



Exploring the Role of Digital Governance and Institutional Readiness in Service Innovation and LMS Adoption: A Comparative Higher Education Study

Ferry Surachmat^{1*}, Delly Mustafa², Imron Sohsan³, Muhibuddin⁴, Syamsuddin Maldun⁵, Asmanurhidayani⁶

¹Public Administration, Universitas Bosowa, Indonesia
Email: vher07pelangi@gmail.com

²Public Administration, Universitas Bosowa, Indonesia
Email: delly.mustafa@universitasbosowa.ac.id

³Public Policy, Khon Kaen University, Thailand
Email: imronso@kku.ac.th

⁴Agrotechnology, Universitas Bosowa, Indonesia,
Email: muhibuddin@universitasbosowa.ac.id

⁵Ilmu Administrasi Publik, Universitas Bosowa, Indonesia
Email: syamsuddin.maldun@universitasbosowa.ac.id

⁶Ilmu Administrasi Publik, Universitas Puangrimaggalatung, Indonesia
Email: pelangiasma@gmail.com

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Abstract

This study investigates how digital governance and institutional readiness influence service innovation and Learning Management System (LMS) adoption success in higher education, through a comparative analysis of Universitas Negeri Makassar (Indonesia) and Khon Kaen University (Thailand). An explanatory sequential mixed-methods design was employed, combining quantitative survey data with qualitative semi-structured interviews. Quantitative data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0, while qualitative findings were analyzed thematically to contextualize the statistical results. The findings indicate that digital governance and institutional readiness significantly and positively influence both service innovation and LMS adoption success. Service innovation was confirmed as the strongest predictor of LMS adoption success and as a partial mediator between governance, institutional readiness, and LMS outcomes. Multi-Group Analysis revealed no statistically significant structural differences between the two institutions, suggesting that the governance–innovation–adoption pathway operates equivalently across governance contexts. The novelty of this study lies in being among the first to integrate digital governance theory, public service innovation theory, and the Technology Organization Environment framework within a comparative Southeast Asian higher education context, thereby advancing LMS adoption research beyond individual-level technology acceptance perspectives.

* Corresponding author at: Public Administration, Universitas Bosowa, Indonesia, Jl. Urip Sumoharjo No.Km.4, Sinrijala, Kec. Panakkukang, Kota Makassar, Sulawesi Selatan, Indonesia



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INTRODUCTION

The accelerated digital metamorphosis within higher education has fundamentally altered the modalities through which universities provide academic services, oversee learning methodologies, and execute governance strategies at the institutional level. In the context of this transformation, digital governance has emerged as an essential framework facilitating the coordination of policies, resources, and digital infrastructures by universities to foster innovation in academic services (Shang, 2025). Learning Management Systems have surfaced as pivotal platforms underpinning this transformation, functioning not merely as instructional technologies but also as comprehensive institutional service systems that augment the accessibility, efficiency, and responsiveness of services in higher education. As a result, a thorough comprehension of LMS adoption necessitates an investigation into the governance and institutional determinants that influence service innovation within universities.

The swift digital transition within the realm of higher education has fundamentally altered the modalities through which universities provide instruction, learning experiences, and academic services (Kharchenko et al., 2024; Nguyen-Anh et al., 2023; Qolamani & Mohammed, 2023; Zimonjić & Baltezarević, 2024). The incorporation of digital technologies into the governance frameworks of universities has emerged as a strategic imperative, as institutions endeavor to enhance efficiency, accessibility, and responsiveness in the delivery of academic services. Among the array of these technologies, Learning Management Systems (LMS) have surfaced as vital digital infrastructures that support not only pedagogical processes but also broader institutional service functions, which encompass academic administration, student engagement, and learning support services (Brady & O'Reilly, 2020; Marzuki, 2025; Toquero, 2020). As a result, the adoption of LMS increasingly signifies not simply a

technological shift but a more extensive transformation in digital governance within the higher education sector.

The escalating dependence on LMS platforms has catalyzed a considerable volume of scholarly inquiry investigating their implementation and effects. The extant literature has predominantly concentrated on pedagogical efficacy, student engagement, user satisfaction, and technology acceptance. Numerous investigations employ behavioral frameworks such as the Technology Acceptance Model (TAM) or the Unified Theory of Acceptance and Use of Technology (UTAUT), which underscore individual user perceptions and educational outcomes (Lee et al., 2025; Rosita & Fatmasari, 2023). While these perspectives furnish valuable insights into the utilization of technology within educational settings, they frequently neglect the institutional and governance aspects pertinent to LMS adoption. Specifically, there has been a paucity of attention directed towards comprehending LMS implementation as an integral component of organizational transformation and public service innovation in the context of higher education.

