Future of actuarial work: advanced actuarial automation technology to meet today's and tomorrow's needs

CLRS 2018

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Agenda

- ► Introductions
- ► Industry trends
- ► Modern automation capabilities
- ► Actuarial automation opportunities
- ► Use case
- ► Getting started

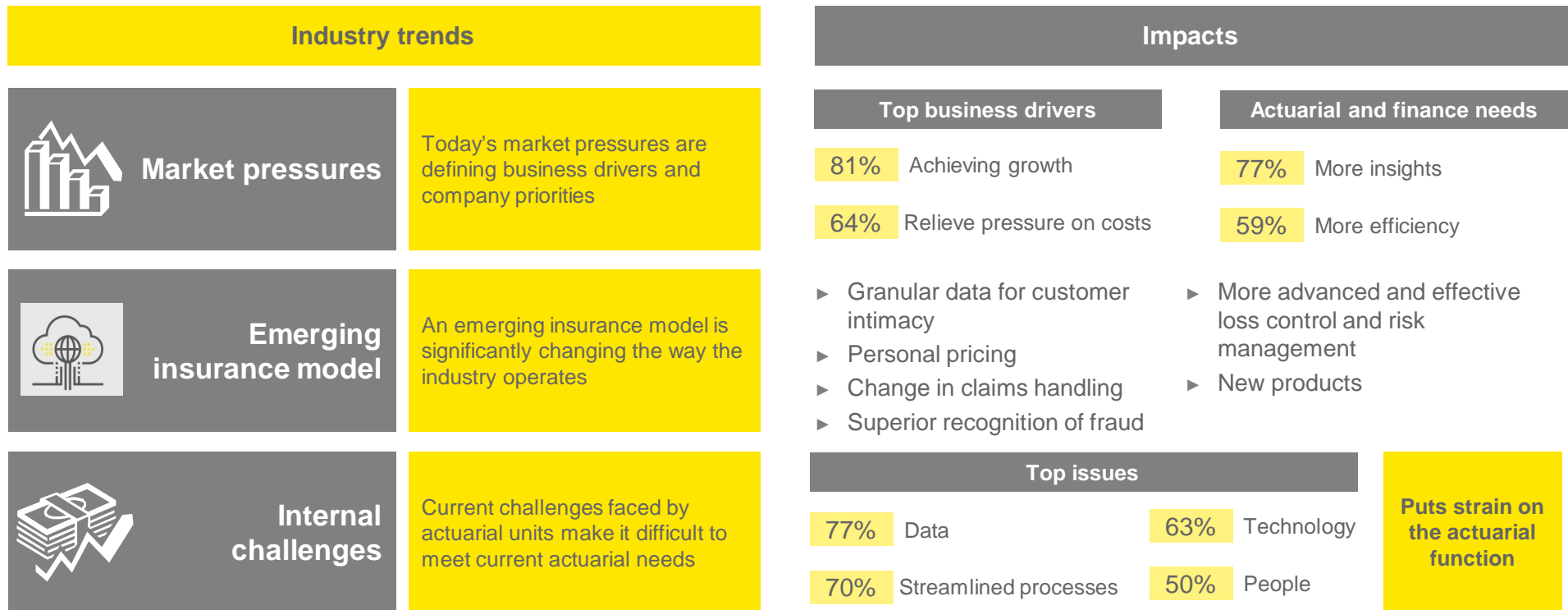| With you today		
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Polling question

► Where do you work?

   ► Consultant

   ► Insurance carrier <$1b GWP

   ► Insurance carrier $1b–$5b GWP

   ► Insurance carrier >$5b GWP

   ► Reinsurance carrier

   ► Regulator

   ► Other

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Industry trends

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Industry trends are driving companies to transform and modernize

Industry trends		Impacts	

Industry trends

Market pressures — Today's market pressures are defining business drivers and company priorities

Emerging insurance model — An emerging insurance model is significantly changing the way the industry operates

Internal challenges — Current challenges faced by actuarial units make it difficult to meet current actuarial needs

Impacts

Top business drivers
- **81%** Achieving growth
- **64%** Relieve pressure on costs

Actuarial and finance needs
- **77%** More insights
- **59%** More efficiency

- ► Granular data for customer intimacy
- ► Personal pricing
- ► Change in claims handling
- ► Superior recognition of fraud

- ► More advanced and effective loss control and risk management
- ► New products

Top issues
- **77%** Data
- **70%** Streamlined processes
- **63%** Technology
- **50%** People

Puts strain on the actuarial function

* Stats from EY Global Insurance CFO Survey

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Polling question

► What is your top priority in the next 3–5 years?

