Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 11, 661-673
2025
Publisher: Learning Gate
DOI: 10.55214/2576-8484.v9i11.10945

Enhancing public communication effectiveness through information systems capabilities and organizational maturity: Evidence from a utility service project in Indonesia

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Abstract: Successful public communication in utility companies increasingly depends on the alignment of information systems capability with organizational maturity. This research examines the influence of ICT capability, digital literacy, and business process standardization on communication effectiveness, with information governance maturity acting as a moderator. Using a quantitative explanatory approach, data were collected from 69 PLN UP3 Berau employees in Indonesia and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that ICT capability and electronic skills improve communication effectiveness primarily when supported by standardized processes and mature governance. Business process standardization emerged as the most significant predictor, highlighting the importance of formalized information flows and process clarity in enhancing communicative performance. Additionally, information governance maturity strengthens the effects of processes and skills, serving as an institutional enabler of transparency and coordination. This study advances the literature on information systems and e-government by proposing a governance-centered communication model that integrates technological, human, and procedural dimensions, offering strategic insights for policymakers and utility managers to boost citizen engagement and digital communication performance.

Keywords: *Business process standardization, Digital skills, ICT adoption, Information governance maturity, Information systems capability, Public communication effectiveness.*

1. Introduction

The development of information technology has transformed the way public organizations communicate with citizens in a way that the effectiveness of public communication is not just a matter of messages and rhetoric, but a product of information system capabilities, information governance, and internal information process standardization [1]. E-government and digitalization agendas in most countries emphasize that adequate ICT capacities and mature information governance procedures are prerequisites for transparency, response timeliness, and public engagement variables that directly influence public trust in state services [2, 3]. Yet practitioner experience illustrates that the take-up of technology does not in itself result in effective public communication; without institutionalized process readiness and governance, ICT investments have little impact or even lock in information inefficiencies [4–6].

Information systems capabilities (ISC) studies examine an organization's ability to mobilize and integrate IT-based assets as the foundation for generating tangible organizational value [7]. ISC is not merely infrastructure and programs, but rather the capability of the organization to operate, maintain, and integrate systems to provide relevant, precise, and timely information to policymakers and the public. Current studies suggest that digital variance is largely a function of how much organizations transform technology assets into accessible operational and informational capabilities [8, 9].

History: Received: 23 September 2025; Revised: 17 October 2025; Accepted: 21 October 2025; Published: 10 November 2025
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Information governance maturity is another central factor, the degree to which information policies, procedures, roles, and mechanisms for control are embedded. Maturity models for information governance (e.g., IGIM/IG Maturity Index) provide a scoring mechanism for establishing how far an organization has developed in having repeatable, compliant, and secure information management habits; this level of maturity is usually strongly connected with the organization's ability to leverage information in favor of strategic communications and operational day-to-day operations [10]. Governance maturity is a mediator that enables ICT capabilities and business processes to optimize their contribution to the efficacy of public communications.

In the case of an emerging nation like Indonesia, there are additional challenges: an insufficient number of digital competencies among state officials, uneven ICT infrastructure, and fragmented administrative processes impede the transformation of information into effective public communication [11, 12]. National reports (policy reports and surveys) indicate that despite possessing a very large number of ICT staff quantitatively, the distribution of skills, information management capacity, and integration of processes between units remain issues detracting from the quality of digital services as well as public communication at the local level [12]. Therefore, focusing on "digital skills" and the standardization of information flows are essential factors for closing the gap between technological potential and communication outcomes.

The scholarly work on business process standardization and business process management emphasizes that standardized procedures, which are meant to ease apparent flows of information, reduce uncertainty, speed up flows of communication, and reduce service variability, all aspects germane to the effectiveness of public communications within service organizations such as electric utilities [13, 14]. Modern conceptual research further indicates that standardization processes must be geared towards appropriate information abilities: processes with no backing data/technology will continue to struggle with the lack of ability to provide accurate and timely information to the public. Thus, the relationship between ICT, processes, and communication output is a synergy that needs to be researched in its collective, not fragmented, forms [1].

However, with a robust set of literature on all dimensions (ISC, information governance maturity, digital competencies, and standardization of processes), empirical research analyzing simultaneously the relationship between how information system competencies (adoption of ICT and digital competencies), standardization of business processes (informational process standardization), and measures of information governance maturity affect public communication efficiency in utility companies is still relatively limited. Few e-government studies focus on citizen service adoption or digital platform assessment at the macro level, and even fewer examine internal organizational means (micro-level) in service units that operate within remote geographical areas, a significant void since numerous key public services (water, electricity, health) function in such environments [4, 13]. Therefore, research that intersects these variables in a utility setting provides an applicable empirical contribution to the domain of public information systems [15].

