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Information Systems Quality, User Experience, and User Satisfaction: An Empirical Study

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Abstract

Information systems increasingly mediate learning, work, public services, healthcare, financial transactions, and organizational decision making. Consequently, the success of a digital system depends not only on technical functionality but also on the quality of information it produces, the experience it provides, and users' overall satisfaction. Drawing on the DeLone and McLean Information Systems Success Model and contemporary user-experience research, this study examines the relationships among system quality, information quality, user experience, and user satisfaction. A quantitative, cross-sectional design using convenience sampling produced 300 usable observations. Four reflective constructs System Quality, Information Quality, User Experience, and User Satisfaction were specified with five indicators each and analyzed through consistent partial least squares structural equation modeling in ADANCO 2.4.1 using 5,000 bootstrap samples. The findings indicate a strong positive relationship between System Quality and User Experience, while Information Quality shows a comparatively weak relationship with User Experience. The model explains 89.17% of the variance in User Experience and 47.32% of the variance in User Satisfaction. Total-effect estimates show positive overall effects of both System Quality and Information Quality on User Satisfaction. However, the measurement assessment also identifies substantial overlap between System Quality and User Experience, with HTMT = 0.9552 and HTMT2 = 0.9949, which contributes to unstable direct satisfaction paths. The study therefore provides substantive evidence that quality perceptions matter while also demonstrating the importance of construct distinctiveness when user experience is incorporated into information-systems success research.

Keywords: system quality; information quality; user experience; user satisfaction; information systems success; PLS-SEM; ADANCO

1. Introduction

Digital information systems have evolved from back-office technologies into interactive service environments through which individuals study, work, communicate, transact, access healthcare, obtain public services, and make decisions. As this transformation has accelerated, assessing information-system success solely through technical availability or functional completion has become inadequate. Contemporary users judge systems according to whether they are reliable, responsive, secure, easy to operate, capable of producing useful information, and able to support an efficient and satisfying interaction. The DeLone and McLean Information Systems Success Model remains one of the most influential frameworks for organizing these evaluations because it identifies system quality, information quality, use, user satisfaction, and net benefits as interconnected dimensions of success (DeLone & McLean, 1992, 2003). Later syntheses show that the model remains highly relevant but also that the strength and direction of its relationships vary by technological context, user group, and model specification (Jeyaraj, 2020; Kalankesh et al., 2020).

Recent research confirms that information-system quality continues to matter across e-learning, e-government, enterprise, healthcare, mobile, and academic information systems. Rulinawaty et al. (2024) reported that system and information quality were important components of learning-management-system effectiveness, while Zheng et al.

(2023) demonstrated the continuing relevance of quality dimensions in hospital information systems. In e-government settings, Rahmatullah et al. (2025) likewise showed that information-system success is strongly tied to user satisfaction and net benefits. More recent evidence from academic information systems indicates positive effects of both system quality and information quality on satisfaction, with information quality showing a particularly strong role in some higher-education contexts (Hildawati et al., 2026). Studies of digital tax systems in 2026 similarly report that system and information quality remain central to user satisfaction during large-scale digital-service transitions (Fedora et al., 2026; Saputri & Puspitaningrum, 2026).

Despite this broad evidence, an important conceptual issue remains unresolved. User experience and user satisfaction are often treated as overlapping or interchangeable outcomes, although they capture different stages of evaluation. User experience concerns what users perceive and feel while interacting with a system such as ease, efficiency, enjoyment, usability, and interaction quality whereas user satisfaction reflects a broader post-use judgment about whether the system fulfilled expectations. This distinction is consistent with the integration of object-based and behavioral beliefs proposed by Wixom and Todd (2005) and with the post-adoption logic of expectation-confirmation theory, where satisfaction is formed after users compare realized performance with prior expectations (Bhattacherjee, 2001). Recent digital-platform studies increasingly support the value of separating immediate interaction quality from subsequent satisfaction (Ali et al., 2021; Almusfar, 2025).

The research problem is therefore not merely whether system quality and information quality affect satisfaction, but how quality perceptions relate to the experience through which users encounter the system. A technically reliable system may still generate a poor experience if its interaction flow is confusing, while accurate information may be difficult to interpret or integrate into users' tasks. Conversely, improvements in response speed, usability, clarity, and interaction quality may transform underlying technical capabilities into positive experiential evaluations. Existing DeLone and McLean applications often retain direct paths from quality to satisfaction but do not explicitly distinguish the experiential mechanism through which users engage with system capabilities (Jeyaraj, 2020; Ernungtyas et al., 2024; Rahmatullah et al., 2025).

This study addresses that gap by integrating System Quality, Information Quality, User Experience, and User Satisfaction in one parsimonious structural model. Specifically, it tests whether System Quality and Information Quality positively affect User Experience; whether User Experience positively affects User Satisfaction; and whether System Quality and Information Quality also retain direct positive effects on User Satisfaction. The five hypotheses are specified in the proposed conceptual framework. The study positions User Experience as an intermediate experiential construct without adding formal mediation hypotheses beyond the specified model.