  ► More efficiently performing standard processes

  ► Providing more business insights

  ► Being more connected with other functions

  ► Incorporating more analytics

  ► Developing new models

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Actuarial functions are being challenged to transform and modernize their operating model to meet current and future needs
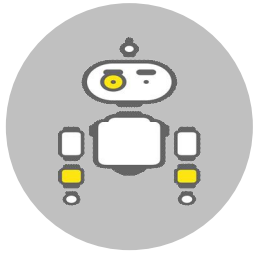
… consistently building upon capabilities by utilizing **emerging tools (e.g., robotics, data visualization)**

… **automation** of standard processes, with robots complementing the traditional workforce

… focused on creation and communication of **business insights** through higher-value analytical and decision support tasks

… continuously enhancing existing and developing new models
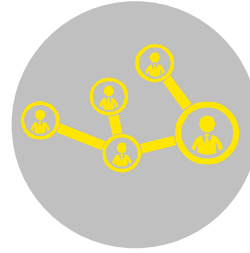
… **highly connected** across actuarial, finance, risk, claims and underwriting teams

… close alignment with IT

… **champions and interpreters of information**, analytics and data insights

… supporting new products and customer offerings

In forming a vision of the target operating model, organizations are determining where they want to be with respect to people, process, data and technology
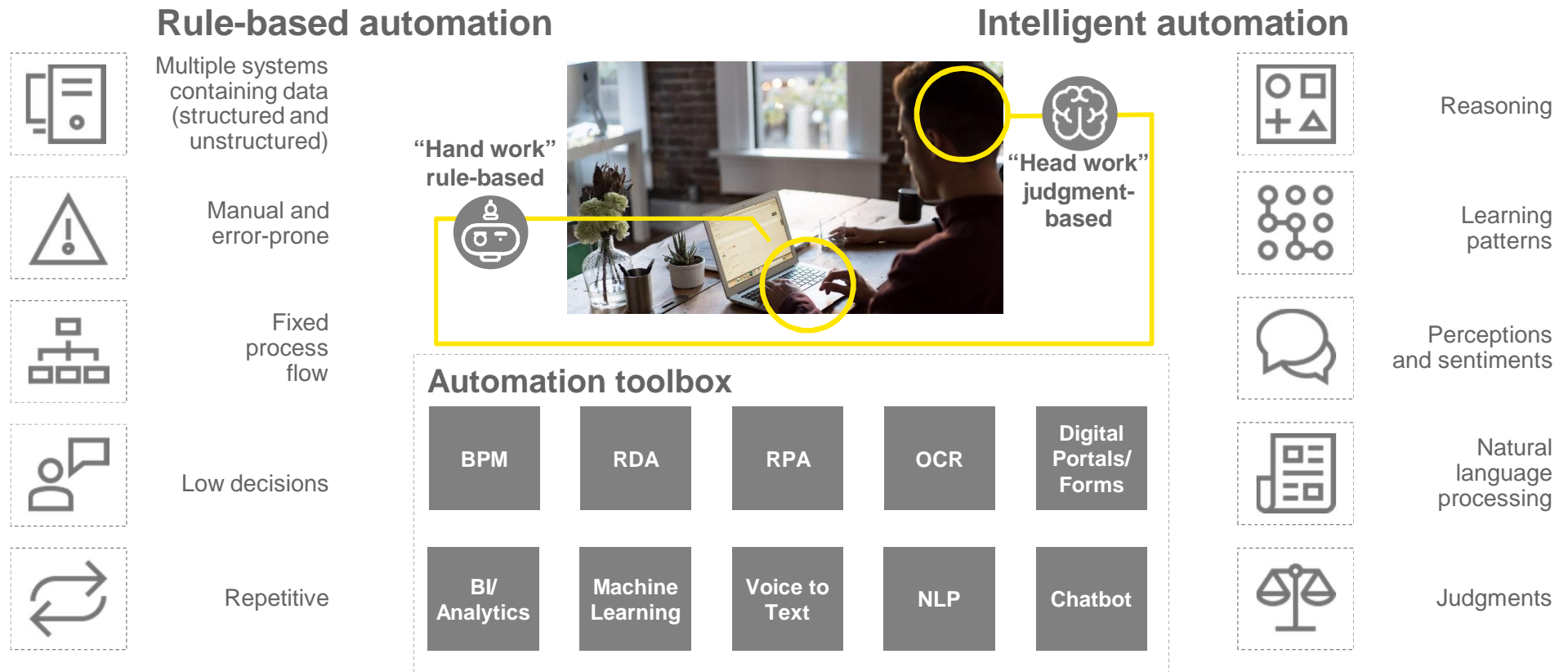
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Modern automation capabilities

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Audience question

► What are some of the automation tools you've heard about?

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Spectrum of broad automation capabilities

Rule-based automation

Multiple systems containing data (structured and unstructured)

Manual and error-prone

Fixed process flow

Low decisions

Repetitive

Intelligent automation

Reasoning

Learning patterns

Perceptions and sentiments

Natural language processing

Judgments

"Hand work" rule-based

"Head work" judgment-based

Automation toolbox

BPM	RDA	RPA	OCR	Digital Portals/ Forms
BI/ Analytics	Machine Learning	Voice to Text	NLP	Chatbot

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Expanding the automation toolbox is a journey that builds on capabilities both existing and emerging

Rule-based automation ➜ **Intelligent automation**

Tier A	Tier B	Tier C	Tier D

Tier A
- Scripting (VBA, Macros, etc.)
- Legacy

Tier B
- BI/Analytics
- RPA/RDA
- BPM
- Tier A toolkit

Tier C
- Chatbots
- NLP
- Next Gen OCR
- Digital portal
- Tier B toolkit

Tier D
- Advanced analytics
- Machine learning
- Tier C toolkit

Enterprise enablers/ next-gen data

Big data/DWH	Cloud technology	Internet of Things	Graph databases

► While there is no one-size-fits-all solution, a variety of tools can be leveraged to standardize, document, automate and enhance processes.

► These tools together can be all part of the business users toolkit.

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Polling question

► What is your exposure to robotic process automation?

