AML Model Risk Management and Validation: Best Practices

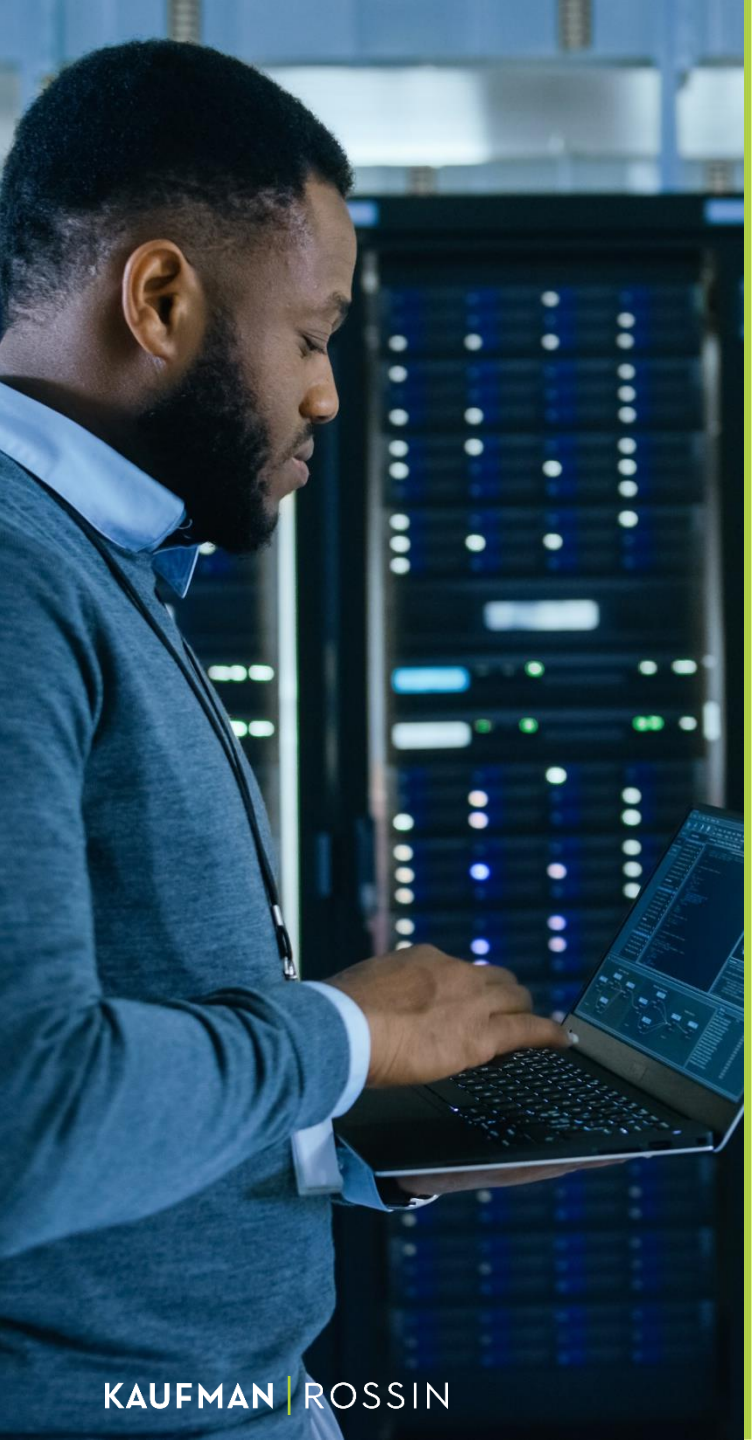
Presented by:

Jason Chorlins
Kaufman Rossin

Maleka Ali
Arc-Serv

KAUFMAN | ROSSIN

ARC-SERV



Recent Industry Observations

- Many clients are still in the process of establishing data governance.
  - Authority, control, and decision making around data may not be uniformly established for the environment.
  - Data cataloging (mapping and indexing sources, usage, lineage) may be undefined.
  - Data owners and data stewards may not be explicitly identified.
- Information security and IT operations teams may not have effective communications with compliance teams.
- Data security is often established and reviewed but may not be optimized.
- Immaturity in data governance may delay innovation and growth.
- COVID-19 drew additional attention to weaknesses in data governance by disrupting processes and environments.
- Skills shortages may be exacerbating the problems.

What's at Stake?

- The stakes in managing data and technology are at an all-time high.
- Proper data governance with an analogous innovation framework is critical in a recovery.
- It remains critical to identify and inventory only those data and processes that may benefit from automation and optimization.
- Banks must prioritize the use of resources.
    - Critical processes need to be inventoried and then ranked in order of opportunity for automation and optimization.
- Data governance risk and process deficiencies may lead to informal or formal regulatory actions.
- Risk typically present for two reasons:
    1. fundamental errors which produce inaccurate outputs when compared to design objectives and intended use of a system or process; or
    2. incorrect or inappropriate use or misunderstood limitations or assumptions.

Do you Speak Techlish?

- **Algorithm**: A step-by-step procedure for solving a problem of accomplishing some end, especially by a computer.
- **Artificial Intelligence**: The development of computer systems able to perform tasks that normally require human intelligence.
- **Machine Learning**: An application of artificial intelligence that provides systems the ability to automatically learn and improve without being explicitly programmed.
- **Data Analytics**: The process of examining data sets in order to draw conclusions about the information they contain, increasingly with the aid of specialized systems and software.

- Machine learning can be utilized to create alternative ***challenger*** models used in benchmarking against ***champion*** models.
- ***"The most effective challenger benchmark models are those that implement a different methodology from that of the champion."***
- Benchmark models used solely for validation need to also be validated. An assessment of the benchmark models and related data should be done to ensure they provide reasonable comparisons.
- The determination/decision on when to replace a primary model with a challenger benchmark model if it is a better performing model.

