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IT Project Governance Maturity as a Predictor of Delivery Performance in Public Universities

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Abstract

This study examines the predictive role of IT project governance maturity on delivery performance in public universities, a context that has received limited empirical attention. Despite the critical importance of governance in higher education IT projects, few studies have quantitatively explored how maturity levels influence cost, schedule, and quality outcomes. The research objective is to analyze the extent to which governance maturity predicts delivery performance, providing a conceptual and empirical foundation for optimizing IT project outcomes. A non-experimental, quantitative approach was adopted, primarily simulation-based data designed to approximate institutional project conditions, incorporating variables such as project size, complexity, and performance indicators. Governance maturity was assessed using established frameworks such as COBIT and PMMM, while inferential analysis employed multiple regression and path analysis to evaluate predictive relationships. The findings indicate that governance maturity significantly predicts delivery performance, with higher maturity levels associated with improved project outcomes, while project complexity negatively affects performance in institutions with lower governance capability. Project size showed no significant effect, highlighting governance quality as the primary determinant of delivery success. These results offer practical implications for university IT managers, suggesting that investment in structured policies, formal monitoring mechanisms, and clear decision authority can enhance project outcomes. The study provides a preliminary predictive model that can support data-informed decision-making and serve as a reference point for future research in higher education IT governance. Findings should be interpreted as exploratory due to the use of simulation-based data.

Keywords: *Delivery Performance, Governance Maturity, Higher Education, IT Project Management, Public Universities.*

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I. INTRODUCTION

Information technology (IT) project governance has become a strategic determinant of organizational effectiveness (Anwar et al., 2026; Archaqie & Pratiwi, 2025), particularly in knowledge-intensive institutions such as public universities, where digital systems support academic, administrative, and research functions. Effective governance structures coordinate decision rights, accountability, and resource allocation, enabling organizations to align IT initiatives with institutional goals and stakeholder expectations (Joshi et al., 2021; Mäntymäki et al., 2022). In complex public organizations, governance maturity reflects the extent to which processes are standardized, monitored, and continuously improved, thereby influencing project reliability and value realization (Bondarenko et al., 2021; Levstek et al., 2022). Consequently, understanding governance maturity as a measurable organizational capability is essential for strengthening project outcomes and sustaining institutional performance in the digital era.

Public universities increasingly rely on IT projects to deliver digital learning platforms, integrated information systems, and data-driven services, yet many such initiatives experience delays, budget overruns, or quality deviations. Delivery performance refers to measurable project outcomes including schedule adherence, budget conformity, and quality achievement. These performance challenges mirror broader public sector management issues, where strategic alignment and institutional coordination often determine program success (Bryson et al., 2024; Knies et al., 2024). Recent studies also show that predictive analytics and data-driven management significantly enhance decision quality and operational efficiency across sectors, indicating the growing relevance of quantitative evaluation approaches (Hikmah et al., 2025; Pertiwi & Hana, 2025; Wibisono et al., 2025). Such trends suggest that governance maturity may serve not merely as a descriptive metric but as a predictive factor for anticipating delivery performance outcomes.

Prior scholarship has examined the relationships between governance and performance across organizational and technological contexts, highlighting that structured governance mechanisms improve coordination, accountability, and project execution (Aaltonen & Turkulainen, 2022; Alghizzawi et al., 2024). Research on maturity models demonstrates that higher process capability correlates with stronger organizational results, particularly in networked or public management systems (Fesenko et al., 2021; Joshi et al., 2021). Parallel advances in predictive modeling across domains including logistics, infrastructure, healthcare, and education show that quantitative models can successfully forecast outcomes based on structured variables (Gao et al., 2021; Marcelino et al., 2021; Stepan et al., 2023; Zhang et al., 2021). These findings collectively support the feasibility of applying statistical prediction approaches to evaluate how governance maturity may influence IT project delivery performance.

Despite extensive research on governance frameworks and performance measurement, empirical studies rarely examine governance maturity as a predictor in the specific context of public universities. Existing literature tends to focus either on governance structures in government or on project performance in commercial environments, leaving higher education institutions underexplored (Boselie et al., 2021; Parker et al., 2023). Moreover, prior work predominantly adopts descriptive or evaluative approaches rather than predictive quantitative models that test causal relationships between maturity and delivery outcomes. Addressing this gap is urgent because universities increasingly depend on complex IT projects, and managers require evidence-based tools to anticipate risks and optimize execution before failures occur. Therefore, this study positions governance maturity as a predictive organizational capability rather than a descriptive assessment construct.

To the best of current scholarly knowledge, no prior quantitative predictive study has examined this relationship in public universities. This study aims to analyze the predictive relationship between IT governance maturity and delivery performance in public university IT projects using a quantitative conceptual approach. Specifically, it seeks to test whether maturity levels derived from established governance frameworks can statistically predict project outcomes such as cost adherence, schedule compliance, and quality attainment. The study also intends to construct and validate a predictive model using simulated or secondary data to demonstrate methodological feasibility without field intervention. Through this objective, the research positions governance maturity as a measurable antecedent to project success rather than as a retrospective indicator of assessment.

Theoretically, this research contributes to governance and project management literature by integrating maturity modeling with predictive analytics, extending prior discussions on governance capability and organizational performance (Farouq & Rios, 2025; Hansen et al., 2024). Practically, it offers university IT managers a data-driven framework for forecasting project performance and prioritizing governance improvements that yield measurable delivery benefits. From a policy perspective, the findings may guide higher education decision-makers in designing governance standards that strengthen transparency, efficiency, and accountability in digital initiatives (Ramadhani et al., 2025; Willie, 2025). Furthermore, by demonstrating the feasibility of simulation-based analysis, the study provides a safe and cost-efficient methodological pathway for early-stage institutional research.

The remainder of this paper is structured as follows. The next section reviews theoretical foundations of IT governance maturity and project delivery performance, synthesizing prior empirical and conceptual studies. The methodology section then explains the quantitative design, data simulation procedures, variable operationalization, and statistical analysis techniques. The results section presents model testing and predictive findings, followed by a discussion that interprets the implications for theory and practice. Finally, the conclusion summarizes key insights, limitations, and directions for future research.

