marginally but significantly higher transparency than those from public institutions ($t = 2.31$, $df = 398$, $p = 0.021$). Online admission systems emerged as a significant predictor of accountability and fairness, explaining 44.6 per cent of the variance in the outcome construct ($\beta = 0.668$, $p < 0.001$), while digital financial management systems demonstrated an even stronger effect, accounting for 49.3 per cent of the variance ($\beta = 0.702$, $p < 0.001$). Correlation analysis confirmed strong, positive and statistically significant associations among all constructs at the one per cent level. The study concludes that e-governance functions as a meaningful enabler of institutional transparency and accountability, that digital financial administration exerts the strongest single influence, and that the modest advantage held by private institutions points to the importance of organisational responsiveness rather than technology alone.

Keywords: e-governance; transparency; accountability; educational administration; online admission systems; digital financial management; public and private institutions

1. Introduction

1.1 Digital Transformation of Educational Administration

The administration of educational institutions has changed substantially over the last decade. Functions that were once managed through registers, physical files and counter-based interaction — admission processing, fee collection, examination management, personnel records and regulatory reporting — are now routinely mediated by integrated digital platforms. This shift has been driven partly by expanding enrolment and administrative complexity, partly by government digitisation programmes, and partly by the expectation of students and parents that institutional services should be accessible online. Alenezi (2021) observes that digital transformation in higher education extends well beyond the acquisition of software, requiring coordinated change in processes, culture and leadership if it is to deliver institutional benefit. Bygstad, Øvrelid, Ludvigsen and Dæhlen (2022) describe a dual digitalisation in which academic and administrative systems evolve along separate tracks that must eventually be reconciled, while Rodríguez-Abitia and Bribiesca-Correa (2021) report wide variation in the digital maturity of universities, attributing much of that variation to organisational culture and leadership rather than to technological availability. Educational administration has therefore become an information-intensive activity in which the design of digital systems increasingly determines the character of governance itself.

1.2 Conceptual Foundations of E-Governance

A conceptual distinction separates e-government from e-governance. The former denotes the electronic delivery of services and the digitisation of transactions; the latter encompasses the broader reconfiguration of decision processes, institutional relationships and mechanisms of control that information and communication technologies make possible. Cordella and Tempini (2015) argue that digitisation does not dissolve bureaucratic structure but rather embeds administrative rules within technological artefacts, so that the logic encoded in a system becomes the operative logic of the organisation. Meijer (2015) identifies the principal barriers to e-governance innovation as institutional and cultural rather than technical, emphasising that reform must engage the political context of the adopting organisation. Twizeyimana and Andersson (2019), reviewing the public value of e-government, distil dimensions that include improved services, administrative efficiency, open-government capability, enhanced ethical conduct and increased trust. Malodia, Dhir, Mishra and Bhatti (2021) integrate these strands into a framework centred on citizen-centricity and data-driven decision-making. Applied to education, these perspectives suggest that an e-governance system generates governance value only when its users find it usable and its outputs credible.

1.3 Transparency and Accountability in Institutional Governance

Transparency and accountability, though frequently paired, are analytically distinct. Transparency concerns the availability, accessibility and intelligibility of information about institutional conduct. Accountability concerns a relationship in which an actor is obliged to

explain and justify conduct before a forum capable of posing questions, forming judgements and imposing consequences. Transparency may support accountability but does not constitute it. Lourenço (2015), analysing open government portals from an accountability perspective, finds that portals often publish substantial data while failing to present it in forms that permit external evaluation. Matheus and Janssen (2020) advance a window theory in which the value of disclosure depends on the design of the aperture rather than on the volume of information released. Venkatesh, Thong, Chan and Hu (2016) demonstrate empirically that transparency and trust jointly mediate citizens' uncertainty about digital public services, indicating that perceived openness has measurable behavioural consequences. Within educational administration these constructs acquire concrete referents: whether admission criteria are visible and consistently applied, whether fee income and its utilisation are disclosed, whether evaluation procedures can be inspected, and whether an aggrieved stakeholder can obtain a reasoned institutional response.

1.4 Public and Private Institutions as Comparative Contexts

Public and private educational institutions operate under different accountability regimes and therefore encounter different incentives to digitise. Public institutions answer to ministries, statutory regulators, audit authorities and, ultimately, taxpayers; their disclosure obligations are prescribed by law and their technology procurement is governed by tendering rules that slow acquisition while subjecting it to scrutiny. Private institutions answer principally to governing boards, fee-paying students and accreditation bodies; their disclosure obligations are narrower, and their incentive to digitise arises from competitive positioning, cost control and service quality. Ingrams, Manoharan, Schmidhuber and Holzer (2020), in a twelve-year longitudinal analysis of e-government development, find that transparency-oriented features mature earlier and more evenly than participation-oriented features, a pattern that plausibly extends to educational institutions. Bharosa (2022) adds that growing reliance on commercial platform providers concentrates control over institutional data with vendors whose own operations remain opaque. These divergent contexts justify a comparative treatment, since the same technology deployed under different governance pressures may produce materially different transparency and accountability outcomes.

