The Three Lines Model in the face of emerging risks: critical analysis and perspectives for adaptation in emerging economies

Lynda DOUAS
Larbi Ben M'hidi University,
COFIFAS Laboratory, Algeria

lynda.douas@univ-oeb.dz

Received: 08/04/2026 *Accepted*: 23/04/2026 *Published*: 05/06/2026

Abstract:
In an environment marked by increasingly complex organizational risks and rapidly evolving institutional frameworks, the Three Lines of Defense model, reformulated by the Institute of Internal Auditors (IIA, 2020) as the Three Lines Model (TLM), is undergoing analytical renewal. This conceptual-comparative study examines the structural limitations of the model and identifies avenues for modernization adapted to contemporary organizations, with particular attention to the Algerian context. The research adopts a qualitative methodology based on in-depth document analysis and a comparison of four Ibero-American companies. The analysis draws on the COSO framework, the IIA 2020 framework, and ESG governance frameworks. The results show that the effectiveness of the TLM depends primarily on interline coordination, technological integration, and the maturity level of the risk culture. The study highlights structural gaps in Algerian organizations and proposes an analytical framework to prepare for future empirical research.

***Key Words*:** *Three Lines Model (TLM); GRC (Governance, Risk Management, and Compliance); Internal audit; Risk management; Emerging economies.*

JEL Classification : G32, M42, O16

* Corresponding author: Douas Lynda (*lynda.douas@univ-oeb.dz*)

Introduction:

Contemporary organizations operate in an environment characterized by intensified regulatory requirements, growing stakeholder expectations, and increased exposure to strategic, technological, and environmental risks. In response to these pressures, the Three Lines of Defense model, initially proposed by the Institute of Internal Auditors (IIA, 2020) and revised under the designation Three Lines Model (TLM) (IIA, 2020), has emerged as a structuring reference framework in the field of internal control and risk management. This model clarifies the roles and responsibilities of actors, enhances organizational transparency, and constitutes a fundamental element for ensuring effective governance.

While several studies show that organizations correctly applying this model improve their responsiveness to emerging risks (Spira & Page, 2003), the literature simultaneously reveals a significant scientific gap: existing studies primarily analyze

the TLM in mature Western contexts, leaving its applicability in emerging economies largely unexplored. These economies are characterized by developing governance structures, weak risk culture, and limited digitalization of controls (Lizarzaburu, Farfan, Camacho, & Gomez, 2024; Bantleon, et al., 2021). The revisions introduced by the IIA (2020), as well as recent academic analyses (Arena, Arnaboldi, & Azzone, 2010; Bertaux & Diouf, 2017; Howard & Zhivitskaya, 2021)), emphasize the need to reconsider the modalities of applying the model in order to adapt it to contemporary practices, yet they do not offer a contextualized framework for emerging countries such as Algeria.

Accordingly, this research explicitly aims to address the absence of contextualized analyses of the Three Lines Model in emerging economies characterized by governance in transition, by proposing an analytical framework adapted to the Algerian organizational context.

Based on this gap, our study seeks to answer the following research question: To what extent can the Three Lines Model (TLM) be adapted to address emerging risks and the specific requirements of contemporary organizations, particularly in the Algerian context?

I. Analytical Research Propositions

Within the framework of a conceptual comparative study, the following analytical propositions structure the documentary exploration. These propositions are not subject to statistical testing. They are explored conceptually through documentary analysis and comparative case study, in accordance with the qualitative research design adopted (Robert, 2018).

- **P1:** Organizational complexity, including the interdependence of functions and the emergence of cross-functional risks, constitutes a factor that weakens the effectiveness of the TLM by reducing clarity of responsibilities and generating independence conflicts between lines, a proposition explored conceptually through documentary analysis.
- **P2:** The integration of control technologies such as artificial intelligence, predictive analytics, and digitalization, together with the adoption of collaborative governance as recommended by the TLM (IIA, 2020), constitutes a lever for strengthening the model's performance by improving inter-line coordination and the early detection of anomalies, a proposition supported by the comparative analysis of Ibero-American cases.

These propositions serve an interpretative and analytical function and do not constitute statistically tested hypotheses, in accordance with the exploratory qualitative research design adopted.

1. Research Methodology

1.1 Research Design

This study adopts a qualitative exploratory research design with a comparative orientation, based on documentary analysis and multiple case studies (Robert, 2018). The approach is employed to contextualize the conditions for the applicability of the TLM in distinct institutional environments by contrasting Ibero-American experiences with the Algerian reality.

