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Assessing Amdalnet's Role in Digitalizing Environmental Approval in Indonesia: An Information System Success Model Approach

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ABSTRACT

Amdalnet is a digital transformation for Indonesia's environmental assessment process. It is very important for acceleration process, but there aren't many in-depth studies that look at how well it works. This study evaluates the efficacy of Amdalnet through the DeLone and McLean Information System Success Model, which includes six evaluative criteria: system quality, information quality, service quality, use, user satisfaction, and the net benefits derived from the system. A structured online survey with 125 participants, consultants, reviewers, and system administrators, utilized a five-point Likert scale for data collection. After that, Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to look at the data. The results showed that five of the eight hypotheses were supported by the empirical data. Both system quality and service quality significantly improved user satisfaction and use, and use was a strong predictor of net gains. On the other hand, the quality of the information didn't have much of an effect on how people used the system or how satisfied they were with it, and user satisfaction didn't have much of an effect on net benefits. These findings indicate that user engagement in mandatory digital platforms such as Amdalnet is predominantly driven by regulatory compliance requirements rather than the perceived advantages of the system. The study emphasizes the imperative for user-centric design in regulatory information systems to enhance both effectiveness and legitimacy in environmental governance. Policy implications are needed to improve the quality and legitimacy of Indonesia's environmental approval process during digital transformation.

Introduction

It is very important to have information systems that speed up the process of getting environmental permission, which needs to be quick, accurate, and legally certain [1]. To improve governance, the Indonesian Ministry of Environment and Forestry (MoEF) set up the Amdalnet information system in February 2023. Since August 2021, this portal has been connected to the Online Single Submission Risk-Based Approach (OSS-RBA). It gives businesses with low and medium-low risks the paperwork they need to get permission from the government to do business, like the Environmental Management Effort – Environmental Monitoring Effort (EMAF-EMOF) form.

Amdalnet is a new digital tool that aims to make it easier to get environmental permission by combining document submission, evaluation workflows, monitoring activities, and communication with stakeholders into one platform. The plan is to make things more open, speed up processing times, and make sure that everyone involved, like project supporters, environmental experts, evaluators, and communities that are affected, follows the rules. By automating some tasks, Amdalnet makes it easier to fill out environmental

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forms and keep an eye on the approval process. It tries to make the process of getting environmental permits faster and better, and it also makes sure that people who want to build something do their part to protect the environment [2].

It is important to look at how well Amdalnet works in terms of both technical performance and how users feel about it and the benefits they see because it is a strategic tool. The DeLone and McLean Information System Success Model (2003) provides a comprehensive framework for evaluating information systems across six essential dimensions: system quality, information quality, service quality, use, user satisfaction, and net benefits. Recent academic studies have highlighted the importance of utilizing contemporary empirical frameworks, such as user-centered and public value methodologies, in the assessment of digital public services. Studies [3–5] demonstrate that user-centered design enhances system adoption, user engagement, and service efficacy. Moreover, another study [6] underscores the imperative of incorporating design thinking and public value considerations into evaluative frameworks. This compilation of literature underscores the imperative of contextualizing the IS Success Model to enable more thorough and relevant assessments in the realm of public-sector digital services [7].

A national study utilizing PLS-SEM (Partial Least Squares Structural Equation Modelling) to evaluate digital government services demonstrated that system quality significantly influences user satisfaction and utilization, thereby impacting perceived public value. Subsequent investigations have employed similar models across diverse domains, underscoring the importance of system, information, and service quality as pivotal determinants of system efficacy, particularly in developing countries [8,9]. Moreover, evaluations of digital services are increasingly emphasizing both technological aspects and ethical considerations, such as informed consent and equitable access [10]. These new ideas build on and improve the original IS success model, making it a better way to judge systems like Amdalnet.

We need to look at the Amdalnet information system, which is a type of digital transformation, to see how useful it is in terms of the quality of the system, the quality of the information, and the quality of the service. This research utilizes the information systems success model proposed by Delone and McLean. This model evaluates success through six criteria: information quality, service quality, system quality, use, user satisfaction, and net benefit (individual impact) [10,11]. The DeLone and McLean framework has been widely employed across various industries; however, most contemporary studies focus on general-purpose information systems or commercial applications, with a notable deficiency of research investigating its relevance to compliance-oriented regulatory platforms like Amdalnet. Moreover, scant research has integrated public value and user-centered methodologies within this framework, particularly concerning environmental regulation systems.

The study employs the revised DeLone–McLean IS Success Model to evaluate Amdalnet's performance in Indonesia's environmental approval process, addressing the identified gap. The objective is to empirically evaluate Amdalnet's success attributes to discern the factors that most profoundly influence its perceived success among users. The expected contributions of the study are to (1) provide significant insights for system improvement by identifying the key factors that affect the perceived success of Amdalnet, and (2) advance digital environmental governance frameworks by offering empirical evidence on the application of the Delone and McLean information system success model within a regulatory platform context [11–13].

Materials and Methods

Methodology

This study utilizes the DeLone–McLean Information Systems Success Model to evaluate the efficacy of Amdalnet by analyzing six latent constructs: system quality, information quality, service quality, use, user satisfaction, and net benefits. This study was carried out in Indonesia, concentrating on the national environmental approval system overseen by the MoEF. The *2023 Rapat Kerja Nasional Analisis Mengenai Dampak Lingkungan* (Rakernas Amdal) on November 23–24, 2023, in Jakarta, was where data was collected. Key system users were there. An organized online survey was sent out through institutional channels and professional networks.

Respondents were chosen through purposive sampling based on the following criteria: (1) they are active users of the Amdalnet system; (2) they have used at least the three main Amdalnet modules (document screening, document preparation, and assessment/approval); and (3) they represent a range of stakeholder groups that are involved in the process of getting environmental approval. We got 125 valid responses in all.

The questionnaire items were derived from validated prior studies [14–16], and were assessed using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Three domain experts from the fields of information systems, environmental impact assessment, and environmental policy in Indonesia confirmed the validity, while Cronbach's alpha and composite reliability were used to check the reliability. We used SmartPLS 4.0 to do Structural Equation Modeling with PLS-SEM. Figure 1 shows the flowchart of the research method.

