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RETHINKING DATA FOR A NEW ERA IN AML



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Arin Ray May 2020

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EXECUTIVE SUMMARY

Traditional technology used in anti-money laundering (AML) operations is proving inadequate in responding to modern-day challenges. Financial institutions (FIs) are exploring new technologies such as artificial intelligence (AI) and machine learning (ML) to improve efficiency and effectiveness of AML programs.

Data forms the foundation in AML and will be even more critical for applying AI and ML techniques. But data has been underutilized because FIs struggle with common data management challenges that are exacerbated by growing volume and speed of transactions. Regulatory scrutiny on model risk management is forcing them to rethink their approach to data management. Many are taking this opportunity to usher in changes that break down data silos and simplify data architecture.

- They are seeking to increase reusability of data by standardizing data definitions, formats, and normalizing data models across products, business lines, and regions.
- Many financial institutions have embarked on a journey to create central data repositories, data warehouses, or data lakes.
- The industry has been talking about the need for creating golden records, but this can be challenging because of disparities in market practices, regulatory requirements, and product specificities. So, many FIs take a more incremental approach, for example, beginning with unifying records across a few business lines and jurisdictions, and gradually expanding the scope.
- Improving data management is therefore more of a journey than an end state.

New technology can play an important role in this journey because it can automate and streamline data management efforts such as automatically extracting information, imputing missing records, repairing basic data entry errors, resolving duplicate records, enriching and aggregating information and profiles, file reports, and many others.

Voluminous and better-quality data will be essential fuels for powering AI and ML techniques, and they are poised to revolutionize AML operations. Results from early exploration and pilot projects show they can significantly improve efficiency, productivity, and coverage. Risk scoring can become more effective and responsive to changes in a client's profile or actions that will enable continuous monitoring of risk across a client's lifecycle.

Operationalizing the pilots into production and industrializing AI will need FIs to rethink their approach to data storage and processing.

- Advancements in cloud technology are opening new horizons because cloud offers massive data storage and scalability, on-demand, high-performance computing, and infinite elasticity.
- Recent developments in application programming interfaces (APIs) present new avenues for seamless connectivity and workflow links.
- APIs can also automate the interaction between different applications and can help FIs adopt a microservices-based architecture.

As new technology opens a world of new possibilities, there will be new challenges facing FIs in the digital era.

- Data privacy and security issues will be paramount, so FIs will need to strengthen access controls and encryption techniques to safeguard against data loss and data theft.
- They will also need to rearchitect operational arrangements regarding data hosting and resource localization to comply with a complex patchwork of data privacy regulations.
- Collecting and analyzing people's personal information can raise ethical and legal questions. Data governance in the digital era will therefore require additional focus on transparency, oversight, and control frameworks to ensure that data is used responsibly.

AML TECHNOLOGY AT A CROSSROADS

The financial services industry has been transformed by the growing wave of digitalization. Technology advancements are giving rise to new products, channels, and business models in banking and payments; on the other hand, they are reshaping consumer behavior as customers increasingly expect rapid onboarding and faster funds transfer. Consequently, the volume and speed of financial transactions are growing, and the world is becoming increasingly interconnected.

New technology also provides criminals newer means to operate and expand into new regions and markets. The growing interconnectedness of the financial services ecosystem makes it easier for them to weave a complex web of operations and evade traditional controls. A case in point is the burgeoning crypto-ecosystem whose business model thrives on the lure of anonymity and decentralization, and this segment has attracted some dubious actors. As its adoption grows, governments across the world are tightening their supervision, which will impact not only the direct participants in the crypto universe, but traditional banks must also strengthen their oversight to prevent financial criminals from cashing out by converting their illicit crypto proceeds into fiat currencies.

The COVID-19 pandemic has accelerated the digitalization trends as people practice social distancing and shift their financial transactions to online and mobile channels. Panic situations like this provide fertile grounds for criminals and money launderers to defraud gullible people and exploit the vulnerabilities in the system. The situation is exacerbated by the remoteness of transacting parties as well as severely disrupted compliance operations at FIs.

These developments are adding tremendous pressure on AML operations of financial institutions. They must tackle the new risks emerging from a rapidly evolving ecosystem while cleaning up a backlog of cases from the past. Traditional technology and processes used in AML are proving inadequate in responding to the modern-day challenges as floods of false positives and exploding costs make compliance operations unsustainable.