1.2 Data Sources

The documentary sources mobilized include:

- the international academic literature published between 2003 and 2024, selected from the Scopus, Web of Science, and Google Scholar databases using the keywords "Three Lines Model", "three lines of defense", "internal audit governance", and "risk management emerging economies";
- institutional reports from the (IIA, 2013; IIA, 2020), (COSO, 2013), and Algerian regulatory bodies;
- corporate governance reports and ESG data published by (Petrobras, 2023), (Codelco, 2024), and Iberdrola, covering the period 2017 to 2024;
- Algerian legislative texts relating to internal control including Regulation BA No. 11-08, Laws No. 05-01, 06-01, 88-01, and the 2024 Decree.

1.3 Criteria for Company Selection

The four companies analyzed, Petrobras, Codelco, Ecopetrol, and Iberdrola, were selected according to the following criteria: belonging to a strategic sector such as energy and resources comparable to Algerian public enterprises; availability of verifiable public governance data; Ibero-American geographic representativeness; documented implementation of the TLM or a structured internal control framework; and the occurrence of governance crises enabling evaluation of the model's actual effectiveness. The choice of an Ibero-American rather than European or African setting is based on three structural institutional similarities with the Algerian context:

- the predominance of public enterprises in strategic sectors such as energy and mining, which generates hybrid state market governance configurations analogous to those observed in Algeria;
- a historical trajectory of governance reforms under external regulatory pressure including corruption scandals and rating agency pressures comparable to the Algerian dynamic after 2016;
- a developing risk culture characterized by the recent regulatory formalization of internal control, which constitutes a common denominator with Algerian organizations (Lizarzaburu, Farfan, Camacho, & Gomez, 2024; Bantleon, et al., 2021).

- These similarities make the Ibero-American experience a relevant reference setting for identifying realistic trajectories for adopting the TLM in an emerging context.

The comparative evaluation is based on qualitative documentary analysis. The scores assigned to the cases studied constitute an interpretative analytical assessment derived from academic literature and institutional reports and should not be interpreted as empirical quantitative measurements.

1.4 Comparative Analysis Grid

The comparative analysis relies on a five-dimensional grid, adapted from the work of (Lizarzaburu, Farfan, Camacho, & Gomez, 2024; Bantleon, et al., 2021):

- clarity and separation of roles among the three lines;
- degree of independence of internal audit;
- maturity of governance and engagement of the board of directors;
- level of integration of ESG and technological risks;
- use of control and detection technologies.

1.5 Methodological Limitations

This study presents limitations inherent in the documentary approach. The absence of primary empirical data (interviews, questionnaires) on Algerian organizations limits the generalization of the results. Moreover, corporate governance reports may present a favorable publication bias. Future research could complement this analysis through qualitative field studies conducted in Algerian public enterprises.

2. Scientific Contribution and Positioning

Identified gap: The existing literature on the Three Lines Model focuses primarily on developed economies. No comparative study systematically contextualizes the conditions for the applicability of the TLM within the context of emerging economies with developing governance systems.

Theoretical contribution: This study contributes to the literature by proposing a contextualized analytical framework for assessing the applicability of the Three Lines Model in emerging economies, thereby extending governance theory beyond its predominantly Western applications. It introduces the concept of the "institutional context–conditioned effectiveness" of the TLM, according to which the performance of the model depends on the institutional environment rather than on its formal adoption.

Comparative analytical contribution: The study provides a comparative analysis of four Ibero-American organizations and examines their implications for Algerian public enterprises (Sonatrach, Sonelgaz, BEA), identifying priority levers for modernization in a context characterized by a weak risk culture. In the absence of

primary Algerian empirical data, this contribution is explicitly positioned as a pre-fieldwork framework: it provides operational hypotheses, institutional maturity variables, and the comparative analysis grid required for future qualitative or quantitative field studies on Algerian organizations.

This contribution therefore proposes a transferable analytical framework serving as a conceptual basis for future empirical research on Algerian public organizations.

2.1 Structure of the Article

Section II presents a critical analysis of the TLM (foundations, roles, limitations). Section III develops the Ibero-American comparative study and perspectives for Algeria. Section IV concludes and formulates operational recommendations.

3. Literature Review

Five major contributions structure the theoretical positioning of this study. (Spira & Page, 2003) establish that the three lines model improves transparency and clarifies responsibilities, but that cross-functional risks weaken the boundaries between lines, thereby constituting the first formalization of the problem of interline coordination. (Lenz & Sarens, 2019) empirically document the independence conflicts of internal audit in complex digital organizations, conceptually corroborating P1 (Howard & Zhivitskaya, 2021) demonstrate that the traditional model cannot incorporate the cross-cutting nature of cyber and ESG risks without a collaborative reinterpretation of the framework, thus supporting P2. (Bertaux & Diouf, 2017) show that the effectiveness of internal control depends primarily on organizational culture and training, a dimension that is particularly critical in emerging economies. (Bantleon, et al., 2021) finally identify coordination challenges in the implementation of the TLM, emphasizing that organizational complexity constitutes the central moderating variable of its effectiveness.