A further consideration concerns organisational responsiveness. Where decision cycles are short and resource reallocation is straightforward, institutions are better positioned to redesign processes around digital systems rather than merely overlaying technology on existing procedure. Kalsi and Kiran (2015), examining e-governance optimisation in an Indian state context, emphasise that back-end process reform is the decisive determinant of whether digitisation delivers governance improvement or simply relocates existing inefficiency.

1.5 Scope and Structure of the Study

The present study investigates the role of e-governance in strengthening transparency and accountability in educational administration, with particular attention to two administrative domains in which digitisation is most advanced: online admission systems and digital financial management systems. It draws on primary data collected from 400 respondents affiliated with public and private institutions and applies inferential statistical procedures to test three

hypotheses concerning institutional differences in perceived transparency and the predictive influence of digital systems on accountability outcomes. The remainder of the paper is organised as follows. Section 2 reviews the relevant literature across three thematic strands. Section 3 sets out the research methodology, including sampling, instrumentation, reliability assessment and analytical procedures. Section 4 presents the empirical results through twelve tables and four figures, accompanied by interpretation. Section 5 concludes by consolidating the findings and considering their implications for institutional practice.

2. Literature Review

The literature informing this study spans three overlapping fields: public administration research on e-government and transparency, information systems research on adoption and service quality, and higher education research on digital transformation and institutional governance. The review proceeds across three thematic strands.

2.1 E-Governance Adoption and Maturity in Educational Institutions

Stage models of e-governance maturity trace a progression from static web presence, through interaction and transaction, to the integration of internal and external databases and eventually to process transformation supported by analytics. Ingrams et al. (2020) provide longitudinal evidence that progression along such stages is neither linear nor uniform, and that administrative capacity, resource endowment and political context shape both pace and direction. Kalsi and Kiran (2015) link maturity explicitly to governance outcomes, proposing a strategic framework in which improvements in service delivery are sustained only where front-end digitisation is accompanied by back-end process redesign.

Adoption research supplies the demand-side counterpart. Gupta, Singh and Bhaskar (2016), reviewing the citizen adoption literature, identify perceived usefulness, perceived ease of use, trust, self-efficacy and facilitating conditions as recurring determinants. Mensah (2019), studying university students specifically, finds that perceived service quality, ease of use and usefulness significantly predict the intention to adopt digital government services — a finding of direct relevance to educational administration, where students constitute the largest and most frequent user group of institutional platforms. Rana, Dwivedi, Williams and Weerakkody (2016), examining an online grievance redressal system, show that perceived usefulness, social influence and trust drive the use of a channel whose entire purpose is accountability. The implication is consequential: accountability mechanisms that are not trusted will not be used, and unused mechanisms generate no accountability. Bharosa (2022) situates these adoption dynamics within the broader emergence of platform-based public digital infrastructure, raising questions of dependency and standardisation that apply equally to institutions licensing student information and learning management systems from commercial suppliers.

2.2 Digital Systems, Transparency and Accountability Outcomes

A substantial body of evidence connects digitisation to improvements in transparency and integrity, though the relationship is consistently reported as conditional rather than automatic. Nam (2018), analysing cross-country data, finds a significant negative association between e-government development and perceived corruption, with the strength of the relationship moderated by national cultural characteristics. Khan and Krishnan (2021) demonstrate that

electronic government maturity interacts with corruption embedded in business systems and basic national institutions, indicating that digital platforms operate upon rather than independently of their institutional environment. Adam and Fazekas (2021), reviewing the evidence on emerging technologies and anti-corruption, conclude that observed effects are genuine but contingent on data quality, enforcement capacity and the presence of actors able and willing to act on disclosed information.

The mechanisms through which these effects operate are reasonably well specified. Proactive disclosure lowers the cost of making institutional information available, though Lourenço (2015) and Matheus and Janssen (2020) both caution that technically complete disclosure may nonetheless fail to render conduct intelligible. Process traceability is arguably more consequential for administrative integrity: when admission, examination and financial processes execute within an integrated system, each action leaves a timestamped record attributable to an identified user, removing the discretion that undocumented procedure permits. Cordella and Tempini (2015) note that this is precisely where digital systems reinforce rule-governed action. Williamson (2018), however, cautions that the expansion of institutional data infrastructures reorients accountability toward computationally tractable indicators, potentially marginalising dimensions of educational quality that resist quantification. Venkatesh et al. (2016) complete the picture by showing that perceived transparency operates through trust to influence actual service use, which suggests that transparency and accountability outcomes are mutually reinforcing rather than sequential.

