



Jurnal Riset Akuntansi dan Keuangan

Journal homepage: <https://ejournal.upi.edu/index.php/JRAK/>



Internal Control Systems and Organizational Effectiveness: Digital Transformation in Indonesian SOEs

Yuliana Sianipar¹, Hanny Mekel Runtuwene², Felix Ariodamar³, Evelyn Hendriana⁴

Master of Management in Strategy and Execution, Bina Nusantara University, Jakarta, Indonesia

*Correspondence: yuliana.sianipar@binus.ac.id

ABSTRACT	INFO ARTIKEL
This study investigates how internal control systems affect organizational effectiveness in Indonesian state-owned enterprises (SOEs), with digital transformation examined as a moderating variable. Employing a cross-sectional quantitative design, data were gathered via structured questionnaires targeting managers across 247 SOEs, yielding 162 usable responses analyzed through PLS-SEM. Findings reveal that control environment, monitoring controls, and digital transformation each independently contribute to improving organizational effectiveness, while control activities, risk assessment, and information and communication yield no significant effect. Although digital transformation demonstrated the strongest individual influence on organizational effectiveness, its role as a moderator between internal control systems and organizational effectiveness was not confirmed. These findings suggest that digital transformation operates as a standalone predictor rather than a catalyst that amplifies internal control mechanisms in the Indonesian SOE context.	Article History: <i>Submitted/Received 09 June 2026</i> <i>First Revised 18 June 2026</i> <i>Accepted 03 July 2026</i> <i>First Available online 17 July 2026</i> <i>Publication Date 25 August 2026</i> Keyword: <i>Digital Transformation; Internal Control System; Organizational Effectiveness; State-Owned Enterprises</i>

1. INTRODUCTION

Internal control systems represent a fundamental element in guaranteeing that organizational operations run efficiently and are directed toward intended outcomes, ensuring the accuracy of financial reporting, safeguarding assets, and reinforcing management oversight structures to achieve strategic goals (Francis & Imiete, 2018; Hoai et al., 2022). Organizations equipped with well-functioning internal control systems tend to exhibit more consistent performance and reduced risk exposure through structured control mechanisms (Otoo et al., 2023).

How well internal control systems are designed and implemented determines an organization's capacity to sustain operational continuity, and this robustness carries meaningful consequences for organizational effectiveness, especially as uncertainty intensifies and competitive pressures mount (Chalmers et al., 2019; Musah et al., 2022). In addition to supporting regulatory adherence, these systems promote operational efficiency by curbing susceptibility to errors and fraudulent conduct (Gal & Akisik, 2020; Omar & Yussuf, 2021; Purnomo, 2014).

The COSO 2013 framework offers a theoretical basis for designing and evaluating internal control systems across five interrelated elements: risk assessment, control environment, information and communication, control activities, and monitoring activities (Addy & Berglund, 2020). Despite this integrated structure, prior research has produced conflicting evidence on how individual components contribute to organizational effectiveness. (Otoo et al., 2023) found that control environment, control activities, and risk assessment yielded notable contributions, while monitoring and information and communication produced no discernible effects. (Gyamerah et al., 2024) reached different conclusions, with control environment, control activities, and monitoring controls each demonstrating positive and significant effects, whereas risk assessment and information and communication fell short of significance. (X. Li, 2020) approached internal control as a unified construct, finding an overall positive bearing on organizational effectiveness, though individual component effects varied considerably.

Digital transformation, through the convergence of information systems, process automation, and big data analytics, enables organizations to enhance data precision, accelerate monitoring, and support more informed decision-making (Zhao et al., 2023). Evidence suggests that digital transformation narrows information asymmetry, elevates reporting quality, and bolsters internal control effectiveness in large and complex organizations (Zhao et al., 2023). (Daway et al., 2025) noted that accounting system digitalization reinforces internal control mechanisms through improved data transparency, recording accuracy, and real-time anomaly detection. (Gyamerah et al., 2024) further observed that organizations embedding digital technology within their internal control frameworks achieve more pronounced gains in organizational effectiveness than those relying on manual controls.

In Indonesian SOEs, internal control systems carry particular significance as SOEs must fulfill dual obligations of commercial performance and public interest (Rossieta et al., 2025), while managing state assets accountably and transparently (Pellokila et al., 2025). Persistent governance irregularities suggest existing control mechanisms remain inadequate in mitigating emerging risks and fraud. (Zhao et al., 2023) and (Gyamerah et al., 2024) confirm that suboptimal digital technology adoption correlates with weaker control effectiveness. The

urgency of reinforcing internal control systems in Indonesia has grown alongside accelerating digital reform across the SOE sector and the government's push toward digital governance as part of national transformation.

Studies examining internal control systems and digital transformation in relation to organizational effectiveness have largely proceeded along separate lines, and research positioning digital transformation as a moderating variable remains scarce, as technology tends to be framed merely as an operational tool. This study therefore aims to examine how internal control systems influence organizational effectiveness within Indonesian SOEs and whether digital transformation plays a moderating role in that relationship.

This study offers three contributions to the existing literature. First, empirical evidence on the relationship between internal control systems and organizational effectiveness in Indonesian state-owned enterprises (SOEs) remains limited. Unlike private sector organizations, SOEs operate under a dual mandate that combines commercial objectives with public accountability, which may influence the way internal control mechanisms are implemented and how they affect organizational outcomes (Rossieta et al., 2025). Second, this study adopts a more refined analytical approach by examining the COSO framework at the component level, rather than treating internal control as a single aggregated construct. By separating control environment, risk assessment, control activities, monitoring, and information and communication, the study identifies the relative contribution of each element to organizational effectiveness. This approach helps explain inconsistencies in prior findings, which may stem from overly aggregated measurement models that obscure the distinct roles of individual components (Gyamerah et al., 2024; Otoo et al., 2023).

Last, the study reconceptualizes digital transformation as a moderating mechanism that influences the relationship between internal control systems and organizational effectiveness, rather than viewing it solely as a direct predictor. This perspective remains relatively underexplored, as prior research has predominantly emphasized its direct effects (Yang et al., 2024; H. Zhang & Dong, 2023). By positioning digital transformation as a moderating mechanism, this study provides deeper insight into how technological advancement can strengthen or potentially weaken the effectiveness of internal control practices in achieving organizational objectives.

Building upon the research gaps identified above, this study further discusses the theoretical foundations and empirical evidence underlying the relationships among the research variables. The discussion integrates the conceptual background of internal control systems, organizational effectiveness, and digital transformation with prior empirical findings to establish the theoretical rationale for the proposed hypotheses.