II. The Three Lines Model: Theoretical Foundations and Critical Analysis

The Three Lines Model (TLM), the official designation since the IIA revision in 2020, replacing the former “Three Lines of Defense” or 3LoD, constitutes the central conceptual framework of this study. Unless otherwise indicated, this unified terminology is used throughout the document. Its critical analysis, prioritized over description, makes it possible to identify the conditions of its effectiveness and its structural limitations. In the remainder of the article, the expression “TLM” will be used to designate the Three Lines Model in order to ensure terminological consistency.

1. From the Classical Model to the TLM: Evolution and Conceptual Breaks

The 2020 revision constitutes more than a terminological update; it marks a paradigm shift. The classical model organized three hierarchical and compartmentalized “lines of defense.” The revised TLM abandons the military metaphor in favor of the notion

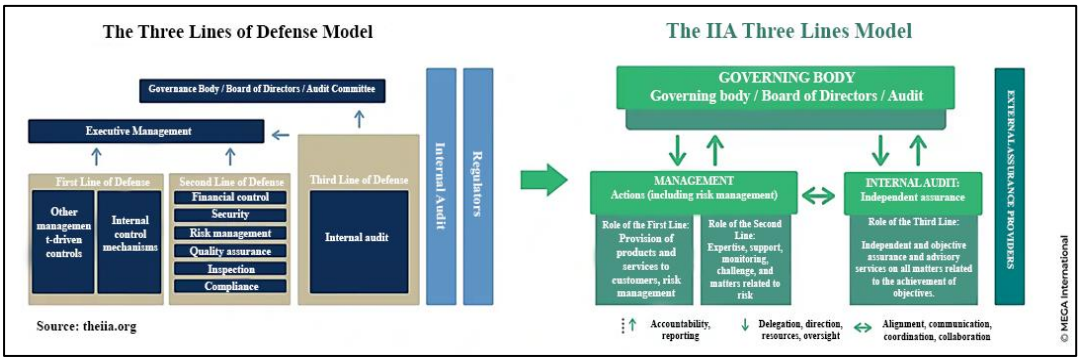
of coordinated lines of control, oriented toward value creation rather than solely risk prevention (IIA, 2020). However, (Davies & Zhivitskaya, 2018) emphasize that this revision did not resolve the fundamental problem of demarcation between functions; in practice, the boundaries between the lines remain permeable and generate conflicts of competence (Lenz & Sarens, 2019).

The adoption of the model has become widespread under regulatory pressure, particularly following the Enron and WorldCom scandals, and later the financial crisis of 2007–2008 (Brunnermeier, 2009; FCIC, 2011). This reactive origin partly explains its more formal than substantive deployment in many organizations, a phenomenon documented by (Bantleon, et al., 2021) as the "institutional isomorphism" of the TLM. Furthermore, some companies mobilize the model in a rigid and formal manner, whereas others interpret it more flexibly, even symbolically, without actual implementation (Davies & Zhivitskaya, 2018).

1.1 Architecture of the TLM: Roles and Responsibilities

In accordance with the (IIA, 2020, p. 05), the TLM organizes responsibilities around four interdependent levels. The Board of Directors and governance bodies define the level of risk appetite and oversee the entire framework. The first line (operational functions) manages day to day risks and implements primary controls. The second line (support functions: compliance, risk management, quality) monitors, advises, and challenges the first line. The third line (internal audit) independently evaluates the effectiveness of the entire system. The specific roles of each level, as specified by the (IIA, 2020, pp. 05-06), are as follows. The Board of Directors assumes responsibility toward stakeholders for the supervision and control of the organization; it establishes a culture that promotes ethical behavior and accountability, defines the level of risk appetite, and delegates the necessary resources to management. The first line ensures the management and guidance of procedures, maintains dialogue with the Board, establishes appropriate structures to manage operations and risks, and ensures compliance with legal and ethical requirements. The second line provides complementary expertise and support in risk management including governance, information security, organizational sustainability, and quality assurance and conducts an in-depth analysis of the effectiveness of the risk management system (IIA, 2020, p. 06). The third line (internal audit) ensures the independence of management responsibilities within the institution and reports risks to management and the Board in order to evaluate the effectiveness and efficiency of risk management, while ensuring compliance with legal and regulatory requirements aimed at protecting stakeholder interests (IIA, 2020, p. 06).

Fig. 1: The Three Lines Model (IIA, 2020)



Source: Adapted reproduction for academic purposes based on (IIA, 2020).