    ► Have not heard of it

    ► Heard of it, but have not seen it in action

    ► Heard of it and seen it in action

    ► Use it at work

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Virtual workers (robots) perform business tasks similar to users, handling complexity and volume with ease

Robotics enables organizations to automate existing high-volume and/or complex data-handling actions as if the business users were performing the work

Claims center

Web

Excel

Reserving software

Email

Databases

Mainframe
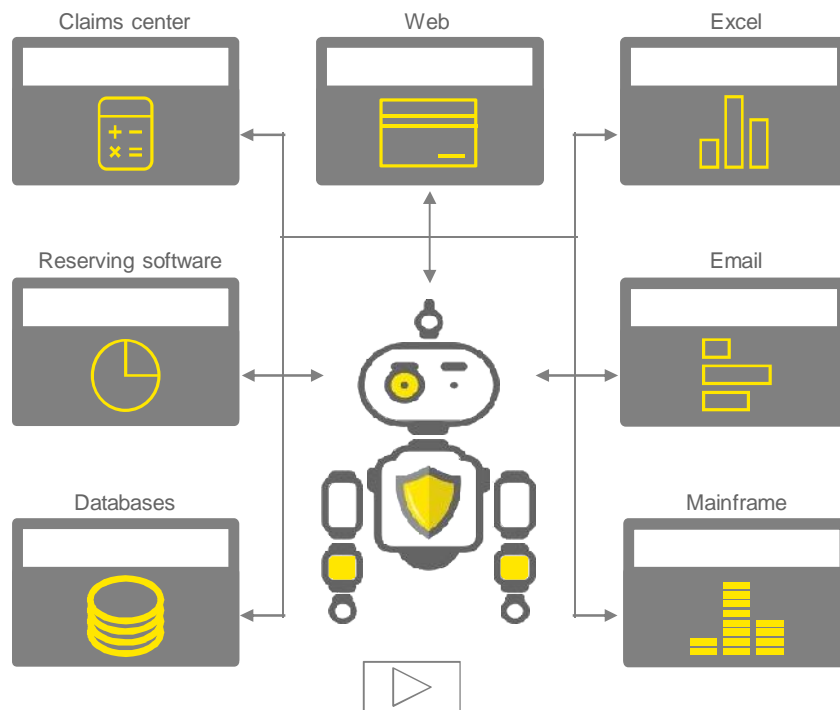
An enterprise-class software automation solution:

► Performs repetitive tasks efficiently, freeing up human capital

► Runs 24 x 7 and can take on tasks performed by multiple people

► Deploys rapidly to deliver ROI quicker than traditional solutions

► Enables business resources to train robots with limited IT involvement

► Solutions typically connect the white space between systems, such as manual data mapping

Robotics and people – a powerful combination

► **Robotics** delivers repetitive, deterministic, high-volume tasks efficiently

► **People** build relationships, provide subjective judgment, deliver exception tasks, and manage change and improvement

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Why should you incorporate RPA?

Benefits

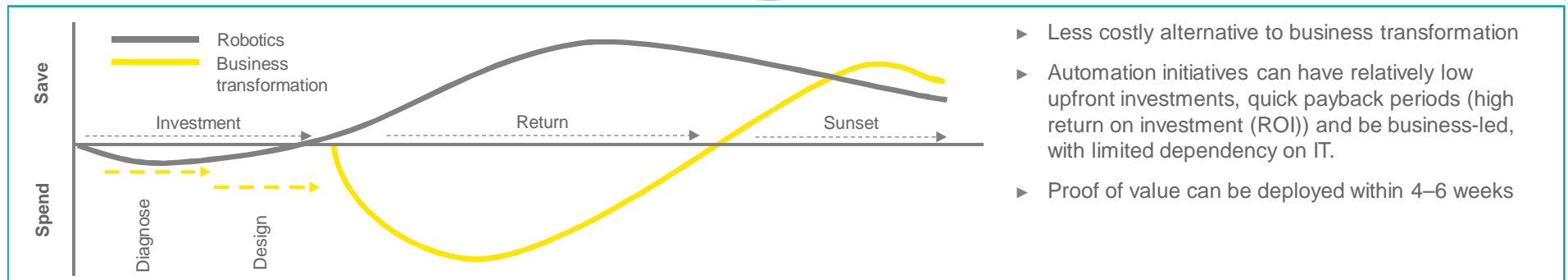| Accelerated cycle times/cost savings	Increased efficiency/productivity	Improved quality and controls
▶ Cycle time savings (usually 20+%) ▶ Focused reviews, which can reduce analysis/reviewer time ▶ Reliability ▶ Higher retention (shift toward more stimulating tasks) ▶ Reduces delays from key person risk ▶ Right shoring	▶ More work without adding heads ▶ Freed capacity for higher value and innovative activities ▶ More time and emphasis on analysis ▶ Earlier and more frequent reporting ▶ Earlier and enhanced insights ▶ More focus on commentary of drivers	▶ More consistent process ▶ Less prone to manual errors ▶ Improved documentation with full audit trail

Save / Spend chart — Robotics, Business transformation — Diagnose, Design, Investment, Return, Sunset

▶ Less costly alternative to business transformation

▶ Automation initiatives can have relatively low upfront investments, quick payback periods (high return on investment (ROI)) and be business-led, with limited dependency on IT.

