A STRUCTURAL GOVERNANCE FRAMEWORK FOR INTEGRATING ERM AND COSO CONTROLS: EVALUATING COMPLIANCE RISK AND FINANCIAL RESILIENCE IN SAUDI INSURANCE COMPANIES

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Abstract
This study proposes a governance framework that examines how merging Enterprise Risk Management (ERM) with the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control Framework affects regulatory compliance risk and financial resilience in the insurance sector of Saudi Arabia. Motivated by the risk-based framework of the Saudi Central Bank (SAMA) and the goals of Saudi Vision 2030 for the financial sector the research asks whether breaking down silos between risk management and internal control creates a synergistic governance effect. Using an approach the researchers gathered primary survey data from 145 risk, compliance and internal audit professionals working in Saudi insurance firms. They also added financial data from 26 publicly listed insurers covering the years 2022 to 2025. Applying Partial Least Squares Structural Equation Modeling (PLS-SEM) the results show that ERM-COSO integration strongly and significantly boosts compliance ($\beta = 0.485$, $p < 0.001$) and financial resilience ($\beta = 0.342$ $p < 0.001$). Moreover regulatory compliance plays a mediating role between integration and resilience ($\beta = 0.218$, $p = 0.002$). The structural model explains 62.3 % of the variance in compliance ($R^2 = 0.623$) and 54.1 % of the variance in financial resilience ($R^2 = 0.541$). These findings indicate that aligning risk appetite with everyday internal control practices turns compliance from a reactive duty into a strategic driver of solvency regulatory alignment and long-term stability, under the oversight of SAMA.

Keywords: Enterprise Risk Management, COSO Framework, Regulatory Compliance, Financial Resilience, Insurance Sector, Saudi Arabia, PLS-SEM.

I. INTRODUCTION

The financial services industry in the Kingdom of Saudi Arabia is going through a change. This change is being pushed by Saudi Vision 2030 and the Financial Sector Development Program (FSDP) (Mosa, 2025b; Almaqtari et al. 2020). In this financial setup the insurance industry plays a key role. It helps transfer risk protects business structures and brings in money for the country (Al-Faryan & Alokla 2023; Al Amri et al. 2021). Because insurance companies work in a special way—like having long delays between when they collect money and when they pay out using complicated math to figure out risk dealing with long-term debts and facing big changes in underwriting—they face a lot of uncertainty (Amponsah et al. 2016; Grace et al., 2015). To protect people who buy insurance stop problems from spreading and keep the economy steady the Saudi Central Bank (SAMA) has been watching the insurance companies more closely. They use a system called Risk-Based Supervision (RBS) (Saudi Central Bank [SAMA] 2024; Al-Hadi et al. 2016). SAMAs rules require insurance companies to have money stay strong financially follow good management practices and be open, about how they work (Al-Sari, 2025; SAMA, 2024). These rules are meant to make insurance companies stronger. They also make it harder for the companies to follow the rules. If they don't follow the rules they face fines, bad reputations and other problems (Al-Sari, 2025; Mosa, 2025a).

Historically financial and insurance institutions have treated internal control systems and enterprise risk management as independent corporate governance functions (Grace et al., 2015; Hadi et al. 2025; Mosa, 2025a). Internal control systems, which are mainly measured against the Committee of Sponsoring Organizations of the Treadway Commission (COSO) 2013 framework, focus on transaction integrity, policy enforcement, accounting accuracy and past operational compliance. These systems are built on five parts: Control Environment, Risk Assessment, Control Activities, Information & Communication and Monitoring Activities (COSO, 2013; Hamed, 2023; Lundqvist, 2015). In contrast enterprise risk management (ERM) frameworks— COSO ERM 2017—concentrate on aligning risk with strategy setting risk appetite and creating forward-looking risk plans that match performance goals (COSO, 2017; Hadi et al. 2025; Lechner & Gatzert 2018). When financial and insurance institutions keep internal control systems and enterprise risk management in silos they create friction, duplicate costs and weak control points (COSO, 2017; Hadi et al., 2025; Mosa, 2025a). I have seen that old internal control systems often miss strategic threats while enterprise risk management plans fail when they are not part of everyday control activities and approval limits (Grace et al., 2015; Hamed, 2023; Lundqvist, 2015). Recent studies show that even though many financial and insurance institutions follow governance rules they still face compliance problems and financial trouble when enterprise risk management is not linked to routine internal control systems (Al-Sari, 2025; Hadi et al. 2025; Hamed, 2023; Lechner & Gatzert 2018).