This configuration illustrates a fundamental conceptual shift from compartmentalized hierarchical control to collaborative and integrated governance. Unlike the classical model in which each line operated in a defensive and sequential manner, the TLM positions the Board of Directors at the center of a bidirectional feedback system with all lines and establishes cross-functional coordination between internal audit, the third line, and operational functions. This theoretical repositioning implies a substantial cultural transformation that many organizations, particularly in emerging economies, struggle to operationalize (Lizarzaburu, Farfan, Camacho, & Gomez, 2024).

1.2 Critical Analysis: Contributions and Structural Limitations of the TLM

The TLM presents contributions widely recognized in the international literature. First, it improves the efficiency of internal processes by reducing errors and failures likely to result in losses or damage the organization's reputation. Second, it strengthens the confidence of stakeholders, both internal and external, by demonstrating the institution's ability to protect its key assets while pursuing its strategic objectives. The model also promotes a genuine risk management culture by involving every hierarchical level. It further clarifies roles and responsibilities, thereby limiting conflicts, duplication, and grey areas in risk management. Finally, its flexibility constitutes a major advantage, as it can be adapted to the specific needs of each institution and evolve in response to environmental changes (IIA, 2020; Bantleon, et al., 2021).

Critical analysis of the literature nevertheless reveals three categories of limitations. First, structural limitations inherent to the model: the linearity of the framework does not correspond to the cross-functional nature of contemporary risks, including cyber, ESG, and reputational risks, which simultaneously span the three lines (Howard & Zhivitskaya, 2021). The distinction between the first and second lines systematically generates zones of ambiguous responsibility, frequently documented in empirical literature on internal audit (Lenz & Sarens, 2019, p. 282).

Second, conditional limitations related to the context of application: the TLM presupposes a minimum level of governance maturity, including board independence, a developed risk culture, and sufficient internal audit resources, which is not universally available. In emerging economies, these prerequisites are often absent, transforming the model into an instrument of symbolic compliance rather than an effective control mechanism (Bantleon, et al., 2021). Third, technological limitations: the TLM, designed in a pre-digital environment, does not natively integrate real-time monitoring tools, predictive analytics, or algorithmic anomaly detection, capabilities that are now essential for addressing cyber and operational risks (Spira & Page, 2003; IIA, 2020).

1.3 Governance Components and Internal Control: Analytical Synthesis

Governance: Corporate governance constitutes the institutional foundation of the TLM. It refers to the set of rules and principles that frame the design, organization, and functioning of governance bodies within an organization, particularly the three major powers within a company: shareholders, the board of directors, and top management (Bantleon, et al., 2021, pp. 59-74). Effective governance provides the necessary incentives to protect the interests of the company and its shareholders by ensuring clarity of information and facilitating the efficient use of resources (Hidalgo, 2020). (Bantleon, et al., 2021) demonstrate that the effectiveness of the model is directly correlated with the effective engagement of the Board of Directors in defining risk appetite, a variable whose absence constitutes the primary documented factor of model failure in emerging economies.

Management: Management constitutes the interface between governance and operations. It is responsible for making decisions, assessing the effectiveness and efficiency of operations, and optimizing control mechanisms in order to achieve organizational objectives. It is also responsible for implementing the organization's strategy and managing the necessary resources, in accordance with the directives defined by the governance body (Anthony & Govindarajan, 2007, pp. 3-20). (Anthony & Govindarajan, 2007) establish that the quality of the managerial control system directly determines the reliability of the first line, a necessary but insufficient condition for the overall effectiveness of the TLM.

