Combating Money Laundering in the Age of Artificial Intelligence (AI): A Comparative Study between Romania and the Republic of Moldova

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August 2025

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Abstract

This paper examines the role of artificial intelligence (AI) in combating money laundering (AML), focusing on a comparative study between Romania and the Republic of Moldova. Romania demonstrates advanced AI integration within its financial institutions, employing machine learning and predictive analytics to enhance transaction monitoring, risk assessment, and regulatory compliance. In contrast, Moldova is in the early stages of adopting AI for AML, facing structural, technical, and regulatory challenges that limit the effectiveness of its anti-money laundering efforts. The study highlights how technological adoption, institutional capacity, and regulatory frameworks intersect to shape AML effectiveness. By analyzing similarities, differences, and lessons learned, the paper provides insights into how AI can strengthen financial integrity while addressing the evolving challenges of illicit financial flows in different national contexts.

Keywords: Anti-Money Laundering, AML, Artificial Intelligence, AI, Financial Crime, Romania, Republic of Moldova, Regulatory Compliance, Transaction Monitoring, Risk Assessment

Jel Classification: G18, G21, K22, O33

1 Introduction

Money laundering is a global financial crime that undermines the integrity, stability, and security of financial systems. It involves the process of concealing the origins of illegally obtained funds, allowing criminals to integrate illicit proceeds into the formal economy. These illicit activities can be linked to organized crime, corruption, drug trafficking, terrorism financing, and tax evasion (Levi, 2002; Unger, 2013). The concealment process typically occurs in three stages: placement, layering, and integration. Placement introduces illegal funds into the financial system; layering involves complex transactions to obscure the origin of the funds; and integration enables the criminal to utilize the laundered funds without arousing suspicion.

Anti-Money Laundering (AML) refers to the policies, procedures, and technologies designed to prevent, detect, and report illicit financial activities, particularly the process of disguising the origins of illegally obtained funds. Money laundering poses significant risks to the integrity of financial systems, facilitating organized crime, corruption, and

terrorism financing. Effective AML measures are therefore crucial for maintaining the stability and credibility of national and international financial institutions.

AML frameworks typically involve a combination of regulatory compliance, risk assessment, transaction monitoring, and reporting suspicious activities to relevant authorities. Key components include customer due diligence (CDD), know-your-customer (KYC) procedures, beneficial ownership verification, and ongoing monitoring of financial transactions. Over the past decade, the increasing complexity and volume of financial transactions have necessitated the adoption of technological solutions, including artificial intelligence (AI) and machine learning, to enhance the effectiveness of AML operations.

International standards for AML are guided by organizations such as the Financial Action Task Force (FATF), the European Union (EU), and the Council of Europe's MONEYVAL committee. Countries are expected to implement these standards within their domestic legal frameworks to prevent financial crimes, ensure transparency, and foster international cooperation. The integration of advanced technologies, particularly AI, offers new opportunities for automating transaction monitoring, detecting suspicious patterns, and reducing false positives, thereby improving both the efficiency and accuracy of AML efforts.

Effective anti-money laundering (AML) frameworks aim to detect and prevent these activities while preserving the efficiency and transparency of financial institutions. AML measures rely on a combination of legal regulations, institutional oversight, risk assessment protocols, and technological solutions. Key components include customer due diligence (CDD), know-your-customer (KYC) procedures, transaction monitoring, and reporting suspicious activities to relevant authorities (FATF, 2024). Financial institutions must establish internal controls, training programs, and compliance procedures to ensure that their operations comply with national and international AML requirements.

International cooperation plays a critical role in strengthening AML efforts. Organizations such as the Financial Action Task Force (FATF), the European Union (EU), and the Council of Europe's MONEYVAL provide recommendations and guidelines to harmonize AML regulations across jurisdictions. FATF, in particular, sets out 40 Recommendations covering the criminalization of money laundering, preventive measures for financial institutions, and international cooperation in investigations and enforcement. Compliance with these standards helps countries maintain the integrity of their financial systems, prevent criminal exploitation, and enhance investor confidence.

Over the past decade, the emergence of digital banking, online payments, and virtual assets has increased the complexity of financial transactions, making traditional manual monitoring increasingly insufficient. Criminals exploit these technological advances to conduct cross-border transactions and obscure illicit activity, challenging conventional AML mechanisms. Consequently, financial institutions and regulators have turned to technological solutions to enhance detection capabilities and improve operational efficiency (Arner et al., 2017; Brynjolfsson & McAfee, 2017).