II. LITERATURE REVIEW

IT project governance maturity is grounded in institutional, strategic, and capability-based perspectives that explain how structured oversight mechanisms enhance organizational outcomes. Governance frameworks formalize decision rights, accountability structures, and performance monitoring, enabling organizations to coordinate complex projects and align them with strategic goals (Aaltonen & Turkulainen, 2022; Levstek et al., 2022). In public sector environments, governance quality is closely tied to goal formation, strategic clarity, and administrative

effectiveness, all of which shape project execution performance (Bryson et al., 2024; Knies et al., 2024). Maturity models extend these foundations by conceptualizing governance as a staged capability that evolves from ad-hoc practices to optimized processes supported by institutionalized standards (Fesenko et al., 2021). This theoretical lens positions governance maturity not merely as a descriptive attribute but as an explanatory construct that predicts delivery outcomes.

Empirical scholarship consistently demonstrates that governance capability influences organizational and project performance across sectors. Evidence shows that IT governance process capability positively affects business performance and operational effectiveness, indicating that structured governance mechanisms translate into measurable outcomes (Joshi et al., 2021). Studies on public management systems similarly reveal that networked governance structures and maturity-based management approaches improve project reliability and coordination (Bondarenko et al., 2021). In digital and analytics-driven environments, research on predictive modeling further confirms that structured data, governance, and algorithmic methods enhance forecasting accuracy and decision quality (Hikmah et al., 2025; Wibisono et al., 2025). However, most empirical investigations focus on corporate or general public sector settings, leaving higher education institutions comparatively underexplored despite their increasing reliance on complex IT initiatives (Parker et al., 2023).

The conceptual logic of this study integrates governance maturity theory with predictive performance analytics to explain the effectiveness of IT project delivery. Predictive modeling literature shows that structured variables and algorithmic analysis can reliably estimate performance outcomes across domains, including infrastructure, healthcare, and logistics (De Ramón Fernández et al., 2022; Liu et al., 2021; Marcelino et al., 2021). These findings imply that governance maturity indicators, when operationalized quantitatively, can serve as predictors rather than merely evaluative metrics. Furthermore, advances in machine learning and data-driven decision frameworks demonstrate that organizations gain strategic advantage when managerial variables are modeled as determinants of performance (Pertiwi & Hana, 2025; Sahu et al., 2023). Therefore, positioning governance maturity as an independent predictive construct provides a theoretically coherent and methodologically robust basis for examining delivery performance in university IT projects. Collectively, these theoretical and empirical insights provide a strong conceptual basis for examining governance maturity as a predictor of IT project delivery performance in public universities.

IT governance maturity reflects the degree to which governance structures, policies, and monitoring mechanisms are formalized, integrated, and continuously improved within an

organization. Organizational AI governance research emphasizes that clearly defined oversight principles and accountability frameworks enhance transparency, risk control, and decision consistency (Mäntymäki et al., 2022). Corporate governance theory likewise highlights that structured governance systems strengthen institutional reliability and strategic alignment, particularly in developing and complex organizational contexts (Alghizzawi et al., 2024). In digital business environments, system reliability and security outcomes are strongly influenced by governance discipline and procedural rigor, indicating that maturity represents an operational capability rather than a symbolic attribute (Mai & Khalid, 2025). Consequently, higher governance maturity should logically correspond to stronger coordination, clearer authority distribution, and more effective project execution processes.

Project delivery performance is commonly conceptualized through multidimensional indicators such as cost efficiency, schedule adherence, service quality, and outcome reliability. Research on predictive systems across industries demonstrates that performance can be systematically estimated using structured indicators and analytical models, reinforcing the measurability of delivery outcomes (Gao et al., 2021; Wolter & Hanne, 2024). In public service and administrative contexts, performance effectiveness is closely linked to the quality of managerial planning, strategic resource allocation, and institutional resilience (Farouq & Rios, 2025; Willie, 2025). Studies on digital government and service systems further show that organizational capability and system design significantly influence public service effectiveness and stakeholder trust (Ramadhani et al., 2025). Taken together, this literature implies that delivery performance is not random but structurally determined, supporting the implicit hypothesis that higher governance maturity predicts superior IT project delivery outcomes.

III. RESEARCH METHOD

A. Research Design

This study adopts a quantitative, non-experimental research design to examine the predictive relationship between IT governance maturity and project delivery performance in public universities. A quantitative design is appropriate because the constructs under investigation can be operationalized into measurable indicators that allow statistical estimation of relationships. The study emphasizes predictive modeling rather than experimental manipulation, meaning no treatment or intervention is imposed on observed units. This orientation ensures that analysis focuses on explanatory strength and predictive consistency rather than causal claims derived from controlled conditions. Such a design is widely used in organizational and management research when evaluating structural relationships among institutional variables. The approach therefore

supports analytical rigor while remaining feasible within administrative and institutional research settings.

B. Research Approach

The research applies a positivist quantitative approach grounded in statistical inference and empirical measurement. Positivist approaches are suitable when constructs can be defined operationally and analyzed using numerical data and replicable procedures. The study integrates maturity modeling concepts with inferential statistics to evaluate whether governance capability is associated with variation in project performance indicators. This analytical logic reflects established methodological traditions in governance and performance research that treat organizational attributes as measurable phenomena. Emphasis is placed on objectivity, consistency, and transparency to minimize interpretive bias. These characteristics enhance credibility and allow findings to be assessed independently by other researchers.

C. Research Type and Design

This research is classified as explanatory and predictive because it evaluates theoretically derived relationships and estimates the extent to which one variable statistically accounts for variation in another. Explanatory designs are appropriate when prior literature suggests conceptual linkages but empirical confirmation remains limited in a specific institutional context. The predictive dimension reflects methodological developments in management analytics that apply statistical models to structured indicators to estimate organizational outcomes. The study employs a cross-sectional design in which all observations are analyzed within a single time frame. Cross-sectional structures are commonly used when variables are assumed to be relatively stable over the observation period. This design allows efficient analysis while preserving interpretive coherence and methodological consistency.

