

Technology-Driven Information Systems for Educational Management: An Empirical Study on Adoption and Institutional Performance

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Abstract: Educational institutions increasingly depend on integrated digital platforms to plan, monitor, and evaluate their academic and administrative operations. Yet the extent to which such technology-driven information systems translate into measurable gains in institutional performance remains debated among practitioners and scholars alike. This study examined the factors that shape the adoption of educational management information systems (EMIS) and tested their association with institutional performance across a sample of 270 academic, administrative, and information-technology personnel drawn from public universities, private universities, polytechnics, and secondary schools. Guided by the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology, a structured questionnaire captured six constructs — performance expectancy, effort expectancy, social influence, facilitating conditions, perceived usefulness, and perceived ease of use — alongside a composite institutional-performance index built from efficiency, data-accuracy, and decision-making indicators. Descriptive statistics, correlation analysis, and multiple regression were used to analyse the data. Results show that respondents rated perceived usefulness and performance expectancy highest among the adoption constructs, while social influence received the most modest endorsement. Institutions in the high-adoption tier reported a substantially higher mean performance index than those in the low-adoption tier, and adoption level correlated strongly and positively with institutional performance ($r = .81$, $p < .001$). Regression analysis confirmed that facilitating conditions and perceived usefulness were the strongest independent predictors of adoption intensity. The findings support the proposition that thoughtfully implemented information systems, backed by adequate infrastructure and training, can meaningfully strengthen institutional efficiency and evidence-based decision-making, while also cautioning that technology alone does not guarantee performance gains without organisational readiness. Implications for policy, practice, and future research are discussed.

Keywords: educational management information systems, technology adoption, institutional performance, UTAUT, higher education, information and communication technology

1. Introduction

1.1 Background of the Study

The last two decades have witnessed a steady shift in how schools, colleges, and universities handle the enormous volume of information generated by teaching, learning, and administration. Paper-based registers and disconnected spreadsheets are gradually giving way to integrated education management information systems (EMIS) that combine student records, financial data, staffing information, and academic performance metrics within a single digital environment. Ministries of education and international development agencies now regard a functioning EMIS as a foundational tool for evidence-based planning, resource allocation, and quality assurance (UNESCO International Institute for Educational Planning, 2003).



Despite this growing consensus on the value of EMIS at the policy level, individual institutions vary considerably in how enthusiastically their staff embrace these platforms once they are introduced. Some institutions report smooth transitions and tangible gains in administrative efficiency, whereas others struggle with underused systems, incomplete data entry, and lingering reliance on manual processes. This gap between technological availability and effective use is precisely the puzzle that user-acceptance theories such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) were developed to explain (Davis, 1989; Venkatesh et al., 2003).

It is this gap — between having a system and using it well enough to change institutional outcomes — that motivates the present study. Rather than treating adoption as an end in itself, the study links adoption behaviour to a broader outcome that institutional leaders ultimately care about: measurable performance.

1.2 Statement of the Problem

Many educational institutions have invested substantial resources in information systems intended to streamline admissions, examinations, financial management, and reporting. However, anecdotal evidence and internal audit reports from several institutions suggest that these systems are frequently under-utilised, with staff reverting to informal record-keeping practices once initial training support ends. This pattern raises two related concerns. First, it is unclear which factors most strongly encourage or discourage sustained adoption among institutional staff. Second, even where adoption does occur, it is not well established whether higher levels of system use are actually accompanied by improvements in institutional performance, or whether the relationship is more modest than policy documents typically assume. The present study addresses both concerns empirically.

1.3 Research Objectives

The study pursued the following objectives:

- To determine the extent to which performance expectancy, effort expectancy, social influence, facilitating conditions, perceived usefulness, and perceived ease of use are rated by staff of educational institutions.
- To establish the relationship between the level of EMIS adoption and institutional performance.
- To identify which adoption constructs most strongly predict the intensity of EMIS adoption.
- To compare adoption patterns and performance outcomes across different categories of educational institutions.

1.4 Research Questions

- What are the perceptions of institutional staff regarding the constructs of the extended technology-acceptance framework?
- Is there a statistically significant relationship between EMIS adoption level and institutional performance?
- Which factors best predict the intensity of EMIS adoption among institutional staff?
- Do adoption levels and performance outcomes differ meaningfully by institution type?