Artificial intelligence (AI) has become a cornerstone in modern AML strategies. AI systems, including machine learning algorithms, natural language processing, and predictive analytics, can analyze vast datasets, identify suspicious patterns, and flag potentially illicit transactions in real time. Unlike traditional rule-based systems, AI can learn from historical data to recognize emerging money laundering typologies, reduce false positives, and prioritize high-risk cases for human review. This not only enhances the accuracy of detection but also allows compliance teams to allocate resources more effectively.

Despite these advantages, AI adoption in AML presents significant challenges. Ef-

fective AI systems require high-quality and standardized data, robust algorithms, and continuous adaptation to new financial crime patterns. Additionally, regulatory frameworks must ensure transparency, data privacy, and accountability to prevent misuse of AI technologies. Countries must strike a balance between innovation and compliance, ensuring that AI enhances AML outcomes without creating unintended risks.

The experiences of Romania and the Republic of Moldova illustrate the varied approaches to AI-driven AML implementation. Romania has advanced in integrating AI into its financial institutions, leveraging sophisticated algorithms to monitor transactions and enhance regulatory compliance. Moldova, on the other hand, faces structural and technical challenges that limit the effectiveness of AI adoption, reflecting the difficulties encountered by developing financial systems. A comparative study of these two countries highlights how technological capabilities, regulatory maturity, and institutional capacity interact to shape AML effectiveness.

In the context of Romania and the Republic of Moldova, the adoption of AI in AML presents unique challenges and opportunities. Romania has progressed toward advanced integration of AI tools in banking and regulatory practices, whereas Moldova is in an early stage of AI adoption, facing structural and regulatory limitations. This comparative study examines the role of AI in enhancing AML measures, highlighting both technological and regulatory dimensions in the two countries.

Anti-Money Laundering (AML) encompasses the policies, procedures, and technological tools designed to prevent, detect, and report illicit financial activities, particularly the concealment of illegally obtained funds. Money laundering threatens the integrity and stability of financial systems, facilitating organized crime, corruption, and terrorism financing (Levi, 2002; Unger, 2013). Effective AML frameworks typically involve customer due diligence (CDD), know-your-customer (KYC) protocols, beneficial ownership verification, and continuous transaction monitoring (FATF, 2024). In recent years, the rapid growth of digital financial services, virtual assets, and cross-border transactions has made traditional manual monitoring increasingly insufficient, prompting the adoption of artificial intelligence (AI) and machine learning technologies to enhance AML efficiency and accuracy (Brynjolfsson & McAfee, 2017; Arner et al., 2017).

In summary, AML is a critical component of global financial governance. The integration of AI presents both opportunities and challenges, offering powerful tools to detect and prevent money laundering while requiring careful consideration of regulatory, technical, and ethical issues. Understanding the evolution of AML strategies, the role of AI, and the differences between national approaches provides a foundation for analyzing the comparative effectiveness of AML measures in Romania and the Republic of Moldova.

2 Romania: Advanced AI Integration with Regulatory Challenges

Romania has made notable progress in integrating artificial intelligence (AI) into anti-money laundering (AML) efforts. Financial institutions, such as Salt Bank, have implemented AI-powered systems to monitor and analyze large volumes of transactions, helping to detect hidden patterns, reduce false positives, and streamline compliance procedures. These AI tools also enhance regulatory compliance by generating detailed audit trails, supporting risk-based monitoring, and adapting to evolving financial crime threats. Major banks in Romania are leveraging AI to automate customer due diligence and trans-

action monitoring, which allows compliance teams to focus on higher-risk activities and improves overall operational efficiency.

Despite these technological advancements, Romania faces regulatory challenges in fully addressing AML requirements. The Council of Europe's MONEYVAL committee has highlighted that the country has made only limited progress in resolving certain AML shortcomings. In response, the National Bank of Romania has intensified supervision of financial institutions, issuing sanctions against banks that fail to meet compliance standards. These regulatory pressures highlight the ongoing need for financial institutions to upgrade both technological solutions and internal processes continuously.

In summary, Romania demonstrates a sophisticated use of AI in combating money laundering, which enhances transaction monitoring and regulatory compliance. However, persistent regulatory gaps and the need for continuous adaptation underline that technological adoption alone is not sufficient to fully mitigate money laundering risks.