Internal control systems have matured into a distinct field of scholarly inquiry built on robust conceptual foundations (Vu & Nga, 2022). At its core, internal control refers to an integrated set of mechanisms through which organizations pursue their operational objectives efficiently (Odunko & Nonyelum, 2022). (Otoo et al., 2023) grouped these mechanisms into detection, prevention, directive, corrective, and compensating categories as means of limiting material errors and fraudulent occurrences (Alawaqleh, 2021; Vulley, 2022). The COSO framework identifies five mutually reinforcing components: control environment, which nurtures a culture of integrity and ethical conduct (Tetteh et al., 2022); risk assessment, which entails systematic identification and evaluation of organizational threats (Otoo et al., 2023); control activities, encompassing rules and operational procedures;

information and communication, centered on the timely delivery of accurate data; and monitoring controls, involving continuous oversight and recurring evaluation (Tetteh et al., 2022).

Organizational effectiveness captures the extent to which an organization accomplishes its strategic aims while optimizing internal processes to yield superior performance outcomes (Dhoopar et al., 2023; Naqshbandi et al., 2024; Potnuru & Sahoo, 2016; Yadav et al., 2022). Achieving it demands coherent coordination among management systems, culture, structure, and core competencies that span productivity, profitability, competitiveness, and workforce commitment (Otoo et al., 2023). Given its abstract and multidimensional character, organizational effectiveness is typically evaluated through four methodological lenses: goal attainment, system resource acquisition, strategic constituencies, and competing values (Jiang et al., 2024; Yadav et al., 2022).

Digital transformation involves harnessing digital technologies to fundamentally rethink how organizations are structured and how they operate, ultimately creating value and advancing organizational performance (Vial, 2019; Wang et al., 2023). It catalyzes technological and business model innovation, narrows information gaps, and raises overall organizational efficiency (Ferreira et al., 2019; Y. Zhang et al., 2023). Digital technology reconfigures organizational processes, structures, and capacities with tangible effects on digital governance practices (Wang et al., 2023; Zeng & Lei, 2021; Zhai et al., 2022). In the SOE context specifically, digital transformation is conceived as a deliberate adoption of technologies encompassing AI, cloud computing, big data, IoT, and blockchain to fundamentally renew business models, organizational structures, and operational workflows (Liu et al., 2024).

Based on the theoretical perspectives and empirical evidence discussed above, the following discussion develops the hypotheses concerning the relationships among the research variables.

Control environment reflects the prevailing attitudes, values, and philosophies within an organization, incorporating dimensions of competence, integrity, morality, and ethical conduct that together underpin the assessment of the internal control framework (Chalmers et al., 2019; Chen et al., 2020; Chiu & Wang, 2019; Addy & Berglund, 2020; Gao & Zhang, 2019; Otoo et al., 2023; Rozali & Alfian, 2014; Vu & Nga, 2022). A strong control environment bolsters coordination, mitigates operational risks, and cultivates conditions that support compliance, reporting accuracy, and operational performance (Chen et al., 2020; Chiu & Wang, 2019; Gal & Akisik, 2020; Musah et al., 2022; Otoo et al., 2023; Tetteh et al., 2022). Accordingly, the proposed hypothesis is:

H1: Control environment has a positive effect on organizational effectiveness.

Control activities refer to the policies, procedures, and mechanisms through which management directives are translated into consistent organizational action, encompassing authorization, verification, reconciliation, separation of duties, asset safeguarding, and operational performance review (Adegboyegun et al., 2020; Chang et al., 2019; Addy & Berglund, 2020; Le et al., 2021; Otoo et al., 2023). Prior research affirms that control activities carry a positive and significant bearing on organizational effectiveness by promoting performance oversight, elevating information reliability, fostering coordination, curtailing errors, and improving governance standards (Adegboyegun et al., 2020; Bruwer et al., 2018; Tetteh et al., 2022; Vu & Nga, 2022). The proposed hypothesis is:

H2: Control activities have a positive effect on organizational effectiveness.

Risk assessment involves systematic efforts to identify, evaluate, and rank threats that obstruct the achievement of organizational objectives (Chen et al., 2020; Chiu & Wang, 2019; Musah et al., 2022; Otoo et al., 2023). When conducted effectively, risk assessment can raise operational efficiency, lower risk-related costs, and sharpen decision-making quality, thereby contributing positively to organizational performance (Adegboyegun et al., 2020; Tetteh et al., 2022; Vu & Nga, 2022). The proposed hypothesis is:

H3: Risk assessment has a positive effect on organizational effectiveness.

Monitoring serves as a vital element within internal control systems by verifying that all control mechanisms function as intended, supporting management in gauging control effectiveness, detecting deficiencies, and ensuring the system's capacity to address emerging risks (Adegboyegun et al., 2020; Chen et al., 2020; Haryanto & Setiawan, 2022; Musah et al., 2022; Tetteh et al., 2022; Wali & Masmoudi, 2020). Robust monitoring practices strengthen accountability, enhance reporting reliability, and elevate overall governance quality (Chen et al., 2020; Singh & Best, 2023; Tetteh et al., 2022; Wali & Masmoudi, 2020). The proposed hypothesis is:

H4: Monitoring controls have a positive effect on organizational effectiveness.

Information and communication occupy a pivotal position within internal control systems by ensuring that relevant, accurate, and timely data reaches management and stakeholders to support sound decision-making (Adegboyegun et al., 2020; Frazer, 2020; Vu & Nga, 2022). (Chen et al., 2020) found that technology-supported information systems improve reporting accuracy and reinforce control processes. The literature broadly supports a positive association between information and communication quality and the overall effectiveness of internal control systems (Addy & Berglund, 2020; Adegboyegun et al., 2020; Anh et al., 2020; Tetteh et al., 2022). The proposed hypothesis is:

H5: Information and communication have a positive effect on organizational effectiveness.

Digital transformation harnesses technologies such as big data, cloud computing, AI, and blockchain to restructure organizational operations, processes, and business models, enabling firms to respond to market dynamics, capitalize on emerging opportunities, and redeploy resources with agility (L. Li, 2022; Wang et al., 2023). Digitalization trims manual workloads and bureaucratic layers while reducing vulnerability to errors and fraud (Wang et al., 2023). Technologies including big data and cloud computing enable continuous real-time monitoring of operational activities and financial reporting, thereby lifting governance quality and the effectiveness of control processes (Wang et al., 2023; Y. Zhang et al., 2023). The proposed hypothesis is:

H6: Digital transformation has a positive effect on organizational effectiveness.

