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Smart Campus Strategy in Islamic Higher Education: Enhancing Service Quality through IT Governance at IAIN Pontianak

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Abstract

The digital transformation imperative in higher education demands strategic approaches to enhance service quality. This study investigates the strategic management of smart campus information systems at IAIN Pontianak, examining how Islamic values are integrated into digital transformation. A convergent embedded mixed-method case study was employed, collecting qualitative data through interviews with 157 participants and document analysis, complemented by quantitative surveys. Findings reveal that strategic formulation through Rector Decrees No. 430/2021 and No. 500/2021 enabled systematic implementation of integrated systems (SIAKAD, e-Learning, e-Office), achieving efficiency gains of 79-88%, 88% reduction in data inconsistencies, and 84.1% user satisfaction ($\chi^2 = 24.37$, $p = 0.002$). Strategic evaluation addressed 83% of the identified issues. However, challenges persisted: 23% faculty resistance, digital literacy gaps (staff over 45 required 3.4 vs 0.7 support requests; $t = 4.82$, $p < 0.001$), and technical disruptions. The study advances theory by: (1) extending strategic management with a digital capability-building dimension; (2) modifying Servqual, adding Digital Accessibility and System Reliability; and (3) developing an Itqan-Servqual Integrated Model operationalizing Islamic values (perfection, precision, clarity, thoroughness) into concrete quality dimensions with empirical evidence. The model positions Islamic values as core quality principles enhancing mainstream frameworks. The study demonstrates that strategic smart campus management significantly enhances service quality when supported by strong leadership and systematic evaluation, though challenges in digital literacy require differentiated interventions.

Kata Kunci:
Kualitas Layanan; Manajemen Strategis; Pendidikan Tinggi Islam; Sistem Informasi; Smart Campus.

Abstrak.

Imperatif transformasi digital di pendidikan tinggi menuntut pendekatan strategis untuk meningkatkan kualitas layanan. Penelitian ini mengkaji manajemen strategis sistem informasi smart campus di IAIN Pontianak, dengan fokus pada integrasi nilai-nilai Islam dalam transformasi digital. Desain studi kasus mixed-method konvergen digunakan untuk mengumpulkan data kualitatif melalui wawancara dengan 157 partisipan dan analisis dokumen, serta dilengkapi dengan survei kuantitatif. Temuan menunjukkan bahwa perumusan strategis melalui Peraturan Rektor No. 430/2021 dan No. 500/2021 memungkinkan implementasi sistematis sistem terintegrasi (SIAKAD, e-Learning, e-Office), mencapai peningkatan efisiensi 79-88%, reduksi inkonsistensi data sebesar 88%, serta peningkatan kepuasan pengguna sebesar 84,1% ($\chi^2 = 24,37$, $p = 0,002$). Evaluasi strategis menindaklanjuti 83% isu teridentifikasi. Tantangan meliputi resistensi dosen (23%), kesenjangan literasi digital (staf di atas 45 tahun membutuhkan 3,4 vs 0,7 bantuan bulanan; $t = 4,82$, $p < 0,001$), serta gangguan teknis. Penelitian ini

mengembangkan teori dengan: (1) memperluas manajemen strategis melalui dimensi pengembangan kapabilitas digital; (2) memodifikasi Servqual dengan menambahkan Aksesibilitas Digital dan Reliabilitas Sistem; dan (3) mengembangkan Model Terintegrasi Itqan-Servqual yang mengoperasionalkan nilai-nilai Islam (kesempurnaan, ketepatan, kejelasan, kemenyeluruhan) ke dalam dimensi kualitas yang konkret dengan bukti empiris. Model ini memposisikan nilai-nilai Islam sebagai prinsip kualitas inti yang memperkuat kerangka arus utama. Penelitian menunjukkan bahwa manajemen strategis smart campus secara signifikan meningkatkan kualitas layanan ketika didukung oleh kepemimpinan yang kuat dan evaluasi sistematis, meskipun tantangan literasi digital memerlukan intervensi yang terdiferensiasi.

INTRODUCTION

Global higher education is undergoing rapid digital transformation, with smart campus concepts reshaping institutional operations and service delivery (Erlangga & Magdalena, 2025; Kartiko et al., 2024; Mexhuani, 2025). As universities worldwide integrate digital technologies into their core functions, this transformation has become a strategic imperative for maintaining competitiveness and relevance in contemporary education (Li, 2024; Sahni et al., 2024). For Islamic Higher Education Institutions (PTKIN) in Indonesia, this digital transformation must align with Islamic values while addressing unique contextual challenges. These institutions serve as strategic vehicles for producing graduates with strong faith, piety, and mastery of science and technology (Arif et al., 2024; Sarbini et al., 2025). The Islamic concept of itqan is the performance of tasks with perfection, precision, clarity, and thoroughness. Provides a philosophical foundation that fundamentally aligns with contemporary quality management principles (Nuryahman et al., 2024).