The controversies and arguments in the literature should be mentioned. One positive viewpoint is that new technology (e.g., real-time dashboards, mobile devices, AI) is a game-changer that enhances communication effectiveness and engagement directly. There are critics citing empirical evidence that, unless there are at the same time process and governance improvements, new technology is dangerous, adding technology without big organizational change that only moderately improves results and, in some cases, sometimes generates complexity [4, 16]. This article draws attention to research designs that test direct (ICT → communication) and indirect/mediated (e.g., ICT → process → communication) effects, as well as the moderating effect of governance maturity.

Based on these lacunae, this study will (1) examine the impact of information system capability, as established by a combination of ICT adoption and digital competency, on public communication effectiveness; (2) explore business process standardization as an intermediary that links information capability in the firm to communication outcomes; and (3) examine information governance maturity as a moderator that amplifies or reduces the influence of processes and skills on communication

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 11: 661-673, 2025
DOI: 10.55214/2576-8484.v9i11.10945

effectiveness. This study was conducted within the PLN UP3 Berau unit (a local utility electricity company), a suitable case given its geographically situated location and associated field communication challenges, thus creating utility company insights for real-world application within developing countries. The theoretical context integrates the literature related to ISC, business processes, and governance maturity in order to create theoretical and practical contributions to the field of public information systems [9].

Finally, the expected contribution of this study is threefold: first, it strengthens the evidence that information systems capabilities have a positive impact on the effectiveness of public communication, especially if combined with standard processes; second, it establishes that business process standardization is a key mediator channel that converts ICT capabilities into tangible communication outcomes; and third, it emphasizes the importance of information governance maturity as an institutional factor that determines the extent to which technology investments and human resource training result in communication outcomes. These findings should prove helpful not just to scholars of information systems but also to policymakers and utility managers developing digital plans and public engagement.

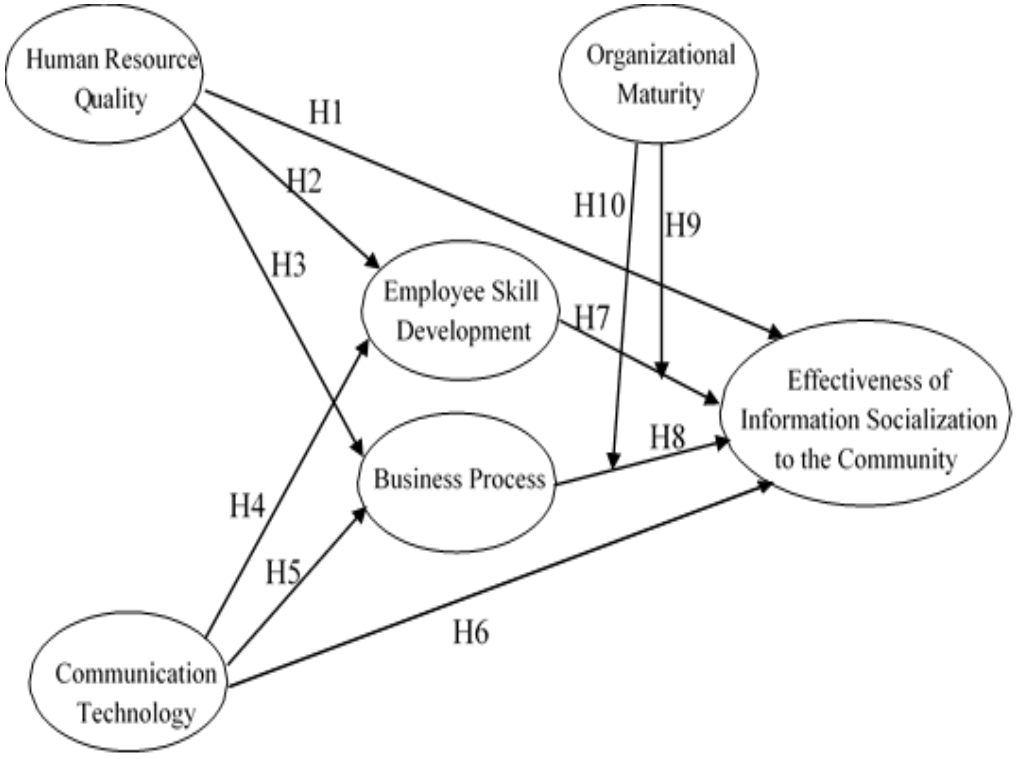

Figure 1.
Conceptual Framework.