Recent Advancements In ML & AI in Model Validation

Current Pain Points & Challenges

Challenges in Money Laundering	Deficiencies in Rule Based Systems
Data spread across multiple systems/silos	Manual analysis by the investigators – time consuming
Data quality issues	One-size-fit-all policy doesn't always work
Inability of systems to track hidden, multi-channel and complex patterns of transactions	Subjective and inconsistent. Rules based system cannot identify hidden ML patterns
Large # of false positives	Ineffective detection routines
Operational inefficiencies	Efforts to manually set thresholds and train employees periodically result in significant time and cost

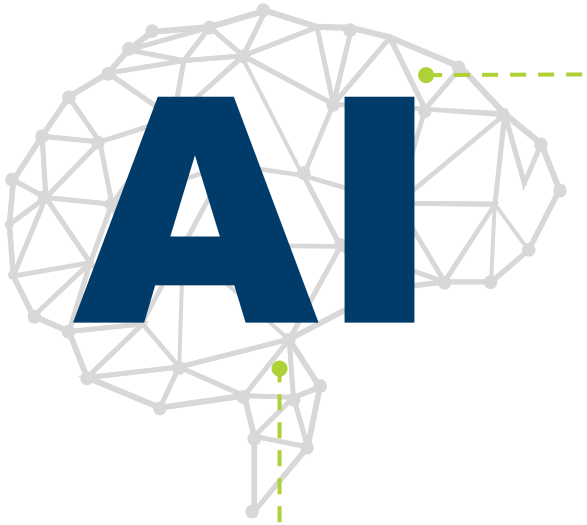
AI/ML – What It's About

How Does it Help?	AI/ML Terminology
Understand behavior and flag anomalies	Supervised & Unsupervised Machine Learning
Connects the Dots	Model Types - Naive Bayes, Decision-Tree, Regression, Random/Isolation Forests, Gradient Boost, Neural Networks, Clustering
ML Use Cases - Sanction Screening, Adverse Media Screening, Case Investigation, Alerts Suppression, Alerts Assignment to Investigators	Compare Model Performance - Choose Optimal Model for your requirement
Fraud Monitoring - Identification of Fraud Scenarios/ New Patterns	Natural Language Processing - Screening of Payments/ ACH
Increase Efficiency	Pluggable Architecture to support additional third-party machine learning libraries
Robotic Process Automation – Faster & Automated	Use of R and Python

When is Machine Learning Not Needed?

- Knowledge model is highly developed across cases
- Knowledge model rarely needs changes
- Data is highly reliable
- Data is highly available

Analytics – AI/ML



1

False Positive Reduction

Uses Historical Data & Combination of Customer & Alerts Risk

2

Alert Risk Scoring

Alert Prioritization Metric based on combination on historical data and alert parameters

3

Customer Profiling

Understands customer transaction patterns based on historical patterns across multiple dimensions

4

Clustering & Outlier Analysis

Customer segmentation by peer grouping and identification of outliers

5

Trend Analysis

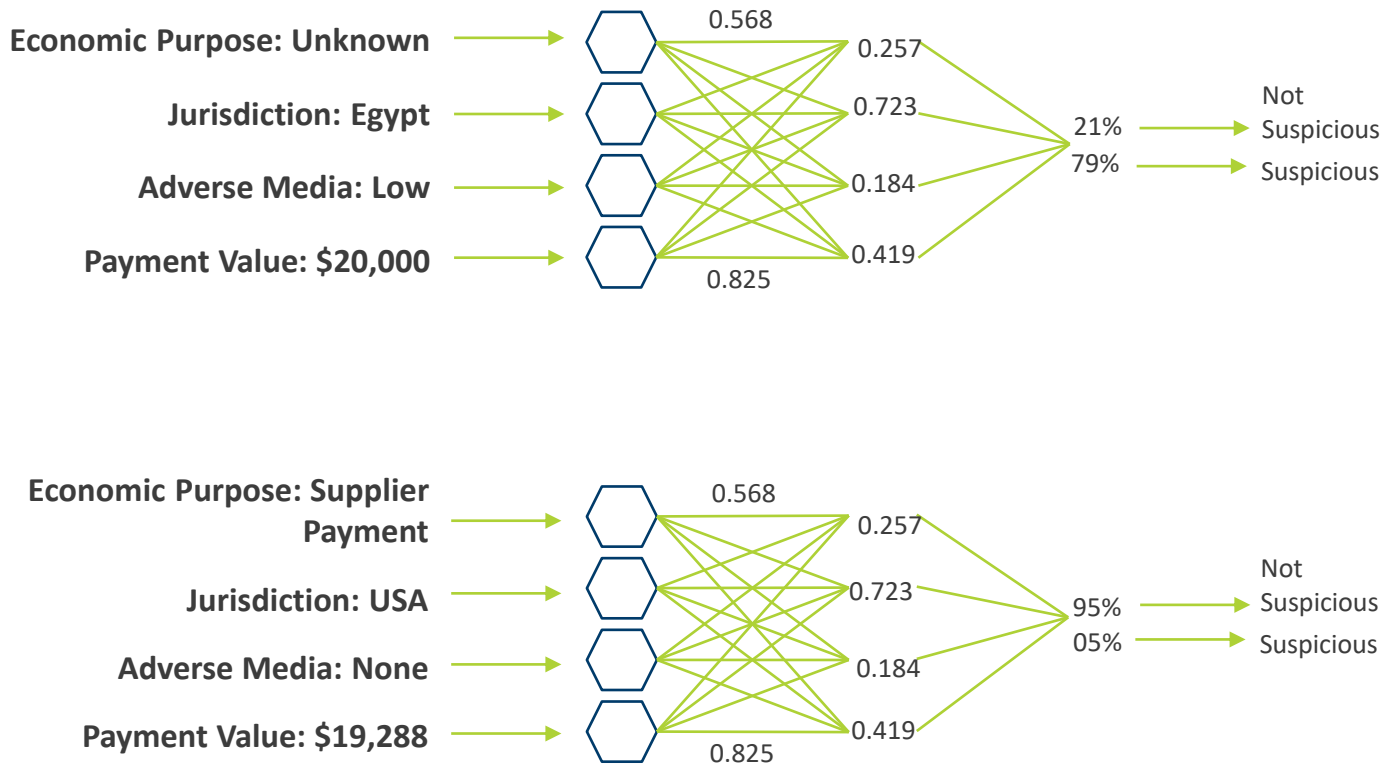
Gives insight on the transaction patterns followed by customer-based historical data