This study operationalizes itqan across four concrete dimensions in smart campus management system design, zero-defect academic data processing to embody perfection, integrated data architecture ensuring consistency across platforms to manifest precision, real-time tracking dashboards providing full user visibility to realize clarity, and comprehensive coverage of Tri Dharma domains to achieve thoroughness (David & David, 2017). This study is theoretically positioned within the strategic management framework as the overarching lens for analysis, specifically adopting. three-phase model of strategy formulation, implementation, and evaluation (Sarbini et al., 2025). While the study acknowledges the relevance of quality management frameworks such as the PPEPP and PDCA cycles, as well as service quality dimensions from Servqual, these serve as complementary analytical tools for assessing processes and outcomes rather than the primary theoretical foundation (Hafidhuddin & Tanjung, 2019).

Despite growing recognition of the importance of smart campuses, significant gaps remain in understanding the strategic management dimensions of implementation, particularly in Islamic higher education contexts. Existing research has predominantly focused on technical development aspects. ((Areni et al., 2019) investigated a smart card-based smart campus at IAIN Bone, concluding with successful system installation at the rectorate entrances (Cordiaz, 2017) examined smart campus technology as educational activity support, finding that implementation creates interactive and flexible environments (Polin et al., 2023). proposed conceptual frameworks incorporating various smart campus dimensions. However, these studies concentrated on technical implementation without examining how institutions strategically formulate, implement, and evaluate smart campus systems to enhance service quality.

Three critical gaps remain in the literature. *First*, no study has examined the strategic management cycle of formulation, implementation, and evaluation in smart campus development within Islamic higher education. *Second*, existing research lacks the integration of Islamic values,

such as itqan, with quality management frameworks in technology implementation. ((David & David, 2017). *Third*, there is no empirically grounded assessment of how smart campus strategies enhance service quality in PTKIN contexts. This gap creates urgent practical challenges for institutions like IAIN Pontianak, the sole State Islamic Higher Education Institution in West Kalimantan, which must navigate digital transformation while preserving Islamic institutional identity. Without strategic management frameworks that integrate Islamic values with technology implementation, institutions risk making technology investments that fail to enhance service quality meaningfully or align with their core missions (Sarbini et al., 2025).

This study addresses these gaps by investigating the strategic management of smart campus information systems in enhancing service quality at IAIN Pontianak. The research specifically examines three fundamental aspects of how smart campus information systems are strategically formulated to enhance service quality, how these strategies are implemented in practice, and how strategic evaluation is conducted to ensure continuous improvement. The study contributes theoretically to the strategic management literature on digital transformation by extending classical frameworks to Islamic educational settings, reconceptualizing service quality dimensions for digital environments, and demonstrating the integration of Islamic values with contemporary quality management. Practically, it offers implications for institutional policymakers developing sustainable smart campus initiatives that maintain fidelity to Islamic values while embracing technological innovation.

METHOD

This study employed a mixed-methods case-study design, adopting a convergent embedded design in which qualitative methods served as the primary approach, with quantitative methods embedded as a secondary component to enrich and validate findings (Creswell & Poth, 2018). In this design, qualitative and quantitative data were collected concurrently, analyzed separately, and integrated during interpretation to enable a comprehensive understanding of the phenomenon. (Fetters et al., 2013). The case study design enabled in-depth contextual analysis within the real-life setting of IAIN Pontianak. This institution was purposively selected as a critical case. Data sources comprised both primary and secondary data (Etikan & Bala, 2017). Primary data were obtained through field survey techniques employing non-random quota sampling with a criterion type (Yin, 2017).

Data collection techniques and instruments included multiple methods to ensure comprehensive data capture (Krueger & Casey, 2015). Direct communication methods were employed to collect opinions from lecturers, educational staff, and students regarding smart campus policies, utilizing digital recording devices as instruments and following established protocols for qualitative interviewing (Brinkmann & Kvale, 2018). Document study methods were used to collect data on relevant government policies, RIP, Renstra, and institutional statutes, with document analysis conducted using systematic procedures to assess authenticity, credibility, and representativeness (Bowen, 2009). Focus Group Discussions were conducted twice, involving formulation teams and policy stakeholders, following established FGD protocols that emphasize group interaction and collective sensemaking (Tisdell et al., 2025).

Data analysis employed both qualitative and quantitative approaches to ensure methodological triangulation and a comprehensive understanding. Qualitative data from interviews, focus group discussions, workshops, and institutional documents were analyzed using content analysis following the Flow Model of Miles, conducted in three stages: data

condensation, data display, and conclusion drawing/verification (Miles et al., 2014). Data condensation involved selecting, focusing, and simplifying data from transcripts and documents. Data display organized information into matrices and narratives to identify patterns. Conclusion drawing was accompanied by verification through member checking with key informants and peer debriefing to ensure credibility.