2. Methods

2.1. Research Design

This study applied a quantitative explanatory research approach to test hypothesized cause-and-effect relationships among information systems capabilities, digital competences, business process standardization, and public communication effectiveness, with information governance maturity as a moderator. Cross-sectional questionnaires are a common practice in information systems and e-government studies to assess employee views of ICT adoption, governance readiness, and organizational procedures [1, 17].

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2.2. Research Context and Participants

The research was conducted at PLN UP3 Berau, a regional office for the state-owned electricity business PT PLN (Persero). The setting was selected based on geographical distance, which imposes special pressures on electronic communication and the exchange of information. All 69 full-time employees were studied, employing a census approach. This strategy ensures that all members of the population being targeted are captured and is often employed in small organizations with small staff numbers [16].

2.3. Measurement of Constructs

Measurement instruments were adapted from established models and validated scales:

- Information Systems Capability (X1): Items adapted from the Technology Acceptance Model (TAM) focusing on perceived usefulness and ease of use [18].
- Digital Skills Development (Z1): Based on Kirkpatrick's training evaluation model [19], adapted for communication-related competencies.
- Business Process Standardization (Z2): Derived from business process reengineering and standardization frameworks, emphasizing process clarity and efficiency [1, 20].
- Information Governance Maturity (M): Assessed with a Capability Maturity Model Integration (CMMI)-based instrument, widely used in information governance research [8].
- Public Communication Effectiveness (Y): Developed using constructs of clarity, timeliness, accuracy, and consistency from communication effectiveness studies [21].

All items were measured on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). A pilot test with five employees confirmed face validity and comprehension.

2.4. Data Collection Procedure

Data was collected using web-based self-report questionnaires distributed via organizational email. It was voluntary, with electronic informed consent. Confidentiality and anonymity of respondents were assured. This is consistent with organizational survey best practices in information systems research [22].

2.5. Data Analysis

Data were examined using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the help of SmartPLS. PLS-SEM is most suitable for small-to-medium sample sizes, models with mediators and moderators, and exploratory theory development [23]. Analysis was done in two steps:

- Measurement Model: Reliability is assessed with Cronbach's alpha and composite reliability (>0.70); convergent validity is determined using Average Variance Extracted (AVE > 0.50); discriminant validity is evaluated with the Fornell–Larcker criterion [24].
- Structural Model: The levels and path coefficients were estimated by bootstrapping with 5000 subsamples. Predictive validity was assessed by R^2 and Stone–Geisser's Q^2 values. Moderation was tested by interaction terms through mean centering to mitigate multicollinearity bias [25].

3. Results

3.1. Descriptive Statistics

The subjects in this research were 69 employees working for PLN UP3 Berau. To present a more complete description of the characteristics of the respondents, the data were studied through the factors of gender, age, and the highest level of education reached. Regarding gender, there were a majority of male respondents (87%) compared to female respondents (13%). This ratio indicates that PLN UP3 Berau employees are predominantly male. Concerning age distribution among the respondents, it reflects a large majority of active-age individuals. Ages 31-40 accounted for 47.8%, and ages 25-30 accounted for 37.7%. Ages 18-24 comprised 8.7%, ages over 50 made up 4.3%, and ages 41-50

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 11: 661-673, 2025
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represented 1.4%. These data demonstrate that most respondents are of active working age and possess sufficient experience.

In terms of educational level, the respondents show a fairly wide range, although most are at the secondary or higher level. 34.8% of respondents had diplomas failing education diplomas, 33.3% had bachelor's degrees, and 30.3% had diplomas. Only 1.4% of respondents had master's degrees. In sum, it can be inferred that the majority of PLN UP3 Berau employees are sufficiently educated to have experience and/or understanding of the context and matter of the research instruments used. With this respondent profile, it is assumed that the survey results are a representative reflection and perspective on the studied subject matter in the organizational context of PLN UP3 Berau.

3.2. Evaluation of Measurement Model (Outer Model)

3.2.1. Validity and Reliability

The outer model illustrates the connection between the indicator block and its underlying variables. This model of measurement is utilized to assess the construct validity and reliability of the tool. The measurement model is also referred to as the measurement assessment conducted to evaluate the validity and reliability of the model.

Table 1.
Loading Factor Value.