Adoption of AI/ML within an Organization

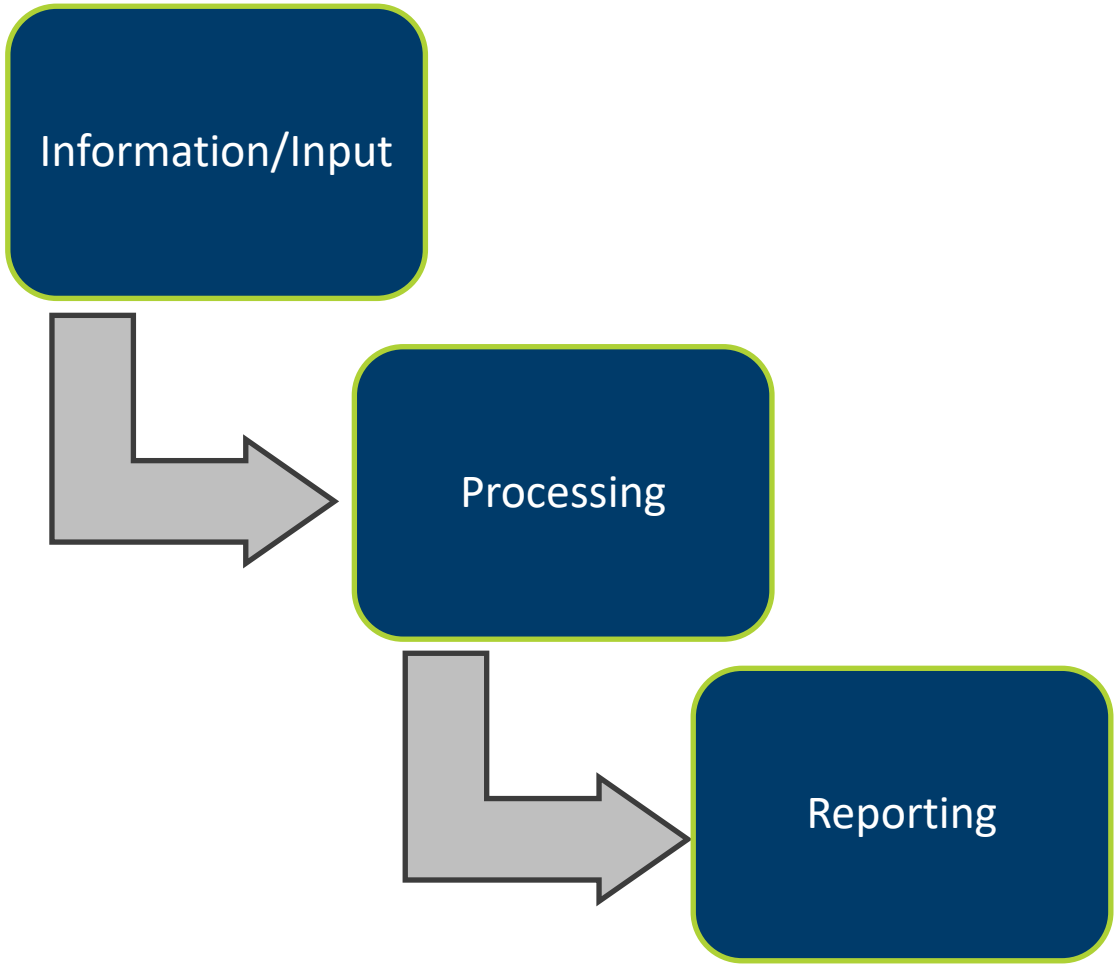
Reasons to Adopt	Factors Fighting Against
Balancing operations with regulatory expectations of systems/controls	Bureaucratic overhead
On-going reduction of false positives	Budgetary constraints
Real-time payments and globalization	Data privacy and sensitivity
Move to Cloud computing	Shortage of skillsets and resources
Reduction in cost of data storage	Transparency on explainable outcomes
	Spanning data internal and external to an enterprise and across silos

No One Way of Validating AI Techniques

- AI techniques are as different as their applications - a variety of approaches will be required.
- An Artificial Neural Network is a representation of a model that learns without **task-specific programming.**
- Financial crime investigators train decision-making algorithms by presenting them with **red flags** and **suspicious activity**, alongside with the decision they would have made.
- Once trained, the neural network acts like a static model. Combinations of inputs result in output with a natural, measurable error rate.



