

ROBOTIC AND COGNITIVE AUTOMATION

Deloitte Perspectives on Financial Services

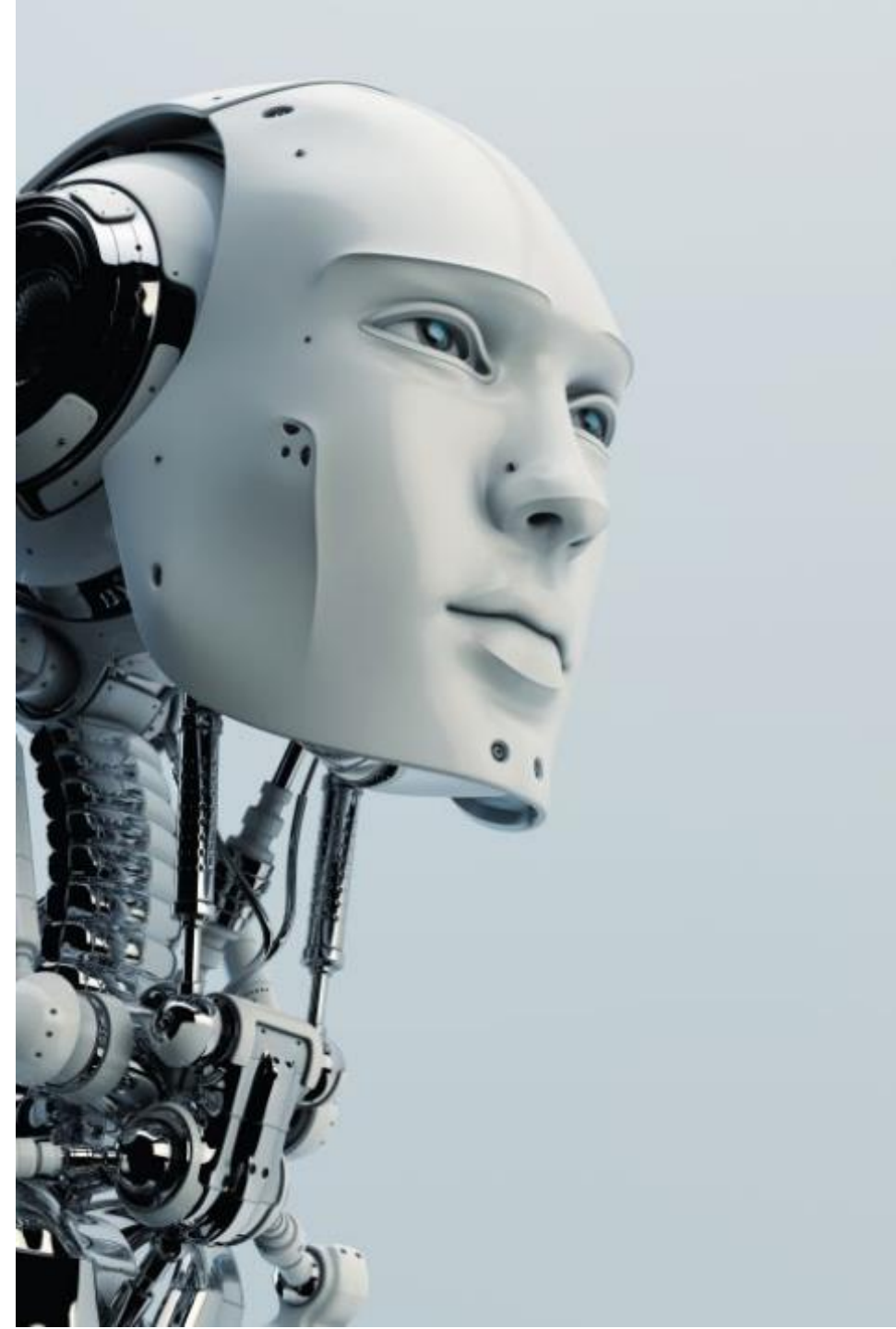
Deloitte Consulting

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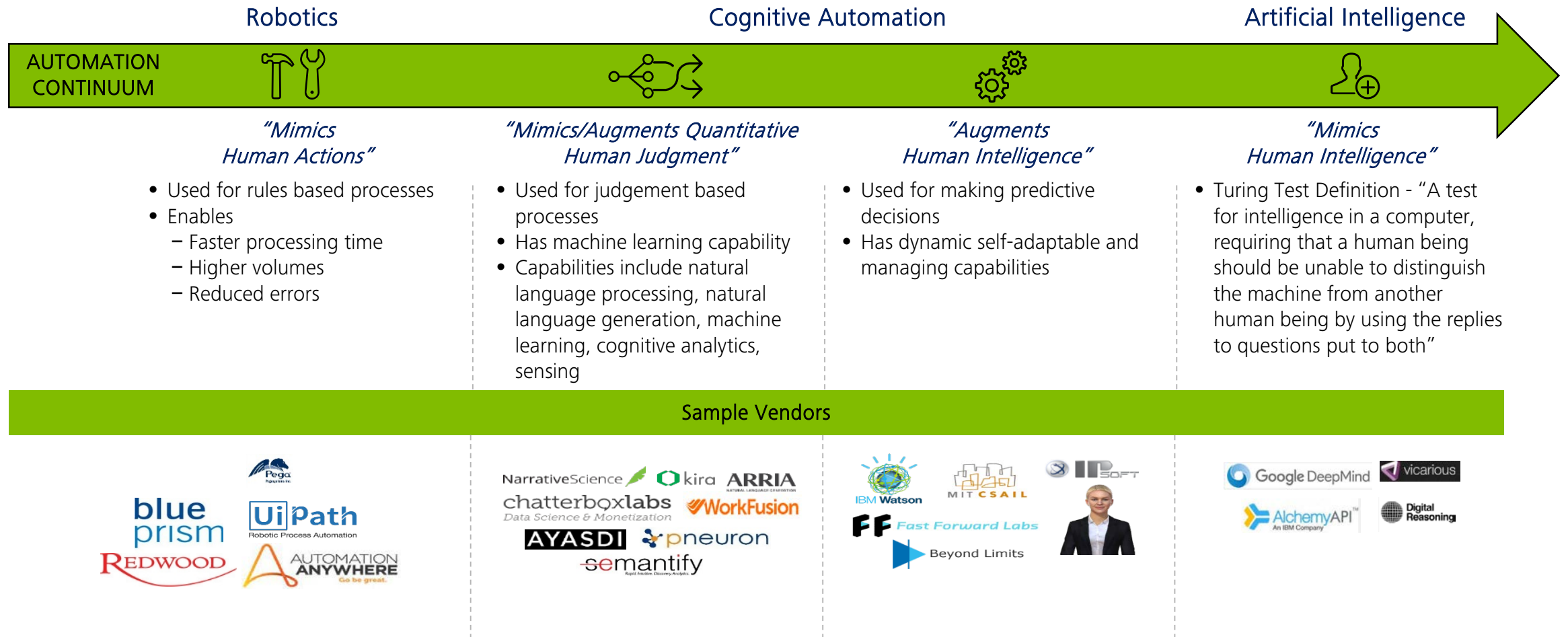
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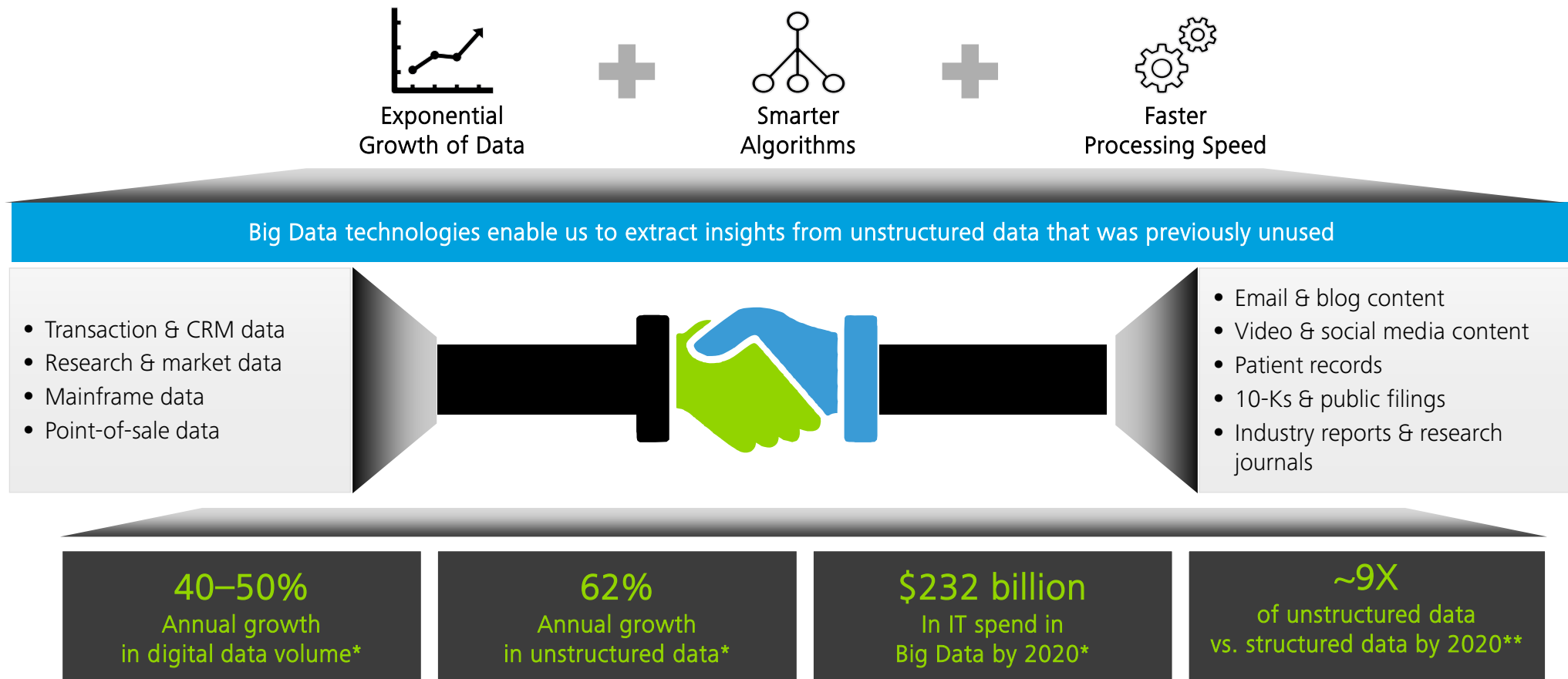
BACKGROUND AND MARKETPLACE PERSPECTIVES

