

Attendance Information System Success in Mandatory Use Contexts: An Integrated TAM–DeLone and McLean–TPB Framework in Higher Education

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Received:

March 11, 2026

Revised:

July 15, 2026

Accepted:

September 2, 2026

Published:

October 24, 2026

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DOI:

10.63158/journalisi.v8i5.1754

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Abstract. Mandatory information systems present a fundamental challenge to IS success theory: institutional enforcement guarantees usage but not acceptance, rendering conventional adoption metrics inadequate in non-voluntary contexts. This study examines the determinants of success of a mandatory mobile attendance application at a single higher education institution, investigating how technical quality dimensions and behavioral factors jointly produce user satisfaction and perceived organizational benefit. An integrated TAM–DeLone and McLean–TPB framework was tested using PLS–SEM on data collected from 140 university lecturers through an online survey. All eight hypotheses were empirically tested; seven were supported. Service quality was the strongest predictor of perceived usefulness ($\beta = 0.399$), followed by system quality ($\beta = 0.317$) and information quality ($\beta = 0.149$). Perceived usefulness ($\beta = 0.592$) and social influence ($\beta = 0.368$) significantly shaped attitude, while perceived behavioral control exerted no significant effect ($\beta = -0.073$, $p = 0.299$). Attitude strongly predicted user satisfaction ($\beta = 0.825$), which in turn predicted perceived net benefits ($\beta = 0.731$). This study contributes an empirically tested integrated TAM–DeLone and McLean–TPB model within a mandatory-use IS context. The findings suggest that IS success is mediated principally through psychological mechanisms rather than technical attributes alone, and that user attitude is the ultimate gateway to perceived organizational benefit. Future research may extend this framework to multi-institutional and longitudinal settings, incorporating privacy concern and perceived surveillance as additional constructs.

Keywords: higher education, information system success, mandatory use, perceived usefulness, PLS–SEM

1. INTRODUCTION

The digitalization of administrative services in higher education has become a strategic necessity to enhance efficiency, accuracy, and transparency in institutional operations. One important implementation is the adoption of mobile-based attendance systems to streamline faculty administrative processes. In one university, a mobile attendance application has been deployed to manage attendance activities, including check-in, check-out, and attendance reporting. The application provides attendance history monitoring accessible to both lecturers and administrators and serves as a basis for lecturer incentive and remuneration calculation, making accurate and consistent usage critical for both administrative and financial processes. The use of this system is mandated through an official institutional policy, making it a compulsory (mandatory) system for all lecturers.

Despite its mandatory nature, the successful implementation of such systems cannot be taken for granted. In practice, the early adoption of the application was marked by various forms of resistance among lecturers, including perceived inconvenience, concerns about system reliability, and reluctance in daily usage. This phenomenon highlights a critical issue: mandatory usage does not necessarily imply successful system adoption [1], [2]. Instead, it suggests a potential misalignment between institutional policy and user acceptance [3], [4], raising concerns about the actual effectiveness and success of the system.

Existing studies in information systems have extensively examined technology adoption and system success using established models such as the Technology Acceptance Model (TAM) and the DeLone and McLean IS Success Model. Prior research has demonstrated that perceived usefulness, perceived ease of use, and system quality significantly influence user acceptance and satisfaction [5], [6]. More recent studies [7], [8], [9], [10], [11] further confirm the importance of integrating behavioral and technical factors in explaining system success. More recently, the Theory of Planned Behavior (TPB) has been integrated into IS research to account for the social and volitional dimensions of technology use, through the inclusion of constructs such as subjective norm and perceived behavioral control, which extend the explanatory scope of technology acceptance beyond purely cognitive factors [12].

Despite this rich theoretical foundation, a critical gap persists. The overwhelming majority of TAM and DeLone and McLean studies are conducted in voluntary usage contexts, where behavioral intention and actual use serve as the primary indicators of system success [13], [14]. In voluntary settings, this logic is sound: users who find a system valuable choose to use it, and usage behavior therefore legitimately signals acceptance. In mandatory settings, however, this assumption collapses entirely. Users interact with the system not because they perceive value in doing so, but because institutional policy compels them to, rendering usage frequency and compliance rates artifacts of enforcement rather than indicators of genuine acceptance [4]. The pertinent question in mandatory use context shifts from whether users engage with the system to whether they perceive it as valuable, report satisfaction with their experience, and realize meaningful benefits from its use. User satisfaction and perceived net benefits therefore emerge as more theoretically appropriate indicators of IS success in mandatory environments [2], [12], a position that this study adopts as its conceptual foundation.

Therefore, this study aims to examine how system quality, information quality, and service quality influence perceived usefulness, and how perceived usefulness, social influence, and perceived behavioral control shape user attitude, which in turn determines user satisfaction and perceived net benefits, in a mandatory use context. The contributions of this study are threefold. First, theoretically, this study extends the understanding of information system success by integrating constructs from the TAM, DeLone and McLean, and TPB within a mandatory use context. Second, empirically, it provides evidence from a real-world implementation of an internal institutional system, highlighting the dynamics of user resistance and acceptance. Third, practically, the findings offer insights for higher education institutions in designing and implementing mandatory systems that are not only enforced by policy but also accepted and valued by users.

2. METHODS

2.1. Research Model and Hypotheses Development

This study integrates three major theoretical frameworks in information systems research, namely the DeLone and McLean Information System Success Model, the Technology Acceptance Model (TAM), and the Theory of Planned Behavior (TPB), to explain

the factors influencing system acceptance, user satisfaction, and the benefits derived from system use. DeLone and McLean model emphasizes that system quality, information quality, and service quality are key determinants of information system success, ultimately leading to benefits for both individuals and organizations [8]. Meanwhile, TPB explains that an individual's attitude toward a behavior is influenced by cognitive, social, and perceived control factors [12]. TAM, on the other hand, posits that technology acceptance is primarily determined by two perceptions: perceived usefulness and perceived ease of use [5].

Based on the integration of these three models, this study develops a conceptual research model, as illustrated in Figure 1, and formulates the following hypotheses. One of the key factors influencing users' perception of system usefulness is system quality. System quality refers to the technical characteristics of an information system, such as reliability, ease of use, response time, and system stability [6], [8]. A system with high quality provides a better user experience, enabling users to perform their tasks more effectively. When users perceive that a system operates reliably and is easy to use, they are more likely to consider it beneficial to their activities. Previous studies have identified system quality as a critical determinant in shaping perceived usefulness [6], [10], [14]. Therefore, it is assumed that higher perceived system quality will lead to higher perceived usefulness.

H1: System Quality (SQ) has a positive effect on Perceived Usefulness (PU).

In addition to system quality, information quality is another crucial factor in determining information system success. Information quality refers to the extent to which the information produced by a system is accurate, relevant, complete, and timely [6], [8]. In the context of digital applications used within the university, users rely heavily on the information provided by the system to support their activities and decision-making processes. When the information generated is perceived as high quality, users are more likely to believe that the system effectively supports their needs. Consequently, higher perceived information quality enhances users' perception of system usefulness.

H2: Information Quality (IQ) has a positive effect on Perceived Usefulness (PU).

