

Tuning AML Detection Rules: A Quantitative Approach to Reducing False Positives

Vamshi Ramagiri

University of Connecticut, School of Business, Stamford, CT, USA

Abstract: This article presents a data-driven framework for optimizing Anti-Money Laundering (AML) detection rules to address the burden of false positive alerts that consume substantial compliance resources. The structured approach progresses from understanding the operational impact of excessive alerts to implementing statistical methodologies for threshold calibration, customer segmentation, and predictive modeling. Comprehensive performance measurement frameworks and validation methods ensure optimization initiatives maintain appropriate risk coverage while reducing non-productive alerts. The framework incorporates practical implementation guidance, including regulatory engagement strategies, documentation standards, phased deployment methodologies, and cross-functional governance structures that support successful rule optimization programs. This article enables financial institutions to transform traditional rules-based systems into more targeted detection mechanisms that align monitoring sensitivity with actual risk profiles while satisfying regulatory expectations. By adopting quantitative methods, institutions can significantly enhance operational efficiency while maintaining or improving their ability to identify genuinely suspicious activity.

Keywords: False Positive Reduction, Rule Calibration, Segmentation Strategies, Alert Disposition Analysis, Risk-based Monitoring.

INTRODUCTION

The landscape of Anti-Money Laundering (AML) monitoring systems faces increasing pressure due to the proliferation of false positive alerts that consume substantial compliance resources while diminishing overall program effectiveness. Financial institutions worldwide report experiencing overwhelming volumes of alerts that require investigation, with a significant portion ultimately classified as false positives after consuming valuable investigator time and organizational resources (Moromoke *et al.*, 2024). According to research findings, these high false positive rates create multifaceted challenges for financial institutions, stretching investigative teams beyond optimal capacity, increasing operational costs, and potentially masking genuine financial crime risks amidst the noise of non-productive alerts. The structural inefficiencies inherent in traditional detection systems contribute to compliance backlogs and resource misallocation, ultimately hindering the primary objective of identifying and reporting actual suspicious activity (Moromoke *et al.*, 2024).

Current transaction monitoring systems deployed across the financial services sector predominantly rely on rigid rules-based frameworks with limited ability to adapt to changing customer behaviors or emerging financial crime typologies. These systems typically employ fixed parameters and simplistic conditional logic that fail to account for the nuanced nature of financial transactions across diverse customer segments and product lines (Alabi *et al.*, 2025). Recent industry research

indicates that compliance departments identify rule calibration and false positive reduction as critical operational priorities, yet significant implementation gaps persist between acknowledging these challenges and deploying sophisticated solutions to address them (Alabi *et al.*, 2025). The disconnect between recognized operational inefficiencies and implemented enhancements represents a substantial opportunity for financial institutions to transform their monitoring approaches through data-driven methodologies.

A quantitative approach to optimizing AML detection rules offers promising pathways to enhanced efficiency while maintaining regulatory compliance and effective risk coverage. The application of advanced statistical techniques, machine learning algorithms, and data visualization tools enables financial institutions to identify patterns, establish meaningful segmentation strategies, and calibrate detection parameters based on empirical evidence rather than arbitrary thresholds (Moromoke *et al.*, 2024). Research demonstrates the potential for substantial improvements in alert quality through the implementation of more sophisticated rule-tuning methodologies, with documented reductions in non-productive alerts while maintaining or enhancing suspicious activity identification capabilities (Alabi *et al.*, 2025).

The transition from volume-driven to risk-focused monitoring represents a paradigm shift in financial

crime compliance that aligns with evolving regulatory expectations for more effective and efficient AML programs. This shift requires financial institutions to reconsider how they

design, calibrate, and manage their detection scenarios to better target genuinely suspicious activity.