▶ Proof of value can be deployed within 4–6 weeks

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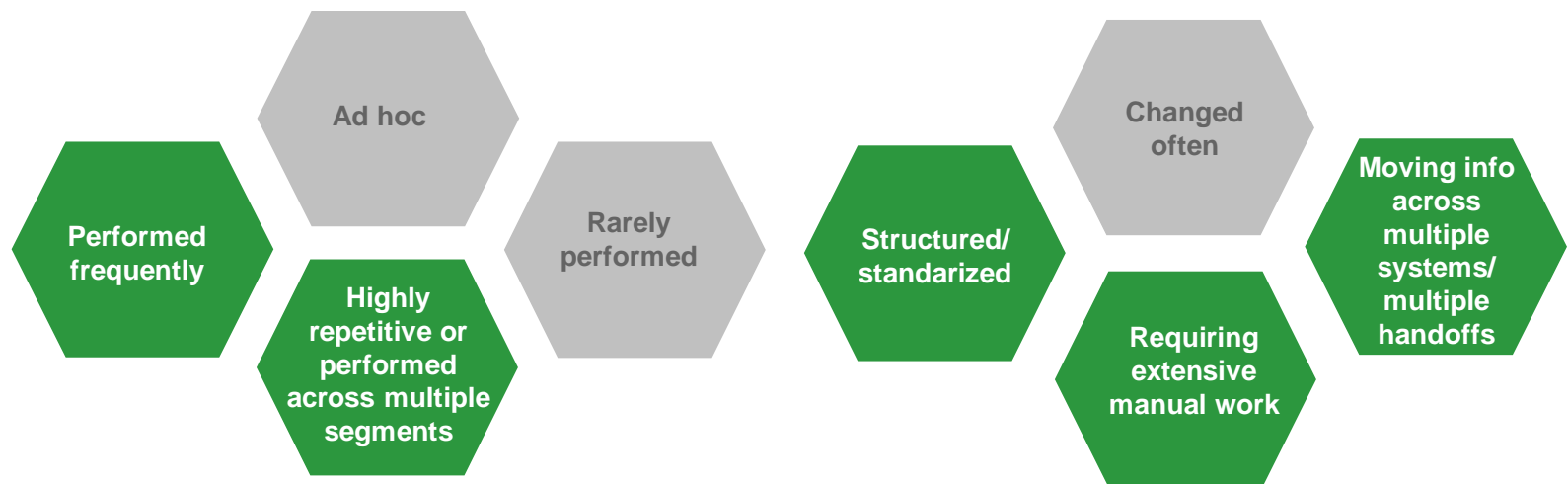
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What types of (sub)processes does automation work well with?

Key considerations

► How often is the analysis performed?

► How many similar analyses are performed?

► How repetitive is the process?

► How manual is the process?

► Does the process go across multiple systems/ applications?

► Should the current spreadsheets/ applications be kept?

Processes that are:

Ad hoc

Performed frequently

Highly repetitive or performed across multiple segments

Rarely performed

Structured/ standarized

Changed often

Requiring extensive manual work

Moving info across multiple systems/ multiple handoffs

Should consider not only end-to-end processes, but also sub-processes

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Polling question

► For what functions within your company is robotic process automation (RPA) being used?

  ► Actuarial

  ► Finance

  ► All other

  ► Actuarial, finance and other

  ► Finance and other

  ► Actuarial and other

  ► Not currently used at all

  ► Not sure

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How fast is RPA growing?
In insurance

Automation is being employed across the insurance industry.

Functions	RPA opportunities
Claims	▶ Process first notice of loss ▶ Perform an initial claims review and audit ▶ Support for fraud management
Underwriting	▶ Collect policyholder records ▶ Pull prior year claims documents ▶ Calculate initial policy renewal estimates
Human resources	▶ Automate onboarding ▶ Enter data in HR or payroll systems ▶ Prepopulate forms
Accounting	▶ Process journal entries ▶ Reconcile data

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Actuarial automation opportunities

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Many opportunities exist for advanced automation in actuarial
Think about where this can be used in your organization

Data preparation
- ▶ Data pull and formatting from policy and claims systems or outputs
- ▶ Routine data preparation and load for analysis (i.e., triangulation)

