



40 - Exponential Actuary Overview - The Evolving Role of the Actuary

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2019 Valuation Actuary Symposium

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**Session Number 40, Exponential Actuary Overview - The Evolving Role of the Actuary
Kaggle Competitions**

August 26, 2019



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What is Kaggle?

- **Kaggle** is an online community of data scientists and machine learners, owned by Google LLC. Competitions include tabular data, computer vision, and Natural Language Processing (NLP).
- Why is Kaggle important as an Actuary?
<https://www.soa.org/predictive-analytics/kaggle-program/>

Concept	Definition
Train Data	Data used to fit the model.
Test Data	Data used at the end of the fitting cycle and on which the predictions are made.
Public Leaderboard	Provides the team rankings while the competition is active.
Private Leaderboard	Determines the competition standings.
Kernel	Cloud computational environment. Supports Python and R code.
Machine Learning	Machine learning is the science (and art) of programming computers so they can learn from data[1].

References: [1] Hands-On Machine Learning with Scikit-Learn & Tensorflow Aurelien Geron 2017 Page 4

Some Problems in Machine Learning

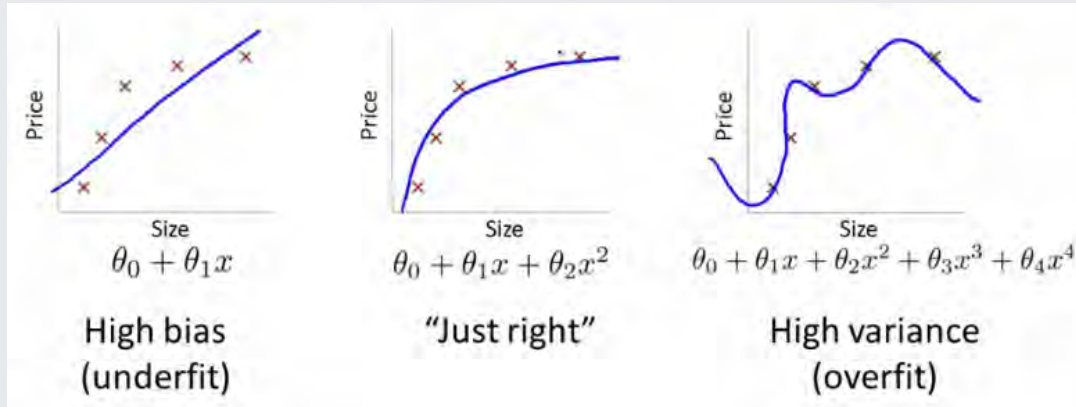
Solution

Data Cleaning:

<https://www.kaggle.com/c/landmark-recognition-challenge/discussion/56436>
<https://cloud.google.com/vision/>

- Focus on data quality.
- Actuarial Standard of Practice No. 23 Data Quality

Overfitting:



- Create an appropriate validation set.
- Treat the leaderboard as another fold of your cross-validation strategy.