Another factor that influences perceived usefulness is service quality. Service quality pertains to the adequacy of user support surrounding system use, characterized by

prompt responsiveness, accessible technical assistance, and the capacity of service personnel to effectively address user-reported issues [6], [15]. In modern information systems, high-quality service increases user trust and provides a sense of security when using the system. When users feel that adequate support is available, they are more confident that the system can be used effectively to achieve their goals. Therefore, better service quality is expected to enhance perceived usefulness.

H3: Service Quality (SVQ) has a positive effect on Perceived Usefulness (PU).

Within the TAM, perceived usefulness is a primary determinant of user attitude toward a technology. It refers to the degree to which users believe that using a system will enhance their job performance or effectiveness [5]. When users perceive tangible benefits from the system, they are more likely to develop a positive attitude toward its use. Conversely, if the system does not provide significant benefits, users tend to form negative attitudes. Therefore, perceived usefulness plays a crucial role in shaping user attitudes.

H4: Perceived Usefulness (PU) has a positive effect on Attitude (ATT).

In addition to perceived usefulness, user attitude is also influenced by social influence. Social influence refers to the extent to which individuals are affected by the opinions of others who are important to them, such as colleagues, supervisors, or the surrounding social environment [7], [13]. In the context of system use within the university, recommendations or support from others can encourage individuals to develop a more positive attitude toward the system. When users observe that others around them support or use the system, they are more likely to form favorable attitudes toward it.

H5: Social Influence (SI) has a positive effect on Attitude (ATT).

Another factor influencing user attitude is perceived behavioral control (PBC). Derived from the TPB, this concept refers to an individual's perception of their ability or ease in performing a behavior [12], [16]. When individuals feel that they have the necessary skills, resources, and opportunities to use the system, they are more likely to develop a positive attitude toward it. Conversely, if they perceive the system as difficult to use or beyond their control, their attitude is likely to be less favorable.

H6: Perceived Behavioral Control (PBC) has a positive effect on Attitude (ATT).

In the context of information system success, a positive attitude toward the system contributes to user satisfaction. User satisfaction reflects the overall experience after using the system [6], [17]. A favorable disposition toward the system predisposes users to report higher levels of satisfaction with their usage experience. This satisfaction indicates the extent to which the system meets user expectations and supports their activities. Therefore, user attitude is expected to significantly influence satisfaction.

H7: Attitude (ATT) has a positive effect on User Satisfaction (US).

Finally, within the DeLone and McLean model, user satisfaction is a key indicator that influences net benefits. Net benefits represent the tangible advantages gained by individuals and organizations from system use, such as improved work efficiency, service effectiveness, and productivity [6], [8], [18]. When users are satisfied, they are more likely to utilize the system optimally, resulting in greater benefits.

H8: User Satisfaction (US) has a positive effect on Net Benefits (NB).

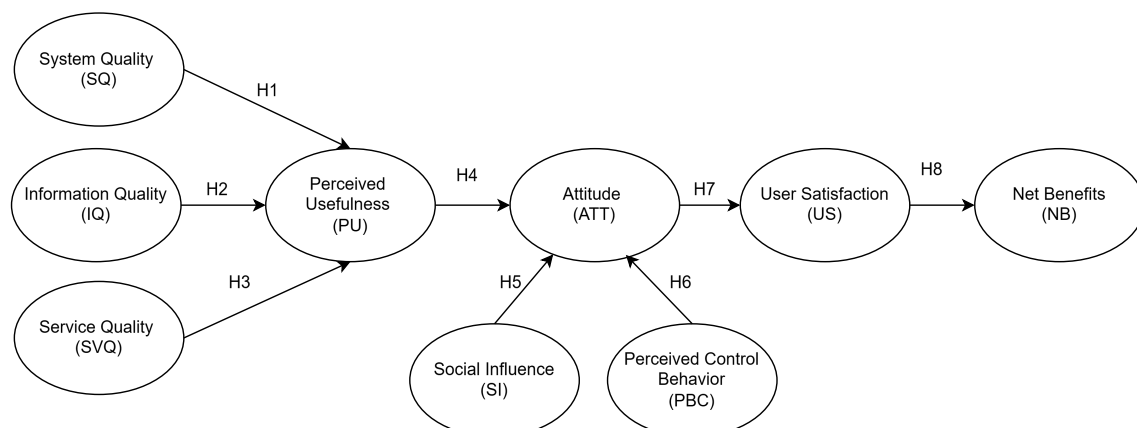


Figure 1. Research model

2.2. Instrument Development

The research instrument was developed by adopting and integrating constructs from three theoretical frameworks: TPB, TAM, and DeLone and McLean. From TPB, three constructs were incorporated: Attitude, Social Influence, and Perceived Behavioral Control. TAM contributed the Perceived Usefulness construct, reflecting users' cognitive appraisal of the system's functional benefits. Notably, Perceived Ease of Use (PEOU), which is the second core construct of TAM, was deliberately excluded from this study. In voluntary use contexts, PEOU captures users' perceptions of the effort required to adopt

a system they may choose to avoid. In mandatory use contexts, however, users have no option to disengage from the system regardless of how difficult they find it to operate, rendering PEOU as an independent attitudinal predictor theoretically redundant. Instead, the ease-of-use dimension is operationalized within the System Quality construct, which encompasses interface usability, navigational simplicity, and operational ease as technical attributes of the system rather than as discretionary perceptions of prospective adopters [6], [8].

Similarly, this model excludes Behavioral Intention and Actual Use, which are traditionally the primary outcome variables in TAM and UTAUT. While behavioral intention meaningfully predicts voluntary adoption based on user perceptions, mandatory contexts remove this choice because institutions compel all lecturers to use the attendance application. Evaluating behavioral intention here would falsely equate institutional compliance with genuine acceptance, distorting the theoretical results. Therefore, this study adopts Attitude, User Satisfaction, and Net Benefits as the primary indicators of system success, aligning with IS success literature that favors satisfaction-based over intention-based metrics in mandatory environments [2], [4], [11].

From DeLone and McLean model, five constructs were adopted: System Quality, Information Quality, Service Quality, User Satisfaction, and Net Benefits. This study measures Net Benefits based on respondents' subjective perceptions of system advantages rather than objective performance records or productivity data. These perceived advantages span individual efficiencies, such as personal productivity and attendance logging consistency, alongside organizational gains, including administrative transparency and human resource management effectiveness.

All measurement indicators were adapted from prior literature [5], [6], [12] and contextualized to the use of a mandatory digital attendance application. The complete list of measurement indicators is provided in Appendix A. Each indicator was measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was developed using Google Forms and distributed via institutional email to prospective respondents within the target population.

Prior to full distribution, a readability test was conducted to ensure the clarity and comprehensibility of the instrument. Five participants from diverse academic backgrounds, namely Language Studies, Informatics, Psychology, and Economics, were invited to evaluate whether each item was clearly worded and unambiguous. Four of the five participants completed the evaluation. Based on their feedback, revisions were applied to two indicators under the Information Quality construct, one indicator each under Attitude and Perceived Behavioral Control, and two indicators within the Net Benefits construct. The revised instrument was then finalized for distribution. It should be noted that formal expert validation beyond the readability test was not conducted, which represents a limitation of the instrument development process in this study.