NEXT-GENERATION TECHNOLOGY TO POWER AML TRANSFORMATION

Financial institutions are exploring new technologies to improve efficiency and effectiveness of AML programs as they seek to smoothly transition into the digital era.

- Many are experimenting with robotic process automation (RPA) to automate routine labor-intensive processes such as case investigation, data extraction, and reporting.
- Advanced analytical techniques such as AI and ML are being applied for improving risk segmentation; alert scoring and prioritization; discovering networks, behavior, and patterns; spotting anomalies; analyzing texts and documents; and dynamically incorporating learning and feedback.
- The analytical capabilities are enhanced by advanced visualization tools such as network and graph analytics, Sankey diagrams, and geospatial analysis.

Early experimentation with the new tools and techniques shows promising results as banks report reduction of false positives, identification of false negatives, and improvements in investigation efficiency and productivity. Regulators are taking note of these developments and, in a departure from the past, are encouraging innovation in AML; this is likely to accelerate the adoption of next-generation technology in AML.

DATA FORMS THE FOUNDATION IN AML

Data forms the foundation in AML and will be even more critical for applying AI and ML techniques. Every AML function is reliant on clean, complete, and accurate data (Figure 1). Yet, data has been underutilized in AML because financial institutions struggle with data management challenges that impact model performance, skew alert distribution, and limit effectiveness of AML programs. Growing volume and speed of transactions are further raising the data management challenges. With growing regulatory scrutiny on model risk management, data governance issues will assume even greater importance. Financial institutions therefore need to rethink their approach to data management in AML.

Figure 1: Voluminous Data Needed Across AML Functions



Source: Celent

SUBOPTIMAL DATA LIMITS AML EFFECTIVENESS

HIDDEN RISKS CAN BE UNCOVERED BY BETTER DATA

Financial institutions have traditionally taken a transaction- or account-oriented view for monitoring AML risks. In this, they have focused on analyzing limited and mostly structured datasets. With growing emphasis on holistic and risk-based approaches to AML, they are seeking to use additional, sometimes new, datasets to uncover unknown risks. Dealing with different types of data comes with benefits and challenges.

- Raw data is the most basic type of data that includes information such as customer name, date of birth, address, professional information, corporate structure, etc. This is collected manually (such as at onboarding) and can therefore be incomplete or erroneous. Raw data also includes digitalized information such as transaction value, volume, and counterparty information, which can be in disparate formats and standards.
- Derived data such as risk scores and profiles, peer groups, and behavioral profiles are important inputs in AML. However, the features, methodology, and parameters chosen to derive such data have traditionally been subjective, crude, and based on an *a priori* notion of risk rather than informed by actual customer activity.
- External data can be another critical source of insights in know your customer (KYC), ultimate beneficial ownership (UBO) identification, and due diligence. However, ingesting different types of data from myriad external sources can be operationally challenging.
- New and non-traditional data are gaining popularity because they can be combined with traditional data to aid holistic analysis. These may include geolocation information, social and professional affiliations, adverse media and sentiment analysis, KYC registries, and open-source intelligence, among others. Information from the deep- or dark-web can also be helpful, for example for de-anonymizing crypto-currency users. Dealing with such datasets requires new ways for consuming and analyzing data.
- AI, natural language processing (NLP), and big data technology are opening new horizons for analyzing unstructured data, and unstructured data use is growing as FIs examine reports and documents, images, and geolocation to find additional insights.

A marketplace of data vendors is emerging to serve FIs' growing appetite for data. Many of them are coming from the burgeoning Fintech and Regtech ecosystems with cloudbased and analytics-driven offerings. However, financial institutions' ability to seamlessly work with new and growing datasets and data providers is constrained by common data management challenges.

DATA CHALLENGES IMPACT AML OUTCOMES

A key challenge in data management is operational silos at most FIs, which are organized along product, business, and regional lines. For larger institutions, historical accretion of systems through mergers and acquisitions exacerbates operational fragmentation. Data silos are its natural outcome, and they are pervasive within an organization and across the industry. This means data resides in different places with inconsistent data definitions, formats, and standards. Data transformation strategies vary across functions and processes resulting in multiple versions of truth. These create difficulties in aggregating data from different sources, limiting FIs' ability to construct 360-degree customer view, conduct risk analysis involving more features and attributes, or enrich profiles and alerts.