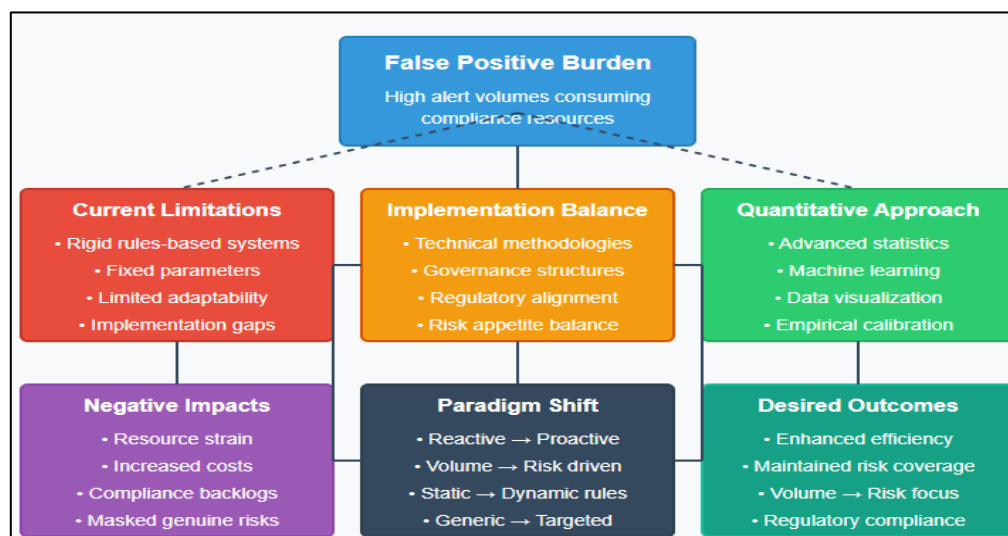


Fig 1: AML False Positive Challenge (Aidoo, S., & AML, I. D. 2025; Alabi, G. 2025)

The effective implementation of rule optimization frameworks requires careful consideration of both technical methodologies and governance structures to ensure modifications align with regulatory requirements and institutional risk appetite. Financial institutions must balance the drive for operational efficiency with the need to maintain comprehensive monitoring coverage and demonstrable risk management capabilities (Moromoke, *et al.*, 2024). The emergence of machine learning and artificial intelligence as complementary tools within the AML technology ecosystem provides additional avenues for alert optimization beyond traditional rules-based approaches, though these advanced techniques require appropriate controls and explanation capabilities to satisfy regulatory expectations (Alabi, *et al.*, 2025). Through structured, data-driven approaches to rule assessment and refinement, financial institutions can progressively transform their monitoring capabilities to focus investigative resources on genuinely suspicious activity while reducing the burden of false positives.

THE FALSE POSITIVE CHALLENGE IN MODERN AML PROGRAMS

Evolution of AML Monitoring Systems

The landscape of anti-money laundering (AML) monitoring has undergone substantial transformation since the initial implementation of automated detection systems, which followed major regulatory developments in the early 2000s.

Transaction monitoring systems have evolved from simple threshold-based configurations to increasingly sophisticated rule engines capable of evaluating multiple conditions and risk factors simultaneously (Oyedokun, *et al.*, 2024). This evolution, while enhancing detection capabilities in principle, has created significant operational challenges through the proliferation of detection scenarios that generate overwhelming volumes of alerts requiring human investigation.

Financial institutions operating legacy monitoring platforms frequently encounter alert management difficulties stemming from outdated technology architectures that lack the flexibility to adapt to changing financial crime patterns and business environments (Oyedokun, *et al.*, 2024). The accumulated layers of detection rules implemented in response to regulatory findings, emerging typologies, and risk management considerations have created complex monitoring ecosystems that generate diminishing returns in terms of identifying genuinely suspicious activity.

Operational Impact of False Positives

The operational impact of excessive false-positive alerts manifests across multiple dimensions of AML compliance programs. Alert investigation represents one of the most resource-intensive components of financial crime compliance, requiring specialized knowledge, careful documentation, and consistent decision-making (Aidoo, S., & AML, I. D. 2025). Alert backlogs frequently develop when monitoring systems

generate volumes exceeding investigative capacity, creating potential regulatory exposure and risk management vulnerabilities.

Financial institutions face mounting pressure to expand compliance staffing to address growing alert volumes, with AML departments experiencing disproportionate headcount growth compared to other banking functions (Oyedokun, *et al.*, 2024). The human factors associated with alert investigation present additional challenges, as investigator fatigue and high turnover rates impact consistency and quality of decision-making. This operational strain has prompted increasing interest in technological solutions to enhance investigative efficiency, including workflow automation, case management enhancements, and decision support tools (Aidoo, S., & AML, I. D. 2025).

Economic Considerations

The fundamental economics of traditional AML monitoring approaches have become increasingly unsustainable as transaction volumes grow and

compliance expectations expand. The direct costs associated with maintaining monitoring systems and supporting alert investigation processes constitute a significant component of overall compliance budgets for financial institutions (Oyedokun, *et al.*, 2024). These explicit costs are complemented by substantial opportunity costs associated with allocating skilled compliance professionals to routine alert reviews rather than more strategic risk management activities.