2.3. Data Collection

The target population for this study comprised all 700 university lecturers at the institution where the mobile attendance application had been formally implemented. As all potential respondents were required by the organization to use the system as part of their routine administrative procedures, prior experience with the application was guaranteed across the entire population, ensuring that participants could provide informed evaluations of the system.

The questionnaire was distributed online via Google Forms in two phases between November 2025 and February 2026. The first distribution, conducted on November 9, 2025, yielded 122 responses. A follow-up distribution on February 17, 2026, produced an additional 18 responses, bringing the total to 140 complete and usable responses. The manuscript was subsequently prepared and submitted for publication in June 2026. The achieved response rate was approximately 20% (140 out of 700). To assess non-response bias, the demographic characteristics of early respondents ($n = 122$, first distribution, November 2025) were compared with those of late respondents ($n = 18$, second distribution, February 2026) using chi-square tests. Results indicated no statistically significant differences across gender ($\chi^2 = 0.335$, $p = 0.563$), age ($\chi^2 = 2.649$, $p = 0.449$), educational background ($\chi^2 = 0.000$, $p = 1.000$), academic position ($\chi^2 = 1.730$, $p = 0.630$), device type ($\chi^2 = 0.299$, $p = 0.861$), and digital technology proficiency ($\chi^2 = 0.876$, $p = 0.831$). A statistically significant difference was observed for teaching experience ($\chi^2 = 22.834$, $p < 0.001$), attributable primarily to the presence of three respondents with less than two years of teaching experience exclusively in the late group, likely reflecting the enrollment

of newer lecturers in the second distribution phase. As this difference is isolated to one demographic variable and is explainable by the timing of institutional onboarding, the overall demographic profiles of both groups are considered sufficiently comparable, and non-response bias is unlikely to pose a serious threat to the validity of the findings.

In terms of sampling procedure, the questionnaire was distributed via institutional email to all 700 lecturers in the target population, constituting a census invitation in which every member of the population was given an equal opportunity to participate. However, as participation was not institutionally mandated and responses depended entirely on individual willingness, the resulting sample is best characterized as a voluntary response sample. This sampling characteristic, combined with the relatively low response rate, represents an inherent limitation of survey-based research in organizational settings where respondent time constraints and administrative workload are considerable. Participation was voluntary, and respondents were informed that their data would be used solely for academic research purposes. This study was conducted in accordance with institutional ethical guidelines. Informed consent was obtained from all participants prior to data collection, and respondents were assured of the confidentiality and anonymity of their responses.

While the Slovin formula applied to the known population of 700 yields a recommended sample of 255, the adequacy of the obtained sample of 140 is justified on methodological grounds specific to the analytical technique employed. In PLS-SEM, sample size requirements are more appropriately determined through power analysis than through population-based formulas [19], [20]. Drawing on Hair et al. [19], the requisite sample size was determined through power analysis, parameterized with $\alpha = 0.05$, power = 0.80, and a medium effect size ($f^2 = 0.15$) [21]. Given that Perceived Usefulness, which is the endogenous construct with the greatest number of predictors in this model, receives paths from three exogenous variables, the power analysis yields a minimum required sample of approximately 77 respondents. The final sample of 140 therefore exceeds this threshold by a factor of nearly two, and is considered adequate for the purposes of PLS-SEM analysis [19].

Hypothesis testing for direct paths was conducted using SmartPLS bootstrapping with 5,000 subsamples, bias-corrected and accelerated (BCa) confidence intervals, and two-

tailed testing at a significance level of 0.05. Indirect effects were estimated using Python-based bootstrapping (5,000 resamples, 95% percentile confidence intervals) applied to composite construct scores, with direct path coefficients from SmartPLS serving as point estimates. This approach was adopted due to software licensing constraints and produces comparable estimates when composite scoring is applied consistently across resampling iterations.

Common method bias was assessed using Harman's single factor test [22]. All 39 items from the 9 constructs were subjected to principal component analysis without rotation. The result indicated that the first unrotated factor accounted for 53.35% of the total variance, slightly exceeding the conventional 50% threshold. As a complementary assessment, full collinearity VIF values were examined for all constructs, with results ranging from 1.000 to 2.996, well below the threshold of 3.3 [23]. While the VIF results are reassuring, the Harman's test result exceeding the 50% threshold indicates that common method bias cannot be fully ruled out and should be treated as a remaining methodological limitation of this study. Future research is encouraged to employ procedural remedies such as temporal separation of measurement occasions or the use of an unrelated marker variable to further mitigate this concern.

3. RESULTS AND DISCUSSION

3.1. Respondent Profile

Data collection was conducted through an online survey distributed to lecturers at the university, yielding a total of 140 valid responses. Respondents were asked to provide demographic information including gender, age, last educational attainment, faculty, study program, academic position, length of teaching experience, type of device used, digital technology proficiency, frequency of technical difficulties encountered, and perceptions regarding the potential impact on privacy. The demographic characteristics of the respondents are presented in Table 1.

Table 1. Respondent characteristics

Variable	Category	Frequency	Percentage (%)
Gender	Female	75	54

Variable	Category	Frequency	Percentage (%)
Age (years)	Male	65	46
	<30	1	1
	30 – 39	54	39
	40 – 49	36	26
	≥50	49	35
Educational Background	Master	77	55
	PhD	63	45
Faculty	Industrial Technology	27	19
	Teaching & Educational Science	28	20
	Pharmacy and Science	13	9
	Public Health & Economy	11	8
	Islamic Religious	9	6
	Medicine	6	4
	Law	4	3
	Others	42	30
	Informatics	12	9
Department	Pharmacy	8	6
	Public Health & Industrial	7	5
	Others	113	81
	Lecturer	17	12
Functional Position	Assistant Professor	83	59
	Associate Professor	27	19
	Professor	13	9
Length of Working (years)	<2	3	2
	2-5	19	14
	6-10	47	34
	>10	71	51
Device Type	Android	115	82
	iPhone	23	16
	Tablet	2	1
	High	63	45
	Moderate	54	39

Variable	Category	Frequency	Percentage (%)
Ability to Use			
Digital Technology	Very High	22	16
Devices	Never	4	3
	Rarely	35	25
Experiencing	Sometimes	71	51
Technical Problems	Often	21	15
	Very Often	9	6
	Not at all	44	31
	Slightly	38	27
Potential Impact on	Moderately	27	19
Privacy	Very much	23	16
	Extremely	8	6

Most respondents were female (54%), held a master's degree (55%), and occupied the functional position of Assistant Professor (59%). In terms of teaching experience, more than half of the respondents (51%) had been teaching for over ten years, suggesting a predominantly experienced sample. Most respondents used Android devices (82%) and rated their digital technology proficiency as high or sufficient (84% combined). Regarding technical difficulties, 51% reported occasionally experiencing issues, while only 3% had never encountered any. With respect to privacy concerns, the majority perceived the potential impact on privacy as low, with 58% selecting either "not at all" or "slightly."

