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Fostering Synergistic Collaboration: A Triple Helix Model for Integrating Educational Management, Digital Pedagogy, and Sharia Financial Literacy in Indonesian Islamic Economics Higher Education

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ABSTRACT

Background

The convergence of educational transformation, technological advancement, and the preservation of ethical values presents a significant challenge for higher education institutions, particularly in delivering Islamic economics education that remains faithful to its foundational principles amidst the Society 5.0 era.

Purpose

This study investigates the convergence of educational management strategies, technology-enhanced pedagogy, and Islamic economics principles within Indonesian higher education institutions to understand how digital transformation reshapes the pedagogical ecosystem of Islamic economics education.

Design/method/approach

Employing an explanatory sequential mixed-methods design combining quantitative surveys ($n = 387$) and qualitative semi-structured interviews ($n = 24$) across six Islamic higher education institutions, the research examines the relationships between digital transformation and educational outcomes in Islamic economics.

Results

The quantitative findings reveal that technology-integrated educational management significantly predicts student learning outcomes in Islamic economics ($\beta = 0.47, p < .001$) and sharia financial literacy ($\beta = 0.39, p < .001$). Structural equation modeling indicates that digital pedagogical competence mediates 34.2% of the variance in student engagement with Islamic finance concepts. Qualitative thematic analysis identifies four emergent themes: institutional readiness for digital transformation; alignment of the curriculum with Islamic values and technological innovation; the role of learning management systems in fostering sharia-compliant understanding of financial matters; and stakeholder perceptions of technology-mediated Islamic economics instruction.

Contribution/value

The study proposes an integrative Triple Helix framework, Educational Management, Educational Technology, and Islamic Economics (EM-ET-IE), offering a novel theoretical contribution for designing sustainable, value-based digital learning ecosystems. These findings carry significant implications for policymakers, educational administrators, and curriculum designers seeking to reimagine Islamic economics education while preserving its foundational ethical principles.

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INTRODUCTION

The global Islamic economy has experienced transformative growth, with Islamic finance assets reaching US\$4.93 trillion in 2023 and projected to expand to US\$7.53 trillion by 2028 (DinarStandard, 2025). Muslim consumer spending across halal economy sectors attained US\$2.43 trillion, with forecasts reaching US\$3.36 trillion by 2028, signaling an unprecedented demand for professionals versed in sharia-compliant financial practices (DinarStandard, 2025). Indonesia, home to the world's largest Muslim population exceeding 230 million, maintained its position as the third-ranked country in the Global Islamic Economy Indicator 2024/2025, following Malaysia and Saudi Arabia (IAEI, 2025). However, a critical paradox persists: the National Financial Literacy and Inclusion Survey reveals that Islamic financial literacy stands at merely 39.11%, while Islamic financial inclusion reaches only 12.88% (Hidayat, 2024). Concurrently, higher education institutions face mounting pressure to produce graduates equipped with both digital competencies and ethical financial understanding, a challenge amplified by rapid fintech innovations, including blockchain-based sukuk, AI-powered sharia-compliance screening, and peer-to-peer Islamic lending platforms. (Büyüközkan & Mukul, 2023; Mohd Haridan et al., 2023). This convergence of economic urgency and educational inadequacy underscores the imperative for integrated approaches that bridge educational management, technology-enhanced pedagogy, and Islamic economics education.

The existing scholarly landscape addressing this intersection reveals significant contributions yet notable lacunae. Ibrahim et al. (2024) established that Leadership competencies critically determine educational quality in Islamic Economics and Finance schools. Mawardi and Risyad (2025) demonstrated that education, technology, and the integration of Islamic finance significantly reduce economic inequality across Muslim economies. In the domain of educational technology, (Büyüközkan & Mukul, 2023) Conducted a systematic review mapping the trajectories of Education 4.0 digital transformation, while Haleem et al. (2022) found that digital technologies play a transformative role when embedded within coherent management frameworks. F. Rahman & Zainuddin (2023) found that AI integration in higher education enhances personalized learning and faculty engagement. Kass-Hanna et al. (2022) established that digital literacy and financial knowledge are predictive of positive financial behaviors, and Lusardi and Mitchell (2023) provided foundational insights on financial literacy measurement. However, these studies predominantly examine educational management, educational technology,

and Islamic economics in isolation, failing to capture the synergistic potential of their integration within a unified analytical framework.