Reserving analysis
- ▶ Facilitate reserve analysis by automating routing processes
- ▶ Enhance reserve analysis by incorporating default selection(s)
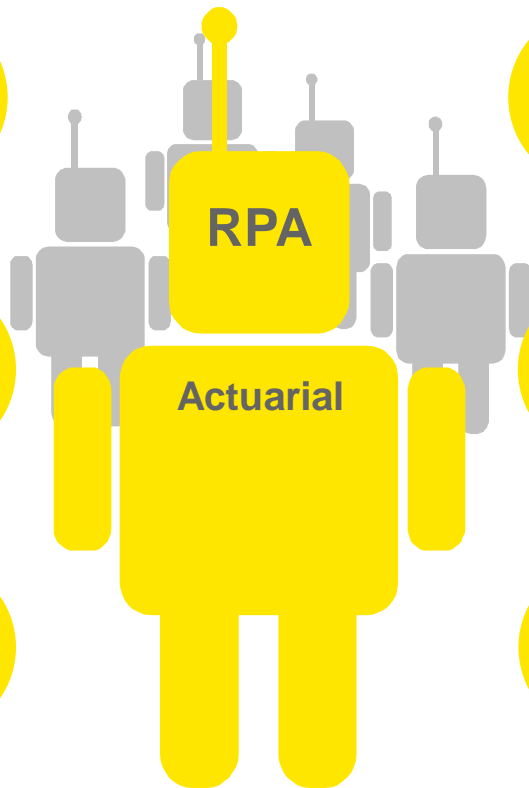
Pricing and rate monitoring
- ▶ Pull data from competitor rate filings
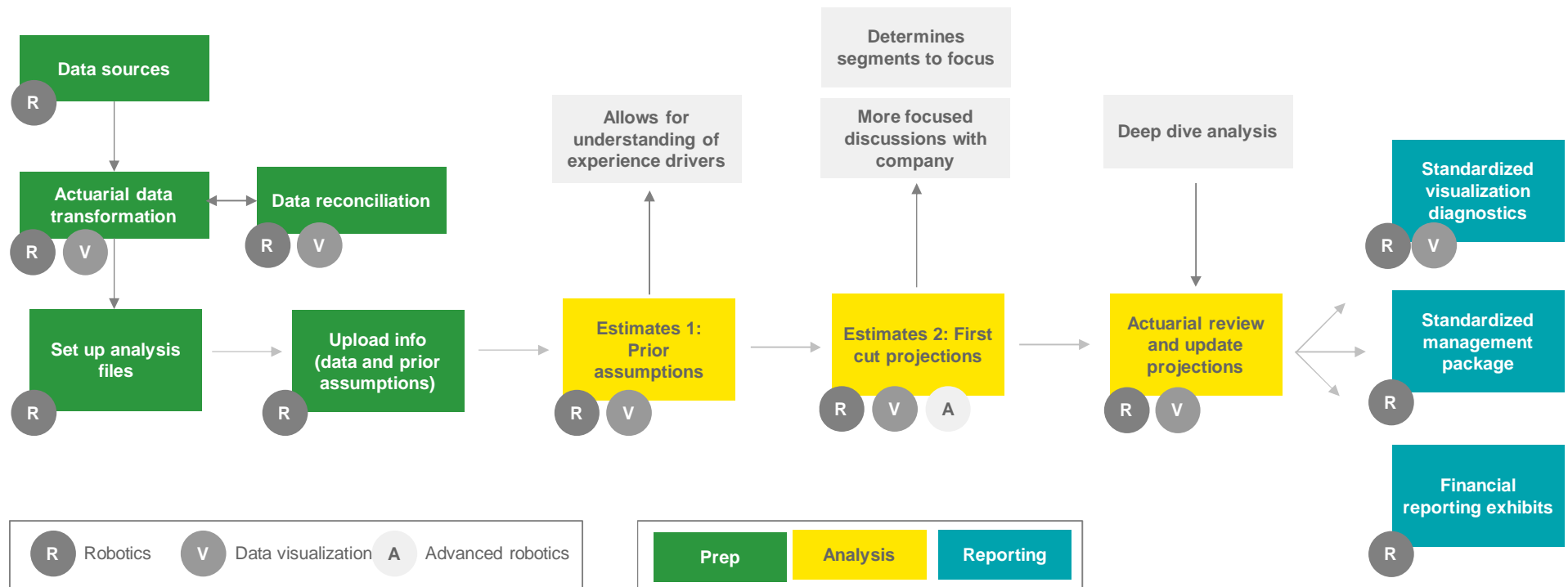- ▶ Facilitate routine rate setting processes, produce variation iterations and report metrics

RPA

Actuarial

Reporting and visualizations
- ▶ Refresh standardized data visualization
- ▶ Visualizations of actuarial indications and predictive modeling results

Model and forecasting
- ▶ Populating predictive models
- ▶ Running routine procedures in the model
- ▶ Aggregating and validating data

Experience monitoring
- ▶ Evaluate actual vs. expected
- ▶ Back testing different combinations of assumptions against historical data

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Transformed traditional actuarial reserving process

The use of new technology (e.g., robotics, data visualization and advanced robotics) in the traditional reserving process delivers significant benefits in terms of efficiency (including shorter close processes), quality of insight and workforce engagement.

Data sources (R)

Actuarial data transformation (R) (V) ↔ **Data reconciliation** (R) (V)

Set up analysis files (R) → **Upload info (data and prior assumptions)** (R) → **Estimates 1: Prior assumptions** (R) (V)

Allows for understanding of experience drivers

Estimates 2: First cut projections (R) (V) (A)

Determines segments to focus

More focused discussions with company

Actuarial review and update projections (R) (V)

Deep dive analysis

Standardized visualization diagnostics (R) (V)

Standardized management package (R)

Financial reporting exhibits (R)

Legend:
(R) Robotics (V) Data visualization (A) Advanced robotics

Prep **Analysis** **Reporting**

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Innovating beyond traditional analyses
Innovative techniques and digital technologies can drive more value from the reserving process

Data

Data examples

Type 1 – Transactional data

ClaimNumber	GInc	GPd	Gres	FinancialMonth
000000RU93NN	20,000	0	20,000	200001
000000RU93NN	(5,000)	5,000	(5,000)	200002
000000RU94NN	5,000	2,500	2,500	200001
000000RU94NN	10,000	0	7,500	200002

Type 2 – Structured data

ClaimNumber	Type	State	Occupation	EvaluationDate
000000RU93NN	WC	CA	Hotel Luggage	12/31/2016
000000RU94NN	WC	NJ	Hotel Cleaning	12/31/2016