The study contributes in three ways. First, it extends information-systems success research by explicitly distinguishing interaction experience from final satisfaction. Second, it empirically evaluates the relative roles of System Quality and Information Quality rather than assuming that all quality dimensions exert similar effects. Third, it demonstrates a methodological issue that is highly relevant to contemporary PLS-SEM research: reliable measures can still be problematic when two constructs are insufficiently distinct. Current SEM recommendations therefore emphasize simultaneous assessment of reliability, convergent validity, discriminant validity, and structural stability rather than mechanical reliance on isolated thresholds (Henseler et al., 2015; Cheung et al., 2024). Practically, the study helps managers and system designers identify whether improving user outcomes requires changes in technical performance, information outputs, or the experience through which those capabilities are delivered.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Theoretical foundation

The DeLone and McLean Information Systems Success Model provides the central theoretical foundation for the study. The original model synthesized prior information-systems success research into six major dimensions: system quality, information quality, system use, user satisfaction, individual impact, and organizational impact (DeLone & McLean, 1992). The updated model later incorporated service quality and consolidated consequences under net benefits while retaining system quality, information quality, use or intention to use, and user satisfaction as core success dimensions (DeLone & McLean, 2003). The framework remains influential because it separates the quality of the technological system from the quality of the information generated by the system, thereby allowing researchers to examine distinct antecedents of user outcomes.

Subsequent literature has both validated and extended this framework. A critical meta-review by Jeyaraj (2020) found extensive empirical support for the general model but also considerable variation in how constructs and paths are specified across studies. Kalankesh et al. (2020) similarly concluded that user satisfaction is influenced by multiple technical, informational, organizational, and user-level factors. Recent empirical applications continue to adapt the framework to new settings. Rulinawaty et al. (2024)

examined learning-management-system effectiveness, Rahmatullah et al. (2025) investigated e-government success, and Hildawati et al. (2026) evaluated academic information systems. These studies demonstrate that the quality-satisfaction relationship remains relevant even as digital systems become more complex and user centered.

The present study extends this tradition by incorporating User Experience as a distinct construct between quality perceptions and satisfaction. This extension is theoretically consistent with Wixom and Todd's (2005) distinction between object-based beliefs about technology attributes and behavioral beliefs emerging from use. It is also compatible with expectation-confirmation theory, which conceptualizes satisfaction as a post-use evaluation rather than an immediate property of the system itself (Bhattacherjee, 2001). Accordingly, system and information characteristics are expected to shape users' interaction experiences, which in turn contribute to their overall satisfaction judgments.

2.2 System Quality and User Experience

System Quality refers to desirable characteristics of the technological system itself, including reliability, response speed, functionality, accessibility, ease of use, flexibility, and security. In the proposed conceptual framework, System Quality is represented by reliability, response speed, ease of use, functionality, and security. These dimensions align with established DeLone and McLean operationalizations and with recent empirical studies that emphasize usability, responsiveness, technical reliability, and user friendliness as core indicators of system quality (DeLone & McLean, 2003; Zheng et al., 2023; Ernungtyas et al., 2024).

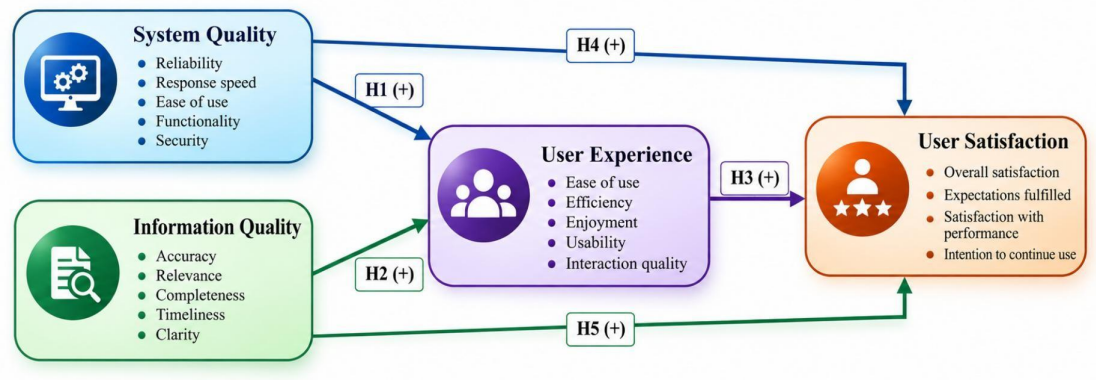

Figure 1. Proposed conceptual model

A direct relationship between System Quality and User Experience is theoretically expected because user experience is formed during interaction with the technology. Reliable system performance reduces interruptions, fast response reduces waiting time, intuitive operation lowers cognitive effort, functional completeness enables task accomplishment, and security supports confidence during use. Poor performance in any of these areas can create friction even if the system ultimately produces correct outputs. In mobile and digital-platform environments, technical quality has been shown to shape engagement and downstream satisfaction (Ali et al., 2021). More recent evidence from learning-management systems similarly indicates that system quality strongly influences user satisfaction and loyalty, particularly through reliability and usability (Almusfar, 2025). The positive role of system quality has also been documented in academic information systems and public digital services (Hildawati et al., 2026; Juliani & Maimunah, 2026).