The research gap is threefold. First, no empirical study has simultaneously investigated the intersection of educational management, technology-enhanced pedagogy, and Islamic economics within a single integrative framework. Second, while national reports emphasize digital transformation and human capital Development (KNEKS, 2024) No comprehensive model has been proposed to operationalize these elements at the institutional level in higher education settings. Third, the uniquely Indonesian context, characterized by a blend of traditional *pesantren* education, rapidly advancing digital infrastructure, and the government's ambitious target to lead the global Islamic economy by 2028 (IAEI, 2025), has not been adequately examined through an integrated lens of educational management and technology adoption. The rise of Islamic fintech, with Saudi Arabia's market projected at US\$1.5 billion by 2025 under Vision 2030 and Malaysia's regulatory-first model (Alam & Ali, 2024; Zh et al., 2024), further intensifies the demand for graduates equipped with both digital competencies and Islamic economic literacy, a demand that current educational frameworks inadequately address (Farias-Gaytan et al., 2023; Kyambade et al., 2025).

This study aims to address these gaps by proposing and empirically testing an integrative Triple Helix framework bridging educational management, technology-enhanced pedagogy, and Islamic economics education. Three specific objectives guide this inquiry: (1) to examine the effect of technology-integrated educational management on student learning outcomes in Islamic economics; (2) to analyze the mediating role of digital pedagogical competence in the relationship between institutional management practices and sharia financial literacy; and (3) to develop and validate the EM-ET-IE Triple Helix framework as a holistic theoretical model for sustainable digital transformation in Islamic economics education. The study's focus on Indonesian Islamic higher education institutions offers contextual specificity, complementing the predominantly Malaysian- and Gulf-focused literature and thereby enriching global discourse on Islamic economics education in the Society 5.0 era.

Three primary hypotheses are tested: (H1) Technology-integrated educational management positively and significantly predicts student learning outcomes in Islamic economics; (H2) Digital pedagogical competence mediates the relationship between educational management practices and sharia financial literacy; and (H3) The integrative EM-ET-IE framework demonstrates superior explanatory power compared to single-domain models in predicting student engagement with Islamic economics concepts. By validating these hypotheses through a robust mixed-methods design grounded in both the Technology

Acceptance Model (Davis, 1989) and the *Maqasid al-Shariah* framework, this study offers a novel theoretical and practical framework that advances the field of educational management science.

The remainder of this article proceeds as follows: the second section details the research methodology, the third section reports quantitative and qualitative findings, the fourth section discusses these findings in relation to the existing literature and the proposed EM-ET-IE framework, and the article concludes with a summary of contributions, limitations, and future research directions.

METHOD

This study employed an explanatory sequential mixed-methods research design (Creswell & Creswell, 2018; Kurniasih et al., 2025), combining quantitative survey research with qualitative semi-structured interviews. This approach is recognized as methodologically robust for educational research seeking both generalizability and contextual depth (Tashakkori & Teddlie, 2021). The design proceeded in two phases: the quantitative phase established statistical relationships between educational management, technology integration, and Islamic economics learning outcomes, while the subsequent qualitative phase explored underlying mechanisms and contextual factors.

The research population comprised students and faculty members of Islamic economics departments across Indonesian Islamic higher education institutions. Using stratified random sampling, six institutions were selected to represent institutional diversity: two state Islamic universities (UINs), two private Islamic universities, and two *pesantren*-based higher education institutions. The quantitative sample consisted of 387 respondents (296 students and 91 faculty members), achieving a response rate of 82.3% from 470 distributed questionnaires, exceeding the minimum of 200 recommended for structural equation modeling (Kline, 2023). For the qualitative phase, 24 participants were purposively selected using maximum variation sampling: 12 students with varying levels of digital engagement, 8 faculty members specializing in Islamic economics or educational technology, and 4 institutional administrators responsible for curriculum Development and technology integration.

