

# Actuarial Modernization Trends

How Modern is Your Actuarial Function?

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# Agenda

PwC 2019 Actuarial Modernization Survey results

Data visualization deep dive

Automation deep dive



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PwC 2019 Actuarial  
Modernization Survey  
Results

# 2019 PwC Actuarial Modernization Survey overview

- 01 Actuarial modernization is a global priority
- 02 Modernization programs lack a clear vision
- 03 Companies have identified multiple catalysts for change
- 04 The actuary of the future possesses data science skills
- 05 There is under investment in actuarial upskilling
- 06 Effective data management is the backbone to modernization
- 07 Efficiencies and insights are best harnessed through advanced technologies
- 08 Companies are establishing Centers of Excellence

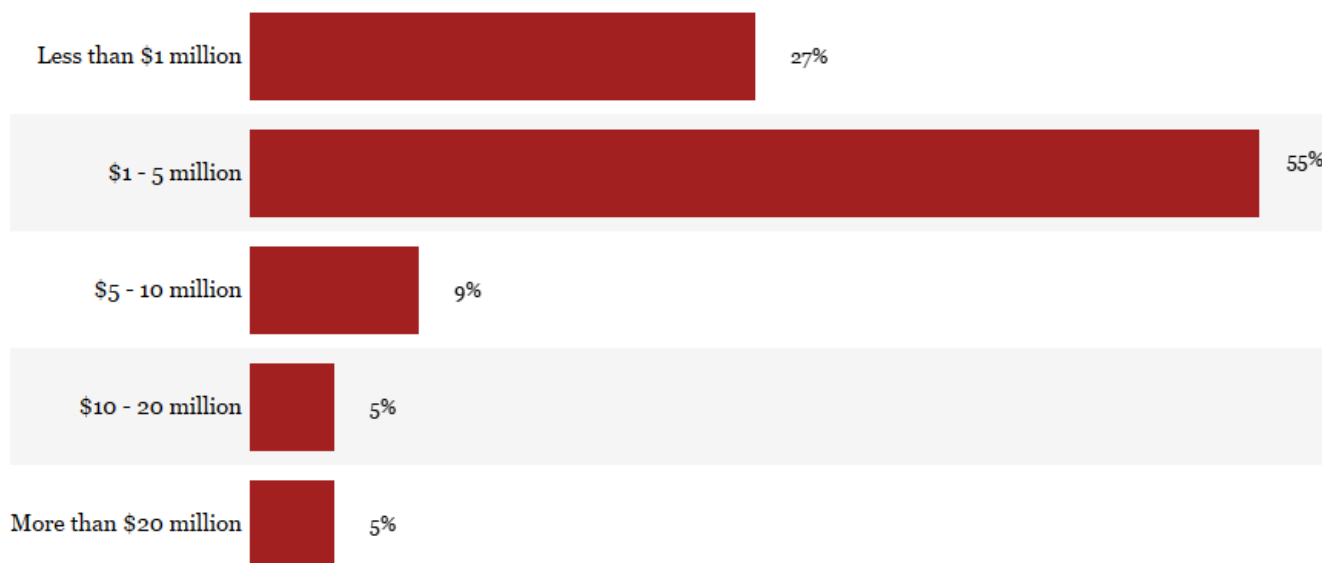
# Modernization drivers and plan

Actuarial modernization is a global priority

# \$5bn

The global insurance industry is undergoing **unprecedented change**. Many firms are investing heavily to improve their actuarial functions to be better business partners and provide more timely insights. The global insurance industry is expected to **invest over \$5bn in the next 5 years on actuarial modernization**.

## Expected P&C spend on actuarial modernization per year over next 5 years

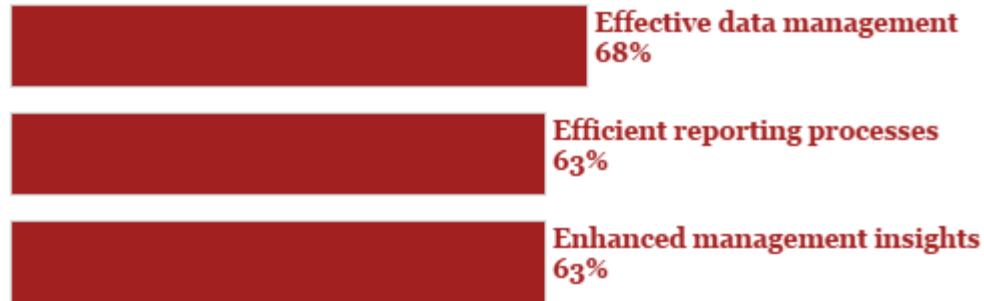


While a third of P&C companies surveyed in Australia, Hong Kong, Japan & Singapore and Europe & UK expect to spend less than \$1mn per year over the next 5 years, almost 90% of the surveyed P&C insurers in the Americas region (US, Canada and Bermuda) anticipate spending between \$1mn - \$5mn a year over the next 5 years.

# Modernization drivers and plan

Several catalysts have driven companies to embark on this path...

## P&C insurers main drivers for actuarial modernization



Nearly all participants indicated **two or more drivers** and over a quarter of participants indicated five or more drivers for initiating actuarial modernization initiatives.

Despite those differences, more than 75% of P&C companies cited **efficiency savings** as the main metric considered when developing a business case for modernization.