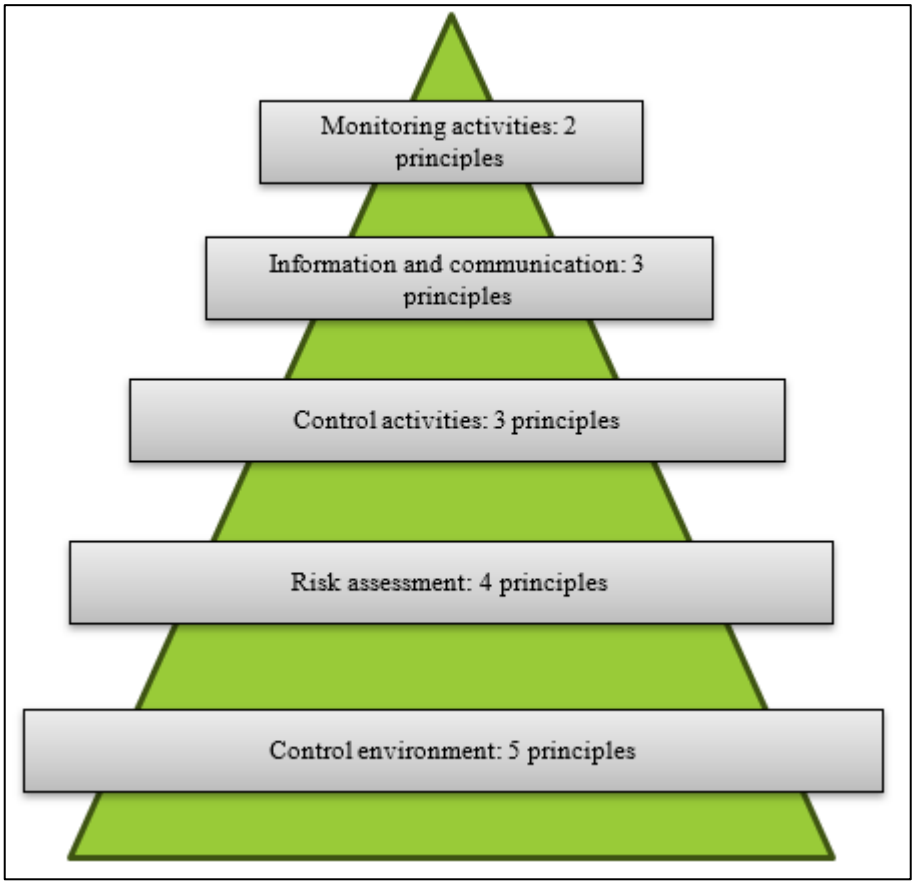
Internal audit: Internal audit represents the independence safeguard of the system. Defined by the IIA as an independent and objective assurance, advisory, and performance management activity, it helps the organization achieve its objectives by evaluating the effectiveness of risk management, control, and governance processes (Bouhadida, 2017, p. 28). Standard 1110 of the IPPF requires that the chief audit executive report directly to the Board, a condition of structural independence that (Lenz & Sarens, 2019) identify as the most frequently compromised factor in complex organizations.

Internal audit activity is effectively managed when key IIA standards are respected: Standard 2000 requires internal audit to add value to the organization by considering

strategies, objectives, and risks; Standard 2010 mandates the establishment of a risk-based audit plan in consultation with management and the Board; Standards 2020 and 2030 govern plan communication and resource allocation; Standard 2050 requires coordination with other assurance providers; Standard 2100 defines the mission of evaluating and improving governance, risk management, and control processes; Standard 2200 requires the planning and detailed documentation of each engagement; finally, Standard 2300 specifies the obligation to identify, analyze, and document sufficient information to achieve engagement objectives (IIA, 2020).

Internal control (COSO, 2013): The (COSO, 2013) framework structures internal control around five components (control environment, risk assessment, control activities, information and communication, monitoring) and 17 principles. Its articulation with the TLM is explicit: the first line performs control activities, the second monitors their effectiveness, and the third evaluates the entire system (Spencer Pickett, 2010).

Fig. 2: Internal Control Architecture (COSO 2013)