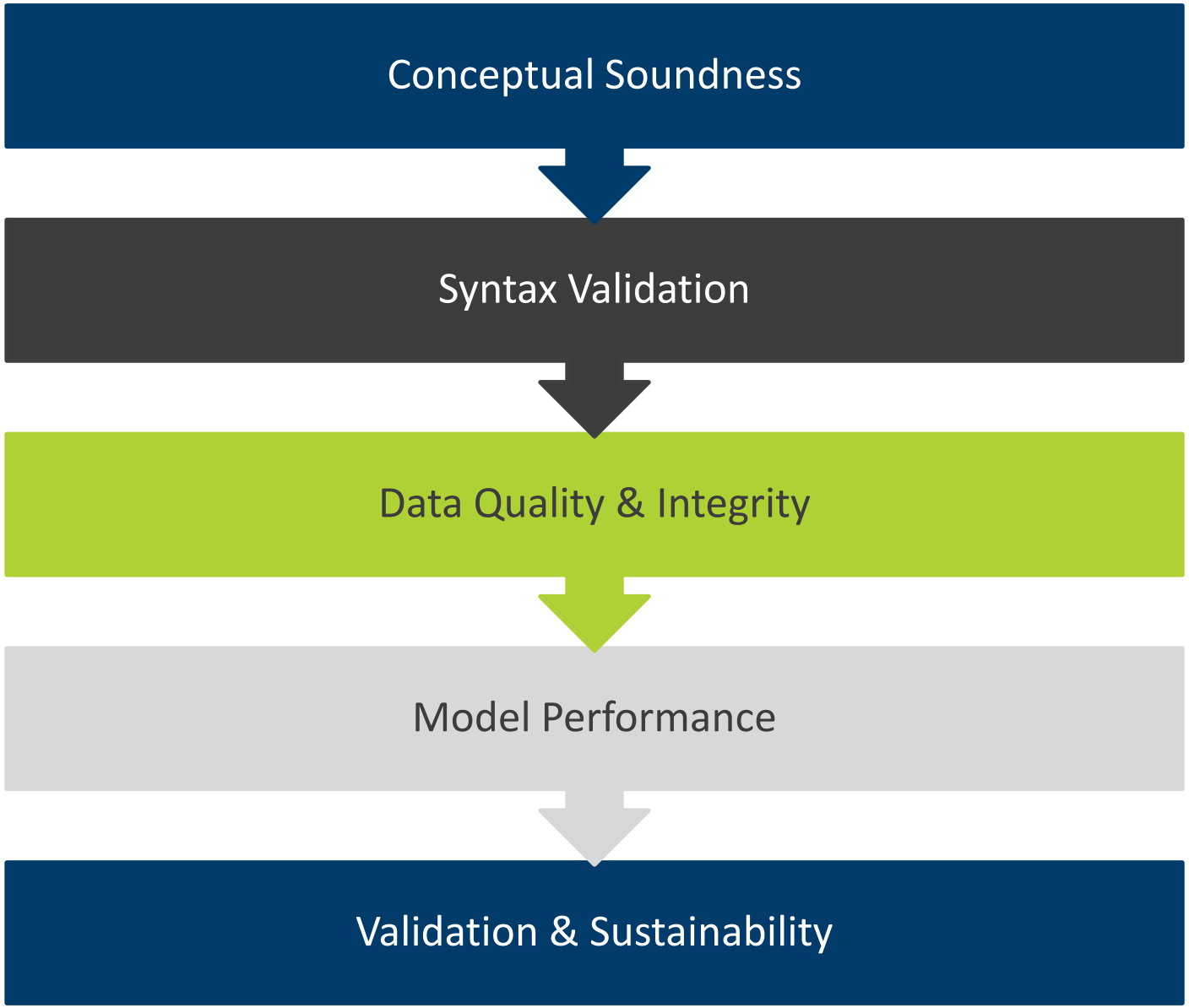
Model Components



The Risk of Models

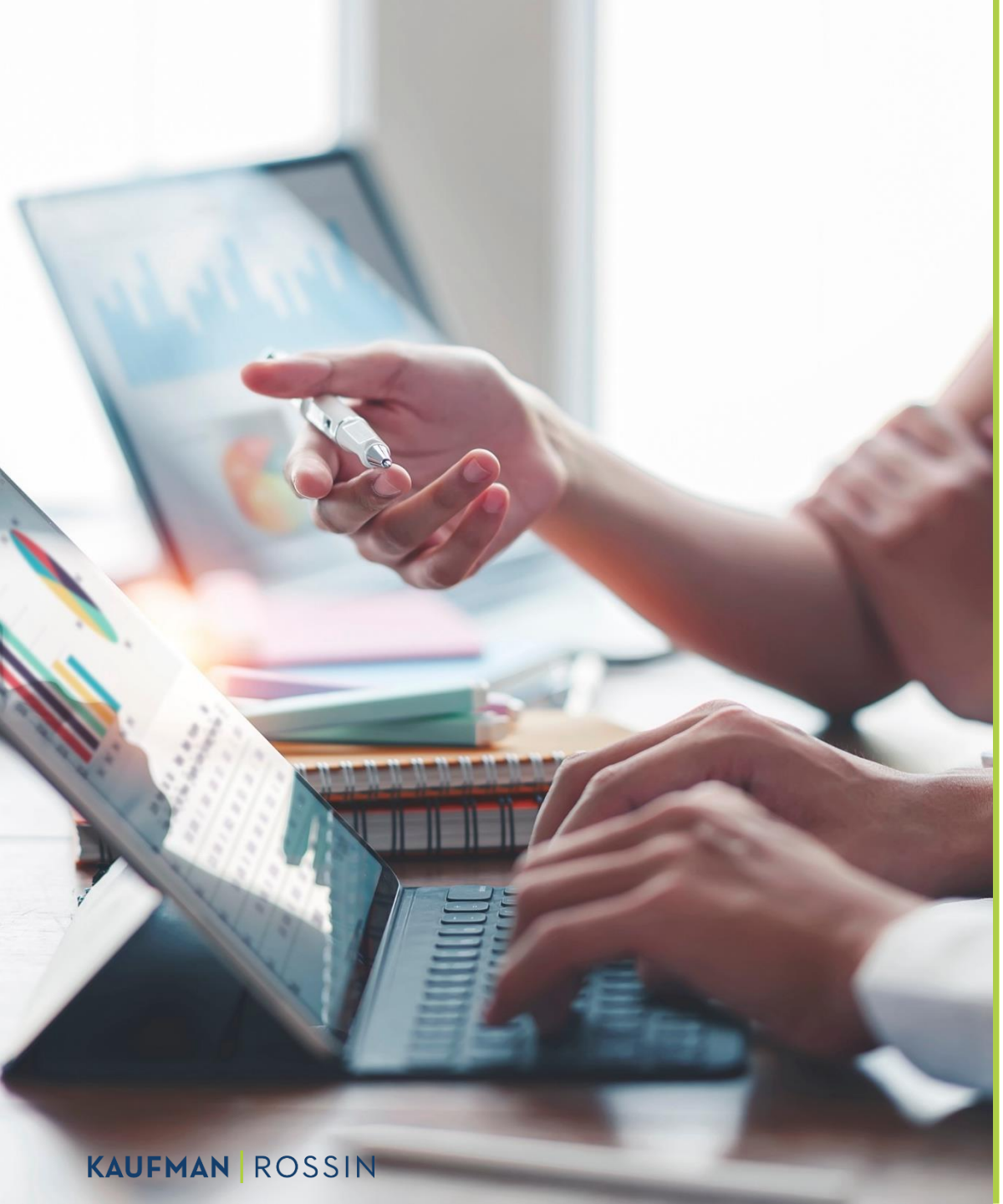
- Fundamental Design & Implementation Errors
- Data Quality
- Applicable Data Inputs
- Incorrect or Inappropriate Data
- Optimization

Components of Model Validation



How do you Evaluate Conceptual Soundness?

- **Evaluate the following factors:**
  - Data Integrity/Representativeness
  - Bias
  - Model Documentation/Explainability
  - Parameter and Method Selection



Questions being asked?

- How well are you equipped?
- How are those tools working?
- Are they being used properly?
- Are they making an impact?

With an Emphasis on Efficiency

Does it Work? Are you Using It?

- Area of growing attention & expense—is BSA/AML data validation.
- Examiners suggest audits on BSA/AML activity monitoring systems to ensure they are performing correctly—producing reliable alerts & accurate reports of potential criminal activity.
- Data integrity from end to end is one concern, but there's more to the validation process.

“Is your program sufficient for the risk level of your institution?”

- Many have proactively had efficiency reviews/evaluations done before exams to catch issues before examiners visit.
- Examiners want to see what banks have done with the systems they purchased.
- Automation brings you powerful tools, but are they all turned on?
- If they have been, have the rules of the system been kept up-to-date in recognition of evolving money-laundering patterns?

Calibrating and Tuning

- Review & test system capabilities & thresholds on a periodic basis
- Focus on specific parameters or filters in order to ensure that suspicious or unusual activity will be captured
- **Understanding the filters in your system *and how your system works* is critical to assessing the effectiveness of your monitoring program**

Does Your Model Work For You?