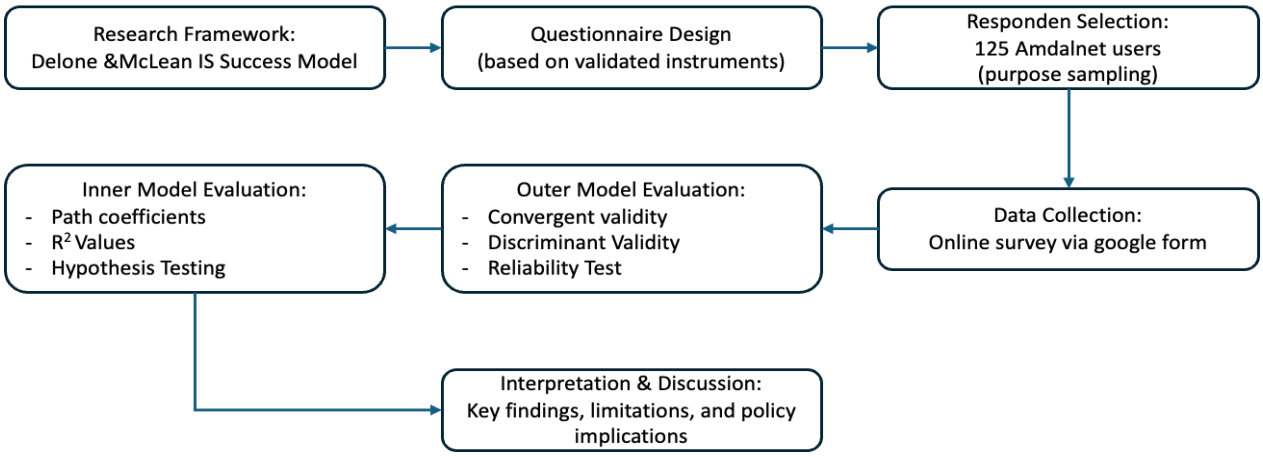

Figure 1. Research methodology flowchart illustrating sequential stages of the PLS-SEM process from conceptual framework and instrument design to data collection, model evaluation (outer and inner models), and interpretation of findings.

The evaluation of the model occurred in two stages: the assessment of the measurement model (outer model) and the structural model (inner model), utilizing the criteria of convergent validity, discriminant validity, and path coefficient significance [17]. The bootstrapping method was used to test the hypotheses, and path coefficients were thought to be statistically significant if the t-statistic was greater than 1.65 (one-tailed, α = 0.05). This research complied with ethical standards. Participation was voluntary, and all respondents provided informed consent digitally. We got digital informed consent from all of the people who answered, and participation was completely up to them. All of the data were made anonymous to protect privacy.

Structural Equation Modeling (SEM) analysis involves two stages of testing, i.e., the outer model and the inner model (structural model). The outer model analysis assesses whether the measurement model is valid and reliable, and specifies the relationships between latent variables and their indicators [18]. This analysis includes several indicators [19]. validity test and reliability test. Validity tests such as convergent validity, which evaluated by looking at the correlation between the construct score and the item/component score, as shown in [16]. The loading factor is used to quantify convergent validity. The loading factor quantifies convergent validity, characterizing the strength of the relationship between each indicator and its construct. An item is considered valid if its individual reflexive measure correlates with the construct to be measured with a value greater than 0.70. The next aspect of validity is discriminant validity, which is tested using the Average Variance Extracted's (AVE) square roots. Discriminant validity assesses the AVE value of each construct in relation to the interrelationships among the model's other constructs. If the AVE root value of a construct is higher than the correlation value between it and other constructs, it is said to have good discriminant validity. The AVE score, which should be higher than 0.50, also shows that the test is very good at telling the difference between different groups. The equation 1 gives us AVE [20].

$$AVE = \frac{\Sigma \lambda_i{}^2}{\Sigma \lambda_i{}^2 + \Sigma_i \, var\,(\varepsilon_i)} \tag{1}$$

Where is the loading factor (convergent validity), and = 1 – (λ_i $\varepsilon_i \Sigma \lambda_i{}^2$ [21,22]).

Reliability testing in the outer model includes composite reliability, denoted as (ρ_c) is used as an indication to quantify a construct that is visible in the coefficients of latent variables, which are calculated through equations 2 [20]:

$$\rho_c = \frac{(\Sigma_i \, l_i)^2}{(\Sigma_i \, l_i)^2 + \Sigma_i var\,(e_i)} \tag{2}$$

In this measurement, if the value achieved is > 0.70, it can be said that the construct has high reliability. Cronbach's Alpha is another reliability test, which further strengthens the results of composite reliability, with values greater than 0.70 indicating reliability.

The inner model (structural model), which is the second step in SEM analysis, predicts how latent variables are related to each other [23]. This assessment encompasses path coefficients, model fit tests, and R^2. After the model fit tests, the importance of the path coefficient and R^2 are checked. This model fit test is meant to find out if the model and the data are the same. The model fit test has five test indices: average path coefficient (APC), average R-squared (ARS), average adjusted R-squared (AARS), and average variance factor (AVIF). If the *p-value* is less than 0.05 and the AVIF is less than 5, then APC, ARS, and AARS values indicate an acceptable model fit. Goodness of fit (GOF) tests if the model fits the data, with GOF value criteria (small $\geq$ 0.1, medium $\geq$ 0.25, large $\geq$ 0.36). The direct effect, which is the result of processing data, also shows the path coefficient and R^2 results. To find the value of the path coefficient, you use the path coefficient. You can find R^2 in effect size, which shows how much the independent variable affects the dependent variable. In addition to looking at the R^2 value [18,24], the PLS (Partial Least Square) model is also judged by how well the Q-square predictive relevance works for constructive models. The Q-square tells us how well the model fits the data and how well it estimates its parameters. Table 1 shows what kind of test it is and what parameters will be tested.