Questionnaire items	M	MZ1	MZ2	X1	X2	Y	Z1	Z2
M.1	0.896	0.023	0.002	0.811	0.776	0.854	0.793	0.838
M.10	0.884	-0.022	-0.037	0.797	0.793	0.852	0.802	0.851
M.11	0.766	-0.037	-0.041	0.67	0.629	0.764	0.68	0.693
M.2	0.808	-0.148	-0.183	0.715	0.632	0.771	0.69	0.742
M.3	0.748	-0.094	-0.057	0.685	0.661	0.708	0.685	0.666
M.4	0.881	0.012	-0.015	0.806	0.785	0.866	0.794	0.858
M.5	0.883	0.027	0.007	0.816	0.773	0.848	0.839	0.892
M.6	0.794	0.014	-0.007	0.689	0.648	0.742	0.675	0.718
M.7	0.865	-0.015	0.025	0.751	0.719	0.817	0.825	0.81
M.8	0.929	-0.203	-0.192	0.851	0.753	0.904	0.845	0.872
M.9	0.826	-0.211	-0.19	0.713	0.652	0.81	0.745	0.759
X1.1	0.696	-0.107	-0.105	0.798	0.655	0.697	0.652	0.715
X1.10	0.708	-0.169	-0.187	0.824	0.632	0.7	0.674	0.694
X1.11	0.804	-0.068	-0.09	0.895	0.782	0.809	0.814	0.849
X1.12	0.707	-0.254	-0.251	0.793	0.663	0.705	0.714	0.707
X1.13	0.688	-0.062	-0.089	0.781	0.668	0.695	0.662	0.719
X1.14	0.699	-0.152	-0.156	0.771	0.663	0.687	0.669	0.68
X1.15	0.835	0.012	-0.001	0.896	0.804	0.809	0.785	0.822
X1.16	0.83	-0.146	-0.143	0.886	0.804	0.804	0.819	0.827
X1.2	0.778	-0.047	-0.095	0.847	0.754	0.78	0.7	0.816
X1.3	0.758	-0.126	-0.127	0.843	0.704	0.741	0.739	0.755
X1.4	0.747	-0.053	-0.079	0.853	0.713	0.763	0.731	0.749
X1.5	0.69	-0.045	-0.093	0.778	0.564	0.672	0.719	0.697
X1.6	0.795	-0.02	-0.035	0.866	0.762	0.791	0.791	0.836
X1.7	0.796	-0.05	-0.074	0.895	0.711	0.815	0.799	0.825
X1.8	0.66	-0.1	-0.109	0.764	0.616	0.657	0.619	0.652
X1.9	0.639	-0.077	-0.093	0.738	0.609	0.659	0.642	0.683
X2.1	0.625	-0.119	-0.094	0.651	0.738	0.598	0.624	0.602
X2.2	0.594	-0.02	-0.052	0.649	0.727	0.589	0.608	0.638
X2.3	0.713	-0.203	-0.159	0.735	0.796	0.712	0.707	0.681