SETTING THE STAGE: THE AUTOMATION SPECTRUM

Robotic and Cognitive Automation (R&CA) replicates human actions and judgement at tremendous speed, scale and quality, and lower cost

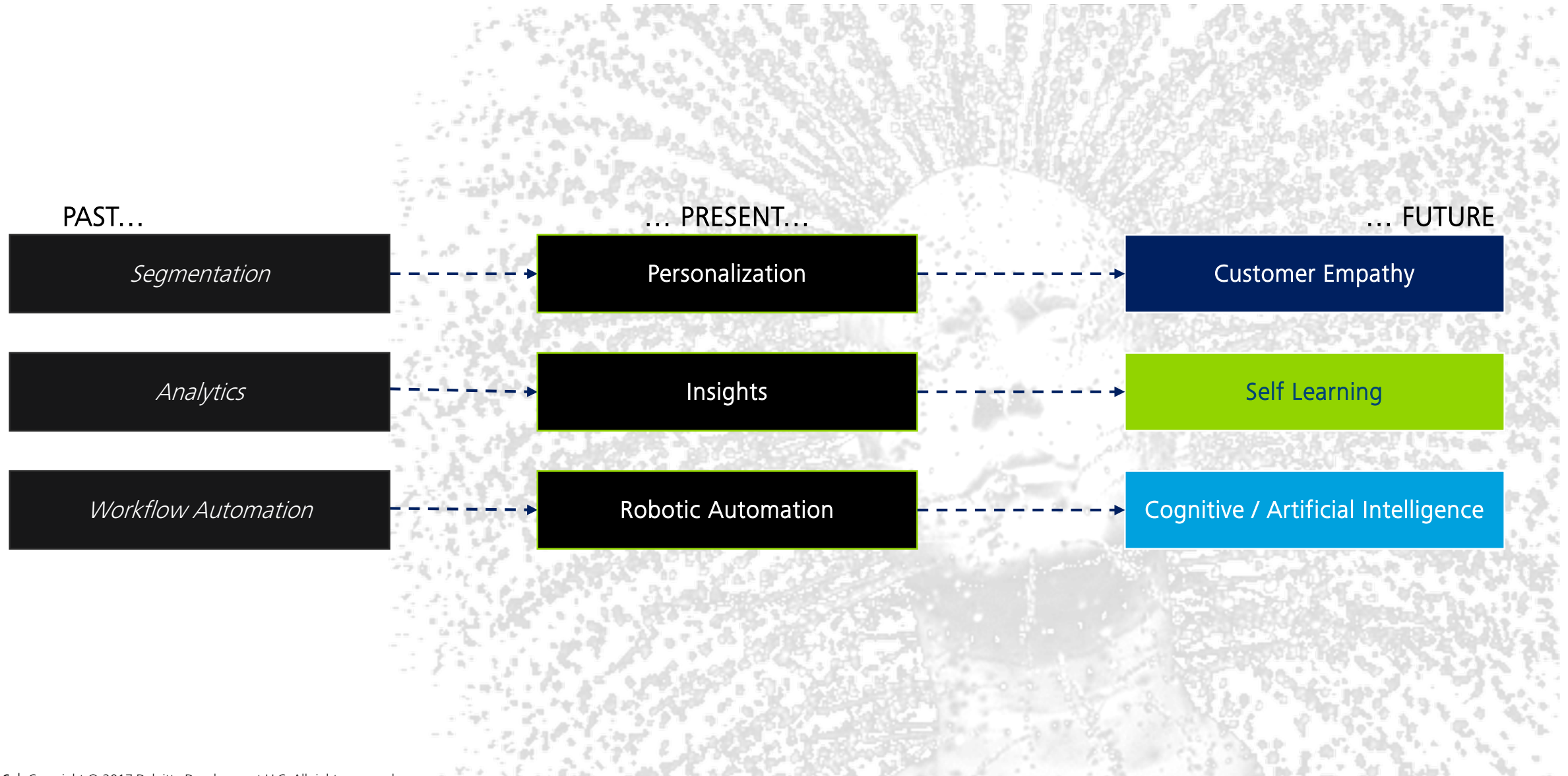


PROCESS INEFFICIENCIES, ALONG WITH GROWTH IN UNSTRUCTURED DATA, ARE RAPIDLY DRIVING ADOPTION



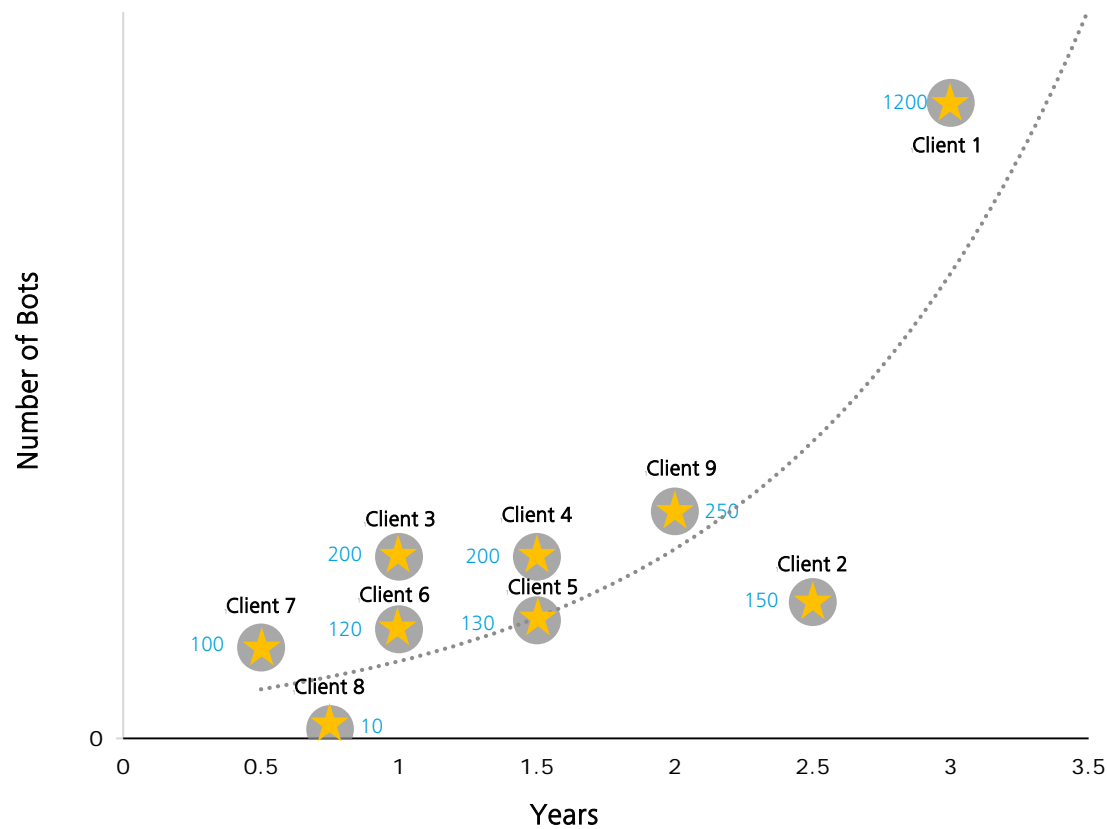
- HP Autonomy, Transitioning to a new era of human information,
- ** Steve Hagan, Big data, cloud computing, spatial databases