Because the quality of the underlying system is directly encountered through everyday interaction, stronger technical quality should result in a more efficient, usable, and positive experience. Therefore:

H1: System Quality has a significant positive effect on User Experience.

2.3 Information Quality and User Experience

Information Quality concerns the desirable characteristics of information produced or delivered by an information system. Common criteria include accuracy, relevance, completeness, timeliness, consistency, clarity, and currency. The proposed framework operationalizes Information Quality through accuracy, relevance, completeness, timeliness, and clarity, which closely mirrors the dimensions used in established IS-success research (DeLone & McLean, 2003; Kalankesh et al., 2020).

High-quality information can improve user experience by reducing uncertainty and the amount of effort required to interpret or verify outputs. Accurate and complete information supports task completion; relevant information avoids overload; timely information supports decision making; and clarity enables users to understand system outputs without additional assistance. Research on mobile-payment continuance indicates that information quality remains an important component of post-

adoption evaluation (Franque et al., 2021). Healthcare studies also show that users value information that is accurate, timely, relevant, and understandable (Zheng et al., 2023). In academic systems, Hildawati et al. (2026) found that information quality significantly predicts satisfaction and can sometimes exert a stronger influence than system quality.

However, contemporary evidence also suggests that the influence of information quality is context dependent. Ernungtyas et al. (2024) found that several detailed information-quality dimensions did not independently predict satisfaction once system-level and design characteristics were considered. Ginting et al. (2025) likewise reported a significant role for information quality while system quality was nonsignificant in an ERP-SAP context. These mixed findings suggest that information quality may affect user outcomes through the experience of accomplishing tasks rather than only through a direct cognitive judgment. Hence:

H2: Information Quality has a significant positive effect on User Experience.

2.4 User Experience and User Satisfaction

User Experience captures users' perceptions and responses resulting from interaction with a system. The present framework represents User Experience through ease of use, efficiency, enjoyment, usability, and interaction quality. User Satisfaction, in contrast, is an overall evaluative judgment regarding whether the system fulfills needs and expectations. Distinguishing the two is important because users may first evaluate the quality of an interaction and only subsequently form a broader judgment about whether they are satisfied with the system.

This distinction is supported by technology-acceptance and post-adoption research. Wixom and Todd (2005) show that technology characteristics shape user beliefs that ultimately influence broader evaluations and behavior, while Bhattacherjee (2001) positions satisfaction as a key post-use judgment. Recent evidence similarly shows that user-centered interaction factors such as usability, convenience, engagement, and perceived effort contribute to satisfaction and continuance. Ali et al. (2021) demonstrated that quality characteristics in smartphone travel applications promote engagement and downstream outcomes, and Almusfar (2025) found that system quality, adaptive functionality, and trust shape satisfaction and loyalty in learning-management systems.

Accordingly, when an information system is easy, efficient, usable, and enjoyable to interact with, users should be more likely to judge the system favorably overall. Therefore:

H3: User Experience has a significant positive effect on User Satisfaction.

2.5 System Quality and User Satisfaction

The updated DeLone and McLean model directly associates System Quality with User Satisfaction because users are expected to evaluate technically reliable, responsive, functional, and user-friendly systems more positively (DeLone & McLean, 2003). This proposition has received broad but not universal empirical support. Rokhman et al. (2022) found quality dimensions important for e-learning success, Zheng et al. (2023) reported significant system-quality effects in hospital information systems, and Rulinawaty et al. (2024) found that quality dimensions contribute to learning-management-system effectiveness. More recent research also shows that system quality remains salient in academic systems and digital tax platforms (Hildawati et al., 2026; Juliani & Maimunah, 2026).

At the same time, findings are heterogeneous. Ginting et al. (2025) reported a positive but nonsignificant system-quality effect on ERP-SAP satisfaction, while information quality remained significant. Ernungtyas et al. (2024) found that only selected system-quality dimensions, particularly design appeal and efficiency, significantly predicted satisfaction. Such variation suggests that system quality should be tested directly rather than assumed to have a uniform effect. Based on the dominant theoretical expectation:

H4: System Quality has a significant positive effect on User Satisfaction.

2.6 Information Quality and User Satisfaction

Information Quality is likewise expected to contribute directly to User Satisfaction because users rely on information systems to deliver outputs that are accurate, relevant, timely, complete, and understandable. Inaccurate or outdated information can undermine satisfaction even when the technical platform is stable. Systematic evidence identifies information quality as a recurring antecedent of information-system satisfaction (Kalankesh et al., 2020). Contemporary empirical studies support this relationship across healthcare, education, enterprise systems, e-government, and academic information systems (Franque et al., 2021; Zheng et al., 2023; Rahmatullah et al., 2025; Hildawati et al., 2026).