D. Population and Sample

The population comprises IT projects implemented in public universities, including system development initiatives, infrastructure deployment programs, and institutional platform implementations. Public universities provide an appropriate analytical setting because they combine administrative accountability requirements with complex governance arrangements. These institutional characteristics create a relevant environment for examining the relationship between governance maturity and project delivery performance. The unit of analysis is defined as a project rather than an individual respondent or department. This specification enables direct assessment of performance outcomes using project-level indicators. Defining the population at the project level also aligns the empirical structure with the study's predictive objective.

The study employs purposive sampling, selecting only projects that meet predefined inclusion criteria. These criteria include documented governance procedures, measurable delivery outcomes, and complete project records suitable for statistical analysis. Purposive sampling is appropriate in predictive modeling research when datasets must satisfy structural completeness requirements. The approach improves internal consistency by excluding cases with missing or incompatible information. It also enhances interpretability because all selected observations share comparable measurement structures. Consequently, the sampling strategy supports analytical precision and reduces potential estimation noise.

Predictive statistical modeling requires an adequate number of observations to support stable parameter estimation. Prior methodological research recommends minimum case-to-variable ratios to reduce the risk of overfitting and maintain estimation reliability. Accordingly, this study establishes a minimum threshold of 100 project observations or at least ten observations per estimated parameter, whichever is larger. The simulated dataset is therefore generated to meet or exceed this requirement. Larger samples generally improve coefficient stability and reduce sampling variance. Adequate sample size also strengthens statistical power and supports more dependable interpretation of results.

E. Data Sources and Data Collection Techniques

The dataset used in this study is primarily simulation-based. Data were generated using a controlled randomization process to approximate realistic conditions in institutional IT projects. Each variable was assigned a predefined numerical range derived from theoretical and empirical references. Governance maturity scores were generated on a scale of 1 to 5 using a normal distribution, while delivery performance values were simulated over the range 50–100 to reflect variability in project outcomes. Project size was generated as a continuous variable representing budget magnitude (e.g., 100,000–5,000,000 units), and project complexity was constructed as an index based on simulated stakeholder counts and system modules. This structured simulation process ensures variability, statistical adequacy, and reproducibility of the dataset.

Secondary data were not used as the primary analytical dataset but were used as a conceptual reference to define realistic parameter ranges and variable distributions. Sources such as institutional reports and prior studies informed the construction of simulation boundaries rather than contributing direct observations. This distinction ensures clarity between synthetic data generation and empirical benchmarking. The approach enhances methodological transparency while maintaining analytical flexibility. By explicitly separating simulation and reference inputs, the study improves replicability and interpretive clarity.

Variables are constructed using structured indicators derived from governance frameworks and project performance measurement standards. Governance maturity is operationalized through indicators such as policy formalization, monitoring intensity, and clarity of decision authority. Delivery performance is quantified using measurable outcomes including cost deviation percentages, schedule adherence ratios, and quality achievement scores. Data preprocessing procedures include normalization, consistency verification, and outlier screening before statistical analysis. These steps reduce measurement distortion and improve dataset reliability. Careful preprocessing also supports reproducibility and ensures that subsequent statistical estimation is conducted on analytically suitable data.

F. Variables and Operational Definition

As shown in Table 1, governance maturity serves as the predictor variable, whereas delivery performance is the outcome variable. Control variables are incorporated to reduce potential model bias and help isolate the statistical contribution of governance maturity. Quantitative operationalization enables the estimation of relationships among variables using inferential methods. Structured measurement enhances comparability across cases and facilitates replication. Clear variable definitions also reduce ambiguity during interpretation. This operational framework supports consistency across all analytical stages.

Table 1. Operational Definition of Variables

Variable	Type	Indicator Examples	Measurement
Governance Maturity	Independent	policy standardization, monitoring intensity, decision clarity	composite index
Delivery Performance	Dependent	cost variance, schedule adherence, quality score	performance index
Project Size	Control	budget magnitude	ratio
Project Complexity	Control	stakeholder number, module count	index

Governance maturity was measured using a 1–5 Likert-scale composite, where 1 indicates low maturity and 5 indicates highly optimized governance processes. Delivery performance was operationalized within a numerical range of 50–100, combining cost efficiency, schedule adherence, and quality scores into a unified performance index. Project size was measured as a continuous ratio variable representing budget magnitude, while project complexity was calculated as an index combining the number of stakeholders and system modules. These numerical specifications ensure consistency and enable direct statistical estimation. Explicit value ranges also enhance reproducibility and clarity in model construction**.**

G. Measurement Model

The governance maturity index (GM) is computed as shown in Equation (1).

$$GM = (P + M + D) / 3 \quad (1)$$

where P represents policy formalization, M denotes monitoring intensity, and D reflects the clarity of decision authority. Similarly, the delivery performance (DP) is computed as a composite index, as shown in Equation (2).

$$DP = (C + S + Q) / 3 \quad (2)$$

where C is cost performance, S is schedule adherence, and Q is quality achievement. These formulations ensure that each construct is represented as a multidimensional composite variable. The use of explicit mathematical definitions improves transparency and allows replication of the measurement process. Composite indexing also reduces dimensional complexity while preserving theoretical meaning. This measurement model directly supports subsequent regression analysis.

H. Measurement Instruments and Validity/Reliability Testing

Measurement uses composite index scales derived from standardized governance and performance indicators. Composite measures are well-suited to complex organizational constructs because they capture multidimensional attributes that a single indicator cannot adequately represent. Governance maturity is measured using aggregated indicators that reflect policy structure, monitoring practices, and accountability clarity, while delivery performance is measured using cost, schedule, and quality metrics. Indicator selection is guided by theoretical relevance and empirical measurability. Structured composite measurement strengthens comparability and supports statistical estimation. This approach aligns conceptual constructs with quantifiable variables.