THE FUTURE IS ARRIVING QUICKLY

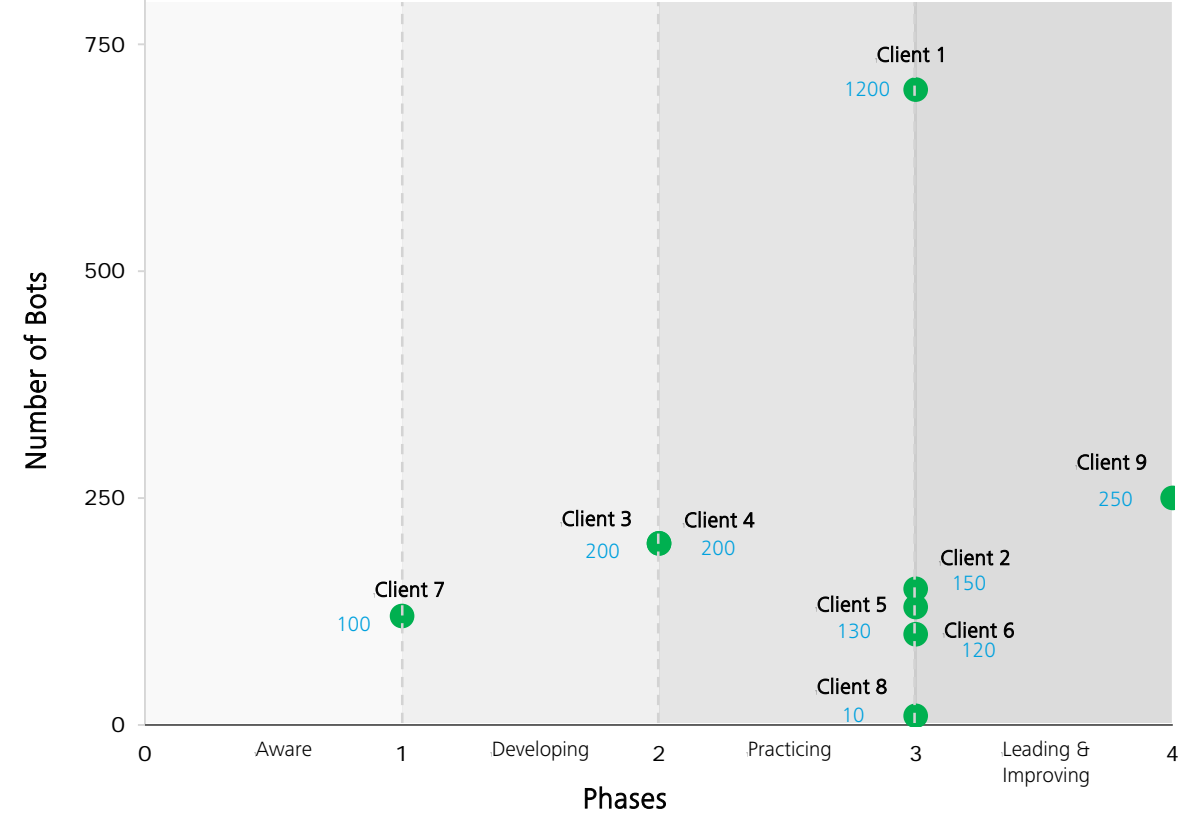


R&CA PENETRATION HAS VARIED ACROSS INDUSTRY SECTORS – INSURANCE AND ASSET MANAGEMENT ARE LAGGING BEHIND BANKING AND SECURITIES

Number of bots over time



Number of bots over maturity phases

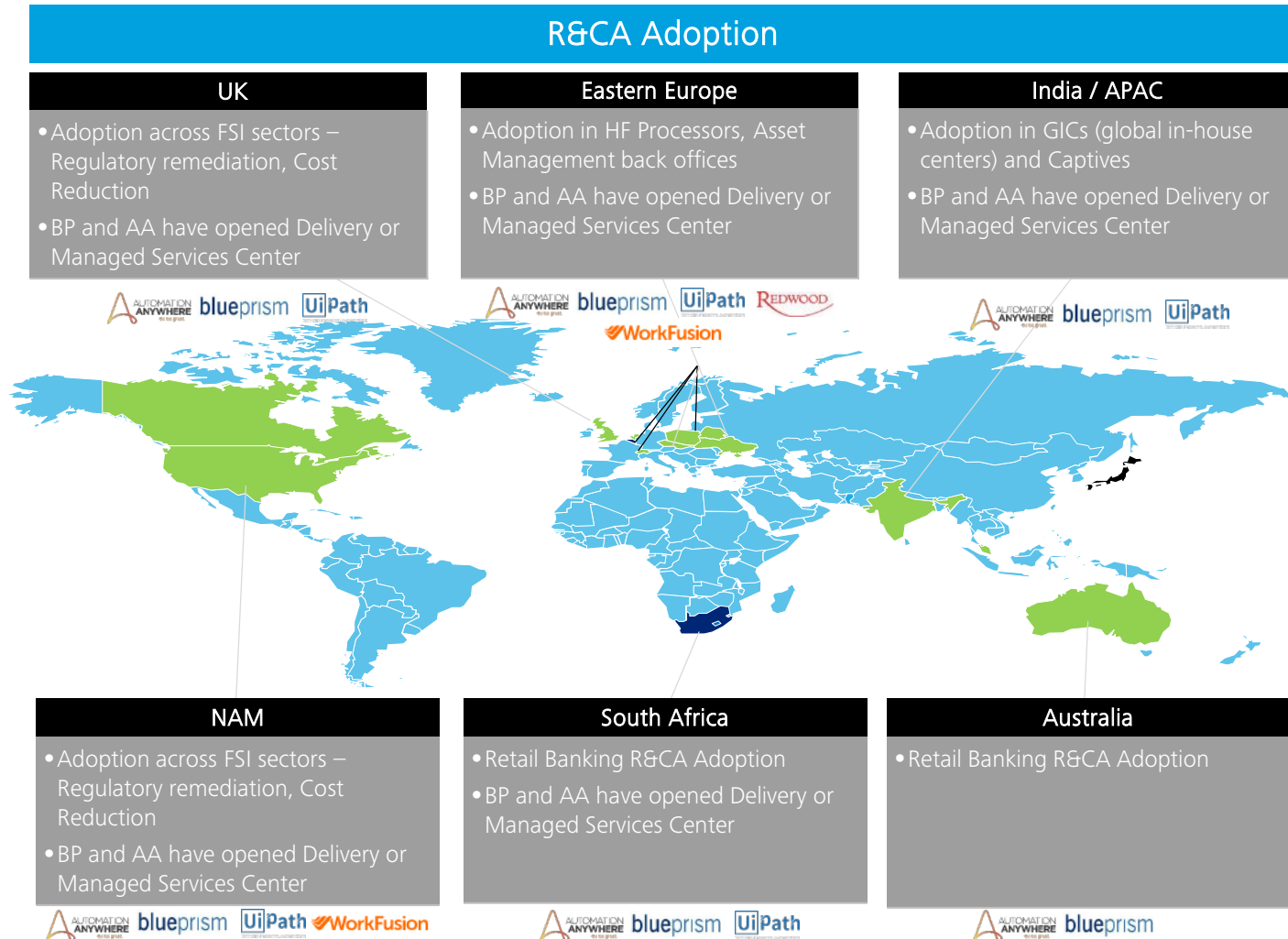


While organizations initially showed restraint when embarking on their robotics journey, they are swiftly gaining momentum as they progress through the phases of maturity. Adoption has been a function of large scale operations in retail financial institutions

Legend:

- Client 1 – Retail bank in APAC
Client 2 – Large global bank
Client 3 – Large global bank
- Client 4 – Global based bank
Client 5 – Global financial services firm
Client 6 – Global custodian bank
- Client 7 – Large European bank
Client 8 – Global retail bank
Client 9 – Regional European bank

GEOGRAPHICALLY, R&CA ADOPTION IS FOCUSED ON LOCATIONS HOSTING LARGE SCALE, MANUALLY INTENSIVE PROCESSES



Considerations

- ❑ Adoption focused on Large Global Banking Centers and related back office locations
- ❑ Tool providers have developed local delivery and managed services centers to support growing R&CA market
- ❑ Geographical breadth has strained automation tool providers' capacity to support clients in local markets and provide adequate training
- ❑ Clients are increasingly looking for managed services for bot / solution development, deployment and maintenance

R&CA DEPLOYMENT ACROSS OTHER INDUSTRIES HAS LESSONS FOR FSI

Large Health Plan and Provider

- Strategic Objective: Re-purpose a third of the workforce using R&CA to address cost pressures (60,000 out of 180,000 employees)
- Plan :
 - 7 bots currently deployed
 - 40 processes identified for automation in current year
 - Plan to scale to 500 Bots in 3 years

Large Industrial Manufacturer

- Strategic Objective: Reduce FTE count over 3 years by use of R&CA
- Plan:
 - 39 processes identified for automation
 - \$3MM savings targeted over 3 year period

☐ CoE Set up is crucial for automation program success

☐ Funding - Ensure appropriate funding of program to support adoption speed

☐ Change Management is critical – struggled with impact on labor unions

☐ Process selection, adequate documentation is critical for business case viability

☐ Skill Sets – struggled with bringing a mix of Operations and Technology resources

☐ Path to production and maintenance of bots post production cannot be underestimated

OVER THE COURSE OF ADOPTING R&CA, CLIENTS HAVE ENCOUNTERED CONSISTENT SUCCESSES AND CHALLENGES

Successes

Capacity Creation

Successful implementation has led to creation of additional capacity allowing staff to focus on more value-added tasks

Better Stakeholder Experience

As RPA is rule based, error rates are substantially reduced, resulting in a better experience for both internal and external stakeholders

More Meaningful Jobs / Empowerment

Reduction / elimination of mundane and repetitive jobs is resulting in higher job satisfaction

Positioning for the Future

Successful implementation of Robotic automation is creating a momentum for future exploratory efforts towards Cognitive automation

Total Process Transformation

During the RPA process, traditional methods of performing certain activities are being overhauled resulting in total process transformation as opposed to incremental improvements

Challenges

Estimation of Expected Benefits

Accurate benefit estimation during business case creation has been a challenge due to lack of available capacity metrics

Fragmentation of Processes

RPA benefits are maximized when processes are consolidated i.e. hand-offs across multiple groups are minimized, otherwise, only parts of the processes get automated resulting in limited benefits

Governance

Lack of structured approach to automation, including organizational structure and controls to coordinate / manage it; a COE is critical for successful R&CA programs