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 11: 661-673, 2025
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X2.4	0.76	0.062	0.061	0.636	0.803	0.721	0.719	0.744
X2.5	0.695	0.043	0.039	0.71	0.836	0.656	0.661	0.688
X2.6	0.7	0.221	0.235	0.715	0.856	0.68	0.734	0.722
X2.7	0.672	0.148	0.195	0.708	0.792	0.705	0.735	0.708
X2.8	0.496	0.151	0.174	0.514	0.715	0.493	0.534	0.511
X2.9	0.632	0.275	0.214	0.572	0.758	0.639	0.651	0.642
Y.1	0.929	-0.163	-0.209	0.905	0.795	0.939	0.853	0.93
Y.10	0.862	-0.135	-0.177	0.801	0.708	0.879	0.763	0.828
Y.2	0.883	-0.018	-0.04	0.822	0.769	0.885	0.818	0.873
Y.3	0.761	0.049	0.08	0.673	0.682	0.815	0.808	0.795
Y.4	0.89	-0.148	-0.171	0.812	0.759	0.92	0.892	0.865
Y.5	0.88	-0.142	-0.182	0.847	0.764	0.913	0.818	0.892
Y.6	0.893	-0.1	-0.137	0.843	0.778	0.939	0.855	0.93
Y.7	0.798	-0.114	-0.096	0.718	0.679	0.862	0.753	0.761
Y.8	0.79	0.004	0.026	0.693	0.689	0.849	0.725	0.735
Y.9	0.905	-0.165	-0.155	0.826	0.78	0.927	0.823	0.846
Z1 * M	-0.07	1	0.943	-0.108	0.079	-0.108	-0.07	-0.056
Z1.1	0.716	-0.096	-0.042	0.713	0.737	0.731	0.836	0.695
Z1.10	0.822	-0.091	-0.063	0.77	0.76	0.824	0.877	0.864
Z1.11	0.745	-0.083	-0.06	0.785	0.76	0.744	0.81	0.791
Z1.2	0.745	-0.071	-0.019	0.76	0.716	0.763	0.868	0.73
Z1.3	0.782	-0.078	-0.113	0.773	0.712	0.79	0.854	0.812
Z1.4	0.732	0.208	0.262	0.688	0.719	0.716	0.797	0.74
Z1.5	0.634	-0.082	-0.065	0.579	0.607	0.651	0.775	0.644
Z1.6	0.872	-0.261	-0.208	0.796	0.748	0.882	0.914	0.87
Z1.7	0.814	0.004	0.019	0.779	0.76	0.789	0.854	0.848
Z1.8	0.673	-0.055	-0.051	0.638	0.635	0.67	0.747	0.721
Z1.9	0.698	-0.008	-0.096	0.676	0.648	0.725	0.81	0.752
Z2 * M	-0.074	0.943	1	-0.128	0.087	-0.124	-0.05	-0.08
Z2.1	0.711	-0.246	-0.232	0.761	0.675	0.722	0.742	0.786
Z2.10	0.864	-0.104	-0.151	0.748	0.669	0.876	0.82	0.904
Z2.11	0.862	0.039	0.01	0.811	0.774	0.85	0.839	0.906
Z2.12	0.854	-0.092	-0.149	0.829	0.759	0.867	0.811	0.918
Z2.13	0.73	0.054	-0.007	0.69	0.663	0.738	0.736	0.794
Z2.14	0.813	-0.065	-0.114	0.76	0.72	0.86	0.77	0.852
Z2.15	0.848	0.029	-0.003	0.787	0.756	0.831	0.813	0.886
Z2.16	0.763	-0.166	-0.175	0.735	0.632	0.767	0.726	0.804
Z2.2	0.798	-0.011	-0.022	0.878	0.828	0.81	0.831	0.861
Z2.3	0.792	-0.03	-0.027	0.771	0.749	0.792	0.819	0.847
Z2.4	0.725	-0.079	-0.053	0.709	0.68	0.729	0.753	0.804
Z2.5	0.881	0.016	0	0.878	0.854	0.899	0.899	0.938
Z2.6	0.911	0.034	0.003	0.869	0.819	0.914	0.888	0.958
Z2.7	0.702	-0.052	-0.046	0.758	0.68	0.719	0.702	0.777
Z2.8	0.86	0.04	0.008	0.805	0.755	0.852	0.838	0.909
Z2.9	0.893	-0.172	-0.179	0.839	0.754	0.91	0.879	0.919

Referring to Table 1, the cross-loading values indicate that every indicator associated with each variable in this study has satisfied the criteria, as they exhibit the highest outer loading values for their

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 11: 661-673, 2025
DOI: 10.55214/2576-8484.v9i11.10945

respective variables rather than for others. Consequently, every indicator within each variable in this research has satisfied the assessment.

Table 2.
Construct Reliability and Validity.

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
X1	0.969	0.972	0.686
X2	0.92	0.934	0.611
Z1	0.955	0.961	0.693
Z2	0.978	0.98	0.754
M	0.96	0.965	0.715
Y	0.972	0.975	0.799

Referencing Table 2, every variable in this research shows an AVE value exceeding 0.5, confirming that the questionnaire satisfies the criteria for convergent validity. The value of Cronbach's Alpha exceeds 0.6, and Composite Reliability is over 0.7, indicating that the instrument used in this study satisfies the reliability standards, signifying that all indicators consistently and reliably reflect their latent variables.

3.3. Structural Model Evaluation (Inner Model)

3.3.1. Coefficient of Determination (R^2)

The examination of the structural model involves analyzing the R-square value, which serves as a goodness-of-fit test for the model.

Table 3.
R-Square Value.

Variable	R Square	R Square Adjusted
Y	0.948	0.947
Z1	0.812	0.811
Z2	0.854	0.853

This research fundamentally employs two endogenous variables affected by other factors, specifically variable Z, which is impacted by variables X1 and X2. Similarly, variable Y is affected by variables Z1, Z2, and Moderation. Table 3 displays the R-squared value for variable Y, which is 0.948. The R-squared value indicates that 94.8% of variable Y is affected by variables X1, X2, Z1, Z2, and the Moderator, whereas the remaining 5.2% is impacted by other variables not included in the analysis. The R-squared values for the variables Z1 and Z2 are 0.812 and 0.854, respectively. It can be concluded that variables X1 and X2 influence Z1 by 81.2% and impact Z2 by 85.4%.

