How Machine Learning Will Transform Finance

Rich Clayton
Vice President Product Strategy
Big Data Analytics
Oracle Corporation
@richardmclayton

CPE Credits

Today's webinar is worth 1 Continuing Professional Education (CPE) credit.

To be eligible for CPE credit, you must:

- Answer **at least 3 of the 4** polling questions (during the webinar) and have a total viewing time of **at least 50** minutes.
- Participants will have the opportunity to download their CPE certificate immediately following the webinar if above requirements are met.
- In accordance with the standards for the National Registry of CPE Sponsors, CPE credit will be granted based on a 50-minute hour.
- We are unable to grant CPE credit in cases where technical difficulties preclude eligibility. CPE Program Sponsorship guidelines prohibit us from issuing credit to those not verified by the technology to have satisfied the minimum requirements listed above.

In This Session….

- What is Machine Learning?
- What are high yield use cases in finance?
- What are the common obstacles?
- How has technology advanced?
- What you do to get started?

ORACLE

Polling Question #1

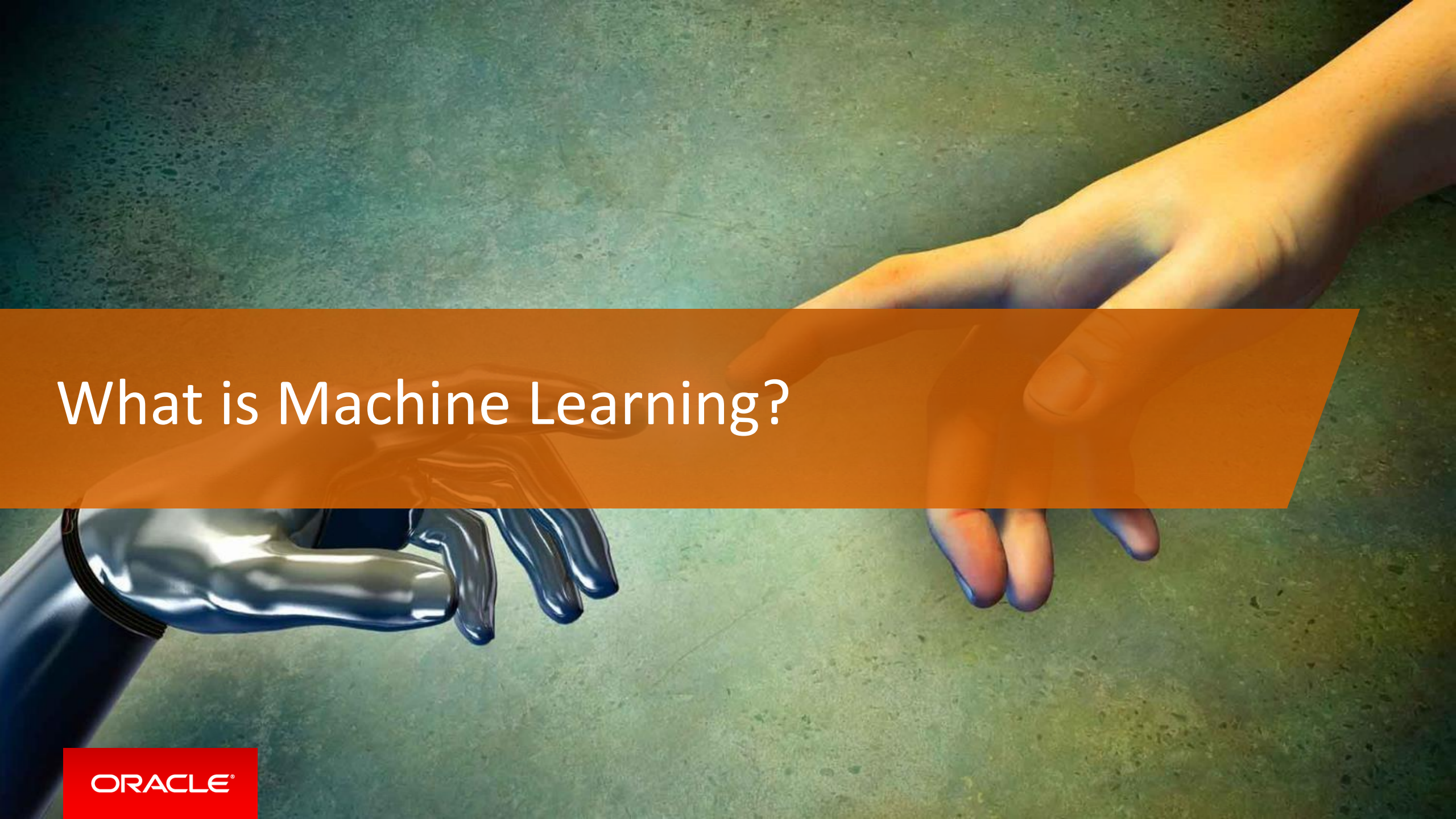
My view of ML is best described as follows:

1. Not relevant to my objectives
2. Over-hyped, too few success stories
3. Still forming an opinion
4. Has transformational potential

Organizations That Analyze All Relevant Data and Deliver Actionable Information Will Achieve Extra $430 Billion in Productivity Gains Over Their Less Analytically Oriented Peers by 2020

IDC

ORACLE



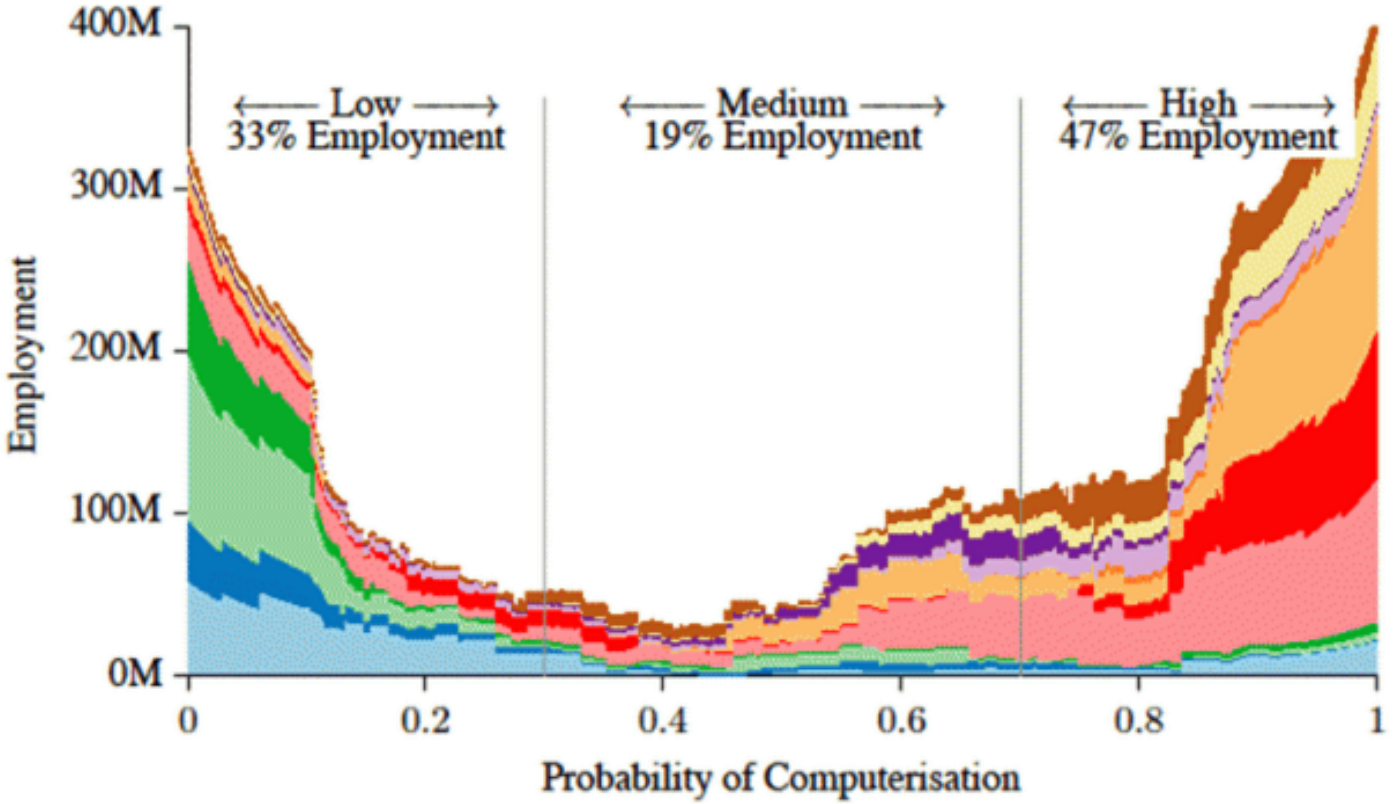
What is Machine Learning?