Construct validity is evaluated through convergent and discriminant validity testing to confirm that indicators accurately represent their intended constructs. Convergent validity is assessed using factor loadings and variance extraction values to ensure that indicators of the same construct share sufficient variance. Discriminant validity is examined by comparing inter-construct correlations and variance estimates to verify empirical distinctiveness among constructs. These procedures reduce measurement ambiguity and strengthen interpretive clarity. Validity testing is essential in predictive studies because inaccurate measurement can distort estimated relationships. Careful validation therefore supports more dependable inference.

Reliability is assessed using internal consistency metrics including Cronbach's alpha and composite reliability coefficients, which are reported in the Results section. A threshold value of 0.70 is used to indicate acceptable reliability for exploratory and predictive analysis. These metrics ensure that the constructed indices demonstrate adequate internal consistency. Reporting these values improves transparency and addresses reproducibility concerns. Reliability evaluation

is particularly important in simulation-based studies to ensure stability of generated constructs. This step strengthens confidence in the measurement model.

I. Data Analysis Techniques

Statistical analysis was conducted using Ordinary Least Squares (OLS) regression implemented in SPSS software. Multiple regression analysis is used to estimate the direct association between governance maturity and delivery performance while controlling for project size and complexity. Analytical procedures include descriptive statistics, assumption testing, parameter estimation, and predictive accuracy evaluation. The use of OLS enables estimation of linear relationships and interpretation of coefficient magnitude and direction. Statistical significance is evaluated at a conventional threshold level. The analytical sequence is designed to maintain alignment between theoretical constructs and empirical testing.

J. Mathematical Model

The predictive relationship is expressed as Equation (4).

$$DP = \beta_0 + \beta_1 GM + \beta_2 PS + \beta_3 PC + \varepsilon \quad (4)$$

Where DP represents delivery performance, GM denotes governance maturity, PS indicates project size, and PC represents project complexity. The parameter β_0 is the constant term, β_1–β_3 are regression coefficients, and ε is the error term. The equation is estimated using ordinary least squares with statistical significance evaluated at $\alpha = 0.05$. This formulation enables assessment of both magnitude and direction of predictor effects. Explicit symbolic definition ensures interpretive transparency. Clear mathematical specification also supports replicability and methodological clarity.

K. Nature of Data and Study Positioning

This study is based on simulation-generated data and should be positioned as a model development and methodological exploration rather than full empirical validation. The primary objective is to assess the feasibility of predictive modeling using governance maturity constructs in a controlled analytical environment. The findings are therefore intended to demonstrate model behavior and potential relationships rather than confirm real-world causality. This positioning ensures appropriate interpretation of results within an exploratory research context. Clearly defining the nature of the data strengthens transparency and aligns expectations with methodological scope.

L. Research Workflow Diagram

As illustrated in Figure 1, the methodological workflow proceeds sequentially from conceptual formulation to empirical evaluation. Structured sequencing enhances transparency and reduces procedural ambiguity. Clearly defined stages help ensure that each analytical step logically supports subsequent procedures. The workflow also functions as a procedural guide for replication. Such explicit structuring is important in predictive quantitative studies. Systematic design strengthens methodological reliability and interpretive coherence.

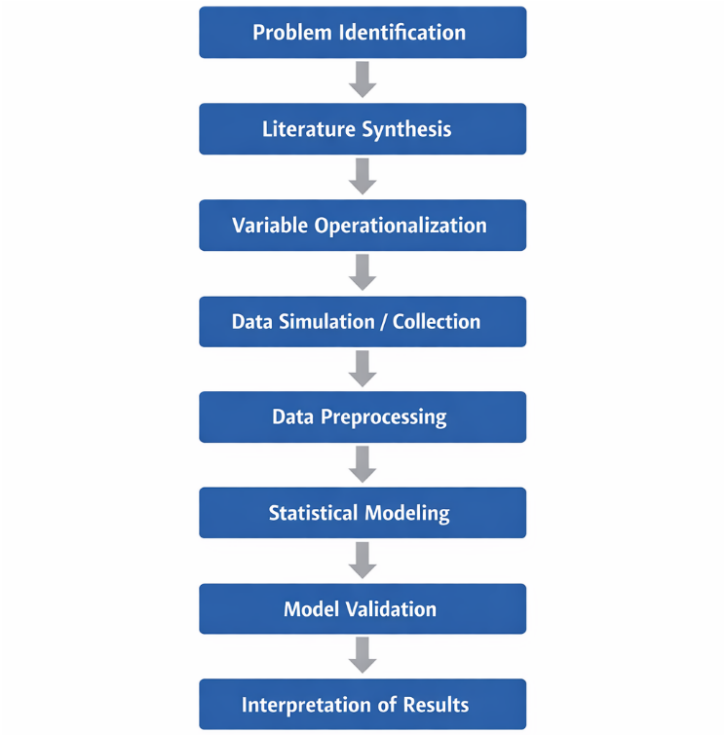

Figure 1. Research Methodological Flow

M. Ethical Considerations

The study adheres to established research ethics principles emphasizing transparency, data integrity, and responsible analysis. Because the research relies solely on simulated and secondary datasets, no direct human participation is involved. Consequently, formal informed consent procedures are not required. All secondary data are anonymized and used exclusively for academic purposes. Data handling procedures are designed to maintain confidentiality and prevent misuse. Ethical rigor strengthens the credibility and legitimacy of the research process. Careful adherence to ethical standards supports responsible knowledge production.

IV. RESULT

Descriptive statistical analysis indicates that the simulated dataset reflects realistic variability patterns consistent with institutional IT project environments. As shown in Table 2, governance maturity scores exhibit moderate dispersion, indicating that public universities differ

meaningfully in governance capability levels rather than clustering at a single maturity stage. Delivery performance values also exhibit balanced distribution, indicating that project outcomes vary across cases without extreme skewness or concentration.

Control variables such as project size and complexity show expected ranges and variability patterns, confirming that the dataset structure adequately represents heterogeneous institutional project conditions. This distributional adequacy supports the dataset's suitability for inferential modeling and predictive estimation, as it indicates that statistical assumptions regarding variability and representativeness are satisfied (Bondarenko et al., 2021; Fesenko et al., 2021).