Digital transformation strengthens the interface between internal control components and organizational effectiveness by elevating system accuracy, streamlining process efficiency, and heightening monitoring responsiveness (Wang et al., 2023; Y. Zhang et al., 2023). It bolsters the control environment through automated regulatory compliance, digital reporting systems, and data-driven oversight (L. Li, 2022; Yang et al., 2024; Y. Zhang et al., 2023), expedites authorization, verification, and duty-segregation workflows within control activities (Adegboyegun et al., 2020; Otoo et al., 2023), advances risk assessment through continuous data collection and automated early-warning systems (Chen et al., 2020; Musah et al., 2022),

reinforces monitoring controls through integrated dashboards and automated audit trail functionalities (Singh & Best, 2023; Tetteh et al., 2022; Yang et al., 2024), and accelerates information and communication flows through seamless digital integration (Adegboyegun et al., 2020; Vu & Nga, 2022; Yang et al., 2024). On this basis, the following hypotheses are proposed:

H7: Digital transformation strengthens the positive effect of control environment on organizational effectiveness.

H8: Digital transformation strengthens the positive effect of control activities on organizational effectiveness.

H9: Digital transformation strengthens the positive effect of risk assessment on organizational effectiveness.

H10: Digital transformation strengthens the positive effect of monitoring controls on organizational effectiveness.

H11: Digital transformation strengthens the positive effect of information and communication on organizational effectiveness.

Based on the theoretical review and hypothesis development outlined above, this research constructs a conceptual framework illustrating the relationships among the variables under study. The framework serves as the empirical foundation for explaining the effect of internal control system components on organizational effectiveness moderated by digital transformation, as presented in Figure 1.

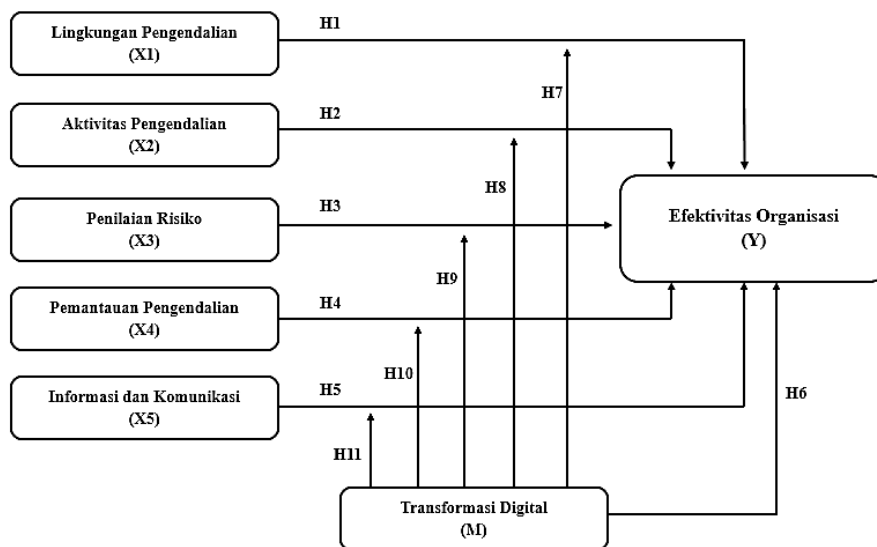


Figure 1. Conceptual Framework

2. METHODOLOGY

This study adopted a cross-sectional quantitative design. The target population covers all Indonesian SOEs, consisting of 62 parent companies and 185 subsidiaries, totaling 247 entities (Ministry of SOEs, 2025). SOEs were selected as the population due to their uniform organizational structure and governance framework under Ministry of SOEs policies, making them contextually appropriate for evaluating organizational effectiveness, internal control systems, and digital transformation implementation.

Respondents were selected purposively from positions directly involved in implementing and evaluating internal control systems (Hossan et al., 2023). Specifically Risk Management

Managers, Accounting Managers, and Internal Control Unit (SPI) Managers, with one respondent drawn from each company. The minimum sample size was set at 153 using the Slovin formula with a 5% margin of error ($e = 0.05$). From the distributed questionnaires, 165 were returned and 162 were declared valid for analysis, surpassing the established minimum threshold.

All measurement instruments were developed through a comprehensive review of relevant literature and operationalized using a five-point Likert scale. Ten items drawn from (Otoo et al., 2023) were used to measure organizational effectiveness. The five COSO framework components were each measured using instruments originally developed by (Otoo et al., 2023): control environment through five indicators, control activities through five indicators, risk assessment through four indicators, monitoring controls through three indicators, and information and communication through six indicators. Digital technology utilization in daily organizational activities was captured using six indicators sourced from (L. Li, 2022).

In this study, PLS-SEM was applied to examine the measurement and structural models, as it is well-suited for predictive analysis and capable of addressing complex and multivariate research frameworks (Hair & Alamer, 2022). All statistical analyses were conducted using SmartPLS 4.0. The evaluation of the measurement or outer model focused on assessing convergent validity, discriminant validity, and the reliability of constructs, which were determined using composite reliability and AVE (Hair & Alamer, 2022; Sarstedt et al., 2019, 2020). Subsequently, the structural model was analyzed to investigate the direct relationships between the components of the internal control system and organizational effectiveness, as well as to examine the moderating role of digital transformation (Sarstedt et al., 2019). Furthermore, the model's predictive relevance and structural robustness were assessed through the examination of R^2 values and the application of PLS Predict (Hair & Alamer, 2022; Shmueli et al., 2019).

3. RESULTS AND DISCUSSION

Data were gathered through structured questionnaire instruments distributed to all SOE entities, both parent and subsidiary companies, over a two-month period from October to November 2025. Each questionnaire was directed to one respondent per company occupying a strategic managerial position: Risk Management Manager, Accounting Manager, or Internal Control Unit (SPI) Manager. Of the 165 questionnaires returned, 162 passed the data cleaning process and were deemed valid for analysis, exceeding the minimum threshold of 153 respondents established through the Slovin formula and thus sufficient to yield reliable research findings.

The demographic and occupational characteristics of the respondents are outlined in Table 1. Male respondents predominated, with most falling in the 40 to 50 age bracket. Educational backgrounds were primarily at the bachelor and master levels, and the majority represented SOE subsidiary companies. Infrastructure and logistics services accounted for the largest share of respondents by industry sector. Most companies had implemented internal control over financial reporting (ICOFR) for more than three years, and Risk Management Managers constituted the largest occupational group. The majority also reported work tenure exceeding three years, reflecting sufficient familiarity with internal control systems in their respective organizations.