Table 1. Comprehensive parameters, evaluation criteria, threshold values, and interpretation guidelines for measurement and structural models in PLS-SEM to assess construct validity, reliability, and hypothesis significance.

Testing		Parameter	Rul of thumb
Outer model	Convergent validity	Loading factor	> 0.70
	Discriminant validity	Cross loading	> 0.70
		AVE	> 0.50
	Reliability test	Cronbach alpha	> 0.70
		Composite reliability	> 0.70
Inner model		R^2	R^2 values 0.70 (strong), 0.50 (moderate), 0.25 (weak)
		Significant (hypotheses testing)	> 1.65 (significance level = 10%)

Figure 2 serves as the basis for the formulation of eight hypotheses aimed at testing the causal relationships within the research model. It is hypothesized that system quality has a substantial impact on the utilization or intention to utilize Amdalnet (H1) and is anticipated to influence user satisfaction (H2). It is believed that the quality of information has a big effect on whether or not people use it (H3) and on how satisfied they are with it (H4). Service quality is also anticipated to have a substantial impact on use or the intention to use (H5) and on user satisfaction (H6). It is also believed that use or the desire to use has a big effect on net benefits (H7), and that user satisfaction will greatly improve the net benefits of Amdalnet implementation (H8).

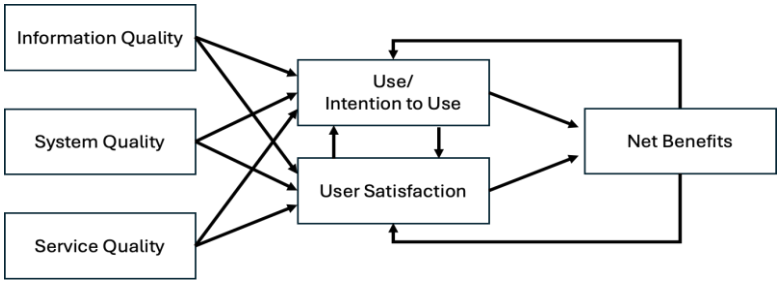

Figure 2. Conceptual research model adapted from the updated DeLone & McLean IS Success Model to assess the performance of Amdalnet. The model posits that system quality, information quality, and service quality shape both system use and user satisfaction. Higher levels of system use and user satisfaction are expected to improve net benefits for stakeholders and environmental governance outcomes. The directional arrows illustrate the hypothesized causal relationships (H1–H8).

The Amdalnet app is a Web GIS that helps people get environmental documents approved and digitize them. For these tasks, it acts as a Service Center. The steps in the process are: (1) looking over environmental documents, (2) making environmental documents, (3) checking or looking over environmental documents,

and (5) giving environmental approvals at both the central and regional levels. You can use Amdalnet online or electronically, and you can link it to other information systems. Amdalnet is one of the ENV-DSS (environmental decision support system) application systems that helps with effectiveness and efficiency and with the complete integration of environmental protection and management [25]. Amdalnet is better at helping with environmental licensing when it is easy to use, has clear steps and suggestions, and has enough capacity and performance. The DeLone and McLean IS Success Model helps us look at and improve the quality of systems, information, and services in a structured way. This guarantees that Amdalnet provides significant value to stakeholders engaged in environmental impact assessment (EIA) and licensing [26,27].

The research employed quantitative descriptive methodologies, utilizing a questionnaire-based survey distributed to participants via Google Forms. Respondents were obtained through the facilitation of a focus group discussion (FGD), specifically the 2023 National EIA Working Meeting. The people who answered the survey were AMDAL compilers, members of the feasibility test team, MoEF, and experts who all used the Amdalnet information system on a regular basis. The main people who answered the questionnaire were people who had used all three Amdalnet modules. There were 28 questions in the questionnaire. Nine were about system quality, five were about information quality, five were about service quality, three were about use, three were about user satisfaction, and three were about net benefit. A 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used to give each item a score. The determination variables in the questionnaire, based on the IS Success Model, include six primary factors that are shown in Table 2.

Table 2. Detailed measurement indicators, codes, and variable dimensions of the DeLone and McLean information system success model in evaluating amdalnet as a digital transformation in the environmental approval process.

Variable	Code	Indicator
System Quality	KS1	The Amdalnet application is easy to use and easy to learn to use.
	KS2	The Amdalnet application can be accessed anywhere as long as there is internet, either through a smartphone or a computer.
	KS3	The Amdalnet application is easy to learn, even for people who are using it for the first time.
	KS4	The Amdalnet application is able to respond quickly to user requests for the information needed.
	KS5	The Amdalnet application is guaranteed confidentiality because all application actions can be tracked (accountability), data can only be accessed by authorized users (confidentiality), and only authorized users can access changes to data and application components (integrity).
	KS6	The language used (input) Amdalnet is easy to understand.
	KS7	The integration of the Amdalnet Application with other systems related to environmental permits is good.
	KS8	Amdalnet has good flexibility (can change/revise) the information needed according to the needs of the work.
	KS9	The system provides repair facilities in case of input errors/system failures.
Information Quality	KI1	Information provided by the Complete Amdalnet application.
	KI2	The information obtained is according to need.
	KI3	The information obtained is unambiguous and has very little chance of error.
	KI4	Information from the Amdalnet application is always up to date.
	KI5	The information presented by the Amdalnet application is easy to understand.
Service Quality	KL1	The Amdalnet application service displays information according to user requests quickly and precisely.
	KL2	The Amdalnet application service takes the interests of users seriously.
	KL3	Services on the Amdalnet application foster trust from users.
	KL4	Amdalnet providers can resolve user issues quickly if there are problems.
	KL5	The system responds according to what the user does.
Use	P1	Users will recommend the Amdalnet application to other users.
	P2	Users will use the Amdalnet application again to process environmental approvals.
	P3	The Amdalnet application reduces operational costs in obtaining environmental approvals.
User Satisfaction	KP1	The Amdalnet T application meets the expectations of system users.
	KP2	Users are satisfied with the data and information obtained.
	KP3	Users are satisfied with the existing Amdalnet Application.
Net Benefit	NB1	The Amdalnet application reduces operational costs in obtaining environmental approvals.
	NB2	The Amdalnet application enhances teamwork productivity in processing environmental approvals.
	NB3	The Amdalnet application enhances the effectiveness and efficiency of environmental approval management work.