- **Evaluation of Reporting Process**
  - Key Performance Indicators (KPIs)
    - Alert to RFI %,
    - Alert to Investigation %,
    - Alert to SAR %

Optimization and Tuning

When is a Rule/Scenario Effective?

- Effective is measured by “meaningful” investigations
- A “meaningful’ investigation could result in a “no-SAR” decision
- Effectiveness will differ based on intended purpose of the scenario
    - Results driven by individual scenario threshold testing

Expectations

- Examiner evaluation of scenarios
  - System capabilities
    - Scenarios available
    - Transaction/data feeds in the system
- Scenarios selected by Financial Institution
  - Criminal Typologies
  - Incorporation of the Risk Assessment
    - Higher Risk Customers

Criticisms

- Use of default settings
- No below/above the line testing
- Lack or insufficient documentation supporting scenarios or thresholds
- Scarce evidence of threshold validation
- Unsupported sampling methodology
- Exclusion of customers, products, services

Challenges with Conceptual Soundness

- Demonstrating the conceptual soundness of the models will be difficult if the math behind the ML/AI theory used to design them is not well understood and documented by the model developers, users and validators.
- ML/AI uses large volumes of structured and unstructured data, the dimensionality of the ML modeling features is much broader and deeper, making it challenging to ensure data integrity and representativeness.
- ML/AI models are difficult to explain and are often viewed as black boxes. Assessment of the variable selection process and explainability of driving factors become difficult due to the complexity and architecture of neural networks.
- MRM guidance requires that model documentation be comprehensive and detailed so that a knowledgeable third party can recreate the model without having access to the model development code.

- Rules-based monitoring is costly and often less efficient.
- AML officers should ensure AI/ML systems are free of potential problems such as algorithmic bias.
- Developing in-house tech talent may be the preferred option but outsourcing allows you to get industry best practices.
- BSA Departments should consider recruiting more staff based on non-traditional compliance skills such a code-writing or data analysis.

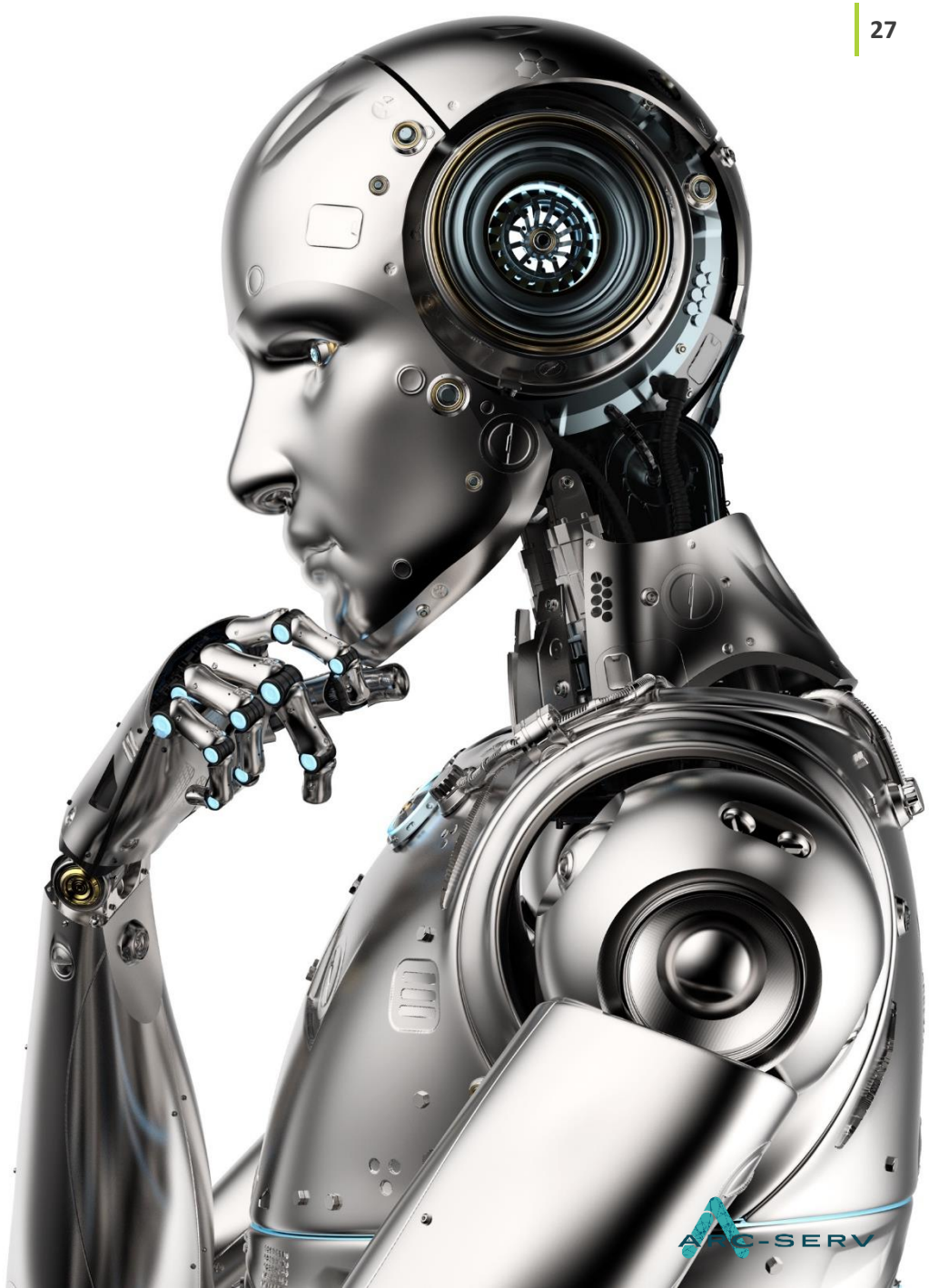
What Should We Be Considering?