The significant imbalance between alert generation and genuine risk identification has prompted a critical examination of the cost-benefit relationship in current monitoring approaches (Aidoo, S., & AML, I. D. 2025). Financial institutions increasingly recognize that current detection methodologies cannot scale effectively to accommodate growth in transaction volumes and complexity without a corresponding expansion of compliance resources beyond reasonable levels.

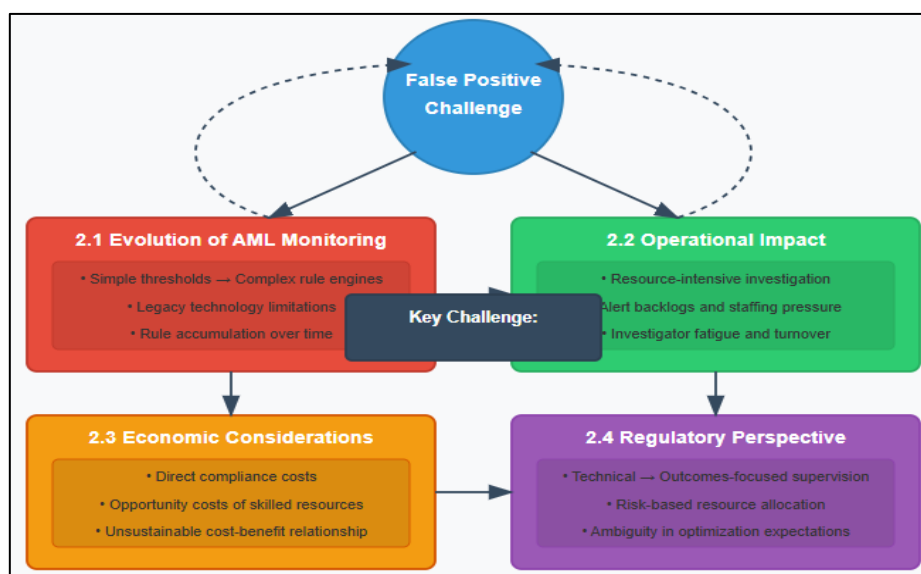


Fig 2: False Positive Challenges in Modern AML Programs (Ozioko, A. C. 2024; Ozioko, A. C. 2024)

Regulatory Perspective

The regulatory perspective on transaction monitoring effectiveness has evolved from an emphasis on technical compliance toward more outcomes-focused supervision. Regulatory authorities increasingly acknowledge the limitations of indiscriminate alert generation and recognize the potential benefits of more targeted approaches (Aidoo, S., & AML, I. D. 2025). Examination frameworks have incorporated concepts related to reasonable design and risk-based resource allocation, reflecting growing regulatory sophistication regarding the operational realities of AML compliance.

Recent supervisory guidance across multiple jurisdictions has provided support for thoughtful optimization initiatives that enhance efficiency without compromising risk management effectiveness (Oyedokun, *et al.*, 2024). However, regulatory expectations remain somewhat ambiguous regarding acceptable approaches to rule tuning and false positive reduction, creating uncertainty for financial institutions contemplating significant changes to monitoring configurations.

QUANTITATIVE METHODOLOGIES FOR RULE OPTIMIZATION

Statistical Threshold Calibration

Statistical methodologies for threshold calibration in AML systems represent a significant advancement over traditional approaches based on arbitrary or experience-based parameter settings. Contemporary research demonstrates that financial transaction data typically exhibits non-normal distributions with significant skewness and multiple modes across different customer segments, requiring sophisticated statistical treatments beyond simple averages or standard deviations.

Distribution analysis techniques, including kernel density estimation, extreme value theory, and dynamic time warping, allow for more precise identification of abnormal behavior patterns within specific transaction types and customer groups (Ketenci, *et al.*, 2021). Financial transaction monitoring systems benefit from the application of robust statistical estimators that resist the influence of outliers while accurately characterizing baseline activity patterns.

The implementation of time-series decomposition methods further enhances threshold calibration by isolating seasonal patterns, trend components, and cyclical variations in transaction activity, enabling more accurate anomaly detection against properly contextualized baseline expectations. Quantitative validation frameworks incorporating hypothesis testing, confidence intervals, and false discovery rate controls provide methodological rigor to threshold modification decisions, establishing statistical significance for parameter adjustments rather than relying solely on subjective assessment (Ketenci, *et al.*, 2021). The formalization of threshold calibration methodologies through documented statistical procedures creates an auditable framework that satisfies regulatory expectations for analytical rigor while delivering measurable improvements in detection effectiveness.