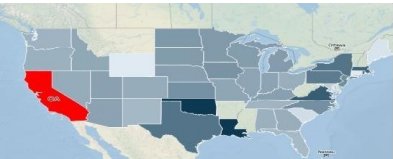#### Type 3 – Unstructured data

ClaimNumber	Injury Type
000000RU93NN	Strain to lower back by lifting heavy objects
000000RU94NN	Strain to ankle by slipping on wet floor

Type 4 – Industry data

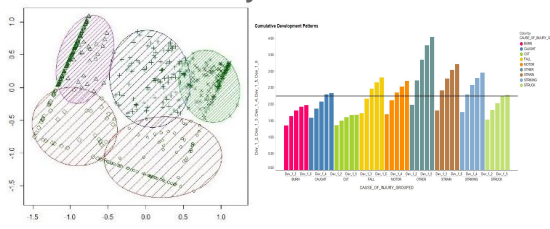| Year	2007	2008	2009	2010	2011	2012	2013	2014
Unemployment	5.0%	7.3%	9.9%	9.3%	8.5%	7.9%	6.7%	5.6%

Visualization and analytics

Visuals

Visualization tools with more granular data can lead to a better understanding of trends (i.e., more advanced AvE) and changing exposure and the ability to drill down
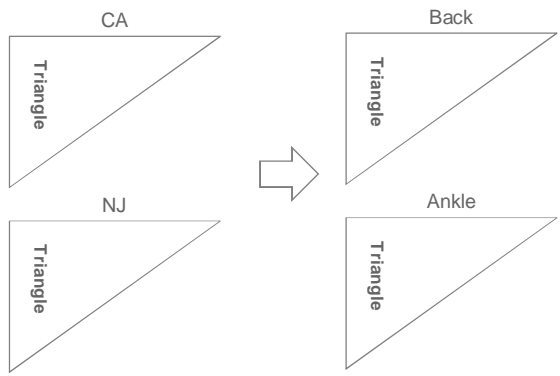
Analytics

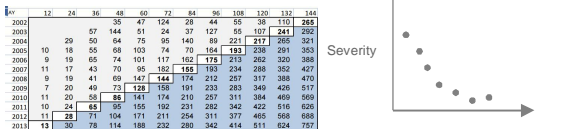Advanced techniques, such as clustering, can identify the most predictive variables

Analyses

Re-segmentation
Claims bucketed into homogeneous clusters/segments

CA

NJ

Triangle

Back

Ankle

Triangle

Responsive bottom-up reserving

Known claims bucketed into homogeneous segments

Severity

IBNR claims predicted in frequency model; severity is simulated

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Reset

Where can advanced automation and robotics be used in your organization?

► Items to consider
  ► License
  ► IT Virtual Machine setup
  ► Building/coding bot
  ► Infrastructure to set up "new employee"

► Focus on
  ► Value add
  ► Efficiency savings
  ► Quality controls improvement

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Use case

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Intelligent automation CoE
Overview of successes

Automation using robotics (Blue Prism)

IBNR adjustment upload
Controlled, resource-intensive process for adjusting IBNR. Significant time savings and improved accuracy.

WC discount automation
Significant time savings during close period of booking discount adjustment to WC reserves.

Segment visualization update
Hourly refresh of data allows enhanced insight and changes way of working.

Data upload into reserving software
Process redesign to allow automated upload of data in Reserving Tool.

SAP reporting
Significant time savings in producing P&L report cards from SAP. More frequent updates and allows analysis to start earlier.

Automation using VBA

Actuarial IBNR study automation
Process redesign to automated the study process.

Reserve memo automation
Automate reserve memo, includes text automation

Automation using R

Premium audit analysis
Process redesign and method enhancement to automate the calculation of audit lag premium.

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Intelligent automation CoE – showcase
IBNR adjustment upload