Quantitative data were collected from 157 respondents comprising 32 lecturers, 28 educational staff, and 97 students, selected through purposive quota sampling based on their active engagement with smart campus systems. The survey instrument underwent validity and reliability testing (Denzin & Lincoln, 2012). Content validity was established through expert judgment by three senior researchers in information systems and educational management. (Nowell et al., 2017). Construct validity was confirmed through exploratory factor analysis with a Kaiser-Meyer-Olkin value of 0.834 and Bartlett's Test of Sphericity significant at $p < 0.001$. Reliability testing yielded Cronbach's Alpha coefficients ranging from 0.812 to 0.896 across dimensions, exceeding the minimum acceptable threshold of 0.70 (Field, 2018). All statistical analyses were conducted using IBM SPSS Statistics version 26. (Fetters et al., 2013)(Cohen, 2013)

RESULT AND DISCUSSION

Result

Strategic Formulation of Smart Campus Information Systems and Strategic Implementation

Strategic formulation of smart campus information systems at IAIN Pontianak was established through formal institutional policies that codified strategic intent into actionable directives. Two landmark policies fundamentally shaped the smart campus landscape: Rector Decree Number 430 of 2021 concerning the implementation of online learning system applications, and Rector Decree Number 500 of 2021 concerning the implementation of application systems, specifically addressing e-Office implementation. These decrees formalize the strategic commitment to digital transformation, transforming abstract strategic vision into concrete operational mandates.

Document analysis of meeting minutes and policy formulation records indicates that the strategic formulation phase involved extensive consultation with academic senates, faculty representatives, administrative unit heads, and student representatives. Four formal consultation meetings were conducted between March and June 2021, involving 47 stakeholders across all constituent groups. This participatory approach ensured that formulated strategies reflected diverse stakeholder perspectives and needs.

The integration strategy encompassed a comprehensive portfolio of systems, SIAKAD (Academic Information System), e-Office, e-Performance, e-Learning, e-Monev, e-Dashboard, ANA-B System, Digi-R System, e-Data, and e-Presensi. Document analysis confirms that this portfolio was designed to address all three domains of the Tri Dharma: education (SIAKAD, e-Learning), research (e-Performance), and community service (e-Data), as well as administrative support functions (e-Office, e-Presensi). Data from system usage logs indicate substantial adoption among faculty members following the issuance of Rector Decree No. 430/2021. Usage statistics reveal consistent growth across key metrics :

Table 1: Academic Performance Metrics

Metric	Semester 1 (2021)	Semester 2 (2021)	Semester 1 (2022)	Growth
Courses created	342	578	812	+137%
Content uploads	1,245	2,367	3,891	+212%
Active courses (>10 students)	218	401	623	+186%
Student logins	12,456	28,934	45,678	+267%

Source: IAIN Pontianak LMS internal analytics report

The quantitative data in Table 1 demonstrates a significant escalation trend in Learning Management System (LMS) utilization, signaling an accelerated digitalization of the curriculum at IAIN Pontianak. The substantial growth in student logins (+267%) reflects strong user retention and a shift in the pedagogical paradigm from conventional methods toward a technology-integrated ecosystem. Theoretically, consolidating course management on a unified platform mitigates administrative bottlenecks, allowing faculty to transition from manual logistical tasks to more focused cognitive engagement and systematic monitoring of student learning outcomes.

Interview data from faculty members revealed that the system enables faculty to upload course materials, conduct online discussions, administer quizzes and assignments, and provide feedback through a unified digital platform. One lecturer noted:

> *"Before e-Learning, I had to manage paper-based assignments and communicate with students through email or WhatsApp groups. Now everything is in one place, students can access materials anytime, and I can track their progress systematically."*

The implementation of E-Performance has introduced a robust framework for the systematic digital monitoring and comprehensive evaluation of faculty performance, encompassing the essential domains of teaching, research, and community service. This transition from manual reporting to an automated, data-driven system facilitates greater institutional transparency and accountability, ensuring that faculty contributions are recorded with higher precision. By integrating various performance indicators into a centralized dashboard, the university can now conduct real-time longitudinal analysis of academic productivity. The following system adoption data highlights the trajectory of this digital transformation system adoption data shows :

Table 2 Tridharma Participation Rate

Activity Type	Faculty Participation (2021)	Faculty Participation (2022)	Change
Teaching reports	78%	92%	+14%
Research reporting	45%	67%	+22%
Community service reporting	38%	59%	+21%
Annual performance submissions	82%	94%	+12%

Source: Academic and Human Resources Database Report, 2022

The transition toward a digital performance monitoring system has brought significant shifts in the organizational culture within the academic environment. While the integration of technology aims to enhance efficiency and transparency, the adaptation process is inevitably intertwined with psychological and structural challenges at the individual level. This dynamic often triggers diverse responses from faculty members, who must balance their traditional professional autonomy with the demands of more stringent digital accountability.