...however, this multi-year journey lacks clear vision

# 70%

Modernization initiatives are well underway across the globe, with **70%** of companies (**up from 53% in 2018**) boldly embarking on multiyear modernization journeys. However, **only 6%** of P&C companies have developed a detailed vision of their target end state supported by a robust project plan.

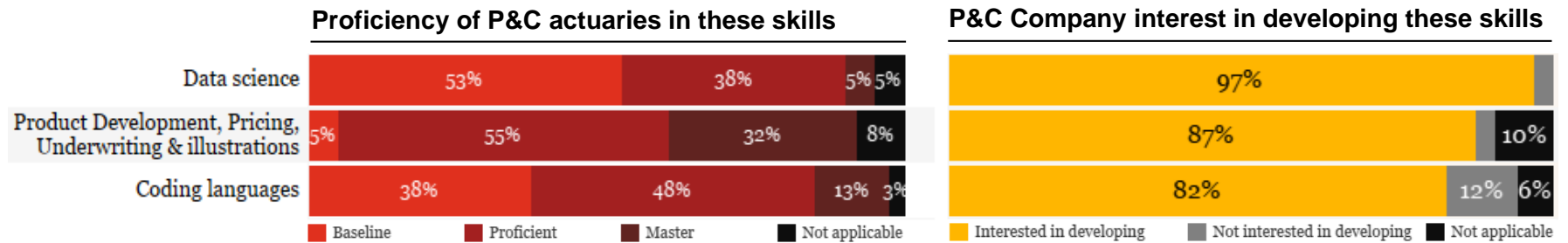
## Comprehensiveness of modernization roadmaps for P&C Companies



- Modernization initiatives are in progress, but no roadmap has been developed
- Broadly defined end state, with limited/few interim states defined
- Detailed end state defined for most functions with limited interim states defined
- Detailed end state defined for most functions with well-defined interim states
- Detailed end state defined for most functions with well-defined interim states and a mobilization plan established addressing project resources and tasks

# Actuary of the future

Companies are interested in their actuaries developing in-depth skills...

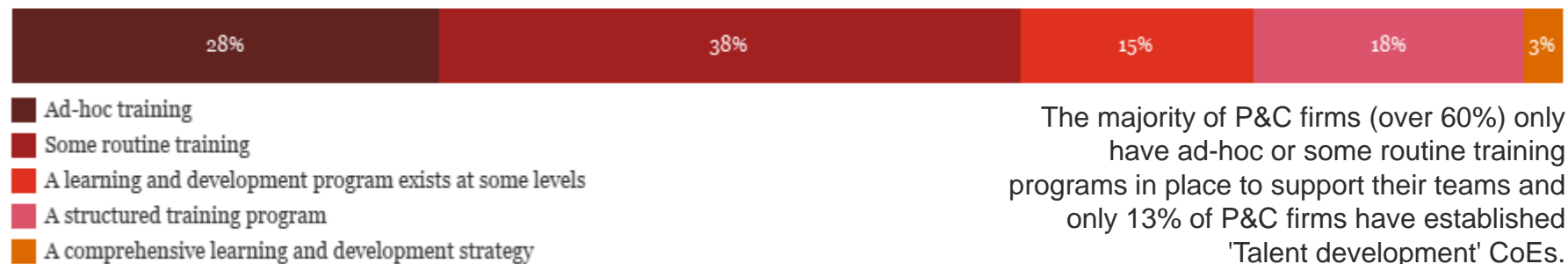


Almost all P&C participants see the need to develop data science skills within their actuarial function, with 78% of companies further indicating that data scientists is an additional skill embedded within the actuarial function. Actuaries will need to both upskill and partner with data scientists in order to remain relevant as analyses move toward leveraging advanced analytics and emerging technologies.

In addition, over 80% P&C participants prefer their actuaries be trained in coding languages. However, over a third of P&C actuaries are less than proficient in the matter.

...but there is an underinvestment in actuarial upskilling and training.

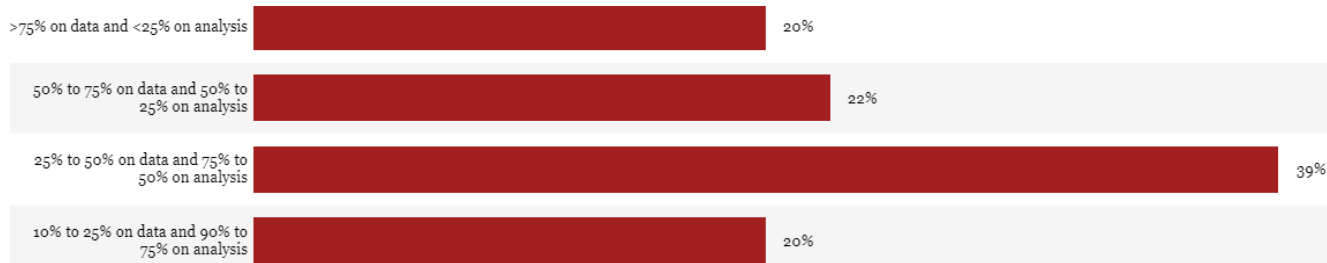
## Current state of P&C actuarial staff training and development opportunities



# Investment in data & technology

## A change is needed in the way actuaries manage data

### P&C actuaries' time spent on data versus analysis and reporting



Actuaries are equipped with specialized knowledge to make sense of data; however, the bulk of their time is spent on potentially automatable work -- processing, manipulating, and reconciling data.