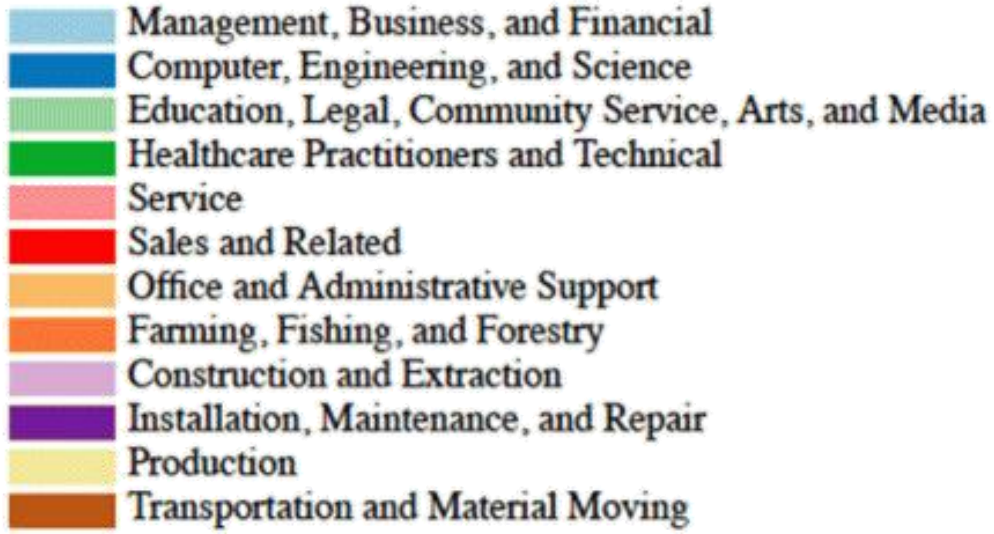
ORACLE

Robotic Bosses Unlikely in Next 10 Years

ORACLE

The Nature of Work Will Most Definitely Change



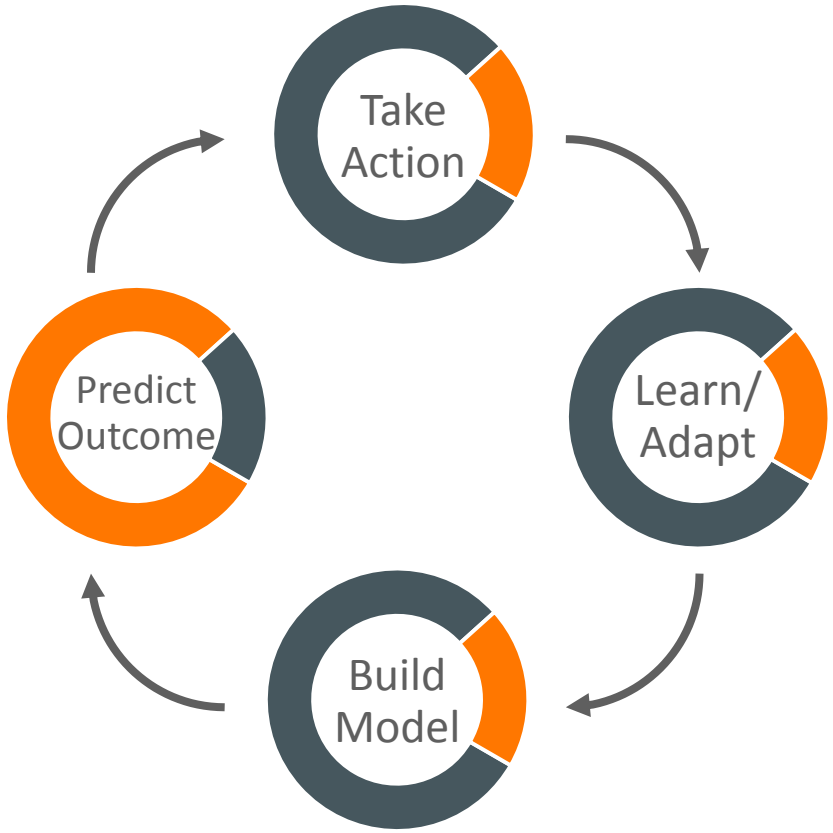


Source: Oxford University

47% US Employment @ Risk of Automation in Next 20 Years

Machine Learning Goes Beyond Predictive Analytics

YESTERDAY'S PREDICTIVE ANALYTICS

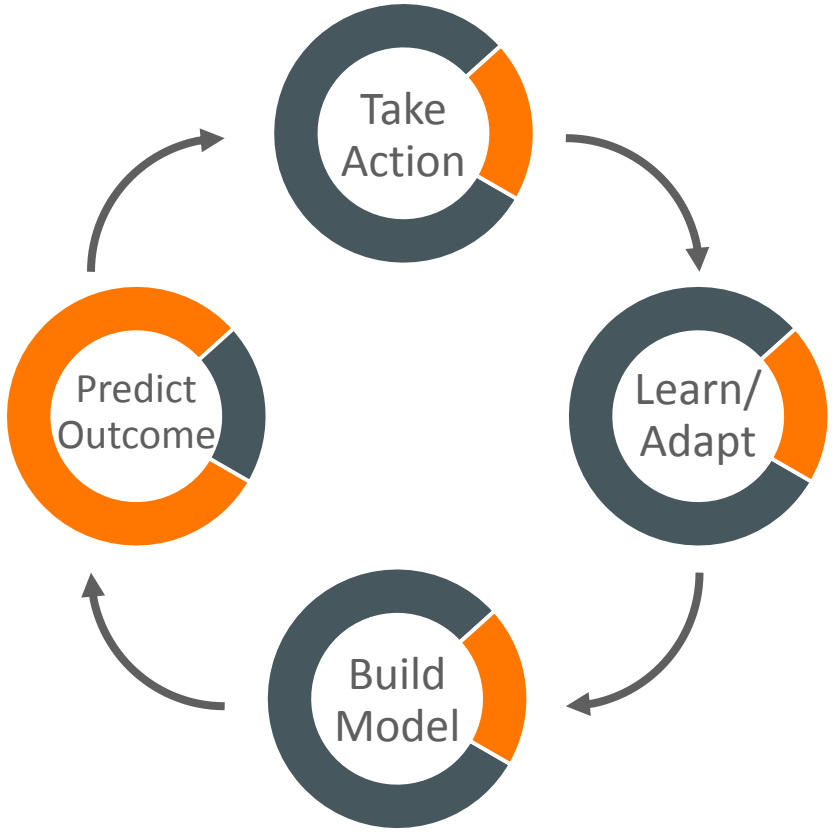


Human Machine

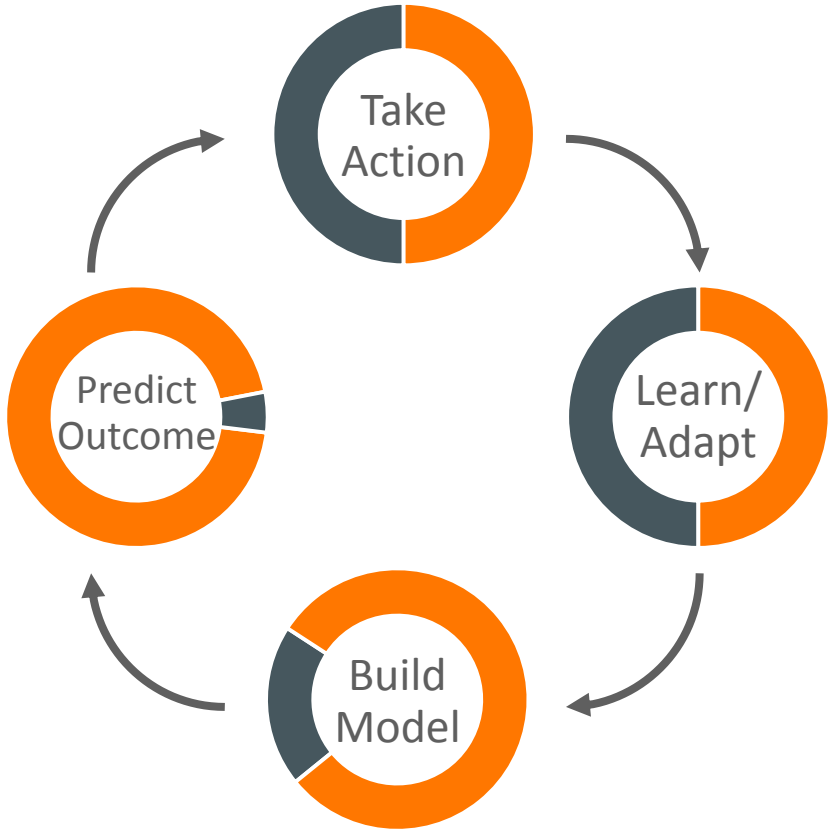
ORACLE

Machine Learning Goes Beyond Predictive Analytics

YESTERDAY'S PREDICTIVE ANALYTICS



TODAY'S MACHINE LEARNING



Human Machine

ORACLE

The New Technology Enabler

Machine Learning is based on algorithms that can learn from data without relying on rules-based programming.