2.3 Comparative Perspectives on Public and Private Institutions

Direct comparative studies of e-governance across public and private educational institutions remain relatively scarce, and comparative insight must largely be assembled from adjacent findings. The pattern that emerges is nonetheless consistent. Public institutions adopt digital systems predominantly in response to mandate, and consequently score well on the breadth of external disclosure while facing procurement rules, budget constraints and entrenched administrative practice that limit the depth of integration. Meijer (2015) and Ingrams et al. (2020) both identify capacity and organisational culture as principal constraints on depth of development, and these constraints weigh more heavily where administrative procedure is externally prescribed.

Private institutions display an inverted profile. Adoption is driven by competition, cost control and the service expectations of fee-paying students, which favours investment in integrated enterprise systems and responsive service interfaces. Rodríguez-Abitia and Bribiesca-Correa (2021) find that variation in university digital maturity is explained more by leadership and organisational culture than by sector membership as such, though the mechanisms they identify — decision speed, willingness to reallocate resources, tolerance for process change — are generally more available to privately governed institutions. Bygstad et al. (2022) note that administrative and academic digitalisation frequently proceed on separate tracks, a divergence that better-resourced institutions are more able to reconcile. The comparative weakness of the private sector lies in external disclosure: where publication is not mandated, competitively sensitive information tends to remain unpublished and the accountability forum contracts to

boards and paying clients. Malodia et al. (2021) and Twizeyimana and Andersson (2019) both suggest that reframing digital governance around public value offers a route toward convergence. The present study contributes empirical evidence to this comparative literature by measuring perceived transparency across both institutional types within a single sampling frame.

3. Research Methodology

The study adopts a quantitative, descriptive and analytical research design based on primary data collected through a structured survey instrument. The design is cross-sectional, capturing stakeholder perceptions of e-governance, transparency and accountability at a single point in time, and comparative, in that it examines differences between respondents affiliated with public and privately managed educational institutions.

Population and Sample. The target population comprised administrators, faculty members and senior students of educational institutions in which e-governance systems for admission, finance and examination management had been operational for at least two academic sessions. A sample of 400 respondents was drawn using stratified purposive sampling, with institutional type serving as the stratification variable. Of the total sample, 220 respondents (55.0 per cent) were affiliated with public institutions and 180 respondents (45.0 per cent) with private institutions. The sample size satisfies the conventional requirement of a minimum of ten observations per measured item for factor-analytic procedures and provides adequate statistical power for the inferential tests employed.

Instrument. Data were collected using a self-administered structured questionnaire organised into four sections: respondent and institutional profile; perceptions of online admission systems, covering efficiency, fairness and accountability; perceptions of digital financial management systems, covering efficiency, transparency and accountability; and a composite transparency construct capturing information disclosure, openness and accessibility. All substantive items were measured on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Item content was developed from constructs established in prior research on e-government adoption and transparency, drawing in particular on the dimensions specified by Gupta et al. (2016), Venkatesh et al. (2016) and Twizeyimana and Andersson (2019).

Validity and Reliability. Content validity was established through expert review by academic and administrative specialists, following which ambiguous items were revised. Construct validity was assessed through factor-analytic diagnostics reported in Section 4.1. The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity were computed to confirm that the correlation structure of the data was suitable for factor extraction. Internal consistency was verified prior to analysis, and all constructs met conventional thresholds for scale reliability.

Hypotheses. Three hypotheses were formulated for testing:

H1: There is a significant difference in perceived transparency of e-governance systems between public and private educational institutions.

H2: Online admission systems significantly enhance accountability and fairness in the admission process of educational institutions.

H3: Digital financial management systems significantly enhance transparency and accountability in the financial administration of educational institutions.

Analytical Procedures. Data were analysed using descriptive and inferential statistics. Descriptive statistics summarised central tendency and dispersion for each construct. A one-sample t-test was applied to determine whether the composite transparency score differed significantly from a hypothesised test value of 2.50, representing the lower-midpoint benchmark of the response scale. An independent samples t-test compared transparency scores across institutional types. Pearson product-moment correlation analysis examined the strength and direction of association among constructs, and simple linear regression was used to estimate the predictive influence of online admission systems and digital financial systems on the corresponding accountability outcomes. Model adequacy was evaluated through the coefficient of determination, adjusted R^2 and the analysis of variance F-statistic. A significance threshold of $p < 0.05$ was applied throughout, with the decision rule that a p-value below 0.05 indicates a statistically significant difference or relationship, and a p-value of 0.05 or above indicates the absence of one.