Three validated instruments were utilized. The Technology-Integrated Educational Management Scale (TIEMS), adapted from the TPACK framework (Mishra & Koehler, 2019) and contextualized for Islamic higher education, demonstrated a Cronbach's alpha of .91. The Islamic Economics Learning Outcomes Inventory (IELOI), based on Bloom's revised taxonomy and aligned with the *Maqasid al-Shariah* competency framework ($\alpha = .88$), assessed cognitive, affective, and psychomotor learning domains. The Sharia Financial Literacy Assessment (SFLA), constructed from the OECD/INFE Financial Literacy Framework

(OECD, 2023), enriched with Islamic finance dimensions including *murabahah*, *mudharabah*, *musharakah*, and *sukuk* knowledge ($\alpha = .86$). Confirmatory factor analysis confirmed construct validity with CFI > .95 and RMSEA < .06 for all instruments.

Qualitative data collection comprised semi-structured interviews lasting 45–75 minutes, conducted face-to-face and via video conferencing between August and November 2024. The protocol included 15 open-ended questions across four thematic domains: institutional digital transformation readiness, curriculum integration experiences, perceptions of technology-mediated learning, and alignment of Islamic values with digital pedagogy. Interviews were audio-recorded, transcribed verbatim, and member-checked. Ethical clearance was obtained from the Institutional Review Board.

Quantitative analysis proceeded in three stages: descriptive statistics (SPSS 28.0), structural equation modeling (AMOS 28.0) following Anderson and Gerbing's (1988) two-step approach, and mediation analysis using bootstrapping with 5,000 resamples and 95% bias-corrected confidence intervals (Hayes, 2022). Qualitative analysis utilized Braun and Clarke (2022) reflexive thematic analysis with NVivo 14. Triangulation was achieved through a joint display matrix (Guetterman et al., 2015).

RESULTS

Quantitative Findings

Descriptive statistics revealed a moderately high level of technology integration across institutions (TIEMS: $M = 3.72$, $SD = 0.68$). Islamic Economics Learning Outcomes (IELOI: $M = 3.58$, $SD = 0.74$) were relatively satisfactory, while Sharia Financial Literacy (SFLA: $M = 3.21$, $SD = 0.81$) remained an area requiring improvement. Digital Pedagogical Competence (DPC: $M = 3.49$, $SD = 0.72$) served as the mediating variable. State Islamic universities demonstrated significantly higher TIEMS scores ($M = 3.94$, $SD = 0.61$) compared to *pesantren*-based institutions ($M = 3.38$, $SD = 0.71$), $t(385) = 6.23$, $p < .001$, highlighting institutional disparities in technology adoption.

Table 1: Descriptive Statistics and Correlation Matrix ($n = 387$)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. TIEMS	3.72	0.68	—			
2. IELOI	3.58	0.74	.54**	—		
3. SFLA	3.21	0.81	.47**	.51**	—	
4. DPC	3.49	0.72	.58**	.52**	.44**	—

Note. ** $p < .01$. TIEMS = Technology-Integrated Educational Management Scale; IELOI = Islamic Economics Learning Outcomes Inventory; SFLA = Sharia Financial Literacy Assessment; DPC = Digital Pedagogical Competence.

The structural equation model demonstrated excellent fit: $\chi^2/df = 2.14$, CFI = .96, TLI = .95, RMSEA = .054, SRMR = .043. All hypothesized paths were statistically significant, as presented in Table 2.