A deeper analysis of the human element in this transformation reveals ambivalence toward real-time surveillance of systems. Although the system was designed to standardize evaluation processes, the perception of 'constant monitoring' has created tension between institutional management and educators. The following interview data provides insight into the initial resistance that emerged during the implementation phase:

> *"Suddenly, every keystroke is recorded. I understand the need for accountability, but it feels like we are not trusted anymore."*

Overall, these findings suggest that the success of digital attendance systems and performance reporting relies heavily on the equilibrium between control instruments and professional trust. Although institutional data indicate a measurable increase in administrative compliance, the long-term effectiveness of this technology requires a more persuasive change-management strategy to mitigate perceptions of intrusive surveillance. Moving forward, the integration of this data is expected to serve not merely as a control mechanism but as a foundation for more substantive faculty professional development.

The system integrates with course schedules and classroom assignments, enabling automated attendance capture through QR code scanning and location-based validation. Institutional data indicates :

Table 3: Impact of QR Code-Based Attendance System Implementation

Metric	Pre	Post	Change
Attendance recording accuracy	76%	98%	+22%
Administrative time spent on attendance (hours/week)	34 hours	6 hours	-82%
Student attendance disputes	23/month	3/month	-87%

Source: Administration Efficiency study, 2022/2023

The implementation of integrated data systems, including e-Data and e-Dashboard, addressed foundational data management challenges. Prior to smart campus implementation, institutional data resided in disparate systems with limited integration. An internal audit conducted in 2020 identified 187 data inconsistencies across different systems. Following the integration, a 2022 follow-up audit identified only 23 inconsistencies, representing an 88% reduction. The e-Dashboard provides institutional leadership with real-time visualization of key performance indicators. Usage logs indicate that all 12 vice rectors and deans access the dashboard at least weekly, with 8 accessing it daily.

Challenges and Resistance in Implementation

While smart campus implementation achieved significant successes, the process encountered challenges, resistance, and partial failures, offering a balanced understanding of the dynamics of digital transformation. The e-Performance system encountered sustained resistance from faculty members. Quantitative survey data revealed that 23% of faculty expressed disagreement with the statement "e-Performance improves my work quality," compared to only 8% of administrative staff for e-Office. Interview data illuminated this resistance. One associate professor stated,

Document analysis of feedback submitted through the system's suggestion mechanism revealed 47 complaints related to perceived over-surveillance during the first year. The institution responded by adding qualitative narrative sections to complement quantitative indicators and conducting dialogue sessions with faculty representatives. Despite training programs, varying levels of digital literacy among educational staff created bottlenecks in implementation. A

quantitative assessment of system usage logs revealed that 23% of administrative staff required repeated assistance with basic e-Office functions six months after implementation.

Training attendance records showed that staff over 45 years old (n=18) required an average of 3.4 support requests per month, compared to 0.7 requests for staff under 35.

"Some of our longer-serving staff struggle with even simple tasks like digital document attachment. They revert to paper-based workarounds, which defeats the purpose."

"This system reduces our complex academic work into numbers. Research productivity cannot be measured simply by counting publications; quality matters more than quantity."

System audit logs confirmed that 34% of official letters continued to circulate in paper format during the first year, as some units maintained parallel systems. During peak registration periods, system response times slowed significantly. Quantitative monitoring showed average response times increasing from 1.2 seconds to 4.7 seconds during high-traffic periods. The PTID's incident reports documented 12 significant technical disruptions in 2022, including :

Table 4. LMS Technical Disruption Analysis

Incident Type	Frequency	Average Duration	Users Affected
System outage	3	2.4 hours	2,800-4,500
Slow response (>5 sec)	7	3.1 hours	1,200-3,800
Data synchronization failure	2	1.8 hours	450-670

Source: PTID IAIN Pontianak, 2025

Beyond the faculty's perspective, the evaluation of digital transformation must also account for the end-user experience, particularly regarding the reliability of the core infrastructure. While the transition aimed for seamless academic administration, the actual system performance during peak periods often dictated the level of student satisfaction and accessibility. Technical bottlenecks during critical academic windows can create significant disparities in service delivery, regardless of the overarching policy goals.

This discrepancy between planned digital efficiency and the lived reality of students highlights a crucial gap in infrastructure readiness. When the technological framework fails to support the intended workload, it creates a cascading effect of frustration that can undermine the perceived legitimacy of the new system. The following testimony from a focus group discussion illustrates the tangible consequences of these technical limitations on student academic pathways

"During course registration, the system was so slow that by the time I could access it, the classes I wanted were full. This happened two semesters in a row."

