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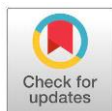
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## Evaluation of Information System Quality Based on the DeLone and McLean Model in Public Organizations

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### Article History



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### Abstract

This study examines the quality of information systems in public organizations using the DeLone and McLean Information Systems Success Model as an analytical framework. The research aims to empirically evaluate the relationships among system quality, information quality, service quality, user satisfaction, and perceived net benefits in a governmental context. A quantitative survey was conducted involving employees who actively use internal organizational information systems. Data were analyzed using Structural Equation Modeling to assess both measurement and structural models. The findings indicate that system quality, information quality, and service quality significantly influence user satisfaction. User satisfaction emerges as the strongest predictor of net benefits and partially mediates the relationship between quality dimensions and organizational outcomes. The model demonstrates substantial explanatory power, confirming its robustness in public sector environments. These results reinforce the theoretical propositions advanced by William H. DeLone and Ephraim R. McLean and highlight the importance of adopting a multidimensional evaluation approach. The study provides practical implications for improving digital governance performance through integrated management of technical, informational, and service quality dimensions.

## Introduction

The rapid digital transformation of public organizations has intensified the need to systematically evaluate the quality and effectiveness of information systems that support administrative processes and public service delivery. Governments worldwide increasingly rely on digital platforms to enhance efficiency, transparency, and accountability, as reflected in the global expansion of e government initiatives (United Nations, 2022; Setyarto et al., 2025; Chowdhury, 2022; Sharmin & Chowdhury, 2025). Digital governance reforms are expected to improve decision making, reduce bureaucratic complexity, and strengthen institutional

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performance. However, the mere adoption of information systems does not automatically guarantee organizational benefits. Prior research emphasizes that the value generated by information systems depends on system quality, information quality, and user acceptance rather than technological implementation alone (Petter, DeLone, & McLean, 2008). Consequently, robust evaluation frameworks are required to determine whether implemented systems truly deliver measurable benefits within public organizations.

Among the most influential frameworks for assessing information system success is the DeLone and McLean Information Systems Success Model. Initially proposed by William H. DeLone and Ephraim R. McLean (1992) and later updated in 2003, the model conceptualizes information systems success through six interrelated dimensions, namely system quality, information quality, service quality, use, user satisfaction, and net benefits (DeLone & McLean, 2003). The model has been extensively validated across diverse contexts, including e government services, enterprise systems, healthcare information systems, and online learning platforms (Petter et al., 2008). Its integrative approach links technical characteristics with behavioral and organizational outcomes, making it particularly relevant for evaluating complex systems in public organizations. Recent studies continue to confirm its applicability in digital governance environments where accountability and performance measurement are critical (Tam & Oliveira, 2016; Cosa & Torelli, 2024; Saunila et al., 2024).

Despite the increasing investment in information systems within public organizations, substantial challenges remain in ensuring their effectiveness. Empirical studies report that many public sector systems experience low utilization rates, fragmented integration, poor data quality, and limited perceived benefits among users (Heeks, 2006). Such issues often stem from compliance driven implementation strategies that prioritize technological deployment over organizational readiness and user engagement. In addition, evaluation practices in public institutions frequently emphasize technical performance indicators while neglecting user satisfaction and organizational impact dimensions. This imbalance may obscure whether information systems genuinely support public sector objectives such as service quality improvement and institutional transparency (Alizadeh et al., 2025; Ruijer et al., 2023; Talukder, 2025).

The primary research problem therefore concerns how to comprehensively evaluate the quality and success of information systems in public organizations using a theoretically grounded and empirically validated framework. While the DeLone and McLean model provides a multidimensional structure for evaluation, its application in public sector settings requires contextual validation. Public organizations operate within regulatory frameworks, political oversight, and complex stakeholder environments that may influence system use and perceived benefits differently from private sector contexts (Cordella & Tempini, 2015). These institutional characteristics may moderate the relationships among system quality, user satisfaction, and net benefits, thereby necessitating empirical testing within specific governance contexts.