Results and Discussion

Result

Characteristics of Participants

Using the Amdalnet system, 125 valid responses were collected from key stakeholders involved in the EIA process. Figure 3 shows the demographics of the people who answered the survey, like their age, job, and level of education. These characteristics indicate an informed sample that reflects Indonesia's environmental permitting system. Most of the people who answered (51.2%) had at least a bachelor's degree. Next were those with master's degrees (43.2%) and finally those with doctoral degrees (5.6%). The majority of participants were EIA consultants (48.8%), followed by government regulators (25.6%), project proponents (16%), subject-matter experts (8%), and other stakeholders (1.6%). Most of the people who answered (66.8%) were between the ages of 31 and 50, which means they were an older and more experienced group.

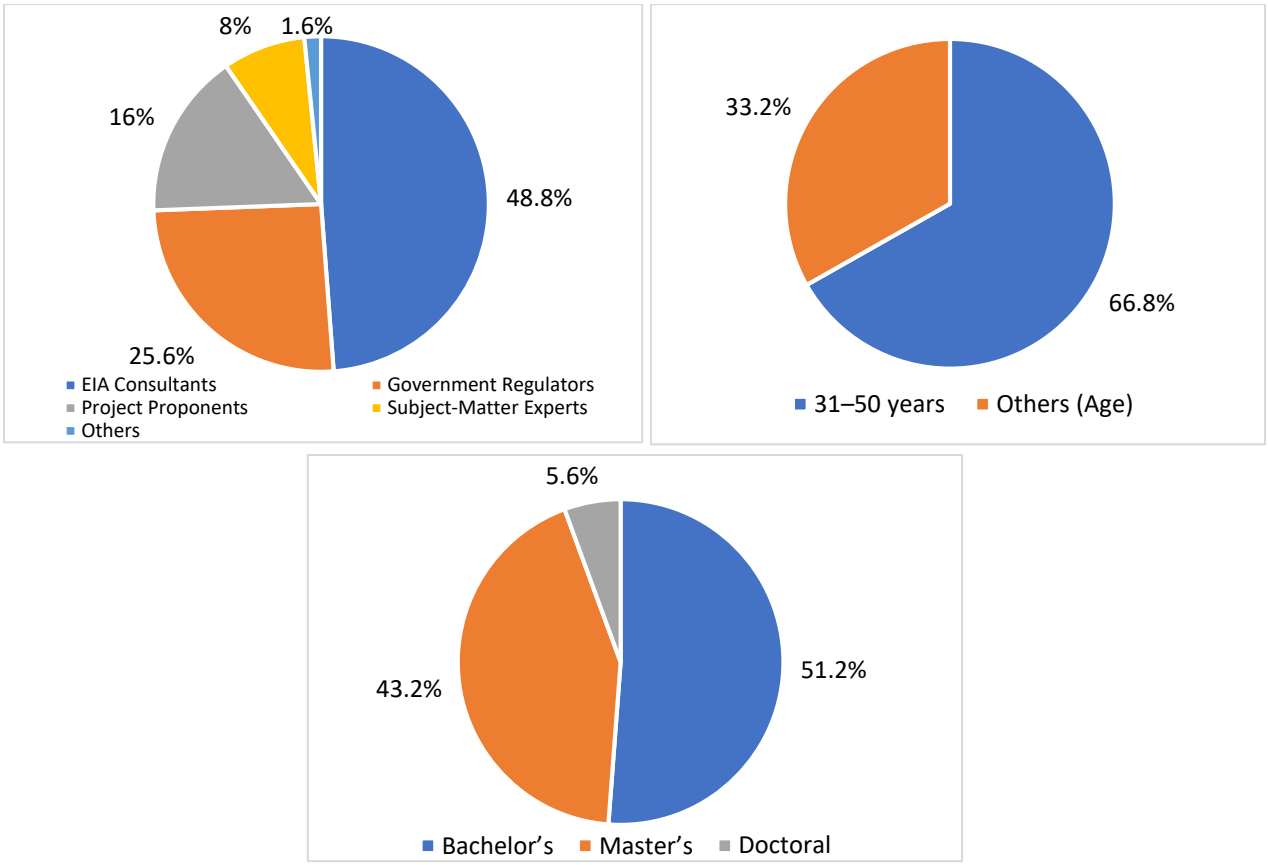

Figure 3. Respondent demographics illustrating the characteristics of Amdalnet users involved in this study: (a) most respondents work as EIA consultants and government regulators, followed by project proponents, subject-matter experts, and others; (b) the majority of respondents are in the productive age group of 31–50 years; and (c) respondents primarily hold Bachelor's and Master's degrees, indicating a relatively strong educational profile among system users.

Outer Model Testing

The first step in PLS-SEM model evaluation is to look at the measurement model, which is also called the outer model. This phase focuses on assessing construct validity, which includes both convergent and discriminant validity [15]. Convergent validity indicates the extent to which various indicators of a construct are interrelated [28]. In PLS-SEM, this is assessed via the loading factors of reflective indicators, which signify the correlation between each element and its underlying concept [29]. Table 3 displays the outer loadings for all indicators employed to assess their corresponding structures. Most of the indicators have strong loadings that are higher than the usual threshold (≥ 0.70), which means that the measurement model has good convergent validity. The constructs of information quality, service quality, user satisfaction, system quality, net benefit, and use frequently exhibit significant reliability and internal consistency. On the other

hand, two indicators are not doing as well as expected. The loading of KL3 (0.261) in service quality is very low, which means that this item may not accurately reflect its foundational construct and should be looked at again or improved in further studies. On the other hand, KS2 (0.676) for system quality is just below the threshold. It can be kept for theoretical completeness as long as the overall AVE and composite reliability stay within acceptable limits. The findings indicate that the constructs in this study exhibit strong convergent validity, with only minor deficiencies that do not compromise the integrity of the measurement model.