Data quality is another limiting factor. There are often gaps between data requirements as defined by compliance policy and data collected by front office staff. This results in incomplete, inconsistent, erroneous, or missing customer records. Some information such as beneficial ownership or joint account holder's details can be hard to obtain and verify. Despite spending significant manual effort, the quality and consistency of the information can be suspect; some information may not be machine readable or ready for digital processing. Poor quality and disparity of data limit the efficacy of analytical models and is a key contributor to high proportion of false positives.

Ingesting and integrating data easily to perform high-volume automated analysis is challenged by inflexible legacy technology. AML systems must interact with and source data from different internal systems, such as customer relationship management (CRM) systems, product systems, transaction systems, case management systems, and incorporate external data from public sources and commercial providers. These internal systems are often built on inflexible legacy technology (e.g., fixed data models) and cannot keep up with the evolving data ingestion and processing needs.

Compliance divisions are seldom in charge of enterprise-wide data strategies and must spend inordinate amounts of time and manual resources to cleanse, aggregate, and enrich the downstream data received from other systems before feeding them to AML models. As a result, compliance analysts spend the bulk — close to two-thirds — of their time just collecting, aggregating, and preparing data for analysis instead of doing actual investigative work. This is a critical source of inefficiency in AML and creates a huge backlog of cases, forcing FIs to undertake costly remediation projects to clear the backlogs. Similarly, changes in regulations or internal policies prompt them to do major refreshes of client data. This process often reveals gaps in customer profile information, and FIs must undertake additional data remediation projects to fulfill the gaps.

Such remediation exercises can be enormous; compliance team sizes have grown two to five times in recent years at most institutions, and program costs have exploded to hundreds of millions of dollars for the largest FIs. Yet the effectiveness of AML programs remains suspect as evident from several instances of money laundering revelations, regulatory fines, and consent orders.

RETHINKING DATA FOR A NEW ERA IN AML

Improving effectiveness of AML programs will require financial institutions to better manage data across its lifecycle. First, they will need to collect better-quality and new types of data from clients and source systems that are in consistent formats and standards. Unleashing the full potential of advanced analytics will necessitate much more granular data than banks have historically collected.

Extracting insights and knowledge from the data will require additional efforts. The collected data needs to be stored and updated in a way that makes it easy for users across the organization including AML teams to automatically query and process the data. Increasingly, they will need support for unstructured data and real time processing capabilities.

Data transformation is needed to convert raw data into information. Data extraction, deduplication, and cleansing need to be consistent and auditable with proper documentation to prevent reworks and ensure efficient work across business lines or operational teams; it will also help demonstrate data lineage and provenance to auditors and regulators.

Turning information into insights will require enriching them with historical and contextual information. This will require easy linkages and interconnectivity among internal systems, external sources, and across the AML functions so risk scores can be updated based on customer profile changes or transaction monitoring results and vice versa, and case information can be enriched with KYC information, and so on.

Insights can be continuously optimized and turned into knowledge through incorporation of findings and feedback from analysis. Dynamic assimilation of learnings will require feedback loops and channels with adequate supervision, controls, and auditability so that only authorized personnel can update the systems and the changes can be tracked.

> Aggregate, Link, and Analyze



Resolve and Enrich

Figure 2: Extracting Insights and Knowledge from Data Involves Many Steps

Extract and Transform

Source: Celent

Collect and Store

DATA AND ADVANCED ANALYTICS USHERING A NEW ERA IN AML

Better data management coupled with modern analytical tools can significantly improve AML performance across the board.

Enhanced KYC Due Diligence

In KYC, a holistic, 360-degree view of clients can be created by leveraging more data.

- Data from different internal systems can be cleansed and reconciled using fuzzy • matching, NLP, and other AI techniques. A customer's information across the FI can be consolidated though entity resolution and unique identifiers (e.g., tax payer's number, address, email); this will also help remove duplicate records and resolve name variations, data entry errors, and mismatches including attempts of deliberate obfuscation.
- Customer records can be enriched with additional details, such as transaction history, • joint account holder information, frequently transacted counterparties, and thus a fuller picture or "profile" of a customer can be obtained.
- At the next level, AI techniques such as cluster analysis can be applied to construct peer groups of customers with similar profiles. Incorporating granular information on customers will improve robustness of such analysis.
- A customer's activities can be monitored against "expected behavior" of the peer group, and significant deviations or anomalies can be flagged as suspicious, prompting additional due diligence.
- Enriched client profiles can be used in graph and network analysis that can reveal suspicious networks and behavioral patterns across groups of clients, which is otherwise hard to detect when monitoring accounts or transactions discretely.
- Assessing UBO and understanding shareholding patterns, corporate hierarchies, and relationships can be streamlined through automated analysis of volumes of structured and unstructured data and intuitive visualization tools.