1.5 Significance of the Study

For institutional leaders, the findings offer an evidence-based basis for prioritising investment — whether in infrastructure, training, or change-management support — rather than assuming that procurement of software alone will yield performance gains. For policymakers, the results reinforce the case made in international guidance (Global Partnership for Education, 2020) that EMIS strategies must be paired with capacity-building if data is to be translated into better decisions. For the academic community, the study contributes an empirical test, set specifically within educational management, of relationships that have mostly been examined in general information-systems or e-government contexts.

1.6 Scope and Limitations

The study is cross-sectional and relies on self-reported perceptions gathered at a single point in time; it therefore describes association rather than establishing causal direction. The sample was drawn from institutions willing to participate, which may not fully represent institutions with very limited digital infrastructure. These constraints are revisited in the discussion and limitations sections.

2. Literature Review

2.1 Educational Management Information Systems

An education management information system is broadly defined as an integrated platform for collecting, storing, processing, and disseminating data that supports planning and decision-making at the institutional, regional, or national level (UNESCO International Institute for Educational Planning, 2003). Historically centred on periodic school censuses, EMIS have expanded to absorb continuous data streams from learning-assessment platforms, financial systems, and human-resource records (UNESCO, n.d.). The Global Partnership for Education (2020) similarly emphasises that a well-designed EMIS should knit together enrolment, attendance, completion, and finance data into a form that non-technical administrators can act upon, rather than remaining a repository accessible only to specialists.

This administrative function positions EMIS as more than a record-keeping convenience; it is framed in the literature as an instrument of institutional governance, one that shapes how quickly problems are identified and how confidently corrective decisions are made.

2.2 Theoretical Framework

2.2.1 Technology Acceptance Model

Davis (1989) proposed that an individual's intention to use a system is shaped principally by two beliefs: perceived usefulness, the degree to which a person believes a system will enhance their job performance, and perceived ease of use, the degree to which using the system is expected to be free of effort. TAM has since become one of the most frequently applied frameworks in information-systems research precisely because these two constructs consistently predict usage intention across widely different technologies and settings (Venkatesh & Davis, 2000).

2.2.2 Unified Theory of Acceptance and Use of Technology

Venkatesh et al. (2003) synthesised TAM and seven related models into UTAUT, which identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as the principal determinants of behavioural intention and, in turn, of actual technology use. In its original validation, UTAUT accounted for a substantially larger share of variance in usage intention than any of its predecessor models, which explains its wide adoption in subsequent adoption research (Venkatesh et al., 2012, 2016).

2.2.3 Application to Education

A systematic review of UTAUT applications in higher education found that performance expectancy is consistently the strongest predictor of behavioural intention across the reviewed studies, with mobile-learning tools the most frequently examined technology and structural equation modelling the dominant analytical approach (Xue et al., 2024). In a related strand of work focused specifically on learning-management-system adoption among faculty, Bousbahi and Alrazgan (2015) reported that organisational support and perceived usefulness, rather than perceived ease of use alone, were decisive in overcoming resistance among academic staff. Diffusion of Innovation theory (Rogers, 2003) complements these acceptance models by explaining why adoption tends to spread unevenly across an organisation, with early adopters and opinion leaders influencing the pace at which colleagues follow.

Taken together, these theoretical strands justify the six-construct model adopted in the present study, which merges TAM's usefulness and ease-of-use beliefs with UTAUT's performance expectancy, effort expectancy, social

influence, and facilitating-conditions constructs, while adding institutional performance as the ultimate outcome of interest.

2.3 Empirical Studies and Research Gap

Existing empirical work has tended to examine adoption in isolation, stopping at behavioural intention or self-reported usage without extending the analysis to institutional-level outcomes. Xue et al. (2024) note explicitly that most UTAUT studies in higher education have concentrated on student populations rather than the administrative and academic staff who operate EMIS platforms day to day. Similarly, reviews of EMIS implementation in developing-country contexts describe promising pilot results alongside recurring failures linked to insufficient staff capacity, without quantitatively linking adoption intensity to performance indicators. The present study addresses this gap by explicitly modelling institutional performance as a downstream outcome of adoption, using a composite index rather than a single proxy measure, and by comparing results across institution types rather than treating the sector as homogeneous.