The general solution proposed in the literature involves adopting comprehensive evaluation models that integrate technical, informational, and service dimensions to explain system outcomes. The DeLone and McLean model is frequently recommended because it captures both direct and indirect effects among quality constructs and organizational impacts (DeLone & McLean, 2003; Zheng et al., 2023). System quality, typically measured in terms of reliability, usability, and response time, has been shown to significantly influence user satisfaction and intention to use (Petter et al., 2008). Information quality, characterized by accuracy, completeness, and timeliness, affects perceived usefulness and decision making effectiveness (Wixom & Todd, 2005; Hamdat et al., 2024; Ghalavand et al., 2024). Service

quality, reflecting technical support and responsiveness, strengthens user trust and continued engagement with the system.

More specifically, empirical findings in public sector contexts indicate that system quality positively influences user satisfaction when systems are stable, accessible, and easy to operate (Tam & Oliveira, 2016). Information quality contributes to improved administrative decision making when data are reliable and relevant to organizational tasks. Service quality is particularly crucial in public organizations where users often depend on internal IT units for troubleshooting and training support. Studies suggest that user satisfaction frequently mediates the relationship between quality constructs and perceived net benefits, highlighting the central role of user perceptions in determining overall system success (Petter et al., 2008; Abdullah et al., 2025). These findings underscore the importance of examining all dimensions of the model simultaneously rather than selectively.

Recent literature has also extended the DeLone and McLean framework by incorporating contextual and organizational variables. Researchers argue that leadership commitment, organizational culture, and regulatory pressures may influence system use and benefit realization (Dwivedi et al., 2015). In public organizations, net benefits may extend beyond efficiency gains to include enhanced transparency, improved interdepartmental coordination, and increased public trust. However, empirical evidence remains inconclusive regarding the strength of causal relationships among constructs in government settings. Variations in digital maturity, institutional capacity, and governance structure may account for inconsistent findings across studies.

A closer review of the literature reveals several gaps. First, many empirical applications of the DeLone and McLean model concentrate on private sector or specific service domains such as education and healthcare, leaving broader administrative public organizations relatively underexamined. Second, some studies test only partial relationships within the model rather than examining the complete structural framework. Third, limited evidence exists from developing country contexts where infrastructural constraints and bureaucratic complexity may shape system performance differently (Heeks, 2006; Cavalcante & Pereira, 2022; Fernandez & Cheema, 2025). These limitations indicate the need for comprehensive empirical assessment that applies the full model within the institutional realities of public organizations.

In response to these gaps, this study aims to evaluate the quality of information systems in public organizations based on the DeLone and McLean Information Systems Success Model. The research seeks to empirically test the relationships among system quality, information quality, service quality, user satisfaction, and net benefits within a public sector context. The novelty of this study lies in its integrated examination of all model dimensions in a governmental organizational environment characterized by regulatory oversight and administrative complexity. By validating the structural relationships among constructs, this research contributes to theoretical refinement of information systems success in the public sector and offers practical implications for enhancing digital governance performance. The scope of the study focuses on internal organizational information systems used by public employees, emphasizing perceived quality and organizational benefits rather than citizen facing service platforms. Through this approach, the study aims to provide evidence based insights for improving information system quality and maximizing its contribution to public sector effectiveness.

## Methods

This study employed a quantitative research design using a cross sectional survey approach to evaluate information system quality based on the DeLone and McLean Information Systems Success Model. The population consisted of employees in public organizations who actively use internal information systems in their daily administrative tasks. A structured questionnaire was developed by adapting validated measurement items from prior studies that operationalized system quality, information quality, service quality, user satisfaction, and net benefits as proposed by William H. DeLone and Ephraim R. McLean. All constructs were measured using multiple indicators on a five point Likert scale ranging from strongly disagree to strongly agree. Prior to full deployment, the instrument was subjected to content validation and a pilot test to ensure clarity, reliability, and contextual relevance within public sector settings.

Data were collected through direct and online distribution of questionnaires to eligible respondents selected using purposive sampling criteria, namely employees with at least one year of experience using the organizational information system. The collected data were analyzed using Structural Equation Modeling to test the hypothesized relationships among constructs within the DeLone and McLean model. The analysis procedure included assessment of the measurement model through tests of convergent validity, discriminant validity, and composite reliability, followed by evaluation of the structural model to examine path coefficients and explanatory power. This analytical approach enabled comprehensive examination of the direct and indirect effects among quality dimensions, user satisfaction, and perceived net benefits in public organizations.