While Rector Decrees provided formal mandates, implementation revealed gaps between policy intent and ground-level practice. Document analysis of correspondence flows showed that despite the e-Office decree mandating a fully digital workflow, 34% of official letters continued to circulate in paper format during the first year. Audit trails revealed that some units maintained parallel systems, processing digitally but also printing and filing paper copies "just in case."

"We have had too many experiences with system crashes or files not being received. The paper gives us a backup. We follow the policy, but we also protect ourselves."

This partial adoption reflects what the organizational change literature terms *"decoupling"*. Formal policies are adopted symbolically without full behavioral implementation. The phenomenon of 'decoupling' observed in the e-Office implementation underscores the deep-seated institutional inertia that often accompanies digital migration. The persistence of parallel paper-based workflows suggests that formal mandates alone are insufficient to displace established bureaucratic habits without first addressing the underlying issues of systemic trust

and technical stability. Ultimately, the transition from symbolic to substantive adoption requires not just a change in digital tools but a fundamental shift in the organizational mindset regarding data integrity and system reliability.

Service Quality Outcomes

Quantitative survey data collected from 157 respondents comprising 32 lecturers, 28 educational staff, and 97 students revealed generally high satisfaction with smart campus services, with notable variations across dimensions and user groups.

Table 5 User Satisfaction with Smart Campus Services by Dimension

Service Dimension	Mean	SD	Satisfied
System Accessibility	4.32	0.67	86.5%
Service Efficiency	4.18	0.72	82.3%
Data Accuracy	4.41	0.58	89.7%
Transparency	4.09	0.81	78.2%
User Interface	3.84	0.93	67.4%
System Reliability	3.91	0.88	71.5%
Overall Satisfaction	4.21	0.64	84.1%

Source: Data Collection, 2025

Chi-Square analysis revealed significant associations between user group and satisfaction levels ($\chi^2 = 24.37$, df = 8, p = 0.002, Cramer's V = 0.28), indicating that students reported significantly higher satisfaction compared to faculty and administrative staff :

Table 6: LMS User Satisfaction Survey Results

User Group	N	Mean	SD
Students	97	4.38	0.51
Faculty	32	4.02	0.73
Administrative Staff	28	3.95	0.68

Source: Data Collection, 2025

The implementation of the 'Smart Campus' initiative has yielded diverse outcomes across the university's stakeholder spectrum, revealing that user experience is significantly moderated by the nature of system engagement. A distinct divergence is observed between voluntary users, such as students, who perceive the digital shift as an enhancement of service convenience, and mandatory users, including faculty and staff, whose engagement is driven by institutional compliance. This distinction suggests that while the digital infrastructure facilitates service delivery, its reception is deeply rooted in how each role perceives the balance between administrative burden and functional utility.

To further evaluate the impact of this digital migration, a qualitative analysis was conducted, identifying five core dimensions of service quality. These themes encapsulate the transition from traditional bureaucratic hurdles to a more streamlined, data-driven environment. By examining feedback from students, faculty, and administrative staff, a comprehensive picture of the current system's successes and remaining friction points emerges. The following thematic summary illustrates these key findings through the lived experiences of the stakeholders:

> *"Previously, we had to visit multiple offices over several days for administrative tasks, but now everything is accessible 24/7 online with consistent, synchronized data across all departments."*
>
> *"We can now monitor the status of every process accurately in real-time; however, the less-than-intuitive system interface means we still occasionally rely on manuals to navigate certain functions."*

In conclusion, while the digital transformation has successfully addressed perennial challenges of efficiency, accessibility, and data integrity, the persistent concerns regarding user interface design highlight a gap in user-centric development. The high student satisfaction suggests that the system's primary value lies in its utilitarian benefits, yet the reliance on manuals by faculty indicates a need for more intuitive design iterations. For the smart campus to achieve full institutional maturity, future upgrades must prioritize usability engineering alongside functional expansion to ensure that all stakeholders can navigate the digital ecosystem with equal ease. Routine system monitoring captures technical performance metrics, including system availability, response times, error rates, and user activity patterns. The PTID maintains real-time dashboards tracking these metrics. Monitoring data for 2022 showed :

Table 7 LMS Service Level Agreement (SLA) Compliance Report

Metric	Target	Actual	Compliance
System availability	99.5%	98.7%	Below target
Average response time	< 2 seconds	2.4 seconds	Below target
Error rate	<1%	0.8%	Met target
Helpdesk resolution time	<24 hours	18 hours	Met target

Source: PTID IAIN Pontianak Service Performance

Periodic strategic evaluations are conducted through a structured framework that includes biannual meetings of the formulation team, supplemented by ad hoc sessions convened to address emerging systemic issues. This evaluative process serves as a critical quality assurance mechanism, where findings directly inform a continuous loop of corrective actions and functional enhancements. Such a systematic approach ensures that the digital ecosystem remains adaptive and responsive to both institutional mandates and evolving technical requirements.