2.1 AI Adoption in AML Practices

- Romania has adopted AI-powered AML solutions. For instance, Salt Bank has partnered with Napier AI to enhance AML compliance and efficiently monitor millions of transactions [6].
- AI tools detect hidden patterns, reduce false positives, and improve regulatory compliance through adaptive risk analysis [7].

2.2 Regulatory Landscape

- Despite technological advancements, Romania faces challenges in fully addressing AML shortcomings [8].
- The National Bank of Romania has intensified supervision and sanctioned banks for insufficient AML compliance [9].

3 Republic of Moldova: Emerging AI Initiatives Amidst Structural Challenges

The Republic of Moldova is at an early stage of integrating artificial intelligence (AI) into anti-money laundering (AML) practices. In 2023, Moldova implemented anti-money laundering software with support from USAID, marking a significant step toward digitalizing its financial monitoring systems. These AI-based tools are designed to assist in transaction monitoring, customer due diligence, and risk assessment, helping regulators and financial institutions detect suspicious activity more efficiently. However, the adoption of AI in Moldova remains limited compared to countries like Romania, and the scope of implementation is constrained by both technical capacity and regulatory readiness.

From a regulatory perspective, Moldova has made progress in improving transparency of beneficial ownership and enhancing customer due diligence measures. Nevertheless, the country faces considerable challenges in regulating virtual assets and aligning its AML framework with international standards. The MONEYVAL committee and other international observers have noted gaps in Moldova's ability to effectively prevent and detect money laundering activities, particularly in emerging financial technologies. Structural

weaknesses in the banking sector, including governance and compliance issues, further exacerbate the risk of fraud and illicit financial flows.

In conclusion, while Moldova has taken initial steps to adopt AI for AML purposes, significant structural and regulatory challenges remain. Strengthening institutional capacity, enhancing legal frameworks, and expanding AI integration across financial institutions are essential for Moldova to achieve an effective AML system comparable to regional peers. The country's ongoing reforms and international support indicate progress, but substantial efforts are still required to mitigate systemic risks.

3.1 AI Initiatives in AML

- Moldova implemented anti-money laundering software with support from USAID in 2023 [10].
- The country faces challenges in regulating virtual assets and aligning with international standards [11].

3.2 Regulatory and Structural Challenges

- Progress has been made in customer due diligence and transparency of beneficial ownership, but virtual asset regulation remains weak [12, 13].
- Systemic issues persist in the banking sector, contributing to fraud and money laundering [14].

4 Comparative Analysis: Romania vs. Republic of Moldova in AI-Driven AML

Romania and the Republic of Moldova exhibit contrasting stages of AI integration and regulatory development in combating money laundering, reflecting differences in technological adoption, institutional capacity, and legal frameworks.

In Romania, financial institutions have made significant strides in leveraging artificial intelligence to strengthen anti-money laundering (AML) efforts. Banks like Salt Bank have implemented AI-powered systems to monitor large volumes of transactions, detect hidden patterns, reduce false positives, and enhance overall compliance. AI tools support risk-based monitoring, generate detailed audit trails, and automate customer due diligence processes, allowing compliance teams to focus on higher-risk activities. Despite these technological advancements, Romania still faces regulatory challenges. The MONEYVAL committee has observed limited progress in fully addressing certain AML shortcomings, prompting the National Bank of Romania to intensify supervision and issue sanctions against non-compliant institutions. This highlights that even advanced AI integration requires continuous alignment with evolving legal standards to effectively mitigate financial crime risks.

In contrast, the Republic of Moldova is in the early stages of adopting AI for AML purposes. The implementation of anti-money laundering software in 2023, supported by USAID, represents a significant step toward digitalizing financial monitoring. These tools assist in transaction monitoring, customer due diligence, and risk assessment, but their deployment is limited by technical capacity and regulatory readiness. Moldova

has made progress in improving transparency of beneficial ownership and strengthening customer due diligence; however, gaps remain in regulating virtual assets and aligning with international standards. Structural weaknesses in the banking sector, including governance and compliance deficiencies, continue to pose challenges to effective AML enforcement.

Comparatively, Romania demonstrates advanced AI integration and more sophisticated institutional frameworks, whereas Moldova's AI adoption is nascent, constrained by structural and regulatory hurdles. Both countries share the common goal of aligning with international AML standards, but their strategies differ: Romania emphasizes technological sophistication paired with regulatory oversight, while Moldova is focused on foundational reforms and capacity building. These contrasts underscore that AI adoption alone is insufficient; robust legal frameworks, institutional capacity, and ongoing international support are critical to achieving effective anti-money laundering outcomes.