4. Results and Analysis

4.1 Suitability of Data for Multivariate Analysis

Table 1. KMO and Bartlett's Test

Test	Value	Significance
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.912	—
Bartlett's Test of Sphericity (Chi-Square)	5420.36	0.000
Degrees of Freedom (df)	780	—

Table 1 reports the diagnostics validating the suitability of the data for factor analysis. The KMO value of 0.912 indicates an excellent level of sampling adequacy, since values above 0.90 are conventionally regarded as marvellous, and suggests that correlations among the variables are sufficiently compact for factor analysis to yield reliable and distinct factors. Bartlett's test of sphericity returns a chi-square value of 5420.36 with 780 degrees of freedom at a significance level of 0.000 ($p < 0.001$), confirming that the correlation matrix is not an identity matrix and that significant interrelationships exist among the variables. The combination of a high chi-square value with statistical significance demonstrates that the observed correlations are adequate for structure detection. Together, both diagnostics strongly support proceeding with factor analysis, indicating that the dataset possesses the statistical properties required for extracting meaningful underlying constructs and for enhancing the validity of the subsequent multivariate procedures.

4.2 Perceived Transparency of E-Governance Systems

Table 2. One-Sample t-Test: Transparency Construct

Test Variable	Mean	Test Value	t-value	p-value	Result
Transparency (Composite Score)	3.01	2.50	14.82	0.000	Significant

Note. $N = 400$; $df = 399$.

The one-sample t-test was conducted to evaluate whether the mean score of the transparency construct differs significantly from the hypothesised test value of 2.50. The observed mean of 3.01 is notably higher than the benchmark, and the computed t-value of 14.82 indicates a substantial deviation of the sample mean from the test value. The p-value of 0.000 ($p < 0.001$) confirms that this difference is statistically highly significant, leading to rejection of the null hypothesis that no difference exists between the sample mean and the test value. The positive direction of the difference indicates that respondents perceive transparency in e-governance systems to be significantly above the expected level, reflecting a favourable evaluation of disclosure, openness and information accessibility within institutional systems. This result is consistent with evidence that digital platforms materially lower the cost of making administrative information available (Lourenço, 2015; Matheus & Janssen, 2020), and indicates that transparency constitutes a strong component of e-governance effectiveness with a critical role in supporting trust, accountability and stakeholder engagement.

4.3 Comparative Analysis of Public and Private Institutions (H1)

Table 3. Group Statistics and Independent Samples t-Test: Transparency by Institution Type

Institution Type	N	Mean	Std. Dev.	t-value	df	p-value	Result
Public Institutions	220	2.96	0.48	2.31	398	0.021	Significant
Private Institutions	180	3.07	0.45				

Note. Decision rule: $p < 0.05$ indicates a significant difference; $p \geq 0.05$ indicates no significant difference.

Table 3 compares transparency perceptions across institutional types. Respondents from public institutions ($N = 220$) reported a mean transparency score of 2.96 with a standard deviation of 0.48, while respondents from private institutions ($N = 180$) reported a higher mean of 3.07 with a standard deviation of 0.45. The similarity of the standard deviations suggests a consistent dispersion of responses across both groups and supports the assumption of homogeneity of variance. The independent samples t-test yields a t-value of 2.31 with 398 degrees of freedom and an associated p-value of 0.021, which falls below the conventional threshold of 0.05. The null hypothesis of no difference in transparency perceptions across institutional types is therefore rejected, and H1 is supported.

Although the magnitude of the mean difference is modest at 0.11, its statistical significance indicates that the observed variation is not attributable to random chance. Private institutions are perceived to exhibit slightly more effective communication, openness and information

accessibility, a tendency plausibly attributable to shorter decision cycles, greater responsiveness to service expectations and more integrated system architectures. The proximity of the two means nonetheless indicates that both sectors perform at broadly comparable levels, with private institutions holding only a marginal advantage. This pattern accords with the argument advanced by Rodríguez-Abitia and Bribiesca-Correa (2021) that organisational culture and leadership, rather than sector membership as such, account for most variation in digital maturity. The finding also underscores the importance of strengthening transparency mechanisms in public institutions so as to match or exceed private-sector standards, thereby improving overall e-governance effectiveness and institutional trust.

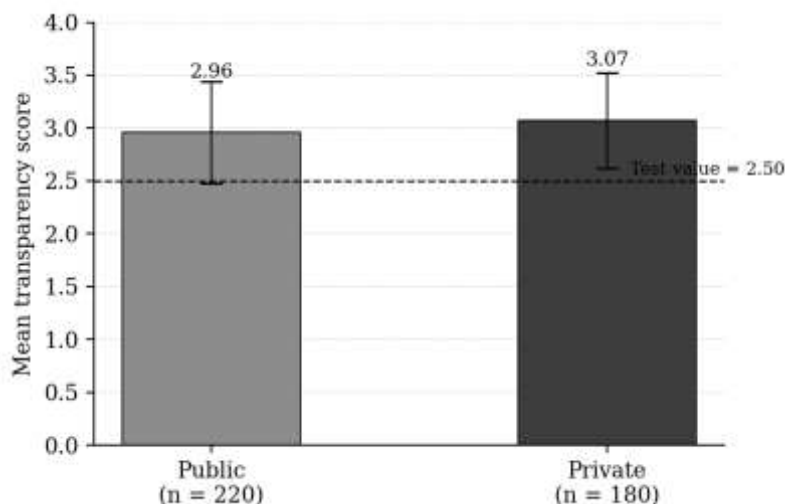


Figure 1. Mean transparency scores by institution type (error bars represent ± 1 SD)