Recent studies also emphasize that the relative contribution of information quality may differ by context. Ginting et al. (2025) found information quality to be significant in an ERP-SAP setting where system quality was not, while 2026 studies of digital tax systems continue to report meaningful effects of information quality on users' evaluations (Fedora et al., 2026; Saputri & Puspitaningrum, 2026). These results reinforce the theoretical expectation that users' satisfaction depends on both how the system operates and the quality of the information it delivers. Therefore:

H5: Information Quality has a significant positive effect on User Satisfaction.

3. METHODOLOGY

3.1 Research design and sampling

The study employed a quantitative, cross-sectional research design to evaluate the relationships among System Quality, Information Quality, User Experience, and User Satisfaction. Cross-sectional survey designs are widely used in information-systems research because they permit the simultaneous assessment of perceptions of system characteristics and post-use outcomes within a defined period. In accordance with the study specification, convenience sampling was used to obtain responses from accessible users with experience of the information system. Convenience sampling enables efficient access to relevant respondents but, as a nonprobability technique, limits population-level generalization.

The ADANCO dataset contains 300 observations. The iterative estimation algorithm converged after six iterations, indicating numerical convergence. The analysis used 5,000 bootstrap samples, all of which were successfully evaluated. The analytical dataset did not include verified demographic variables, sectoral composition, geographical distribution, recruitment-channel information, or data-collection dates; therefore, subgroup descriptions and demographic comparisons were not undertaken.

3.2 Measurement of constructs

The empirical model contains four latent constructs: System Quality (SQ), Information Quality (IQ), User Experience (UE), and User Satisfaction (US). ADANCO specifies each construct as a latent variable estimated using Mode A consistent and associates five indicators with each construct, yielding 20 observed indicators in total. The indicator domains represented in the conceptual framework are consistent with the DeLone and McLean tradition and with contemporary user-experience literature.

System Quality is represented by reliability, response speed, ease of use, functionality, and security. These dimensions are consistent with DeLone and McLean (2003), Zheng et al. (2023), and recent digital-system studies emphasizing technical reliability and usability (Almusfar, 2025; Hildawati et al., 2026). Information Quality is represented by accuracy, relevance, completeness, timeliness, and clarity, which are standard dimensions in IS-success research (DeLone & McLean, 2003; Kalankesh et al., 2020; Ernungtyas et al., 2024). User Experience is represented by ease of use, efficiency, enjoyment, usability, and interaction quality and is conceptually aligned with user-centered technology evaluation and post-adoption research (Wixom & Todd, 2005; Ali et al., 2021). User Satisfaction captures overall satisfaction, fulfillment of expectations, satisfaction with performance, and continuance-oriented evaluation, consistent with the IS-success and expectation-confirmation traditions (Bhattacherjee, 2001; DeLone & McLean, 2003).

The analytical dataset did not retain the original item wording or response-scale anchors. Accordingly, the cited studies are used as conceptual and measurement anchors for the four constructs rather than as evidence that the questionnaire was reproduced verbatim from any single source. This limitation is acknowledged in interpreting the measurement model and should be addressed in future replication studies through full reporting of item wording and scale anchors.

Table 1. Construct operationalization and relevant measurement sources

Construct	Indicator domain	Measurement anchors
System Quality	Reliability; response speed; ease of use; functionality; security	DeLone & McLean (2003); Zheng et al. (2023); Almusfar (2025)
Information Quality	Accuracy; relevance; completeness; timeliness; clarity	DeLone & McLean (2003); Kalankesh et al. (2020); Ernungtyas et al. (2024)
User Experience	Ease of use; efficiency; enjoyment; usability; interaction quality	Wixom & Todd (2005); Ali et al. (2021)
User Satisfaction	Overall satisfaction; expectation fulfillment; performance satisfaction; continuance-oriented evaluation	Bhattacherjee (2001); DeLone & McLean (2003)

3.3 Analytical technique

The model was analyzed with ADANCO version 2.4.1 using consistent PLS estimation. The algorithm used a factor inner-weighting scheme, a stop criterion of 1.0 × 10^-6, a maximum of 200 iterations, and

random imputation for missing values. Structural inference was based on 5,000 bootstrap samples. PLS-SEM is suitable for simultaneously estimating measurement and structural relationships among latent variables and for examining explanatory and predictive relationships in models with multiple endogenous constructs. Contemporary guidance recommends evaluating indicator reliability, internal-consistency reliability, convergent validity, discriminant validity, collinearity, coefficients of determination, path coefficients, effect sizes, and bootstrap confidence intervals rather than relying on a single model-quality statistic (Hair et al., 2022; Cheung et al., 2024).

Because the constructs were specified as reflective Mode A consistent variables, the analysis is closely aligned with consistent PLS procedures designed to correct attenuation in reflective measurement models (Dijkstra & Henseler, 2015). Internal consistency was assessed using Dijkstra-Henseler's rho_A, Jöreskog's rho_c, and Cronbach's alpha. Convergent validity was evaluated using average variance extracted (AVE), and discriminant validity was assessed primarily through the heterotrait-monotrait ratio (HTMT), which is more sensitive than the Fornell-Larcker criterion to insufficient construct distinctiveness (Henseler et al., 2015). The structural model was evaluated through R-squared, path coefficients, bootstrap inference, total and indirect effects, and Cohen's f-squared effect sizes. Model-fit diagnostics reported by ADANCO were also retained and interpreted transparently rather than ignored when they indicated specification concerns.