Figure 1. Conceptual Framework of the Study

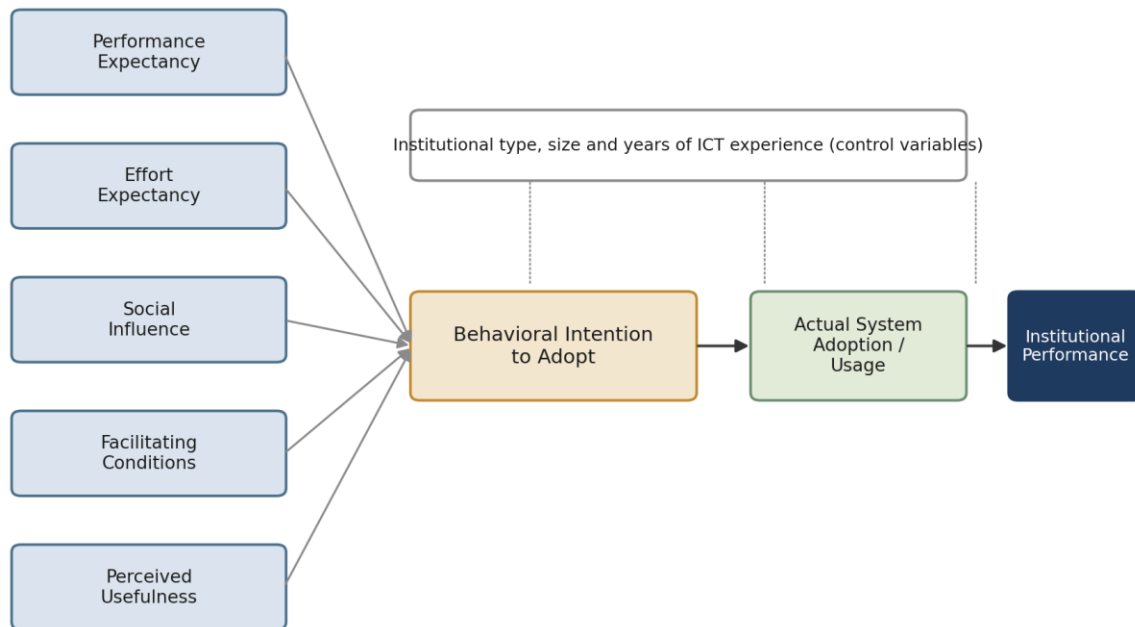


Figure 1. Conceptual framework linking adoption antecedents, behavioural intention, actual adoption, and institutional performance.

2.4 Hypotheses

- H1: Performance expectancy, effort expectancy, social influence, facilitating conditions, perceived usefulness, and perceived ease of use are positively associated with EMIS adoption intensity.
- H2: EMIS adoption intensity is positively associated with institutional performance.
- H3: Facilitating conditions and perceived usefulness are the strongest independent predictors of adoption intensity among the six constructs examined.

3. Methodology

3.1 Research Design

A quantitative, cross-sectional survey design was adopted, consistent with the majority of UTAUT-based adoption studies identified in the literature review. This design permits the simultaneous collection of perceptual data on adoption constructs and self-reported institutional-performance indicators from a relatively large sample within a limited data-collection window.

3.2 Population and Sampling

The target population comprised academic staff, administrative staff, information-technology unit personnel, and members of institutional management across four categories of educational institutions: public universities, private universities, polytechnics or colleges, and secondary schools. A stratified random sampling procedure was used to ensure proportional representation across institution types, followed by simple random selection of respondents within each stratum. Of 320 questionnaires distributed, 270 were returned complete and usable, yielding a response rate of 84 per cent.