McKinsey

ORACLE

Machine Learning: It's Everywhere

WORK

- Next Best Offer
- Recruiting Best Candidates
- Fraud Detection
- Supply Chain Automation
- Predictive Maintenance
- Optimize Payment Terms
- Boost Data Center Efficiency

LIFE

- Personalized Shopping
- Personalized Medicine
- Personalized Entertainment
- Improved Navigation
- Self-Driving Cars
- Virtual Assistants
- Wealth Management

ORACLE

From the Frontlines of Machine Learning Innovation

Financial Services

Large bank used ML to analyze its collection activities and learned it could eliminate more than 40% of customer calls with better outcome.

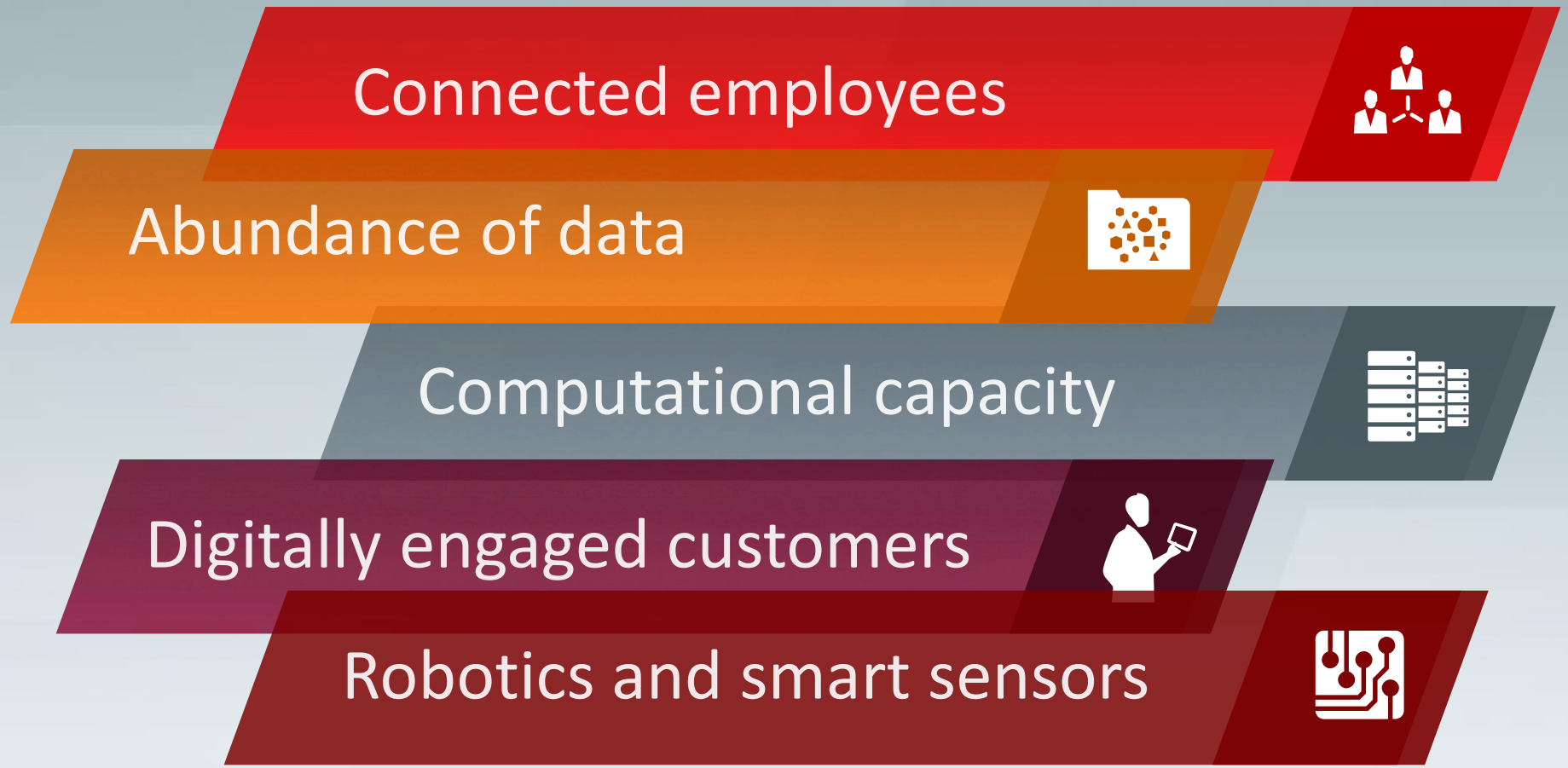
Retail

Global retailer used advanced ML to forecast customer demand cutting forecasting error in half.

Telecom

Telecom company found that their ML methods yielded a 75x reduction in ‘false-alarms’ for churn; focusing resources on those truly at risk of leaving.

Confluence of Events Happening Simultaneously

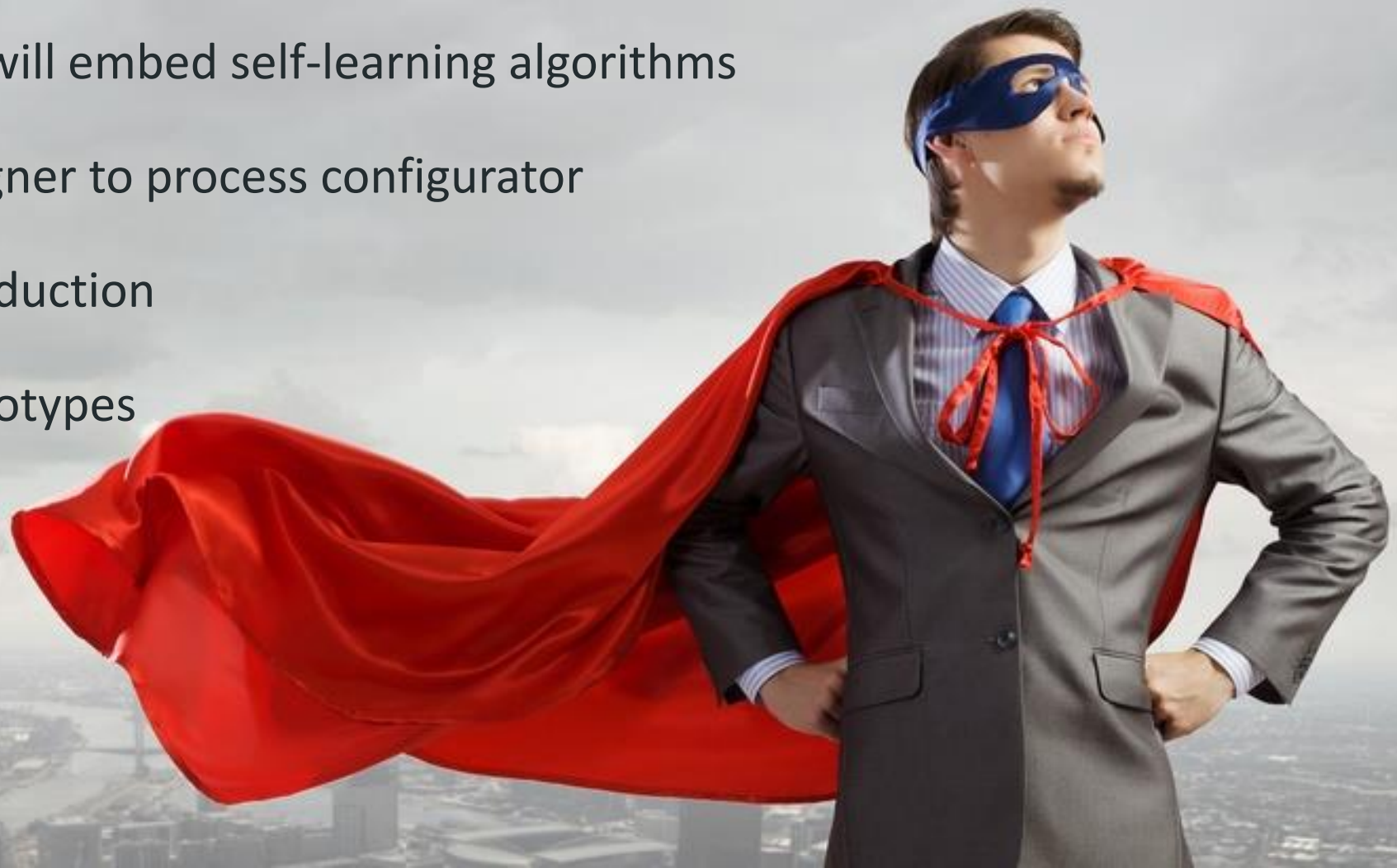


ORACLE

The Role of the Data Scientist Will Change

- Predictive models will improve over time
- Business Applications will embed self-learning algorithms
- From experiment designer to process configurator
- Monitor models in production
- Scale labs beyond prototypes
- Operationalize insights

