Why should you be interested in AI / ML / DL?

Everyone wants AI / ML / DL and advanced analytics….

AI and advanced analytics represent 2 of top 3 CIO priorities

AI and advanced analytics infrastructure could constitute 15-20% of the market by 2021

Enterprise AI adoption 2.7X growth in last 4 years

…but face many challenges

Use cases
New roles, skill gaps
Culture and change
Data preparation
Legacy infrastructure

1 IDC, Goldman Sachs, HPE Corporate Strategy, 2018
2 Gartner - “2019 CIO Survey: CIOs Have Awakened to the Importance of AI”
HPE helps “unlock your data with AI”

**AI within our products**

**AI for our customers**

**AI for the future**

**Al-driven Operations**
Across edge to cloud infrastructure

**Gain faster insights**
with scalable AI solutions & services

**Optimize infrastructure**
with the latest AI technologies
Business goals for AI

- Revenue Growth
- Cost Efficiency
- Risk Control

→ Speed, Accuracy, Transparent
### USES OF AI IN BANKING

<table>
<thead>
<tr>
<th>Channel</th>
<th>Front office</th>
<th>Middle office</th>
<th>Back office</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size of cost savings opportunity</strong></td>
<td>$199B</td>
<td>$217B</td>
<td>$31B</td>
</tr>
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</table>

**Key use cases**

<table>
<thead>
<tr>
<th>More mature</th>
<th>Conversational banking</th>
<th>Anti-fraud &amp; risk</th>
<th>Credit underwriting</th>
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</thead>
<tbody>
<tr>
<td>AI biometrics technology</td>
<td>Personalized insights</td>
<td><strong>Anti-money laundering/Know-your-customer</strong></td>
<td>Smart contracts infrastructure</td>
</tr>
</tbody>
</table>

**Source:** Business Insider Intelligence, Autonomous NEXT, 2019
About Tookitaki

- Founded: Nov 2014 in Singapore
- Funded: Jungle
- WEF Technology Pioneer 2019
- SBR Technology Excellence Award AI for Banking
- Accreditation@SGD (2017): Only 21 of 5000 Companies Accredited
- QCFintech
- Accenture
- Top 7 AI in FinServ in APAC (2017)
- Top AI Startups in Singapore (2017)
- 1st Place: MAS Fintech Awards (2016) SME Category
## About Tookitaki

<table>
<thead>
<tr>
<th>Vision</th>
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<tbody>
<tr>
<td>Enable sustainable compliance programmes at financial institutions</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Values</th>
</tr>
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<tbody>
<tr>
<td>• Prime Focus on Clients</td>
</tr>
<tr>
<td>• Grit towards pursuit of excellence</td>
</tr>
<tr>
<td>• Teamwork and family ambience</td>
</tr>
<tr>
<td>• Continuous innovation</td>
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<table>
<thead>
<tr>
<th>Products</th>
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<tbody>
<tr>
<td>• Anti-money laundering suite (AMLS)</td>
</tr>
<tr>
<td>• Reconciliation suite (RS)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Company</th>
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<tbody>
<tr>
<td>• HQ in Singapore; Offices in India &amp; US</td>
</tr>
<tr>
<td>• 100% R&amp;D and Product Development in Singapore</td>
</tr>
<tr>
<td>• Core Team with 30+y in Finance, Machine Learning &amp; Big Data</td>
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<table>
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<tr>
<th>Advisory Board</th>
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<tbody>
<tr>
<td>• Senior Advisor with 25+ yrs Retail &amp; Weath (HSBC, Citi, Barclays)</td>
</tr>
<tr>
<td>• Jungle Ventures</td>
</tr>
<tr>
<td>• McKinsey &amp; Co</td>
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</tbody>
</table>
Money Laundering is a continuing challenge

Soundness of the banking system is challenged

$1.8 trillion laundered annually growing at 10%+

$321 billion fines paid by banks in the US alone since the financial crisis of 2008 until 2017

Escalating costs pose a strategic risk

Banks are still using multiple compliance technologies, and employing resources in separate teams for monitoring, screening and reporting

Banking and Financial Services (BFS) industry spent has gone up by 20% for compliance
Money Laundering is a continuing challenge

Compliance spend to touch $118 billion globally by 2020.

Regulatory fines to top ~$400 billion by 2020 just in US and Europe

~ 17 million
Annual average compliance spend is common for a +$10-billion bank.

50%
Compliance spend is on manpower. Size of compliance team has increased 10x in last 5 years.