Customer Segmentation Approaches

Customer segmentation approaches leverage the heterogeneity of financial behavior across different entity types, geographies, and activity patterns to enhance monitoring precision through targeted rule parameterization. Advanced segmentation methodologies employ multivariate clustering techniques, including k-means, hierarchical clustering, and Gaussian mixture models, to identify natural groupings within customer populations based on transaction characteristics,

account usage patterns, and risk attributes (Jensen & Iosifidis, 2023).

These techniques reveal distinct behavioral segments that may not align with traditional customer classifications, enabling more precise rule calibration based on empirically observed activity rather than presumed business categories. Network-based segmentation approaches extend traditional methods by incorporating relationship data and transaction counterparty information, revealing interconnected entity clusters that share similar risk characteristics or financial behaviors (Ketenci, *et al.*, 2021).

Recent innovations in segmentation methodology introduce temporal dynamics through sequence-based clustering and trajectory modeling, capturing the evolution of customer behavior over time rather than relying on static attributes. The application of dimensionality reduction techniques, including principal component analysis and t-distributed stochastic neighbor embedding, enables visualization and interpretation of complex multidimensional customer data, facilitating a more intuitive understanding of segment characteristics and supporting more effective rule customization (Jensen & Iosifidis, 2023). The integration of domain expertise with data-driven segmentation methodologies creates powerful frameworks for rule optimization that align detection sensitivity with demonstrated risk characteristics across diverse customer groups.

Alert Disposition Analysis

Alert disposition analysis and conversion metrics provide essential feedback mechanisms for continuous improvement of detection rules and monitoring effectiveness. Advanced analytical frameworks for alert evaluation incorporate detailed typology mapping, investigative outcome tracking, and quality control metrics to develop a comprehensive understanding of rule performance across different scenarios and customer segments (Ketenci, *et al.*, 2021).

The systematic assessment of alert-to-SAR conversion rates by rule type, customer segment, and transaction category reveals specific detection scenarios yielding disproportionately low productivity, enabling targeted optimization efforts focused on rules with the greatest efficiency improvement potential. Predictive modeling approaches leverage historical alert disposition data to develop algorithmic classifiers capable of estimating suspicious activity probability based on

transaction characteristics, customer attributes, and scenario-specific risk factors (Jensen & Iosifidis, 2023).

These models employ feature importance analysis to identify the most predictive variables associated with genuine suspicious activity, providing valuable insights for rule refinement and parameter adjustment. The application of uplift modeling techniques extends predictive capabilities by estimating the incremental value of specific rule

modifications, supporting data-driven decisions regarding rule retirement, threshold adjustment, or logic refinement based on expected impact on both alert volume and risk coverage (Ketenci, *et al.*, 2021). The integration of predictive models within alert generation and management workflows represents a progressive evolution toward more intelligent monitoring systems that continuously learn from investigative outcomes to enhance future detection effectiveness.

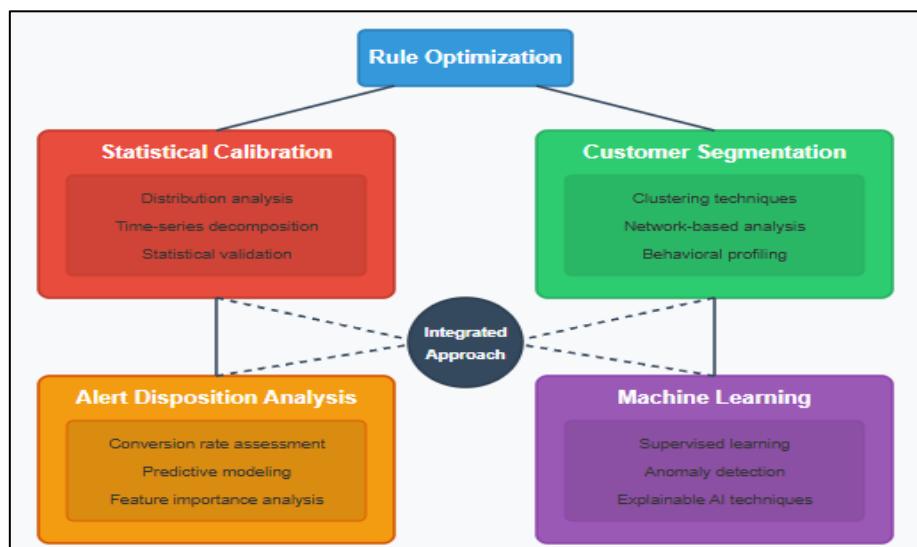


Fig 3: Quantitative Methodologies (Halford, E. *et al.*, 2025; Jensen, R. I. T., & Iosifidis, A. 2023)