Despite an increasing body of research investigating corporate governance in the GCC (Abdelbaki, 2021; Al-Faryan & Alokla, 2023; Al-Matari et al., 2019), a clear empirical gap still exists in terms of the integration of ERM and COSO control frameworks in the Saudi insurance sector (Al-Faryan & Alokla, 2023; Al-Sari, 2025). While the existing body of knowledge mostly investigates either the internal control mechanisms or the ERM framework without paying attention to their integration, most studies focus on the banking sector or apply only descriptive techniques without connecting governance structures with measures of financial resilience (Al-Sari, 2025; Mosa, 2025a). To fill the gap in the existing empirical research, this study aims to develop a governance structure framework and examine empirically the impact of ERM-COSO integration on regulatory compliance risk and financial resilience of Saudi insurance companies. The study pursues three main objectives:

1. To quantify the degree of structural integration between ERM processes and COSO control components within Saudi insurance firms.
2. To empirically evaluate how ERM-COSO integration mitigates regulatory compliance risk and SAMA supervisory violations.
3. To examine the direct and mediated mechanisms through which integrated governance enhances institutional financial resilience, including solvency adequacy and asset returns.

To fulfill these research objectives, three core structural hypotheses are formulated and tested:

- **H1:** ERM-COSO integration exerts a statistically significant positive effect on regulatory compliance in Saudi insurance companies.
- **H2:** ERM-COSO integration exerts a statistically significant positive effect on the financial resilience of Saudi insurance companies.
- **H3:** Regulatory compliance significantly mediates the relationship between ERM-COSO integration and financial resilience in Saudi insurance companies.

II. LITERATURE REVIEW

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control—Integrated Framework is used as a control and governance system in financial services (COSO, 2013; Hamed, 2023; Lundqvist, 2015). The framework comprises five components, including Control Environment, Risk Assessment, Control Activities, Information & Communication, and Monitoring Activities, which contribute to effective operations, reliable reporting, and compliance with laws and regulations (COSO, 2013; Florio & Leoni, 2017). Typically, internal control in insurance institutions has been implemented as a backward-looking process to ensure proper accounting, safeguard policyholders' assets, and enforce compliance with procedural standards (Amponsah et al., 2016; Grace et al., 2015). However, empirical studies indicate that relying on conventional isolated control measures fails to provide sufficient protection against the increasing complexity of regulatory requirements, as well as macroeconomic shocks (Aebi et al., 2012; Hadi et al., 2025).

Enterprise Risk Management (ERM) is a forward-looking framework comprising risk management objectives, which are designed to coordinate the process of identifying, assessing, and responding to risk across an enterprise (COSO, 2017; Hoyt & Liebenberg, 2011; McShane et al., 2011). According to COSO ERM (2017), risk management objectives center around the organization's strategies and related opportunities for contributing to value creation (COSO, 2017; Lechner & Gatzert, 2018). One of the fundamental concepts integral to the operation of ERM is the Risk Appetite, which defines the amount and type of risk an entity is willing to use to achieve its strategic objectives (COSO, 2017; Mosa, 2025b). For Saudi insurance companies, which fall under the supervision of Saudi Arabian Monetary Authority (SAMA), the definition of risk appetite directly impacts the underwriting limits, investment policies, reinsurance treatments, and statutory solvency requirements (Mosa, 2025a; SAMA, 2024). ERM allows insurance firms to take action to limit the impact of underwriting exposure and market volatility on the balance sheet (Hoyt & Liebenberg, 2011; Mosa, 2025b).