Table 1. Respondent Profile

Respondent Profile	Frequency	Percentage (%)
<u><i>Gender</i></u>		
Male	111	68.50
Female	51	31.50
Total	162	100.00
<u><i>Age</i></u>		
< 30 Years	0	0
> 30 - 40 Years	53	32.70
> 40 - 50 Years	94	58.00
> 50 Years	15	9.30
Total	162	100.00
<u><i>Educational Level</i></u>		
Diploma 3 (D3)	0	0
Bachelor 1 (S1)	91	56.20
Master (S2)	69	42.60
Doctoral (S3)	2	1.20
Total	162	100.00
<u><i>Company Status</i></u>		
Parent Company	43	26.50
Subsidiary Company	119	73.50
Total	162	100.00
<u><i>SOE Sector</i></u>		
Energy, Oil and Gas Industry	15	9.30
Health Industry	1	0.60
Manufacturing Industry	7	4.30
Mineral and Coal Industry	8	4.90
Food and Fertilizer Industry	5	3.10
Plantation and Forestry Industry	2	1.20
Insurance and Pension Fund Services	8	4.90
Infrastructure Services	34	21.00
Financial Services	18	11.10
Logistics Services	28	17.30
Tourism and Supporting Services	9	5.60
Telecommunication and Media Services	27	16.70
Total	162	100.00
<u><i>Duration of ICOFR Implementation</i></u>		
< 1 Year	25	15.40
1 - 3 Years	47	29.00
> 3 Years	90	55.60
Total	162	100.00
<u><i>Position/Title</i></u>		
Risk Management Manager	80	49.40
Accounting Manager	25	15.40
Internal Control Unit (SPI) Manager	57	35.20
Total	162	100.00
<u><i>Work Tenure</i></u>		

Respondent Profile	Frequency	Percentage (%)
< 1 Year	8	4.90
> 1 - 3 Years	47	29.00
> 3 - 5 Years	50	30.90
> 5 Years	57	35.20
Total	162	100.00

Source: Primary Data (2025)

Prior to structural model testing, measurement model evaluation was conducted to confirm that all constructs and indicators adequately represent the intended research variables, with the discussion centered on instrument validity and reliability. Within the PLS-SEM framework, this evaluation covers factor loading analysis, convergent validity, discriminant validity, and composite reliability (Hair & Alamer, 2022), with the loading factor serving as an initial indicator of the relationship between variables and their indicators.

Table 2. Convergent Validity and Reliability

Construct	Item	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Control Environment (X1)	LP1	0.778	0.815	0.871	0.574
	LP2	0.766			
	LP3	0.715			
	LP4	0.774			
	LP5	0.755			
Control Activities (X2)	AP1	0.826	0.856	0.896	0.633
	AP2	0.788			
	AP3	0.788			
	AP4	0.777			
	AP5	0.796			
Risk Assessment (X3)	PR1	0.755	0.774	0.855	0.597
	PR2	0.719			
	PR3	0.773			
	PR4	0.839			
Monitoring Controls (X4)	PP1	0.858	0.794	0.880	0.709
	PP2	0.831			
	PP3	0.837			
Information and Communication (X5)	IK1	0.752	0.867	0.901	0.602
	IK2	0.794			
	IK3	0.757			
	IK4	0.727			
	IK5	0.819			
	IK6	0.802			
Digital Transformation (M)	TD1	0.740	0.887	0.914	0.638
	TD2	0.798			
	TD3	0.790			
	TD4	0.829			
	TD5	0.823			
	TD6	0.810			
	EO1	0,783			
			0.933	0.943	0.623

Construct	Item	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Organizational Effectiveness (Y)	EO2	0.836			
	EO3	0.800			
	EO4	0.732			
	EO5	0.802			
	EO6	0.789			
	EO7	0.778			
	EO8	0.812			
	EO9	0.765			
	EO10	0.793			

Source: Primary Data (2025)

All indicators surpassed the loading factor threshold of ≥ 0.50 , confirming their adequacy as construct proxies. AVE values for all latent variables exceeded 0.50 as shown in Table 2, verifying that indicators sufficiently capture their respective constructs. AVE values at this level indicate that the bulk of indicator variance is attributable to the underlying construct, in line with PLS-SEM benchmarks (Sarstedt et al., 2020). All constructs also achieved composite reliability above 0.70, signaling strong internal consistency, while Cronbach's alpha values were comparably above 0.70 across most constructs, confirming uniform item contribution within each construct and the instrument's overall measurement stability in accordance with SEM guidelines (Hair & Alamer, 2022).

The Fornell-Larcker criterion was applied to evaluate discriminant validity, as evidenced by Table 3, which demonstrates that the square root of each construct's AVE surpasses the inter-construct correlations, thereby demonstrating sufficient construct distinctiveness and fulfilling the criteria for discriminant validity.

Table 3. Discriminant Validity Test Results with Fornell-Larcker

	AP	EO	IK	LP	PP	PR	TD
AP	0.795						
EO	0.506	0.790					
IK	0.661	0.605	0.776				
LP	0.713	0.678	0.614	0.758			
PP	0.609	0.697	0.712	0.697	0.842		
PR	0.665	0.600	0.701	0.706	0.767	0.773	
TD	0.662	0.729	0.769	0.743	0.758	0.731	0.799

Note:

AP → Control Activities; EO → Organizational Effectiveness; IK → Information and Communication; LP → Control Environment; PP → Monitoring Controls; PR → Risk Assessment; TD → Digital Transformation (M)

Following confirmation of measurement model adequacy, analysis proceeded to the structural model, which determines how well the proposed model accounts for relationships among latent variables. Hypothesis testing relied on p-values (Hair & Alamer, 2022), and model quality was further verified through R^2 values and PLS Predict to assess predictive capability and structural accuracy (Hair & Alamer, 2022; Shmueli et al., 2019).