Increasing regulatory changes, alerts volume and cost of compliance together with depleting RoI on manpower investment and hefty fines raise question on sustainability of current AML/CFT programs.
AML industry landscape
As transactions become complex, there is increased need for higher regulatory scrutiny

**Rule-based systems:** one-dimension detection logic that is unable to capture evolving AML threats and generate high volume of alerts, of which ~ 95% are false

**AI / ML models:** self-learning (supervised & unsupervised) able to detect changing scenarios, identify more true positives, increase alert-to-case ratios and significantly reduce false alerts

**Reduced efficiencies:** increasing time and effort by Compliance Analysts to triage alerts, research disparate data to determine issue and dispose

**Changing regulations and trends:** Configuring processes and legacy technologies to meet MAS requirements and industry trends

**From Blackbox to Glass-box**

- Explainable, defensible and transparent ML models

**Value Proposition**

- Scoring & Profiling: enables teams to focus on priority alerts, with documented narratives of analysis reducing time spent on alerts

**Configurable:** adaptability of AI / ML models, tuning of segmentation and rule-thresholds to keep up with changing ecosystem

**Risk Mitigation**

- AI / ML models calibrated to the bank’s’ risks, customers and complexities, resulting in reduced and prioritized hits

**Explainability**

- Glass-box, audit-trail and extraction of decision trees to explain models

**Viable business case**

- Based on efficiency gains from reduced volume of alerts and time to review alerts, can achieve huge operational cost savings within 2-3 years of implementation

---

**Value for Banks**

HPE Discover More
Why advanced Tech: AI and Machine Learning

Gen 0 & 1
- Rule-based Detection + Watch List match
- Throws too many false alerts. Cannot detect new suspicious cases, and no self learning

Gen 2
- ML-Driven
- Reduce false alerts. Detect new fraud cases with unsupervised model, refresh by data scientists

Tookitaki (Gen 3)
- ML-Driven + Self-Learning + Unknown Detection + Explainable
- Detection of new cases, self-learning and highly explainable models

2000’s era 2010’s era Current era
Tookitaki’s ML-powered Anti Money Laundering Suite (AMLS)

Features
- Self learning models
- Explanation and Audit Trail
- Smart rules creation
- Detect unknown unknowns (Unsupervised ML)
- Improved Matching and Network Detection
- Dynamic Segmentation (ML)
- Alerts Prioritization (Supervised ML)

Value drivers
- Increase in true positives for monitoring
- Alert triaging and reduction in false positives for monitoring and screening

Investigation
User Interface

Tookitaki Analytics platform

Smart typologies repository

Increase in true positives for monitoring
Alert triaging and reduction in false positives for monitoring and screening
Tookitaki AMLS value proposition

- **Detect Unknown Unknowns**
- **Investigator Insights**
- **Scenario Explainability**
- **Prioritization**
- **Explanation and Audit Trail**
- **Improved Network Detection & Dynamic Segmentation**

**Solutioned Uniquely**

1. **Accurate Predictions**
2. **Full Explainability & Auditability**
3. **Self-Learning**
4. **Seamless Integration**

- **Reduces Enterprise AML Risk**
- **Reduces Cost of AML Operations**

**HPE Discover More**
Quantifiable business value and impact

Prior to Implementing Tookitaki: Traditional Systems Fall Well Short

- Massive Numbers of Alerts for Acceptable Coverage
- Nearly All Alerts Are False Positives (93-97%)
- Result in High Risk:
  - Huge Backlogs
  - Alert Ageing
  - Investigator churn
  - Missed activity

After Deploying Tookitaki AML Name/Client Screening

- 60% Reduction in False Positive Hits (Individual Names)
- 50% Reduction in False Positive Hits (Corporate Names)

After Deploying Tookitaki AML Transaction Monitoring

- 40% Reduction in False Positive Alerts
- 5% Increase in True Positive Alerts
- Identified 12 Unknown Cases – 9 Filed as STRs

✓ Millions (USD) Saved
✓ Substantially Reduced Compliance Costs
✓ Significantly Reduced Risk
Tookitaki’s competitive advantage

- Innovating Beyond Rules-Based AML
- A Sustainable Compliance Program for AML
- Revolutionize Regulatory Compliance

Competitive Advantage

- ML Models & User Interactions Are Auditable
- Fully Explainable
- Self-Learning & Continuous Model Improvement
- Smart Typology Framework to Detect Unknown Cases
- Dynamic Typology Repository to Evolve Detection Strategies
- Intelligent Triaging to Bucket Alerts in Relevant Risk Bands

Fully Explainable
Tookitaki AMLS – high level solution architecture

- AMLS Transaction Monitoring:
  - Alerts Prioritization
  - Unknown Case Detection

- AMLS Name Matching:
  - Hits Prioritization
  - Watchlist Matching

- Tookitaki Analytics Platform:
  - Connectors
  - ML models
  - Self learning
  - Explainability
  - DSS – Data science studio
  - Relational DB