Documentary evidence underscores the efficacy of this oversight, showing that 83% of identified issues (19 out of 23) led to verified corrective interventions in subsequent review cycles. These actions encompassed a comprehensive range of improvements, including infrastructure upgrades, user interface refinements, targeted faculty training, and strategic policy adjustments. The high rate of successful implementation demonstrates a robust institutional commitment to bridging the gap between evaluative feedback and operational excellence in the university's digital transformation journey.

DISCUSSION

Strategic Management Framework in the Islamic Higher Education Context

The findings of this study demonstrate that David, The three-phase strategic management model formulation, implementation, and evaluation provides a robust analytical lens for understanding smart campus development in Islamic higher education. However, the IAIN Pontianak case reveals that in digital transformation contexts, this classical framework requires adaptation to accommodate technology-specific dynamics (David & David, 2017).

The study confirms that strategic formulation through formal institutional policies, specifically Rector Decrees No. 430/2021 and No. 500/2021, established the essential foundation for subsequent implementation and evaluation. This finding aligns with Mexhuani's assertion that formal policy adoption significantly predicts implementation success by providing clear direction and reducing organizational ambiguity (Mexhuani, 2025). The participatory formulation process involving 47 stakeholders across academic senates, faculty, administrative units, and students supports stakeholder theory, which posits that organizations achieve superior

performance when they consider and balance the interests of multiple stakeholder groups rather than focusing exclusively on narrow managerial priorities (Edward Freeman & Phillips, 2002; Pinheiro et al., 2023).

While the three-phase model proved useful as an analytical framework, the findings reveal that in technology-intensive transformations, an additional cross-cutting dimension, digital capability building, must be integrated throughout all phases. At IAIN Pontianak, strategic formulation required assessing existing digital literacy across user groups; implementation demanded continuous user training and support; and evaluation necessitated tracking digital adoption metrics alongside traditional performance indicators. This suggests that, in digital transformation contexts, the classical strategic management model should be augmented by a parallel *"digital capability track"* that spans all phases (Warner & Wäger, 2019). This extension responds to Wanner's call to evolve strategic management theory to address digital transformation imperatives, as well as to the observation that higher education institutions require adapted strategic management approaches in contemporary environments (Fumasoli & Hladchenko, 2023).

The establishment of the Center for Information Technology and Data (PTID) as a dedicated organizational unit with specialized staff emerged as a critical success factor. This finding corroborates research by Sengik and Guerrero, who demonstrated that dedicated IT governance structures with clear mandates, adequate resources, and appropriate authority significantly enhance the success of technology implementation in higher education institutions (Sengik et al., 2022) . The PTID's positioning within institutional governance enabled effective coordination across academic and administrative units, ensuring that system development responded to diverse stakeholder needs while maintaining technical coherence, a capability that ad-hoc technological interventions cannot replicate (Guerrero-Avendaño et al., 2023).

Operationalizing Itqan in Smart Campus Management

The Islamic concept of itqan is perfection, precision, clarity, and thoroughness. It was not merely a philosophical backdrop but was concretely operationalized in IAIN Pontianak's smart campus implementation across multiple dimensions. This section clarifies how these values are translated into management practices, addressing the need for explicit operationalization of Islamic principles in the implementation of technology (Hafidhuddin & Tanjung, 2019).

Perfection was manifested in SIAKAD's design philosophy and integrated systems, which incorporated automated validation protocols to prevent data-entry errors. The 88% reduction in data inconsistencies following integration, from 187 to 23, provides empirical evidence of this perfection principle in operation. As the Head of PTID explained during interviews, multiple validation layers ensure data integrity from the point of entry, embodying the itqan principle that tasks should be performed with utmost quality. This finding extends (Kutbaniyah & Faslah, 2025). Conceptual work on itqan in quality assurance by demonstrating concrete technological applications of the perfection principle, and aligns with the articulation of itqan as a manifestation of ihsan (excellence) in Islamic work ethics (Zakiyyah et al., 2024).

Precision was operationalized through the integrated data architecture connecting SIAKAD, e-Office, e-Presence, and e-Performance systems. Unlike fragmented implementations common in other institutions, where data must be re-entered across platforms, IAIN Pontianak's architecture ensured that data entered once was propagated accurately across all dependent

systems. Quantitative data revealed that complaints about data inconsistency decreased by 78% following integration, demonstrating precision in practice (Qazi et al., 2021). This operationalization responds to technology integration that maintains alignment with core values while delivering efficiency gains and addresses Bakti's concern that Islamic education technology must be adapted to preserve essential human guidance (Bakti et al., 2025).