3.2. Measurement Model Assessment

Prior to structural model analysis, the measurement model was assessed for reliability and validity. Reliability was evaluated using Cronbach's alpha (CA) and two forms of composite reliability: rho_a (pa) and rho_c (pc). Convergent validity was assessed through the Average Variance Extracted (AVE), with values above 0.50 considered acceptable [19]. Table 2 presents the results. All nine constructs demonstrated satisfactory reliability, with CA values ranging from 0.831 (PBC) to 0.944 (NB), pa values from 0.842 to 0.945, and pc values from 0.888 to 0.959, all exceeding the 0.70 threshold [19]. AVE values ranged from 0.659 (SQ) to 0.855 (NB), all surpassing the 0.50 threshold, confirming convergent validity

for all constructs. All indicator loadings substantially exceeded 1.96 in t-statistic values, confirming statistical significance at $p < 0.05$.

Table 2. Construct and Indicator Reliability Analysis

Variables (Constructs)	Indicators	Loading	t-statistics	Composite reliability (pa)	Composite reliability (pc)	Cronbach's Alpha	AVE	Results
System Quality (SQ)	SQ1	0.760	14.208	0.881	0.906	0.836	0.659	Reliable
	SQ2	0.832	21.992					
	SQ3	0.850	38.429					
	SQ4	0.830	25.744					
	SQ5	0.785	20.356					
Information Quality (IQ)	IQ1	0.909	43.362	0.938	0.952	0.937	0.799	Reliable
	IQ2	0.940	66.631					
	IQ3	0.902	35.866					
	IQ4	0.848	24.874					
	IQ5	0.866	33.826					
Service Quality (SVQ)	SVQ1	0.851	26.475	0.929	0.941	0.871	0.760	Reliable
	SVQ2	0.874	32.137					
	SVQ3	0.829	24.384					
	SVQ4	0.914	65.101					
	SVQ5	0.888	40.740					
Perceived Usefulness (PU)	PU1	0.855	29.274	0.893	0.923	0.889	0.751	Reliable
	PU2	0.843	30.219					
	PU3	0.846	27.981					
	PU4	0.920	61.835					
Attitude (ATT)	ATT1	0.912	40.170	0.936	0.952	0.933	0.833	Reliable
	ATT2	0.892	30.598					
	ATT3	0.922	43.106					
	ATT4	0.924	47.855					
Social Influence (SI)	SI1	0.817	16.254	0.848	0.891	0.836	0.673	Reliable
	SI2	0.872	41.133					
	SI3	0.864	30.679					
	SI4	0.721	14.323					
Perceived Behavioral Control (PBC)	PBC1	0.708	13.117	0.842	0.888	0.831	0.667	Reliable
	PBC2	0.866	30.919					
	PBC3	0.833	19.185					
	PBC4	0.849	36.211					
User Satisfaction (US)	US1	0.942	79.662	0.852	0.956	0.939	0.846	Reliable
	US2	0.937	67.092					
	US3	0.941	106.957					
	US4	0.856	21.673					
Net	NB1	0.931	68.609	0.945	0.959	0.944	0.855	Reliable

Variables (Constructs)	Indicators	Loading	t _{statistics}	Composite reliability (pa)	Composite reliability (pc)	Cronbach's Alpha	AVE	Results
Benefits (NB)	NB2	0.907	35.150					
	NB3	0.938	71.905					
	NB4	0.923	45.873					

As shown in Table 2, all nine constructs demonstrated satisfactory to excellent reliability. Net Benefits (NB) recorded the highest reliability values ($p_a = 0.945$; $CA = 0.944$), with indicator loadings ranging from 0.907 to 0.938. Attitude (ATT) also exhibited strong reliability ($p_a = 0.936$; $CA = 0.933$), with loadings between 0.892 and 0.924. Information Quality (IQ) yielded $p_a = 0.938$ and $CA = 0.937$, with loadings ranging from 0.848 to 0.940. Service Quality (SVQ) showed $p_a = 0.929$ and $CA = 0.871$, supported by loadings between 0.829 and 0.914. User Satisfaction (US) demonstrated high internal consistency ($p_a = 0.852$; $CA = 0.939$), with the highest individual indicator loadings observed across all constructs, ranging from 0.856 to 0.942. Perceived Usefulness (PU) produced $p_a = 0.893$ and $CA = 0.889$, with loadings between 0.843 and 0.920. System Quality (SQ) yielded $p_a = 0.881$ and $CA = 0.836$, with loadings ranging from 0.760 to 0.850. Social Influence (SI) showed acceptable reliability ($p_a = 0.848$; $CA = 0.836$), with loadings between 0.721 and 0.872. Perceived Behavioral Control (PBC) recorded the lowest yet acceptable values ($p_a = 0.842$; $CA = 0.831$), with loadings ranging from 0.708 to 0.866. Across all constructs, t-statistics for all indicator loadings substantially exceeded the threshold of 1.96, confirming statistical significance at $p < 0.05$ [19]. These results confirm that all constructs meet the established reliability thresholds, providing a sound basis for structural model evaluation.

Discriminant validity was assessed using the Heterotrait-Monotrait ratio (HTMT), with values below 0.90 indicating acceptable discriminant validity [19]. As presented in Table 3, all HTMT values fell below the 0.90 threshold, ranging from 0.503 (NB ↔ IQ) to 0.891 (US ↔ PU), confirming that all constructs are empirically distinct. It is worth noting that five construct pairs, NB ↔ ATT (0.869), SVQ ↔ SQ (0.862), US ↔ ATT (0.870), US ↔ SQ (0.878), and US ↔ PU (0.891) returned HTMT values above 0.85, approaching but not exceeding the threshold. These elevated values are theoretically expected given the integrative nature of the model, where quality dimensions, attitudes, and satisfaction outcomes are conceptually interrelated by design.

Table 3. Heterotrait-Monotrait Ratio (HTMT)

	ATT	IQ	NB	PBC	PU	SI	SQ	SVQ	US
ATT									
IQ	0.511								
NB	0.869	0.503							
PBC	0.608	0.682	0.543						
PU	0.833	0.714	0.800	0.811					
SI	0.778	0.526	0.706	0.643	0.700				
SQ	0.652	0.758	0.650	0.839	0.823	0.619			
SVQ	0.670	0.765	0.637	0.742	0.825	0.688	0.862		
US	0.870	0.723	0.767	0.786	0.891	0.770	0.878	0.836	

3.3. Structural Model and Hypothesis Testing

This study employed PLS-SEM to examine eight hypothesized relationships within an integrated TAM–DeLone and McLean–TPB framework applied to the attendance application among university lecturers. As illustrated in Figure 2, the structural model demonstrates a coherent sequential pathway from quality dimensions through psychological mechanisms to organizational outcomes. As depicted in Figure 2, the model demonstrates a coherent sequential pathway from quality dimensions through psychological mechanisms to organizational outcomes, with R^2 values of 0.630 (PU), 0.668 (ATT), 0.680 (US), and 0.535 (NB), indicating moderate to substantial explanatory power [19]. Overall, seven of the eight hypotheses were supported, as summarized in Table 4.