- Data Management Infrastructure:
  - Spark
  - Hive
  - Phoenix
  - Yarn – Resource management
  - HBase
  - Zookeeper
  - Hadoop distributed file system
HPE GreenLake Big Data-as-a-Service
Faster time to business insights

Design and Consulting
High performance and high availability platform

Best fit for Hadoop and AMLS
Reference Architecture on HPE x86 platform

Tailored components to fit your needs
Enterprise-grade Cloudera

Operated for you
Free your teams for more valuable contribution
## HPE AI and Data Platform solutions

### Advisory, professional and operational services

<table>
<thead>
<tr>
<th>AI Solutions Layer</th>
<th>Custom Use Case / ISV Solutions</th>
</tr>
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<tbody>
<tr>
<td>DataRobot</td>
<td>H2O.ai</td>
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<td>AiDA</td>
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<tr>
<td>Smart Lending</td>
<td>Insurance Claims</td>
</tr>
<tr>
<td>Treasury Compliance</td>
<td>AML Reconciliation</td>
</tr>
<tr>
<td>Toolkite</td>
<td></td>
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</tbody>
</table>

### AI Layer - Platform Focus

- **Machine Learning as a service**
  - DataRobot
  - H2O.ai
  - AiDA
  - Toolkite

### Data Platform Layer

- **Hadoop Ecosystem**
  - Cloudera
  - MAPR
  - Spark
- **Fast Data & Edge Data**
  - Storm
  - Kafka
  - TensorFlow

### Data Deployment Layer

- **AI and BigData Deployments**

### HPE Apollo 6500

- **HPE Apollo 6500**
  - The enterprise bridge to accelerated computing

### HPE Apollo 2000

- **HPE Apollo 2000**
  - The bridge to enterprise scale-out architecture

### HPE Apollo 4200

- **HPE Apollo 4200**
  - Optimized for Big Data Analytics and other data storage intensive workloads

### HPE DL 380

- **HPE DL 380**
  - Unprecedented levels of performance for databases and analytic workloads
Wherever you are on your AI journey, HPE can help

**Explore**
- HPE Artificial Intelligence Transformation Workshop
- HPE AI/Deep Learning Trainings

**Experiment**
- AI/ML Proof of Value Service
- HPE Agile AI Design and Planning Service

**Evolve**
- HPE GreenLake
- HPE Big Data/ AI Implementation

- Gather and validate your use cases and data
- Conduct a Proof-of-Value for select use cases
- Integrate AI to the existing applications
- Manage change, train your teams and AI systems
- Modernize data, compute, storage platforms
- Protect, manage and consume data and analytics

Understand AI, data, analytics outcomes and challenges
Align teams around common vision & plan
Explore the best use cases and technologies
HPE POINTNEXT
HPE Discover More
Thank you

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sagar.sinha@tookitaki.com
Appendix
Tookitaki AMLS Core Logic

- Alerts
- Customers
- Accounts
- Transactions

Dynamic Clustering

- Improved Matching and Network Detection
- Detect unknown unknowns
- Supervised Learning
- Prioritization

Smart rules creation
AMLS: Transaction Monitoring Alerts Prioritization

Non-alerted TXNs

- No Alerts

Detection scenario triggered

- No

Alerts

- Yes

Alerted TXNs

Self learning

Data analysis, findings & preparation

- Customer profile
- Transactions profile
- Past alerts

Training & Predictions approach

- Dynamic Segmentation
- Semi-Supervised learning
- Explainability

Alert Triaging

- L3
- L2
- L1

Investigate alerts

SAR

Productive alerts

Suspicious

- Yes

No

Reasons

Recommended For auto-close

- Yes

No
**AMLS : Name Screen Alerts Prioritization**

**Non-alerted Names**
- No Hits
- Detection scenario triggered
  - No
  - Yes
- Hits

**Alerted Names**
- Input data for NS
  - Watch list name updates
  - Bank customer name updates
  - Past alerts

1. Data analysis, findings & preparation
   - Watch list names
   - Bank Customer Name
   - Past alerts

2. Training & Predictions approach
   - NS specific Models
   - Supervised learning
   - Explainability

3. Alert Triaging
   - L3
   - L2
   - L1

**Self learning**
- Investigate alerts
- STR
  - Productive alerts
    - Yes
    - No
  - Suspicious
- Reasons
  - STR

**Recommended For auto-close**
If the account satisfies the following conditions:

1. Customer belongs to Retail Bank sector;
2. The customer’s occupation is businessman/woman;
3. Flow Through Rate of last 3 month > 0.9 and < 1.1;
4. Total amount of cash deposit in last 3 months > 80k;
5. Total amount of remittances in last 3 months > 500k;
6. The transaction volumes in last 1 month > 40;
7. The number of jurisdictions across transactions >= 3.