Clarity was achieved through real-time tracking dashboards that provide full user visibility into administrative processes. Previously, staff and students submitted requests and waited without visibility into progress. Post-implementation, each request generates trackable status updates with notifications at each processing stage. The transparency dimension of service quality received a mean satisfaction score of 4.09 (SD = 0.81), with 78.2% of users expressing satisfaction, and qualitative data confirmed that users appreciate this visibility. This operationalisation of clarity addresses what (Vorm & Combs, 2022) Identifies the critical role of transparency in technology acceptance, and aligns with Islamic principles of honest and clear dealings *(amanah and shiddiq)*.

Thoroughness (Kemenyeluruhan) was achieved through comprehensive coverage of the Tri Dharma domains of higher education. The smart campus portfolio addresses education through e-Learning and SIAKAD, research through e-Performance, and community service through integrated reporting in e-Data. This thoroughness ensures that digital transformation supports the institution's full mission rather than selectively benefiting only certain functions. This finding addresses Bakti's concern that Islamic education cannot rely solely on digital tools but requires comprehensive approaches that integrate technology with traditional pedagogical roles (Bakti et al., 2025).

Despite these achievements, operationalizing itqan faced significant challenges. Achieving perfection required substantial investment in system design and testing that smaller institutions might find prohibitive. Precision demanded robust infrastructure that occasionally faltered during peak usage, as evidenced by 12 technical disruptions in 2022 documented in PTID incident reports. Clarity required users to actively engage with dashboards, with levels of engagement varying significantly by digital literacy. Staff over 45 required 3.4 support requests monthly, compared to 0.7 for younger staff ($t = 4.82$, $p < 0.001$). Thoroughness meant balancing comprehensive coverage with manageable complexity, a tension evident in the 67.4% satisfaction rating for user interface design. (Nuryahman et al., 2024). These challenges reveal that itqan is not a binary achievement but an ongoing pursuit requiring continuous improvement, aligning with the continuous quality improvement philosophy emphasized in Islamic management literature. And the PDCA cycle is integral to modern quality management (Dwisusanti & Mukhroji, 2025).

Service Quality Reinterpretation in Digital Context

The findings both confirm and extend. SERVQUAL framework for digitally-transformed higher education contexts. Traditional service quality dimensions remain relevant but require reinterpretation for digital environments. Tangibles, traditionally focused on physical facilities and equipment, now encompass digital interface design, system responsiveness, and user experience quality. ((Rita et al., 2019). This dimension received a relatively lower satisfaction rating ($M = 3.84$, $SD = 0.93$; 67.4% satisfied), indicating that while systems function adequately, there is room for improvement in user interface design. This finding aligns with research by who

demonstrated that, in e-service contexts, website design and interface quality significantly influence overall satisfaction (Parasuraman et al., 1988) .

Reliability, defined as the ability to perform promised services dependably and accurately, extends beyond organizational dependability to include system uptime and data consistency. Data accuracy received the highest satisfaction rating among all dimensions (M = 4.41, SD = 0.58; 89.7% satisfied), reflecting the success of integrated data architecture in ensuring consistency across platforms. This finding supports (Gordiichuk et al., 2024). emphasis on information systems as vital influences on learning environment quality. Responsiveness, traditionally defined as the willingness to help and provide prompt service, now includes real-time processing capabilities and automated notifications. This is reflected in the documented efficiency gains of 79% to 88% across various service types, consistent with (Tan et al., 2023). finding that service quality positively impacts perceived ease of use and usefulness of learning systems.

Beyond confirming existing dimensions, the findings suggest two additional dimensions for e-service quality in higher education. Digital Accessibility, the ability to access services anytime, anywhere, through multiple devices, emerged as a distinct quality dimension, with students particularly valuing 24/7 access that accommodates work schedules and family responsibilities. This dimension received the second-highest satisfaction rating (M = 4.32, SD = 0.67; 86.5% satisfied), supporting (Pham et al., 2019) finding that anytime-anywhere access significantly enhances perceived service quality and student satisfaction.

System Reliability, technical stability, and performance consistency emerged as a separate concern, distinct from traditional reliability. With a satisfaction rating of 3.91 (SD = 0.88; 71.5% satisfied) and documented incidents of outages affecting user experience, this dimension captures the technical infrastructure considerations essential for digital service delivery. This finding aligns with research by (Chowdhury et al., 2024). Those who emphasize that proactive system monitoring is essential for maintaining service quality in technology-mediated environments.