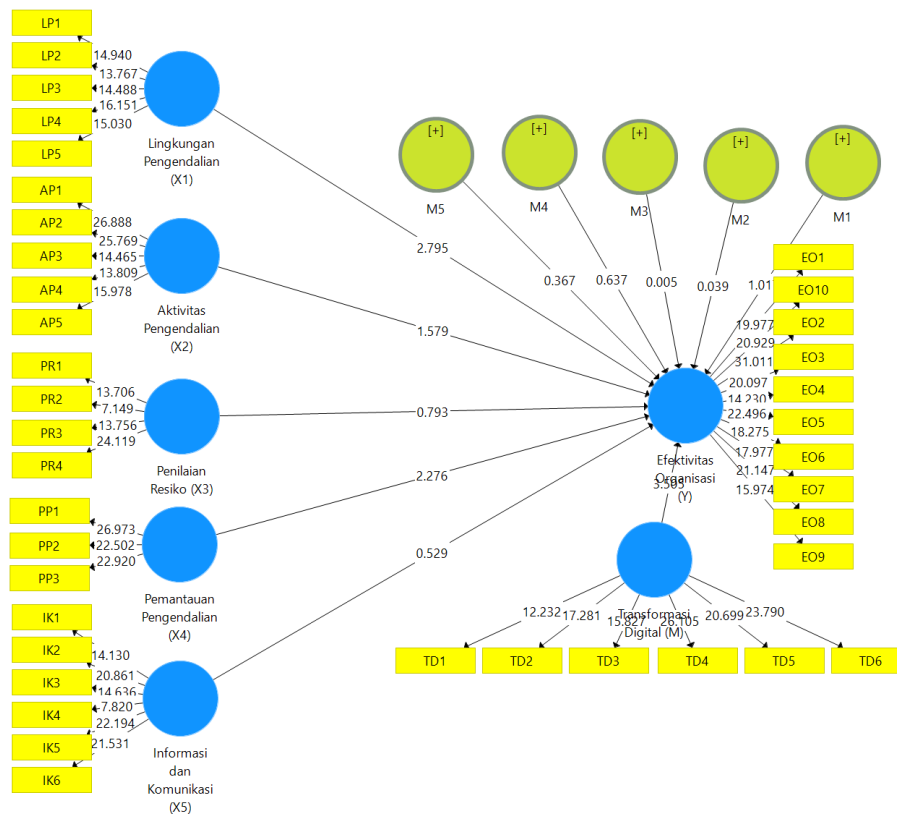


Figure 2. PLS-Bootstrapping

PLS-Predict results confirmed that all organizational effectiveness indicators (EO1-EO10) yielded Q^2_{predict} values above zero, spanning 0.288 to 0.414, attesting to the model's adequate predictive relevance for observational data. RMSE values from the PLS-SEM model were uniformly below those from the Linear Model (LM) across all indicators, confirming satisfactory predictive accuracy.

Table 4. PLS Predict

Item	Q^2_{predict}	RMSE	
		PLS	LM
EO1	0.332	0.634	0.723
EO2	0.385	0.610	0.667
EO3	0.333	0.603	0.736
EO4	0.288	0.649	0.770
EO5	0.368	0.647	0.774
EO6	0.414	0.577	0.646
EO7	0.354	0.607	0.730
EO8	0.325	0.586	0.695
EO9	0.308	0.656	0.725
EO10	0.291	0.616	0.765

Source: Primary Data (2025)

Hypothesis Testing

Bootstrapping was performed to test hypotheses concerning the effect of internal control systems components on organizational effectiveness through and the potential moderating contribution of digital transformation across 162 SOE observations. Hypotheses were evaluated based on p-value, with $p < 0.05$ indicating support and $p > 0.05$ indicating non-

support (Hair & Alamer, 2022). Effect size (f^2) was also computed to gauge each independent variable's contribution to organizational effectiveness. Findings are reported in Table 5.

Table 5. Direct Effect and Moderating Role Test Results

	Hypothesis	Path Coefficient	t-value	p-value	Effect Size (f^2)	Decision
H1:	Control environment has a positive effect on organizational effectiveness.	0.308	2.795	0.005	0.076	Supported
H2:	Control activities have a positive effect on organizational effectiveness.	-0.134	1.579	0.115	0.017	Not Supported
H3:	Risk assessment has a positive effect on organizational effectiveness.	-0.063	0.793	0.428	0.003	Not Supported
H4:	Monitoring controls have a positive effect on organizational effectiveness.	0.272	2.276	0.023	0.058	Supported
H5:	Information and communication have a positive effect on organizational effectiveness.	0.050	0.529	0.597	0.002	Not Supported
H6:	Digital transformation has a positive effect on organizational effectiveness.	0.375	3.505	0.000	0.090	Supported
H7:	Digital transformation strengthens the positive effect of control environment on organizational effectiveness.	0.115	1.017	0.310	0.010	Not Supported
H8:	Digital transformation strengthens the positive effect of control activities on organizational effectiveness.	0.003	0.039	0.969	0.000	Not Supported
H9:	Digital transformation strengthens the positive effect of risk assessment on organizational effectiveness.	0.001	0.005	0.996	0.000	Not Supported

Hypothesis	Path Coefficient	t-value	p-value	Effect Size (f ²)	Decision
H10: Digital transformation strengthens the positive effect of monitoring controls on organizational effectiveness.	-0.094	0.637	0.524	0.006	Not Supported
H11: Digital transformation strengthens the positive effect of information and communication on organizational effectiveness.	-0.047	0.367	0.714	0.001	Not Supported

Source: Primary Data (2025)

The model accounts for 61.7% of the variability in organizational effectiveness. Control Environment ($\beta = 0.308$; $p = 0.005$), Monitoring Controls ($\beta = 0.272$; $p = 0.023$), and Digital Transformation ($\beta = 0.375$; $p < 0.001$) each demonstrated positive and significant effects, supporting H1, H4, and H6, albeit with small effect sizes. Conversely, Control Activities ($\beta = -0.134$; $p = 0.115$), Risk Assessment ($\beta = -0.063$; $p = 0.428$), and Information and Communication ($\beta = 0.050$; $p = 0.597$) yielded no significant effects, leaving H2, H3, and H5 unsupported. All moderation hypotheses (H7-H11) were likewise unsupported ($p > 0.05$), indicating that digital transformation does not moderate the relationship between internal control systems and organizational effectiveness.

These findings reveal that only select components of the internal control system contribute to organizational effectiveness in Indonesian SOEs, suggesting that despite its design as a comprehensive framework, the COSO model has not produced uniform impact across all components in the SOE context. This is consistent with (Tetteh et al., 2022), who found that control environment and monitoring are the most consistently influential components, as both establish governance discipline and sustain control implementation continuity in daily operations.