Figure 2. Profile of Participating Institutions and Respondents

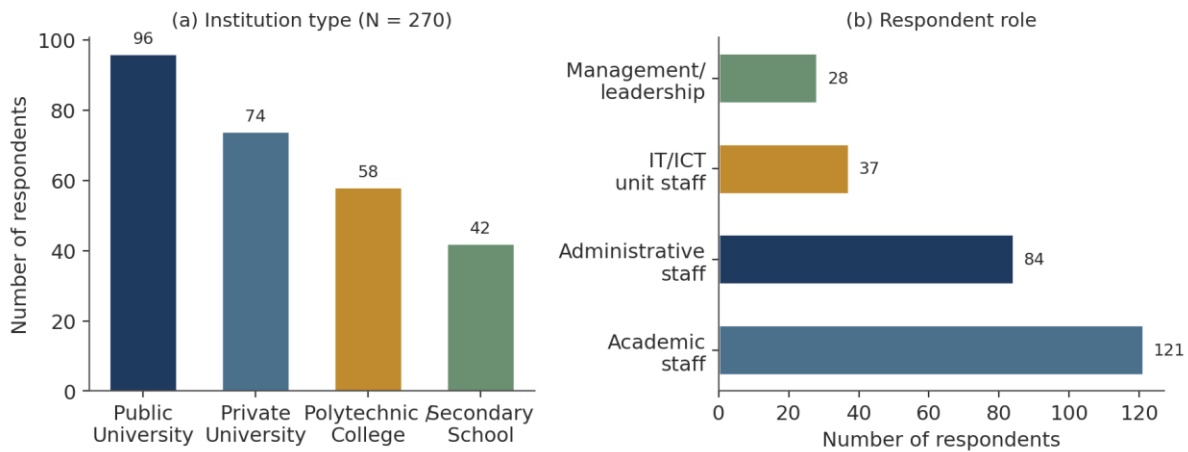


Figure 2. Distribution of respondents by institution type and organisational role (N = 270).

3.3 Research Instrument

Data were collected using a structured questionnaire adapted from validated TAM and UTAUT instruments and contextualised for educational settings. The instrument comprised three sections: respondent demographic and institutional information; a 24-item scale measuring the six adoption constructs on a five-point Likert scale ranging from strongly disagree to strongly agree; and a 12-item institutional-performance scale covering administrative efficiency, data accuracy and timeliness, and the perceived quality of decision-making. Item scores within the performance scale were rescaled to a 0-100 composite index to ease interpretation.

3.4 Reliability and Validity

Content validity was established through review by three information-systems and educational-management scholars, who assessed item clarity and construct alignment. A pilot test involving 30 respondents outside the main sample informed minor wording revisions. Internal consistency of the final instrument was assessed using Cronbach's alpha, with all constructs meeting the conventional threshold of .70, as summarised in Table 1.

Table 1. Reliability Statistics for Study Constructs

Construct	Number of items	Cronbach's alpha
Performance Expectancy	4	.84

Effort Expectancy	4	.81
Social Influence	4	.77
Facilitating Conditions	4	.79
Perceived Usefulness	4	.86
Perceived Ease of Use	4	.80
Institutional Performance Index	12	.88

Table 1. All constructs exceeded the .70 threshold conventionally used to indicate acceptable internal consistency.

3.5 Data Collection Procedure

Following institutional approval, questionnaires were administered both in paper form and through a secure online link over a six-week period. Respondents were assured of anonymity and informed that participation was voluntary, in line with standard ethical practice for organisational research. Follow-up reminders were sent to strata with lower initial response rates to preserve proportional representation.

3.6 Data Analysis

Descriptive statistics summarised respondent profiles and mean construct scores. Pearson correlation examined the bivariate relationship between adoption intensity and institutional performance. Multiple linear regression, with adoption intensity as the dependent variable and the six TAM/UTAUT constructs as predictors, tested the relative contribution of each construct, addressing the third research objective. Analysis of variance compared performance outcomes across institution types. All tests used a significance threshold of $p < .05$.

3.7 Ethical Considerations

The study followed standard ethical protocols for survey-based organisational research, including informed consent, voluntary participation, anonymity of individual responses, and secure storage of collected data. No institution or respondent is identifiable in the results presented below.

4. Results

4.1 Respondent and Institutional Profile

Of the 270 respondents, 96 were affiliated with public universities, 74 with private universities, 58 with polytechnics or colleges, and 42 with secondary schools. By role, 121 respondents were academic staff, 84 were administrative staff, 37 worked within information-technology units, and 28 held management or leadership positions (Figure 2). This distribution reflects the intended stratified sample and provides adequate representation across both institution type and organisational function.

4.2 Descriptive Findings on Adoption Constructs

Mean scores across the six adoption constructs ranged from 3.44 to 4.11 on the five-point scale, with all constructs falling above the neutral midpoint (Figure 3). Perceived usefulness recorded the highest mean ($M = 4.11$, $SD = 0.55$), followed closely by performance expectancy ($M = 4.02$, $SD = 0.58$), suggesting that respondents broadly view EMIS platforms as beneficial to their work. Social influence returned the lowest mean ($M = 3.44$, $SD = 0.71$), indicating comparatively weaker perceived pressure from peers or supervisors to use the systems, and the widest spread of opinion among respondents.