4. RESULTS

4.1 Measurement-model assessment

The reliability results indicate satisfactory internal consistency for all four constructs. Dijkstra-Henseler's rho_A ranges from 0.8307 for System Quality to 0.8985 for User Satisfaction; Jöreskog's rho_c ranges from 0.8179 to 0.8959; and Cronbach's alpha ranges from 0.8025 to 0.8958. All values therefore exceed the widely used 0.70 guideline and indicate that the indicator sets are internally consistent.

Convergent validity is stronger for Information Quality and User Satisfaction than for System Quality and User Experience. AVE is 0.4783 for SQ, 0.6031 for IQ, 0.4916 for UE, and 0.6333 for US. Thus, IQ and US exceed the conventional 0.50 benchmark, whereas SQ and UE fall slightly below it. Convergent validity for System Quality and User Experience was therefore marginal, as their AVE values were slightly below the recommended 0.50 benchmark. Accordingly, results involving these constructs should be interpreted with appropriate caution (Cheung et al., 2024).

Indicator loadings range from 0.5156 to 0.7892 for System Quality, from 0.6823 to 0.8902 for Information Quality, from 0.6452 to 0.7615 for User Experience, and from 0.7410 to 0.8551 for User Satisfaction. User Satisfaction therefore demonstrates the strongest overall indicator pattern, while several System Quality and User Experience indicators are comparatively weak.

Discriminant validity is the central measurement concern. HTMT between System Quality and User Experience is 0.9552, exceeding the commonly applied 0.90 guideline, and HTMT2 for the same pair is 0.9949. The remaining HTMT values are materially lower. The elevated HTMT between System Quality and User Experience indicates limited discriminant validity between these constructs. This may partly reflect conceptual proximity between technical usability and users' interaction experience, particularly because ease of use is closely related to both constructs. Accordingly, structural coefficients involving System Quality and User Experience should be interpreted cautiously. Henseler et al. (2015) emphasize that high HTMT values can signal insufficient construct distinctiveness even when reliability is strong

Table 2. Reliability and convergent validity

Construct	rho_A	rho_c	Cronbach α	AVE
System Quality (SQ)	0.8307	0.8179	0.8025	0.4783
Information Quality (IQ)	0.8903	0.8826	0.8825	0.6031
User Experience (UE)	0.8313	0.8279	0.8287	0.4916
User Satisfaction (US)	0.8985	0.8959	0.8958	0.6333

4.2 Structural-model results

The structural model explains a very high proportion of variance in User Experience. The coefficient of determination for UE is R^2 = 0.8917 with adjusted R^2 = 0.8910, meaning that System Quality and Information Quality jointly explain 89.17% of User Experience variance. User Satisfaction has R^2 = 0.4732 and adjusted R^2 =

0.4679, indicating that System Quality, Information Quality, and User Experience explain approximately 47.32% of its variance.

Effect-size estimates further show that the SQ→UE relationship is exceptionally large (f^2 = 4.7765), while IQ→UE is small (f^2 = 0.0568). The UE→US relationship has f^2 = 0.3669, the SQ→US direct effect has f^2 = 0.1472, and IQ→US is negligible at f^2 = 0.0127. These values reinforce the substantive dominance of System Quality in explaining User Experience, but the extremely large SQ→UE effect should be interpreted alongside the discriminant-validity concern described above.

Table 3. Coefficients of determination and effect sizes

Outcome/effect	Statistic	Value
User Experience	R^2 / Adjusted R^2	0.8917 / 0.8910
User Satisfaction	R^2 / Adjusted R^2	0.4732 / 0.4679
SQ → UE	Cohen f^2	4.7765
IQ → UE	Cohen f^2	0.0568
SQ → US	Cohen f^2	0.1472
IQ → US	Cohen f^2	0.0127
UE → US	Cohen f^2	0.3669