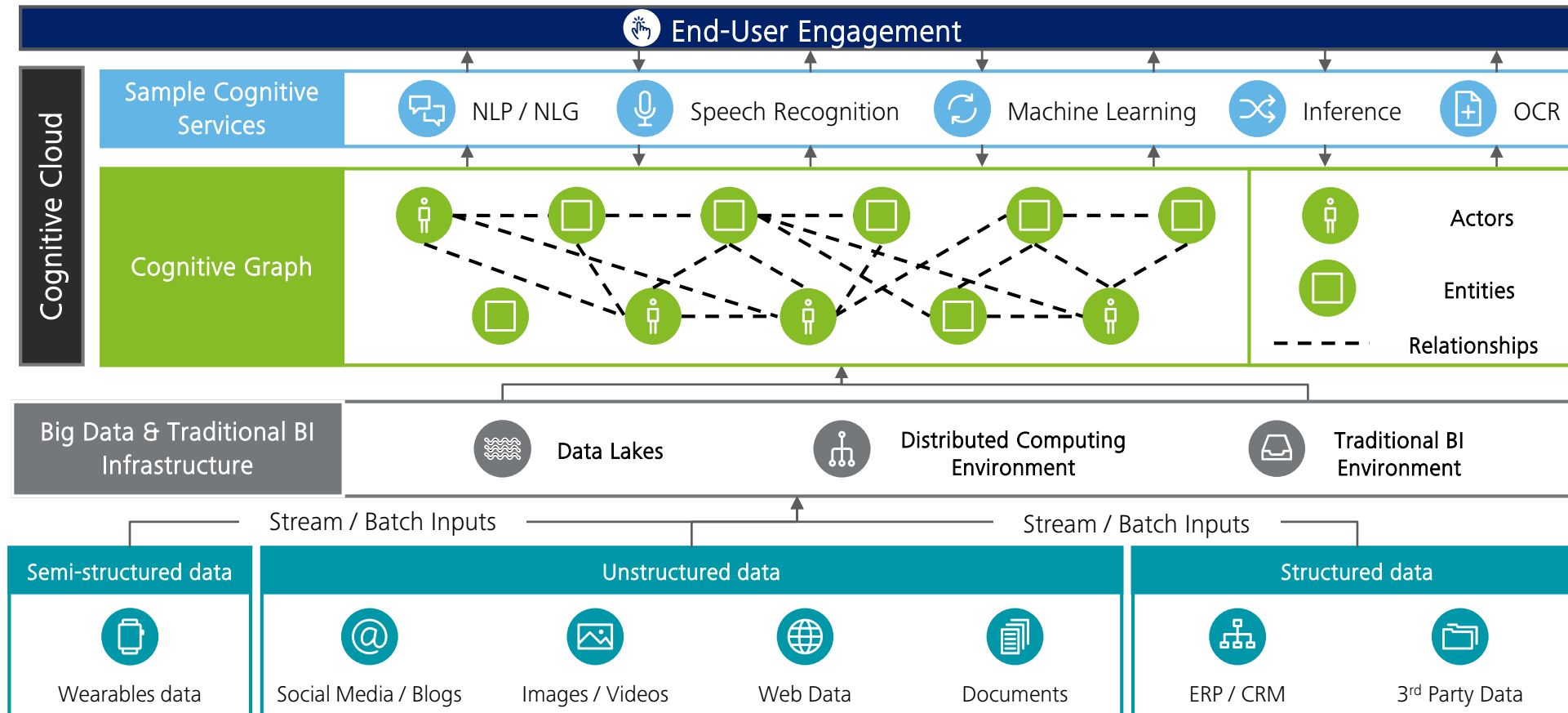
Adhoc Approaches

Multiple, uncoordinated automation ventures across functional groups result in adhoc processes / methods of automation. Initial failures could cause resistance for adoption

Limited Availability of Skills

Limited availability of skilled resources to manage an automated process (involving humans and bots); limited focus on Bot design, deployment and maintenance

SCALABILITY AND MODULARIZATION OF AUTOMATION SOLUTIONS - COGNITIVE SOLUTIONS CAN COMPLEMENT AND ENHANCE EXISTING INVESTMENTS



SOME R&CA USE CASES ARE COMMON ACROSS FSI CLIENTS

REPORTING

- ❑ **Client Reporting** -
Standard client reports / template population (bolt on commentary generation)
- ❑ **Regulatory Reporting** -
Automated data gathering and template population w/ software logs for reference



COMPLIANCE

- ❑ **AML / KYC** - *Transaction Monitoring, Due Diligence*
- ❑ **Rule Monitoring** - *Automated checks for various internal / external thresholds*
- ❑ **Compliance Reporting** -
Rapid data extraction and generation (bolt on generation of narratives)



ACCOUNTING AND ADMINISTRATION

- ❑ **Asset and Cash Reconciliations** - *Custodian / counterparties / prime broker vs. asset manager*
- ❑ **Client Onboarding and Fund Setup** -
Automated bots to set up client information in different systems
- ❑ **Fund Accounting / NAV Calculation** -
Automating daily NAV checks

SECURITIES OPERATIONS

- ❑ **Securities Pricing** -
Aggregating securities pricing approvals
- ❑ **Vendor Management** -
NLP-based contract reviews to extract terms to feed vendor risk analysis, contract remediation
- ❑ **Trade Processing** - *Trade Capture, Allocations, New Issue Setup*
- ❑ **Corporate Actions** - *Event setup, processing, client notifications*
- ❑ **Settlements** - *Instructing DvP / FoP settlements, Deliveries*



SELECT AUTOMATION USE CASES

1

E-statement Check



RPA

Data Extraction and
Analysis

2

Retirement Plan Set up



RPA

Data Extraction and
Form Fulfilment

3

Finance helpdesk



Chat Bot

Natural Language
Processing

4

Contract Invoice Reconciliation



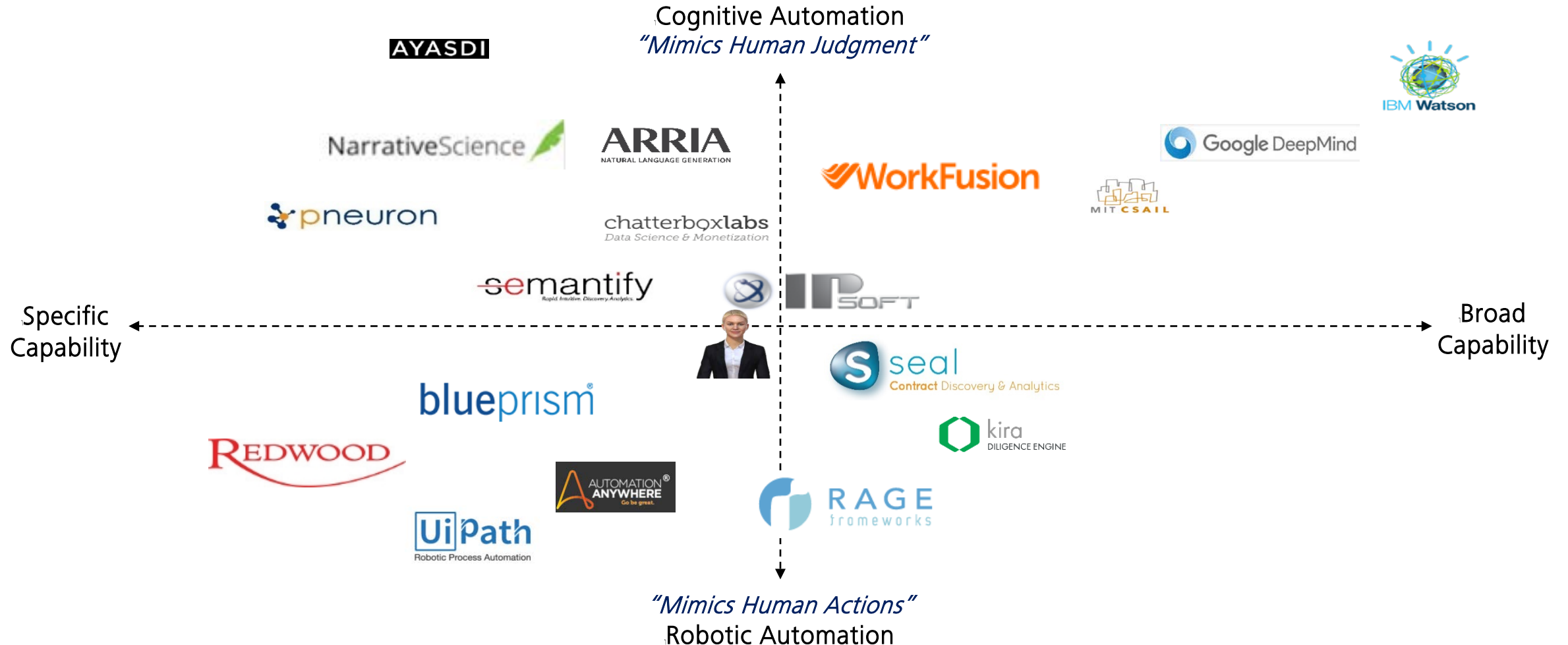
Natural Language
Processing

Data Extraction

PERSPECTIVES ON VENDOR CAPABILITIES

TECHNOLOGY VENDOR LANDSCAPE

The vendor landscape is highly fragmented with no clear market leader; some are focused only on R&CA, while others have a diverse portfolio



PARTNERSHIP MODELS



In-House

Partner engaged to re-sell automation license only; no partnership support sought for delivery, execution and maintenance



Joint Implementation

Partner integrated into the Client environment to accelerate initial implementation, then hands over to in-house capability



SaaS / Licensing

Partner to deploy technology / solution on Client's platform and charges an annual fee for the solution / technology



Managed Services

Partner owns the platform and Client pays for volume of services rather than a yearly subscription fee

Key Benefits:

- Automation partner is responsible for re-selling automation tool licenses, technical support and training
- Client has full control of delivery, and execution remains in-house
- Suitable when strong experience and resourcing depth exist in-house

- Automation partner is engaged in any of the following (in addition to being license re-seller)
 - One-time automation solution build
 - Designing and setting up automation program, business case, process selection, Automation Control Center
 - Production deployment support and ongoing maintenance
- Joint model can be established in collaboration with in-house

- Expert partner with demonstrated experience engaged via a Software-as-a-Service model
- Partner brings tools, methodology and management models to lead implementation
- Software is licensed to client typically behind their firewalls
- Potential for client to select a prime contractor to interact with and manage other vendors

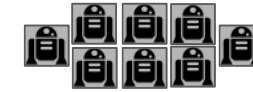
- Partner fully responsible for managing and delivering services to the business
- Partner responsible for installation, maintenance, and upgrades associated with the solution
- Solution sits within Partner's firewall; batch interactions with client systems
- Frees up client resources to focus on core competencies
- Partner charges a consumption fee (e.g. per contract reviewed)

Hybrid Partnership Models

BUILD VS BUY – WHAT’S RIGHT FOR YOU?