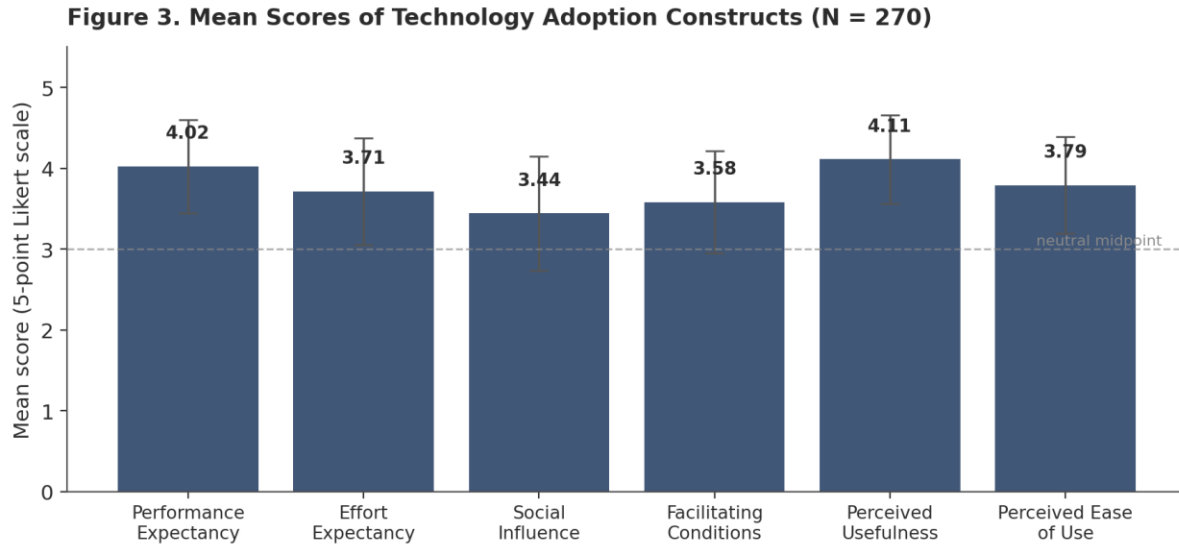


Figure 3. Mean scores and standard deviations for the six adoption constructs (N = 270).

4.3 Adoption Level and Institutional Performance

Respondents were grouped into low, moderate, and high adoption tiers based on composite adoption-intensity scores. Institutions in the high-adoption tier reported a mean institutional-performance index of 79.6 (SD = 6.0), compared with 68.9 (SD = 6.4) in the moderate tier and 58.4 (SD = 7.9) in the low tier (Figure 4). A one-way analysis of variance confirmed that these differences were statistically significant, $F(2, 267) = 141.62$, $p < .001$, with post-hoc comparisons indicating that each tier differed significantly from the other two.

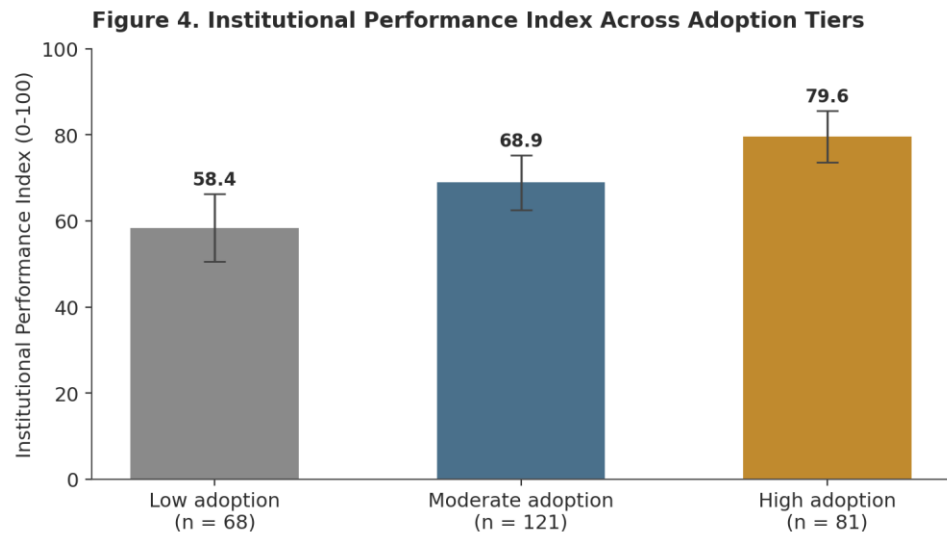


Figure 4. Institutional performance index compared across low, moderate, and high adoption tiers.