3.3.2. Predictive Relevance (Q^2)

The goodness of fit for the model is assessed using the R-Square of dependent latent variables, interpreted similarly to regression, while Q-Square assesses predictive relevance for structural models. Predictive relevance evaluates the quality of conservation value generated by the model and its parameter estimates. The value of Q^2 falls within the range of $0 < Q^2 < 1$, indicating that values nearing 1 reflect a superior model. The size of Q^2 is the same as the overall determination coefficient in path analysis. According to Table 3, the assessment of predictive relevance is determined as follows.

Q^2 value = $1 - (1 - R22) \times (1 - R1^2)$

Q^2 value = $1 - (1 - 0.948) \times (1 - 0.833) = 1 - (0.052 \times 0.167) = 0.008684$

Description:

Q^2: Predictive Relevance value

$R1^2$: R-Square value of Y variable

$R2^2$: R-Square value of Z variable

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According to the calculation results, the Q^2 value is 0.9913, indicating that 99.13% of the data variability from the study can be explained by the designed structural model, whereas the remaining 0.0087% is attributed to other factors not included in the model. From these findings, it can be concluded that the structural model in this research is robust, as it approaches the value of 1.

3.3.3. Hypothesis Testing

3.3.3.1. Direct Effect

Hypothesis testing aims to examine the causal connections established in the model (thought framework), specifically the impact of exogenous variables on endogenous variables. In this study, hypothesis testing employs the T-statistic value and significance value (p-value), with the criterion that the T-statistic must exceed the t-table value (1.96) and the p-value must be less than 0.05 for the hypothesis to be accepted. The outcomes of hypothesis testing are achieved through the PLS bootstrapping technique.

Table 4.
Hypothesis Testing Results (Direct Effect).

Hypothesis	Correlation between variables	Original Sample	T Statistics	P Values	Description
H1	X1 → Y	0.006	0.245	0.806	Not Significant
H2	X1 → Z1	0.528	8.977	0	Significant
H3	X1 → Z2	0.672	13.8	0	Significant
H4	X2 → Z1	0.41	7.246	0	Significant
H5	X2 → Z2	0.284	6.36	0	Significant
H6	X2 → Y	0.001	0.025	0.98	Not Significant
H7	Z1 → Y	0.09	3.749	0	Significant
H8	Z2 → Y	0.301	6.452	0	Significant
H9	Z1 → Y*M	0.044	2.035	0.042	Significant
H10	Z1 → Y*M	0.081	3.536	0	Significant

According to the findings from the analysis shown in Table 4, the outcomes of the direct hypothesis testing (H1, H2, H3, H4, H5, H6, H7, H8, H9, and H10) in this research were acquired. The hypothesis test results indicated that eight hypotheses were accepted, specifically H2, H3, H4, H5, H7, H8, H9, and H10. Although H1 and H6 were rejected.

3.3.3.2. Indirect Effect

Testing for indirect influence can be performed by contrasting the t-count with the t-table. The t-table value can be derived from respondents, leading to a final t-table of 1.960. Yet, when employing the p-value, the reference value utilized is the error rate (α) set at 5%. The outcomes of indirect testing are as follows:

Table 5.
Indirect Effect.

Correlation between variables	Original Sample	T Statistics	P Values	Description
X1 → Z1 → Y	0.047	3.347	0.001	Significant
X2 → Z1 → Y	0.037	3.42	0.001	Significant
X1 → Z2 → Y	0.202	5.844	0.000	Significant
X2 → Z2 → Y	0.086	4.566	0.000	Significant

From Table 5, all mediation paths (both through Z1 and Z2) were significant, and Z2 had a stronger mediation effect than Z1. This underscores the important role of both mediators in transmitting the effect of independent variables on the effectiveness of information socialization.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 11: 661-673, 2025
DOI: 10.55214/2576-8484.v9i11.10945

3.3.3.3. Total Effect

The following will present the results of the total effect analysis:

Table 6.
Total Effect.

Correlation between variables	Original Sample	T Statistics	P Values	Description
M à Y	0.601	11.534	0	Significant
MZ1 à Y	0.044	2.035	0.042	Significant
MZ2 à Y	-0.081	3.536	0	Significant
X1 à Y	-0.006	0.245	0.806	Not Significant
X1 à Z1	0.528	8.977	0	Significant
X1 à Z2	0.672	13.8	0	Significant
X2 à Y	0.001	0.025	0.98	Not Significant
X2 à Z1	0.41	7.246	0	Significant
X2 à Z2	0.284	6.36	0	Significant
Z1 à Y	0.09	3.749	0	Significant
Z2 à Y	0.301	6.452	0	Significant

Based on Table 6 above explains that the biggest influence on the efficiency of information socialization to the community is the business process, with a coefficient of 0.301 (original sample). Then, on the development of employee skills, the biggest influence is on the quality of human resources, with a coefficient of 0.528 (original sample). The biggest influence on the business process is also the quality of human resources, with a coefficient of 0.672 (original sample).