Table 4. Hypotheses testing results

Hyp.	Path	β	t-statistics	p-value	VIF	F^2	Effect Size	Decision
H1	SQ → PU	0.317	3.281	0.001	2.854	0.095	Small	Supported
H2	IQ → PU	0.149	2.076	0.038	2.234	0.027	Small	Supported
H3	SVQ → PU	0.399	4.176	< 0.001	2.996	0.143	Small	Supported
H4	PU → ATT	0.592	7.714	< 0.001	2.329	0.454	Large	Supported
H5	SI → ATT	0.368	5.617	< 0.001	1.655	0.247	Medium	Supported
H6	PBC → ATT	0.073	1.038	0.299	2.054	0.008	Negligible	Not Supported
H7	ATT → US	0.825	29.209	< 0.001	1.000	2.124	Large	Supported
H8	US → NB	0.731	16.086	< 0.001	1.000	1.149	Large	Supported

Note: Effect size classification Follows Cohen (1988) [21]: $F^2 \geq 0.35$ = large, ≥ 0.15 = medium, ≥ 0.02 = small, < 0.02 = negligible.

All VIF values < 3.3, indicating no multicollinearity concerns.

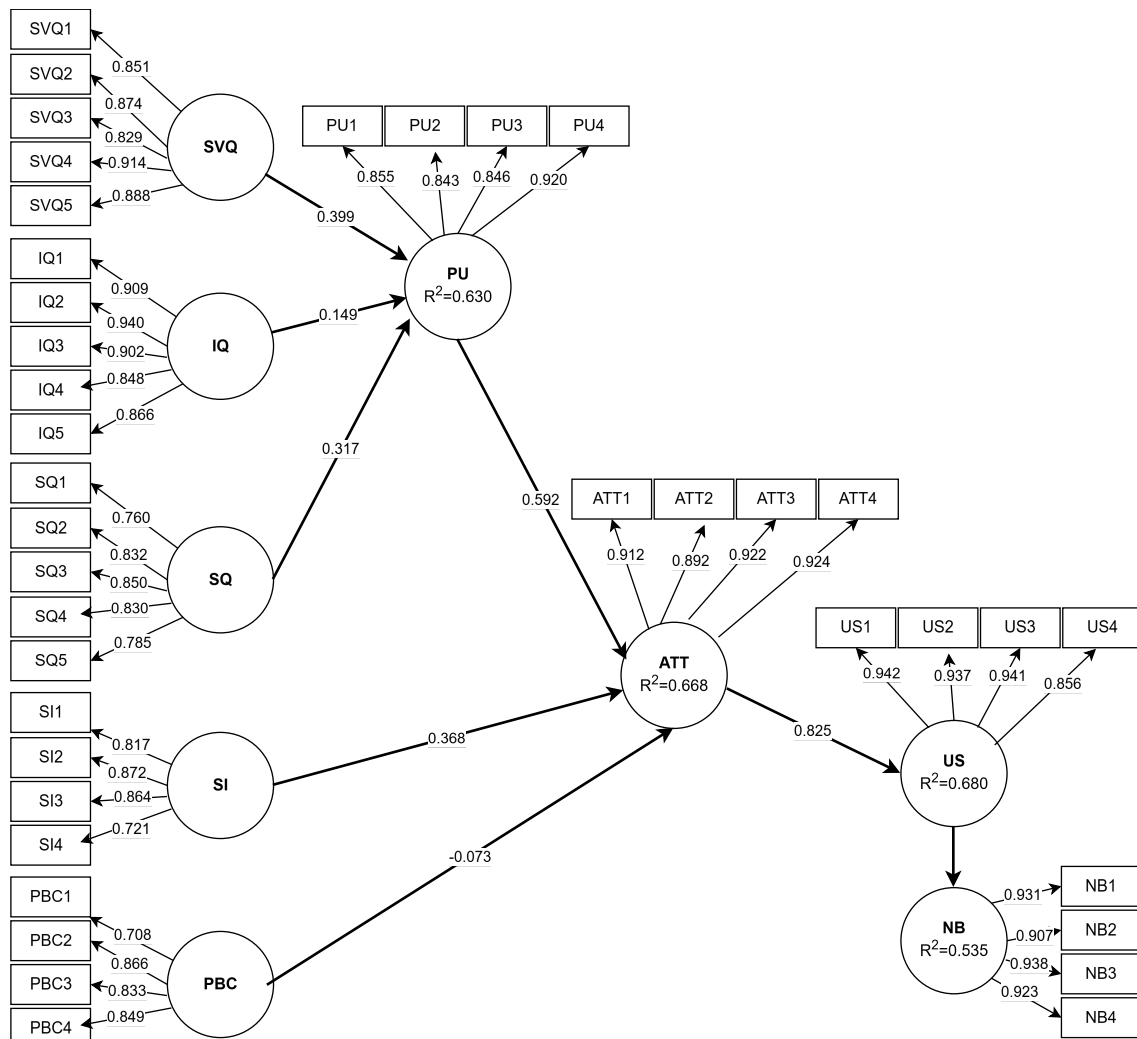


Figure 2. Estimated PLS-SEM structural model showing standardized path coefficients and variance explained (R^2)

As shown in Table 4, VIF values for all predictor variables ranged from 1.000 to 2.996, all well below the conservative threshold of 3.3 recommended for PLS-SEM [20], confirming the absence of multicollinearity concerns. Effect sizes (F^2) ranged from negligible (PBC → ATT, $F^2 = 0.008$) to large (ATT → US, $F^2 = 2.124$; US → NB, $F^2 = 1.149$; PU → ATT, $F^2 = 0.454$), providing evidence of both statistical and practical significance for the supported hypotheses. The negligible effect size of the PBC → ATT path ($F^2 = 0.008$) further corroborates the decision to reject H6, indicating that perceived behavioral control contributes minimally to the explanation of attitude variance in this context.

Predictive relevance was assessed using PLSpredict [19], with results presented in Table 5. Both construct-level and indicator-level Q^2 predict values are reported to provide a complete picture of the model's predictive accuracy, as recommended by [24]. All Q^2 predict values at the indicator level exceeded zero, confirming that the model possesses predictive relevance for all endogenous constructs. At the construct level, Q^2 predict values ranged from 0.399 (NB) to 0.639 (US), indicating medium to large predictive power. At the indicator level, values ranged from 0.314 (NB2) to 0.603 (US1), with all indicators returning positive accuracy for this construct. User Satisfaction indicators consistently produced the highest individual Q^2 predict values, reflecting the model's particularly strong predictive accuracy for this construct. The relatively lower indicator-level values observed for Net Benefits (NB1-NB4, range: 0.314-0.365) are consistent with the construct's moderate R^2 (0.535) and suggest that while the model predicts net benefits adequately, there remains unexplained variance attributable to factors beyond the scope of this study.

Table 5. Predictive Relevance (PLSpredict)

Construct	Indicator	Q^2 predict (Indicator)	Q^2 predict (Construct Average)	Predictive Power
PU	PU1	0.458	0.609	Large
	PU2	0.373		
	PU3	0.499		
	PU4	0.492		
ATT	ATT1	0.378	0.516	Large
	ATT2	0.472		
	ATT3	0.367		
	ATT4	0.482		
US	US1	0.603	0.639	Large
	US2	0.539		
	US3	0.534		
	US4	0.484		
NB	NB1	0.328	0.399	Medium
	NB2	0.314		
	NB3	0.358		
	NB4	0.365		

*Construct-level Q^2 predict represents the average of indicator-level values within each construct.