Source: Forrester, Massive Machine Learning



ORACLE

Adaptive Intelligence – Best of Both Worlds

PEOPLE JUDGEMENT

Model inputs factors and training data, improve data imperfections, model usage (ethics)

MACHINE AUTOMATION

Simplify execution of repetitive computational, statistical processes

ORACLE

Adaptive Intelligence Platform

Discover

Prepare

Analyze

Predict

Consolidate Many Sources

Programmatic Integration

Interactive Visualization

Defined Models

Human to Machine

ORACLE

Adaptive Intelligence Platform

Machine to Human

Auto Explain

Recommend Best Action

Contextual Insights

Self-Learning Algorithms

Discover | **Prepare** | **Analyze** | **Predict**

Consolidate Many Sources

Programmatic Integration

Interactive Visualization

Defined Models

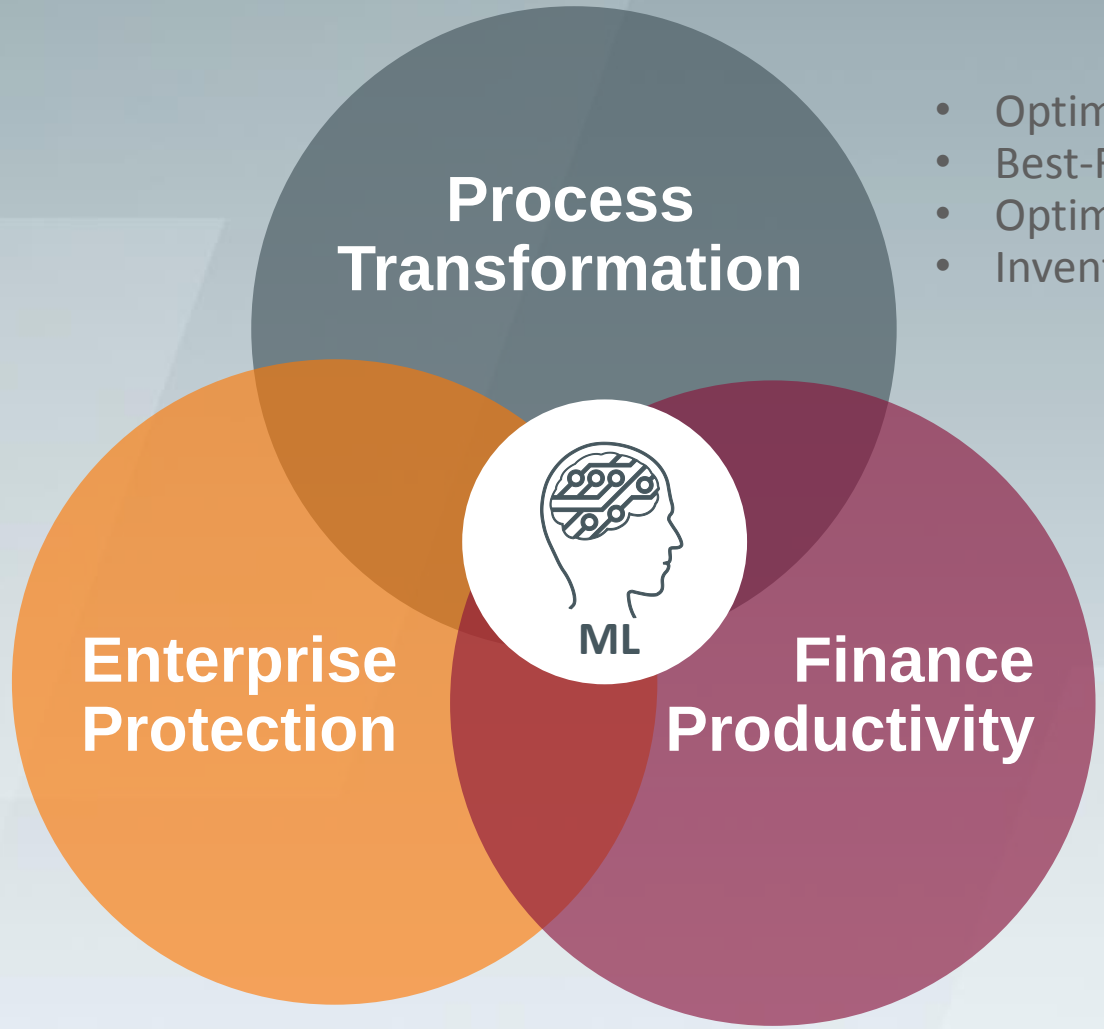
Human to Machine

ORACLE

How can ML be applied at all levels of the finance organization?

ORACLE

Framing the Opportunity Space



- Optimized Payment Terms
- Best-Fit Suppliers
- Optimized Demand Sensing
- Inventory Management

- Employee safety
- Consumer fraud
- Employee theft
- Physical & Cyber-security

- Autonomous Discovery
- Narrative Automation
- Expense Audit
- Tax Analytics
- Smart Forecasts
- Account Reconciliations

ORACLE

Assessing these Opportunities

Process Transformation

- What 3rd party data could we use to add more science to the optimization?
- How can we interact with our suppliers so they understand demand changes in real time as they occur?

Enterprise Protection

- How fast can we we proactively identify critical suppliers at risk of non-delivery or failure?
- How well guarded is our infrastructure protected against internal and/or external hacking?

Finance Productivity

- Which pattern(s) indicate an employee is attempting to game the expense management system?
- How will continuous forecasting change the way we plan and budget our finances?

Polling Question #2

Highest value use case for my organization:

1. Process transformation
2. Finance productivity
3. Enterprise protection

What are the common obstacles?

"Bottleneck is management, implementation and imagination."

Andrew McAfee
Principal Research Scientist
MIT Sloan School of Management

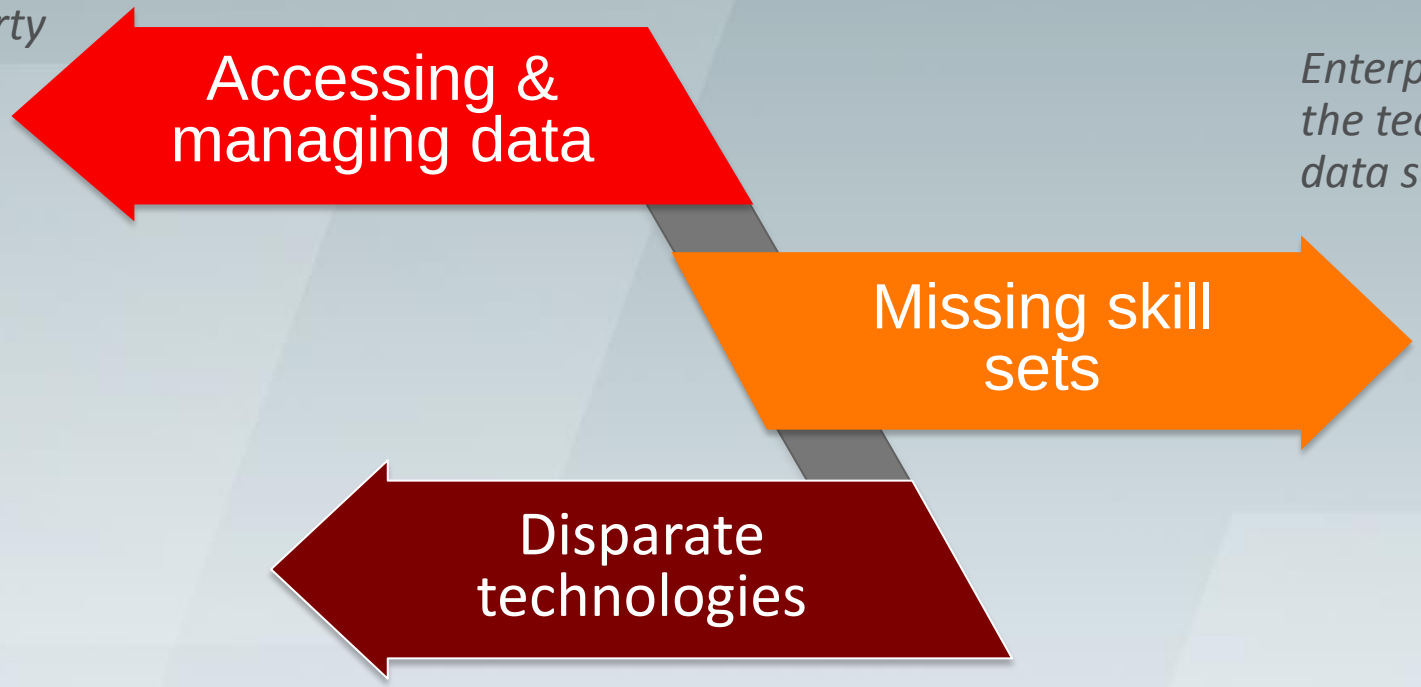
ORACLE

Source: HBR, The Business of Artificial Intelligence

Hurdles to Overcome on the Path to ML Adoption

Limited data, limited skills and complex technology stack make ML adoption difficult