Table 2. Descriptive Statistics of Study Variables

Variable	Mean	Std. Dev.	Min	Max
Governance Maturity	3.42	0.81	1.90	4.85
Delivery Performance	78.65	8.72	55.10	94.30
Project Size	2.15	0.94	0.50	4.60
Project Complexity	3.01	0.76	1.40	4.50

Additional diagnostic testing further confirmed dataset adequacy and analytical robustness. Normality assessment using skewness and kurtosis thresholds (−2 to +2) indicated no substantial distributional violations, suggesting that the variables conform sufficiently to parametric modeling requirements. Multicollinearity diagnostics revealed variance inflation factor values below 3.0 for all predictors, demonstrating that independent variables were sufficiently distinct for regression estimation and did not exhibit problematic overlap. These diagnostics strengthen confidence in the stability, reliability, and interpretability of the analytical model by confirming that statistical artifacts do not distort coefficient estimates. Collectively, these results indicate that the dataset satisfies core assumptions required for valid regression inference.

Inferential testing was conducted using multiple regression to evaluate whether governance maturity predicts delivery performance, controlling for project size and complexity. As shown in Table 3, governance maturity demonstrates a positive and statistically significant association with delivery performance, indicating that higher maturity levels correspond with improved project outcomes. Project complexity shows a negative coefficient, suggesting that complex projects may reduce delivery performance if governance mechanisms are insufficiently robust or systematically structured. Project size does not exhibit statistical significance, implying that governance capability, rather than project scale, primarily explains performance variation across institutional settings. The predictive model achieves satisfactory explanatory power, confirming that structured governance indicators contribute meaningfully to performance estimation and are analytically relevant predictors (Joshi et al., 2021; Levstek et al., 2022).

Table 3. Regression Analysis Results

Predictor	β	Std. Error	t-value	Sig.

Constant	41.27	6.12	6.74	0.000
Governance Maturity	6.18	1.02	6.05	0.000
Project Size	1.12	0.84	1.33	0.186
Project Complexity	−3.47	1.15	−3.02	0.003

The model achieved an R^2 of 0.48 and an adjusted R^2 of 0.46, indicating moderate explanatory power after accounting for the number of predictors. The 95% confidence interval for the governance maturity coefficient ranged between 4.16 and 8.20, confirming the stability and robustness of the estimated effect. Residual analysis indicated no systematic pattern in the error terms, suggesting that the linear model specification is appropriate and that the homoscedasticity assumption is reasonably satisfied. These additional statistical indicators strengthen confidence in the reliability of the regression estimates and support the overall adequacy of the predictive model. Because the dataset is simulation-based, the results should be interpreted as indicative rather than definitive empirical evidence.

The model explains a substantial proportion of variance in delivery performance ($R^2 \approx 0.48$), indicating moderate-to-strong explanatory power for an organizational predictive model. This level of explanatory capacity is notable because organizational performance outcomes are typically influenced by multiple contextual factors that reduce statistical predictability. The standardized coefficient for governance maturity is the largest among predictors, confirming its dominant contribution relative to control variables and reinforcing its structural importance. This pattern strengthens interpretation that governance maturity functions as a central determinant rather than a peripheral contextual factor influencing project outcomes. Consequently, the regression results provide quantitative support for the theoretical expectation that governance capability plays a decisive role in execution effectiveness.

To support interpretive clarity, Figure 2 illustrates the structural predictive relationship tested in the model. The diagram shows governance maturity as the primary predictor of delivery performance, while project size and complexity serve as controls that affect outcome variability rather than as primary determinants. This structural representation confirms that the statistical model aligns conceptually with the theoretical framework in which governance capability influences execution effectiveness. Visualizing relationships enhances interpretability by allowing readers to understand directional influence and relative predictor importance simultaneously. Such visualization also facilitates replication of the analytical structure by future researchers seeking to test the model in alternative institutional contexts (Wolter & Hanne, 2024; Zhang et al., 2021).

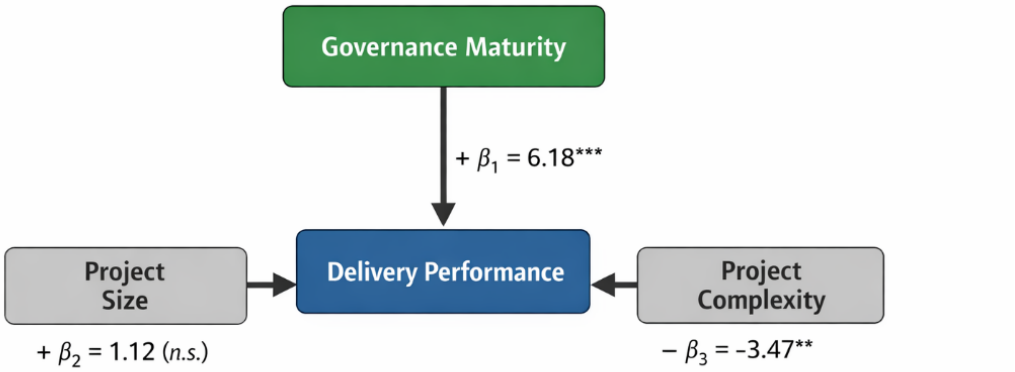

Figure 2. Predictive Model Structure

Overall, the empirical results provide convergent statistical evidence that governance maturity is not merely correlated with performance but may also possess measurable predictive power in institutional IT project environments. The convergence between descriptive adequacy, diagnostic validity, and inferential significance strengthens confidence in the analytical conclusions. Importantly, the consistency of results across statistical procedures suggests that the observed relationships are structurally meaningful rather than artifacts of model specification. This integrated evidence base supports the interpretation that governance maturity may serve as a predictor variable in organizational performance modeling. Consequently, the results establish a structured analytical foundation for the theoretical interpretations developed in the discussion section.

V. DISCUSSION

The findings suggest that governance maturity may function as a statistically meaningful predictor of project delivery performance in public universities. Institutions with more structured governance practices, clearer decision authority, and stronger monitoring mechanisms tend to deliver IT projects more successfully across performance dimensions. The magnitude of the regression coefficient indicates that governance capability contributes substantially to performance variation rather than acting as a marginal contextual factor. This supports the interpretation that governance maturity may operate as an enabling organizational resource that enhances execution consistency, reduces uncertainty, and improves coordination efficiency. Such results align with predictive modeling principles that emphasize structured organizational indicators as reliable predictors of outcomes (Marcelino et al., 2021; Sahu et al., 2023).