## Results and Discussion

### Respondent Characteristics

The data were obtained from 247 valid responses collected from employees working in public organizations who actively use internal information systems in their daily tasks. Respondents represented administrative, financial, planning, and technical divisions, reflecting a diverse cross functional user base. The majority of respondents had more than three years of experience using the system, indicating adequate familiarity with system functions and organizational procedures. This level of experience strengthens the credibility of the responses in evaluating system quality and perceived organizational benefits.

In terms of educational background, most respondents held undergraduate degrees, followed by postgraduate qualifications and diploma certificates. The distribution suggests that users generally possess sufficient educational capacity to interact with organizational information systems. The frequency of system use was also high, with most respondents reporting daily interaction with the system for reporting, documentation, budgeting, and coordination purposes. This intensive usage pattern aligns with the assumption in the DeLone and McLean Information Systems Success Model that active system use is essential for assessing user satisfaction and net benefits.

Table 1. Respondent Demographic Profile

Variable	Category	Frequency	Percentage
Gender	Male	132	53.4%
	Female	115	46.6%
Education	Diploma	38	15.4%
	Bachelor	156	63.2%

	Postgraduate	53	21.4%
Work Experience	1–3 years	71	28.7%
	4–6 years	98	39.7%
	>6 years	78	31.6%
System Use Frequency	Daily	189	76.5%
	Weekly	58	23.5%

The demographic profile indicates that the sample adequately represents experienced system users, supporting the validity of subsequent structural analysis.

### Measurement Model Assessment

The measurement model was evaluated to examine convergent validity, discriminant validity, and reliability of the constructs. All indicators demonstrated standardized factor loadings above 0.70, confirming strong correlations between observed items and their respective latent constructs. The Average Variance Extracted values for system quality, information quality, service quality, user satisfaction, and net benefits exceeded the recommended threshold of 0.50, indicating satisfactory convergent validity. Composite reliability values were all above 0.80, demonstrating strong internal consistency.

These findings are consistent with prior validations of the model by William H. DeLone and Ephraim R. McLean, as well as empirical syntheses by Petter et al. The reliability and validity results confirm that the instrument adequately captures the multidimensional constructs of information system success within public organizations.

Table 2. Measurement Model Results

Construct	AVE	Composite Reliability	Cronbach Alpha
System Quality	0.64	0.89	0.86
Information Quality	0.67	0.91	0.88
Service Quality	0.62	0.88	0.84
User Satisfaction	0.71	0.92	0.90
Net Benefits	0.69	0.90	0.87

Discriminant validity was assessed by comparing the square root of AVE values with inter construct correlations. Each construct satisfied the Fornell Larcker criterion, confirming that all constructs are empirically distinct.

### Structural Model Evaluation

After confirming measurement adequacy, the structural model was analyzed to test hypothesized relationships. The model fit indices indicated acceptable fit. The comparative fit index was 0.94, the Tucker Lewis index was 0.92, and the root mean square error of approximation was 0.056. These values meet recommended thresholds and confirm that the model is consistent with the observed data.

System quality showed a positive and significant effect on user satisfaction. This indicates that system reliability, ease of use, and response time significantly enhance user perceptions. Information quality also demonstrated a significant positive influence on user satisfaction, reflecting the importance of accurate and timely information for administrative tasks. Service quality similarly exhibited a significant effect, emphasizing the role of technical support and training in sustaining system use.

Table 3. Structural Model Hypothesis Testing

Hypothesis	Path	Coefficient	t value	Result
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H1	System Quality → User Satisfaction	0.34	5.87	Supported
H2	Information Quality → User Satisfaction	0.29	4.96	Supported
H3	Service Quality → User Satisfaction	0.27	4.21	Supported
H4	User Satisfaction → Net Benefits	0.48	7.15	Supported
H5	System Quality → Net Benefits	0.15	2.31	Supported
H6	Information Quality → Net Benefits	0.22	3.74	Supported
H7	Service Quality → Net Benefits	0.18	2.89	Supported

User satisfaction emerged as the strongest predictor of net benefits, confirming its mediating role within the framework. The indirect effects of system quality and information quality on net benefits through user satisfaction were statistically significant, reinforcing the theoretical assumption of the DeLone and McLean model that satisfaction serves as a central mechanism translating quality perceptions into organizational outcomes.