Reference: <https://www.kdnuggets.com/2017/11/create-good-validation-set.html>

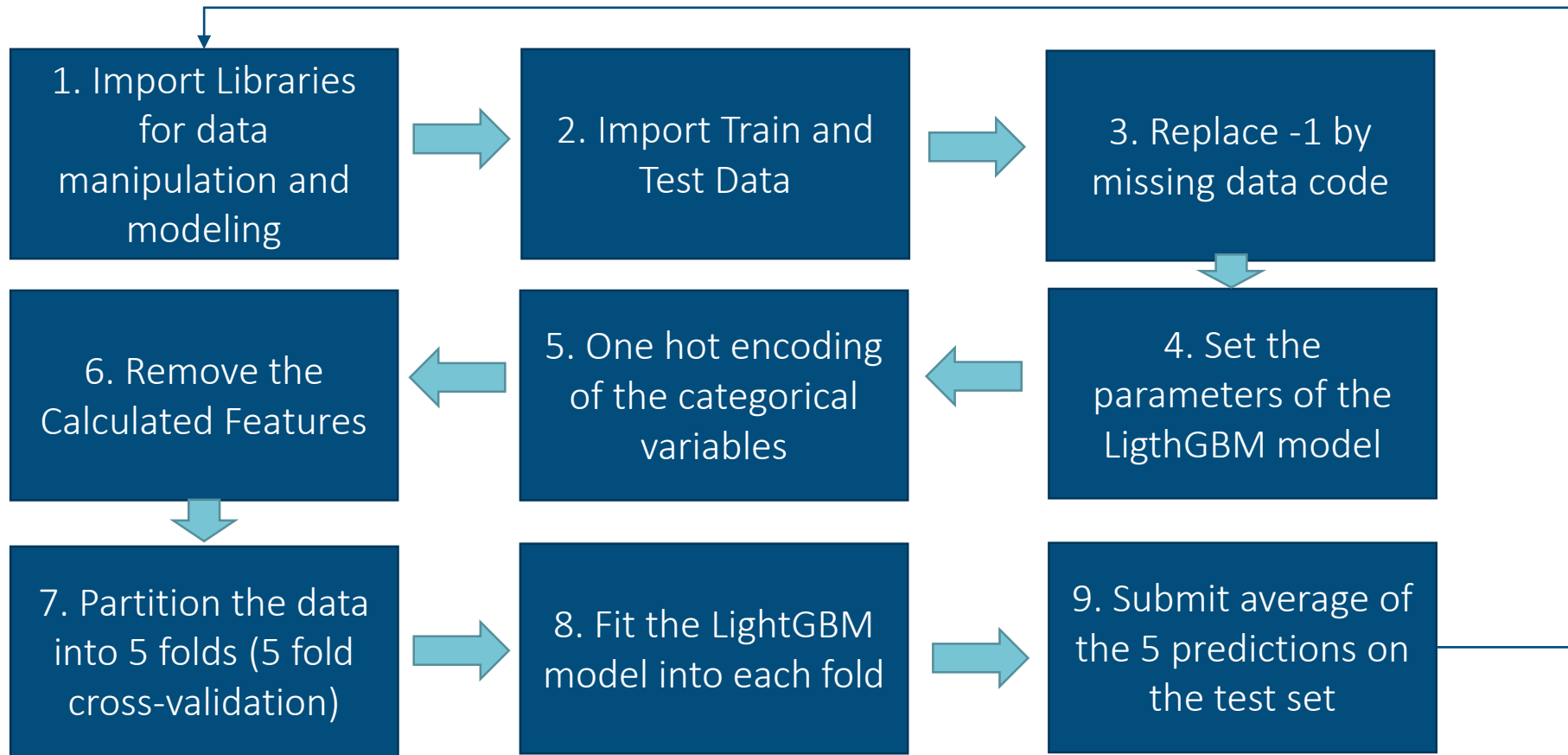
Kaggle competitions related to insurance

Competition Name	Date	Description	Link
Allstate Claim Prediction Challenge	October 2011	Predict Bodily Injury Liability Insurance claim payments based on the characteristics of the insured's vehicle.	https://www.kaggle.com/c/ClaimPredictionChallenge
Allstate Purchase Prediction Challenge	May 2014	Using a customer's shopping history, can you predict what policy they will end up choosing?	https://www.kaggle.com/c/allstate-purchase-prediction-challenge
Liberty Mutual Group - Fire Peril Loss Cost	September 2014	Predict expected fire losses for insurance policies.	https://www.kaggle.com/c/liberty-mutual-fire-peril
Liberty Mutual Group: Property Inspection Prediction	August 2015	Predict a transformed count of hazards or pre-existing damages using a dataset of property information.	https://www.kaggle.com/c/liberty-mutual-group-property-inspection-prediction
Homesite Quote Conversion	February 2016	Which customers will purchase a quoted insurance plan?	https://www.kaggle.com/c/homesite-quote-conversion
State Farm Distracted Driver Detection	August 2016	Can computer vision spot distracted drivers?	https://www.kaggle.com/c/state-farm-distracted-driver-detection
Allstate Claims Severity	December 2016	How severe is an insurance claim?	https://www.kaggle.com/c/allstate-claims-severity
Porto Seguro's Safe Driver Prediction	November 2017	Predict if a driver will file an insurance claim next year	https://www.kaggle.com/c/porto-seguro-safe-driver-prediction/

How to get started with Machine Learning?

- Fastai library: <https://docs.fast.ai/>
- Machine learning for coders: <http://course18.fast.ai/ml>
- Deep Learning Course: <https://course.fast.ai/>

Porto Seguro Safe Driver Prediction <https://www.kaggle.com/msmelguizo/lightgbm-demo/>



Questions?
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Exponential Actuary Overview - The Evolving Role of the Actuary

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Valuation Actuary Symposium: Session 40

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Today's Objectives

At the conclusion of the session, attendees will be able to:

- Understand the broader technological disrupters and enablers impacting actuaries
- Understand the trends in employment and staffing models
- Identify opportunities for new staffing and training and development
- Understand concepts such as crowdsourcing, gig workers and other types of alternative workforce arrangements
- Identify opportunities for leveraging exponential technologies
- Identify opportunities to modify physical and virtual workplace structures to maximize collaboration and productivity