Note: Q^2 predict > 0 indicates predictive relevance. Effect size classification: Large > 0.50, Medium > 0.25, Small > 0 [24].

To examine the mediating mechanisms underlying the structural model, indirect effects were estimated using bootstrapping with 5,000 resamples and 95% percentile confidence intervals. Results are presented in Table 6. Fourteen of the sixteen indirect paths were statistically significant, with confidence intervals not straddling zero, providing evidence for a robust chain of mediated relationships throughout the model.

Among the quality dimension pathways, Service Quality demonstrated the strongest indirect effect on Attitude through Perceived Usefulness ($\beta = 0.284$, 95% CI [0.127, 0.466]), followed by System Quality ($\beta = 0.238$, 95% CI [0.077, 0.414]) and Information Quality ($\beta = 0.117$, 95% CI [0.019, 0.236]), confirming that Perceived Usefulness fully mediates the relationships between all three quality dimensions and user attitude. The indirect effect of Perceived Usefulness on User Satisfaction through Attitude ($\beta = 0.496$, 95% CI [0.347, 0.644]) and on Net Benefits through the full ATT-US chain ($\beta = 0.391$, 95% CI [0.255, 0.533]) were both significant and substantive, underscoring the central mediating role of attitude in the model.

The complete pathway from Service Quality to Net Benefits, mediated sequentially through Perceived Usefulness, Attitude, and User Satisfaction, yielded a significant indirect effect of $\beta = 0.176$ (95% CI [0.077, 0.305]), the largest among the full-chain quality-to-benefit paths. Similarly, Social Influence exerted a significant indirect effect on Net Benefits through Attitude and User Satisfaction ($\beta = 0.275$, 95% CI [0.182, 0.375]). In contrast, Perceived Behavioral Control did not produce significant indirect effects on either User Satisfaction ($\beta = -0.076$, 95% CI [-0.214, 0.079]) or Net Benefits ($\beta = -0.060$, 95% CI [-0.165, 0.064]), consistent with the rejection of H6 in the direct path analysis. Collectively, these results confirm that IS success in this mandatory-use context is realized through a psychologically mediated chain rather than through direct technical-to-outcome pathways.

Table 6. Indirect Effects with 95% Confidence Intervals (Bootstrapping, $n = 5,000$)

Path	Indirect Effect	SE	95% CI Lower	95% CI Upper	Significant
SQ → PU → ATT	0.238	0.084	0.077	0.414	Yes
IQ → PU → ATT	0.117	0.056	0.019	0.236	Yes
SVQ → PU → ATT	0.284	0.087	0.127	0.466	Yes

Path	Indirect Effect	SE	95% CI Lower	95% CI Upper	Significant
PU → ATT → US	0.496	0.075	0.347	0.644	Yes
SI → ATT → US	0.348	0.059	0.231	0.463	Yes
PBC → ATT → US	-0.076	0.075	-0.214	0.079	No
ATT → US → NB	0.622	0.060	0.499	0.739	Yes
PU → ATT → US → NB	0.391	0.071	0.255	0.533	Yes
SI → ATT → US → NB	0.275	0.049	0.182	0.375	Yes
PBC → ATT → US → NB	-0.060	0.059	-0.165	0.064	No
SQ → PU → ATT → US	0.187	0.067	0.062	0.330	Yes
IQ → PU → ATT → US	0.093	0.044	0.014	0.189	Yes
SVQ → PU → ATT → US	0.223	0.070	0.100	0.371	Yes
SQ → PU → ATT → US → NB	0.148	0.055	0.047	0.267	Yes
IQ → PU → ATT → US → NB	0.073	0.035	0.011	0.152	Yes
SVQ → PU → ATT → US → NB	0.176	0.059	0.077	0.305	Yes

Note: Significance determined by 95% percentile confidence intervals from 5,000 bootstrap resamples. An indirect effect is significant when the confidence interval does not include zero.

Prior to the discussion of structural model results, it is important to note the response distribution of one Perceived Usefulness indicator that exhibited a notably skewed pattern. As presented in Table 7, item PU2 "The attendance application improves my work efficiency" revealed that 44.3% of respondents disagreed or strongly disagreed, while only 30.0% agreed or strongly agreed, and 25.7% remained neutral. This item-level distribution is discussed further in the context of the overall construct performance in the Discussion section.

Table 7. Item-Level Response Distribution for PU2: "The attendance application improves my work efficiency"

Response	Frequency	Percentage (%)
Strongly Disagree	30	21.4
Disagree	32	22.9
Neutral	36	25.7

Response	Frequency	Percentage (%)
Agree	30	21.4
Strongly Agree	12	8.6
Total	140	100

3.4. Discussion

1) Quality Dimensions and Perceived Usefulness (H1, H2, H3)

The structural model explained 63.0% of the variance in Perceived Usefulness ($R^2 = 0.630$), with all three quality dimensions emerging as significant predictors. Service Quality exerted the strongest influence ($\beta = 0.399$, $t = 4.176$, $p < 0.001$), followed by System Quality ($\beta = 0.317$, $t = 3.281$, $p = 0.001$), and Information Quality ($\beta = 0.149$, $t = 2.076$, $p = 0.038$), supporting H1, H2, and H3 respectively.

The dominant role of Service Quality aligns with the DeLone and McLean model proposition that responsive support structures are essential mediators between technical infrastructure and perceived value [6]. In routine organizational systems such as attendance applications, users' confidence in the availability of technical support appears to amplify their perception of system utility. This finding is consistent with IS literature demonstrating that technically capable systems may still be perceived as unhelpful in the absence of adequate service backing, particularly when users encounter operational disruptions in time-sensitive administrative tasks [9], [10], [25], [26].

The comparatively modest effect of Information Quality, while statistically significant, reflects the functional nature of attendance systems. Unlike decision-support or analytics platforms where information richness is central to value creation, attendance applications primarily serve procedural functions. Users appear to operate with a sufficiency threshold for information quality: once data is perceived as accurate and reliable, incremental improvements in information richness yield diminishing returns on perceived usefulness. This context-dependency of information quality effects has been similarly documented in IS research comparing decision-oriented versus operational systems [11], [27].

System Quality occupying a middle position reinforces TAM's foundational argument that technical reliability, manifested through stability, responsiveness, and navigational ease, constitutes a prerequisite for utility perception. When the system operates without friction, users can associate its use with task facilitation rather than procedural burden, thereby strengthening perceived usefulness [5].

2) Perceived Usefulness, Social Influence, and Perceived Behavioral Control → Attitude (H4, H5, H6)

The model accounted for 66.8% of variance in Attitude ($R^2 = 0.668$). Perceived Usefulness was the strongest predictor ($\beta = 0.592$, $t = 7.714$, $p < 0.001$), followed by Social Influence ($\beta = 0.368$, $t = 5.617$, $p < 0.001$), supporting H4 and H5. Perceived Behavioral Control, however, did not significantly influence Attitude ($\beta = -0.073$, $t = 1.038$, $p = 0.299$), leading to the rejection of H6.