Controlled process allowing adjustments to IBNR before feeding to SAP. Short time frame in which to process adjustments. Robotic automation to maintain current controls.
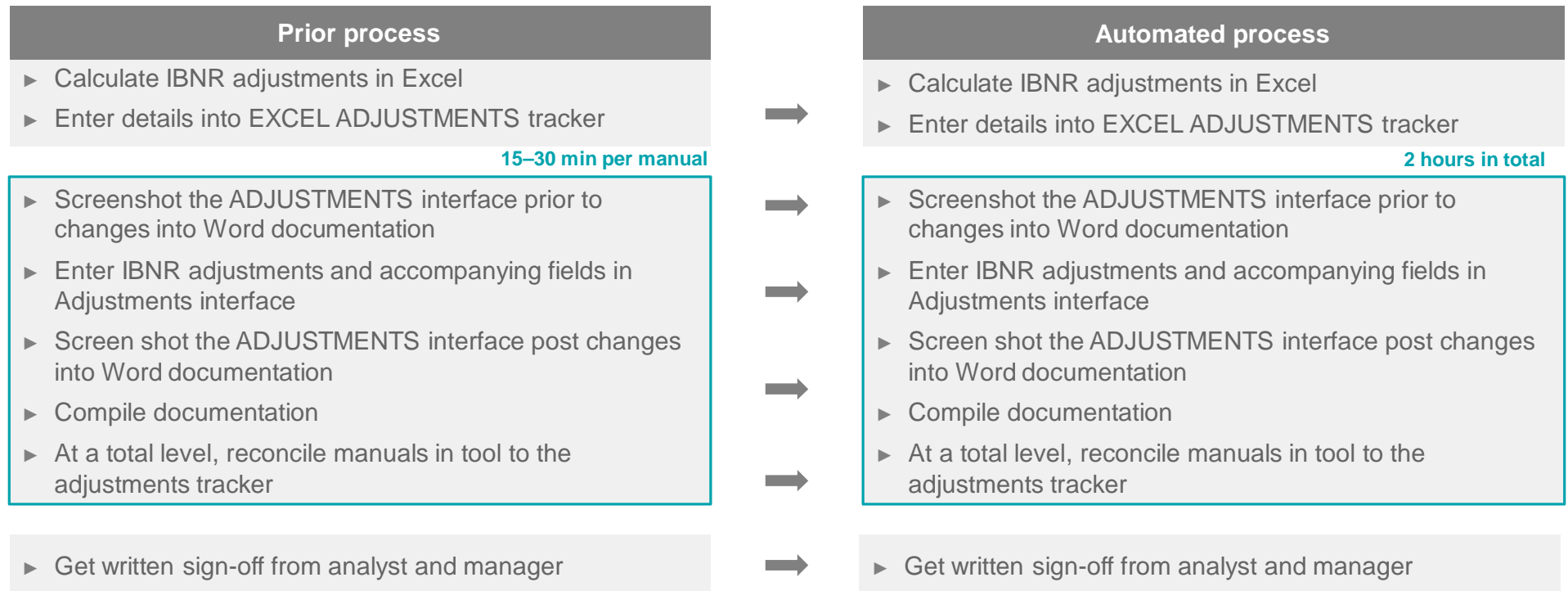
Automation solution: robotic process automation

Number of hours saved: 15–30 minutes per manual, 1,500 manuals in 2016 => 400–750 hours saved

► Process summary

  ► Adjustments are used for reinsurance adjustments, catastrophe IBNR, adjustments to IBNR due to large losses and management IBNR. Adjustments entered via a controlled interface with written sign-off from analyst and manager. Individual entry amounts calculated in Excel and typed into Adjustments interface.

► Automated process

  ► Robotic process automation takes an Excel-based summary and uploads using the controlled process. Outputs appropriate documentation and performs checks.

► Example process flow – see next slide

► Impact

  ► Time saving during crucial close period.

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Intelligent automation CoE – showcase
IBNR manual upload

Prior process		Automated process
▶ Calculate IBNR adjustments in Excel ▶ Enter details into EXCEL ADJUSTMENTS tracker **15–30 min per manual**	➡	▶ Calculate IBNR adjustments in Excel ▶ Enter details into EXCEL ADJUSTMENTS tracker **2 hours in total**
▶ Screenshot the ADJUSTMENTS interface prior to changes into Word documentation ▶ Enter IBNR adjustments and accompanying fields in Adjustments interface ▶ Screen shot the ADJUSTMENTS interface post changes into Word documentation ▶ Compile documentation ▶ At a total level, reconcile manuals in tool to the adjustments tracker	➡ ➡ ➡ ➡	▶ Screenshot the ADJUSTMENTS interface prior to changes into Word documentation ▶ Enter IBNR adjustments and accompanying fields in Adjustments interface ▶ Screen shot the ADJUSTMENTS interface post changes into Word documentation ▶ Compile documentation ▶ At a total level, reconcile manuals in tool to the adjustments tracker
▶ Get written sign-off from analyst and manager	➡	▶ Get written sign-off from analyst and manager

These steps are automated

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Intelligent automation CoE – showcase
Segment data visualization tool – hourly refresh

Tool developed with intention to automate. Robotic process automation (RPA) allows hourly refresh, which changes way of working.

Automation solution: robotic process automation

Number of hours saved: N/A, this is a process enhancement, hourly refresh not possible without RPA

► Process summary

  ► Profitability and detailed plan analysis completed in multiple Excel files (one per analysis segment). Indications in Excel file saved to access database. Pivot tables used to summarize results for review. Manually update tool if a known change made leading up to a meeting.

► Automated process

  ► Hourly refreshed tool allows the data visualization tool to be used for checking analysis and sharing insights, as DV tool now has the latest analysis data.