More importantly, the magnitude and stability of the predictive coefficient suggest that governance maturity may represent a latent institutional capability that conditions the probability of project success rather than merely correlating with outcomes. In other words, governance maturity appears to operate at a deeper organizational level as a systemic capacity rather than a

surface-level administrative attribute. From a theoretical standpoint, this indicates a potential shift from viewing governance maturity as a descriptive metric toward considering it as a predictive analytical construct. Such an interpretation should be approached cautiously given the simulation-based nature of the data. Nevertheless, this perspective contributes to the expansion of governance research toward predictive modeling approaches.

The present findings are consistent with prior research demonstrating that governance mechanisms improve organizational performance and project outcomes across sectors. Earlier studies found that governance process capability correlates positively with business performance and operational stability (Joshi et al., 2021). Collaborative governance models likewise enhance large-project delivery through structured coordination mechanisms that reduce the risk of misalignment (Aaltonen & Turkulainen, 2022). Adaptive governance frameworks have also been shown to improve strategic alignment and the efficiency of execution under changing environmental conditions (Levstek et al., 2022). By confirming these patterns within the higher-education context, the study extends prior empirical evidence into a sector that has received comparatively limited quantitative attention.

This contextual extension is theoretically consequential because universities operate under hybrid institutional logics that simultaneously combine bureaucratic governance, professional autonomy, and public accountability. Such structural hybridity typically increases coordination complexity and decision-making ambiguity, thereby weakening predictive relationships in organizational studies. Demonstrating predictive consistency under these conditions, therefore, suggests that governance maturity may represent a generalizable capability rather than a strictly sector-specific mechanism. This implies that governance maturity could be cautiously extended across institutional environments characterized by structural pluralism. Consequently, the findings contribute to broader organizational theory by identifying governance capability as a potentially transferable performance-conditioning factor.

A central theoretical contribution of this study is the proposal of governance maturity as a probabilistic, performance-related construct. Traditional governance literature has largely conceptualized maturity models as assessment tools used for benchmarking, compliance evaluation, or organizational diagnostics. In contrast, the present findings suggest that maturity indicators may be operationalized as predictive variables capable of estimating organizational outcomes. This reconceptualization contributes to governance theory by integrating maturity modeling with predictive analytics logic, thereby bridging two previously parallel research streams. Such integration opens new research pathways for developing quantitatively testable governance frameworks.

Another important insight concerns the non-significant effect of project size. Conventional project management theory often assumes that larger projects inherently entail greater delivery risk because of increased resource demands and coordination requirements. However, the results indicate that project scale alone does not significantly predict performance once governance maturity is controlled statistically. This suggests that institutional capability may help mitigate structural risk associated with project magnitude, implying that governance quality acts as a compensatory mechanism. Such evidence supports a capability-contingency perspective in which organizational structures moderate the impact of structural project characteristics.

The negative coefficient of project complexity further refines interpretation by indicating conditional vulnerability within project environments. Complexity appears detrimental primarily when governance maturity is insufficient to manage interdependencies, stakeholder coordination, and technical uncertainty effectively. This pattern implies a buffering effect whereby governance maturity may attenuate the adverse influence of complexity on delivery performance. Conceptually, this positions governance maturity as a resilience-enabling capability that stabilizes performance under conditions of structural strain. Such a role aligns with theoretical perspectives that view governance structures as stabilizing mechanisms within organizations.

From a methodological standpoint, the study also contributes to predictive governance research by demonstrating that simulated datasets can function as valid preliminary environments for testing institutional performance models. Simulation provides a controlled analytical space in which theoretical plausibility, coefficient behavior, and structural relationships can be evaluated systematically. Although simulation cannot replace real-world data, it allows researchers to refine models before costly or logistically complex field studies are conducted. This methodological approach strengthens theory development by enabling iterative validation before empirical deployment. Consequently, simulation can be understood as a complementary methodological stage rather than a substitute for empirical observation.

Nevertheless, interpretive caution is warranted when translating predictive findings into theoretical claims. Predictive significance does not automatically imply causal determination, and governance maturity should therefore be understood as a statistically reliable predictor rather than a definitive causal driver. This distinction is epistemologically important because organizational phenomena are inherently multicausal, path-dependent, and context-sensitive. Recognizing this boundary condition preserves analytical rigor while preventing overextension of conclusions beyond what the data support. Maintaining this distinction also strengthens the credibility of the study's theoretical claims.

Taken together, the findings suggest a conceptual synthesis in which governance maturity may operate as a structural capability, a predictive indicator, and a potential risk-moderating mechanism within institutional project environments. This multidimensional perspective suggests that governance maturity could play an important role in shaping execution effectiveness, although the extent of its influence may vary across contexts. The integrative interpretation provides a preliminary explanatory lens linking governance structure, institutional capability, and project outcomes. However, given the simulation-based nature of the data, this synthesis should be interpreted as exploratory and subject to further empirical validation.

A. Theoretical Implications

Theoretically, the results suggest that governance maturity may function as a measurable organizational construct with potential predictive relevance across institutional contexts. The observed relationship supports conceptual arguments that governance is not merely a compliance mechanism but may also act as a performance-enabling capability embedded within organizational structures (Mäntymäki et al., 2022). The findings further indicate that maturity models can be operationalized quantitatively, allowing governance-related constructs to be examined using statistical inference rather than relying solely on conceptual reasoning. This empirical operationalization contributes to greater theoretical clarity by making constructs more observable and testable. However, given the simulation-based nature of the data, these theoretical implications should be interpreted as preliminary and subject to further empirical validation.