4.4 Online Admission Systems, Accountability and Fairness (H2)

Table 4. Descriptive Statistics: Online Admission Systems

Variable	N	Mean	Std. Deviation
Online Admission Efficiency	400	3.08	0.91
Admission Fairness (Reduced Bias)	400	3.02	0.94
Accountability in Admission Process	400	3.01	0.93

Table 4 presents descriptive statistics for the three variables associated with the admission process. Online admission efficiency records a mean of 3.08 with a standard deviation of 0.91, indicating that respondents generally perceive the online admission system as moderately efficient with a reasonable level of consistency in responses. Admission fairness records a mean of 3.02 and a standard deviation of 0.94, suggesting perceptions of a fair level of impartiality, although the marginally higher dispersion reflects some variability in opinion. Accountability in the admission process records a mean of 3.01 with a standard deviation of 0.93, indicating that accountability mechanisms are viewed as present but not exceptionally strong. All three means lie slightly above the scale midpoint, reflecting a moderately positive assessment of the e-governance-driven admission system, while the comparable standard

deviations suggest a uniform spread of responses that reinforces data reliability. The findings collectively indicate that the digital admission process functions adequately with respect to efficiency, fairness and accountability, while leaving considerable scope for further improvement.

Table 5. Correlation Matrix: Online Admission Systems, Accountability and Fairness

Variables	Online Admission Systems	Accountability	Fairness
Online Admission Systems	1	0.642**	0.618**
Accountability	0.642**	1	0.655**
Fairness	0.618**	0.655**	1

*Note. ** $p < 0.01$ (significant at the 1 per cent level); $N = 400$.*

Table 5 reports the Pearson correlation matrix examining relationships among online admission systems, accountability and fairness. All coefficients are positive, substantial and statistically significant at the one per cent level. Online admission systems correlate strongly with accountability ($r = 0.642$), indicating that improvements in digital admission processes are closely associated with enhanced accountability mechanisms, and with fairness ($r = 0.618$), suggesting that more efficient and transparent online systems contribute to reducing bias and promoting equitable practice. The relationship between accountability and fairness is the strongest of the three ($r = 0.655$), implying that greater answerability is linked to more equitable outcomes. The strength and consistency of these associations indicate a high degree of interdependence among the constructs, so that advancement along one dimension is likely to reinforce the others. This pattern supports the argument that process traceability embedded in digital systems converts informal administrative discretion into rule-governed action (Cordella & Tempini, 2015).

Table 6. ANOVA: Regression Model 1 (Online Admission Systems)

Source	Sum of Squares	df	Mean Square	F-value	Sig.
Regression	82.45	1	82.45	304.12	0.000
Residual	102.30	398	0.257	—	—
Total	184.75	399	—	—	—

The analysis of variance reported in Table 6 assesses the overall statistical significance of the first regression model. The regression sum of squares is 82.45 with one degree of freedom, representing the portion of total variance explained by the predictor, while the residual sum of squares is 102.30 with 398 degrees of freedom. The total sum of squares of 184.75 confirms that a substantial proportion of variance is captured by the model. The mean square for regression of 82.45 compared with the residual mean square of 0.257 produces an F-value of

304.12, indicating that the model provides a significantly better fit than one containing no predictors. The associated significance level of 0.000 ($p < 0.001$) confirms that the model is statistically highly significant, leading to rejection of the null hypothesis that the model possesses no explanatory power.

Table 7. Regression Coefficients: Model 1 (Online Admission Systems)

Variable	Unstandardized Coefficient (B)	Std. Error	Beta	t-value	Sig.
Constant	0.842	0.143	—	5.89	0.000
Online Admission Systems	0.703	0.040	0.668	17.43	0.000

Note. Dependent variable: composite accountability and fairness score.

Table 7 presents the regression coefficients for the first model. The constant has an unstandardised coefficient of 0.842 with a standard error of 0.143 and a t-value of 5.89, significant at $p = 0.000$, indicating that the baseline level of the dependent variable remains positive and meaningful when the predictor is held at zero. The online admission systems variable exhibits a strong positive effect, with an unstandardised coefficient of 0.703 and a comparatively small standard error of 0.040, reflecting a precise estimate. The standardised coefficient of 0.668 indicates a substantial effect size, implying that a one standard deviation increase in online admission systems is associated with a 0.668 standard deviation increase in accountability and fairness outcomes. The t-value of 17.43 and significance level of 0.000 confirm that the predictor is highly significant, and H2 is therefore supported. The results demonstrate that online admission systems play a statistically robust role in shaping accountability outcomes, reinforcing their importance within the wider e-governance framework.