Nascent / Early Stage



At Scale

Key considerations for decision making:

Partnerships

- Leverage learnings from other similar projects
- Availability of and access to Automation talent
- Design the automation program correctly the first time (coding standards, best practices, governance)
- Careful and practical evaluation of vendor tools to address organizational requirement and economics
- Leveraging accelerators – Templates and Methodologies for assessing opportunities, Process standardization, Compatibility checks etc.

Explore Options Based On Organizational Maturity:



Robotics – Center of Excellence

- The CoE helps manage the automation program and drives collaboration across the organization
- Enables strong control and governance over the program



Robotics - Managed Services

- Maintenance and future automation developments will be managed by the service provider
- Enables the institution to reduce infrastructure and resource spend (especially for smaller automation programs)



Cognitive – Software as a Service

- Allows the institution to access services on demand
- Allows distribution of services with limited upfront cost
- Allows the institution to benefit from usage based pricing

AUTOMATION TOOLS

Organizations are using single RPA tool to scale but multiple RPA and Cognitive tools to experiment; to solve large scale business problems end to end, firms are looking to stitch together multiple tools

Sample Use Cases

1

Reporting: Data Extraction from SAP and publishing internal updates (via email)

- Single RPA Tool



2

Expense Statement: Check against scanned receipts to approve expenses

- Required combination of RPA Tool and Third Party OCR tool



3

Payment Dispute Resolution: Review manual customer letters and capture data to support dispute resolution

- Natural Language Processing tool and RPA Tool



4

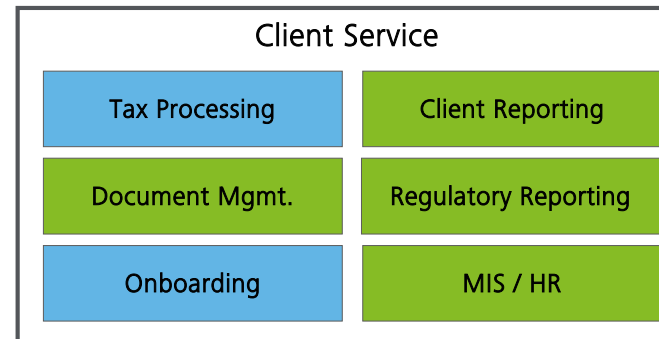
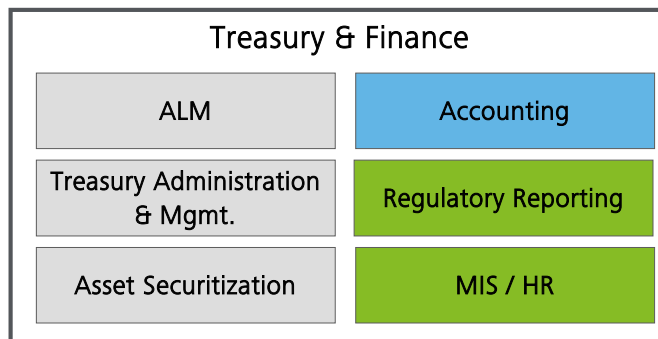
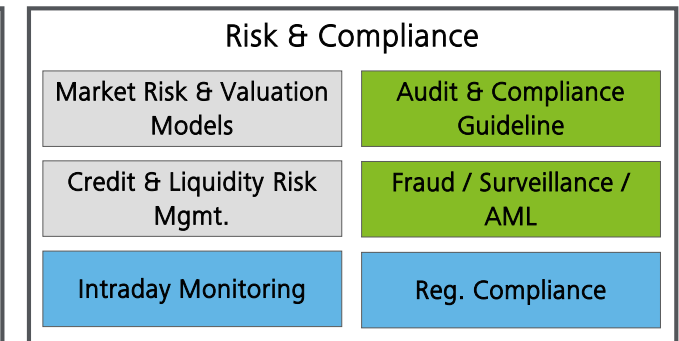
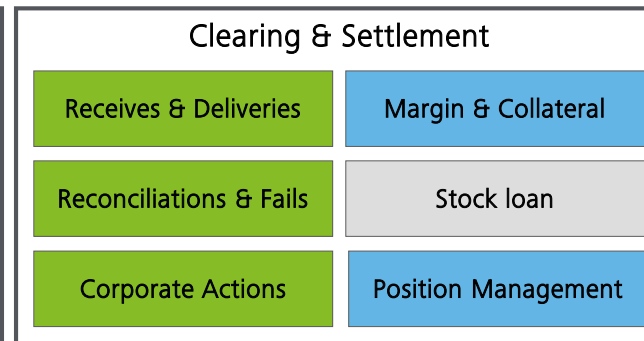
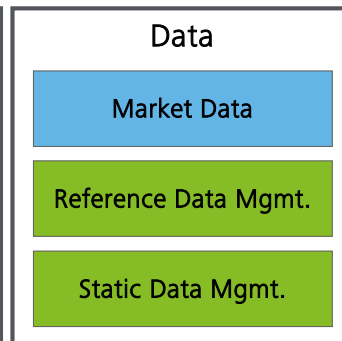
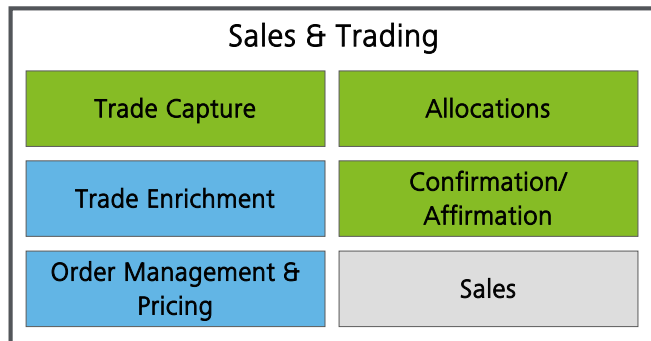
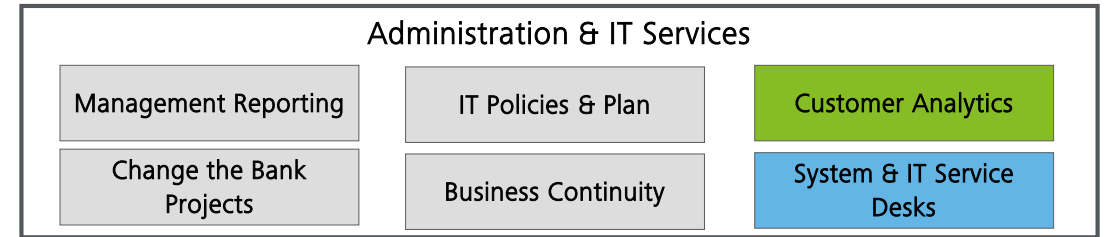
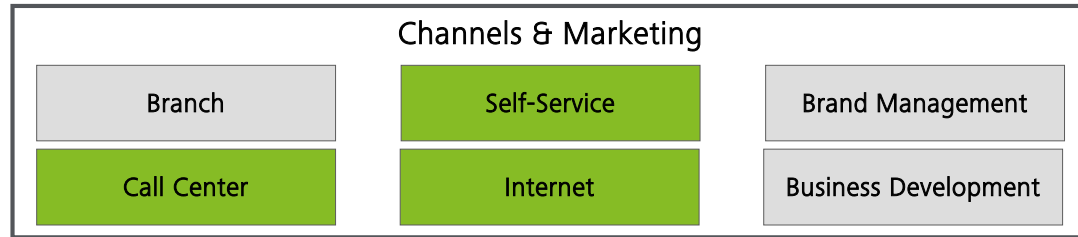
Payment Repairs: Correct Payment information based on specific error code

- Required machine learning tool and RPA tool



FUNCTIONAL AREA PERSPECTIVES

R&CA IN SECURITIES / INVESTMENT BANKING OPERATIONS



R&CA IN IB OPERATIONS – SELECT USE CASES

Challenge

1 Trade Allocations

- Many clients with limited STP send allocation instructions via email; given the multitude of systems involved (per client domicile and trading jurisdiction), teams spent a considerable amount of time performing manual allocations

Solution Description

- A standardized template was constructed to capture the necessary attributes
- Automation involved extracting the block trade ID, sub accounts, and quantities to perform allocations in appropriate systems

Benefits & Impact

- Saves 3 FTE hours of works in Equities and 4 hours in FI
- Instantaneous allocations leading to a better client experience



Challenge

2 Instruct DVP/FOP Settlement

- Instructing settlements currently involves a manual verification of current inventory and delivering in a predefined priority order

Solution Description

- The bot aggregates all receives and delivers, nets it, and then compares against available securities in the inventory
- Based on a set of prioritization rules, it sequences instructions and updates appropriate codes in delivery systems

Benefits & Impact

- Saves 2 FTEs worth of effort in the particular group
- Avoids the need for extensive recon and four eye checks