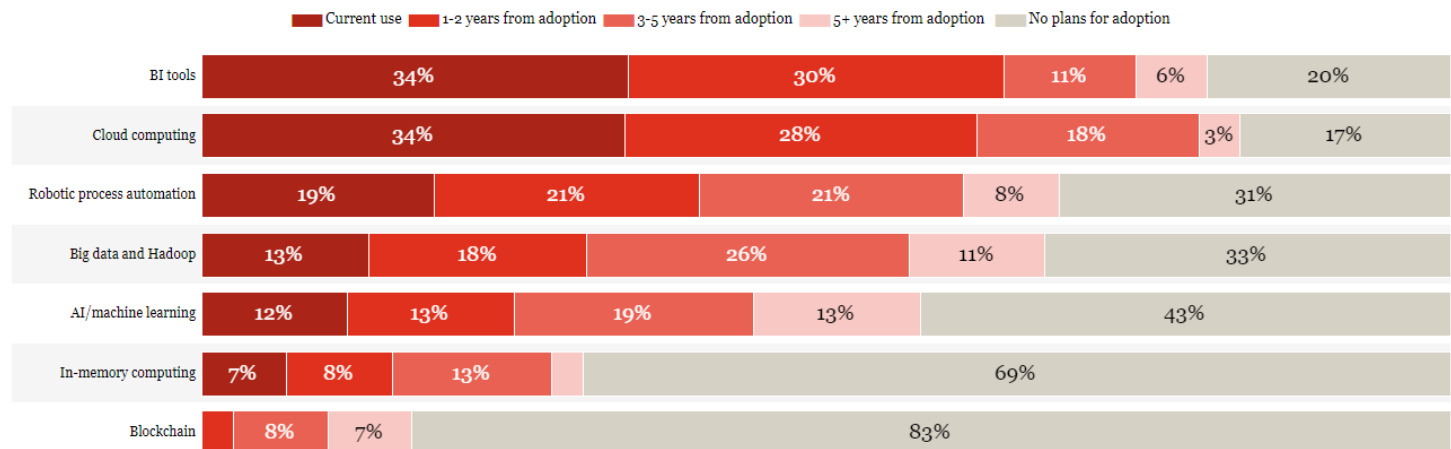
In fact, **42%** of P&C Insurers reported spending more than half their time on data preparation.

## This is a vital step to effectively implement advanced technologies

The three greatest impediments to P&C companies in the adoption of advanced technologies are:

- Cost/budget constraints
- Existing IT platforms / infrastructure
- Lack of capacity to invest time in exploring technology solutions

### State of companies in adoption and implementation of advanced technologies





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Data Visualization

# What is data visualization?

**Data visualization is a visual representation of data that enables users to understand its patterns, trends, and outliers**

## *Prior state*

Relatively limited visualization tools

Static charts and graphs

Specific data pre-processing and formatting

## *Modern state*

Multiple **user friendly** visualization tools

Offers users an **interactive** experience

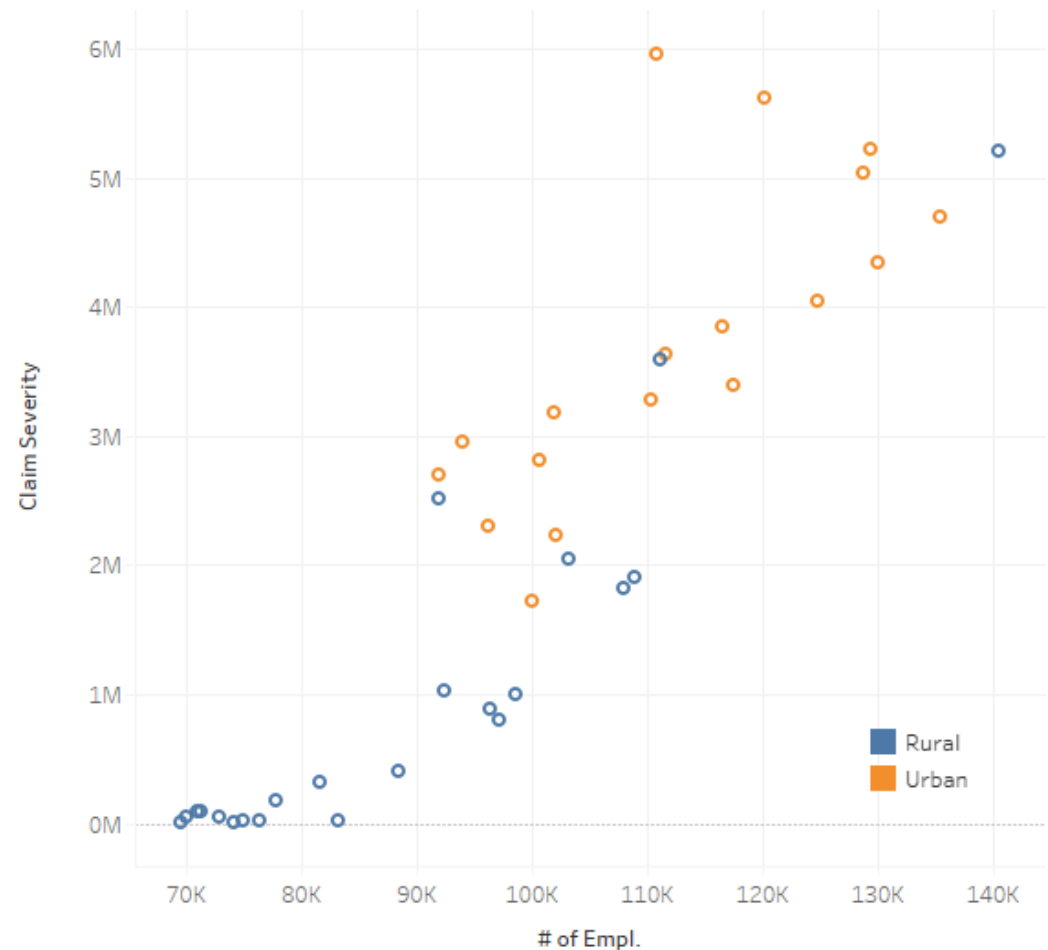
Communicates with many **different data sources**