Organizational effectiveness in this context appears to be driven more by strong governance foundations, continuous monitoring, and digital technology adoption than by procedural completeness alone. The significant effect of Control Environment confirms its foundational role in shaping organizational effectiveness, as management integrity, structural clarity, and ethical commitment cultivate consistent control behavior, consistent with (Musah et al., 2022), who emphasized that control environment is a key determinant of internal control success in public sector and multi-stakeholder organizations. Within the SOE context specifically, control environment is pivotal given the strict government oversight and high accountability demands SOEs face (Grossi et al., 2015), with leadership commitment and structural clarity forming the basis of substantive rather than merely administrative compliance. (Adegboyegun et al., 2020) further demonstrated that other internal control components tend to underperform in the absence of a robust control environment.

Monitoring Controls similarly exerted a significant effect, underscoring the value of continuous evaluation and corrective responsiveness. This aligns with (Vu & Nga, 2022) and (Adegboyegun et al., 2020), who noted that effective monitoring enables timely responses to

control weaknesses. Given the operational complexity, business diversification, and reputational risks characteristic of SOEs (Gyamerah et al., 2024), continuous monitoring practices including internal audits and management supervision are critical instruments for ensuring control implementation. (Tetteh et al., 2022) similarly found that monitoring plays a crucial role in public sector organizational effectiveness through early detection and rapid corrective action, a relevance that is amplified in Indonesian SOEs given their exposure to strategic risks and shareholder performance pressures.

Digital transformation emerged as the variable with the greatest individual influence on organizational effectiveness. Process digitalization, information system integration, and workflow automation serve as primary drivers, reinforcing (Yang et al., 2024) and (L. Li, 2022), who position digital transformation as a strategic enabler of organizational performance.

The insignificance of control activities, risk assessment, and information and communication suggests that formal procedures and standardized systems alone do not guarantee organizational effectiveness. Many SOEs already possess risk policies, control SOPs, and information systems, yet their implementation tends to be symbolic and compliance-oriented, consistent with (Otoo et al., 2023), who noted that in bureaucratic organizations, internal control components tend to function as compliance instruments rather than performance drivers. Control activities internalized into organizational routines often lose their direct performance impact, particularly without strong oversight (Y. Zhang et al., 2023), consistent with (H. Zhang & Dong, 2023). Risk assessment's insignificance reflects the relatively stable operational environment of state-supported SOEs, where its contribution tends to emerge more prominently in dynamic and competitive settings (Musah et al., 2022). Information and communication, meanwhile, appear to function primarily as supporting infrastructure for other control components, with their influence on organizational effectiveness being indirect and contingent on integration with other elements (Otoo et al., 2023).

Beyond internal control systems, digital transformation proves to be the strongest individual driver of SOE organizational effectiveness, reflecting the actual conditions of Indonesian SOEs under pressure to improve competitiveness and efficiency through digitalization. Technology integration, process automation, and information digitalization enable SOEs to accelerate workflows, enhance oversight, and improve managerial decision quality, consistent (L. Li, 2022) and (Yang et al., 2024). However, digital transformation does not function as a moderator, consistent with literature suggests that moderating interactions tend to be insignificant when the primary relationship is stable or when the variable is better positioned as a mediator or independent predictor (Aguinis et al., 2017). Consistent with (H. Zhang & Dong, 2023) and (Siswanti et al., 2024), digital transformation operates as a direct performance driver rather than a mechanism that amplifies internal control effects.

4. CONCLUSION

This study confirms that enhancing SOE organizational effectiveness cannot rest solely on the formal presence of internal control systems. Effectiveness is more substantially shaped by how well the most impactful control components are implemented, particularly control environment and monitoring controls, and is further reinforced by digital transformation embedded within organizational business processes. These findings affirm that SOE governance reform should be directed toward cultivating leadership integrity, strengthening oversight mechanisms, and accelerating digital transformation so that internal control

systems genuinely function as instruments of value creation rather than mere compliance tools.

The findings advance internal control system theory by demonstrating that its effectiveness is not uniform across all components, particularly within public organizations characterized by complex bureaucratic structures such as SOEs. Rather than serving as a moderating mechanism within the internal control system framework, digital transformation operates as a direct and independent driver of organizational outcomes, indicating that its contribution is structural and functionally distinct from internal control mechanisms. From a managerial standpoint, efforts to improve organizational effectiveness should prioritize foundational governance elements, specifically control environment and monitoring functions, through strengthening top management integrity and commitment, refining organizational structures, and elevating internal audit quality and the continuity of control evaluation.

Several limitations warrant acknowledgment. The sample's exclusivity to SOEs may constrain the applicability of findings to private sector or non-listed entities. Certain organizational effectiveness indicators depend on respondent perceptions, which introduces the possibility of subjective bias. Additionally, digital transformation is treated as an aggregate measure without differentiating across specific technology types, which limits the granularity of technology-specific insights. Subsequent research should consider extending the population to non-listed organizations or other public sector bodies to broaden generalizability, incorporating objective financial metrics such as ROA, ROE, or revenue growth, isolating the contributions of specific technologies including digital audit systems, AI-driven controls, and big data analytics, and applying longitudinal designs to track how internal control systems and digital transformation co-evolve over extended time horizons.

5. REFERENCES

- Addy, N. D., & Berglund, N. R. (2020). Determinants of timely adoption of the 2013 COSO integrated framework. *Journal of Information Systems*, 34(1), 1–20. <https://doi.org/10.2308/isis-52378>
- Adegboyegun, A. E., Ben-Caleb, E., Ademola, A. O., Oladutire, E. O., & Sodeinde, G. M. (2020). Internal control systems and operating performance: Evidence from small and medium enterprises (SMEs) in Ondo State. *Asian Economic and Financial Review*, 10(4), 469–479. <https://doi.org/10.18488/journal.aefr.2020.104.469.479>
- Aguinis, H., Edwards, J. R., & Bradley, K. J. (2017). Improving our understanding of moderation and mediation in strategic management research. *Organizational Research Methods*, 20(4), 665–685. <https://doi.org/10.1177/1094428115627498>
- Alawaqleh, Q. A. (2021). The effect of internal control on employee performance of small and medium-sized enterprises in Jordan: The role of accounting information system. *The Journal of Asian Finance, Economics and Business*, 8(3), 855–863.