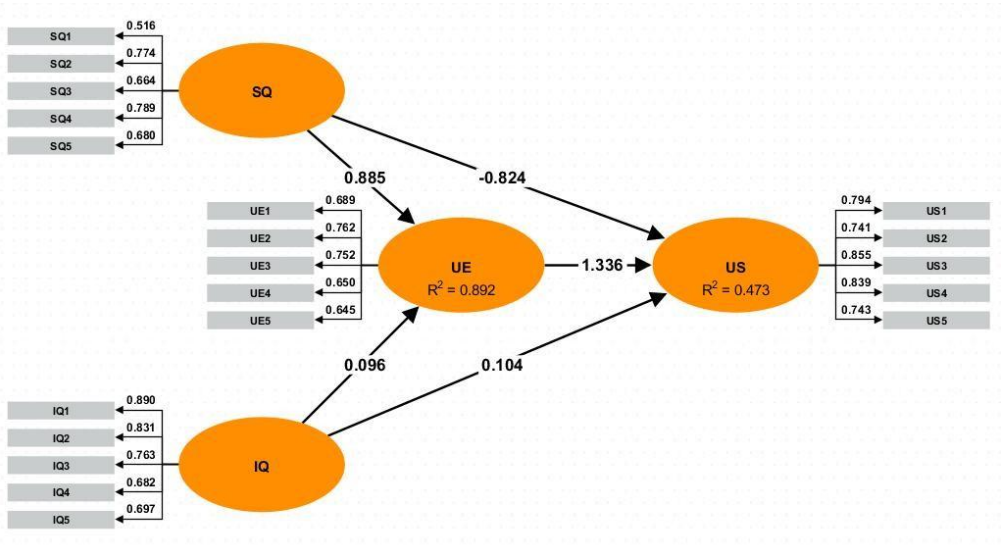

Figure 2. Estimated ADANCO structural model

4.3 Hypothesis testing and supplementary effects

H1 is strongly supported. The path from System Quality to User Experience is positive and large (β = 0.8849, t = 20.9059, two-sided p < 0.001), with a 95% percentile bootstrap interval from 0.8011 to 0.9662. This provides clear evidence that better System Quality is associated with a more positive User Experience.

H2 is positive but marginal under conservative two-sided testing. The IQ→UE coefficient is β = 0.0965 with t = 1.8851 and p = 0.0595; the 95% percentile interval ranges from -0.0032 to 0.1960. ADANCO reports a one-sided p-value of 0.0297. Accordingly, H2 would meet a pre-specified directional one-tailed criterion but not the conventional two-sided 5% criterion. The paper therefore reports it as marginal rather than unequivocally supported.

The remaining direct satisfaction paths are statistically unstable. For H3, UE→US has a large positive point estimate (β = 1.3362), but its bootstrap standard error is 21.1215 and the standard two-

sided p-value is 0.9496. Although the percentile interval is positive, the extreme standard error indicates an unstable bootstrap distribution. Given the unstable bootstrap inference, H3 cannot be considered conclusively supported despite the positive point estimate and percentile confidence interval. H4 is not supported in the direct-effect model, as the estimated SQ→US coefficient is negative (β = -0.8236) and statistically unstable (two-sided p = 0.9677). This result should be interpreted in light of the substantial overlap between System Quality and User Experience. H5 is also not supported under the direct-effect test (β = 0.1036, p = 0.9405).

The direct satisfaction coefficients should not be read in isolation because System Quality and User Experience are highly overlapping predictors. Supplementary total-effect estimates show that the overall effect of System Quality on User Satisfaction is positive and significant (β = 0.3588, t = 4.7137, p < 0.001, 95% percentile CI [0.2086, 0.5082]). Information Quality also shows a significant positive total effect on User Satisfaction (β = 0.2325, t = 3.1459, p = 0.0017, 95% CI [0.0859, 0.3782]). ADANCO additionally reports indirect effects through User Experience of 1.1823 for SQ→US and 0.1289 for IQ→US. Because no formal mediation hypotheses were specified and the SQ-UE discriminant-validity problem affects these estimates, the indirect effects are interpreted as exploratory rather than confirmatory.

Table 4. Direct hypothesis tests based on ADANCO bootstrap output

Hyp.	Path	β	t	p (2-sided)	95% percentile CI	Decision
H1	SQ → UE	0.8849	20.9059	<0.001	[0.8011, 0.9662]	Supported
H2	IQ → UE	0.0965	1.8851	0.0595	[-0.0032, 0.1960]	Marginal / not supported at 2-sided 5%
H3	UE → US	1.3362	0.0633	0.9496	[0.6936, 3.6673]	Inconclusive; unstable bootstrap
H4	SQ → US	-0.8236	-0.0405	0.9677	[-3.0229, -0.1760]	Not supported; opposite sign
H5	IQ → US	0.1036	0.0747	0.9405	[-0.1796, 0.2926]	Not supported

Table 5. Supplementary total and indirect effects

Effect	Direct β	Indirect effect	Total effect	Total-effect p (2-sided)
SQ → US	-0.8236	1.1823	0.3588	<0.001
IQ → US	0.1036	0.1289	0.2325	0.0017
UE → US	1.3362		1.3362	0.9496

4.4 Model-fit and robustness considerations

The ADANCO exact-fit diagnostics indicate model strain. For the saturated model, SRMR is 0.0888 compared with a bootstrap HI95 value of 0.0385; d_ULS is 1.6564 compared with HI95 = 0.3115; and d_G is 0.4210 compared with HI95 = 0.1897. The corresponding estimated-model values are identical in the ADANCO output. These diagnostics therefore do not support close exact fit under the bootstrap criteria.

This pattern is consistent with the measurement overlap between System Quality and User Experience. The findings remain informative because the model explains substantial variance and several effects are strong, but they should be treated as evidence from a model requiring measurement refinement rather than as a final, perfectly fitting specification. Robustness is further evaluated by comparing direct effects with total effects: while individual direct satisfaction paths are unstable, the positive total effects of System Quality and Information Quality on User Satisfaction are statistically significant. This contrast supports a cautious interpretation centered on the overall quality-satisfaction relationship rather than on unstable partitioning of highly correlated predictors.