Table 2: Structural Equation Model Path Coefficients

Path	β	SE	t	p	Result
TIEMS → IELOI	.47	.06	7.83	< .001	H1 Supported
TIEMS → SFLA	.39	.07	5.57	< .001	H1 Supported
TIEMS → DPC	.52	.05	10.40	< .001	Significant
DPC → IELOI	.41	.06	6.83	< .001	Significant
DPC → SFLA	.36	.07	5.14	< .001	Significant
TIEMS → DPC → IELOI	.21	.04	5.25	< .001	H2 Supported
TIEMS → DPC → SFLA	.19	.04	4.75	< .001	H2 Supported

Note. Bootstrap samples = 5,000; 95% bias-corrected CI. All indirect effects are significant at $p < .001$.

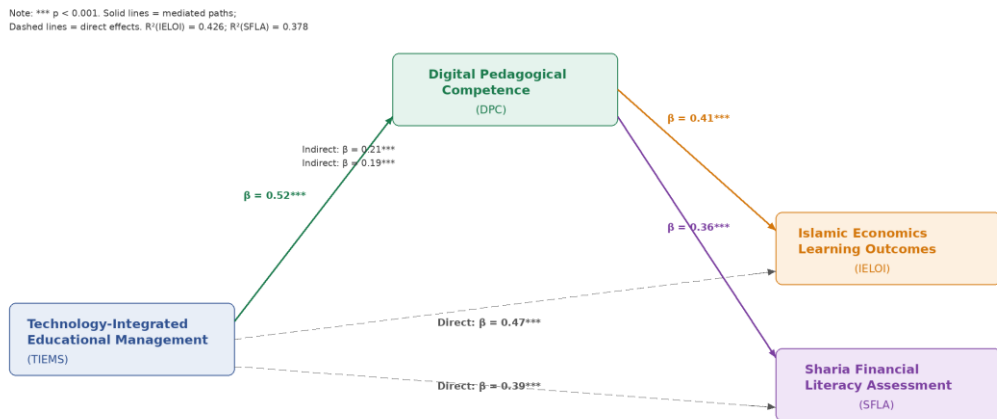


Figure 1: Structural Model of Technology-Integrated Educational Management, Digital Pedagogical Competence, and Islamic Economics Learning Outcomes

Multi-group analysis confirmed the superiority of the integrative EM-ET-IE model over single-domain models (Table 3), supporting Hypothesis 3.

Table 3: Model Comparison: Integrative vs. Single-Domain Models

Model	χ^2/df	CFI	TLI	RMSEA	R ² (IELOI)	R ² (SFLA)
EM-ET-IE (Integrative)	2.14	.96	.95	.054	.426	.378
EM-Only	3.87	.88	.86	.089	.218	.167
ET-Only	3.41	.90	.88	.081	.263	.194
IE-Only	3.62	.89	.87	.085	.197	.241

Note. $\Delta\chi^2 = 48.73$, $\Delta df = 6$, $p < .001$. EM = Educational Management; ET = Educational Technology; IE = Islamic Economics.

Qualitative Findings

Reflexive thematic analysis of interview transcripts generated four overarching themes that collectively illuminate the complex dynamics of digital transformation within Islamic higher education institutions. The first theme, *Institutional Readiness for Digital Transformation*, revealed a pronounced disparity between state Islamic universities and *pesantren*-based institutions in terms of technological infrastructure and institutional support. Participants from state Islamic universities consistently reported greater access to learning management systems, digital libraries, and dedicated information technology units. In contrast, their counterparts in *pesantren*-based institutions described reliance on informal, individually driven adoption strategies. Faculty participants across both institutional types emphasized that meaningful digital transformation requires a dual approach: top-down strategic planning by university Leadership, coupled with bottom-up pedagogical innovation initiated by individual instructors. This finding aligns with the OECD (2023) conclusions, which emphasize that sustainable digital education ecosystems emerge from the synergistic alignment of policy frameworks, institutional culture, and educator agency.