- Anh, T. C., Thi, L. H. T., Quang, H. P., & Thi, T. T. (2020). Factors influencing the effectiveness of internal control in cement manufacturing companies. *Management Science Letters*, 133–142. <https://doi.org/10.5267/j.msl.2019.8.009>
- Bruwer, J.-P., Coetzee, P., & Meiring, J. (2018). Can internal control activities and managerial conduct influence business sustainability? A South African SMME perspective. *Journal of Small Business and Enterprise Development*, 25(5), 710–729. <https://doi.org/10.1108/JSBED-11-2016-0188>
- Chalmers, K., Hay, D., & Khlif, H. (2019). Internal control in accounting research: A review. *Journal of Accounting Literature*, 42(1), 80–103. <https://doi.org/10.1016/j.acclit.2018.03.002>
- Chang, Y.-T., Chen, H., Cheng, R. K., & Chi, W. (2019). The impact of internal audit attributes on the effectiveness of internal control over operations and compliance. *Journal of Contemporary Accounting & Economics*, 15(1), 1–19. <https://doi.org/10.1016/j.jcae.2018.11.002>
- Chen, H., Yang, D., Zhang, X., & Zhou, N. (2020). The moderating role of internal control in tax avoidance: Evidence from a COSO-based Internal Control Index in China. *The Journal of the American Taxation Association*, 42(1), 23–55. <https://doi.org/10.2308/atax-52408>
- Chiu, T., & Wang, T. (David). (2019). The COSO framework in emerging technology environments: An effective in-class exercise on internal control. *Journal of Emerging Technologies in Accounting*, 16(2), 89–98. <https://doi.org/10.2308/jeta-52500>
- Daway, A. M., Daway, W. M., Zghair, K. A., & Flayyih, H. H. (2025). The impact of digital transformation of accounting information system in enhancing the effectiveness of internal control. *Journal of Lifestyle and SDGs Review*, 5(3), e05572. <https://doi.org/10.47172/2965-730X.SDGsReview.v5.n03.pe05572>
- Dhoopar, A., Sihag, P., & Gupta, B. (2023). Antecedents and measures of organizational effectiveness: A systematic review of literature. *Human Resource Management Review*, 33(1), 100915. <https://doi.org/10.1016/j.hrmr.2022.100915>
- Ferreira, J. J. M., Fernandes, C. I., & Ferreira, F. A. F. (2019). To be or not to be digital, that is the question: Firm innovation and performance. *Journal of Business Research*, 101, 583–590. <https://doi.org/10.1016/j.jbusres.2018.11.013>
- Francis, S., & Imiete, B. U. (2018). Internal control system as a mechanism for effective fund management of universities in Bayelsa State, Nigeria. *Global Journal of Social Sciences*, 17(1), 77. <https://doi.org/10.4314/gjss.v17i1.8>
- Frazer, L. (2020). Does internal control improve the attestation function and by extension assurance services? A practical approach. *Journal of Accounting and Finance*, 20(1). <https://doi.org/10.33423/jaf.v20i1.2739>

- Gal, G., & Akisik, O. (2020). The impact of internal control, external assurance, and integrated reports on market value. *Corporate Social Responsibility and Environmental Management*, 27(3), 1227–1240. <https://doi.org/10.1002/csr.1878>
- Gao, P., & Zhang, G. (2019). Accounting manipulation, peer pressure, and internal control. *The Accounting Review*, 94(1), 127–151. <https://doi.org/10.2308/accr-52078>
- Grossi, G., Papenfuß, U., & Tremblay, M.-S. (2015). Corporate governance and accountability of state-owned enterprises. *International Journal of Public Sector Management*, 28(4/5), 274–285. <https://doi.org/10.1108/IJPSM-09-2015-0166>
- Gyamerah, S. A., Laar, G., & Asare, C. (2024). Evaluating the impact of internal control systems on corporate performance of Ghanaian banks: The moderating role of information technology. *Scientific African*, 26, e02476. <https://doi.org/10.1016/j.sciaf.2024.e02476>
- Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics*, 1(3). <https://doi.org/10.1016/j.rmal.2022.100027>
- Haryanto, H., & Setiawan, A. (2022). Pengaruh pengendalian intern dan self-efficacy terhadap kinerja pada masa bekerja secara online. *Jurnal Riset Akuntansi Dan Keuangan*, 10(1), 151–164. <https://doi.org/10.17509/jrak.v10i1.34184>
- Hoai, T. T., Hung, B. Q., & Nguyen, N. P. (2022). The impact of internal control systems on the intensity of innovation and organizational performance of public sector organizations in Vietnam: the moderating role of transformational leadership. *Heliyon*, 8(2), e08954. <https://doi.org/10.1016/j.heliyon.2022.e08954>
- Hossan, D., Dato' Mansor, Z., & Jaharuddin, N. S. (2023). Research population and sampling in quantitative study. *International Journal of Business and Technopreneurship (IJBT)*, 13(3), 209–222. <https://doi.org/10.58915/ijbt.v13i3.263>
- Jiang, Y., Jamil, S., Zaman, S. I., & Fatima, S. A. (2024). Elevating organizational effectiveness: synthesizing human resource management with sustainable performance alignment. *Journal of Organizational Effectiveness: People and Performance*, 11(2), 392–447. <https://doi.org/10.1108/JOEPP-03-2023-0111>
- Le, N. T. B., Vu, L. T. P., & Nguyen, T. V. (2021). The use of internal control systems and codes of conduct as anti-corruption practices: evidence from Vietnamese firms. *Baltic Journal of Management*, 16(2), 173–189. <https://doi.org/10.1108/BJM-09-2020-0338>
- Li, L. (2022). Digital transformation and sustainable performance: The moderating role of market turbulence. *Industrial Marketing Management*, 104, 28–37. <https://doi.org/10.1016/j.indmarman.2022.04.007>
- Li, X. (2020). The effectiveness of internal control and innovation performance: An intermediary effect based on corporate social responsibility. *PLOS ONE*, 15(6), e0234506. <https://doi.org/10.1371/journal.pone.0234506>