B. Practical Implications

From a managerial perspective, improving governance maturity may represent a potentially high-leverage strategy for enhancing IT project outcomes in public universities. Because governance maturity is strongly associated with delivery performance, institutional leaders may consider prioritizing the development of governance capabilities as part of strategic project optimization initiatives. Structured monitoring systems, standardized policies, and clearly defined authority structures appear especially relevant for improving execution reliability and reducing delivery risk. However, these implications should be applied with caution, as the findings are based on simulation-based modeling rather than direct empirical observation. These insights remain aligned with data-driven decision-making approaches that are increasingly recommended in contemporary organizational management environments (Pertiwi & Hana, 2025; Wibisono et al., 2025).

C. Limitations and Future Research Directions

Despite its contributions, this study has several limitations that should be considered when interpreting the findings. First, the analysis relies on simulation-based data which, although designed to reflect realistic conditions, cannot fully replicate the complexity of real institutional environments. Second, cross-sectional modeling restricts causal interpretation because temporal dynamics and longitudinal performance trajectories cannot be observed directly. Third, governance maturity was measured using composite indicators that may not capture qualitative aspects of governance practices or informal organizational processes. These limitations reinforce that the findings should be interpreted as exploratory rather than definitive empirical evidence.

Future research should therefore test the model using longitudinal real-world datasets from multiple universities to confirm predictive stability across institutional contexts and time periods. Replication studies would be particularly valuable for determining whether coefficient magnitudes remain consistent under empirical conditions. Expanding the model to include additional organizational variables such as leadership support, digital capability, or institutional culture could further improve explanatory accuracy and theoretical completeness. Incorporating multilevel modeling approaches may also reveal cross-level governance effects not observable in single-level regression. Such extensions would deepen understanding of governance maturity as a multidimensional organizational construct (Bryson et al., 2024; Knies et al., 2024).

VI. CONCLUSION AND RECOMMENDATION

The study suggests that IT governance maturity is a significant predictor of project delivery performance in public universities in a simulation-based analytical context, highlighting that institutions with structured governance mechanisms, clear decision-making authority, and robust monitoring processes tend to achieve better project outcomes. The simulated and secondary data analyses indicate that governance capability exerts a stronger influence on delivery performance than project size does. In contrast, project complexity negatively affects outcomes when governance structures are insufficiently developed. These findings address the research objective by establishing a quantifiable, predictive relationship between governance maturity and delivery performance. However, the evidence remains indicative rather than definitive, providing analytical support for the application of maturity models in higher education IT project management (Aaltonen & Turkulainen, 2022; Joshi et al., 2021; Levstek et al., 2022). The model should be interpreted as preliminary and requires validation using real-world institutional datasets.

From a practical perspective, university IT leaders are encouraged to invest strategically in enhancing governance maturity through standardized policies, formalized monitoring mechanisms, and clearly delineated decision-making authority, as these interventions may

improve project success rates. Future research should extend the model using longitudinal, multi-institutional datasets to validate predictive stability over time and explore additional organizational factors, such as leadership support, digital capability, and resource allocation, that may further refine predictions of delivery performance. By integrating these dimensions, subsequent studies can offer richer, more actionable insights to optimize IT project governance in the public higher education sector (Bryson et al., 2024; Knies et al., 2024; Wibisono et al., 2025).

AI Tool Usage Declaration

The authors disclose that artificial intelligence tools, including ChatGPT, were used exclusively for editorial support to improve the manuscript's grammar, clarity, coherence, and overall presentation. No AI technologies were involved in the development of the research framework, data processing, analytical evaluation, interpretation of results, or formulation of scientific conclusions. All scholarly contributions were generated independently by the authors. The authors bear full responsibility for the originality, validity, and academic integrity of the manuscript submitted to the Journal of Management and Informatics.

REFERENCES

Aaltonen, K., & Turkulainen, V. (2022). Institutionalization of a Collaborative Governance Model to Deliver Large, Inter-Organizational Projects. *International Journal of Operations and Production Management*, *42*(8), 1294–1328. https://doi.org/10.1108/ijopm-11-2021-0741

Alghizzawi, M., Ahmed, E., Al-Gasawneh, J. A., & Alhawamdeh, Z. M. (2024). Corporate Governance Paradigm in Developing Country: Theoretical Overview. In *Studies in Systems, Decision and Control*, 897–907. https://doi.org/10.1007/978-3-031-54383-8_68

Anwar, D. M., Emita, I., Melyani, M., Rahadjeng, I. R., Indrarti, W., Rafik, A., & Sari, D. I. (2026). Optimizing Regional Financial Management through the Transformation of the Digital Financial Information System in the Bekasi City Government. *Journal of Technology Informatics and Engineering*, *5*(1), 200–218. https://doi.org/10.51903/jtie.v5i1.495

Archaqie, H. N. R., & Pratiwi, P. (2025). Assessing IT Governance in Digital UMKM Application Projects: A Comparative Study Using the COBIT 2019 Framework. *Jurnal Ilmiah Sistem Informasi*, *4*(2), 232–241. https://doi.org/10.51903/wpt7q648

Bondarenko, S., Halachenko, O., Shmorgun, L., Volokhova, I., Khomutenko, A., & Krainov, V. (2021). The Effectiveness of Network Systems in Providing Project Maturity of Public Management. *TEM Journal*, *10*(1), 272–282. https://doi.org/10.18421/tem101-34

Boselie, P., Van Harten, J., & Veld, M. (2021). A Human Resource Management Review on Public Management and Public Administration Research: Stop Right There… Before We

Go Any Further…. *Public Management Review*, *23*(4), 483–500. https://doi.org/10.1080/14719037.2019.1695880

Bryson, J. M., George, B., & Seo, D. (2024). Understanding Goal Formation in Strategic Public Management: A Proposed Theoretical Framework. *Public Management Review*, *26*(2), 539–564. https://doi.org/10.1080/14719037.2022.2103173

De Ramón Fernández, A., Ruiz Fernández, D., & Prieto Sánchez, M. T. (2022). Prediction of the Mode of Delivery Using Artificial Intelligence Algorithms. *Computer Methods and Programs in Biomedicine*, *219*, 106740. https://doi.org/10.1016/j.cmpb.2022.106740