From a governance perspective, universities operate as public service institutions responsible for delivering educational services to diverse stakeholders. The adoption of LMS can therefore be understood not only as a technological initiative but also as a form of digital service innovation aimed at improving the quality and effectiveness of academic services (Almaiah et al., 2020). Service innovation in the public sector refers to the introduction of new processes, systems, or approaches to improve service delivery and organizational performance (De Vries et al., 2016; Osborne, 2018). Nevertheless, research that scrutinizes LMS through the prism of digital governance and institutional readiness remains scant. This deficiency is particularly pronounced in studies that incorporate governance structures, institutional preparedness, and innovation capacity as critical determinants of the success of LMS adoption success (Herniawati et al.,

2025; Kuppusamy et al., 2023).

The research gap that this study addresses is specific and theoretically critical: existing literature has not examined the joint, mediated pathways through which digital governance and institutional readiness shape LMS adoption success via service innovation, nor tested these pathways comparatively across institutions operating within different national governance contexts. Most prior studies treat governance and readiness as background conditions rather than theoretically integrated explanatory variables. This omission limits understanding of how universities can strategically leverage governance and organizational capacity to achieve sustainable LMS implementation outcomes.

Moreover, comparative investigations that examine how universities with analogous institutional profiles adopt LMS within varying governance contexts are notably limited. Comparative analysis is crucial, as the arrangements of institutional governance, leadership priorities, and organizational capabilities may significantly influence the implementation and sustainability of digital innovations. This issue holds particular relevance in Southeast Asia, where universities are undergoing rapid digital transformation while functioning under divergent higher education governance frameworks. Despite these advancements, empirical research comparing practices of digital governance and institutional readiness in the adoption of LMS across universities within the region remains insufficient.

To rectify these deficiencies, this investigation utilizes three synergistic theoretical frameworks: digital governance theory, public service innovation theory, and the Technology–Organization–Environment (TOE) framework. Digital governance theory establishes a basis for comprehending the manner in which institutional policies, leadership dedication, and governance structures influence the digital transformation within public sector entities, including academic institutions (Dunleavy & Dede, 2014; Gil-Garcia et al., 2018). Public service innovation theory provides a conceptual framework to interpret Learning Management System (LMS) adoption as a variant of service innovation that enhances the accessibility, efficacy, and responsiveness of academic

services (Kayyali, 2025). Concurrently, the TOE framework offers a methodical approach to elucidating how technological competencies, organizational preparedness, and institutional contexts affect decisions regarding technology adoption (Alkandi, 2022). The amalgamation of these theoretical perspectives facilitates a more holistic comprehension of LMS adoption success as an integral component of digital public service transformation, rather than a mere technological or pedagogical concern.

Informed by this theoretical synthesis, this study investigates LMS adoption success as a representation of digital governance and institutional readiness within the realm of higher education through a comparative analysis of Universitas Negeri Makassar (Indonesia) and Khon Kaen University (Thailand). These institutions serve as a fitting comparative framework due to their analogous institutional characteristics and standing in the global academic landscape, even as they function within disparate governance contexts. By conducting a comparative analysis of these educational establishments, this study aims to yield insights regarding the influence of governance frameworks and institutional capabilities on the outcomes of digital service innovation.

This study makes three important contributions. First, it extends LMS research beyond pedagogical and technology acceptance perspectives by positioning LMS adoption success within a digital governance and institutional readiness framework. Second, it provides comparative empirical evidence on how institutional governance and readiness shape digital service innovation in higher education. Third, it develops an integrated analytical model linking digital governance, institutional readiness, service innovation, and LMS adoption success, thereby contributing to the growing literature on digital transformation in public sector education.

Based on these considerations, this study addresses the following research questions:

RQ1:

How do digital governance and institutional readiness influence service innovation in LMS adoption in higher education?

RQ2:

How do digital governance and institutional

readiness explain differences in LMS adoption success between universities?

RQ3:

How does service innovation mediate the relationship between digital governance, institutional readiness, and LMS adoption success?

RQ4: How do governance contexts moderate LMS adoption outcomes across institutions?