# What is the goal of data visualization?

## Explore data

Number of Employees	Location	Claim Severity
96,141	Urban	2,309,367
91,937	Urban	2,701,182
72,834	Rural	44,651
103,085	Rural	2,045,607
101,871	Urban	3,185,820
116,543	Urban	3,847,532
102,046	Urban	2,234,526
111,159	Rural	3,590,885
⋮	⋮	⋮
74,111	Rural	10,000
124,707	Urban	4,044,486

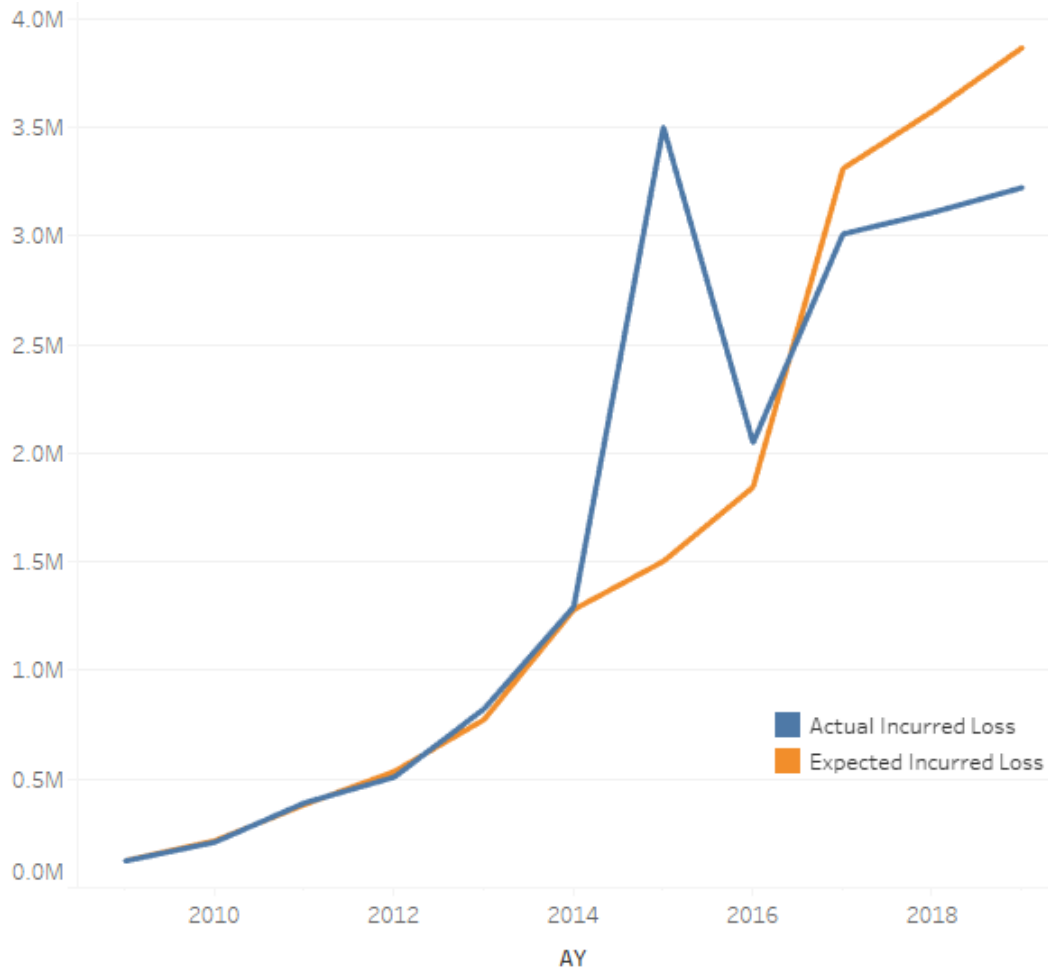
## Impact of Number of Employees and Location on Claim Severity