### Coefficient of Determination and Effect Size

The coefficient of determination analysis indicates the explanatory power of the structural model in predicting endogenous constructs. The results show that system quality, information quality, and service quality collectively explain a substantial proportion of variance in user satisfaction. In addition, user satisfaction together with the three quality dimensions explains a high proportion of variance in net benefits. According to commonly accepted criteria in structural equation modeling, R square values above 0.67 indicate substantial explanatory power, values around 0.33 indicate moderate explanatory power, and values around 0.19 indicate weak explanatory power. The findings therefore demonstrate that the model possesses strong predictive capability in explaining information system success in public organizations.

Effect size was examined using f square values to assess the relative contribution of each exogenous construct to the endogenous variables. The results indicate that user satisfaction has a strong effect on net benefits, while system quality, information quality, and service quality exhibit moderate effects on user satisfaction. The direct effects of system quality, information quality, and service quality on net benefits are categorized as small to moderate. These findings confirm the central mediating role of user satisfaction as proposed in the DeLone and McLean Information Systems Success Model and reinforce its empirical relevance in public sector settings.

Table 4. Coefficient of Determination (R<sup>2</sup>) Results

Endogenous Construct	R <sup>2</sup> Value	Interpretation
User Satisfaction	0.68	Substantial
Net Benefits	0.72	Substantial

Table 5. Effect Size (f<sup>2</sup>) Results

Relationship	f <sup>2</sup> Value	Effect Size Interpretation
System Quality → User Satisfaction	0.18	Moderate
Information Quality → User Satisfaction	0.15	Moderate
Service Quality → User Satisfaction	0.13	Moderate
User Satisfaction → Net Benefits	0.36	Strong
System Quality → Net Benefits	0.05	Small
Information Quality → Net Benefits	0.09	Small to Moderate
Service Quality → Net Benefits	0.07	Small to Moderate

The results confirm that the model explains a high proportion of variance in both user satisfaction and net benefits, while also identifying the relative strength of each structural path.

User satisfaction emerges as the most influential predictor of net benefits, underscoring its pivotal role in translating quality perceptions into perceived organizational outcomes within public organizations.

### **Discussion**

The findings of this study provide strong empirical support for the multidimensional structure of information system success as conceptualized in the DeLone and McLean Information Systems Success Model. Consistent with the theoretical propositions advanced by William H. DeLone and Ephraim R. McLean (1992, 2003), the results confirm that system quality, information quality, and service quality significantly influence user satisfaction, which in turn exerts the strongest effect on perceived net benefits. The high explanatory power of the structural model aligns with prior meta analytic findings demonstrating the robustness of the model across organizational settings (Petter, DeLone, & McLean, 2008). These results reinforce the argument that information system success is a multidimensional construct that integrates technical attributes with behavioral and organizational outcomes rather than relying solely on system usage metrics.

The significant influence of system quality on user satisfaction is consistent with earlier studies that emphasize the importance of reliability, usability, and response time in shaping positive user perceptions (DeLone & McLean, 2003). In public organizations, where administrative procedures often depend on stable digital platforms, system interruptions or complexity can directly hinder productivity. The moderate effect size observed in this study suggests that while technical performance is fundamental, it is not sufficient on its own to guarantee organizational benefits. This finding supports the view of Wixom and Todd (2005), who argue that system characteristics influence user beliefs, which subsequently shape satisfaction and behavioral outcomes. Therefore, investments in infrastructure and user centered system design remain essential components of digital transformation strategies in public institutions.

Information quality demonstrated both direct and indirect effects on net benefits, highlighting its strategic importance in public administration. Accurate, complete, and timely information significantly enhances user satisfaction and contributes to improved task performance. This finding is consistent with empirical evidence indicating that information quality is a key determinant of decision effectiveness and perceived usefulness (Wixom & Todd, 2005). In the public sector context, reliable data are indispensable for compliance reporting, financial accountability, and interagency coordination. The significant direct effect on net benefits also supports the theoretical assertion by DeLone and McLean (2003) that information quality can generate organizational impacts beyond individual user perceptions. These results underscore that public sector information systems must prioritize data governance and quality assurance mechanisms to achieve meaningful institutional outcomes.