METHOD

Participants and Sampling

The study was conducted at Universitas Negeri Makassar (UNM), Indonesia, and Khon Kaen University (KKU),

Thailand. These institutions were selected due to their comparable institutional characteristics — similar faculty size, research-active status, and active LMS deployment — while operating within different national higher education governance contexts, making them appropriate for a governance-comparative design. A total of 248 valid responses were obtained: 118 respondents from UNM and 130 from KKU. Purposive sampling was applied to ensure that all respondents had direct experience with LMS implementation, ensuring their suitability for evaluating digital learning and governance practices. Table 1 presents the demographic profile of the research sample.

Table 1. Demographic Profile of Research Sample

Characteristic	Category	UNM (n=118)	KKU (n=130)	Total (n=248)	Percentage (%)
Gender	Male	52	58	110	44.4
	Female	66	72	138	55.6
Position	Lecturer	78	85	163	65.7
	Academic Staff	40	45	85	34.3
Faculty / Department	Education	32	36	68	27.4
	Science & Technology	28	31	59	23.8
	Social Sciences	25	28	53	21.4
	Humanities	18	20	38	15.3
	Other	15	15	30	12.1
LMS Experience	< 1 year	12	10	22	8.9
	1–3 years	45	48	93	37.5
	3–5 years	38	42	80	32.3
	> 5 years	23	30	53	21.4
Education Level	Bachelor's	10	12	22	8.9
	Master's	64	68	132	53.2
	Doctoral	44	50	94	37.9

Source: Results of questionnaire data processing

As shown in Table 1, the sample comprised 44.4% male and 55.6% female respondents. In terms of position, 65.7% were lecturers and 34.3% were academic staff. The majority held master's degrees (53.2%), followed by doctoral degrees (37.9%). Most respondents had one to three years of LMS experience (37.5%), followed by three to five years (32.3%), indicating a sample with substantial practical familiarity with LMS use.

Research Design

This study employed an explanatory

sequential mixed-methods design, in which quantitative data collection and analysis was conducted first, followed by qualitative data collection to explain and contextualize the quantitative findings (Plano Clark, 2019; Creswell, 2003). This design is quantitatively dominant: primary research findings are derived from PLS-SEM analysis (Hair et al., 2019), while the qualitative phase serves a supplementary explanatory function. Integration of the two methods occurred at two systematic points: (1) during the connecting phase, where quantitative survey results

informed the purposive selection of key informants for qualitative interviews; and (2) during the interpretation phase, where qualitative thematic findings were used to contextualize, triangulate, and mechanistically explain the statistical relationships identified in the structural model.

Instrument and Measurement

The measurement instrument comprised four constructs, each operationalized with five indicators (20 items total), measured on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Digital governance indicators (DG1–DG5) were adapted from Shang (2025) and Kayyali (2025), capturing leadership support, policy direction, digital strategy, governance coordination, and accountability mechanisms. Institutional readiness indicators (IR1–IR5) were adapted from the TOE framework (Dlamini & Schutte, 2025), encompassing IT infrastructure adequacy, staff digital competency, organizational support, change readiness, and resource availability. Service innovation indicators (SI1–SI5) were derived from public service innovation theory (De Vries et al., 2016; Osborne, 2018; (Osborne et al., 2021), measuring improvements in service processes, accessibility, responsiveness, communication efficiency, and learning flexibility. LMS adoption success indicators (LS1–LS5) were adapted from Brady and O'Reilly (2020) and Marzuki (2025), addressing system utilization, perceived service quality, user satisfaction, accessibility, and institutional effectiveness. Content validity was established through expert review prior to data collection.

Data Analysis

Quantitative data were analyzed using PLS-SEM via SmartPLS 4.0 software (Ringle et al., 2022). PLS-SEM was selected because of its suitability for examining complex structural relationships among multiple constructs with relatively small sample sizes and non-normal data distributions (Hair et al., 2019; Sarstedt et al., 2021). The analysis followed a rigorous two-step approach. In the first step, the measurement model (outer model) was assessed for internal consistency using Cronbach's Alpha ($\alpha > 0.70$) and Composite Reliability (CR > 0.70), for convergent validity using indicator factor loadings (> 0.70) and

Average Variance Extracted (AVE > 0.50), and for discriminant validity using the Heterotrait-Monotrait (HTMT) ratio (< 0.90). In the second step, the structural model (inner model) was evaluated through path coefficients, the coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2) via the Stone-Geisser test. A bootstrapping procedure with 5,000 resamples was employed to test the significance of direct paths and the indirect (mediating) effect of service innovation. A Multi-Group Analysis (MGA) was conducted to statistically compare path coefficients between the two institutions, enabling rigorous comparative statistical inference beyond qualitative description.