Table 3. Convergent validity assessment of the PLS-SEM measurement model based on outer loadings across six constructs (quality of information, quality of service, user satisfaction, system quality, net benefit, and use), with acceptable indicators defined as loadings ≥ 0.70 and construct-level convergent validity indicated by AVE ≥ 0.50 (n = 125).

Code	Quality of information (KI)	Quality of service (KL)	User satisfaction (KP)	System quality (KS)	Net benefit (NB)	Use (P)
KI 1	0.930					
KI 2	0.865					
KI 3	0.871					
KI 4	0.840					
KI 5	0.881					
KL 1		0.938				
KL 2		0.938				
KL 3		0.261				
KL 4		0.877				
KL 5		0.896				
KP 1			0.955			
KP 2			0.946			
KP 3			0.962			
KS 1				0.866		
KS 2				0.676		
KS 3				0.821		
KS 4				0.863		
KS 5				0.704		
KS 6				0.792		
KS 7				0.802		
KS 8				0.838		
NB 1					0.923	
NB 2					0.933	
NB 3					0.958	
P1						0.781
P2						0.890
P3						0.914

Table 4 shows how the cross-loading method was used to check for discriminant validity. All indicators exhibited heightened loadings on their respective constructs in comparison to others, thereby satisfying the Fornell–Larcker criterion. This shows that each latent variable in the model represents a different conceptual area, which supports the idea that the measurement model is strong. The structural model estimated by PLS-SEM is shown in Figure 4.

Table 4. Using cross-loadings in the PLS-SEM measurement model to check for discriminant validity, showing that each indicator loads highest on its intended construct with acceptable loading thresholds (≥ 0.70; n = 125).

Code	Quality of information (KI)	Quality of service (KL)	User satisfaction (KP)	System quality (KS)	Net benefit (NB)	Use (P)
KI 1	0.930	0.774	0.726	0.722	0.571	0.556
KI 2	0.865	0.785	0.702	0.693	0.516	0.510
KI 3	0.871	0.715	0.709	0.695	0.560	0.556
KI 4	0.840	0.738	0.719	0.692	0.539	0.530
KI 5	0.881	0.760	0.716	0.812	0.591	0.591
KL 1	0.829	0.938	0.875	0.837	0.691	0.684
KL 2	0.832	0.938	0.843	0.811	0.685	0.711
KL 3	0.236	0.261	0.284	0.245	0.161	0.162
KL 4	0.702	0.877	0.769	0.761	0.553	0.591

Code	Quality of information (KI)	Quality of service (KL)	User satisfaction (KP)	System quality (KS)	Net benefit (NB)	Use (P)
KL 5	0.760	0.896	0.748	0.736	0.608	0.600
KP 1	0.776	0.847	0.955	0.866	0.703	0.749
KP 2	0.773	0.846	0.946	0.840	0.698	0.757
KP 3	0.781	0.865	0.962	0.834	0.732	0.757
KS 1	0.750	0.740	0.780	0.866	0.573	0.625
KS 2	0.532	0.561	0.530	0.676	0.529	0.506
KS 3	0.583	0.648	0.725	0.821	0.515	0.534
KS 4	0.711	0.760	0.800	0.863	0.620	0.646
KS 5	0.556	0.559	0.593	0.704	0.514	0.557
KS 6	0.730	0.718	0.702	0.792	0.569	0.566
KS 7	0.658	0.709	0.722	0.802	0.508	0.560
KS 8	0.711	0.791	0.764	0.838	0.640	0.637
NB 1	0.489	0.540	0.611	0.569	0.923	0.914
NB 2	0.671	0.739	0.762	0.739	0.933	0.809
NB 3	0.633	0.692	0.732	0.673	0.958	0.830
P1	0.708	0.761	0.858	0.837	0.628	0.781
P2	0.416	0.534	0.572	0.468	0.793	0.890
P3	0.489	0.540	0.611	0.569	0.923	0.914