Bringing together enterprise and third-party data meaningfully



Enterprises do not have the technologists and data scientists needed

Non-integrated stack within the enterprise presents challenges

Polling Question #3

Our biggest obstacle is:

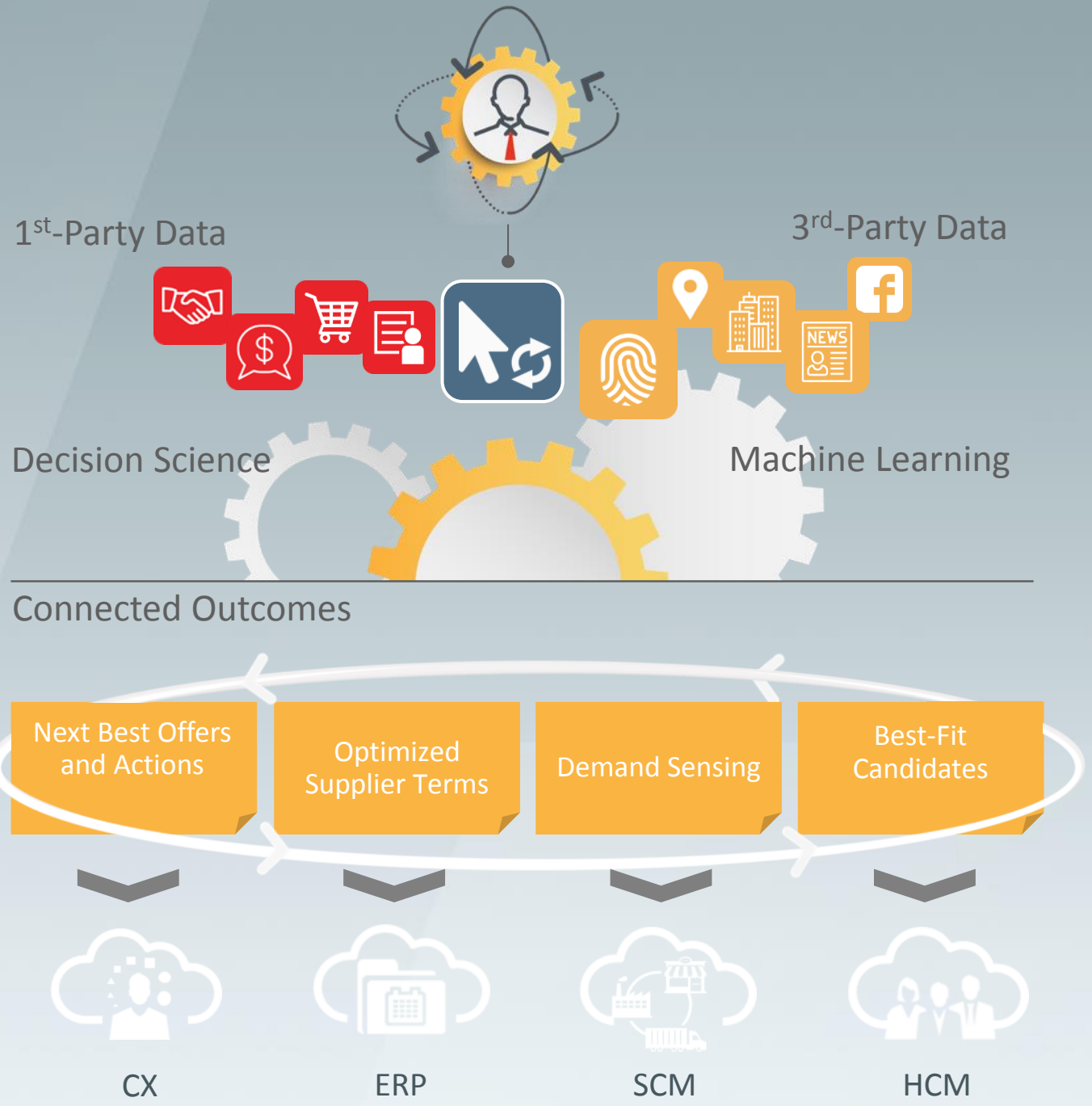
1. Management buy-in / perceptions
2. Insufficient data
3. Analytical skills in finance
4. Data platform
5. Other

How is ERP embracing Machine Learning?

ORACLE

Oracle's Adaptive Applications

- Purpose-Built and Ready-To-Go
- Enriched with 3rd-Party Data
- Bundled Decision Science
- Built on the Modern Cloud
- Connected Intelligent Outcomes



ORACLE

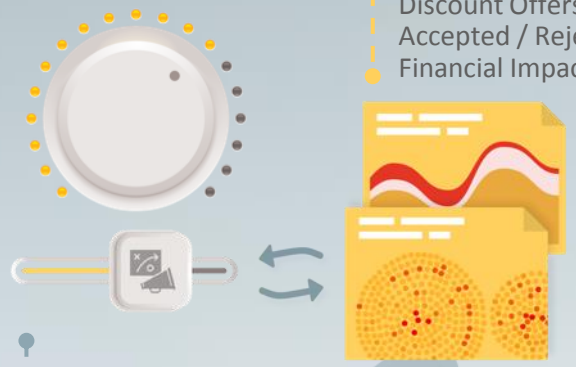
How Would ML Work in an ERP Process?

1st-Party Data
Payables, Suppliers, Treasury Position,

3rd-Party Data
Company Profiles, Business News, Regulatory Actions,

Insights
Discount Offers Accepted / Rejected, Financial Impact

Feedback
Discount Offers Accepted / Rejected



Oracle ERP Cloud

Supervisory Controls
Program Definition, Supplier Eligibility, Supplier Opt-in

Decision Science
Artificial Intelligence, Machine Learning Algorithms

Surfaced Outputs
Stack Ranked Supplier Eligibility and Discount Offers

Channel Delivery
Web, Email, Mobile, Digital

ORACLE

How are analytics platforms embedding machine learning to serve finance?

ORACLE

Image Recognition: More Room to Grow

Muffin or Chihuahua

Apple or Owl

ORACLE

Designers Are Thinking About….

- Why do you receive 65 push notifications per day on your cell phone but 0 from your business?
- What your analytics systems are doing while you are sleeping?
- Why you spend so much time explaining simple variances when much can be automated?
- Why you can ask our mobile for directions to find nearest restaurant but you can't ask our system how revenues are trending in Italy?

ORACLE

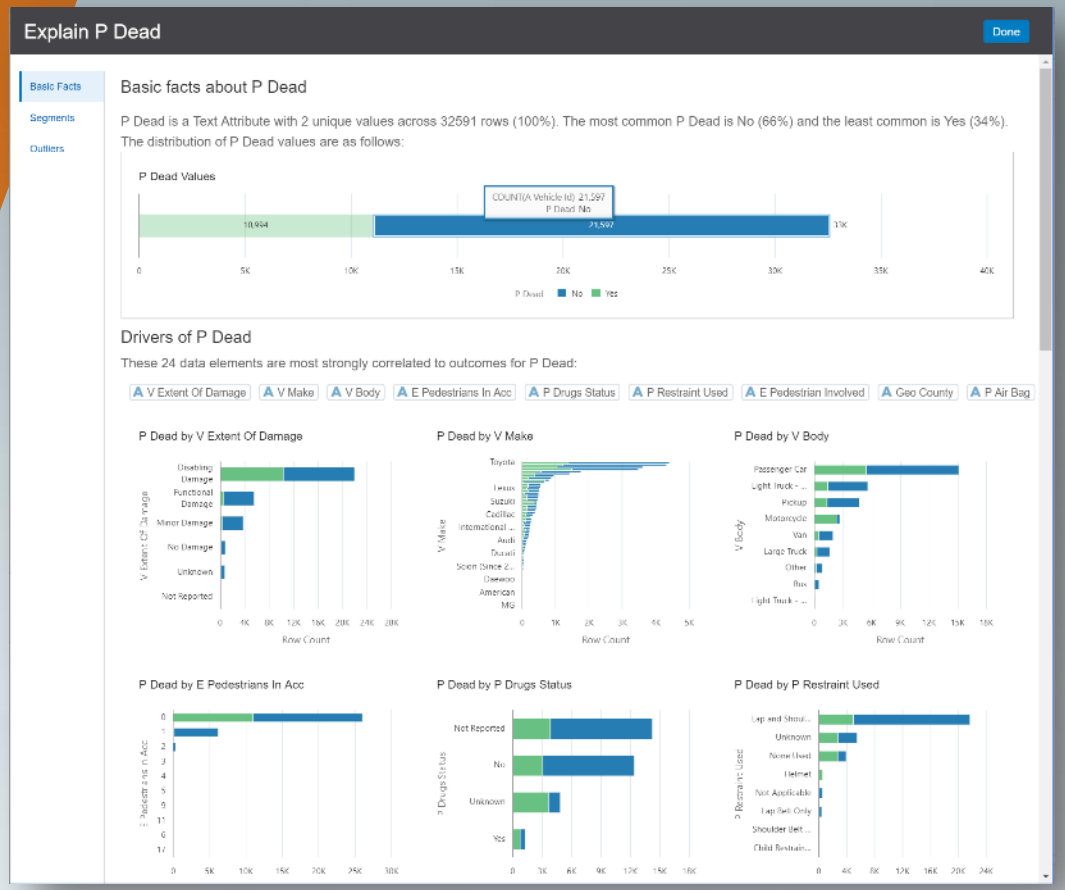
Autonomous Data Discovery

What is it?