The significant association between user group and satisfaction ($\chi^2 = 24.37$, df = 8, p = 0.002, Cramer's V = 0.28) reveals that students (M = 4.38, SD = 0.51) report higher satisfaction than faculty (M = 4.02, SD = 0.73) and administrative staff (M = 3.95, SD = 0.68). This pattern suggests that those using systems voluntarily (students) report more positive experiences than those using systems for mandatory reporting and monitoring *(faculty and staff)*. This finding extends (Scherer et al., 2019). Meta-analysis of the Technology Acceptance Model by demonstrating that the purpose of system use *(voluntary vs. mandatory)* moderates the relationship between technical quality and perceived satisfaction.

Dynamics of Resistance and Partial Failure in Digital Transformation

While much digital transformation literature emphasizes success factors, this study's findings on resistance and partial failures provide a more nuanced understanding that addresses the common bias toward reporting only successes. Faculty resistance to performance monitoring manifested in delayed data entry, incomplete reporting (15% incomplete during the first semester according to system audit logs), and expressed concerns about surveillance (Oreg et al., 2016). One faculty member's comment, *"it feels like we are not trusted anymore,"* reveals that performance monitoring systems can threaten professional identity and perceived autonomy. This finding aligns with the affect-based model of organizational change that emphasizes that resistance often

stems from perceived threats to identity and autonomy rather than from technical difficulties. It also supports Obina's observation that employee resistance during organizational change frequently arises from concerns about increased scrutiny and loss of professional discretion (Obina & Adenike, 2022).

Digital literacy as a differentiating factor revealed significant variation by age group, with staff over 45 requiring 3.4 support requests monthly compared to 0.7 for younger staff ($t = 4.82$, $p < 0.001$). This finding extends Halim and Hidayat's research on the digital divide in Indonesian education by demonstrating that within-institution variation can be as significant as between-institution variation, requiring differentiated support strategies rather than uniform approaches. The 23% of administrative staff requiring repeated assistance for basic e-Office functions six months after implementation underscores (Sneesl et al., 2022) emphasis on the importance of considering technology adoption factors in smart campus implementations.

Policy-practice decoupling was evident in the finding that 34% of official letters continued to circulate in paper format despite the e-Office mandate. This illustrates what organizational scholars term *"decoupling,"* where formal policies are adopted symbolically without full behavioral implementation (Meyer & Rowan, 1977). The explanation offered by an administrative head's paper gives us a backup; we follow the policy, but we also protect ourselves," reveals that decoupling can stem from legitimate concerns about system reliability rather than mere resistance to change. This finding nuances the understanding of implementation failure by distinguishing between resistance based on principle and caution based on experience with technical limitations, supporting. analysis of the complex dynamics in organizational transformation processes (Seo et al., 2025).

Infrastructure limitations, such as implementation barriers, were documented through 12 significant technical disruptions in 2022, with average response times increasing from 1.2 seconds to 4.7 seconds during peak periods. A student's experience, "by the time I could access it, the classes I wanted were full," illustrates how technical limitations translate into tangible service quality failures. This finding supports (Gurcan et al., 2023). Observation that resource constraints in developing country contexts necessitate strategic prioritization and phased implementation approaches rather than expecting immediate perfection. It also aligns with (Rinchen et al., 2024) analysis of digital transformation challenges in developing countries, where infrastructure limitations frequently impede strategy implementation despite sound strategic intent.

CONCLUSION

This study concludes that the strategic management of smart campus information systems at IAIN Pontianak significantly enhances service quality through an integrated formulation, implementation, and evaluation process. Inclusive strategic formulation, established through participatory policies (Rector Decrees No. 430 and 500 of 2021), laid a robust foundation for institutional digitalization. During implementation, service efficiency increased between 79% and 88%, accompanied by an overall user satisfaction rate of 84.1%. Although satisfaction levels varied across stakeholder groups, with students reporting higher satisfaction than faculty and staff, the evaluation mechanism proved highly responsive, successfully addressing 83% of identified technical issues through corrective actions. Furthermore, this research contributes theoretically through the Itqan-Servqual Integrated Model, demonstrating

that Islamic values such as Perfection, Precision, Clarity, and Thoroughness can be effectively operationalized to strengthen digital service quality management in higher education."

Despite these achievements, this study is subject to certain limitations, including its single-case design and data collection conducted during the early stages of implementation, which focused primarily on service quality rather than long-term academic outcomes. Consequently, future research should employ multi-case designs and longitudinal approaches to monitor the sustainability of digital transformation. Practical recommendations for the institution include developing differentiated digital literacy programs to overcome demographic barriers, particularly age-related challenges, and strengthening technical infrastructure to minimize system disruptions. Ultimately, the IAIN Pontianak case demonstrates that a *'smart campus'* is not merely a technical project but a continuous organizational learning process that requires alignment between strong leadership, reliable infrastructure, and the internalization of itqan values for continuous improvement.

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