The strong utility-attitude relationship corroborates the core TAM proposition that utility beliefs are the primary cognitive antecedent of favorable technology evaluations [5], [28]. When users perceive that the application facilitates attendance administration, reduces recording errors, and enhances data transparency, these functional benefits form the evaluative basis of a positive disposition toward the system. Notably, however, a closer examination of individual PU indicators reveals an important tension within this construct. One item, specifically "The application improves my work efficiency", yielded a markedly skewed distribution (see Table 7): 44.3% of respondents disagreed or strongly disagreed, only 30% agreed or strongly agreed, and 25.7% remained neutral. This divergence between indicator-level perception and construct-level influence warrants careful interpretation. In PLS-SEM, a construct reflects the aggregated signal across all its indicators; a single negatively skewed item does not negate the overall construct's predictive power if other indicators carry sufficient positive variance. More substantively, this pattern reveals a theoretically meaningful distinction between organizational benefit and individual perceived benefit, a tension well-documented in IS literature [4]. The attendance system appears to be perceived primarily as an administrative control mechanism, functioning as a tool for organizational monitoring and incentive administration, rather than as an instrument that directly enhances individual productivity. The additional procedural steps inherent in app-based attendance, including launching the application, verifying internet connectivity, and the cognitive burden of

remembering whether attendance has been recorded and whether the required working hours have been fulfilled, may be experienced as workflow additions rather than efficiency gains. This finding suggests that future system development should integrate features that reduce procedural friction, such as fingerprint recognition or automatic device detection, to bridge the gap between organizational-level value and individual-level utility perception.

The significant influence of Social Influence on Attitude reflects the collective and obligatory nature of attendance recording in higher education institutions. When attendance application use is institutionally mandated and visibly practiced by colleagues and endorsed by leadership, it gradually becomes an organizational norm. Individuals then align their attitudes with prevailing institutional expectations, consistent with the subjective norm mechanisms described in both TPB and UTAUT frameworks [7], [12], [29], [30]. This finding carries relevance for organizational IS implementation: technology adoption in collectively regulated environments is not purely an individual cognitive calculus but is substantially shaped by social embeddedness.

Social Influence remains a significant predictor of Attitude because mandatory contexts dictate compliance, not genuine acceptance. While institutional policy enforces system usage, social endorsement from supervisors and colleagues shapes the quality of user attitude. Positive social framing encourages users to internalize the system as a valuable tool rather than an imposed burden, preventing the surface-level compliance that leads to attitudinal resistance. Consequently, organizations relying solely on enforcement may achieve usage metrics but risk undermining long-term user satisfaction and net benefits [7], [12], [30].

The non-significant and negative path from PBC to Attitude (H6 rejected) is theoretically interpretable rather than anomalous. Within TPB, PBC is conceptually positioned as a determinant of behavioral intention and actual behavior rather than of attitude, which reflects evaluative rather than volitional cognition [12], [16], [31]. Empirically, the result likely reflects the relatively homogeneous and sufficient digital competence among the respondents, who are predominantly experienced lecturers with adequate technology literacy. When capability variance across users is low, PBC loses its discriminatory power

as an attitude predictor. Users appear to evaluate the system based on its utility and service quality, not on their self-assessed capacity to operate it.

3) Attitude → User Satisfaction (H7)

Attitude emerged as a remarkably powerful predictor of User Satisfaction ($\beta = 0.825$, $t = 29.209$, $p < 0.001$), explaining 68.0% of its variance ($R^2 = 0.680$), thereby supporting H7. The magnitude of this path coefficient, which is the largest in the model, indicates that users' overall psychological orientation toward the system is the primary determinant of their satisfaction, exceeding the direct contributions of technical quality dimensions. This finding extends TAM's attitudinal propositions into the satisfaction domain, suggesting that satisfaction is not merely a functional outcome of system performance but is substantially mediated by how users cognitively and affectively frame their relationship with the technology [5], [17]. Users who hold positive attitudes toward the system are more likely to interpret usage experiences favorably, exhibit greater tolerance for minor technical disruptions, and engage more actively with available features, all of which cumulatively elevate satisfaction levels [32]. For IS implementation practice, this implies that interventions targeting attitude formation through institutional socialization, user training, and participatory system design may yield greater returns on user satisfaction than equivalent investments in technical feature development alone.

The strong path coefficient between Attitude and User Satisfaction ($\beta = 0.825$) reflects a theoretically coherent convergence in mandatory, low-variation usage contexts rather than construct redundancy. Unlike voluntary settings where attitude and satisfaction are temporally distinct (pre- versus post-adoption), mandatory environments with routine systems, such as attendance applications, conflate these phases due to enforced, repetitive interaction. Consequently, users evaluate the system almost entirely through their psychological disposition. Future longitudinal or experience-sampling studies could further disentangle these temporal dynamics.

4) User Satisfaction → Net Benefits (H8)

User Satisfaction strongly predicted Net Benefits ($\beta = 0.731$, $t = 16.086$, $p < 0.001$), with the model explaining 53.5% of variance in this outcome variable ($R^2 = 0.535$), supporting H8. This result provides robust empirical support for the DeLone and McLean model's positioning of user satisfaction as the critical penultimate link in the IS success chain [6],

[18]. Satisfied users engage with the system more consistently and productively, associating their positive experiences with perceived organizational outcomes: improved accuracy in attendance recording, streamlined administrative reporting, and enhanced accountability in incentive allocation processes. The strong satisfaction–benefit pathway also underscores a broader implication often overlooked in IS investment decisions: the realization of perceived organizational value from technology is not guaranteed by technical quality alone but is contingent upon the quality of users' subjective experience with the system. Organizations that focus exclusively on system feature development while neglecting user experience risk deploying technically sound systems that are less likely to generate the perceived organizational benefits users reported as meaningful [33].

A further observation warranting careful interpretation concerns HTMT values between User Satisfaction and two of its antecedents: $US \leftrightarrow PU$ (HTMT = 0.891) and $US \leftrightarrow ATT$ (HTMT = 0.870). While both values remain below the conservative 0.90 threshold and therefore do not constitute a violation of discriminant validity [19], their proximity to the threshold merits theoretical reflection. The elevated HTMT between US and ATT is theoretically consistent with the strong $ATT \rightarrow US$ path ($\beta = 0.825$) discussed earlier and reflects the conceptual closeness between attitudinal disposition and satisfaction experience in mandatory, operationally routine systems, where the two constructs tend to converge due to the limited experiential variation available to users. The elevated HTMT between US and PU similarly reflects the indirect conceptual linkage between perceived utility and satisfaction: users who perceive the system as useful are predisposed to engage with it more productively, which in turn elevates their satisfaction. Importantly, in PLS-SEM, HTMT values below 0.90 are considered indicative of acceptable discriminant validity, and the full HTMT matrix (Table 3) confirms that no construct pair exceeds this threshold. These findings suggest that although US, PU, and ATT share meaningful conceptual overlap that is theoretically expected in an integrated IS success model, they remain empirically distinguishable constructs. Future research employing confirmatory factor analysis (CFA) within a CB-SEM framework could provide additional evidence on the discriminant validity of these constructs in mandatory attendance system contexts.