- In-line **Machine Learning** for the business user with no specialty skills required
- Uncovers hidden drivers and recommends areas of exploration without user actively analyzing specific factors

Why does it matter?

- Guide the user to areas of interest they might not know to look at
- Freedom to explore data more fully without specialist intervention
- In-depth statistical analysis on contextual data enriches the interactive analytic experience



Self-Learning Contextual Insights

Anticipates questions through self-learning

- Infuse data-based insights into daily activities
- Get customized feeds based on what you are interested in, when and where you are interested in it, and who you collaborate with
- Anticipates your needs and delivers appropriate information to help you make better informed decisions throughout the day
- Use your device's voice capabilities to obtain answers

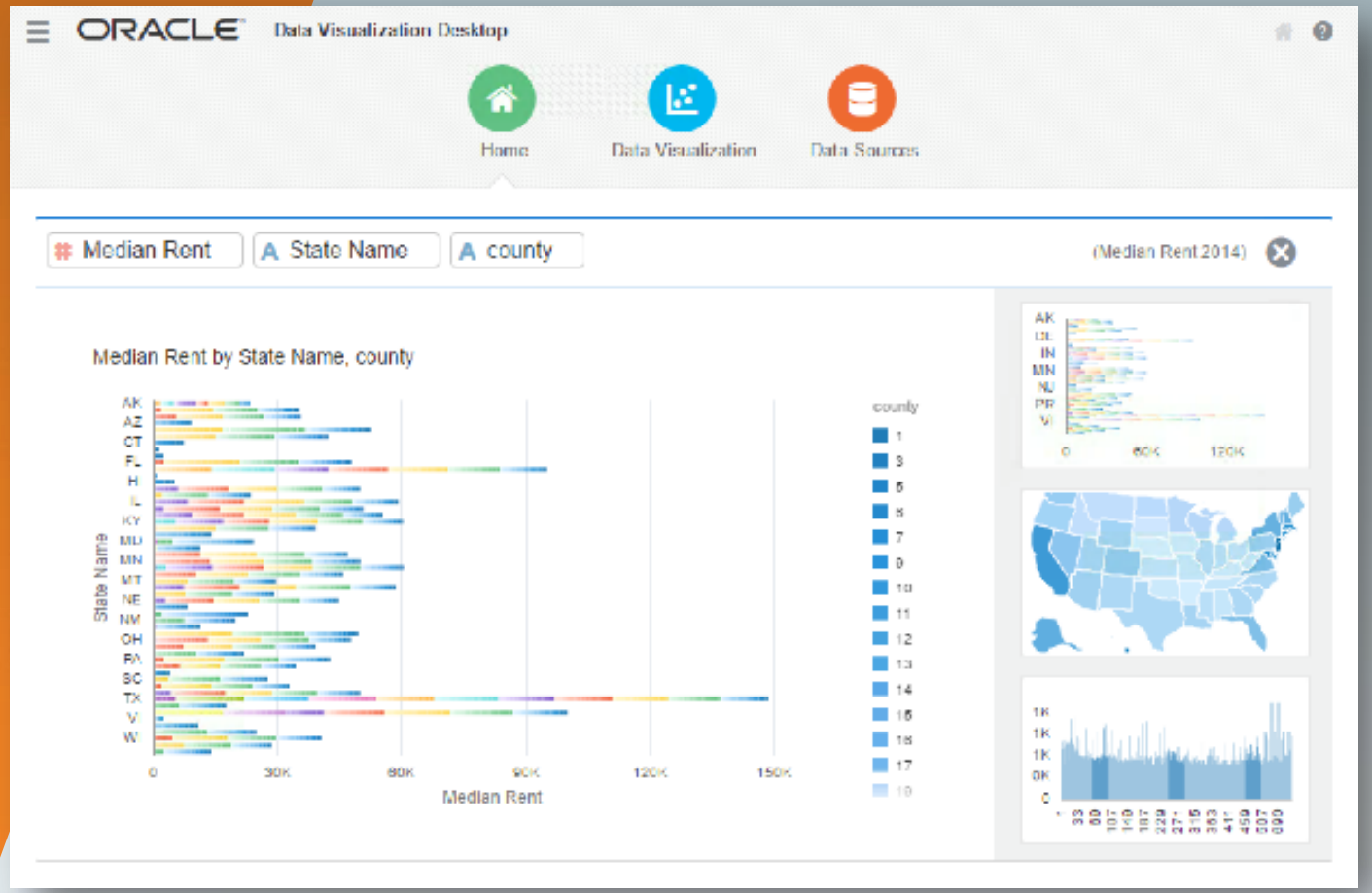
Voice Activated Conversational Analytics

Powerful, intuitive keyword search

- Interprets semantic layer, user private data, expression library and catalog artifacts
- Voice-enabled
- Fuzzy match, stemming, natural language processing
- Generates on-the-fly queries - visualizations are auto-created while user types

Available on all platforms

- Mobile
- Browser
- Desktop



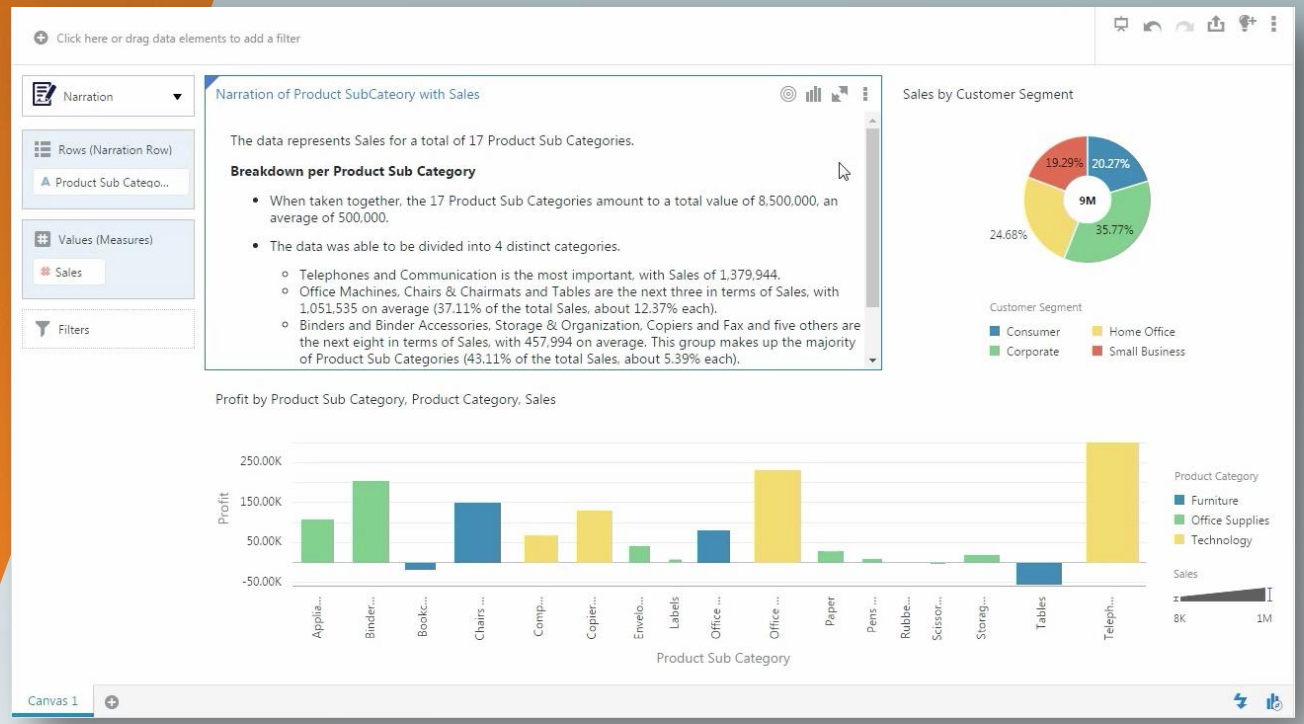
Natural Language Generation

What is it?