Challenge

3 Static/Account Repair

- Trade failures were observed due to missing accounts or static data. Teams had to manually look up the missing data and repair the trade

Solution Description

- Most institutional clients subscribe to Omgeo Alert utility and voluntarily update their funds and static data
- Bot was designed to automatically login to Omgeo Alert and extract the missing information and resubmit the trade

Benefits & Impact

- Over 2 FTEs worth of savings achieved via automatic break fix
- Reduced settlement failures by over 30%

Challenge

4 New Issue Setup

- Every new structured products issue that the clients subscribe to need to be setup in the Product database and the New Issue database; this is a manual task that involves extracting the information from term sheet and setting up

Solution Description

- A bot was designed to automatically extract the details of the issue from prospectus and term sheet

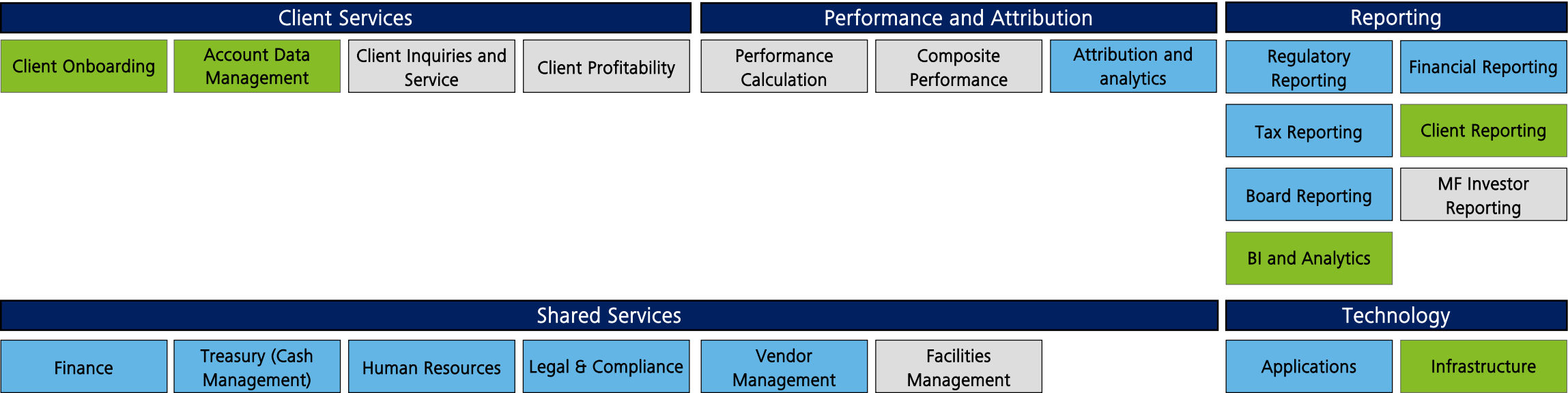
Benefits & Impact

- The bot automatically sets up over 1400 new issuances requiring 30 mins for each setup
- Instantaneous setup allows for greater reference data integrity and higher STP

R&CA IN ASSET MANAGEMENT (PAGE 1 OF 2)

Governance								
Business Management and Governance			Risk Management			Data Management and Business Intelligence		
Policies	Strategy & Planning	General Mgmt.	Market Risk	Credit Risk	Operational Risk	Data Architecture	Data Admin	Database Admin
						Data Delivery	Data Quality	
Front Office			Investment Operations				Accounting and Admin	
Sales & Marketing	Product Mgmt.	Distribution	Trade Support		Market and Reference Data		Accounting	Administration
Marketing	New Product	Channel Selection	Trade processing	Confirmation	Reference Data	Securities Pricing	Postings	Fund Distributions
Sales	Product Pricing	Contracting	Post-Trade Compliance	Cash Forecasting		Corporate Actions	Fund Accounting / NAV Calculation	Proxy Voting
Model Trading	Product Coordination	Network Mgmt.	Front to Back Recon	Clearing/ Settlement			Books and Records	Counterparty Management
Trading			Derivatives / Collateral Management				Pre/ Post-Close Analysis	Bank Relations
Pre-trade Compliance	Order Mgmt.	Trade Allocation	Margin Calculation	Derivative Operations	Collateral Posting		Valuation and Pricing	Custodial Mgmt
Investment Management			Investor and Intermediary Services				Institutional Accounting	Fee Billing
Investment Strategy	Research	Model Development	TA Ops and Admin	Investor Services	SMA and Sponsor Support		Cash & Asset Recon	Intermediary Services
Portfolio Construction	Cash Management	Investment Analytics						
Hedging	Order Creation							

R&CA IN ASSET MANAGEMENT (PAGE 2 OF 2)



R&CA IN ASSET MANAGEMENT – SELECT USE CASES

Challenge

- Significant amount of manual effort invested in reviewing reconciliation rule results, creation of custodian-specific outputs, and updating accounting records

Solution Description

- Automated the custodial reconciliation data review, creation of upload files, and update to accounting systems using bots to execute tasks to complete the process

Benefits & Impact

- Significant reduction in time, 100% accuracy, process timeline earlier in day
- Zero manual-decision making, limited reviews, and ease in scaling
- Easy to manage peaks and troughs

1

Reconciliations

Challenge

- As part of KYC - Periodic Review (PR) and Client Refresh (CR), the investigating analyst must identify missing client information and manually update in various systems upon receiving, which taking significant time (about 25 mins per customer)

Solution Description

- The automation enabled logging in, searching for customer record, identifying missing data, emailing the Relationship Manager, and then subsequently updating the information received

Benefits & Impact

- Elimination of manual tasks reducing the effort required to complete periodic reviews and refresh, including audit trails on data changes

2

KYC Client Refresh

Challenge

- Process is time and resource-intensive, ever-expanding scope of required commentary necessitates new strategies and separately managed accounts (SMAs)

Solution Description

- Automated the portfolio commentary creation process using Natural Language Generation (NLG) platforms in conjunction with portfolio analytics software

Benefits & Impact

- Improved client communication due to high quality, consistent commentary
- Improved time, effort to produce commentary, better reporting coverage and frequency
- Compliance requirements were met by delivering timely, accurate and consistent regulatory reports

3

Portfolio Commentary

Challenge

- When a new retirement plan is won, and initial plan information is received from the plan sponsor, required information needs to be pulled from multiple artifacts (e.g., sales questionnaire) and updated into the recordkeeping system

Solution Description

- Automated the steps to compile plan information, identify additional information requirements and automatically trigger notifications, compare an incumbent plan's fund line up to determine whether all investments currently exist on platform's master fund list to finally generate formal document (e.g., adoption agreement)

Benefits & Impact

- Results in cost reduction, lower processing time, and eliminates human error due to elimination of manual steps