# What is the goal of data visualization?

## Analyze data

Actual vs. Expected Incurred Losses

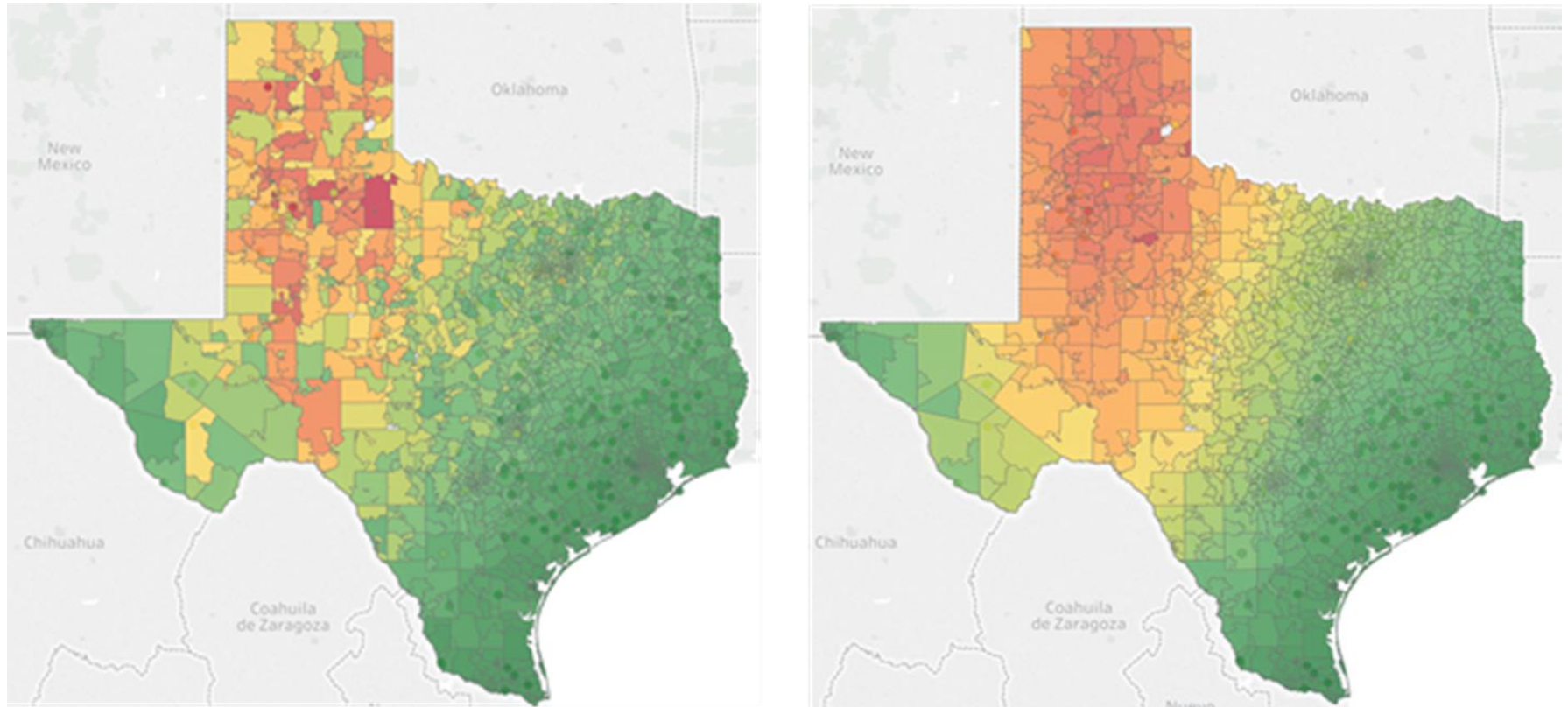


AY	Actual Incurred Loss	Expected Incurred Loss
2009	123,049	124,279
2010	209,873	216,169
2011	390,823	383,007
2012	509,237	534,699
2013	823,785	774,358
2014	1,293,854	1,280,915
2015	3,502,933	1,502,933
2016	2,049,583	1,844,625
2017	3,010,293	3,311,322
2018	3,109,382	3,575,789
2019	3,223,813	3,868,576