- NLG as standard visualization type
- Narrative auto-generated based on visual grammar
- Building block for other conversational interface capabilities

Why it matters?

- As analytic interfaces become more conversational, you need words in natural language to enhance the meaning of visualizations
- Summarizing and highlighting salient points on a chart allows users to focus on what matters and helps filter out the noise



How do you get started with ML?

ORACLE

Your Action Plan

- Digitize and save all data!
- Create data lab for experimentation
- Form data ethics committee
- Build advanced analytic competencies and finance
- Embrace cloud; it's faster!

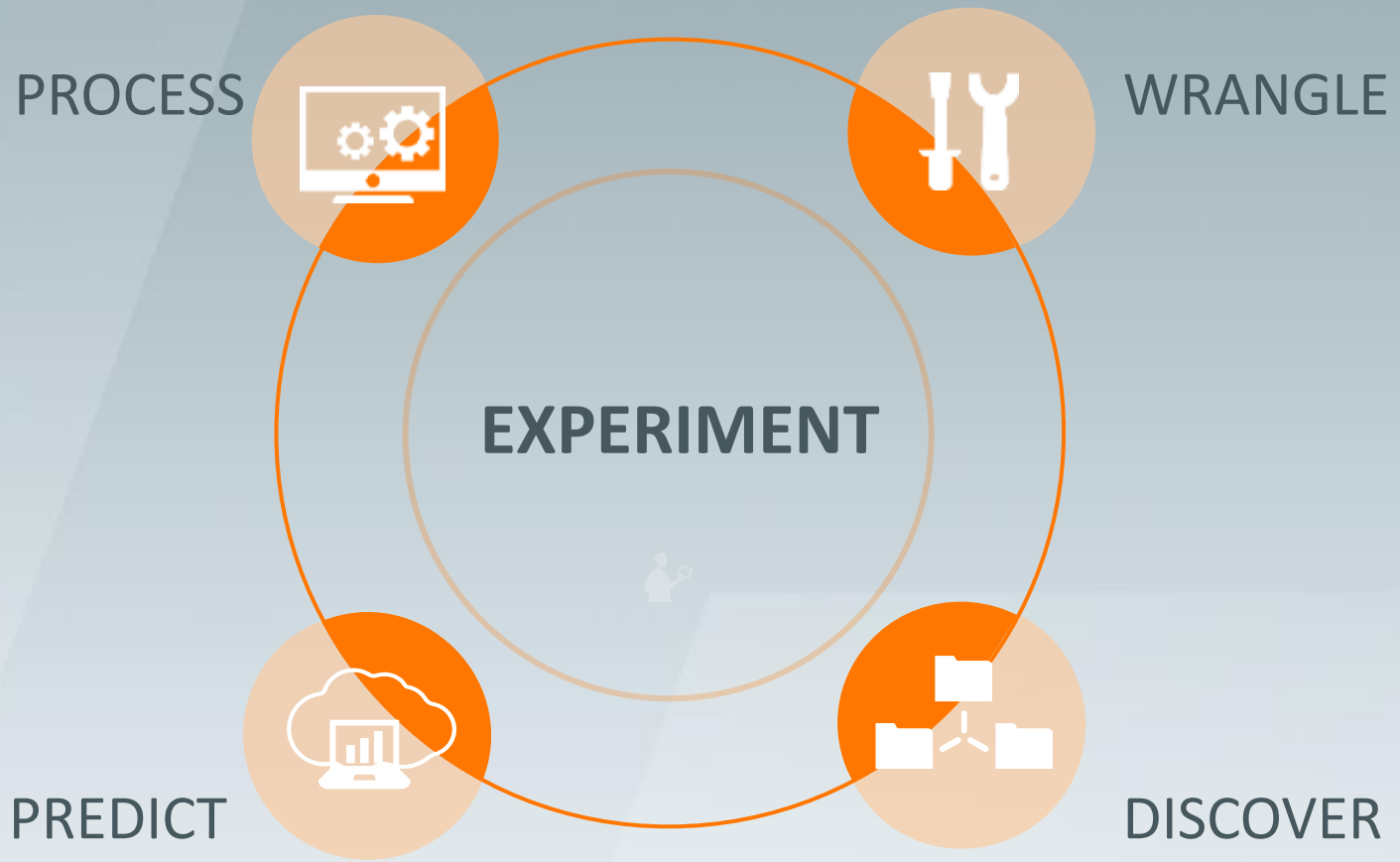
Polling Question #4

On a scale of 1-5, how prepared is your finance organization to embracing the potential of machine learning?

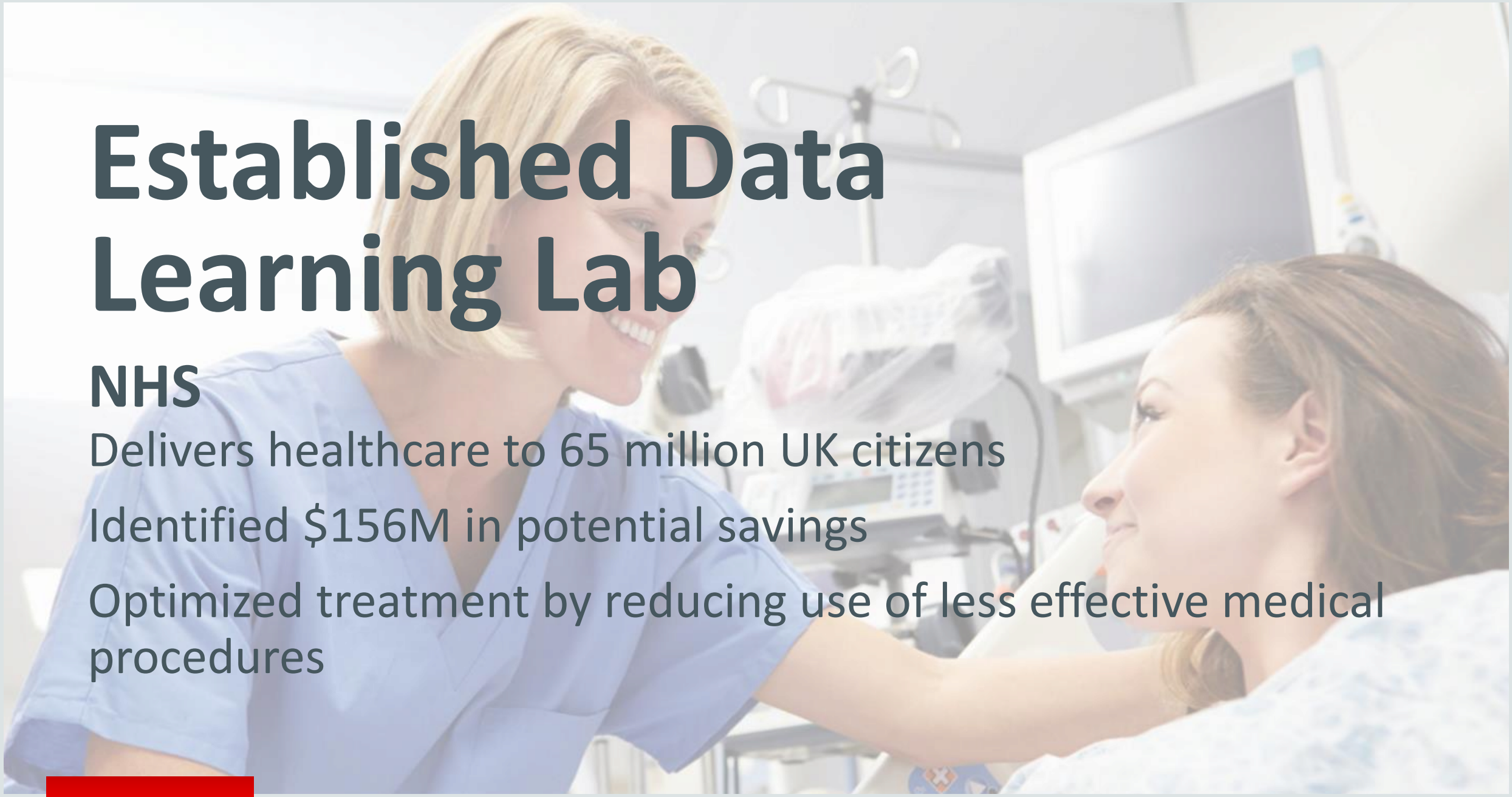
1. Research not yet started
2. Early days, skill gap exists
3. Have skills and started to explore potential
4. Project identified and scoped
5. Using ML today