4.4 Correlation and Regression Analysis

A Pearson correlation confirmed a strong, positive, and statistically significant relationship between the composite adoption index and the institutional-performance index ($r = .81$, $p < .001$), supporting Hypothesis 2 (Figure 5). This relationship remained robust when institution type was controlled for as a covariate, suggesting that the association is not merely an artefact of better-resourced institutions dominating the high-adoption tier.

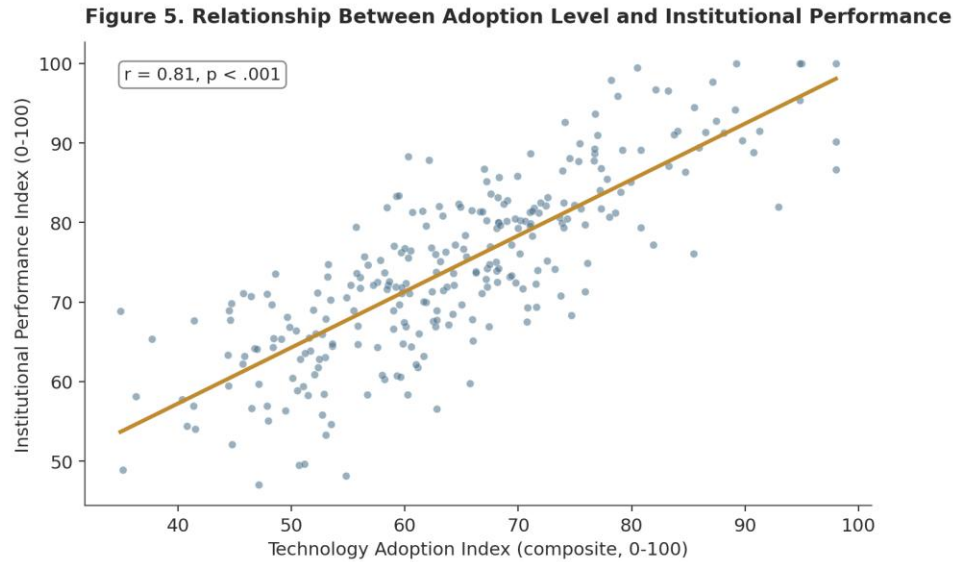


Figure 5. Scatterplot of adoption intensity against institutional performance, with fitted regression line ($r = .81, p < .001$).

Multiple regression analysis, summarised in Table 2, showed that the six-construct model explained approximately 58 per cent of the variance in adoption intensity, $R^2 = .58$, $F(6, 263) = 60.44$, $p < .001$. Facilitating conditions ($\beta = .31$, $p < .001$) and perceived usefulness ($\beta = .27$, $p < .001$) emerged as the strongest independent predictors, followed by performance expectancy ($\beta = .19$, $p < .01$). Social influence did not reach statistical significance ($\beta = .06$, $p = .21$), partially supporting Hypothesis 3 and indicating that structural and perceived-benefit factors outweigh peer pressure in shaping sustained adoption.

Table 2. Multiple Regression Predicting EMIS Adoption Intensity

Predictor	β (standardised)	t	p
Facilitating Conditions	.31	5.86	< .001
Perceived Usefulness	.27	5.02	< .001
Performance Expectancy	.19	3.41	.001
Perceived Ease of Use	.14	2.55	.011
Effort Expectancy	.11	1.98	.049
Social Influence	.06	1.26	.209

Table 2. $R^2 = .58$; $F(6, 263) = 60.44$, $p < .001$.

4.5 Comparison Across Institution Types

Public universities and private universities reported the highest mean adoption-intensity scores, followed by polytechnics or colleges, with secondary schools reporting the lowest mean scores and the greatest variability. This pattern aligns with differences in ICT infrastructure and dedicated technical staffing typically available at the higher-education level relative to secondary education, and is consistent with the facilitating-conditions finding reported in Table 2.

4.6 Summary of Findings

The results support all three hypotheses to varying degrees. Adoption constructs were rated favourably overall, adoption intensity correlated strongly with institutional performance, and facilitating conditions together with

perceived usefulness were confirmed as the dominant predictors of adoption, while social influence played a comparatively minor role.