- Liu, G., Liu, J., Gao, P., Yu, J., & Pu, Z. (2024). Understanding mechanisms of digital transformation in state-owned enterprises in China: An institutional perspective. *Technological Forecasting and Social Change*, 202, 123288. <https://doi.org/10.1016/j.techfore.2024.123288>
- Musah, A., Padi, A., Okyere, B., E. Adenutsi, D., & Ayariga, C. (2022). Does corporate governance moderate the relationship between internal control system effectiveness and SMEs financial performance in Ghana? *Cogent Business & Management*, 9(1). <https://doi.org/10.1080/23311975.2022.2152159>
- Naqshbandi, M. M., Farhana Said, T., & Hisa, A. (2024). Organizational effectiveness: The role of culture and work engagement. *Management Decision*, 62(11), 3633–3658. <https://doi.org/10.1108/MD-11-2023-2180>
- Odunko, & Nonyelum, S. (2022). Internal control and firm performance: Evidence from selected firms in Nigeria (2015-2020). *International Journal of Innovative Finance and Economics Research*, 10(1), 68–80.
- Omar, F. S., & Yussuf, S. (2021). Effect of control environment on the financial performance of higher learning public institutions in Zanzibar. *International Journal of Scientific and Technical Research in Engineering (IJSTRE)*, 6(3).
- Otoo, F. N. K., Kaur, M., & Rather, N. A. (2023). Evaluating the impact of internal control systems on organizational effectiveness. *LBS Journal of Management & Research*, 21(1), 135–154. <https://doi.org/10.1108/LBSJMR-11-2022-0078>
- Pellokila, C. A. Z., Sugiharti, D. K., & Affandi, N. K. (2025). Legal implications of the Danantara Superholding Model on public accountability in State-Owned Bank asset management in Indonesia. *Journal of Law, Politic and Humanities*, 5(5), 3721–3730. <https://doi.org/10.38035/jlph.v5i5.1916>
- Potnuru, R. K. G., & Sahoo, C. K. (2016). HRD interventions, employee competencies and organizational effectiveness: An empirical study. *European Journal of Training and Development*, 40(5), 345–365. <https://doi.org/10.1108/EJTD-02-2016-0008>
- Purnomo, B. S. (2014). Pengaruh sistem pengendalian internal dan kekuatan koersif terhadap kualitas laporan keuangan pemerintah daerah. *Jurnal Riset Akuntansi Dan Keuangan*, 2(1), 276. <https://doi.org/10.17509/jrak.v2i1.6581>
- Rossieta, H., Geraldina, I., & Mita, A. F. (2025). State ownership, corporate missions and accountability of dividend policy: Empirical evidence of state-owned enterprises governance. *Journal of Governance and Regulation*, 14(1, special issue), 381. <https://doi.org/10.22495/jgrv14i1siart14>
- Rozali, R. D. Y., & Alfian, R. (2014). Pengaruh efektivitas fungsi audit internal terhadap pengungkapan kelemahan pengendalian internal. *Jurnal Riset Akuntansi Dan Keuangan*, 2(2), 326. <https://doi.org/10.17509/jrak.v2i2.6588>

- Sarstedt, M., Hair, J. F., Cheah, J.-H., Becker, J.-M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal*, 27(3), 197–211. <https://doi.org/10.1016/j.ausmj.2019.05.003>
- Sarstedt, M., Ringle, C. M., Cheah, J.-H., Ting, H., Moisesescu, O. I., & Radomir, L. (2020). Structural model robustness checks in PLS-SEM. *Tourism Economics*, 26(4), 531–554. <https://doi.org/10.1177/1354816618823921>
- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict. *European Journal of Marketing*, 53(11), 2322–2347. <https://doi.org/10.1108/EJM-02-2019-0189>
- Singh, K., & Best, P. (2023). Auditing during a pandemic – can continuous controls monitoring (CCM) address challenges facing internal audit departments? *Pacific Accounting Review*, 35(5), 727–745. <https://doi.org/10.1108/PAR-07-2022-0103>
- Siswanti, I., Riyadh, H. A., Nawangsari, L. C., Mohd Yusoff, Y., & Wibowo, M. W. (2024). The impact of digital transformation for sustainable business: the meditating role of corporate governance and financial performance. *Cogent Business & Management*, 11(1). <https://doi.org/10.1080/23311975.2024.2316954>
- Tetteh, L. A., Kwarteng, A., Aveh, F. K., Dadzie, S. A., & Asante-Darko, D. (2022). The impact of internal control systems on corporate performance among listed firms in Ghana: The moderating role of information technology. *Journal of African Business*, 23(1), 104–125. <https://doi.org/10.1080/15228916.2020.1826851>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Vu, Q., & Nga, N. T. T. (2022). Does the implementation of internal controls promote firm profitability? Evidence from private Vietnamese small- and medium-sized enterprises (SMEs). *Finance Research Letters*, 45, 102178. <https://doi.org/10.1016/j.frl.2021.102178>
- Vulley, D. (2022). Factors influencing the effectiveness of internal control systems: A case study of commercial banks in Ghana. *European Journal of Accounting, Auditing and Finance Research*, 10(4), 63–75. <https://doi.org/10.37745/ejafr.2013/vol10no4pp.63-75>
- Wali, S., & Masmoudi, S. M. (2020). Internal control and real earnings management in the French context. *Journal of Financial Reporting and Accounting*, 18(2), 363–387. <https://doi.org/10.1108/JFRA-09-2019-0117>
- Wang, C., Wang, D., Deng, X., & Wang, S. (2023). Research on the impact of enterprise digital transformation on internal control. *Sustainability*, 15(10), 8392. <https://doi.org/10.3390/su15108392>

- Yadav, A., Pandita, D., & Singh, S. (2022). Work-life integration, job contentment, employee engagement and its impact on organizational effectiveness: A systematic literature review. *Industrial and Commercial Training*, 54(3), 509–527. <https://doi.org/10.1108/ICT-12-2021-0083>
- Yang, S., Tai, Y., & Liu, J. (2024). Mechanism analysis and path study of digital transformation on corporate governance: Evidence from Chinese listed companies. *Sustainability*, 16(21), 9245. <https://doi.org/10.3390/su16219245>
- Zeng, G., & Lei, L. (2021). Digital transformation and corporate total factor productivity: Empirical evidence based on listed enterprises. *Discrete Dynamics in Nature and Society*, 2021, 1–6. <https://doi.org/10.1155/2021/9155861>
- Zhai, H., Yang, M., & Chan, K. C. (2022). Does digital transformation enhance a firm's performance? Evidence from China. *Technology in Society*, 68, 101841. <https://doi.org/10.1016/j.techsoc.2021.101841>
- Zhang, H., & Dong, S. (2023). Digital transformation and firms' total factor productivity: The role of internal control quality. *Finance Research Letters*, 57, 104231. <https://doi.org/10.1016/j.frl.2023.104231>
- Zhang, Y., Pan, C., Meng, S., & Wang, K. (2023). The role of internal control and digital transformation between political connections and financial performance: Evidence from China. *Asia Pacific Business Review*, 29(4), 990–1012. <https://doi.org/10.1080/13602381.2023.2220606>
- Zhao, T., Yan, N., & Ji, L. (2023). Digital transformation, life cycle and internal control effectiveness: Evidence from China. *Finance Research Letters*, 58, 104223. <https://doi.org/10.1016/j.frl.2023.104223>