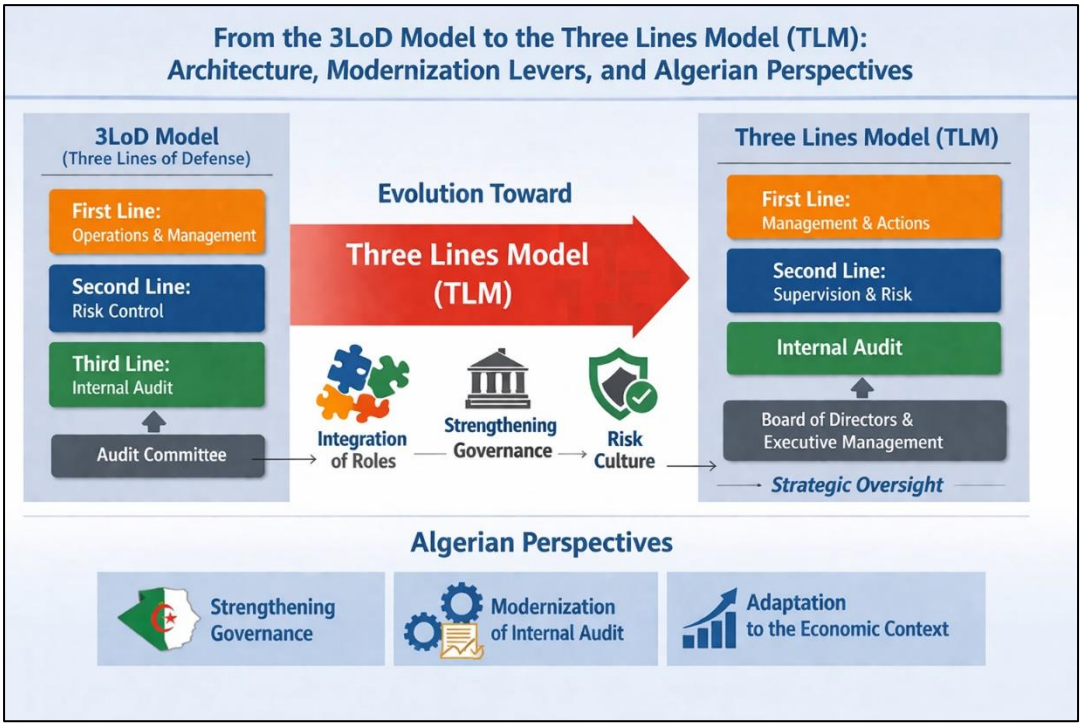


Source: Author's elaboration, based on (COSO, 2013).

This pyramidal representation illustrates the primacy of organizational culture as the foundation of the control system: without a robust control environment at the

inverted apex, none of the operational components can function effectively, an observation that is particularly critical for Algerian organizations whose risk culture is still developing.

Fig. 3: Synthesis. From the 3LoD Model to the Three Lines Model (TLM): Architecture, Modernization Levers, and Algerian Perspectives



Source: Adapted from (IIA, 2020; IIA, 2020). The Three Lines Model: An update of the Three Lines of Defense. Altamonte Springs: IIA Global.

The figure illustrates the conceptual evolution of the traditional Three Lines of Defense model (3LoD) toward the Three Lines Model (TLM) proposed by the Institute of Internal Auditors (IIA, 2020). While the 3LoD model relied primarily on a functional separation of responsibilities between operations, risk management, and internal audit, the TLM introduces an integrated logic based on governance, interfunctional coordination, and organizational value creation. The architecture highlights the shift from a defensive approach centered on control to a strategic approach oriented toward risk culture, board oversight, and alignment with organizational objectives. In the Algerian context, this transformation implies strengthening governance mechanisms, modernizing internal audit, and progressively adapting to the institutional and economic requirements of emerging economies.

III. Comparative Study: Application of the TLM and Implications for Algeria

This section applies the five-dimensional analytical framework (Section 1.2) to the four selected organizations, then examines the conditions for adapting the TLM to the Algerian context.

1. Comparative Analysis: Four Ibero American Cases

The analyzed companies represent a spectrum of governance maturity ranging from a reactive post scandal model (Petrobras) to a proactive model aligned with the SDGs (Iberdrola), thus offering a mapping of possible trajectories for TLM adoption (Lizarzaburu, Farfan, Camacho, & Gomez, 2024):

- Petrobras (Brazil): Systemic reform following the Lava Jato scandal. Strengthening of control mechanisms through rigorous implementation of the three lines, with the creation of a dedicated GRC directorate.
- Codelco (Chile): Preventive and integrated approach structured around governance, prevention, and compliance, a rare case of proactive TLM adoption outside a crisis context.
- Ecopetrol (Colombia): Optimized coordination between operational units, internal control, and audit based on the COSO 2013 framework, a model of integration of international standards.
- Iberdrola (Spain): Mature model aligned with the SDGs, characterized by strong managerial involvement and full integration of ESG risks within the TLM.

The following table presents a qualitative comparative synthesis based on interpretative documentary analysis rather than statistical evaluation.

Table 1: Comparative Analysis According to the Five-Dimensional Framework

Company	Role Clarity	Audit Independence	Governance Maturity	Technology Integration	Score
Petrobras (Brazil)	High (post-reform)	Strengthened after 2015	Developing	Partial	5-Mar
Codelco (Chile)	High	Structurally guaranteed	Developed	Partial	5-Apr
Ecopetrol (Colombia)	High	COSO compliant	Good	Partial	5-Apr
Iberdrola (Spain)	Very high	Fully independent	Mature	Integrated (ESG + AI)	5-May

Source: Author's elaboration based on (Lizarzaburu, Farfan, Camacho, & Gomez, 2024; Bantleon, et al., 2021).Qualitative interpretative scores derived from comparative documentary analysis.

The comparative analysis conceptually corroborates P1: organizations that experienced governance crises, Petrobras and Codelco, developed their TLM in a reactive mode characterized by initially weak role clarity and documented competency conflicts between the first and second lines. It also corroborates P2: Iberdrola, the only case of full technological integration including predictive analytics and real-time ESG monitoring, exhibits the highest maturity score and the strongest inter-line coordination performance. These results confirm that the effectiveness of the TLM is not a function of its formal adoption but of institutional maturity and technological integration, two variables critically deficient in the Algerian context.