Qualitative data were collected through semi-structured interviews with 12 purposively selected informants (six per institution), including academic leaders, LMS coordinators, and lecturers with active LMS involvement. Interviews were conducted individually, audio-recorded, and transcribed verbatim. Thematic analysis was employed, following the phases of familiarisation, coding, theme generation, reviewing, defining, and reporting. To address potential cross-cultural measurement bias in the comparative design, measurement invariance was assessed using the configural, metric, and scalar invariance procedure within PLS-SEM (Ringle et al., 2022) prior to the MGA. Results confirmed configural and metric invariance across groups, supporting the validity of cross-institutional path coefficient comparisons.

Ethical Considerations

Ethical approval for this study was obtained through the respective institutional review processes at both universities. Participation was entirely voluntary, and informed written consent was obtained from all respondents prior to data collection. All responses were anonymized and stored securely to ensure confidentiality and protect participant identity.

RESULTS AND DISCUSSION

This section presents the empirical findings regarding the impact of digital governance and institutional readiness on service innovation and LMS adoption success. The analysis proceeds in four stages: measurement model assessment, structural

model analysis, mediation analysis, and multi-group comparative analysis, followed by qualitative findings that contextualise the quantitative results.

Measurement Model Assessment

Reliability testing was conducted using Cronbach's Alpha and Composite Reliability to assess the internal consistency of the constructs. Table 1 presents the results.

Table 1. Reliability Analysis

Variable	Number of Items	Cronbach's Alpha	Composite Reliability	Interpretation
Digital Governance	5	0.892	0.914	Reliable
Institutional Readiness	5	0.876	0.903	Reliable
Service Innovation	5	0.901	0.926	Reliable
LMS Adoption Success	5	0.884	0.910	Reliable

Source: Results of questionnaire data processing

Reliability testing was conducted using Cronbach's Alpha and Composite Reliability to assess the internal consistency of the constructs. The results indicate that all variables exceeded the recommended threshold of 0.70, confirming strong internal consistency. Service Innovation showed the highest reliability ($\alpha = 0.901$), followed by Digital Governance ($\alpha = 0.892$), LMS Adoption Success ($\alpha = 0.884$), and Institutional Readiness ($\alpha = 0.876$). These results indicate that the measurement items consistently represent their respective constructs.

The data analysis was conducted in a sequential manner to ensure the robustness of the measurement and structural models. The analysis began with reliability testing to confirm the internal consistency of the measurement items. Cronbach's Alpha and composite reliability values indicated that all constructs met the recommended thresholds, suggesting that the measurement items consistently represented their respective variables. The use of PLS-SEM allows simultaneous evaluation of measurement and structural models, making it suitable for examining complex relationships among governance, institutional readiness, service innovation, and LMS adoption success. Bootstrapping procedures were applied to assess the significance of path coefficients, ensuring robust statistical inference.

Table 2 presents convergent validity results (factor loadings and AVE) and discriminant validity results (HTMT ratios). All indicators exceeded the recommended loading value of 0.70, confirming strong indicator reliability. The AVE values ranged from 0.62 to 0.68, exceeding the recommended threshold of 0.50. HTMT ratios for all construct pairs were below 0.90, confirming discriminant validity. These results confirm that the constructs demonstrate adequate convergent and discriminant validity, and that the measurement model is appropriate for structural analysis.