Farouq, A., & Rios, C. (2025). The Role of Strategic Financial Planning in Enhancing Organizational Resilience: A Cross-Industry Perspective. *Journal of Management and Informatics*, *4*(3), 947–962. https://doi.org/10.51903/jmi.v4i3.301

Fesenko, G., Fesenko, T., Fesenko, H., Shakhov, A., Yakunin, A., & Korzhenko, V. (2021). Developing E-Maturity Model for Municipal Project and Program Management System. *Eastern-European Journal of Enterprise Technologies*, *1*(3), 15–28. https://doi.org/10.15587/1729-4061.2021.225278

Gao, C., Zhang, F., Wu, G., Hu, Q., Ru, Q., Hao, J., He, R., & Sun, Z. (2021). A Deep Learning Method for Route and Time Prediction in Food Delivery Service. *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 2879–2889. https://doi.org/10.1145/3447548.3467068

Hansen, J. R., Pop, M., Skov, M. B., & George, B. (2024). A Review of Open Strategy: Bridging Strategy and Public Management Research. *Public Management Review*, *26*(3), 678–700. https://doi.org/10.1080/14719037.2022.2116091

Hikmah, N., Fauzi, A., & Nayyiroh, F. U. (2025). Measuring the Forecast Accuracy in Retail MSMEs: A Comparative Analysis between AI and Traditional Methods in the Era of Digital Selling. *Journal of Management and Informatics*, *4*(1), 687–705. https://doi.org/10.51903/jmi.v4i1.166

Joshi, A., Ruiz, L., & De Haes, S. (2021). Impact of IT Governance Process Capability on Business Performance: Theory and Empirical Evidence. *International Journal of IT/Business Alignment and Governance (IJITBAG)*, *12*(1), 1–19. https://doi.org/10.4018/ijitbag.2021010101

Knies, E., Boselie, P., Gould-Williams, J., & Vandenabeele, W. (2024). Strategic Human Resource Management and Public Sector Performance: Context Matters. *International Journal of Human Resource Management*, *35*(14), 2432–2444. https://doi.org/10.1080/09585192.2017.1407088

Levstek, A., Pucihar, A., & Hovelja, T. (2022). Towards an Adaptive Strategic IT Governance Model for SMEs. *Journal of Theoretical and Applied Electronic Commerce Research*, *17*(1), 230–252. https://doi.org/10.3390/jtaer17010012

Liu, S., He, L., & Shen, Z. J. M. (2021). On-Time Last-Mile Delivery: Order Assignment with Travel-Time Predictors. *Management Science*, *67*(7), 4095–4119. https://doi.org/10.1287/mnsc.2020.3741

Mai, N. T., & Khalid, I. (2025). Human Error vs. System Security: Evaluating the Weakest Link in Digital Business Information Systems. *Journal of Management and Informatics*, *4*(3), 981–997. https://doi.org/10.51903/jmi.v4i3.305

Mäntymäki, M., Minkkinen, M., Birkstedt, T., & Viljanen, M. (2022). Defining Organizational AI Governance. *AI and Ethics*, *2*(4), 603–609. https://doi.org/10.1007/s43681-022-00143-x

Marcelino, P., de Lurdes Antunes, M., Fortunato, E., & Gomes, M. C. (2021). Machine Learning Approach for Pavement Performance Prediction. *International Journal of Pavement Engineering*, *22*(3), 341–354. https://doi.org/10.1080/10298436.2019.1609673

Parker, L., Martin-Sardesai, A., & Guthrie, J. (2023). The Commercialized Australian Public University: An Accountingized Transition. *Financial Accountability and Management*, *39*(1), 125–150. https://doi.org/10.1111/faam.12310

Pertiwi, J. P., & Hana, A. U. (2025). Data-Driven Decision Making in MSMEs: Leveraging Free Analytics Tools for Financial Planning and Efficiency. *Journal of Management and Informatics*, *4*(1), 633–648. https://doi.org/10.51903/jmi.v4i1.146

Ramadhani, D. P. S., Sulaiman, H. R., Anggraeni, A. W., & Aisyah, S. (2025). The Effectiveness of E-Government Services in Enhancing Public Trust: A Comparative Study Across ASEAN Countries. *Journal of Management and Informatics*, *4*(1), 649–667. https://doi.org/10.51903/jmi.v4i1.150

Sahu, S. K., Mokhade, A., & Bokde, N. D. (2023). An Overview of Machine Learning, Deep Learning, and Reinforcement Learning-Based Techniques in Quantitative Finance: Recent Progress and Challenges. *Applied Sciences*, *13*(3), 1956. https://doi.org/10.3390/app13031956

Stepan, H., Galindo, A., Hund, M., Schlembach, D., Sillman, J., Surbek, D., & Vatish, M. (2023). Clinical Utility of sFlt-1 and PlGF in Screening, Prediction, Diagnosis and Monitoring of Pre-Eclampsia and Fetal Growth Restriction. *Ultrasound in Obstetrics and Gynecology*, *61*(2), 168–180. https://doi.org/10.1002/uog.26032

Wibisono, G., Nikhlis, N., Wicaksono, Y. A., & Faradila, S. (2025). Enhancing Decision Quality and Transparency via Machine Learning-Based Goodwill Impairment Estimation in Banks. *Journal of Management and Informatics*, *4*(3), 1059–1074. https://doi.org/10.51903/jmi.v4i3.233

Willie, M. M. (2025). Value-Based Administration Services and Value-Based Care: Aligning Administrative Efficiency with Patient Outcomes. *Journal of Management and Informatics*, *4*(3), 1032–1042. https://doi.org/10.51903/jmi.v4i3.308

Wolter, J., & Hanne, T. (2024). Prediction of Service Time for Home Delivery Services Using Machine Learning. *Soft Computing*, *28*(6), 5045–5056. https://doi.org/10.1007/s00500-023-09220-7

Zhang, Y., Yun, Y., An, R., Cui, J., Dai, H., & Shang, X. (2021). Educational Data Mining Techniques for Student Performance Prediction: Method Review and Comparison Analysis. *Frontiers in Psychology*, *12*, 698490. https://doi.org/10.3389/fpsyg.2021.698490