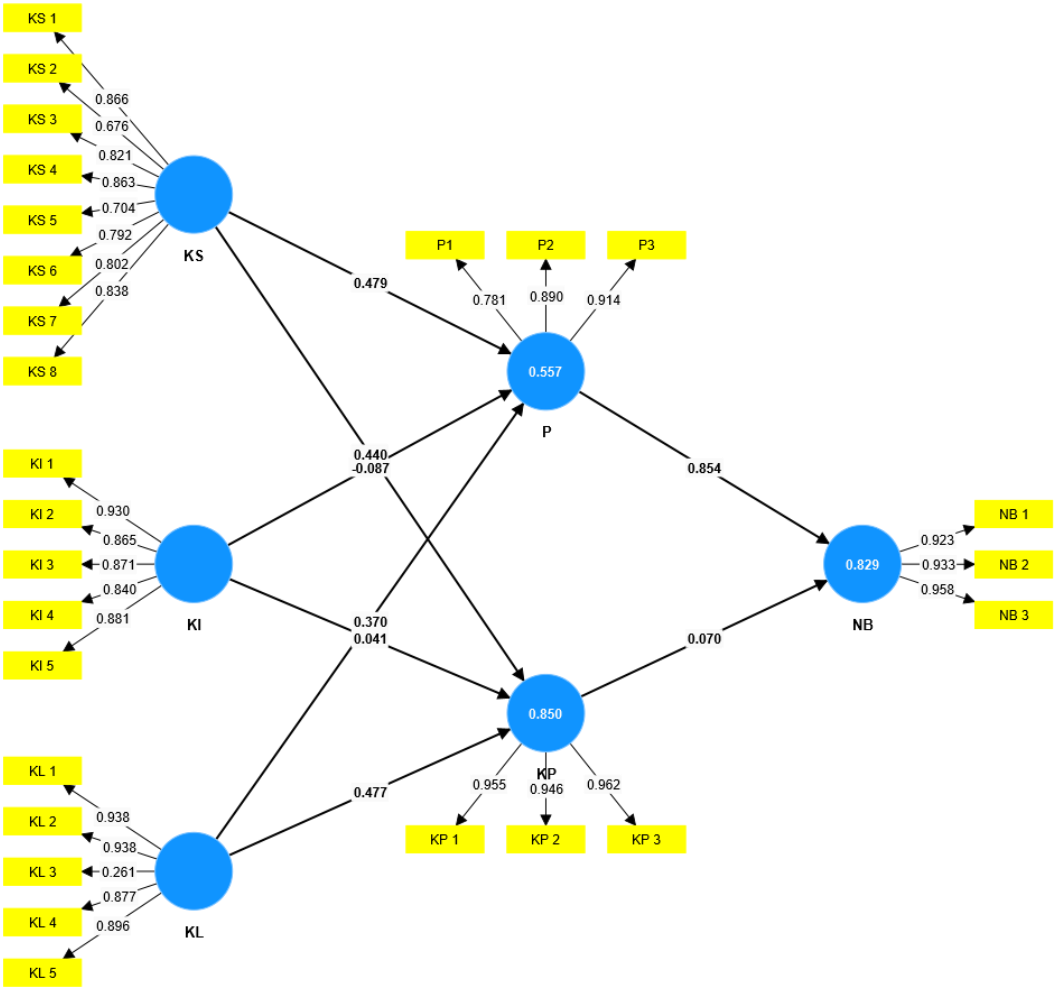

Figure 4. SmartPLS path model for Amdalnet (PLS-SEM, n = 125). Blue circles show latent constructs with R^2 (use = 0.557; user satisfaction = 0.850; net benefit = 0.829). Significant paths are: system quality → use (β = 0.479), system quality → user satisfaction (β = 0.440), service quality → use (β = 0.370), service quality → user satisfaction (β = 0.477), and use → net benefit (β = 0.854). Non-significant paths are: information quality → user satisfaction (β = 0.041), information quality → use (β = −0.087), and user satisfaction → net benefit (β = 0.070). Yellow boxes display indicator outer loadings; most are ≥ 0.70, with KL3 = 0.261 (weak) and KS2 = 0.676 (marginal).

The model accounts for 55.7% of the variance in use, 85.0% in user satisfaction, and 82.9% in net benefit, demonstrating its significant explanatory capacity. Within the structural pathways, system quality and service quality have the most effect on both use and user satisfaction. This shows how important it is for technology to be reliable and services to be responsive in order to get users involved. The substantial influence of use on net benefit (β = 0.854) reinforces the idea that regular and efficient use of the system provides concrete benefits for both the organization and society. On the other hand, information quality did not significantly predict either use or user satisfaction. This suggests that when people use Amdalnet, they may care more about how fast and reliable it is than how much information it has. The results show that the quality of Amdalnet's system and service parts has a bigger effect on its success than the quality of its information.

Table 5 shows that all of the constructs are very reliable when it comes to internal consistency. All of the values for Cronbach's alpha, ρ_a, and composite reliability are well above the 0.70 level that is needed. Use (P) has the lowest dependability (α = 0.827) of all the variables, but this is still fine for practical PLS-SEM research. User satisfaction (KP), on the other hand, has the highest coefficient (α = 0.951; ρ_c = 0.969), which means that the indicators are very closely related. Even though very high reliability ratings can mean that there is redundancy, the measurements shown are still conceptually important because the items in each construct are strongly related to each other. These results show that the tool accurately measures the expected hidden qualities within the Amdalnet framework.

Table 5. Evaluation of internal consistency reliability for the Amdalnet PLS-SEM measurement model using cronbach's alpha, ρ_a, and composite reliability, with acceptable values defined as ≥ 0.70 (n = 125).

Variable	Cronbach's alpha	Composite reliability (ρ_a)	Composite reliability (ρ_c)
KI	0.925	0.926	0.944
KL	0.852	0.932	0.905
KP	0.951	0.951	0.969
KS	0.917	0.924	0.933
NB	0.932	0.934	0.957
P	0.827	0.830	0.898

Table 6 shows that the AVE was used to test the convergent validity of the measurement model. All structures exceed the 0.50 threshold, signifying that a significant proportion of the variance in the indicators is attributed to their corresponding latent variables. Use (P) and information quality (KI) have relatively high AVE values (0.746 and 0.771), indicating that they are well-defined constructs. On the other hand, system quality (KS) shows good convergence even though its value is lower (0.637). These results confirm that the reflecting items accurately depict the fundamental concepts related to each construct. The combined data from Tables 5 and 6 shows that the measurement framework used in this study is both strong and conceptually sound for evaluating Amdalnet's system performance.

Table 6. Convergent Validity Results for the Amdalnet PLS-SEM Measurement Model, indicating that all constructs (KI, KL, KP, KS, NB, and P) demonstrate adequate convergent validity based on AVE values ranging from 0.637 to 0.911, which substantially exceed the minimum acceptable threshold of 0.50 (n = 125).

Variable	Average variance extracted
KI	0.771
KL	0.680
KP	0.911
KS	0.637
NB	0.880
P	0.746

Inner Model Testing

The structural model was tested using R^2 and the path coefficients' significance. As seen in Table 7, the model accounts for 85.0% of the variance in KP, 82.9% of the variance in NB, and 55.7% of the variance in P. This indicates that it is a robust model for the majority of the endogenous constructs [28]. We employed t-statistics with a significance level of 1.65 (one-tailed, α = 0.05) to evaluate the hypotheses. The results of the hypothesis testing (Tables 8 and 9) show that five of the eight hypotheses that were submitted are statistically

significant. System quality and service quality have a big effect on both use and user satisfaction. Use is the main factor that predicts net benefit. Conversely, information quality was determined to have no significant impact on either use or satisfaction, and satisfaction did not significantly influence net benefit.

Table 7. Structural model validity of the Amdalnet PLS-SEM Model assessed using R^2 and adjusted R^2 values, demonstrating strong explanatory power for KP and NB and moderate explanatory power for P, indicating that the model adequately captures the variance of key endogenous constructs (n = 125).