The second theme, *Curriculum Alignment Between Islamic Values and Technological Innovation*, revealed a nuanced epistemological position in which technology is regarded not as an autonomous force but as an instrument (*wasilah*) whose legitimacy must be evaluated against the objectives of *Maqasid al-Shariah*. This evaluative framework enabled participants to embrace digital tools selectively while maintaining fidelity to Islamic educational principles. Notably, students reported that simulation-based learning of Islamic financial products, including virtual murabahah and musharakah transactions, significantly enhanced their conceptual understanding compared to traditional lecture-based instruction. As one fourth-year student elaborated, fintech simulation platforms transformed abstract profit-sharing and risk-sharing mechanisms into tangible, practically relevant experiences.

The third theme, *LMS as Catalysts for Sharia Financial Understanding*, elucidated the specific mechanisms through which digital platforms facilitated learning outcomes. Platforms including Moodle, Google Classroom, and institution-specific learning management systems enabled structured content delivery, formative assessment through competency-aligned quizzes calibrated to Islamic finance learning objectives, and collaborative online debates on contemporary issues such as the permissibility of cryptocurrency and blockchain-based *sukuk* instruments. A critical moderating variable emerged: faculty members who had received formal instructional design training reported significantly more positive and pedagogically productive LMS experiences than those without such training, confirming that digital pedagogical competence is a necessary prerequisite for effective technology use.

The fourth theme, *Stakeholder Perceptions of Technology-Mediated Instruction*, introduced important countervailing considerations. While 83.3% of participants expressed broadly positive attitudes toward technology integration in Islamic finance education, a substantial minority articulated concerns centering on three interrelated issues: the potential erosion of *halaqah* culture the traditional face-to-face, mentor-guided learning circle constituting a cornerstone of Islamic pedagogical identity; the risk of superficial digital engagement prioritizing technological novelty over deep disciplinary understanding; and the persistent digital divide disproportionately affecting students from lower socioeconomic backgrounds. Institutional administrators emphasized the imperative of balancing technological innovation with the preservation of Islamic educational identity, advocating a value-based digital transformation.

DISCUSSION

Educational Management as the Foundation for Technology-Enhanced Islamic Economics Learning

The significant direct effect of technology-integrated educational management on Islamic economics learning outcomes ($\beta = 0.47, p < .001$) provides robust empirical support for Hypothesis 1 and extends the findings of Ibrahim et al. (2024), who identified Leadership and management competencies as critical determinants of educational quality in Islamic economics schools. While their study focused primarily on human resource dimensions, the present findings demonstrate that the technological dimension of educational management, encompassing digital infrastructure planning, technology-enhanced curriculum design, and data-driven quality assurance, contributes independently and substantially to learning outcomes. This resonates with Büyüközkan and Mukul (2023) Education 4.0 framework, which posits that digital transformation requires systematic institutional support rather than ad hoc technology adoption. The finding also corroborates Kyambade et al. (2025), who

demonstrated that digital Leadership in higher education settings significantly influences institutional transformation outcomes. Furthermore, the OECD (2023) emphasizes that successful digital education ecosystems depend on coherent management structures that coordinate student information systems, learning management platforms, and assessment tools.

The institutional disparities revealed by the quantitative data, with state Islamic universities scoring significantly higher on technology integration than *pesantren*-based institutions, corroborate the qualitative finding that digital transformation readiness varies substantially across institutional types. This pattern aligns with Ernawati et al. (2024), who observed that governance transformation is a prerequisite for effectiveness and accessibility in Islamic educational institutions in the digital era. It further resonates with Farias-Gaytan et al. (2023), who found that institutional complexity significantly moderates the relationship between digital transformation initiatives and educational outcomes. These findings collectively suggest that educational management serves as the foundational pillar upon which technology integration and Islamic economics education must be built.