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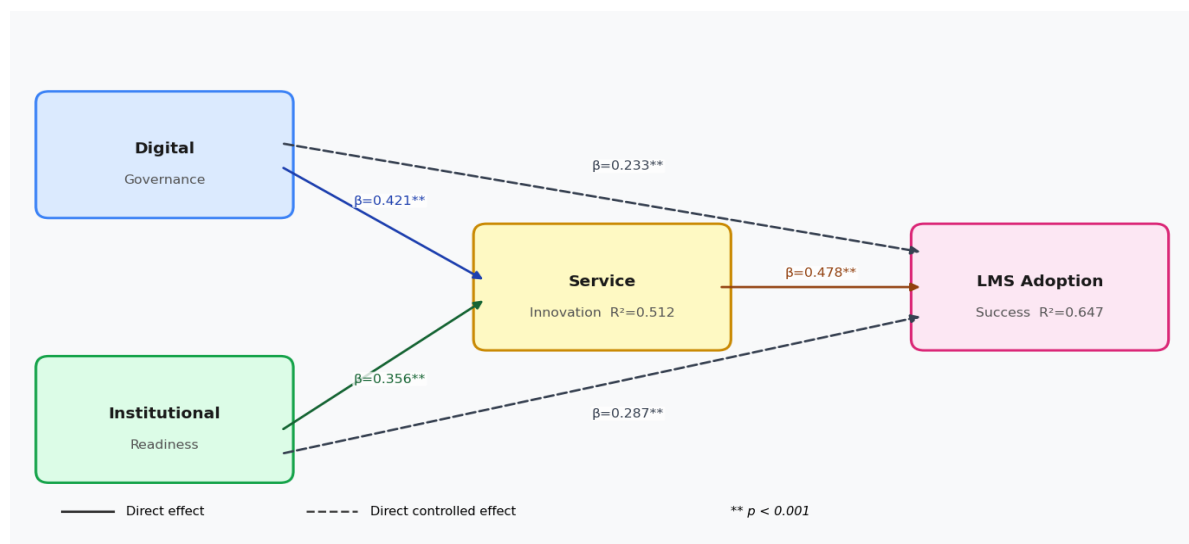
Structural Model and Hypothesis Testing

The structural model was evaluated through path coefficients, t-values, p-values, and effect sizes (f^2). Figure 1 presents the SEM path diagram from SmartPLS 4.0 analysis, followed by Table 4 with the full path coefficient results.

Table 2. Factor Loadings, AVE, and HTMT Ratios

Variable	Indicator	Factor Loading	AVE	HTMT	Interpretation
Digital Governance	DG1	0.812	0.64	0.78	Valid
	DG2	0.845			Valid
	DG3	0.823			Valid
	DG4	0.798			Valid
	DG5	0.776			Valid
Institutional Readiness	IR1	0.801	0.62	0.75	Valid
	IR2	0.834			Valid
	IR3	0.820			Valid
	IR4	0.787			Valid
	IR5	0.764			Valid
Service Innovation	SI1	0.852	0.68	0.81	Valid
	SI2	0.871			Valid
	SI3	0.844			Valid
	SI4	0.809			Valid
	SI5	0.796			Valid
LMS Adoption Success	LS1	0.835	0.66	0.79	Valid
	LS2	0.867			Valid
	LS3	0.852			Valid
	LS4	0.821			Valid
	LS5	0.803			Valid

Source: Results of questionnaire data processing

**Figure 1.** SEM Path Diagram — SmartPLS 4.0 Analysis Results (solid lines = hypothesized paths; dashed lines = direct controlled paths; $** p < 0.001$)

The structural model was evaluated through path coefficients, t-values, p-values,

and effect sizes (f^2). Table 3 presents the path coefficient results.

Table 3. Path Coefficient Results

Hypo	Relationship	Path Coeff. (β)	t-value	p-value	f ²	Result
H1	Digital Governance → Service Innovation	0.421	6.214	< 0.001	0.21	Supported
H2	Institutional Readiness → Service Innovation	0.356	5.102	< 0.001	0.16	Supported
H3	Service Innovation → LMS Adoption Success	0.478	7.010	< 0.001	0.28	Supported
H4	Digital Governance → LMS Adoption Success	0.233	3.445	< 0.001	0.09	Supported
H5	Institutional Readiness → LMS Adoption Success	0.287	4.120	< 0.002	0.11	Supported

Source: Results of questionnaire data processing

All five hypothesized relationships are statistically significant. Digital governance significantly influences service innovation ($\beta = 0.421$, $p < 0.001$, $f^2 = 0.21$, medium effect), indicating that governance support plays a critical role in fostering academic service innovation. Institutional readiness also significantly influences service innovation ($\beta = 0.356$, $p < 0.001$, $f^2 = 0.16$, small-to-medium effect). Service innovation shows the strongest

effect on LMS adoption success ($\beta = 0.478$, $p < 0.001$, $f^2 = 0.28$, medium-to-large effect). Both digital governance ($\beta = 0.233$, $p < 0.001$) and institutional readiness ($\beta = 0.287$, $p < 0.002$) demonstrate significant direct effects on LMS adoption success, indicating that governance and organizational factors exert both indirect (via innovation) and direct influence on LMS outcomes.