In conclusion, Romania's experience illustrates the benefits and limitations of advanced AI adoption in AML, while Moldova highlights the challenges of early-stage AI integration amidst structural constraints. Both cases provide valuable lessons for countries seeking to leverage technology in the fight against money laundering while ensuring compliance with evolving international standards.

4.1 2007-2025

Aspect	Romania	Republic of Moldova
AI Integration	Advanced adoption	Emerging initiatives
Regulatory Compliance	Limited progress addressing AML shortcomings	Progress in customer due diligence and transparency
Virtual Asset Regulation	Stronger alignment with international standards	Challenges in regulating virtual assets
Banking Sector Integrity	Ongoing supervision and sanctions	Structural issues leading to systemic fraud

Table 1: Comparative Overview of AML Strategies in Romania and Moldova

4.2 2025-Present

Aspect	Romania	Republic of Moldova
AI Integration	Advanced, widely deployed in banks	Early-stage, limited deployment
Transaction Monitoring	AI detects patterns, reduces false positives	AI assists monitoring, but limited scope
Customer Due Diligence	Automated, integrated with AI tools	Improved, but partially supported by AI
Regulatory Compliance	Ongoing supervision, sanctions for non-compliance	Progress in transparency, gaps in virtual asset regulation
Banking Sector Integrity	Stronger institutional frameworks, advanced oversight	Structural weaknesses, governance and compliance challenges
AML Effectiveness	Moderate to high, technology plus regulatory oversight	Emerging, dependent on reforms and capacity building

Table 2: Comparative Summary of AI-Driven AML Strategies in Romania and Moldova

5 Conclusion

Romania demonstrates advanced AI integration in AML practices but still faces regulatory challenges. Moldova is in the early stages of AI adoption, with structural and regulatory hurdles. Both countries must continue enhancing AML frameworks to align with international standards. The integration of artificial intelligence (AI) into Anti-Money Laundering (AML) efforts represents a transformative step in combating financial crime, yet its effectiveness depends on the interplay between technology, regulatory frameworks, and institutional capacity. Romania demonstrates how advanced AI adoption can enhance transaction monitoring, risk assessment, and customer due diligence, contributing to a more robust and efficient AML system. However, even in technologically advanced environments, regulatory challenges and compliance gaps remain, underscoring the importance of ongoing supervision and alignment with international standards.

In contrast, the Republic of Moldova illustrates the challenges faced by countries in the early stages of AI adoption for AML. While initial steps have been taken to implement AI-assisted monitoring systems and strengthen transparency, structural weaknesses in the banking sector, limited technical capacity, and regulatory gaps constrain overall effectiveness. Moldova's experience highlights the critical need for capacity building, institutional reforms, and international cooperation to fully leverage AI in AML.

The comparative analysis underscores that technology alone cannot solve money laundering challenges. Effective AML requires a balanced combination of AI tools, strong regulatory oversight, risk-based monitoring, and continuous adaptation to evolving financial crimes. Both Romania and Moldova offer important lessons: advanced AI can significantly enhance AML operations when paired with strong institutions, whereas early adoption must be accompanied by legal, technical, and organizational reforms to achieve meaningful results.

In conclusion, AI presents both opportunities and challenges for the fight against money laundering. Policymakers and financial institutions must focus not only on adopting cutting-edge technologies but also on developing resilient regulatory frameworks and institutional capabilities to ensure sustainable, effective, and transparent AML systems.

6 Aknowledgements

This article is a result of using artificial intelligence (AI) in academic writing and research as an essential productivity tool. Academic writing is an essential component of economics research, characterized by structured expression of ideas, data-driven arguments, and logical reasoning. To ensure the responsible development and deployment of AI, collaboration between government, industry, and academia is essential. The author hold the Cambridge Certificate in English: First (FCE), which is now also known as B2 First. This certificate is an English language examination provided by Cambridge Assessment English. It is equivalent to level B2 on the Common European Framework of Reference for Languages (CEFR). Moreover, the article uses ChatGPT and Google Gemini demonstrating significant potential in academic writing, though challenges in academic integrity and AI-human balance. Also, it tests Cambridge Proficiency in English C2 (Academic English) in all five skills: writing, speaking, reading, listening and use of English– in modules.

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