2. Strengths and Weaknesses of the TLM: Critical Synthesis

Table 2: Strengths and Weaknesses of the Three Lines Model in Emerging Economies

Strengths	Weaknesses / Limitations
Role clarity: reduces gray areas between operational, control, and audit functions.	Lack of coordination: siloed operations are common → duplication and gaps in risk coverage.
International recognition: strengthens institutional credibility and facilitates relationships with regulators and investors.	Structural rigidity: linear structure incompatible with cross-cutting cyber, climate, and ESG risks.
Transparency and governance: improves communication between management, internal control, and the board of directors.	Role conflicts: blurred boundary between 1st and 2nd line → dilution of operational responsibility, frequently documented in empirical literature (Lenz & Sarens, 2019, p. 282)
Adaptability flexibility: adjustable according to organizational maturity, sector, and size.	Institutional conditionality: effectiveness depends on a minimum governance maturity, often absent in many emerging economies.
Reduction of information asymmetry: improves the quality of managerial decision-making.	Symbolic adoption: often implemented to satisfy regulatory requirements without real strategic integration (Bantleon, et al., 2021).

Source: Author's elaboration based on (Lizarzaburu, Farfan, Camacho, & Gomez, 2024) and (Lenz & Sarens, 2019).

3. Challenges of Adopting the TLM for Algerian Enterprises

The Algerian regulatory framework provides a legal basis for adopting the TLM, notably through Regulation (Bank of Algeria, 2011) imposing internal control on banks, (Law Number 05-01, 2005) (money laundering), (Law Number 06-01, 2006), (Law Number 88-01, 1988), and (Executive Decree Relating to Internal Control Programs, 2024). This framework creates the minimum conditions for a first and second line in regulated sectors but leaves unresolved the issue of independent internal audit as the third line, a dimension that remains structurally underdeveloped in the majority of Algerian public enterprises.

Sonatrach: The integration of the TLM would clarify control levels and improve the supervision of technical and environmental risks related to hydrocarbon activities, which are simultaneously exposed to operational, ESG, and reputational risks (Lizarzaburu, Farfan, Camacho, & Gomez, 2024; IIA, 2020).

Sonelgaz: Faced with operational and regulatory risks associated with a national energy network, the TLM would enable a clear segmentation of responsibilities among operational, control, and internal audit levels (Bantleon, et al., 2021; IIA, 2020).

BEA (banking sector): Already equipped with internal control mechanisms imposed by Regulation BA No. 11-08, BEA is the Algerian organization best positioned for full formal adoption of the TLM, particularly to harmonize responsibilities among ongoing control, compliance, and general inspection functions.

The modernization of risk management in Algeria requires a three-level approach: (1) consolidating the legal framework to extend internal control obligations beyond the banking sector; (2) developing internal audit competencies and strengthening their structural independence; (3) integrating technological control tools such as artificial intelligence, predictive analytics, and real-time risk dashboards to compensate for the weak risk culture through algorithmic monitoring.

These results corroborate the two analytical research propositions: organizational complexity and insufficient institutional maturity (P1) effectively weaken the applicability of the TLM in the Algerian context, while technological integration and collaborative governance (P2) constitute the priority modernization levers, consistent with the Iberdrola case as a reference model.

Conclusion:

This study examined the relevance of the Three Lines Model (TLM) in a changing organizational context by identifying its structural limitations and the conditions of its effectiveness, particularly in emerging economies with developing governance structures. The results analytically corroborate the two proposed propositions: organizational complexity effectively weakens the effectiveness of the TLM by generating independence conflicts between lines (P1), while technological integration and collaborative governance significantly enhance its performance (P2).

The comparative analysis of four Ibero American organizations demonstrates that the effectiveness of the TLM is not a function of its formal adoption, but rather of prior institutional maturity and the capacity to integrate technological control tools. This finding constitutes the central theoretical contribution of the study: the introduction of the concept of "context dependent institutional effectiveness" of the TLM, which extends governance theory beyond its conventional Western applications.

For Algerian organizations, the modernization of the TLM requires a three-dimensional structural adaptation: clarification of responsibilities between the lines, strengthening the independence of internal audit from managerial hierarchy, and integration of artificial intelligence and predictive analytics to improve early detection of anomalies and automate compliance controls (Howard & Zhivitskaya, 2021; IIA, 2020).

Future research could complement this analysis through primary empirical studies on Algerian public enterprises, precisely measuring institutional maturity variables and quantitatively testing the relationships proposed in P1 and P2.