Machine Learning Applications

Machine learning applications in AML monitoring continue to advance rapidly, moving beyond simple alert prioritization toward more sophisticated implementations that fundamentally enhance detection capabilities. Supervised learning approaches, including random forests, gradient boosting machines, and deep neural networks, demonstrate superior discrimination capabilities compared to traditional rule-based methods when trained on sufficient volumes of labeled alert data with appropriate feature engineering (Jensen & Iosifidis, 2023).

These techniques enable more nuanced pattern recognition that captures complex relationships between transaction attributes and suspicious activity indicators that may not be apparent through manual analysis or explicitly coded in rule logic. Unsupervised anomaly detection algorithms, including isolation forests, one-class SVM, and autoencoders, identify unusual patterns without requiring labeled training data, providing complementary detection capabilities that can identify novel typologies not captured by existing rules (Ketenci, *et al.*, 2021).

Recent innovations in explainable AI techniques address critical regulatory concerns regarding model interpretability, enabling machine learning implementations that satisfy expectations for transparency and audibility while delivering enhanced detection performance. The application of ensemble methods combining multiple modeling techniques with traditional rule-based approaches creates robust frameworks that leverage the strengths of different methodologies while mitigating the limitations of any single approach (Jensen & Iosifidis, 2023). The progressive integration of machine learning capabilities within AML monitoring systems represents an evolutionary path toward more effective financial crime detection that preserves compliance with regulatory expectations while substantially enhancing operational efficiency.

PERFORMANCE METRICS AND VALIDATION FRAMEWORKS

Developing Robust Performance Measurement Frameworks

The establishment of robust performance measurement frameworks constitutes an essential foundation for effective AML rule optimization

initiatives. Contemporary research in financial monitoring effectiveness highlights the need for multidimensional assessment methodologies that capture both efficiency and risk management dimensions of detection systems (Kuzmenko, *et al.*, 2023). Traditional approaches relying on simplistic metrics such as overall alert volumes or basic productivity ratios fail to provide sufficient granularity for targeted optimization efforts.

Advanced survival analysis techniques applied to alert disposition data enable more sophisticated evaluation of rule performance across different time horizons, revealing patterns in investigative outcomes that may not be apparent through conventional productivity metrics. The application of time-to-event modeling approaches in AML assessment frameworks provides valuable insights regarding investigative efficiency and resource utilization across different alert types and customer segments (Kuzmenko, *et al.*, 2023).

Financial institutions implementing comprehensive metric frameworks typically develop customized key performance indicators aligned with specific program objectives, risk appetite statements, and operational constraints rather than applying generic industry benchmarks without appropriate contextualization. The development of standardized measurement protocols facilitates consistent performance tracking across detection scenarios and organizational units, supporting more meaningful analysis of monitoring effectiveness over time and enabling more informed decision-making regarding rule modification priorities.

Alert Disposition Pattern Analysis

The analysis of alert disposition patterns across different rule categories, customer segments, and risk classifications reveals significant variations in performance characteristics that can inform targeted optimization strategies. Survival analysis methodologies applied to AML alert data demonstrate that time-dependent productivity patterns differ substantially across rule types, with some detection scenarios showing early conversion patterns while others exhibit extended investigation timeframes before suspicious activity determination (Kuzmenko, *et al.*, 2023).

Advanced performance assessment frameworks incorporate risk-based evaluation approaches that weight alerts according to potential financial crime impact rather than treating all alerts as equally significant from a measurement perspective. The

implementation of cohort analysis techniques enables a more meaningful comparison of rule performance across different time periods by controlling for portfolio changes, seasonality effects, and other external factors that may influence detection outcomes (Halford, *et al.*, 2025).

Financial institutions implementing sophisticated performance measurement frameworks typically establish defined thresholds for acceptable performance variation, supporting the more objective determination of when rule modifications are warranted based on statistically significant deviations from expected outcomes rather than subjective assessment. The integration of investigative quality metrics alongside efficiency measures provides a more balanced evaluation of overall program effectiveness, recognizing that optimization objectives extend beyond simple alert reduction to encompass improved detection precision and enhanced risk management capabilities.