4. Discussion

Findings of the study provide strong empirical evidence that public communication success in a utility context is a multi-faceted measure that is driven by information systems competencies, process standardization, and organizational maturity. Findings amalgamate and reinforce existing information systems theory by combining knowledge from information governance and e-government maturity frameworks and observing that communication success cannot be achieved through technology adoption but through harmonized institutional readiness and process alignment.

4.1. The Influence of Information Systems Capabilities

Consistent with past studies, ICT capability and digital competence have strong impacts on communication effectiveness via indirect routes. There was no significant direct relationship between ICT capability and communication effectiveness (H1), corroborating the earlier caution by Daft and Lengel [5] and Heeks and Bailur [17] that technology adoption is no assurance of information timeliness, accuracy, or clarity. However, when directed through business process standardization and digital capabilities (H3, H5), ICT capability had a significant positive impact, implying that effective digital transformation in public utilities relies on the conversion of technological resources into operational skills [8, 10].

This result aligns with Yao and Li [8], who emphasized that IT capability must be coupled with organizational absorptive capacity in order to create measurable value. Within the Indonesian context, as identified by Silitonga [16], digital literacy inequality among governmental officials is a barrier to ICT utilization. To this end, this study contributes by demonstrating empirically that organizational capability building through digital competencies training can act as an enabler to transform ICT investments into improved communication outcomes. The novelty here is in linking digital skills development at the individual level to communication performance at the organizational level, thereby extending the boundaries of traditional IS capability models to the domain of public communication.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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4.2. The Mediating Role of Business Process Standardization

Standardized business processes were the strongest predictor of public communication effectiveness ($\beta = 0.301$), consistent with Goel et al. [1] and Röglinger et al. [2] arguing that standardized processes enable reliable and consistent information flows through deep organizational hierarchies. The process standardization mediation effect between ICT capability and public communication effectiveness also identifies process maturity as a central mechanism through which technology is used to enable public information dissemination.

This outcome incorporates the business process maturity model (BPMM) concept into the domain of information transmission. Even though earlier research, Melão and Pidd [11], talked about process standardization as largely a motivator of internal effectiveness, this study demonstrates its communicative value: standardized processes reduce distortion, facilitate precision in messages, and decrease latency in information channels directed towards citizens. This joint focus on process design and communication management is not dominant in e-government theory, so this is a theoretical contribution.

Lastly, the indirect effects through process standardization (H3–H5) imply that transparency of processes and traceability of information are mediators between ICT capacity and external communication effectiveness. Such processes capture the "information value chain" of Riggs et al. [9] whereby ICT inputs are being converted into strategic informational outputs through well-governed processes. The innovation of the study, therefore, lies in empirically testing the process standardization acting as an informational conduit from ICT to communication results, particularly in public service settings characterized by geographical remoteness and bureaucratic complexity.

4.3. The Moderating Effect of Information Governance Maturity

Maturity of information governance was also significantly found to mediate the relationship between the two mediators (digital skills and business processes) and communication effectiveness (H9–H10). This finding aligns with maturity model studies, Wendler [3] and Paulk et al. [4], that show increased governance maturity enhances consistency and liability in information management practices. The moderating function supports that governance maturity is a facilitator of effective digital transformation [10]. There are well-established roles, policies, and control processes in such mature organizations to ensure that the information systems are appropriately and methodically utilized to facilitate public-facing communication.

This is particularly relevant to the Indonesian government sector, where fragmented administrative arrangements and varying degrees of digital preparedness pose implementation challenges [12]. The results in PLN UP3 Berau show that the organizations with higher governance maturity have more effective use of technology and process improvement, and more transparent and consistent communication with citizens. Therefore, this study adds to the existing literature as it shows not only that governance maturity mediates performance effects but also that it amplifies the communicative effects of IS capability, a connection that has been partially overlooked in previous models of IS maturity.