Managerial implications: For Algerian organizations, (Iberdrola, 2024) the effective adoption of the Three Lines Model primarily requires clarification of responsibilities between operational functions and control functions, strengthening the structural independence of internal audit, and the progressive integration of digital risk monitoring tools. These actions constitute essential organizational preconditions prior to any comprehensive regulatory formalization of the model in public enterprises and national financial institutions.

Research limitations: The documentary approach adopted presents inherent limitations: absence of primary empirical data, risk of favorable publication bias in corporate reports, and inability to control unobserved contextual variables. These limitations reinforce the exploratory value of the study rather than compromising its theoretical contribution.

References:

- Anthony, R. N., & Govindarajan, V. (2007). *Management Control Systems* (12rd ed.). New York: McGraw Hill Education.
- Arena, M., Arnaboldi, M., & Azzone, G. (2010). The Organizational Dynamics of Enterprise Risk Management. *Accounting Organizations and Society*, 659-675.
- Bank of Algeria. (2011). *Regulation Number 11-08 of 28 November 2011 Concerning Internal Control of Banks and Financial Institutions.* Algiers: Official Journal of the People's Democratic Republic of Algeria.
- Bantleon, U., Arcy, A. d., Eulerich, M., Hucke, A., Pedell, B., & Sakel, N. R. (2021). Coordination Challenges in Implementing the Three Lines of Defense Model. *International Journal of Auditing*, 1-21.
- Bertaux, N., & Diouf, D. (2017). Internal Control Effectiveness and Organizational Culture An Empirical Survey. *French Management Review*, 55-74.
- Bouhadida, M. (2017). *Internal Audit Theoretical and Practical Aspects.* Algiers: Ministry of Finance.
- Brunnermeier, M. K. (2009). Deciphering the Liquidity and Credit Crunch 2007 2008. *Journal of Economic Perspectives*, 77-100.
- Codelco. (2024). *Corporate Governance Report.* Santiago: Codelco.
- COSO. (2013). *Internal Control Integrated Framework.* New York: Committee of Sponsoring Organizations of the Treadway Commission.
- Davies, J., & Zhivitskaya, M. (2018). Three Lines of Defense A Robust Organizing Framework or Just Lines in the Sand. *Global Policy*, 45-67.
- xecutive Decree Relating to Internal Control Programs. (2024). *Executive Decree Relating to Internal Control Programs Within the Framework of Prevention of Money Laundering and Financing of Terrorism.* Algiers: Official Journal.
- FCIC. (2011). *The Financial Crisis Inquiry Report.* Washington DC: US Government Printing Office.
- Hidalgo, L. (2020). *Corporate Governance Why It Is a Fundamental Pillar for Growth.* London: EY Global.
- Howard, D., & Zhivitskaya, M. (2021). Rethinking the Three Lines of Defense Model in the Era of Emerging Risks. *Journal of Risk Management*, 210-227.
- Iberdrola, S. (2024). *Annual Corporate Governance Report.* Bilbao: Iberdrola SA.

- IIA. (2013). *International Standards for the Professional Practice of Internal Auditing.* Altamonte Springs: Institute of Internal Auditors.
- IIA. (2020). *The IIAs Three Lines Model An Update of the Three Lines of Defense.* Altamonte Springs: Institute of Internal Auditors.
- Law Number 05-01. (2005). Amended and Supplemented Concerning Prevention and Fight Against Money Laundering and Financing of Terrorism. *People's Democratic Republic of Algeria*. Official Journal.
- Law Number 06-01. (2006). Amended and Supplemented Concerning Prevention and Fight Against Corruption. *People's Democratic Republic of Algeria*. Algiers: Official Journal.
- Law Number 88-01. (1988, 01 12). Orientation on Public Economic Enterprises. Algiers: People's Democratic Republic of Algeria.
- Lenz, R., & Sarens, G. (2019). Challenges for Internal Auditors in Applying the Three Lines of Defense Model. *Managerial Auditing Journal*, 272-295.
- Lizarzaburu, E., Farfan, K. B., Camacho, M., & Gomez, C. D. (2024). Corporate Structure and Prevention The Three Lines Model Applied to Latin American Companies. *Corporate and Business Strategy Review*, 226-240.
- Petrobras. (2023). *ESG Datasheet Sustainability Report.* Rio de Janeiro: Petrobras.
- Robert, K. Y. (2018). *Case Study Research and Applications Design and Methods* (6th ed.). Thousand Oaks California: SAGE Publications.
- Spencer Pickett, K. H. (2010). *The Essential Handbook of Internal Auditing* (2nd ed.). Hoboken New Jersey: Wiley.
- Spira, L. F., & Page, M. (2003). Risk Management and Corporate Governance The Alternative Role of Internal Audit. *Managerial Auditing Journal*, 395-404.