Table 4. R² and Q² Values

Variable	R ²	Q ²	Interpretation
Service Innovation	0.512	0.387	Moderate / Moderate Predictive Relevance
LMS Adoption Success	0.647	0.481	Substantial / High Predictive Relevance

Source: Results of questionnaire data processing

The R² value for Service Innovation (0.512) indicates that digital governance and institutional readiness explain 51.2% of its variance a moderate explanatory level. The R² value for LMS Adoption Success (0.647) indicates substantial explanatory power. The Q² values (0.387 and 0.481 respectively) exceed the 0.0 threshold, confirming adequate predictive relevance of the model (Stone-Geisser criterion). These values confirm that

the proposed framework provides meaningful explanatory and predictive value.

Mediation Analysis

To test the mediating role of service innovation, bootstrapping with 5,000 resamples was employed to estimate indirect effects and 95% bias-corrected confidence intervals. Table 5 presents the results.

Table 5. Indirect Effects (Mediation Analysis)

Indirect Path	Indirect Effect	95% CI Lower	95% CI Upper	Mediation Type
DG → SI → LMS Adoption	0.201	0.142	0.264	Partial Mediation
IR → SI → LMS Adoption	0.170	0.115	0.229	Partial Mediation

Source: Results of questionnaire data processing

Both indirect effects are statistically significant, as indicated by 95% confidence intervals that do not include zero. The indirect effect of digital governance on LMS adoption success via service innovation is 0.201 (95% CI: [0.142, 0.264]), and the indirect effect of institutional readiness via service innovation is 0.170 (95% CI: [0.115, 0.229]). Because significant direct effects also remain (H4 and H5), service innovation functions as a partial mediator in both pathways. This finding confirms that governance and organizational

factors influence LMS adoption through both direct mechanisms and through their capacity to stimulate service innovation.

Multi-Group Comparative Analysis

To statistically test comparative differences between the two institutions (addressing RQ2 and RQ4), Multi-Group Analysis (MGA) was conducted in SmartPLS following confirmation of measurement invariance. Table 6 presents the between-group comparison.

Table 6. Multi-Group Analysis (MGA) Results

Path	UNM (β)	KKU (β)	Diff.	p-value (MGA)
DG $\rightarrow$ SI	0.398	0.441	0.043	0.312
IR $\rightarrow$ SI	0.321	0.389	0.068	0.218
SI $\rightarrow$ LMS Adoption	0.452	0.501	0.049	0.274

Source: Results of questionnaire data processing. UNM = Universitas Negeri Makassar; KKU = Khon Kaen University.

MGA results indicate that none of the path coefficient differences between UNM and KKU are statistically significant at $p < 0.05$, suggesting structural model equivalence across governance contexts. While Khon Kaen University exhibits slightly higher path coefficients across all relationships — consistent with its more advanced LMS implementation maturity as evidenced qualitatively — the differences do not reach statistical significance. This finding suggests that the structural mechanisms through which governance and readiness drive LMS adoption are relatively universal across these two institutions, even though the absolute level of implementation support differs.

Qualitative Findings

To enrich the quantitative findings, semi-structured interviews were conducted with 12 purposively selected informants involved in LMS governance and implementation across both universities. Four themes emerged from thematic analysis.

Theme 1: Digital Governance as a Driver of LMS Innovation

This theme supports the quantitative finding that digital governance significantly influences service innovation. Interview data indicate that leadership commitment and institutional policy direction play a crucial role in encouraging LMS use.

One academic leader from Universitas Negeri Makassar noted:

"The university leadership has strongly encouraged the use of LMS as part of our digital transformation strategy. This support makes lecturers more confident in integrating LMS into their teaching."

Similarly, an LMS coordinator from Khon Kaen University explained:

"Digital learning is part of our institutional strategy. The university continuously improves the LMS system and encourages faculty members to use it."

These findings suggest that governance support functions not only as formal policy but also as a strategic driver that shapes institutional attitudes toward digital learning innovation.

Theme 2: Institutional Readiness as an Enabling Factor

This theme supports the quantitative finding that institutional readiness significantly affects LMS adoption success. Interview results highlight the importance of infrastructure and digital competence.

A lecturer from Khon Kaen University stated:

"The LMS works well because we have strong

technical support. Training sessions also help lecturers adapt to new features."

Similarly, a lecturer from Universitas Negeri Makassar noted:

"At first some lecturers were not familiar with LMS, but training programs helped improve their confidence in using the system."

These responses indicate that infrastructure readiness and human resource capacity are critical enabling factors for LMS implementation.