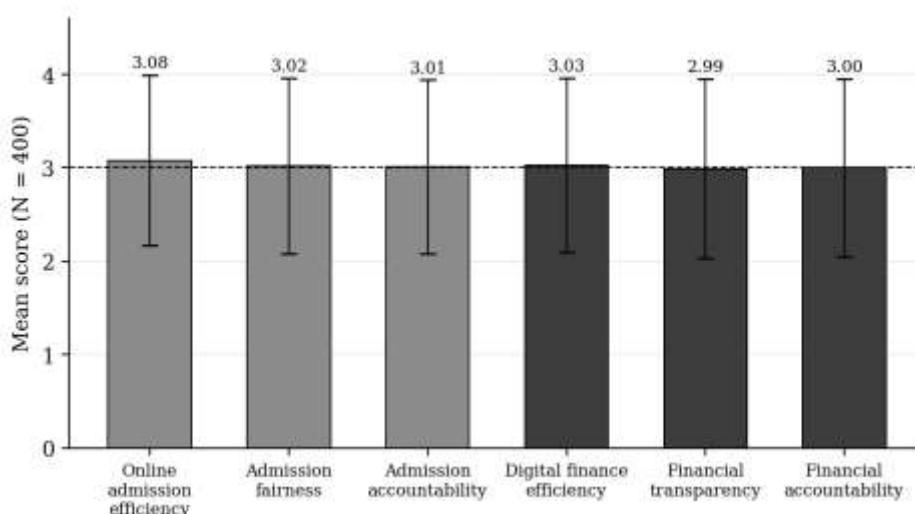


Figure 2. Construct means with standard deviations (N = 400)

4.5 Digital Financial Management Systems (H3)

Table 8. Descriptive Statistics: Digital Financial Systems

Variable	N	Mean	Std. Deviation
Digital Financial Systems Efficiency	400	3.03	0.93
Financial Transparency	400	2.99	0.96
Financial Accountability	400	3.00	0.95

Table 8 reports descriptive statistics for the digital financial management constructs. Digital financial systems efficiency records a mean of 3.03 with a standard deviation of 0.93, indicating a moderately positive assessment with a fairly consistent distribution of responses. Financial transparency records a mean of 2.99 with a standard deviation of 0.96, placing perceptions close to the neutral midpoint with slightly greater variability among respondents. Financial accountability records a mean of 3.00 with a standard deviation of 0.95, reflecting a balanced perception of accountability mechanisms within the digital financial framework. The similarity of standard deviations across all three variables indicates a uniform spread of responses that supports data reliability. Mean values clustering around 3.00 suggest that respondents regard digital financial systems as reasonably effective in terms of efficiency, transparency and accountability without considering them exceptionally strong, indicating that the systems function adequately while retaining scope for improvement in user confidence and governance practice.

Table 9. Correlation Matrix: Digital Financial Systems, Transparency and Accountability

Variables	Digital Financial Systems	Transparency	Accountability
Digital Financial Systems	1	0.658**	0.671**
Transparency	0.658**	1	0.690**
Accountability	0.671**	0.690**	1

*Note. ** $p < 0.01$ (significant at the 1 per cent level); $N = 400$.*

Table 9 presents the correlation coefficients among digital financial systems, transparency and accountability, revealing strong positive relationships that are all statistically significant at the one per cent level. Digital financial systems correlate with transparency at $r = 0.658$, indicating that improvements in digital financial infrastructure are closely associated with enhanced transparency in financial operations, and with accountability at $r = 0.671$, suggesting that more efficient and digitised financial processes contribute to stronger accountability mechanisms. Transparency and accountability share the strongest relationship in the matrix at $r = 0.690$,

highlighting that increased openness and clarity in financial transactions are closely linked to improved answerability. The consistently high coefficients demonstrate a substantial degree of interdependence and imply that advancement in any one dimension is likely to reinforce the others. These findings underscore the integrated character of digital financial governance, in which efficiency, transparency and accountability operate synergistically to enhance the credibility and trustworthiness of financial management.

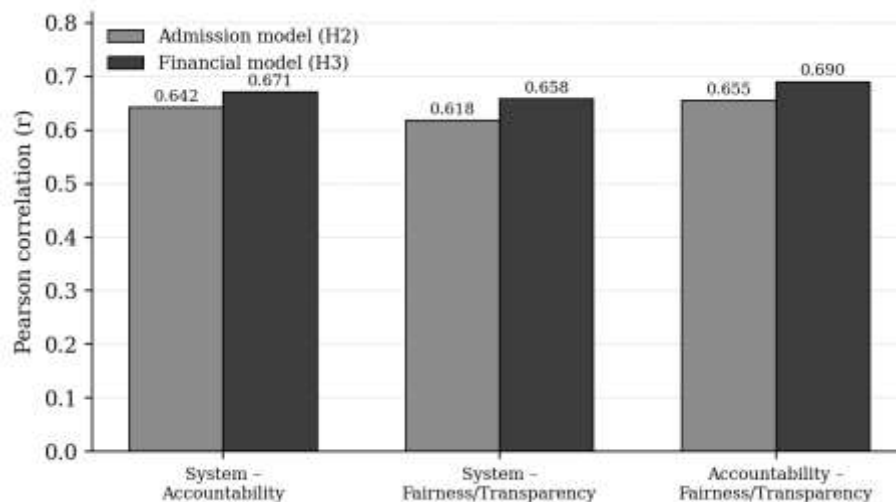


Figure 3. Correlation coefficients across the admission and financial models

Table 10. ANOVA: Regression Model 2 (Digital Financial Systems)