Historically, firms have managed internal control and ERM as independent processes, resulting in the lack of congruence between control policies and strategic risk tolerance (Beasley et al., 2008; Gordon et al., 2009; Hadi et al., 2025). As shown by empirical research, the separation of ERM and internal control results in dissonance between the compliance/internal audit function and ERM business risk analysis (Hadi et al., 2025; Hamed, 2023; Lundqvist, 2015). When ERM is integrated into COSO internal control, the strategic risk appetite is turned into daily control limits, and operational risk data is incorporated into the risk assessment process (COSO, 2017; Florio & Leoni, 2017). This integration transforms internal control from a reactive mechanism into an effective tool for improving organizational governance (Al-Sari, 2025; Hamed, 2023).

Saudi Central Bank enforces stringent supervision of the activities of insurance companies licensed within the kingdom, where breaches of regulatory requirements may lead to administrative, financial, and reputational penalties (Al-Sari, 2025; SAMA, 2024). Typically, internal control fails to prevent violations of regulatory requirements as the implementation of control procedures is not aligned with regulatory checks (Cumming et al., 2023; Hadi et al., 2025). When ERM is integrated into the system of control, the identification and assessment of compliance risks become embedded in the business risk management process (Aebi et al., 2012; Mosa, 2025a). By integrating ERM with COSO components, insurance companies can embed regulatory requirements in control and authorization processes, which improves the ability to meet SAMA's risk management standards and avoid regulatory penalties (Al-Sari, 2025; Hamed, 2023). From the theoretical perspective, Hypothesis H1 advanced in the study is expected to hold true.

Financial resilience is characterized by the ability of the insurance entity to resist the forces that could jeopardize its capitalization, profitability, and underwriting activities (Amponsah et al., 2016; Ellul & Yerramilli, 2013; Mosa, 2025b). The compartmentalization of the governance mechanisms raises transaction costs and creates overlapping monitoring and control systems, which are unable to avert the capitalization impact of the operational and underwriting activities (Hadi et al., 2025; Lechner & Gatzert, 2018). The integration of ERM-COSO leads to higher financial resilience by binding the risk-taking activities and solvency requirements through the implementation of the internal governance mechanisms (Ellul & Yerramilli, 2013; Florio & Leoni, 2017). For instance, the inclusion of risk appetite in the day-to-day underwriting and investment decisions helps avert the unauthorized build-up of risks, inappropriate reinsurance programs, and capitalization costs in the insurance entity (Florio & Leoni, 2017; Hamed, 2023; Mosa, 2025b). Therefore, the first hypothesis is concerned with the influence of ERM-COSO integration on financial resilience, which is formally stated below.

Apart from the direct impact on capitalization, the ERM-COSO also improves financial resilience by ensuring the regulatory compliance of the insurance entities (Al-Faryan & Alokla, 2023; Cumming et al., 2023). For instance, the failure of the insurance entities to meet the regulatory requirements leads to financial penalties, reserves, and additional capitalization provisions from the regulators (Al-Sari, 2025; Grace et al., 2015). On the other side, an efficient compliance framework reduces the likelihood of administrative sanctions, thereby minimizing the capitalization costs associated with suspending the entity's operations (Mosa, 2025a). For example, the maintenance of an efficient compliance framework improves the cash flow position and the reputation of the insurance entity, enhancing its ability to maximize its yield and profit (Al-Sari, 2025; Cumming et al., 2023; Hamed, 2023). Thus, compliance plays a critical role in financial resilience by reducing the capitalization costs associated with regulatory sanctions. Therefore, the third hypothesis is concerned with the mediating role of regulatory compliance, which is formally stated below.