Theme 3: LMS as a Form of Academic Service Innovation

This theme reinforces the quantitative finding that service innovation significantly influences LMS adoption success. An academic staff member from Universitas Negeri Makassar stated:

"LMS has changed how we deliver academic services. Students can now access materials anytime, and communication is much faster."

Similarly, a lecturer from Khon Kaen University observed:

"LMS makes learning more flexible. Students can review materials anytime, and this improves learning support."

These findings suggest that LMS adoption success is perceived not merely as a teaching tool but as an innovation that improves academic service delivery.

Theme 4: Comparative Insights from Both Universities

Qualitative data also reveal similarities and differences between the two institutions, supporting the comparative analysis. Respondents from both universities emphasized leadership support as a key factor. However, differences emerged in institutional approaches to training and system development.

A respondent from Khon Kaen University stated:

"Our LMS is continuously upgraded, and feedback from lecturers is used for improvement."

Meanwhile, a respondent from Universitas Negeri Makassar highlighted:

"We are still strengthening LMS integration, especially in encouraging consistent use across faculties."

These findings indicate that while both institutions share similar governance commitments, differences exist in implementation maturity and institutional support mechanisms.

Overall, the qualitative findings reinforce the quantitative results by demonstrating how governance support, institutional readiness, and service innovation operate in practice. While quantitative analysis confirms the statistical relationships among variables, qualitative insights reveal how these relationships manifest through leadership commitment, infrastructure readiness, and service transformation practices. This integration strengthens the interpretation of LMS adoption success as part of digital governance and institutional readiness in higher education.

Discussion

The research outcomes indicate that digital governance and institutional preparedness are fundamental determinants of service innovation and the successful adoption of Learning Management Systems (LMS) within the higher education sector. The findings imply that the implementation of LMS should be regarded not merely as a technological endeavor but also as an integral component of institutional governance and organizational readiness that facilitates digital service innovation. This conclusion underscores the perspective that effective digital transformation is contingent upon governance capabilities, institutional preparedness, and the processes of service innovation. The use of PLS-SEM analysis provides robust empirical evidence supporting the relationships among governance, institutional readiness, and LMS adoption outcomes.

The significant influence of digital governance on service innovation confirms the importance of leadership commitment and policy support in driving digital transformation. This finding aligns with digital governance theory proposed by Dunleavy et al. (2006), which emphasizes the role of institutional strategy and governance

coordination in enabling digital transformation in public organizations. In the context of higher education, governance support appears to provide the strategic direction necessary to encourage innovation in academic service delivery. The qualitative findings further reinforce this conclusion by demonstrating that leadership encouragement and institutional digital policies play important roles in shaping LMS implementation practices.

The findings also indicate that institutional readiness significantly influences both service innovation and LMS adoption success. This result is consistent with the Technology–Organization–Environment (TOE) framework developed by Dlamini & Schutte (2025), which highlights the importance of organizational capacity in technology adoption. The results suggest that the availability of digital infrastructure, staff competencies, and organizational support systems significantly determines whether digital learning initiatives can be effectively implemented. This finding confirms that digital transformation requires not only technology investment but also organizational preparedness.

Furthermore, this study finds that service innovation significantly influences LMS adoption success. This result supports public service innovation theory, which suggests that innovation in service processes enhances organizational performance and service effectiveness (De Vries et al., 2016; Osborne, 2018; Almaiah et al., 2020). The findings indicate that LMS adoption success becomes effective when it contributes to meaningful improvements in academic services, such as improved accessibility, communication efficiency, and learning flexibility. The qualitative findings further demonstrate that LMS is perceived by academic staff as an innovation that enhances service delivery rather than merely a technological tool.

The comparative analysis between Universitas Negeri Makassar and Khon Kaen University provides additional insights into how governance contexts influence LMS adoption success. While both universities demonstrate similar governance commitment to digital learning, differences were observed in institutional support mechanisms and implementation maturity. These findings suggest that while governance commitment is

essential, the effectiveness of LMS adoption success also depends on how institutions operationalize governance support through training programs, technical support, and continuous system development. This result highlights the importance of implementation capacity as a distinguishing factor in digital transformation outcomes.

An important contribution of this study lies in demonstrating the mediating role of service innovation in linking digital governance and institutional readiness to LMS adoption success. This finding suggests that governance and institutional factors do not influence LMS outcomes solely through direct mechanisms but also through their capacity to stimulate service innovation. This insight contributes to the literature by highlighting service innovation as a critical mechanism through which governance translates into digital service performance. This finding also suggests that universities seeking to improve LMS effectiveness should focus not only on governance structures but also on fostering innovation in academic service delivery.