Source	Sum of Squares	df	Mean Square	F-value	Sig.
Regression	91.62	1	91.62	381.45	0.000
Residual	94.50	398	0.237	—	—
Total	186.12	399	—	—	—

Table 10 reports the analysis of variance for the second regression model. The regression sum of squares is 91.62 with one degree of freedom, while the residual sum of squares is 94.50 with 398 degrees of freedom, against a total sum of squares of 186.12. The mean square for regression of 91.62 compared with the residual mean square of 0.237 produces an F-value of 381.45, demonstrating that the model explains a substantial proportion of variance relative to the error term. The significance level of 0.000 ($p < 0.001$) confirms that the model is statistically highly significant, leading to rejection of the null hypothesis that the independent variable exerts no effect on the dependent variable. The F-value materially exceeds that obtained for the first model, indicating a stronger overall fit for the financial management specification.

Table 11. Regression Coefficients: Model 2 (Digital Financial Systems)

Variable	Unstandardized Coefficient (B)	Std. Error	Beta	t-value	Sig.
Constant	0.801	0.138	—	5.80	0.000
Digital Financial Systems	0.742	0.038	0.702	19.53	0.000

Note. *Dependent variable: composite financial transparency and accountability score.*

Table 11 presents the regression coefficients for the second model. The constant records an unstandardised coefficient of 0.801 with a standard error of 0.138 and a t-value of 5.80, significant at $p = 0.000$. The digital financial systems variable exhibits a substantial positive effect, with an unstandardised coefficient of 0.742 and a low standard error of 0.038, reflecting high precision in estimation. The standardised coefficient of 0.702 indicates a strong effect size, implying that a one standard deviation increase in digital financial systems is associated with a 0.702 standard deviation increase in financial transparency and accountability. The t-value of 19.53 and significance level of 0.000 confirm that the predictor is highly significant, and H3 is accordingly supported. These findings establish digital financial management systems as an influential determinant of governance outcomes, reinforcing their importance in improving efficiency, transparency and accountability within the e-governance framework.

4.6 Comparative Model Performance

Table 12. Model Summary: Comparative Regression Performance

Model	R	R ²	Adjusted R ²	Std. Error of Estimate
Model 1: Online Admission Systems	0.668	0.446	0.443	0.52
Model 2: Digital Financial Systems	0.702	0.493	0.490	0.49

Table 12 consolidates the summary statistics for both regression models. Model 1 records a correlation coefficient of 0.668, reflecting a moderate to strong positive relationship between online admission systems and accountability outcomes, with an R² of 0.446 indicating that approximately 44.6 per cent of the variance in the dependent variable is explained by the predictor. The adjusted R² of 0.443 lies very close to the unadjusted value, indicating a well-fitted model that does not suffer from overfitting, while the standard error of estimate of 0.52 signals a relatively low level of prediction error. Model 2 performs more strongly, with a correlation coefficient of 0.702 and an R² of 0.493, meaning that approximately 49.3 per cent of the variance in financial transparency and accountability is explained by digital financial systems. The adjusted R² of 0.490 again confirms model stability, and the lower standard error

of 0.49 indicates that predicted values align more closely with observed values than in the first model.

The comparison indicates that digital financial management systems exert a stronger influence on governance outcomes than online admission systems, explaining an additional 4.7 percentage points of variance. A plausible explanation is that financial processes generate structured, auditable transaction records by their nature, so that digitisation produces immediate and visible traceability. Admission processes, by contrast, retain elements of discretionary judgement — in the assessment of eligibility, category verification and documentary review — that remain only partially amenable to system-enforced rules. This interpretation is consistent with evidence that the anti-corruption effects of digitisation are strongest where discretion can be encoded away and weakest where consequential judgement remains with human decision-makers (Adam & Fazekas, 2021; Nam, 2018). Both R^2 values, it should be noted, fall within the range conventionally regarded as substantial in behavioural and social science research.