Risk Coverage Assessment

Risk coverage assessment constitutes a critical component of comprehensive validation frameworks, ensuring that efficiency improvement initiatives maintain appropriate detection capabilities for key financial crime risks. Advanced coverage validation methodologies employ various assessment techniques, including scenario-based testing, synthetic transaction analysis, and typology mapping, to evaluate monitoring effectiveness across different risk dimensions (Halford, *et al.*, 2025).

The application of expert judgment protocols in coverage assessment enables integration of domain knowledge with quantitative metrics, supporting more nuanced evaluation of detection capabilities beyond the mechanical calculation of alert volumes or conversion rates. Financial institutions implementing formal coverage validation frameworks typically establish documentation standards for risk assessment decisions, creating audit trails that demonstrate thoughtful consideration of potential monitoring gaps resulting from rule modifications.

The development of visualization techniques for coverage assessment enables a more intuitive interpretation of complex risk relationships, supporting more effective communication with stakeholders regarding the potential impact of rule optimization initiatives on overall risk

management capabilities (Kuzmenko, *et al.*, 2023). Regulatory expectations regarding validation increasingly emphasize the importance of comprehensive coverage assessment as a counterbalance to efficiency metrics, requiring financial institutions to demonstrate that rule optimization initiatives maintain appropriate detection capabilities for relevant financial crime typologies while reducing non-productive alerts.

BACKTESTING METHODOLOGIES

Backtesting methodologies provide essential validation mechanisms for proposed rule modifications, enabling the evaluation of potential changes before implementation in production environments. Contemporary validation frameworks incorporate multiple testing approaches, including historical replay analysis, virtual implementation periods, and simulation-based assessment to evaluate rule modifications across different dimensions (Halford, *et al.*, 2025).

The implementation of controlled testing environments enables financial institutions to assess the impact of threshold adjustments, logic modifications, and scenario refinements on alert generation patterns without disrupting ongoing monitoring activities. Advanced backtesting approaches incorporate sensitivity analysis techniques to evaluate performance stability across different parameters and conditions, identifying potential vulnerability points in proposed rule configurations (Kuzmenko, *et al.*, 2023).

Financial institutions implementing comprehensive validation frameworks typically establish formal governance protocols for backtesting processes, including documentation requirements, approval workflows, and quality control procedures to ensure methodological rigor in modification assessment. The integration of backtesting results with other performance metrics enables a more holistic evaluation of proposed changes, supporting data-driven decisions regarding implementation priorities based on expected impact across multiple performance dimensions rather than focusing exclusively on alert volume reduction.

IMPLEMENTATION STRATEGIES AND CHANGE MANAGEMENT

Regulatory Engagement Strategies

The development of effective regulatory engagement strategies constitutes a foundational element for successful rule optimization initiatives in financial crime compliance programs. Research

examining implementation approaches across multiple jurisdictions highlights the importance of establishing structured communication frameworks with regulatory authorities throughout the optimization lifecycle (Chinweike, 2024a). Engagement protocols typically commence with initial conceptual discussions prior to design phases, followed by periodic updates during development and testing, and culminating with comprehensive results presentations after implementation.

Financial institutions adopting proactive regulatory communication strategies report experiencing more constructive supervisory interactions compared to organizations implementing significant changes without formal notification. The establishment of dedicated regulatory liaison roles with specialized knowledge regarding both monitoring systems and supervisory expectations supports more effective engagement throughout the optimization process (Chinweike, 2024a).

Successful regulatory communication approaches emphasize the risk-based nature of optimization initiatives, demonstrating how modifications align with both institutional risk appetite and regulatory guidance regarding reasonable program design. The development of specialized presentation materials specifically designed for regulatory audiences enhances communication effectiveness by translating technical concepts into frameworks familiar to supervisory personnel while addressing potential compliance concerns proactively.

Documentation Frameworks

Documentation frameworks for rule modification decisions serve critical functions in both governance processes and regulatory defense, providing comprehensive audit trails demonstrating thoughtful consideration of risk implications. Research examining optimization program implementations across diverse financial institution types identifies documentation quality as a primary determinant of both internal governance effectiveness and regulatory acceptance (Chinweike, 2024b).

Comprehensive documentation architectures capture multiple dimensions of the decision-making process, including initial performance assessment, methodology selection, validation results, impact analysis, governance deliberations, and implementation outcomes. Financial institutions implementing successful optimization initiatives typically develop standardized

documentation templates that ensure consistent information capture while streamlining the review process across different rule modifications (Chinweike, 2024a).