Other Things to Consider

- Case Investigation, Escalation, and Alert Triage processes may also be subject to “validation”
  - Statistical tests/evaluations of potential biases in the resolution of cases
  - Analysis and validation of alert triage and scoring models used for case prioritization or case closure

Myth of Validation

- “Validation is a living and breathing lifecycle which has matured with age and doesn’t have to be cumbersome
- Industry has moved into taking a risk-based approach to validation and this makes perfect sense; adopt a proficient risk management methodology

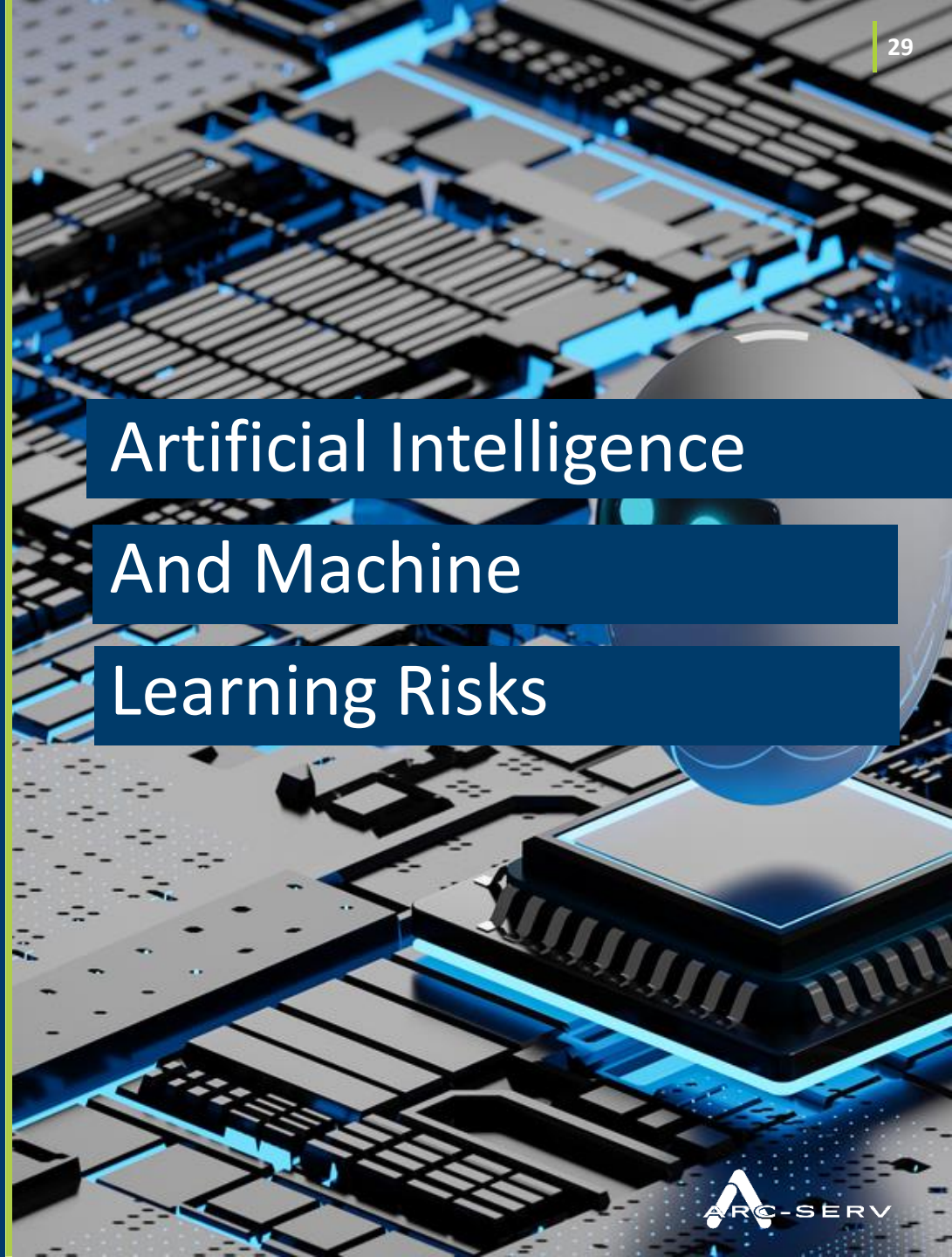


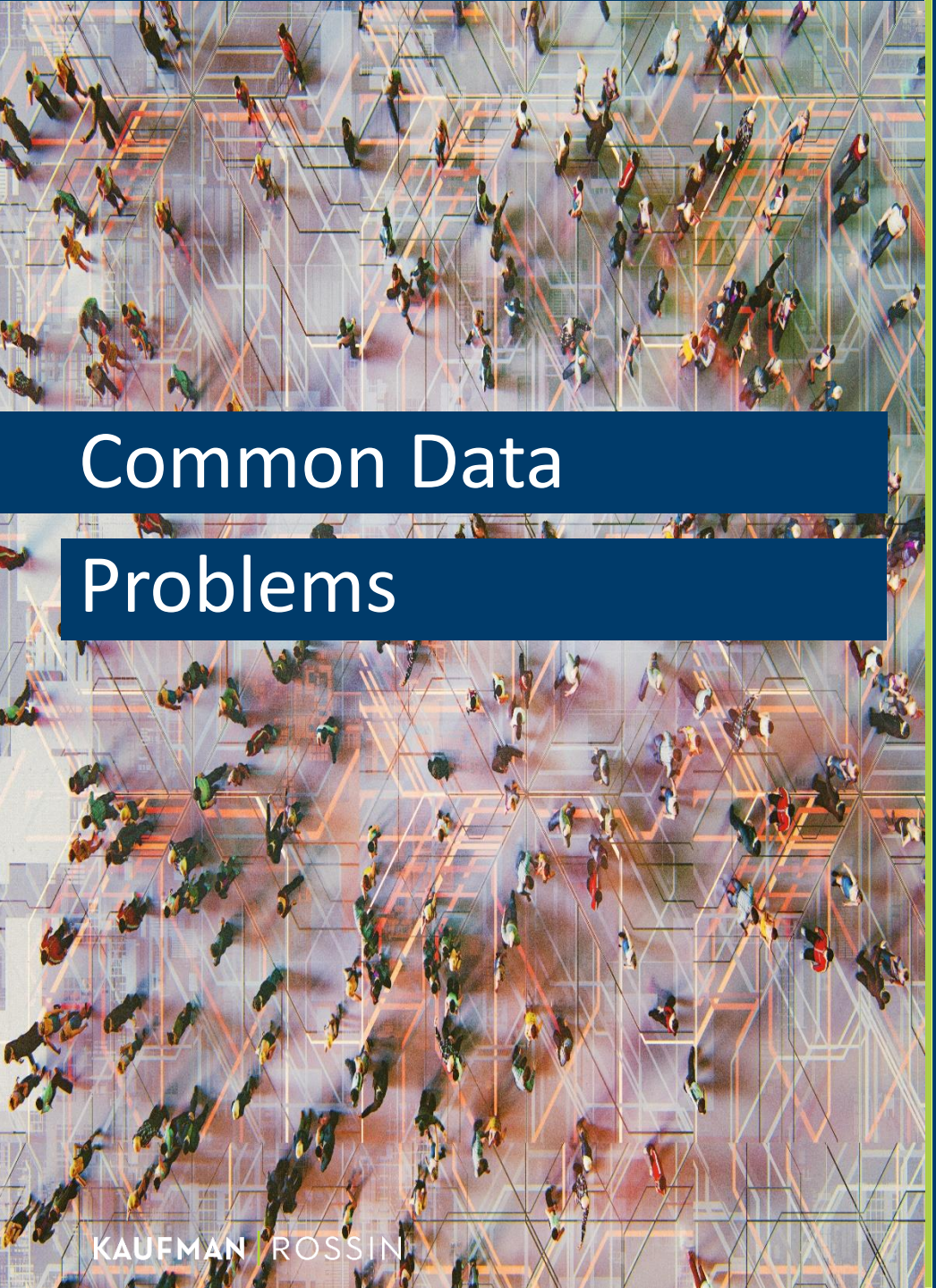
Data Validation

- You rely on the data in your reports to help you detect suspicious activity
- Important to ensure you are not missing significant data in your monitoring reports
- And that your information is accurate
- You never want your examiners to find suspicious activity that you missed!

Artificial Intelligence And Machine Learning Risks

- Large amounts of available data, which, if breached, can result in misuse of data, fraud, financial loss, impact to an entity's reputation, or harm to consumers.
- Potential for human errors of omission or commission in the development of algorithms that can lead to incorrect decisions.
- Potential for bias (intentional or unintentional) in algorithm development and use if it is not tested and validated, as well as used appropriately.



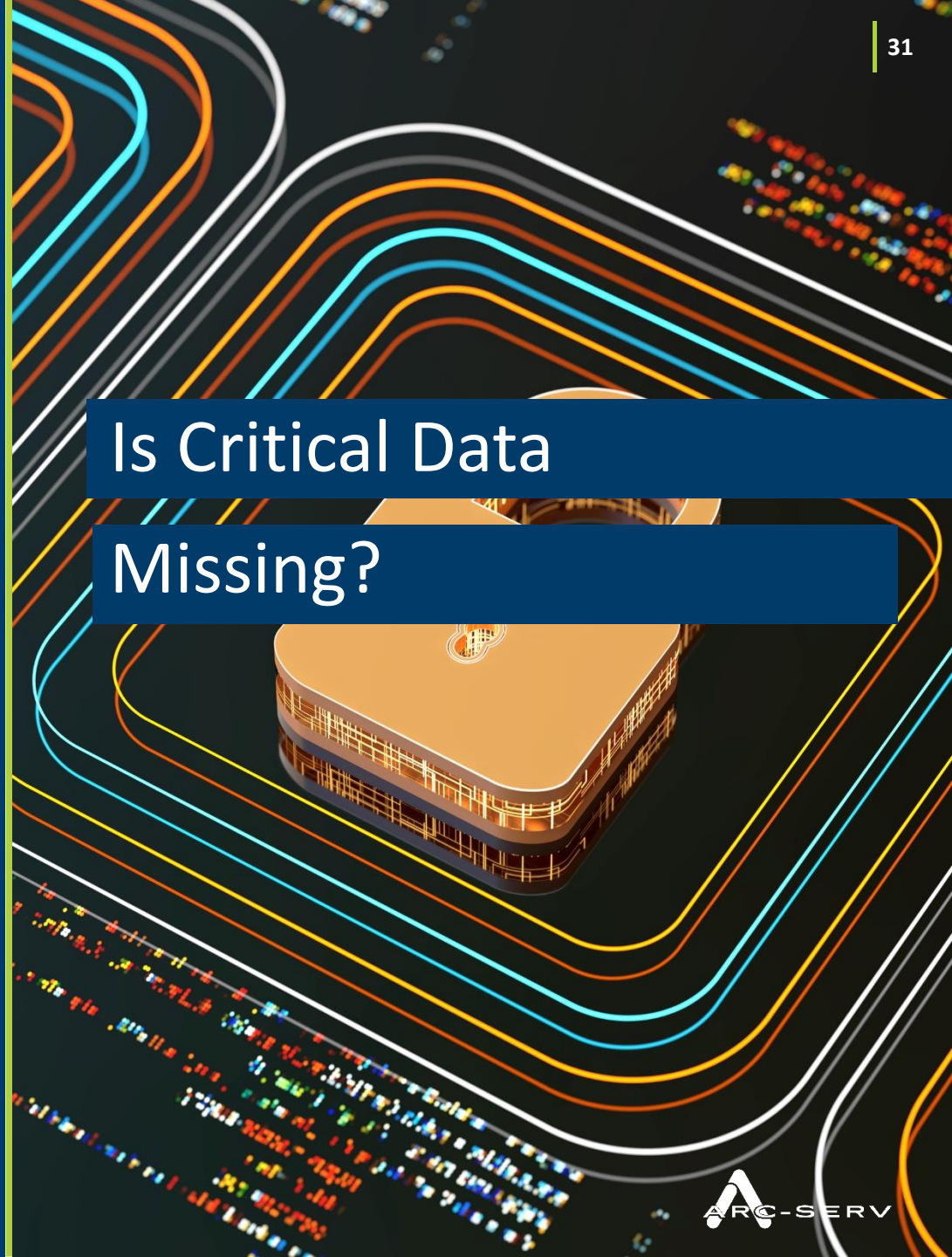


Common Data Problems

- NAICS codes-business type
- TIN codes
- Non-resident aliens