Table 6. ADANCO model-fit diagnostics

Fit statistic	Observed	HI95	HI99	Interpretation
SRMR	0.0888	0.0385	0.0412	Observed value exceeds bootstrap quantiles
d_ULS	1.6564	0.3115	0.3560	Observed value exceeds bootstrap quantiles
d_G	0.4210	0.1897	0.2181	Observed value exceeds bootstrap quantiles

5. DISCUSSION

The objective of this study was to explain how System Quality and Information Quality relate to User Experience and User Satisfaction within an integrated information-systems success framework. The findings provide a clear substantive message: quality matters, but they also reveal a measurement problem that changes how individual direct effects should be interpreted.

The strongest finding is the effect of System Quality on User Experience. The coefficient of 0.8849, accompanied by a very large effect size, indicates that users' experience is closely associated with their perceptions of reliability, response speed, ease of use, functionality, and security. This finding is theoretically consistent with the DeLone and McLean model, which treats system characteristics as fundamental antecedents of user outcomes (DeLone & McLean, 2003). It also aligns with recent empirical evidence. Almusfar (2025) found that system quality meaningfully affects satisfaction in learning-management systems, emphasizing reliability and usability, while Hildawati et al. (2026) reported a positive relationship between system quality and satisfaction in academic information systems. Comparable findings appear in healthcare and e-government research (Zheng et al., 2023; Rahmatullah et al., 2025).

At the same time, the magnitude of the SQ→UE relationship is unusually high. System Quality and User Experience correlate at 0.9411, their HTMT is 0.9552, and HTMT2 is 0.9949. This indicates that the two constructs are not sufficiently distinct in the current measurement specification. The issue is understandable conceptually: the System Quality block includes ease of use, while User Experience also includes ease of use and usability. The high association therefore suggests that respondents may have perceived System Quality and User Experience as closely related dimensions of the same interaction process. Henseler et al. (2015) developed HTMT precisely to detect such situations, and Cheung et al. (2024) emphasize that high internal consistency does not compensate for weak discriminant validity.

The Information Quality→User Experience path is positive but substantially weaker. The coefficient of 0.0965 suggests that once System Quality is included, the incremental contribution of accurate, relevant, complete, timely, and clear information to immediate experience is modest. This result is consistent with the context-dependent nature of information quality reported in recent literature. In some settings, information quality is a major determinant of satisfaction or effectiveness (Ginting et al., 2025; Hildawati et al., 2026); in others, detailed information-quality dimensions lose significance when system design or efficiency is considered simultaneously (Ernungtyas et al., 2024). The present result suggests that users' moment-to-moment experience may be driven more by how the system behaves than by the incremental quality of its informational content.

This does not mean that Information Quality is unimportant. Its significant positive total effect on User Satisfaction demonstrates that information quality remains relevant when the overall causal chain is considered. Users ultimately depend on an information system not merely to operate smoothly but to deliver accurate and useful outputs. Recent studies of academic information systems and digital public systems similarly show that information quality contributes to satisfaction and broader system success (Rahmatullah et al., 2025; Hildawati et al., 2026; Saputri & Puspitaningrum, 2026). The present findings therefore support a distinction between the immediate interaction experience and the broader value users derive from system outputs.

The most complex result involves User Experience and User Satisfaction. The UE→US point estimate is large and positive, which is substantively consistent with theory, but the standard bootstrap inference is highly unstable. The standard error is exceptionally large, producing a nonsignificant standard p-value even though the percentile confidence interval is positive. This instability is likely caused by the extreme overlap between System Quality and User Experience when both are included as predictors of User Satisfaction. In regression terms, two nearly redundant predictors can produce unstable partial coefficients, sign reversals, and exaggerated standard

errors even when their combined contribution to the outcome is meaningful.

The negative direct SQ→US coefficient illustrates this issue. The negative direct coefficient should not be interpreted as evidence that higher System Quality reduces User Satisfaction, because the bivariate relationship between System Quality and User Satisfaction is positive and the corresponding total effect is also positive and statistically significant. The negative direct coefficient appears only after User Experience, a highly overlapping predictor, is entered simultaneously. This pattern is more consistent with suppression and multicollinearity than with a plausible negative substantive effect. The significant positive total effect of System Quality on satisfaction therefore provides a more theoretically coherent summary of the overall relationship.

The study makes three theoretical contributions. First, it demonstrates the value of separating User Experience from User Satisfaction. Traditional IS-success research often moves directly from system and information quality to satisfaction, whereas the current framework explicitly recognizes that users first experience a system and then evaluate it more globally. This distinction is compatible with the integration proposed by Wixom and Todd (2005) and the post-adoption mechanism described by Bhattacherjee (2001). It also responds to the increasing user-centered orientation of digital-system research, where engagement, usability, convenience, trust, and experience are treated as mechanisms linking system characteristics to post-use outcomes (Ali et al., 2021; Almusfar, 2025).