Variable	R-square	R-square adjusted	Information
KP	0.850	0.846	Strong
NB	0.829	0.826	Strong
P	0.557	0.546	Moderate

Table 8. Bootstrapping results for structural path coefficients in the Amdalnet PLS-SEM Model, showing original estimates, standard errors, bootstrapped t-values, and decision outcomes (H1, H2, H5, H6, and H7 accepted; H3, H4, and H8 rejected) Based on a One-Tailed Significance Threshold of t > 1.65 (n = 125).

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-statistics (|O/STDEV|)	Result
KI -> KP	0.041	0.052	0.123	0.335	Rejected
KI -> P	–0.087	–0.077	0.182	0.475	Rejected
KL -> KP	0.477	0.473	0.101	4.704	Accepted
KL -> P	0.370	0.364	0.168	2.197	Accepted
KP -> NB	0.070	0.070	0.090	0.779	Rejected
KS -> KP	0.440	0.435	0.090	4.894	Accepted
KS -> P	0.479	0.476	0.144	3.333	Accepted
P -> NB	0.854	0.855	0.073	11.683	Accepted

Table 9. Structural path hypothesis testing results in the Amdalnet PLS-SEM Model, showing bootstrapped *t-values* and decision outcomes (H1, H2, H5, H6, and H7 accepted; H3, H4, and H8 rejected) based on a one-tailed significance threshold of t > 1.65 (n = 125).

Hypothesis	Effect	T statistics (|O/STDEV|)	Result
H4	KI > KP	0.335 < 1.65	Rejected
H3	KI > P	0.475 < 1.65	Rejected
H6	KL > KP	4.704 > 1.65	Accepted
H5	KL > P	2.197 > 1.65	Accepted
H8	KP > NB	0.779 < 1.65	Rejected
H2	KS > KP	4.894 > 1.65	Accepted
H1	KS > P	3.333 > 1.65	Accepted
H7	P > NB	11.683 > 1.65	Accepted

Discussion

Principal Findings

This study's use of SEM is especially useful for looking into the causal links between the different parts of the information system. This analytical technique facilitates a comprehensive evaluation of the impact of information quality, system quality, and service quality on user satisfaction and system utilization, consistent with prior e-government success studies employing similar SEM frameworks [9,10,17]. We use T-statistics to look at the results, with a 95% confidence level and a significant threshold of 1.65.

The findings indicate that the quality of the information does not significantly affect system utilization (T = 0.475) or user satisfaction (T = 0.335). This means that to make users happier or get them to keep using the system, you need to do more than just give them a lot of information that is easy to find. This means that just giving customers a lot of information or making it easy for them to find it won't be enough to keep them happy or using the system. This finding aligns with previous research indicating that customers desire contextual relevance, system integration, and accessibility, in addition to information availability [30]. This shows that the quality of information only makes people feel more successful when it helps them finish their tasks, as was shown in the case of m-banking [30].

The evaluation of the quality factor in online health information sites also showed that the information given doesn't match what users really want, which could be because of bad interface design or low levels of digital literacy [31]. System designers should rethink how they think about information quality so that content better meets user needs and the platform offers easier ways for users to find information.

Our findings corroborate previous studies that emphasize the substantial impact of system and service quality on users' evaluations of public sector digital platforms [3,5,27,28]. The current findings indicate that technical reliability and user-centered design are crucial for user satisfaction and adoption, aligning with research on other e-government systems [3,5]. Consequently, they differ from research indicating that perceived advantages in voluntary-use or more integrated digital environments are positively associated with information quality [28]. This difference may be due to the need to use Amdalnet, which is also true for accounting information systems [32], where system support and stability are more important than having a lot of information. We believe that the inconsistency is due to the need to use Amdalnet and the fact that the supporting administrative systems don't work well together. Users care more about responsive support and platform reliability than about how much content there is [26,31–33]. In these cases, having a lot of information that isn't part of the task procedures or doesn't follow OSS-RBA standards usually leads to lower usage and satisfaction rates.

Service quality has a big effect on both how much people use the system (T = 2.197) and how happy they are with it (T = 4.704). This shows how important it is to be responsive, empathetic, and have good technical support in order to make users happy [31]. Research assessing user satisfaction with workflow management systems in a food company [8] and Surabaya's civil registration and population administration systems [9] has yielded analogous findings, indicating that responsive helpdesks and effectively managed service channels significantly enhance user satisfaction and retention. Good service not only makes customers happier, but it also makes it more likely that they will keep using the system. The technology acceptance model (TAM) says that system support is very important for changing how people use a system and getting them to keep using it. Improving service channels, whether they are run by AI chatbots or real people, could make users much happier and get them to use them more often. This aligns with research highlighting the imperative of adaptable service design for citizen-centric digital platforms [6].

System quality has a big effect on both how often people use the system (T = 3.333) and how happy they are with it (T = 4.894). This shows how important it is for platforms to be technically sound, have reliable features, and work well. Previous studies on contact center evaluations [14] and e-government services in East Kalimantan [3] have shown that strong system performance is important for keeping users' trust and getting them to keep using the system. Even if the content and services are good, users may be unhappy with the system if it is hard to use or crashes often. These results are in line with studies that show how important user interface (UI) and user experience (UX) design are in making digital platforms popular [32]. So, in future system development, regular technical tests, gradual feature improvements, and design methods that take into account the user's whole experience must be the most important things to do.

The results indicate that perceived net benefits are not substantially influenced by user satisfaction (T = 0.779). This means that people might like the system, but they might not always see it as a good thing, like saving money or getting more done. These findings support the notion that satisfaction is an emotional response that does not consistently align with functional or performance-related value. Similar to e-learning systems [33], our findings indicate that satisfaction is predominantly an emotional state rather than a predictor of net benefits. So, in addition to making users' interactions with the system more emotional, system designers must make sure that the features fit users' needs and expectations.