Dynamic Risk Rating

Traditional risk rating methodology is highly subjective based on generic background information (e.g., nationality, occupation, and income) collected at onboarding. This coarse approach often results in misclassification of customer risk and a disproportionately high volume of alerts (and false positives) from high-risk groups that skew alert distribution. These shortcomings can be remedied by leveraging more data and AI techniques.

- Additional data such as transactional and behavioral characteristics (e.g., transaction frequency, channels used) and clustering techniques can be used to better segment clients going beyond traditional matrix-based risk classification.
- Al techniques can be applied to identify new features and attributes that are best • predictors of risk based on an FI's specific product and client portfolio, and eliminate "spurious" or correlated features that skew risk scores.
- The risk scores can be updated dynamically as clients' profiles or behaviors change (such as moving to another country, or a new watchlist or transaction monitoring alert).
- Movements of clients among risk categories can be automatically flagged and investigated where needed. This will be a significant improvement over the current periodic risk refresh approach, which is highly static and driven by FIs' organizational policies rather than actual changes in client behavior.

Intelligent Detection Process

Detection engines can be made more powerful by leveraging better data and analytics. Advanced statistics have been used sometimes to optimize AML model scenarios, parameters, and thresholds, but they have been one-off and ad hoc exercises. Incorporating AI techniques can make this process more dynamic and frequent.

Al and ML techniques can optimize existing rules and scenarios automatically or with supervision. They can also suggest new features, scenarios, and typologies by

leveraging more information such as enriched KYC profiles, network analysis, risk segments, patterns identified from previously resolved alerts, insights gleaned from filed suspicious activity reports (SAR), and so on. ML-based algorithms can be added to existing detection engines, used as a second pass filter after them, or as parallel detection mechanisms.

Furthermore, specific detection algorithms can be developed for subgroups (of customers or products), which is an improvement over the traditional coarse approach of modeling across broad and generic groups.

Efficient Alert Management

Improvements in the upstream processes as discussed above will have significant downstream impact because they can reduce false positives and improve the distribution and quality of alerts. Alerts can be enriched with additional data (e.g., KYC information, feedback from past cases) and can be risk-scored by AI algorithms. Higher risk rated alerts can be automatically escalated while less risky ones can be routed to junior staff. suppressed, or potentially auto-closed. Al-based adverse media analysis can be used to aid alert investigation where adverse media hits are weighted based on relevance and risk and presented in order with relevant excerpts automatically highlighted.





- Improved coverage
- Continuous monitoring of risk across client lifecycle
- Holistic customer view and risk based AML

Source: Celent

These can drive significant improvements in efficiency and productivity in AML. They also help improving coverage because by incorporating additional information, AI models can help discover unknown typologies or networks and detect false negatives or suspicious activities missed by current systems. Risk monitoring can be made more responsive to changes in a client's profile or action. This can make KYC refreshes more dynamic and enable more continuous monitoring of risk across a client's lifecycle. Thus, they will help FIs transition from a transaction-oriented approach to a risk-based approach by taking a holistic view of the customer across a wide range of activities and throughout the client lifecycle.

CHARTING A PATH TO IMPROVED DATA MANAGEMENT

Operationalizing and industrializing AI will necessitate rethinking FIs' approach to data governance. Data governance is not a single technology or process but a framework for ensuring critical aspects of an organization's data such us availability, usability, accuracy, consistency, integrity, completeness, timeliness, provenance, and security of data. Regulators increasingly demand FIs to validate data and models used in AML, which means they must document their actions and controls to prove the appropriateness of their data governance efforts. Sound data governance practices must also include accountability for the consequences of suboptimal data management.

These are driving financial institutions to revisit their data governance framework. Many are taking this opportunity to usher in changes to break down data silos and simplify their data architecture. They are seeking to increase reusability of data by standardizing data definitions, formats, and normalizing data models across products, business lines, and regions.

Many financial institutions have embarked on a journey to create central data repositories, data warehouses, or data lakes. Some are building enterprise-wide data repositories with AML departments sharing a sliver of that; for others, such efforts are focused specifically on compliance operations and intended for group wide compliance functions such as capital reporting, surveillance, fraud, money laundering, regulatory reporting, and others.