# What is the goal of data visualization?

*Analyze data*

Hail/Hurricane Risk by Zip Code



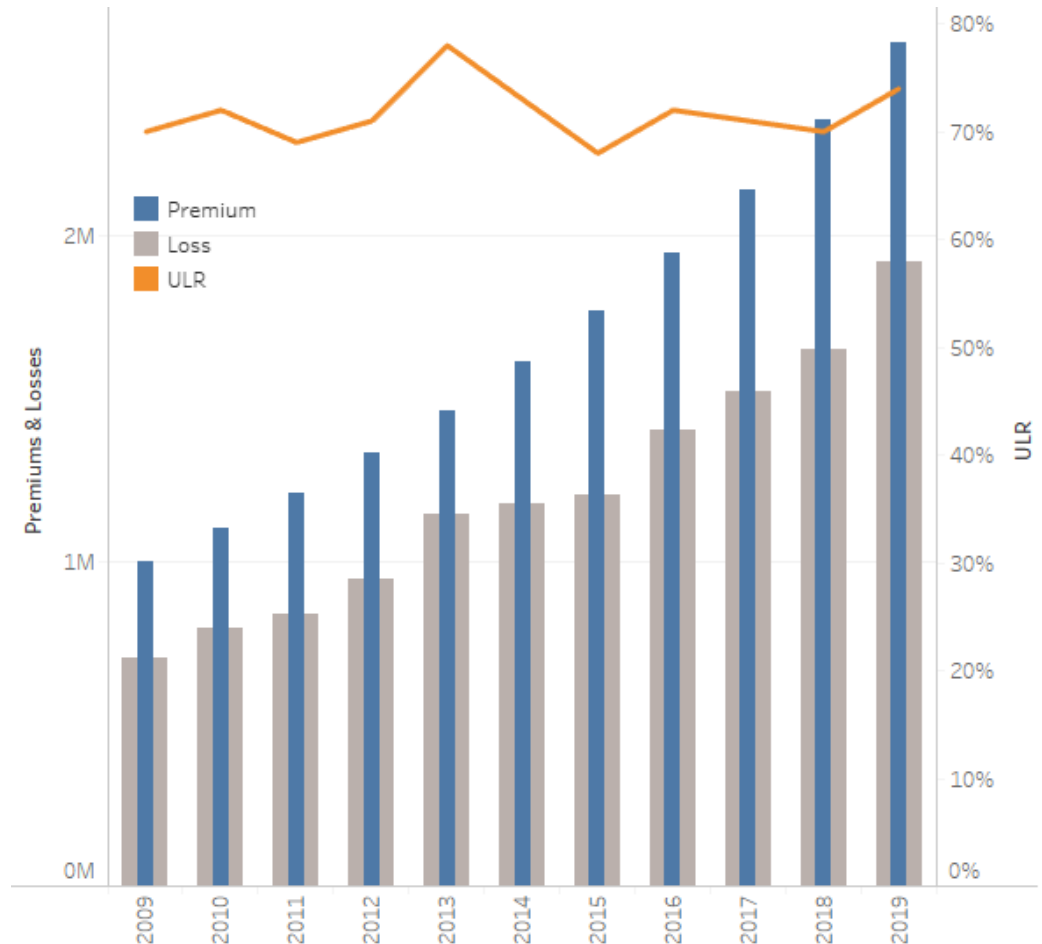
Least Risk  Most Risk

# What is the goal of data visualization?

## Present data

AY	Premium	Loss	ULR
2009	1,000,000	700,000	70%
2010	1,100,000	792,000	72%
2011	1,210,000	834,900	69%
2012	1,331,000	945,010	71%
2013	1,464,100	1,141,998	78%
2014	1,610,510	1,175,672	73%
2015	1,771,561	1,204,661	68%
2016	1,948,717	1,403,076	72%
2017	2,143,589	1,521,948	71%
2018	2,357,948	1,650,563	70%
2019	2,593,742	1,919,369	74%

Premiums, Losses, and Ultimate Loss Ratios by Accident Year



# What are the pros and cons of data visualization?



## PROS

- Better understanding of compared performances
- Sharing of information is easy as presentation is engaging and digestible
- It is easier to identify trends and draw better inference
- Visibility to see corresponding events to performance
- Modification of data to provide audience with a presentation that resonates
- Geographical visualization – present data in the context of location
- Patterns are quickly seen for further exploration
- Large data sets can be presented in various formats to provide increased speed to insights



## CONS

- It gives estimation not always accuracy as data transformation can lead to speculation
- Can be biased depending on how the data sets are combined for visualization
- Different audience may interpret differently
- Improper design issue can lead to confusion of meaning
- Core messages can be missed if the audience is not clear on the context of the visualization

# Is my deliverable a prime candidate for data visualization?

*One of the main reasons to use data visualization is the versatility of reviewing multiple dimensions of data at once. It can save a lot of time and help you focus on the most important information!*