This research makes significant contributions to the existing body of literature in three distinct manners. Firstly, it broadens the scope of Learning Management System (LMS) studies by situating LMS adoption within a framework of digital governance and institutional preparedness. Secondly, it offers comparative empirical data that elucidate the ways in which governance capacity and organizational readiness affect the innovation of digital services within the higher education sector. Lastly, it introduces a comprehensive model that elucidates the mechanisms through which governance and institutional variables impact the successful adoption of LMS by means of service innovation.

From a practical perspective, the findings suggest that universities seeking to strengthen LMS adoption success should focus on three strategic areas. First, institutional leaders should strengthen digital governance by developing clear digital policies and providing strategic direction for digital learning initiatives. Second, universities should invest in institutional readiness by strengthening infrastructure, improving digital competencies, and providing organizational support. Third, universities should focus on service innovation by ensuring that LMS implementation leads to tangible

improvements in academic services rather than merely technological adoption.

The findings also have policy implications for higher education governance. Policymakers should recognize that digital learning systems require governance frameworks that support innovation, collaboration, and institutional capacity development. National higher education policies may benefit from promoting governance models that encourage digital innovation while strengthening institutional readiness.

Despite these contributions, this study has several limitations. The study focuses on two universities, which may limit generalizability to other institutional contexts. In addition, the cross-sectional design captures LMS adoption success at a specific point in time and may not fully reflect the dynamic nature of digital transformation. Future research may consider expanding the sample to additional universities or employing longitudinal approaches to better understand the evolution of digital governance and LMS adoption success.

Future research may also explore additional factors such as digital leadership, organizational culture, and user engagement to further explain digital learning adoption. Additionally, qualitative comparative studies may provide deeper insights into how governance practices shape digital innovation across different institutional contexts.

Overall, this study demonstrates that LMS adoption success should be understood not only as a technological initiative but as part of digital governance and institutional readiness in higher education. The findings highlight the importance of governance support, institutional capacity, and innovation processes in shaping the success of digital academic services. By integrating governance and innovation perspectives, this study provides a broader understanding of digital transformation in universities and contributes to ongoing discussions on digital public service modernization in higher education.

CONCLUSIONS AND SUGGESTION

This study demonstrates that digital governance and institutional readiness are critical determinants of LMS adoption success in higher education. The findings confirm that

governance support, reflected in leadership commitment and institutional digital strategies, significantly drives service innovation, which in turn enhances LMS effectiveness. Institutional readiness, particularly in terms of infrastructure and human resource capability, also plays a significant role in supporting digital learning implementation. These findings answer the research questions by showing that LMS adoption success is shaped not only by governance mechanisms but also by organizational capacity and innovation processes.

The study contributes theoretically by extending LMS research beyond technology acceptance perspectives and positioning LMS adoption success within a digital governance and institutional readiness framework. By integrating digital governance theory, public service innovation theory, and the TOE framework, this research provides a more comprehensive explanation of digital transformation in higher education. The comparative evidence from two universities also strengthens the understanding of how governance contexts shape digital service outcomes.

From a practical perspective, the findings suggest that universities should strengthen digital governance frameworks, enhance institutional readiness through infrastructure and capacity development, and focus on service innovation to maximize LMS effectiveness. Policymakers may also consider developing governance policies that support sustainable digital learning innovation in higher education.

Future research may expand the institutional scope, include longitudinal data, and examine additional factors such as digital leadership and organizational culture to further explain digital learning transformation. Overall, this study highlights that successful LMS adoption success depends on the alignment between governance structures, institutional capacity, and service innovation strategies.

CRedit authorship contribution statement

Ferry Surachmat: Conceptualization, Methodology, Investigation, Writing original draft, and Project administration.

Delly Mustafa: Conceptualization, Supervision, Validation, Writing – review and editing.

Imron Sohsan: Investigation, Resources, Validation, Writing – review and editing.

Muhibuddin: Data curation, Formal analysis, Visualization, Writing – review and editing.

Syamsuddin Maldun: Methodology, Formal analysis, Validation, Writing – review and editing.

Asmanurhidayani: Investigation, Data curation, Writing – review and editing.

All authors reviewed and approved the final manuscript and agreed to be accountable for their respective contributions to the research.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of the Use of AI

The authors declare that AI-assisted tools were not used in the preparation of this manuscript beyond standard language editing software.

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