In this vein, the industry participants have been talking about the need for creating golden records for the management of master and reference data that can serve as a single source of truth across an organization. This often proves challenging, especially for larger organizations with multiple business lines, products, and regions of operations, because disparities in market practices, product specificities, and regulatory requirements impede large-scale standardization efforts. So, many FIs prefer a more incremental approach, for example beginning with unifying customer records across a few business lines and jurisdictions, and gradually expanding the scope. Therefore, achieving golden records specifically, and improving data governance in general, is more a journey than an end state.

STREAMLINING DATA MANAGEMENT WITH NEW TECHNOLOGY

In this journey, new technology can play an important role because it can automate and streamline several aspects of data management efforts.

- Optical character recognition (OCR), RPA, and NLP techniques can automatically extract and consolidate information from documents, public sources, as well as from internal systems and applications.
- Intelligent automation tools combining RPA and AI can help improve data quality by imputing missing records (e.g., impute country or state based on ZIP code information), repairing basic data entry errors, identifying and reconciling duplicate records, and so on.
- Automation tools can also help in documentation and reporting, starting from filing pre-formatted reports with basic RPA, through to generating narrative-based reports and SARs based on advanced natural language generation (NLG) techniques.

Advanced analytical tools thrive on high-volume and granular data and need high computing power in short bursts. Therefore, FIs will need to rethink their approach to data storage and processing, because traditional relational databases and on-premise based

technology solutions may not be efficient and cost effective for storing, linking, and processing large volumes of data, especially unstructured data.

- Advancements in cloud technology are opening new horizons in this regard because cloud offers massive data storage and scalability, on-demand high-performance computing, and infinite elasticity.
- Recent developments in APIs present new avenues for seamless connectivity and workflow linkages. They can enable easy import of data from internal applications and external data sources and automate export of analytical results, for example, to case management or reporting systems.
- APIs can also automate the interaction between different applications which is becoming important as FIs adopt a microservices-based architecture. For example, a change in customer information can be transmitted to the risk rating system through an API call triggering risk score updates in near real time.
- APIs and microservices are essential components in the technology strategy of the digitally native financial services providers emerging from the fintech ecosystem. Their adoption is now growing among traditional FIs driven by competition from fintechs and more recently by the European Revised Payment Services Directive (PSD2).

REARCHITECTING AML FOR THE DIGITAL ERA

Innovation in AML has lagged behind other areas in financial services. But that is changing due to exploding operational costs, intensifying regulatory scrutiny, and advancements in technology. New technology is poised to revolutionize AML operations; results from early exploration show their immense potential to drive significant improvements. Data has been underutilized in AML because of the operational challenges and limitations of legacy technology. New tools and techniques can overcome these limitations and complement FIs' efforts to improve data management practices.

It is important to note that the next-generation technologies will not immediately replace incumbent systems but will have to integrate and co-exist with them for some time. Therefore, for rearchitecting their AML operations, FIs prefer a crawl, walk, run approach that simplifies the complexities in technology transformation and minimizes disruption while transitioning to the future state. Therefore, instead of ripping and replacing big pieces, the goal should be to leverage better data and smart workflow tools that seamlessly integrate the new and old systems.

CONSIDERATIONS FOR THE DIGITAL ERA

As new technology opens a world of new possibilities, there will be new challenges facing FIs in the digital era. Sharing data in an increasingly interconnected ecosystem will require widely accepted standards and connectors. Data privacy and security issues will be paramount because any system is as strong as its weakest link in this regard. So FIs will need to improve security of their data by strengthening access controls and encryption techniques to safeguard against data loss and data theft.

Complying with data privacy regulations such as the European General Data Protection Regulation (GDPR) and a patchwork of country-specific regulations will present additional challenges. At times these regulations can conflict with the regulatory push for holistic analysis; for example, sharing KYC information with foreign subsidiaries may be constrained by such regulations. So FIs will need to rethink not only the technology aspects, but also operational arrangements in terms of data hosting and resource localization.

The debate about sharing and analysis of people's personal information by other actors is still evolving in society. Therefore, collecting and analyzing such information in AML can raise ethical and legal questions. Social biases can be encoded in data, and analytics done even with the best of intentions can end up reflecting, or worse, amplifying, such biases that can have serious consequences; for example, denying products or services to certain segments of a marginalized population. Data governance in the digital era will therefore require additional focus on transparency, oversight, and control frameworks to ensure that data is used responsibly.

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