- Signer information
- Relationship codes
- Beneficiaries
- Employees
- Missing data

Common Missing Data

- International wires
- Correspondent Bank Activity
- Loans & Certificate activity
- Monetary instrument Sales
- ATM Cash
- Cash from Armored Car



Is Critical Data Missing?

Utilizing Current Industry Best-Practice Applies to AI

- Satisfying regulators that the letter and spirit of OCC 2011-12 are met:
  - Examining threshold distribution drives an understanding of the ‘Suspicious’ outcome along the distribution of the risk inputs
  - Sensitivity analysis can determine the impact of changes in the ‘Suspicious’ thresholds by examining Alerts and SARs
  - Type I errors (false positives) can be measured using hybrid BTL methodology
  - Type II errors (false negatives) can be measured using ‘known truths’
  - Common ratios for e.g., Alerts/SARs can be used to assess throughput

Assessing the Challenges in AML Model Validation & Surveillance: Multiple Testing Aspects

- AML validation must address the following testing and performance considerations:
  - Sensitivity of model to data structure, limitations and biases
  - Benchmarking of model against other methods, and lift of optimal model
  - Performance of model over different datasets, time periods or events
  - Ability of model to capture or adapt to new/emerging risks and scenarios

Identifying the Right Model Risk Framework that Works for AML

Set realistic expectations on the potential to automate AML models and activities versus to improve performance of existing AML models and better align existing resources.