# What tech-enabled tools can I use for modern visualization?



Power BI



QlikView



# How can I start implementing data visualization?

**Define the goal**

**Brainstorm** which graphics convey the message

**Identify data**

**Connect** software to the data

**Obtain** feedback on effectiveness

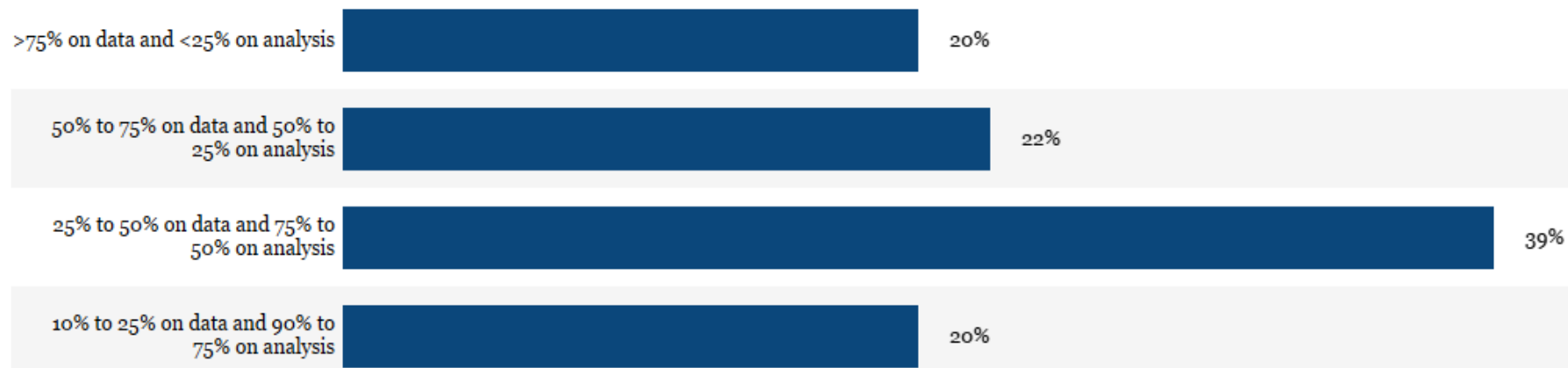
**Refine** your visualization

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Automation

# Automation can make a difference

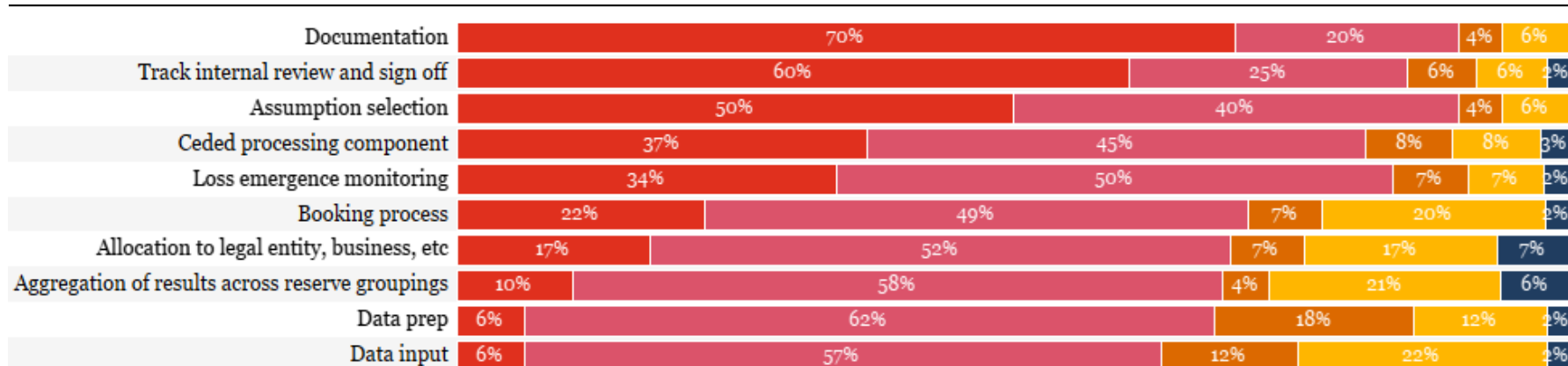
## P&C actuaries' time spent on data versus analysis and reporting



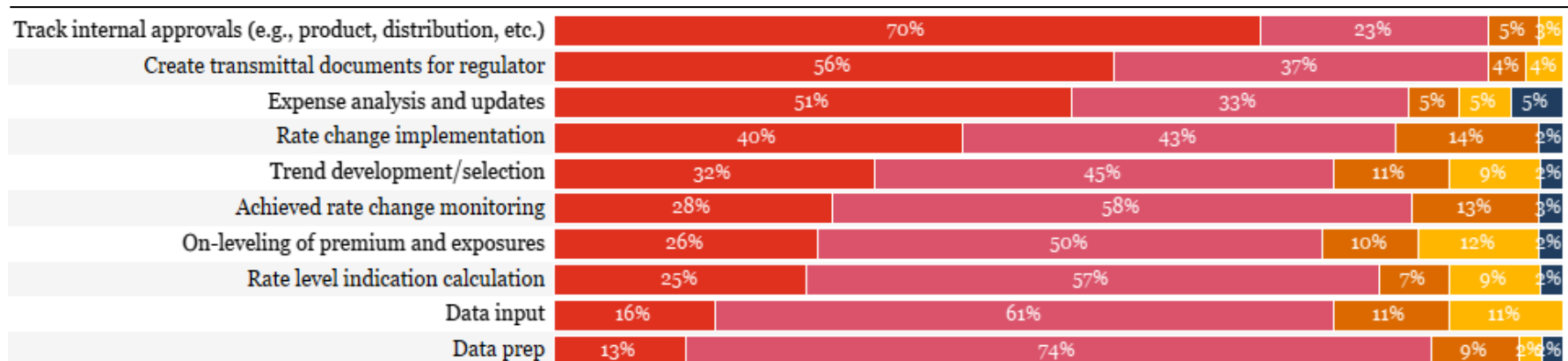
*42% of P&C Insurers reported spending more than half their time on processing, manipulating, and reconciling data compared to analysis and reporting.*

# How far along is the industry in adopting automation?

## Level of automation used within the following reserving tasks



## Level of automation used within the following pricing tasks



- Manual
- Some desktop automation (e.g., use of macros, batch processing)
- Some robotics automation

- Fully automated process flow
- Fully automated process with decentralized ability to update process

Source: PwC 2019 Actuarial Modernization Survey

# Automation and Robotic Process Automation (RPA)

- Automation is the use of tools such as software and code to automate tasks related to actuarial processes
- RPA is a technology engaging bots to execute repetitive, rules-based business tasks that are ordinarily completed by humans
- Modern state
  - **Alleviates** the need for humans to perform repetitive, rules-based tasks
  - Communicates **cross application** and **cross function**
  - Requires **minimal coding** knowledge