Form a Data Lab: A Fundamental New Approach

- Build a system of innovation, not just system of record
- Understand data potential
- Enrich the data and make it better
- Unlock insights and share the value
- MIT rule of thumb: 6 x 6 x 6



Established Data Learning Lab



NHS

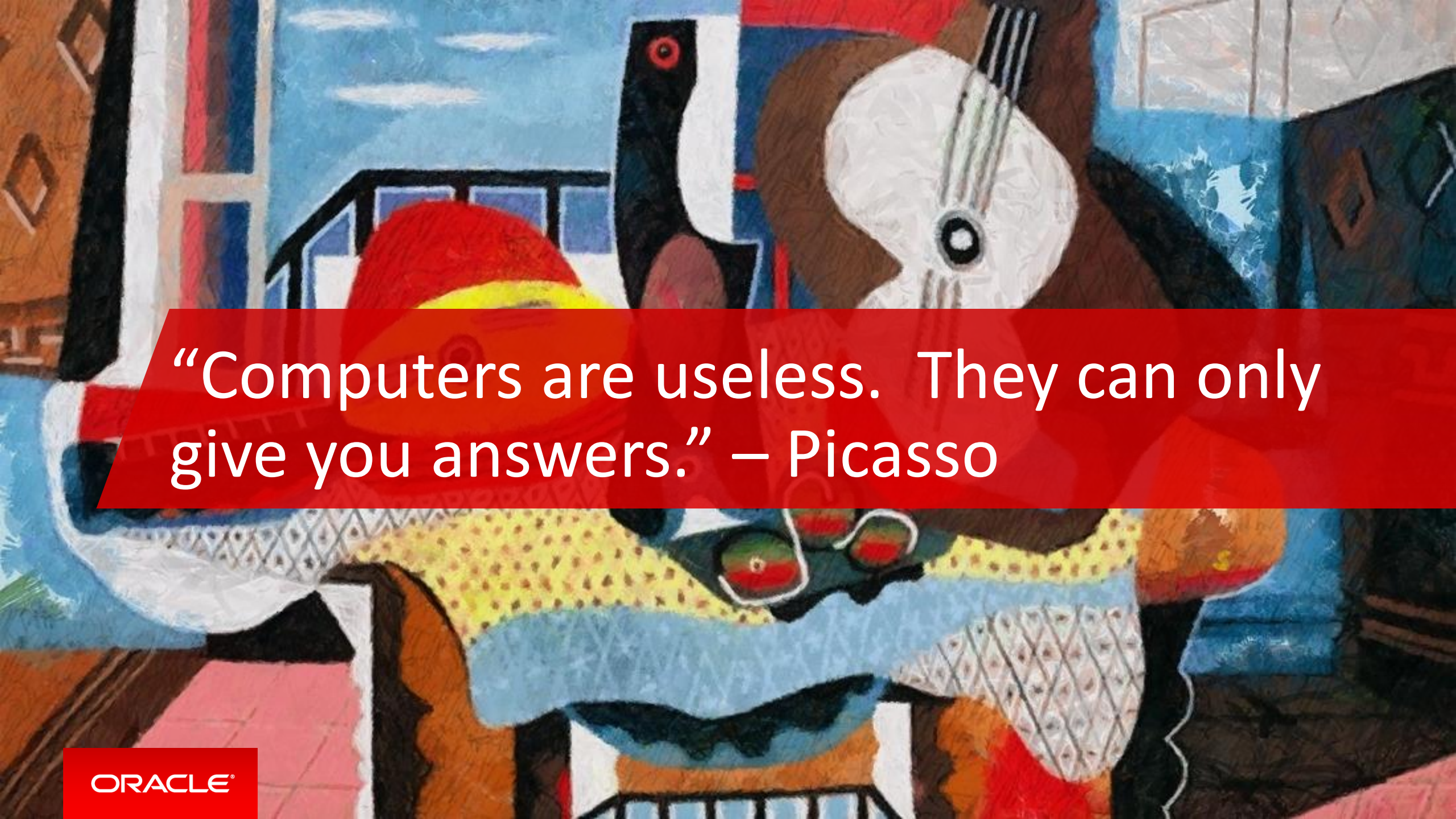
Delivers healthcare to 65 million UK citizens

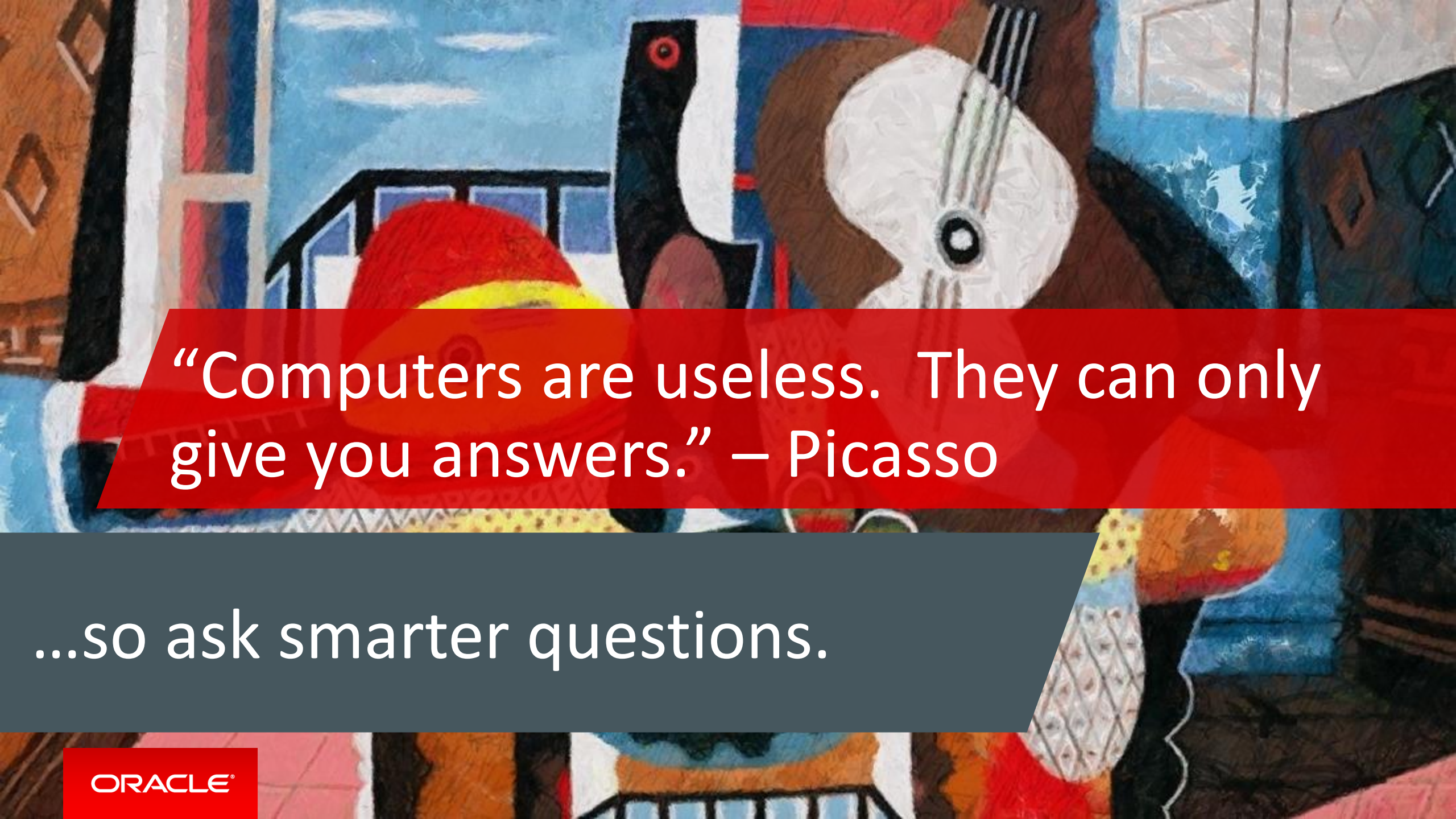
Identified $156M in potential savings

Optimized treatment by reducing use of less effective medical procedures

Deepen Analytic Competencies in Finance

- Storytelling
- Machine Learning
- Scenario Analysis
- Data Visualization
- Analytic Process Design
- Data Wrangling
- Visualization
- Text Analysis


“Computers are useless. They can only give you answers.” – Picasso


“Computers are useless. They can only give you answers.” – Picasso
…so ask smarter questions.
ORACLE

MODERN FINANCE EXPERIENCE

Presented by

ORACLE

Save the Date

ModernFinanceExperience.oracle.com

February 13-15, 2018

New York, NY

#OracleMFE

ORACLE