Advanced documentation approaches incorporate decision matrices mapping modification significance to required approval levels, documentation depth, and post-implementation monitoring intensity. The implementation of electronic document management systems with appropriate retention capabilities supports effective information organization while ensuring accessibility during internal audits and regulatory examinations. Documentation practices evolve throughout the implementation lifecycle, with initial conceptual documents focusing on methodological approaches while later materials emphasize validation results and performance outcomes (Chinweike, 2024b).

Phased Implementation Approaches

The implementation of phased approaches for rule modification represents a prudent risk management strategy when undertaking significant changes to monitoring systems. Research examining implementation methodologies across financial institutions of varying sizes identifies incremental deployment strategies as a consistent characteristic of successful optimization programs (Chinweike, 2024b).

Phased implementation frameworks typically begin with lower-risk rule categories or customer segments where tuning opportunities present minimal compliance risk exposure, establishing methodological validation before addressing more sensitive detection scenarios. The incorporation of controlled testing periods during which modified rules operate in evaluation environments prior to production implementation enables thorough assessment without impacting ongoing monitoring operations.

Financial institutions implementing graduated deployment strategies report higher stakeholder confidence and fewer operational disruptions compared to organizations attempting comprehensive system modifications simultaneously (Chinweike, 2024a). The development of detailed implementation roadmaps with specific milestone criteria, validation requirements, and contingency triggers supports more effective management of the transition

process while providing appropriate visibility to governance committees regarding progress and outcomes. Successful phased implementation approaches incorporate appropriate rollback capabilities and remediation procedures if monitoring performance deviates from expected patterns after deployment.

Cross-functional Governance Structures

Cross-functional governance structures provide essential oversight and direction for rule optimization initiatives, ensuring appropriate balancing of efficiency objectives with risk management responsibilities. Research examining organizational frameworks for monitoring enhancement programs identifies governance effectiveness as a critical determinant of both implementation success and sustained performance improvement (Chinweike, 2024b).

Comprehensive governance architectures typically incorporate multiple organizational perspectives, including compliance, operations, technology, risk management, and business units, to ensure consideration of all relevant factors in rule modification decisions. The establishment of multi-tiered governance structures with working groups focusing on technical implementation operating under executive committees providing strategic direction creates an effective division of responsibilities between tactical execution and policy oversight (Chinweike, 2024a).

Financial institutions implementing dedicated optimization governance frameworks report more consistent decision-making and stronger alignment between tuning activities and broader risk management objectives compared to organizations managing modifications through existing operational channels. The implementation of formal escalation protocols based on predefined criteria, including alert volume impact, risk coverage implications, and customer segment considerations, ensures appropriate governance intensity proportionate to modification significance (Chinweike, 2024b). Successful governance frameworks evolve throughout the optimization lifecycle, with an initial focus on methodology approval and risk assessment transitioning toward performance monitoring and continuous improvement as implementations progress.

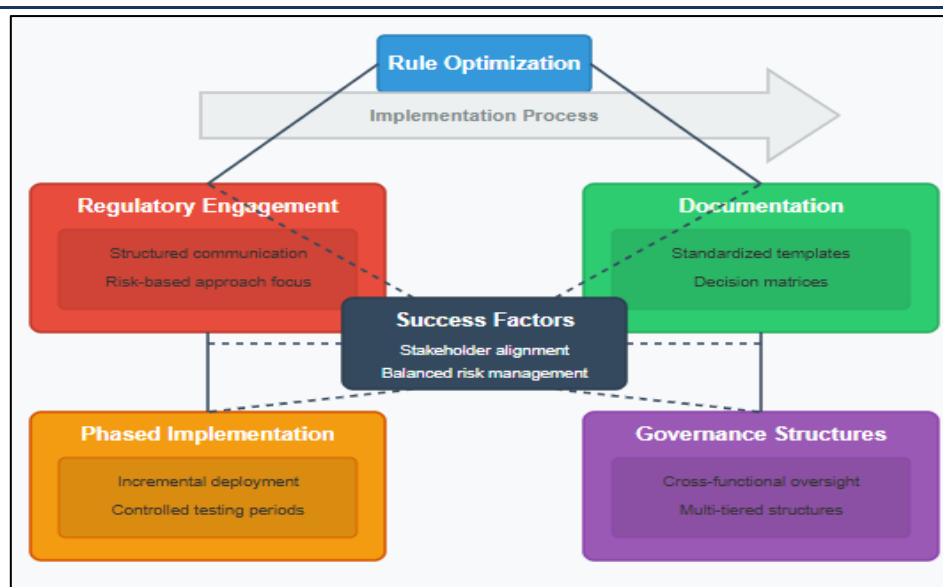


Fig 4: Implementation Strategies (Moromoke, O. A. *et al.*, 2024; Oyedokun, O. *et al.*, 2024)