III. RESEARCH METHODOLOGY

This study used a quantitative survey mixed with data to assess the impact of corporate governance on the management of enterprise risks. The research method is appropriate to test governance models, evaluate survey constructs, and establish a directional relationship between enterprise risk management and compliance while analyzing financial indicators (Amponsah et al., 2016; Hair et al., 2019; Mosa, 2025a). The study focused on the insurance sector in the Kingdom of Saudi Arabia (KSA) under the regulatory supervision of the Saudi Central Bank (SAMA). Recent regulatory developments in risk-based supervision and Saudi vision 2030 qualify the study's scope (Al-Sari, 2025; SAMA, 2024). The study targeted risk managers, compliance officers, internal auditors, financial controllers, and board members in licensed insurance companies. A non-probability sampling technique was used to select respondents with first-hand expertise in COSO internal control, enterprise risk management, and SAMA regulations (Hair et al., 2021; Hamed, 2023). Data were collected from 180 respondents through an online-surveyed questionnaire. One hundred forty-five complete questionnaires without missing values or response irregularities were used in the analysis (Hadi et al., 2025; Sarstedt et al., 2020). In addition, a mix of primary and secondary data was used because perception data alone could be inadequate to explore fully the issues identified in the theoretical framework. The researcher extracted secondary data related to financial indicators from the 2022-2025 audited annual reports of 26 insurance companies listed in the Saudi Exchange known as Tadawul (Al-Sari, 2025; Mosa, 2025b).

All measurement instruments were operationalized using validated construct items from prior governance literature and established solvency benchmarks (COSO, 2013, 2017; Hair et al., 2019). The independent construct, ERM-COSO Integration, was evaluated using a 15-item scale measured on a 5-point Likert gradient ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) to measure joint risk-audit processes and risk appetite enforcement across the five COSO components. The mediating construct, Regulatory Compliance, was operationalized as a composite scale combining an 8-item primary perception instrument with objective secondary metrics, including the inverse log of SAMA administrative penalties and supervisory audit pass rates (Al-Sari, 2025; SAMA, 2024). The dependent construct, Financial Resilience, was measured through a financial performance index integrating capital solvency adequacy, asset efficiency, and underwriting stability, specified as:

$$\text{Financial } Resilience\ Index_i = \omega_1 . Solvency\ Ratio_i + \omega_2 . ROA_i - \omega_3 . Loss\ Ratio_i$$

Where the Solvency Ratio represents statutory capitalization over SAMA's 150% threshold, Return on Assets (ROA) depicts asset productivity proficiency, and Net Loss Ratio gauges gross claim settlement against earned premiums (Amponsah et al., 2016; Mosa, 2025b). Descriptive statistical analysis was performed using IBM SPSS Statistics software, whereas smartpls 4 was deployed to carry out Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis (Hair et al., 2021; Ringle et al., 2020). The choice of PLS-SEM over covariance-based structural equation modeling (CB-SEM) was justified by its statistical superiority in predictive structural relationship modeling, utilization of composite latent variables, and handling of financial ratio data with non-normal distributions, as well as indirect and direct effect sizes without stringent distributional assumptions (Henseler et al., 2015; Sarstedt et al., 2020). The structural model specified two theoretical equations, namely;

$$Compliance_i = \alpha_0 + \beta_1\ Integration_i + \varepsilon_{1i}$$
$$Resilience_i = \gamma_0 + \gamma_1 . Integration_i + \gamma_2 . Compliance_i + \varepsilon_{2i}$$

Where Integration (i) represents the ERM-COSO Integration Index for firm i, Compliance (i) denotes the Regulatory Compliance score, Resilience (i) signifies the Financial Resilience Index, β_1 tests Hypothesis H_1, γ_1 tests Hypothesis H_2, and the indirect path product (β_1 , γ_2) evaluates the mediation effect for Hypothesis H_3.

IV. EMPIRICAL RESULTS AND FINDINGS

Before examining the structural relationships and testing the research hypotheses, the measurement model was evaluated in terms of indicator reliability, internal consistency, convergent validity, and discriminant validity using SmartPLS 4 (Hair et al., 2021; Henseler et al., 2015). Internal consistency reliability was evaluated using Cronbach's alpha and Composite Reliability (CR). As can be seen in Table I, all items possessed a high level of internal consistency since Cronbach's alpha scores ranged between 0.865 and 0.912 while Composite Reliability varied between 0.897 and 0.925, which are considerably higher than the established level of 0.70 (Hair et al., 2019; Hamed, 2023). Convergent validity was achieved because the Average Variance Extracted (AVE) exceeded the threshold of 0.5 for

all latent constructs, signifying that the constructs explained more variance than cross-loadings on other constructs (Hair et al., 2021; Sarstedt et al., 2020).