# What tech-enabled tools can I use for RPA?

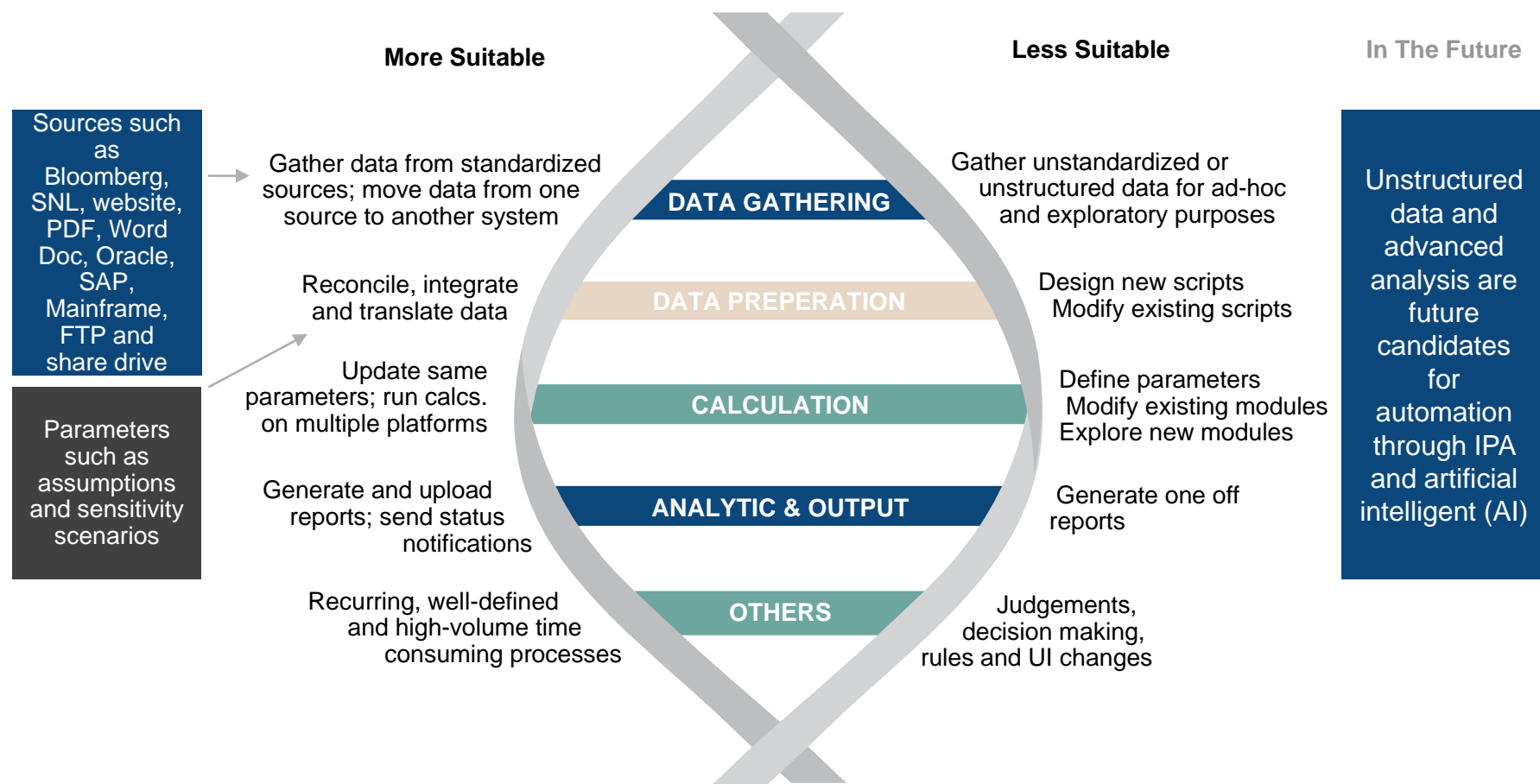


# Is my actuarial process a prime candidate for RPA?

	Levels of Complexity		
	Low	Medium	High
<b>User interfaces required</b>	1-2 applications	3-4 applications	4+ applications
<b>Data format structure</b>	1-3 formats	4-6 formats	6+ formats
<b>Reuse of programming logic/elements</b>	High reuse – up to 80%	Medium reuse – no more than 50%	Low reuse – Less than 30%
<b>Types of application</b>	Off the shelf packaged software with fixed screen layouts and/or infrequent changes	Combination of fixed layouts and dynamic applications, 25% - 30%, 1-2 changes a year	More than 50% of the apps are dynamics and/or change frequently to meet the business need
<b>Target application maturity</b>	Application stable at target architecture with no planned major changes	Target application in transition, major changes in 12-24 months	Target application changing in less than 12 months



# Is my actuarial process a prime candidate for RPA?



Consider processes which are rules based, standardized, and take up significant time as candidates for process automation

# What are the pros and cons of RPA?



## PROS

- Less actuarial time spent on manual repetitive tasks
- Net cost savings
- Run processes faster



## CONS

- Can take focus off of more optimal solution
- Initial investment
- Learning curve

# How can I start implementing RPA?

**Identify** the processes and sub-processes that are suitable for automation

**Define** and detail each step you would take to complete the processes

**Review** the steps for any inefficiencies and consolidate

**Implement** the consolidated steps within your RPA software

**Test** your automation on various different scenarios

# *RPA Demo Video*

Thank you