The largest route coefficient in this analysis, T = 11.683, shows that using the system has a big effect on net benefits. This aligns with previous studies on e-government system evaluation, demonstrating that consistent and deliberate interaction with the system results in increased perceived value, encompassing improvements in productivity and decision-making [10,34]. These connections, when viewed together, show that the performance of information systems has a bigger impact on environmental governance outcomes. More efficient system use is expected to lead to better legal certainty through verifiable digital records, shorter approval processing times and less rework, and more transparency and stakeholder participation through better progress tracking and service-level response mechanisms (SLA). These governance-related outcomes demonstrate how Amdalnet's digital transformation can generate public value within Indonesia's environmental approval system, aligning with international research on digital transformation for sustainable development [35] and studies focused on enhancing public sector performance [36–39].

Finally, this study illustrates that system and service quality are the principal determinants of user satisfaction and system utilization, whereas the notion of information quality requires further enhancement to align with the evolving needs of users. Satisfaction should be regarded as an intermediary state that facilitates effective system utilization, rather than a final result, as SEM findings indicate a discrepancy between satisfaction and net gains [33]. To make sure that better platform performance leads to better environmental approval outcomes [34,35,38], performance improvements should be measured using governance-focused performance metrics like median approval duration, first-time-right submissions, the number of revision cycles, and adherence to public-facing SLAs, in addition to information system indicators.

The findings demonstrate the efficacy of SEM in evaluating an information system's performance and endorse the application of the DeLone and McLean Information System Success Model [2,10,16]. Subsequent research may enhance the model's components to more effectively reflect contextual dynamics and examine the influence of public value on the adoption and utilization of Information and Communication Technologies (ICTs) [34,37].

Comparative Analysis with Global E-Government Research

These findings align with recent studies suggesting that, through genuine user engagement and adaptable system architecture, digital transformation in the public sector could enhance efficiency and transparency [34]. As demonstrated in the realm of sustainable digital transformation [37] and transparency platforms [38], analogous trends manifest when digital solutions are directly associated with specific service delivery requirements, guaranteeing that system enhancements yield tangible governance results. This body of work shows how important system and service quality are in our model. It also shows how important user-centered support and procedures that work together without problems are. The fact that information quality is less important now means that content is useless on its own unless it is presented in a way that is easy to understand and well-designed. The examination of challenges associated with public-sector restructuring [36] referenced a comparable situation. Putting Amdalnet in this bigger picture shows that its effect on public value goes beyond just making technology better. The UN e-government survey [35] says that governance procedures are very important for making sure that system design can meet the needs of different stakeholders.

Practical and Policy Implementations

Organizations must keep giving Amdalnet strong user support services, like personalized capacity-building programs and quick help channels, to encourage it to work with internal licensing and administrative processes. To make things more accountable and open, government officials might make it mandatory for users to give feedback and make public promises about how well services work. From the point of view of system development, small changes to the UX/UI that make it easier for users to do what they need to do are likely to quickly make the system more useful and valuable. Regular performance reviews and the use of real-time monitoring dashboards can make systems more reliable and give users more trust in them. These actions show the best ways for countries to adapt and take control of digital governance.

Measurement Implications

The measurement diagnostics indicate that KS2 (system quality: system stability during document processing; loading = 0.676) is negligible, while KL3 (service quality: responsiveness of system support; loading = 0.261) is deficient. These results indicate that the intended constructs for Amdalnet users may not be adequately represented in the current phrasing or implementation. Consequently, we recommend evaluating more streamlined models that exclude ineffective indicators and enhancing the formulations employed in KL3 and KS2. To improve validation in the future, researchers could do confirmatory factor analysis (CFA), test new indicators, and see if the measurement structure is the same for different user groups, such as administrators, consultants, and reviewers. Additionally, objective behavioral evidence could enhance self-reported survey data by integrating administrative usage logs that detail login frequency, session duration, and the number of completed submissions. Consequently, assessments of the impact of system usage on perceived benefits would be more precise, and potential biases, including social desirability and recall bias, would be mitigated. When taken as a whole, these actions will strengthen the structural estimates' resilience and make the net benefit results easier to understand.

Limitations

There are various restrictions on this study. First, self-selection bias could occur, and the sample's representativeness might be constrained by event-based data collection during the 2023 AMDAL National

Working Meeting. Second, there was a need to improve the operationalization and wording of two indicators due to their weak or marginal loadings (KL3 = 0.261; KS2 = 0.676). Third, to enhance generalizability, subsequent research should employ longitudinal designs and broaden sampling frames beyond participants in working meetings, as the cross-sectional design inhibits causal inference.

Conclusions

This study finds that system and service quality have a big effect on how happy users are and how much they use the system, which in turn makes the perceived net benefits go up. Nonetheless, the quality of the information did not have a big effect on either utilization or satisfaction, and satisfaction did not have a big effect on net benefits. These results show that Amdalnet has done well in many technical and service-related areas, but the quality of the information is still not good enough. Users can't use the system effectively or see its benefits if the information is missing, unclear, or poorly organized. Therefore, it is crucial to give priority to improving the information provided across Amdalnet in terms of clarity, accessibility, and contextual relevance. These improvements are necessary to ensure that the system better meets the needs of EIA stakeholders and makes the digital transition much easier, which speeds up the process of getting environmental approval. In conclusion, Amdalnet can be classified as moderately successful according to the six dimensions of the DeLone and McLean IS Success Model. When the system and service quality dimensions work well, but there are problems with the quality of the information and user satisfaction, it means that the system is only partially effective. If these problems were fixed, Amdalnet would be closer to reaching full digital maturity in environmental governance.

Author Contributions

FM: Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Software, Visualization, Writing – Original Draft, Writing – Review & Editing; **SHS**: Supervision, Validation, Resources, Writing – Review & Editing; **HE**: Supervision, Validation, Resources, Writing – Review & Editing; **ISS**: Supervision, Methodology, Writing – Review & Editing; and **DPS**: Supervision, Validation, Resources, Writing – Review & Editing.

AI Writing Statement

During the preparation of this work, the author used ChatGPT (OpenAI, GPT-5) to assist in language editing, formatting, and improvement of academic clarity. After using this tool, the author reviewed and revised the content extensively and takes full responsibility for the accuracy, interpretation, and conclusions presented in this publication.

Conflicts of interest

There are no conflicts to declare.

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