4

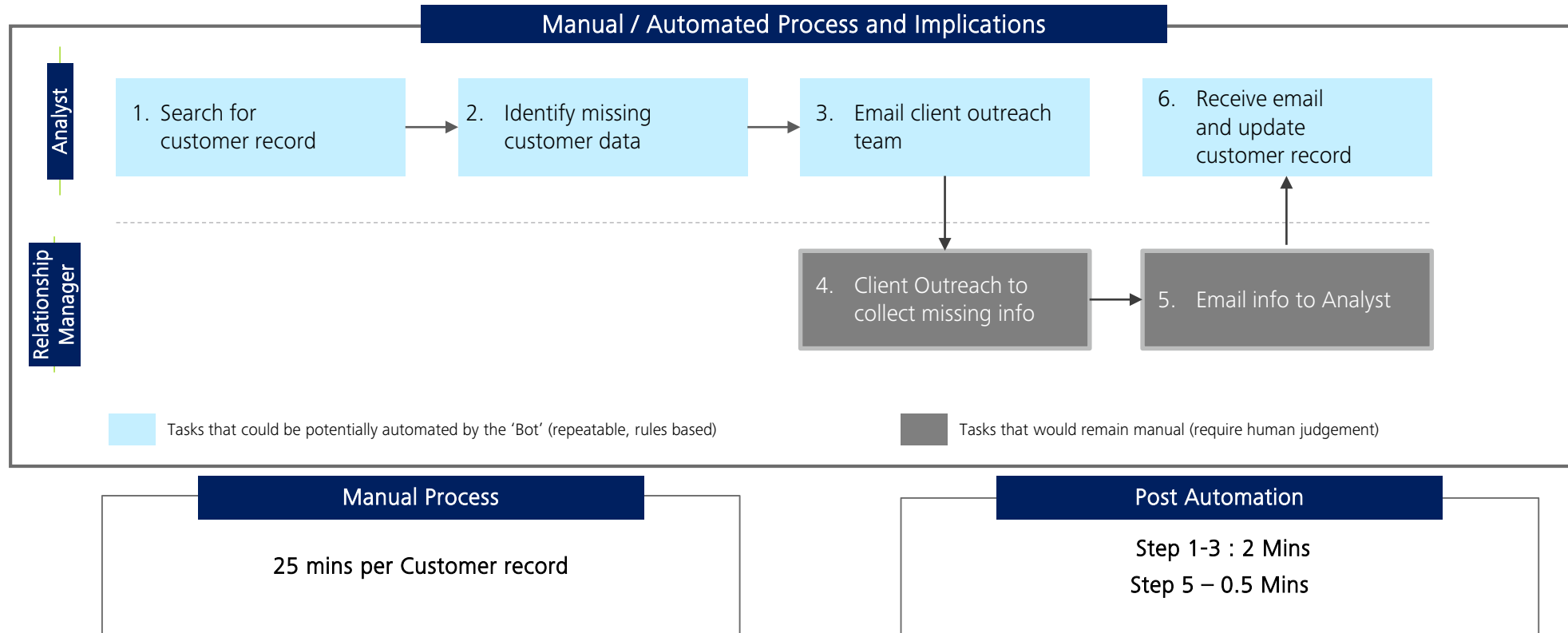
Retirals Plan Setup

SAMPLE AUTOMATION PROCESS – DEEP DIVE

Screening and Record Review – Client Information Aggregation Task

Task Overview

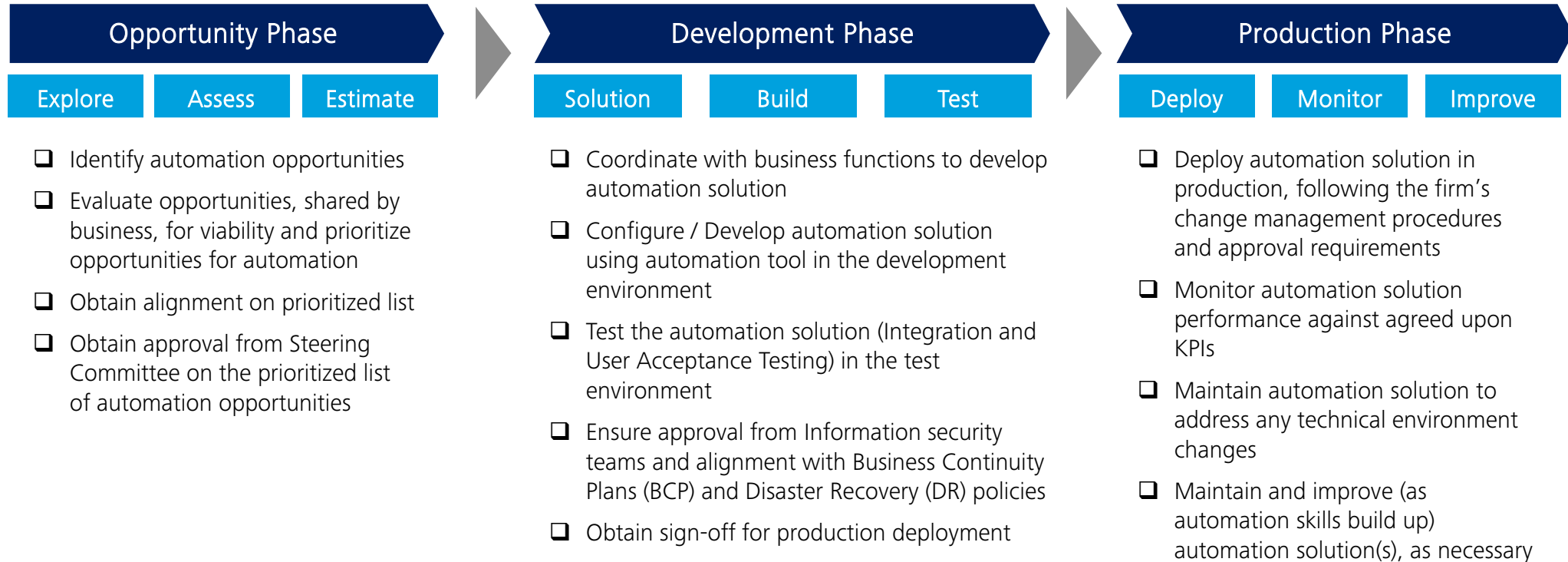
- ❑ The analyst aggregates missing client information as part of the Periodic Review process and writes an email to the Relationship Manager (RM). The RM collects this information through various outreach methods and sends it to the analyst who updates the record
- ❑ Only items shown in blue boxes can be automated as they are rule based, repeatable and involve human actions (not judgement)



OPERATING MODEL

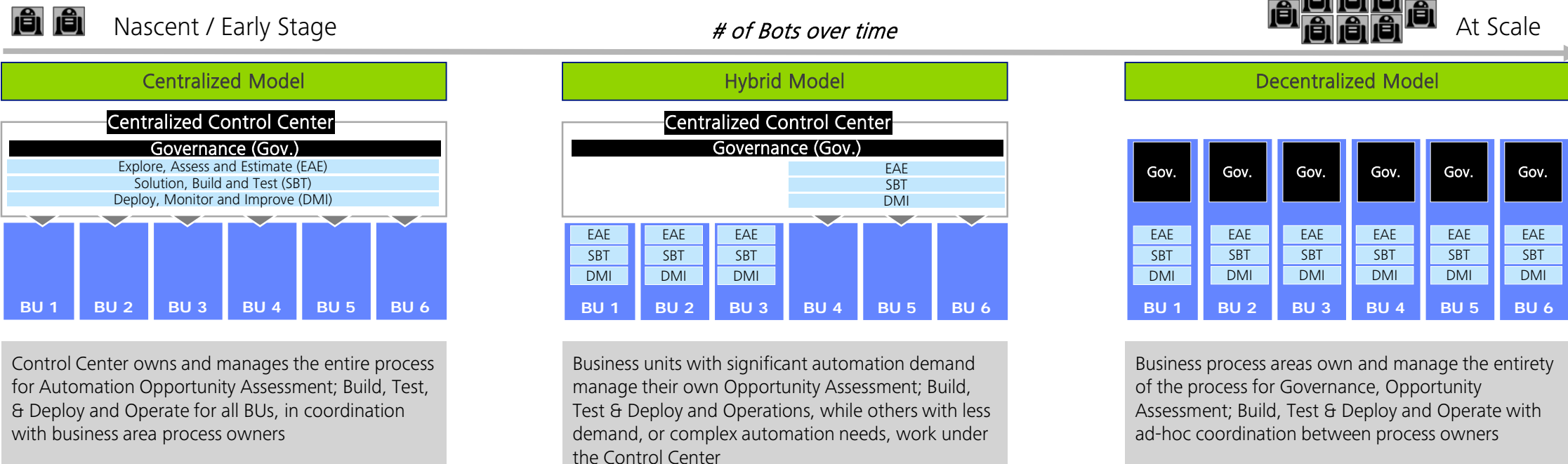
R&CA LIFECYCLE (“WHAT”)

The robotics journey is spread across 3 key phases with 9 sub-activities; governance and execution responsibilities will vary depending on the phase of the journey



OPERATING MODEL (“HOW”)

As organizations mature in their robotics capabilities, the operating model is likely to evolve from Centralized to Decentralized



‘Automation’ operating model features

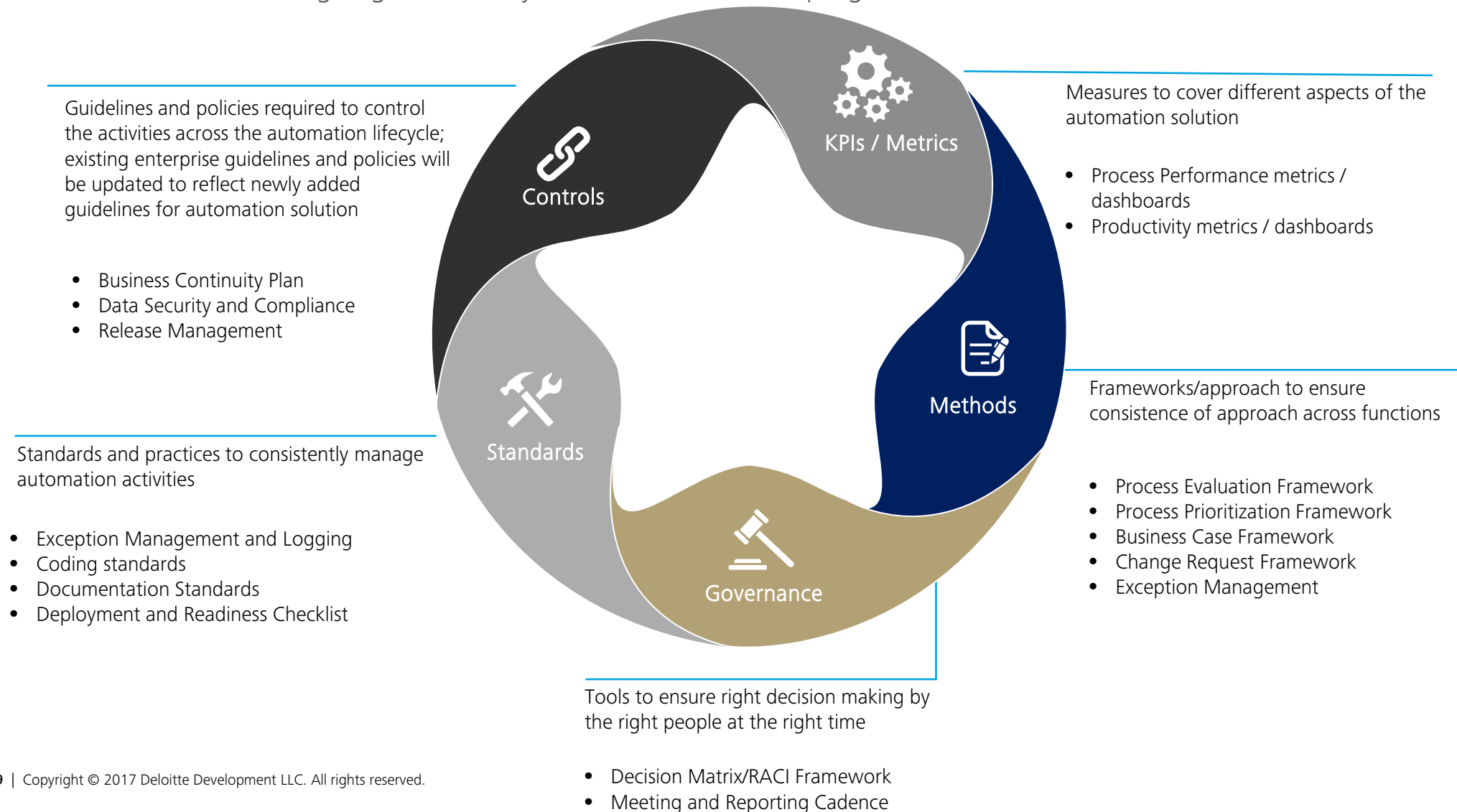
- **RPA capabilities are not mature** across Business Units
- **Availability of resources** with requisite RPA skill sets is limited
- **Proliferation of RPA capabilities** and tools across Business Units is limited
- **Platforms and systems** across Business Units are common