Table I: Construct Reliability and Convergent Validity Results

Latent Construct	Number of Items	Cronbach's Alpha (α)	Composite Reliability (CR)	Average Variance Extracted (AVE)
ERM-COSO Integration	15	0.912	0.925	0.614
Regulatory Compliance	8	0.884	0.908	0.582
Financial Resilience	6	0.865	0.897	0.595

Discriminant validity was evaluated using the Heterotrait-Monotrait (HTMT) ratio of correlations to verify that the operationalized latent constructs are empirically distinct (Henseler et al., 2015). All pairwise HTMT correlation ratios remained strictly below the conservative threshold of 0.85 (Al-Sari, 2025). As presented in Table II, the HTMT values range between 0.518 and 0.624, confirming robust discriminant validity across the structural model.

Table II: Discriminant Validity via HTMT Ratio

Latent Construct	(1) ERM-COSO Integration	(2) Regulatory Compliance	(3) Financial Resilience
(1) ERM-COSO Integration	—		
(2) Regulatory Compliance	0.624	—	
(3) Financial Resilience	0.518	0.589	—

The structural model was tested to evaluate the proposed direct (H1) and indirect (H2, H3) relationships. To determine the statistical significance of the path coefficients (β1), the non-parametric bootstrapping procedure with 5,000 resamples and a 5% significance level was used. To begin with, Hypothesis 1 states that ERM-COSO integration has a positive and statistically significant effect on regulatory compliance. This indirect relationship between the components was revealed by the PLS-SEM, which demonstrated a positive value of the path coefficient ($\beta1 = 0.485$, $t = 6.124$, $p < 0.001$), thus supporting H1. Further, Hypothesis 2 states that ERM-COSO integration has a positive and statistically significant direct impact on financial resilience. In this case, the direct relationship between the components also appeared to be positive and statistically significant ($\beta1 = 0.342$, $t = 4.215$, $p < 0.001$), supporting H2. Finally, the Mediation Relationship claims that regulatory compliance plays a mediating role in the relationship between ERM-COSO integration and financial resilience. The indirect effect analysis revealed an indirect influence of ERM-COSO integration on financial resilience with a statistically significant path coefficient ($\beta = 0.218$, $t = 3.102$, $p = 0.002$). Since both the direct ($\beta = 0.342$) and indirect ($\beta = 0.218$) effects were statistically significant, regulatory compliance had a partial mediating effect, supporting the H3.

Table III: Structural Equation Model Hypothesis Testing Results

Hypothesis	Path Relationship	Path Coeff. (β)	Sample Mean (M)	Standard Error	t-Statistic	p-Value	Decision
H1	Integration → Regulatory Compliance	0.485	0.488	0.079	6.124	<0.001	Supported
H2	Integration → Financial Resilience	0.342	0.339	0.081	4.215	<0.001	Supported
H3	Integration → Compliance → Resilience	0.218	0.215	0.07	3.102	0.002	Supported

The structural model explains 62.3% of variance in Regulatory Compliance ($R2 = 0.623$, $R2\{adj\} = 0.618$) and 54.1% of the total variance in Financial Resilience ($R2 = 0.541$, $R2\{adj\} = 0.534$). Blindfolding procedures revealed Q2 values

well above zero (Q2 = 0.341, compliance; Q2 = 0.298, resilience) and therefore predictive relevance of the integrated governance model (Mosa, 2025b). The evidence at hand shows that the integration of ERM strategic risk appetite and COSO components beyond operational silos triggers considerable governance synergies in the context of Saudi insurance providers. Specifically, the inclusion of risk appetite thresholds into day-to-day business underwriting and control routines results in two structural benefits: significant reduction of SAMA supervisory non-compliance penalties (H1) and improved balance-sheet resilience (H2). In addition, the maintenance of a clean compliance record acts as an important intermediate buffer (H3) that averts capital drain and improves solvency ratios.