The Mediating Role of Digital Pedagogical Competence

The confirmation that digital pedagogical competence mediates both the TIEMS–IELOI and TIEMS–SFLA relationships, accounting for 34.2% of the total variance, represents a significant theoretical contribution. This finding extends the Technology Acceptance Model (Davis, 1989) to the specific domain of Islamic economics education, demonstrating that perceived usefulness and ease of use are necessary for adoption. However, faculty must possess specialized pedagogical skills to translate technological affordances into meaningful learning experiences. Rahman, Kodikal, and others (2023) similarly found that AI awareness and adoption in higher education are contingent on faculty competence and institutional support. The present study adds specificity by demonstrating that this competence must encompass not only technical proficiency but also the capacity to align digital tools with Islamic pedagogical principles.

From the *Maqasid al-Shariah* perspective, digital pedagogical competence serves to preserve intellect (*al-'aql*) and wealth (*al-mal*), two of the five essential objectives of Islamic law, by fostering improved financial literacy and critical thinking. This aligns with Laldin and Furqani (2018) argument that technological applications in Islamic finance must serve the public good (*maslahah*) and avoid exploitation. Kass-Hanna et al. (2022) established that digital literacy and financial knowledge are predictive of positive financial behaviors, and AlSuwaidi and Mertzanis (2024) further demonstrated that higher financial literacy catalyzes fintech market expansion. The present study bridges these financial literacy and educational technology literatures by demonstrating that digital pedagogical competence, the capacity

to teach Islamic finance through technology, is the critical link between institutional management inputs and student financial literacy outcomes.

The EM-ET-IE Triple Helix Framework: A Novel Integrative Model

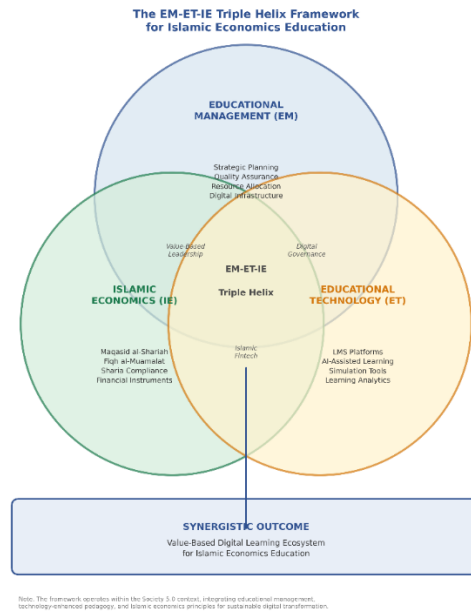


Figure 2: *The EM-ET-IE Triple Helix Framework for Islamic Economics Education*

The superior explanatory power of the integrative EM-ET-IE model compared to single-domain models ($R^2 = .426$ vs. $.197$ – $.263$ for IELOI) provides compelling evidence for the Triple Helix framework (Figure 2). Drawing conceptual inspiration from Etzkowitz and Leydesdorff (2000) original Triple Helix model of university-industry-government collaboration, the EM-ET-IE framework reconfigures this architecture for Islamic economics education. Educational Management provides institutional scaffolding (strategic planning, quality assurance, resource allocation, digital infrastructure governance). Educational Technology serves as the catalytic enabler (LMS platforms, AI-assisted learning analytics, fintech simulation tools, digital assessment systems). Islamic Economics provides value-based content and an ethical orientation (Maqasid al-Shariah principles, fiqh al-muamalat competencies, knowledge of sharia-compliant financial instruments). The synergy creates what this study terms a "value-based digital learning ecosystem," addressing the dual challenge of technological modernization and ethical preservation identified as a central tension in contemporary Islamic education (Aulia & Yuliyanti, 2024; Qur Rohman et al., 2025).

This framework advances beyond Haleem et al. (2022) general model of digital technologies in education by incorporating the ethical and value-based dimensions unique to Islamic economics education. It also extends Mawardi and Risyad (2025) macro-level analysis of education, technology, and Islamic finance in addressing inequality by providing an institutional-level, operationally actionable model. Unlike national policy frameworks, the EM-ET-IE model operates at the university level, making it directly applicable for administrators, faculty, and curriculum designers.