- **RPA is a mature capability** in one or more Business Units
- Some Business Units have **resources with the requisite RPA skill set**
- Some Business Units have **RPA tool needs** that are not applicable to others
- Business Unit **platforms and technologies** are siloed

- **RPA is a mature capability** across many Business Units
- Many Business Units have **resources with the requisite RPA skill set**
- **RPA capabilities and tool needs** are **business specific** with limited overlap
- Business Area **platforms and technologies** are siloed

KEY ELEMENTS

The operating model is anchored by key elements that allow the successful completion of tasks by the key stakeholders; these elements are critical in designing a flexible, yet robust automation program



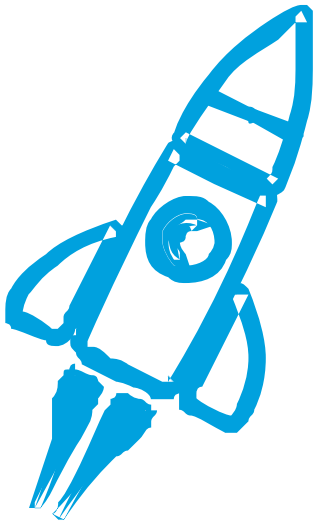
SCALING CHALLENGES

Scaling represents a key to element to a successful RPA Program, providing the ability to build from a foundation and develop insight and value

Stage	Description	Stakeholder Involvement	Maturity Implications	Typical Bots	Value to Enterprise
4 Integrate & evolve	Maintain, operate, and continuously improve robotic automation solutions. Maintain automation updates through coordination with IT function and system upgrade cadences	Revised organization design to capture automation benefit; RPA as a shared value across the organization	Cognitive + RPA implemented	>100	Non-linear growth in capacity creation / FTE savings
3 Deploy strategically	Coordinate relevant IT build, configuration and testing of all automated process solutions, enable business acceptance and handle change management	Formulation of a Governance committee and broader organization involvement for opportunity identification; greater involvement of IT to enable access to systems	Consideration for Cognitive to co-exist with RPA	50-75	Allows end-to-end automation enabling greater capacity creation and FTE savings; potential to bundle opportunities into a shared bots
2 Develop approach	Identify and prioritize potential opportunities based on impact assessment; quickly automate simple processes, and address pain points for more complex ones	Opportunity assessment and business case; limited to business / function in scope for automation and benefit case socialized with adjacent areas	Initial partnership with the selected vendor. Organizational level licenses secured	20-30	Initial benefit capture through capacity creation; enables the organization to understand and adjust to the new operating environment
1 Prove the concept through the POC	Completion of the POC and Business Case will lay the foundation for the Operating Model and allow for rapid scaling	Stakeholders involved to understand the process and appreciate value	Evaluation of RPA vendors. PoC executed with one or two vendors under trial license	3-4	Limited focus : Allows core team to become familiar with concept and prove it prior to expansion; better management of technical, cost and political risks

CREATING A ROBOTICS AND COGNITIVE AUTOMATION STRATEGY

Competitors are aggressively moving to adopt robotics and cognitive automation enterprise-wide; to maintain your competitive advantage, we recommend adopting an enterprise-wide view on automation



- ☐ Develop a strategy that aligns global and local requirements
- ☐ Design an Operating Model to implement automation strategy
- ☐ Identify two processes to review for the initial pilot, one each for robotic process automaton and cognitive automation
- ☐ Finalize automation tool and initiate PoC

DELOITTE'S MARKET PLACE CAPABILITIES

Though our capabilities & in-house expertise in most global locations, we are uniquely positioned and best qualified to partner with you to adopt RPA

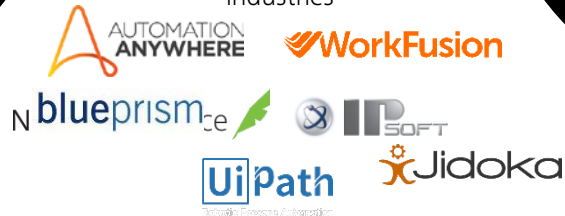
UNRIVALED RPA EXPERIENCE

Engaged in delivering Robotic projects across most major US Universal and Regional Banks

- 800+ Processes Automated
- 500+ bots deployed in production
- Working with 8 out of top 10 US / Global Banks on RPA

PROVEN EXECUTION WITH MULTIPLE VENDORS

Deep vendor alliances with leading RPA vendors, with multiple complex global implementations across industries



Over 30 vendors / tools included as part of Deloitte innovation ecosystem

DEEP EXPERTISE

Application of a consistent core methodology and customizing it to avoid a "one size fits all" approach across client's functions and processes

- 160+ RPA Projects
- 1500+ RPA Practitioners



RECOGNIZED THOUGHT LEADER

Deloitte's published eminence provides a comprehensive outlook on automation and the significant benefits that organizations can derive from it

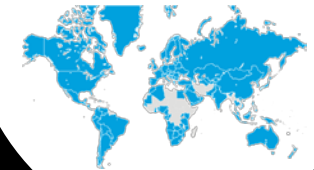


Deloitte published eminence on RPA and its applications

STRONG GLOBAL PRESENCE

Strong international presence across the globe reflecting your Businesses – NAM, EMEA and APAC

- Dedicated 'Bot' factory in Orlando (100+ resources)



Deloitte is the only partner that can understand and execute the Processes, Technology, Culture and Global Complexity across your organization into a successful RPA solution with a flexible offering

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APPENDIX

LESSONS LEARNED

1

Right Process or Activity

Ensure that the business process is well defined to ensure automation can be implemented. The process must be able to fulfil the business case for automation

2

Testing

Business process testing is required to ensure as many issues as the automated solution can encounter. This is to ensure robustness and efficiency of the automated solution

3

Stable not Broken Processes

Processes should be amended and made as efficient as possible before implementing automation to enable most desirable outcomes

4

Quality and Exceptions Management

The quality of the outputs from the automation must be continuously monitored to ensure that they are trustworthy. It is important to invest heavily in exception management for quality purposes

5

Approach to Measure and Track Benefits

Strong focus should be afforded to ensure benefits of automation are tracked and understood, with a detailed approach to measurement agreed prior to implementation

6

Adequate Education and User Adoption

There is a great need to ensure that automation is adopted into business and the need and result of integrations should be explained thoroughly

7

Checklist for Requirements

Ensure that the correct infrastructure is in place and compliance requirements have been met early on in the project

8

Stakeholder Management

Stakeholders need to be engaged from the programme's outset to ensure effective buy-in, collaboration and adoption of changes

9

Vendor and Business Vision Alignment

The chosen automation vendor should meet the long term process automation requirements of the business

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Wider Strategic Technology Initiatives

Selected automation investments should align with broader technological investment in the client's overall IT strategy

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Transformers: How Machines are Changing every Sector of the UK Economy

Explains the impact of automation and robotics on work and employment focusing on the sector outlook of robotics



Connectors: Robotic Process Automation

A quick-reference guide to how R&CA plays out in global business services, shared services, and outsourcing



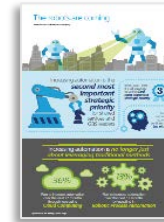
Cognitive Technologies: The Real Opportunities for Business

Examines the evolution of cognitive technologies and how it is being used in organizations today



Redesigning Work in an Era of Cognitive Technologies

Analyzes the impact of disruptive technologies and how new possibilities for work redesign can provide greater value to business and customers



The Robots are Coming

Examines the increasing appetite for robotics leadership and discusses how implementing robotics can improve the Finance functions



Show me the Money: Autonomics in Business Process Outsourcing

Examines how autonomics has the potential to be a disruptor in the outsourcing industry



Automate This: The Business Leader's Guide to Robotic Process Automation and Intelligent Automation

Explains the basics of enterprise automation using RPA and introduces the capabilities behind Intelligent Automation

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Crunch Time: Finance in a digital world

Explains the impact of digital disruption on business, the various digital tools, from cloud computing and robotics to analytics, artificial intelligence and automation, for the CFOs and the talent essentials



Cognitive Analytics: Augmenting and amplifying human intelligence

Brief overview of Cognitive Analytics



DUP: A path to cognitive enterprise

Talks about how developers are incorporating cognitive technologies, including machine learning and speech recognition, into robotic process automation—and giving bots new power



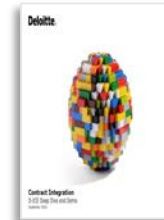
Intelligent automation entering the business world

Explains how automation using AI might be the next game changer in terms of process efficiency in financial industry. Also contains brief case studies



Next generation automation: Transform your business process with robotic and intelligent automation

Provides an overview of RPA vs AI, automation benefits to small scale processes, and popular myths



Contract Integration: D - ICE

Use case for Deloitte's Intelligent Content Extraction (ICE)



The robots are here: Meet your digital workforce

2016 Deloitte report examines Robotic Process Automation (RPA) and its role in shared services and Global Business Services (GBS)



Deloitte's Cognitive Advantage

Brief summary of Deloitte's offering in Cognitive automation