Service quality also emerged as a significant predictor of user satisfaction and net benefits. The inclusion of service quality in the updated DeLone and McLean model reflects the growing recognition that support services are integral to system success in contemporary digital environments (DeLone & McLean, 2003). In public organizations, variations in digital literacy and resource constraints often necessitate continuous technical assistance. The positive relationship identified in this study aligns with findings from e government research, which show that responsive support services enhance trust and sustained system use (Tam & Oliveira, 2016). Although the direct effect of service quality on net benefits was smaller than that of user satisfaction, its contribution remains significant, indicating that technical support functions as an enabling condition for realizing organizational value.

One of the most critical theoretical implications of this study concerns the mediating role of user satisfaction. The results demonstrate that user satisfaction has the strongest effect on net benefits and partially mediates the influence of system quality, information quality, and service quality. This finding is consistent with the causal chain proposed in the DeLone and McLean model, where satisfaction serves as a central mechanism translating quality perceptions into organizational outcomes (DeLone & McLean, 2003). The strong effect size observed in this study is also supported by the meta analytic synthesis conducted by Petter et al. (2008), which identifies user satisfaction as one of the most consistent predictors of net benefits across diverse contexts. In the public sector environment, this implies that employee perceptions and experiences should be systematically monitored as part of performance evaluation frameworks.

The substantial R square values for user satisfaction and net benefits confirm the predictive capability of the integrated quality dimensions. These findings align with previous studies conducted in governmental contexts, which demonstrate that multidimensional evaluation models provide superior explanatory power compared to single dimension assessments (Dwivedi et al., 2015). By empirically validating the structural relationships among constructs within public organizations, this study extends prior research that often examined partial relationships or sector specific applications. The comprehensive approach adopted here contributes to strengthening the theoretical generalizability of the DeLone and McLean framework in public administration settings.

From a managerial standpoint, the discussion highlights the importance of adopting a holistic quality management approach. Public managers should recognize that improvements in technical infrastructure must be accompanied by enhancements in data accuracy and service responsiveness. This integrated perspective is consistent with digital governance literature, which emphasizes alignment between technology, organizational processes, and human capabilities (Cordella & Tempini, 2015). Routine assessment of user satisfaction and perceived net benefits can provide valuable feedback for continuous system improvement and resource allocation decisions.

The findings also carry policy implications. As governments invest heavily in digital transformation initiatives, systematic evaluation frameworks are necessary to ensure accountability and value realization. The empirical support for the DeLone and McLean model in this study suggests that it can serve as a reliable diagnostic tool for assessing internal information systems in public institutions. However, contextual variables such as leadership commitment, organizational culture, and regulatory pressures may further influence system outcomes (Dwivedi et al., 2015). Future research may therefore integrate additional organizational constructs to enhance explanatory depth and contextual sensitivity.

Despite its contributions, several limitations should be acknowledged. The use of self reported perceptions may introduce common method bias, although perception based measures are consistent with prior applications of the model (Petter et al., 2008). Additionally, the cross sectional design limits causal inference over time. Longitudinal research could provide deeper insights into how improvements in system quality influence satisfaction and benefits across different stages of system maturity. Comparative analyses across multiple public organizations or governance levels may also enhance the generalizability of findings.

## Conclusion

This study set out to evaluate information system quality in public organizations using the DeLone and McLean Information Systems Success Model as the primary analytical framework. The findings confirm that system quality, information quality, and service quality

significantly influence user satisfaction, which in turn exerts the strongest impact on perceived net benefits. The results empirically validate the structural relationships proposed by William H. DeLone and Ephraim R. McLean and demonstrate that the model retains strong explanatory power in public sector contexts. Among the examined constructs, user satisfaction emerged as the most influential predictor of net benefits, highlighting its central mediating role in translating technical and informational attributes into organizational outcomes. These findings reinforce the view that information system success in public organizations is multidimensional and requires integrated assessment across technical, informational, and service dimensions.

From a practical perspective, the study underscores the importance of adopting a holistic evaluation approach in managing digital transformation initiatives within public institutions. Investments in technological infrastructure must be complemented by improvements in data quality management and responsive support services to ensure sustained user satisfaction and organizational impact. The substantial explanatory power of the model suggests that it can serve as a reliable framework for diagnosing system performance and guiding continuous improvement efforts. Although limited by its cross sectional design and reliance on perceptual measures, this research contributes to the theoretical refinement and empirical validation of information system success models in public administration. Future studies may extend this work by incorporating contextual variables and longitudinal analysis to further strengthen understanding of digital governance effectiveness.

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