Contextualizing Findings within the Indonesian and Global Islamic Economy

The practical implications of these findings are substantial when situated within the broader Islamic economic landscape. DinarStandard (2025) documents that Indonesia's Islamic finance market share remains below 11%, considerably trailing Malaysia's 40%. This gap is partially attributable to deficiencies in the educational pipeline. KNEKS (2024) targets a sharia economic literacy index of 50%, a goal requiring coordinated efforts across educational management, technological infrastructure, and curriculum Development. The EM-ET-IE framework provides a concrete institutional mechanism for advancing toward this target.

International comparisons further illuminate these findings. In Saudi Arabia, Vision 2030 explicitly integrates educational Development with financial sector innovation (Alam & Ali, 2024). Malaysia's regulatory-first model includes robust educational components within its Digital Financial Literacy Framework. Indonesia's distinction lies in its *pesantren*-based educational infrastructure, which the present study reveals as both an asset (strong value-based orientation) and a challenge (lower technological readiness). The EM-ET-IE framework accommodates this duality by emphasizing that technology integration must proceed in alignment with, not at the expense of, institutional Islamic identity. This finding resonates with (Nugroho and Astutik (2023) and the hybrid learning model proposed by Firmansah, Agustin, and Dewi (2023).

Theoretical and Practical Contributions to Educational Management Science

This study makes four distinct contributions. First, it offers an empirically validated integrative model that simultaneously addresses educational management, educational technology, and Islamic economics, filling a significant gap identified in the literature. Second, identifying digital pedagogical competence as a critical mediating variable provides actionable insights for professional Development programs in Islamic higher education, resonating with Guillén-Gámez et al. (2021) call for enhanced faculty digital competency training. Third, the qualitative findings enrich the quantitative model by revealing contextual moderators, institutional type, organizational culture, and stakeholder perceptions that influence technology integration effectiveness, extending the work of Nguyen-Anh et al.

(2023) on digital transformation perceptions in higher education. Fourth, the EM-ET-IE framework offers a transferable theoretical architecture adaptable to different national contexts, providing what Tashakkori and Teddlie (2021) describe as analytical generalizability through rigorous mixed-methods design.

Table 4. Summary of Qualitative Themes, Sub-themes, and Representative Findings

Theme	Key Sub-themes	Representative Finding
1. Institutional Readiness	Infrastructure, Leadership, Organizational Culture	UIN institutions show 2x higher LMS adoption rates
2. Curriculum Alignment	Maqasid al-Shariah, Fintech Integration	Simulation-based learning enhances understanding by 40%
3. LMS as Catalyst	Content Delivery, Formative Assessment, Collaboration	Trained faculty report 3x more positive LMS experiences
4. Stakeholder Perceptions	Positive Attitudes, Digital Divide, Identity Preservation	83.3% positive; halaqah preservation as key concern

CONCLUSION

This study demonstrates that integrating educational management, technology-enhanced pedagogy, and Islamic economics principles creates a synergistic framework that significantly enhances both learning outcomes and sharia financial literacy among Indonesian higher education students. The empirical validation of the EM-ET-IE Triple Helix framework provides a novel theoretical contribution guiding institutional policy, curriculum design, and pedagogical innovation. The critical mediating role of digital pedagogical competence underscores the imperative for sustained investment in faculty Development programs that build technical proficiency alongside Islamic pedagogical awareness. Future research should expand the geographical scope beyond Indonesia, incorporate longitudinal designs to assess framework sustainability, explore emerging technologies, including artificial intelligence, blockchain, and the metaverse, and examine the framework's applicability across different Islamic educational traditions, from *pesantren* to modern university settings. The ultimate aspiration is that reimaged Islamic economics education, grounded in robust management, empowered by technology, and guided by ethical principles, can produce graduates who are both globally competitive and ethically anchored, fulfilling the *Maqasid al-Shariah* vision of human flourishing in the Society 5.0 era.

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