CONCLUSION

The optimization of AML detection rules represents a critical frontier in financial crime compliance, offering institutions the opportunity to significantly enhance efficiency while maintaining effective risk management capabilities. By adopting quantitative approaches to rule tuning, financial institutions can create more precise detection mechanisms that focus investigative resources on genuinely suspicious activity. The framework provides a roadmap for compliance teams seeking to modernize monitoring systems through statistical techniques, customer segmentation, and performance measurement while satisfying regulatory expectations. Financial institutions implementing these methodologies can progressively evolve monitoring capabilities from reactive to proactive and from volume-driven to risk-focused, ultimately supporting more effective allocation of compliance resources. Future directions include integration with emerging technologies such as artificial intelligence and network analysis to further enhance the precision of financial crime detection systems.

KEY TAKEAWAYS:

Data-Driven Optimization

Quantitative approaches provide objective, empirical foundations for rule calibration that significantly outperform traditional experience-based threshold settings.

Balanced Implementation

Successful rule-tuning initiatives require balancing operational efficiency goals with comprehensive

risk coverage and regulatory compliance considerations.

Phased Deployment

Implementing optimization initiatives through incremental, risk-based phases with appropriate validation controls minimizes transition risks while building organizational confidence.

Governance Structure

Cross-functional oversight with clear documentation standards and escalation protocols ensures sustainable optimization programs that align with broader institutional risk management objectives.

Continuous Improvement

Performance measurement frameworks enable ongoing evaluation and refinement of detection capabilities as financial crime typologies and business environments evolve.

REFERENCES

1. Aidoo, S., & AML, I. D. "Evaluating the Effectiveness of AML Regulations: A Critical Review." (2025).
2. Alabi, G., Johnson, M., & Thomas, R. "Enhancing anti-money laundering (AML) efforts through AI-driven transaction monitoring." *ResearchGate*. (2025). https://www.researchgate.net/publication/390764256_Enhancing_Anti-Money_Laundering_AML_Efforts_through_AI-Driven_Transaction_Monitoring
3. Ozioko, A. C. "Preventive Strategies for Financial Institutions: Compliance and Legal Implications." *Multi-Disciplinary Research*

- and Development Journals Int'l 5.1 (2024): 86-107.
4. Ozioko, A. C. "Evolution Of Anti-Money Laundering Laws: A Comparative Study." *Multi-Disciplinary Research and Development Journals Int'l* 6.1 (2024): 1-27.
 5. Halford, E., Gibson, I., Newfield, M., & Dhanwala, M. "Developing a scoring model for managing money laundering transactions using machine learning." *Journal of Money Laundering Control* 28.7 (2025): 30-49.
 6. Jensen, R. I. T., & Iosifidis, A. "Fighting money laundering with statistics and machine learning." *Ieee Access* 11 (2023): 8889-8903.
 7. Ketenci, U. G., Kurt, T., Önal, S., Erbil, C., Aktürkoğlu, S., & İlhan, H. Ş. "A time-frequency based suspicious activity detection for anti-money laundering." *IEEE Access* 9 (2021): 59957-59967.
 8. Kuzmenko, O., Lieonov, S., & Boiko, H. "Survival analysis methods for assessing the effectiveness of the anti-money laundering system." *WSEAS Transactions on Business and Economics*, 5.4 (2023): 87–95. https://essuir.sumdu.edu.ua/bitstream-download/123456789/93434/1/Kuzmenko_survival_analysis.pdf
 9. Moromoke, O. A., Aro, O., Adepetun, A., & Iwalehin, O. "Navigating regulatory challenges in digital finance: A strategic approach." *International Research Journal of Modernization in Engineering Technology and Science* 6.10 (2024): 3574-3594.
 10. Oyedokun, O., Ewim, S. E., & Oyeyemi, O. P. "A comprehensive review of machine learning applications in AML transaction monitoring." *International Journal of Engineering Research and Development* 20.11 (2024): 173-143.

Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:

Ramagiri, V. "Tuning AML Detection Rules: A Quantitative Approach to Reducing False Positives" *Sarcouncil Journal of Engineering and Computer Sciences* 4.8 (2025): pp 524-533.