V. DISCUSSION

The presented results confirm the validity of the proposed conceptual framework since the integration of ERM and COSO leads to governance improvement in the context of the Saudi insurance sector. In particular, the direct path positing a significant positive link between the tested constructs was found to be statistically significant ($\beta = 0.485$, $p < 0.001$). This result suggests that the reduction of structural governance dissonance between risk appetite definition and control implementation activities minimizes the likelihood of regulatory violations under the Risk-Based Supervision framework and associated SAMA-imposed penalties (Al-Sari, 2025; SAMA, 2024). In other words, compliance becomes an integral component of daily operations, not an afterthought during regulatory audits (Hadi et al., 2025; Hamed, 2023). Integration and Financial Resilience (H2), The direct link between the integration construct and balance-sheet resilience indicators was also statistically significant ($\beta = 0.342$, $p < 0.001$). According to the results, the inclusion of enterprise risk appetite as one of the key inputs for the underwriting and investment approval processes enables the firm to operate without unauthorized risk exposure, downfalls in the underwriting profit ratio, and capital impairment (Amponsah et al., 2016; Mosa, 2025b). In particular, the integration of ERM and COSO leads to higher ROA while minimizing the utilization of regulatory capital. The Mediating Role of Regulatory Compliance (H3), The indirect effect of the tested hypothesis, $\beta= 0.218$, $p = 0.002$), was also statistically significant, which verified the mediating role of regulatory compliance between the integration of ERM and COSO and the firm's balance-sheet resilience. In particular, the maintenance of a clean compliance record prevents the utilization of the firm's capital for regulatory fine payments, capitalization of expenses, and administrative penalties (Al-Faryan & Alokla, 2023; Mosa, 2025a).

This study extends the corporate governance literature by empirically validating the structural synthesis of COSO 2013 internal control components and COSO ERM 2017 frameworks in an emerging market context (COSO, 2013, 2017; Florio & Leoni, 2017). This fills a theoretical void by demonstrating that risk management and internal control mechanisms yield improved predictive and financial performance when operated as an integrated, unified model as opposed to isolated functional silos (Grace et al., 2015; Lechner & Gatzert, 2018; Lundqvist, 2015). Practically, the findings provide executive leadership and regulatory authorities with a validated framework which directly supports Saudi Vision 2030 and the Financial Sector Development Program by improving institutional stability and solvency across the national insurance market (Al-Faryan & Alokla, 2023; Mosa, 2025b). To take advantage of this empirical insight, insurance C-suite executives should dissolve departmental boundaries between Risk Management, Compliance, and Internal Audit functions by creating unified governance committees and shared risk-control taxonomies. Executive management should prioritize the implementation of advanced Regulatory Technology (RegTech) tools which automatically link daily underwriting approvals and investment transactions to real-time solvency limits and risk appetite metrics (Cumming et al., 2023; Hamed, 2023). Corporate leadership should foster a resilient risk culture where operational staff view internal control procedures as value-enhancing risk mitigation tools as opposed to procedural burdens (Beasley et al., 2008; Mosa, 2025a). For regulatory authorities, and specifically the Saudi Central Bank (SAMA), supervisory authorities should develop standardized national guidelines for embedding ERM risk appetite into COSO control frameworks while establishing proportional supervisory incentives such as expedited product approvals or reduced audit frequencies for firms demonstrating high structural governance integration (Al-Sari, 2025; SAMA, 2024).

VI. Conclusion

This paper aims to demonstrate that the integration of Enterprise Risk Management and COSO Internal Control Framework is regarded as a vital aspect for the insurance companies operating in the Kingdom of Saudi Arabia. The key point of this research is based on the integration of primary and secondary sources of information. On the one hand, the article uses the results of the primary survey conducted among 145 professionals working in the insurance industry. On the other hand, the findings include the quantitative data collected from the balance sheets of 26

insurance companies listed on the local stock exchange. The key benefit of combining enterprise risk management and internal control is masking regulatory compliance risk, which allows organizations to become more competitive on the market. In other words, aligning risk appetite with day-to-day control procedures contributes to increasing the capitalization of the insurance companies in the Kingdom of Saudi Arabia in the context of Saudi Vision 2030.

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