One important limitation of this study relates to the privacy dimension, which emerged in the respondent profile data but was not incorporated into the research model. The data revealed that 41% of respondents perceived the attendance application as having moderate to very large potential privacy impact (19% moderate, 16% considerable, 6% very large). These perceptions are theoretically consequential given that the system collects timestamp data, monitors working hour fulfillment, and links attendance records directly to lecturer incentive and remuneration calculations. In such a context, privacy concern is not a peripheral issue: when users perceive the system as a surveillance mechanism tied to financial consequences, their attitudinal disposition and satisfaction may be suppressed by privacy anxiety even when aggregate survey scores appear positive. This represents a meaningful limitation of the current model, which captures the positive quality-to-satisfaction pathway without accounting for the potentially moderating role of privacy concern. Future research is encouraged to incorporate privacy concern, perceived surveillance, and institutional trust as additional constructs, and to examine whether privacy anxiety moderates the relationship between system quality, user attitude, and satisfaction in mandatory attendance system contexts.

4. CONCLUSION

This study examined the factors influencing the success of the mobile-based attendance application among university lecturers through an integrated TAM–DeLone and McLean–TPB framework, tested using PLS-SEM on 140 valid responses. The findings demonstrate that system success in a mandatory-use organizational context is not determined by technical quality alone but is primarily mediated through a chain of psychological mechanisms: among quality dimensions, service quality in particular is most strongly associated with perceived usefulness, which together with social influence is linked to positive user attitudes, ultimately predicting user satisfaction and perceived net benefits. Seven of the eight hypothesized relationships were supported, with the attitude–satisfaction path yielding the strongest effect in the model ($\beta = 0.825$), underscoring that users' psychological orientation toward technology is the dominant determinant of their satisfaction experience. The rejection of the perceived behavioral control–attitude path further reveals that in operationally simple systems with digitally competent users, self-assessed capability ceases to be a meaningful attitudinal predictor. A notable finding concerns the tension between organizational-level benefit and individual-level efficiency

perception within the Perceived Usefulness construct, suggesting that administrative monitoring systems are fundamentally evaluated differently by end users than by organizations, a distinction that carries direct implications for how attendance technologies should be designed and communicated to users. Theoretically, this study contributes to IS acceptance literature by empirically testing and supporting the integrative explanatory power of TAM, DeLone and McLean IS Success Model, and TPB in a higher education organizational setting, while practically suggesting that sustainable IS success requires simultaneous investment in service responsiveness, institutional socialization, and user-centered design rather than technical development alone.

This study is subject to several limitations. The sample was drawn from a single higher education institution, limiting the generalizability of the findings to other organizational or cultural contexts. All data were self-reported, which introduces the possibility of common method bias. Although full collinearity VIF values were within acceptable ranges, Harman's single factor test yielded a value of 53.35%, slightly exceeding the conventional 50% threshold. Common method bias therefore cannot be fully ruled out and remains a methodological limitation of this study that future research should address through procedural remedies such as temporal separation of data collection or marker variable techniques. The voluntary response sampling resulted in a response rate of approximately 20%. A non-response bias analysis comparing early and late respondents across seven demographic variables indicated no significant differences in six variables. A difference in teaching experience was observed but is attributable to the enrollment of newer lecturers in the second distribution phase rather than systematic bias. Nevertheless, non-response bias cannot be fully ruled out as a limitation of this study. Furthermore, the cross-sectional design of this study precludes causal inference, and the reported associations between constructs should be interpreted as statistically predictive rather than causally definitive.

Future studies are encouraged to employ longitudinal designs to capture how user attitudes and satisfaction evolve following system updates or policy changes. Incorporating objective system performance indicators derived from system logs, such as attendance accuracy records, administrative processing time, and incentive calculation error rates, would complement the perception-based measures used in this study and provide a more complete picture of IS success at the organizational level. The framework

may also be extended to include privacy concern, technostress, perceived surveillance, and institutional trust as additional constructs, given their theoretical relevance to mandatory mobile attendance systems that collect personally consequential behavioral data. Finally, replication of this study across multiple institutions and organizational types would strengthen the generalizability of the proposed integrated TAM–DeLone and McLean–TPB model.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to Universitas Ahmad Dahlan for the financial support provided through the Internal Research Grant scheme (Skim Hibah Internal Universitas Ahmad Dahlan) under contract number PD-325/SP3/LPPM-UAD/XII/2025. This research would not have been possible without the support and facilities provided by the Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM) Universitas Ahmad Dahlan.

APPENDIX A. Measurement Instrument: Constructs, Item Codes, and Indicators

Variables (Constructs)	Item Codes	Indicators
System Quality (SQ)	SQ1	Since its implementation, the attendance application has run stably with few errors or technical disruptions
	SQ2	Since its implementation, the attendance application responds quickly when in use
	SQ3	The attendance feature in the application functions accurately and as expected
	SQ4	The attendance application can be accessed easily at any time within the campus area
	SQ5	The user interface of the attendance application is easy to use and well organized
Information Quality (IQ)	IQ1	The check-in and check-out times recorded by the attendance application correspond to the actual times
	IQ2	The check-in and check-out data presented by the attendance application are reliable
	IQ3	The attendance history and records in the application are always up to date
	IQ4	The attendance application presents complete attendance history without any missing data
	IQ5	The attendance history and records in the application are easy to understand

Variables (Constructs)	Item Codes	Indicators
Service Quality (SVQ)	SVQ1	The technical support team responds promptly when I encounter problems with the application
	SVQ2	The helpdesk staff can provide effective solutions to the issues I experience
	SVQ3	The application usage guide is easily accessible and understandable
	SVQ4	The application management team actively perform updates and improvements to enhance user experience
	SVQ5	The application management team understands users' needs and complaints well
Perceived Usefulness (PU)	PU1	The attendance application helps me record my attendance more quickly than manual methods
	PU2	The attendance application improves my work efficiency
	PU3	The attendance application helps produce more accurate attendance data
	PU4	The attendance application helps me be more consistent in fulfilling my attendance obligations
Attitude (ATT)	ATT1	Using the attendance application is a good thing for me
	ATT2	I feel comfortable using the attendance application
	ATT3	I have a positive attitude toward using the attendance application
	ATT4	I feel that using the attendance application is the right thing to do
Social Influence (SI)	SI1	My supervisor expects me to use the attendance application
	SI2	Most of my colleagues expect me to use the attendance application as well
	SI3	The institution emphasizes the importance of using this attendance application
	SI4	I feel the need to use this attendance application in order to be perceived as disciplined by my colleagues
Perceived Behavioral Control (PBC)	PBC1	I have sufficient ability to use the attendance application
	PBC2	I have the device and internet connectivity that consistently support my use of the attendance application
	PBC3	I can resolve technical issues when using the attendance application
	PBC4	I rarely experience significant obstacles when using the attendance application
User Satisfaction (US)	US1	Overall, I am satisfied with the performance of the attendance application
	US2	The attendance application meets my expectations in recording attendance
	US3	I feel that using the attendance application provides a positive experience
	US4	I feel that the attendance application runs well without significant issues
Net Benefits (NB)	NB1	The use of the attendance application contributes to improving lecturers' work punctuality and discipline
	NB2	The attendance application enhances the transparency and accuracy of lecturer attendance data
	NB3	The attendance application facilitates supervisors in monitoring and making decisions related to lecturer attendance
	NB4	The use of the attendance application supports the effectiveness and efficiency of lecturer human resource management

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