Second, the study adds to evidence that DeLone and McLean relationships are context dependent rather than universally identical. Jeyaraj (2020) showed substantial variation in empirical applications of the IS-success model. Recent research continues to report different combinations of significant and nonsignificant paths. System quality dominates in some digital settings, information quality dominates in others, and user-centered characteristics become decisive in still others (Ernungtyas et al., 2024; Ginting et al., 2025; Hildawati et al., 2026). The current results reinforce the need to theorize which quality dimension is most salient for a particular system rather than mechanically reproducing every path from prior models.

Third, the study makes a methodological contribution by showing why measurement validation must precede strong structural interpretation. The reliability coefficients are all satisfactory and could create a misleading impression that the measurement model is fully adequate. However, the HTMT results reveal serious overlap between System Quality and User Experience, and the exact-fit tests show model strain. Current SEM guidance increasingly emphasizes this holistic perspective, in which reliability, convergent validity, discriminant validity, model fit, and structural stability are evaluated together (Henseler et al., 2015; Cheung et al., 2024).

The practical implications are direct. Organizations should first ensure that their systems are reliable, fast, functional, secure, and easy to operate because these characteristics are strongly associated with users' experience. Investments in infrastructure, response time, error reduction, navigation, authentication, and functional completeness can therefore produce benefits that users experience immediately. Almusfar (2025) similarly emphasizes reliability, usability, and trust as practical levers of satisfaction in learning platforms, while recent 2026 academic-system evidence highlights the continuing importance of system performance (Hildawati et al., 2026).

Managers should also avoid interpreting the weaker IQ→UE path as evidence that information quality can be neglected. Information quality has a significant positive total effect on satisfaction and remains central to the fundamental purpose of an information system. Users need accurate, timely, complete, relevant, and clear information to make decisions and accomplish tasks. Improvements to interface quality cannot compensate for inaccurate or outdated content. The optimal strategy is therefore dual: improve the technological experience while maintaining the integrity and usefulness of information outputs.

A further managerial implication concerns survey design and system evaluation. Future evaluations should avoid using nearly identical indicators for System Quality and User Experience. Technical system quality can be measured through system availability, reliability, security, integration, processing speed, error recovery, and functional completeness. User Experience can then focus on experiential responses such as perceived effort, flow, enjoyment, interaction intuitiveness, cognitive burden, and overall interaction quality. This clearer separation would improve diagnostic usefulness because managers could determine whether dissatisfaction originates in technical infrastructure or in the way users experience the interface.

The study has several limitations. First, convenience sampling restricts representativeness and limits the ability to generalize beyond the observed respondents. Second, the cross-sectional design does not establish temporal causality. Third, the analytical dataset does not include verified demographics, sectoral composition, or usage history, so subgroup differences could not be examined. Fourth, System Quality and User Experience exhibit limited discriminant validity, which may affect the stability of structural paths involving these constructs; both also have AVE values slightly below 0.50. Fifth, the exact-fit diagnostics indicate model strain, while several satisfaction paths have unstable bootstrap standard

errors. These limitations call for cautious interpretation of the structural estimates.

Future research should refine the measurement specification and rerun the model. A revised System Quality scale should remove experiential wording that overlaps with User Experience, particularly duplicated ease-of-use content. User Experience could be measured through a validated multidimensional UX instrument with stronger emphasis on interaction and affective responses. Longitudinal studies could examine whether improvements in technical and informational quality first alter experience and then produce subsequent changes in satisfaction and continuance. Researchers could also introduce service quality, trust, perceived usefulness, digital literacy, task-system fit, or continuance intention as theoretically justified extensions. Multi-group analysis could determine whether relationships differ across user experience levels, age groups, organizational roles, or digital-service categories. Such extensions would build on the continuing evolution of the DeLone and McLean model documented in contemporary IS-success research (Rulinawaty et al., 2024; Rahmatullah et al., 2025; Hildawati et al., 2026).

6. CONCLUSION

This study investigated the relationships among System Quality, Information Quality, User Experience, and User Satisfaction using a five-hypothesis information-systems success model. Based on 300 observations and consistent PLS estimation with 5,000 bootstrap samples, System Quality emerged as the strongest predictor of User Experience, while Information Quality made a comparatively modest contribution. The model explained 89.17% of User Experience and 47.32% of User Satisfaction. Although several direct satisfaction paths were unstable, the total effects of both System Quality and Information Quality on User Satisfaction were positive and significant.

The study's central theoretical contribution is the explicit distinction between User Experience and User Satisfaction within an IS-success framework. Its main methodological lesson is equally important: two constructs can be individually reliable yet insufficiently distinct. The high overlap between System Quality and User Experience suggests that future studies should further refine the distinction between technical system characteristics and experiential evaluations. Practically, the results indicate that successful digital systems require both dependable technical performance and high-quality information, delivered through an interaction that users experience as efficient and usable. Future replication across broader and more representative user samples would help assess the robustness of this experiential logic.

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