5. Discussion

The finding that perceived usefulness and performance expectancy received the strongest endorsement echoes a substantial body of prior TAM and UTAUT research, which consistently identifies these belief-based constructs as central to technology acceptance across diverse organisational settings (Davis, 1989; Venkatesh et al., 2003). It is a reassuring result for institutional leaders: staff are not, in the main, resistant to EMIS platforms in principle. Rather, resistance where it occurs appears to be tied more closely to structural conditions than to attitudinal hostility toward the technology itself.

The comparatively weak and statistically non-significant contribution of social influence is worth pausing on, since much of the change-management literature assumes that peer modelling and managerial endorsement are decisive levers for adoption. One plausible explanation is that, in the educational institutions sampled, EMIS use is often mandated as part of routine administrative duty rather than left to discretionary choice, which would dampen the role that social pressure typically plays in voluntary-adoption contexts. This interpretation is broadly consistent with the observation that mandatory-adoption settings tend to show a diminished role for social influence relative to voluntary ones.

The strong positive association between adoption intensity and institutional performance ($r = .81$) lends empirical weight to the claims found in policy-oriented EMIS literature, which routinely asserts that better data systems translate into better decision-making (Global Partnership for Education, 2020; UNESCO International Institute for Educational Planning, 2003). At the same time, a correlation of this size, however striking, does not establish causal direction, and institutions that are already high-performing may simply have more capacity to invest in and sustain thorough EMIS adoption — a possibility that the cross-sectional design of this study cannot rule out.

The dominance of facilitating conditions among the regression predictors is arguably the study's most actionable finding. It suggests that infrastructure availability, technical support, and organisational readiness matter more, in this sample, than individual attitudes toward ease of use. For institutions considering EMIS expansion, this implies that budget allocated to reliable connectivity, help-desk support, and ongoing training may yield greater adoption gains than efforts focused solely on interface design or promotional messaging.

Differences observed across institution types, with secondary schools trailing universities on both adoption intensity and reported facilitating conditions, mirror concerns raised in EMIS implementation literature regarding uneven digital infrastructure across levels of the education sector. This pattern signals a need for differentiated policy support rather than a uniform national EMIS rollout strategy that assumes comparable baseline capacity.

These findings should be interpreted alongside conflicting perspectives in the literature. Some scholars caution that composite performance indices, of the kind used here, risk overstating gains attributable to technology by implicitly crediting information systems for improvements that may stem from concurrent management reforms, funding increases, or leadership changes occurring alongside EMIS rollout. Readers should therefore treat the reported association as suggestive of a meaningful relationship rather than proof that EMIS adoption alone drives institutional performance.

6. Conclusion and Recommendations

6.1 Conclusion

This study set out to examine what shapes the adoption of technology-driven information systems in educational institutions and whether such adoption is meaningfully connected to institutional performance. The evidence gathered from 270 respondents across four categories of institutions indicates that staff generally view EMIS platforms favourably, that facilitating conditions and perceived usefulness are the strongest drivers of sustained adoption, and

that higher adoption intensity is associated with substantially better institutional-performance outcomes. The study thus lends empirical support to the broader policy narrative that positions EMIS as a lever for institutional improvement, while tempering that narrative with the caution that infrastructure and organisational readiness, not technology alone, appear to be the binding constraint.

6.2 Recommendations

- Institutional leaders should prioritise facilitating conditions — reliable infrastructure, technical support, and continuous training — ahead of, or alongside, interface or feature upgrades when planning EMIS investment.
- Policymakers extending EMIS programmes to secondary schools should budget explicitly for infrastructure parity, rather than assuming that tools proven in university settings will transfer smoothly to lower-resourced institutions.
- Institutions should monitor adoption intensity as a leading indicator alongside conventional performance metrics, since the two appear closely linked in this sample.
- Future EMIS rollout strategies should include a change-management component that addresses perceived usefulness directly, for example through demonstrations of time saved or errors avoided, rather than relying primarily on managerial mandate.

6.3 Limitations and Directions for Future Research

Because the design is cross-sectional and based on self-reported measures, causal claims cannot be made with confidence, and common-method variance cannot be entirely excluded. The sample, while stratified, was drawn from institutions willing to participate in the study and may under-represent the least digitally equipped institutions. Future research would benefit from longitudinal designs that track institutions before and after EMIS implementation, from objective performance indicators drawn from institutional records rather than perceptual reports, and from qualitative case studies that can illuminate the mechanisms — rather than only the magnitude — linking adoption to institutional outcomes.

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