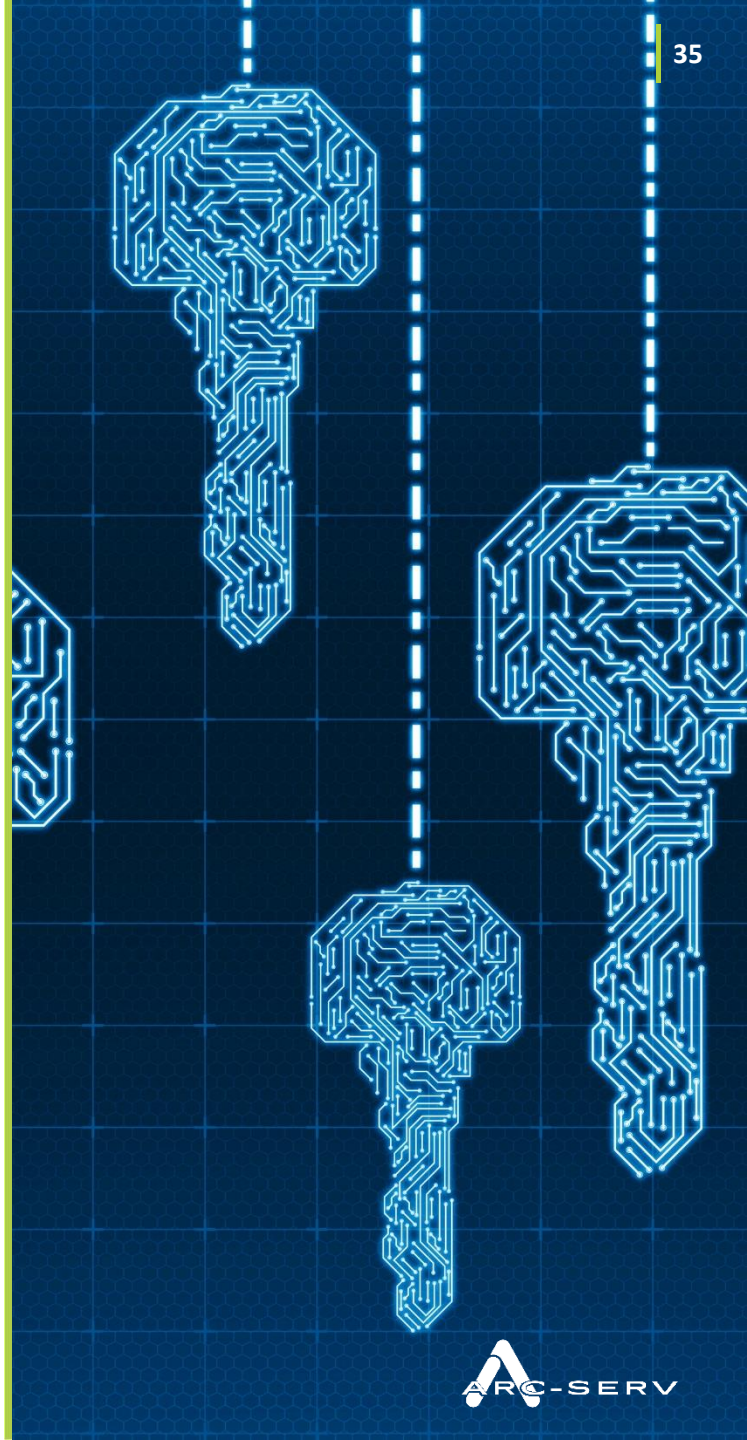
- ML/AI can improve efficiencies over existing monitoring systems and automate some decisions.
- Many model methods can be employed in AML risk rating for increased accuracy & efficiency.

New AML technologies that integrate with existing monitoring can create an iterative feedback loop to improve both the legacy and new technology systems.

- Integration of new technologies can change culture by transitioning much investigation work to technology and focusing human SMEs on substantive investigations.
- Retain and optimize many aspects of human subject matter expertise in existing AML models.

Key Takeaways

- Consider stacking (RPA for data pulling, ML for comparing data to stated patterns, AI for SAR/NSAR decision (auto-filing)
- Don’t attempt a home run on the first pitch at bat; rather, just get on base
- Even one successful BOT data pull counts; a small victory is still a victory
- **RPA, ML, AI – Flipping the 3 AML Ratios**
- False Positive Ratio – 95% of alerts are false positives … flip that to 5% false positives
- Forgotten SAR Ratio – only 20% of SARs have Tactical or Strategic Value … flip that to 80% of SARs with “TSV”
- Analyst’s Time Ratio – 90% of an Analyst’s time is spent gathering information and 10% investigating … flip that to 10% gathering of information and 90% investigating
- Even if ML models perform better than traditional models, the lack of explainability may cause ML/AI models to be restricted in use by model validation and MRM teams



Questions?

Thank you!

At the **Kaufman Rossin Group**, it's our business to make joy your bottom line. With 60 years of experience, five offices in Florida, and New York, four international offices in the Cayman Islands, Côte d'Ivoire and India, and clients all over the globe, we provide professional services to businesses and their leaders, serving entrepreneurs, public companies, non-profits and individuals. The Group includes Kaufman Rossin CPA + Advisors, one of the top 50 accounting and advisory firms in the U.S., along with Kaufman Rossin Wealth, Kaufman Rossin Insurance Services, and Kaufman Rossin Alternative Investment Services. We bring technical mastery, collective intelligence and integrity to our work for every client. But it's the listening, innovating and caring of our 700+ team members that bring joy to clients – they give us 4.9 stars! It all starts with our joy-at-work, people-first culture, which has won us repeat honors as a Best Place to Work.

Arc-Serv provides independent regulatory compliance solutions. We operate on the philosophy that consulting is more than just giving advice. We provide our clients with objective feedback to help them make decisions and develop action plans to achieve results. We aim to bring together the right people to master complexity, drive quantifiable change, and introduce positive, long-term impact. With locations across the country (including three locations in California) and over 35 years of experience in the industry, Arc-Serv has completed model validations, optimizations/calibrations, risk assessments, and BSA program reviews for over 100 financial institutions.