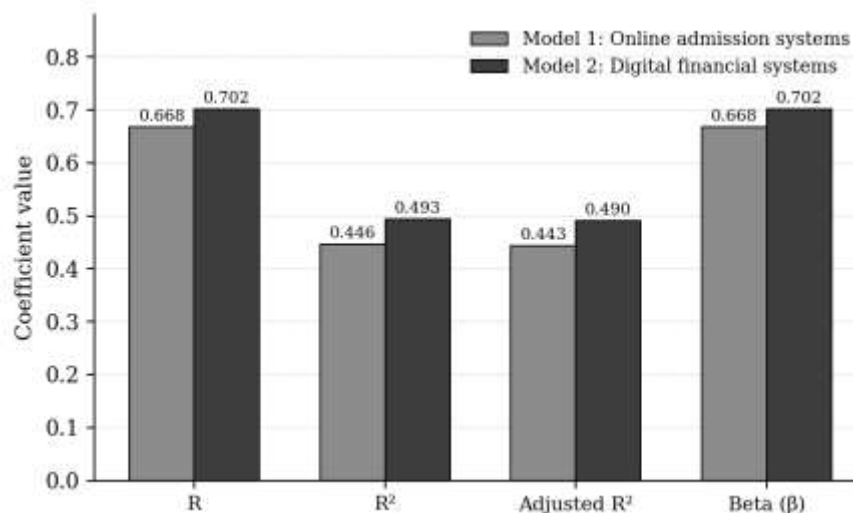


Figure 4. Comparative regression model performance

Taken together, the results support all three hypotheses. Perceived transparency significantly exceeds the benchmark value; a statistically significant, if modest, difference in transparency exists between public and private institutions in favour of the latter; and both online admission systems and digital financial management systems function as significant positive predictors of accountability outcomes, with the financial domain exerting the stronger effect.

5. Conclusion

This study examined the role of e-governance in strengthening transparency and accountability in educational administration and compared perceptions across public and private institutions using data from 400 respondents. Four conclusions follow from the analysis.

First, e-governance systems are perceived to contribute meaningfully to institutional transparency. The composite transparency score of 3.01 significantly exceeds the hypothesised benchmark of 2.50 ($t = 14.82$, $p < 0.001$), indicating that stakeholders regard disclosure, openness and information accessibility within digitally administered institutions as established rather than aspirational. The magnitude of the mean, however, sits only modestly above the

scale midpoint, which suggests that the achievement is real but incremental. Digital systems appear to have lowered the cost of making administrative information available without yet transforming stakeholder assessments of institutional openness — a pattern consistent with the caution that disclosure and accountability are related but distinct achievements (Lourenço, 2015; Matheus & Janssen, 2020).

Second, the comparative analysis reveals a statistically significant but substantively small advantage for private institutions ($M = 3.07$ against 2.96 ; $t = 2.31$, $p = 0.021$). The difference confirms that institutional type influences transparency perceptions, most plausibly through shorter decision cycles, greater responsiveness to service expectations and more integrated system architectures in privately governed institutions. The proximity of the two means nonetheless indicates broadly comparable performance, supporting the contention that organisational culture and leadership commitment explain more of the variation in digital governance outcomes than ownership structure alone (Meijer, 2015; Rodríguez-Abitia & Bribiesca-Correa, 2021). Public institutions, which typically operate under broader statutory disclosure obligations, appear not to convert that mandated breadth into correspondingly higher perceived transparency, which suggests that the usability and responsiveness of disclosure matter as much as its scope.

Third, both administrative domains examined function as significant predictors of accountability outcomes. Online admission systems explain 44.6 per cent of the variance in admission accountability and fairness ($\beta = 0.668$, $p < 0.001$), while digital financial management systems explain 49.3 per cent of the variance in financial transparency and accountability ($\beta = 0.702$, $p < 0.001$). The consistently strong correlations observed among all constructs, ranging from 0.618 to 0.690 and significant at the one per cent level, indicate that efficiency, transparency, fairness and accountability operate as mutually reinforcing dimensions rather than as independent outcomes. The stronger performance of the financial model suggests that digitisation delivers its greatest governance returns where administrative processes are inherently rule-bound and transaction-based, and comparatively smaller returns where consequential discretion remains with human decision-makers.

Fourth, the findings carry practical implications for institutional practice. For public institutions, the priority indicated by the results is not further expansion of disclosure but improvement in the integration, usability and responsiveness of existing systems, so that published information becomes intelligible and actionable for the stakeholders it is intended to serve. For private institutions, the corresponding priority is the extension of external disclosure to match the internal process integration already achieved, since accountability requires an external forum with access to the record as well as a reliable record itself. For both sectors, the evidence indicates that e-governance functions as enabling infrastructure rather than as an automatic corrective: the systems generate the traceability on which accountability depends, but institutional culture, leadership commitment, stakeholder data literacy and the credibility of grievance mechanisms determine whether that traceability is converted into genuine answerability. Future research may usefully extend this analysis through longitudinal designs capable of establishing causal direction, through multi-institutional sampling across regions,

and through examination of emerging concerns regarding algorithmic decision-making and vendor governance in educational administration (Bharosa, 2022; Williamson, 2018).

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