4.4. Integrative Interpretation and Novel Contribution

Merging ICT adoption, digital competence, process standardization, and governance maturity into one single predictive model constitutes a new contribution to information systems capability research. The extremely high explanatory power ($R^2 = 0.948$) underlines the synergistic interplay of these factors, suggesting that communication effectiveness is best achieved as a system attribute from the co-evolution of technology, processes, and governance. This combined reading extends traditional TAM or CMMI perspectives by formulating a communications-centered approach to IS capability, where maturity at an organizational level operates as a cross-level moderator linking micro (ability) and meso (process) dimensions to macro (communication) outcomes.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 11: 661-673, 2025
DOI: 10.55214/2576-8484.v9i11.10945

Theoretically, the study bridges the missing link between communication effectiveness models (e.g., IGIM) and information governance maturity models, an evidence-based model that measures how digital infrastructure and organizational readiness collectively determine communication quality in public utilities. The study further develops the argument made by Diniz et al. [15] that citizen-government communication is not an interface design issue but one of institutional and informational alignment. Thus, this paper takes its place in the new "governance-oriented IS communication" literature, offering a new conceptual framework through which to interpret the communicative contribution of digital governance.

4.5. Practical Implications

Practically, these findings mean that public utilities and government offices should not prioritize ICT take-up alone but instead achieve parallel business process maturity and governance readiness. Capacity development programs must be designed by policymakers to concentrate on digital capability development and information governance standardization as twin engines of effective public communication. In agreement with Latupeirissa et al. [7], the success of digital transformation in public organizations depends not on the technology itself but on the organizational capacity to institutionalize it through systematic means and responsive governance architectures.

To utility corporations such as PLN, the implications are that improving standard operating procedures (SOPs) for data sharing, maintaining uniform data governance frameworks, and developing digital literacy among employees can together enable quicker, clearer, and more reliable communication with citizens. Further, the governance maturity moderating role emphasizes that accountability measures and regulatory obligations also need to be planned in conjunction with digital investments so that transparency and responsiveness are at the centre of information-based public services.

4.6. Future Research Directions

Although the model demonstrates strong explanatory power, future research can attempt to apply this model to other public service areas (e.g., water, health, transportation) and include longitudinal designs to see how governance maturity evolves over time. Comparative studies across developing and developed economies can also examine the universality of the hypothesized relationships. In addition, the incorporation of qualitative insights into how employees view digital skill programs and governance reforms can enhance the understanding of the social processes behind ICT adoption and communication performance. Finally, future research can examine how emerging technologies such as AI-powered communication systems and predictive analytics interact with governance maturity to continue shaping public communication effectiveness [6].

5. Conclusions

This study shows the way in which the public communication efficacy in utility companies is determined by synergetic interaction between ICT capability, business process standardization, and information governance maturity. Even though ICT capability as well as skills development in digital are key enablers, their impact is activated only when these are embedded within standardized processes supported by mature governance mechanisms.

The findings show that standardization of business processes is the strongest driver of communication effectiveness, as a structural channel conveying digital capability into explicit, timely, and reliable information flows. Moreover, information governance maturity plays a decisive moderating role in affirming the effect of digital competencies and process standardization on results in communication. These findings empirically affirm the claim that public sector digital transformation is not only a technical exercise but an institutional process of aligning technology, people, and governance.

Theoretically, this study makes a contribution to information systems literature by integrating the Technology Acceptance Model (TAM), Capability Maturity Model Integration (CMMI), and information governance models into a single model of public communication effectiveness. This study

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ISSN: 2576-8484
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DOI: 10.55214/2576-8484.v9i11.10945

advances the IS capability literature beyond efficiency and performance, establishing communication effectiveness as a socially embedded new outcome of digital maturity.

Practically, this study offers policymakers and managers of public utilities concrete suggestions: (1) favor cross-cutting digital capacity building over technologically compartmentalized procurement; (2) bureaucratize procedural standardization, guaranteeing equal information provisioning; and (3) build governance maturity as a strategic accelerator of transparency and trust among citizens. To the Indonesian public sector, implications underscore that ICT adoption must be supplemented with digital literacy among the workforce and government reform in order to bridge the gap between digital potential and communication achievement.

Subsequent research can further apply the model with other contextual variables, e.g., organizational culture, coordination between departments, or artificial intelligence implementation, to clarify public service ecosystem communication dynamics. Cross-sectoral or longitudinal tests can also probe for temporal and contextual invariance of these relationships, further validating how digital governance maturity results in sustained excellence in public communication.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgment:

The author expresses heartfelt gratitude to the promoters for their valuable insights, constructive feedback, and ongoing encouragement throughout this research. The author extends heartfelt thanks to everyone and organizations that contributed to the execution of this research, either directly or indirectly, as their assistance, collaboration, and support in various forms have been invaluable and highly appreciated.

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Edelweiss Applied Science and Technology
ISSN: 2576-8484
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