► Impact

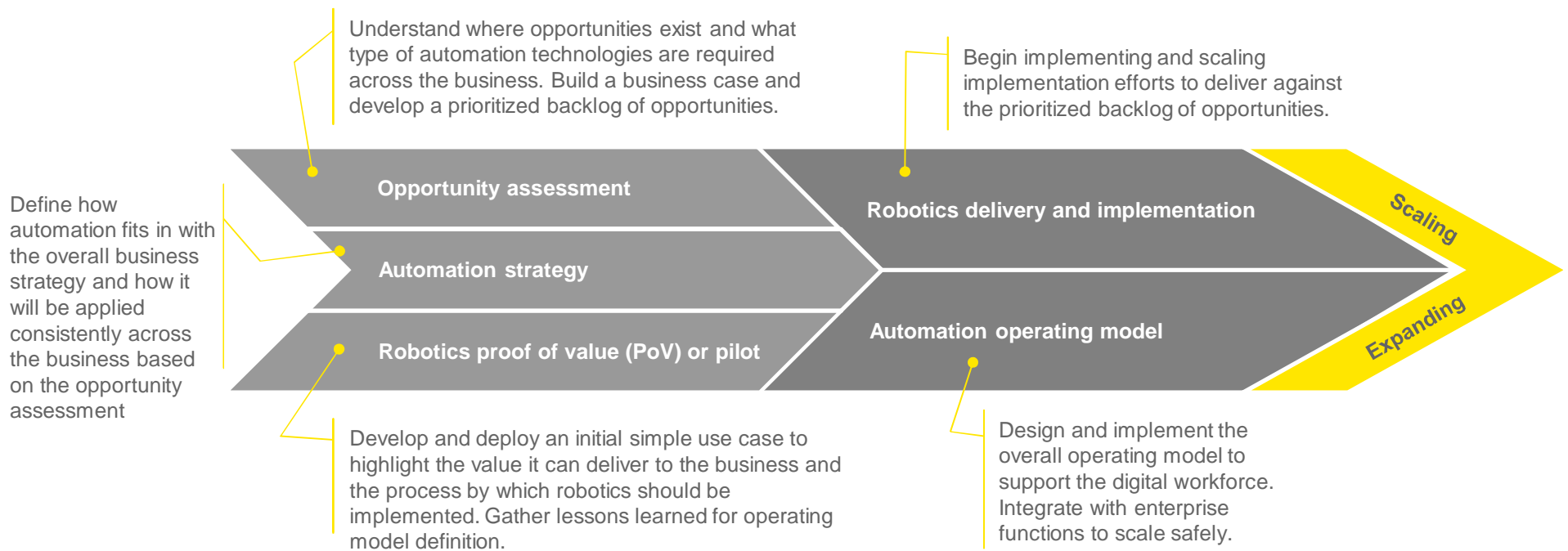 ► Changes way of working to bring enhanced, faster insights.

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Starting the automation journey

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Getting started is key!

"The secret to getting ahead is getting started."

Mark Twain

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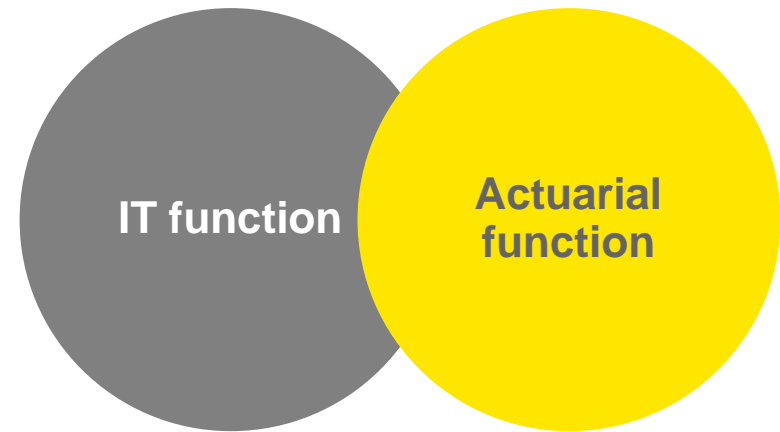
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Actuarial automation strategy

The transformation journey allows companies to start understanding automation opportunities within the actuarial function and begin executing

Understand where opportunities exist and what type of automation technologies are required across the business. Build a business case and develop a prioritized backlog of opportunities.

Begin implementing and scaling implementation efforts to deliver against the prioritized backlog of opportunities.

Define how automation fits in with the overall business strategy and how it will be applied consistently across the business based on the opportunity assessment

Opportunity assessment

Automation strategy

Robotics proof of value (PoV) or pilot

Robotics delivery and implementation

Automation operating model

Scaling

Expanding

Develop and deploy an initial simple use case to highlight the value it can deliver to the business and the process by which robotics should be implemented. Gather lessons learned for operating model definition.

Design and implement the overall operating model to support the digital workforce. Integrate with enterprise functions to scale safely.

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How is RPA being implemented within the company?

► Center of EXCELLENCE

  ► What is this?

► Alternative structures

► What are the roles and interaction model of IT and actuarial in supporting an implementation?

IT function

Actuarial function

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Accelerating an automation opportunity scan

Automation Suitability	High (5)	Medium (3)	Low (1)	/30
Repeatable steps with high system interaction	Most steps	About half	Only a few	/5
Clear business rules for decision making	All programmable	Mixed programmable human judgment	Mainly human judgment	/5
Structured, digitized, quality data	Structured, digital, high quality	Mixed, variable quality	Unstructured, low quality, image recognition and remote desktop based systems	5
% of control suitable for automation	>85%	60 to 85%	50 to 60%	/5
Control variation	Only one scenario	2-5 scenarios	>5 scenarios	/5
Number of source and target systems	2 to 4	1	>4	/5

Benefits	High (5)	Medium (3)	Low (1)	/30
Improve control	Current control has known error rate, high criticality	Current control has some errors, medium criticality	Current control has low error rate, low criticality	/5
Create FTE capacity for other value-add tasks	>5 FTE	2 – 5 FTE	1 or less FTE	/5
Improve service performance	Faster completion and value add is very important	Faster completion and value add is a 'nice to have'	Faster completion and value add is not relevant	/5
People impact	Current control is mundane, many low value activities	Some low value activities	Few low value activities	/5
Total score				**/50**

10 — Needs control improvements before automation can be feasible ————————— Ideal candidate for automation → 50

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Questions

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