7 Disruptors

7 Disruptors



Tsunami of Data



AI , Cognitive Computing, Robotics



Explosion in contingent work



Careers – 100 year life



Technology is Everywhere



Jobs Vulnerable to Automation



Diversity/Generational Change



Technology is Everywhere

7.2 billion smartphones worldwide by 2023

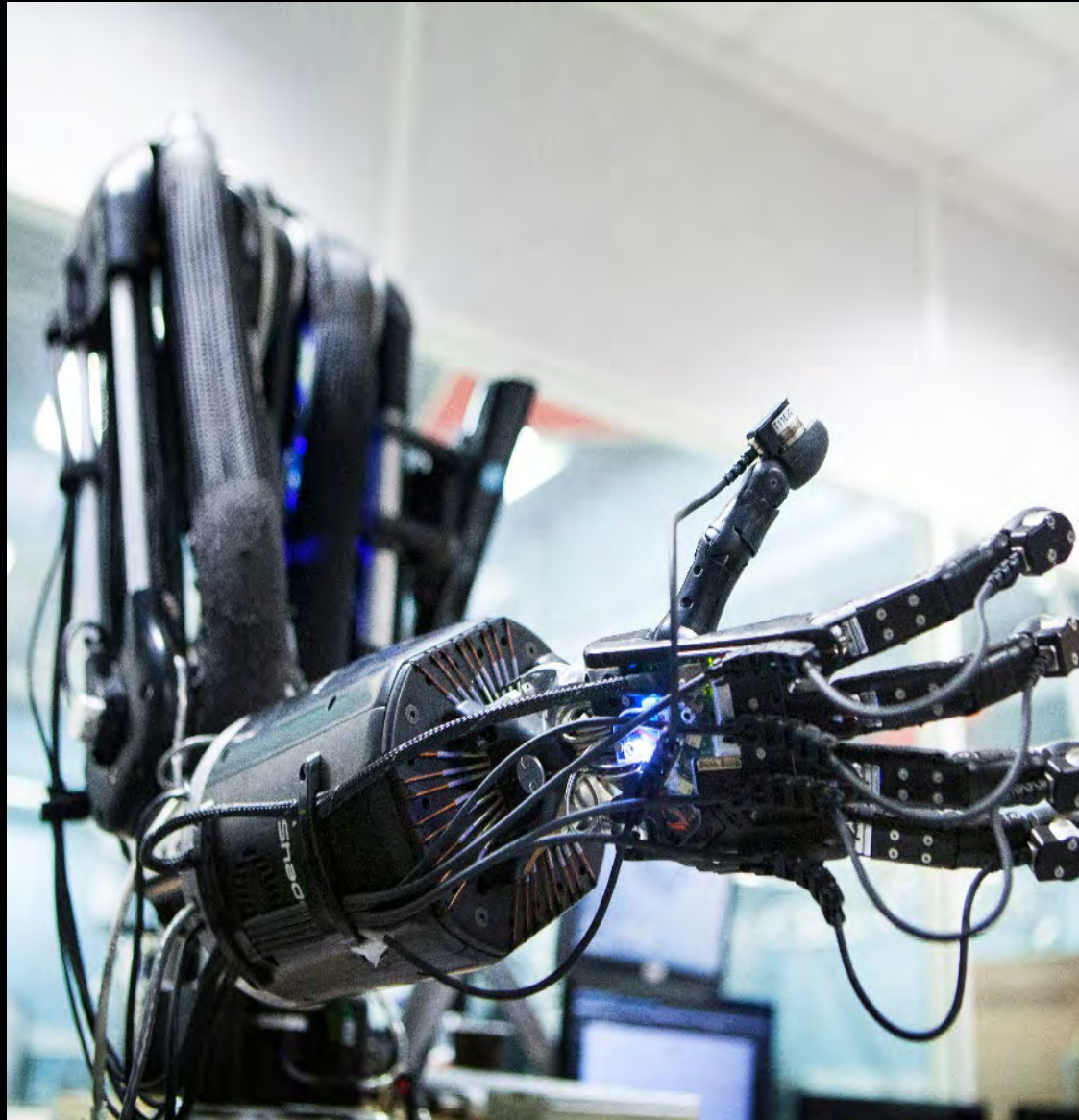
A smartphone has more computing power (1.4 GHZ) than the computers used for the Apollo 11 moon landing!

Tsunami of Data

9x more data has been collected in the last two years than was collected in all of human history

80 billion connected devices around the world by 2025





AI , Cognitive Computing, Robotics

AI-related products and innovations will add nearly \$16 trillion to the global GDP by 2030

Increasingly affordable - \$500,000 in 2008 and \$22,000 today

Jobs Vulnerable to Automation

Nearly half of today's task-based jobs are predicted to be vulnerable to automation in the next 10 years





Diversity and Generational Change

In 2020, the global workforce will be made up of:

- **Baby Boomers: 6%**
- **Gen X: 35%**
- **Millennial: 35%**
- **Gen Z: 24%**

Change in Nature of Careers – The 100 Year Life

A baby born today could live to be over 125 years old

The half-life of skills has fallen to 2.5 – 5 years



Explosion in Contingent Work

94% of the new jobs created in the US from 2005–2015 were classified as alternative work

77 million formally identified freelancers in Europe, India, and the US

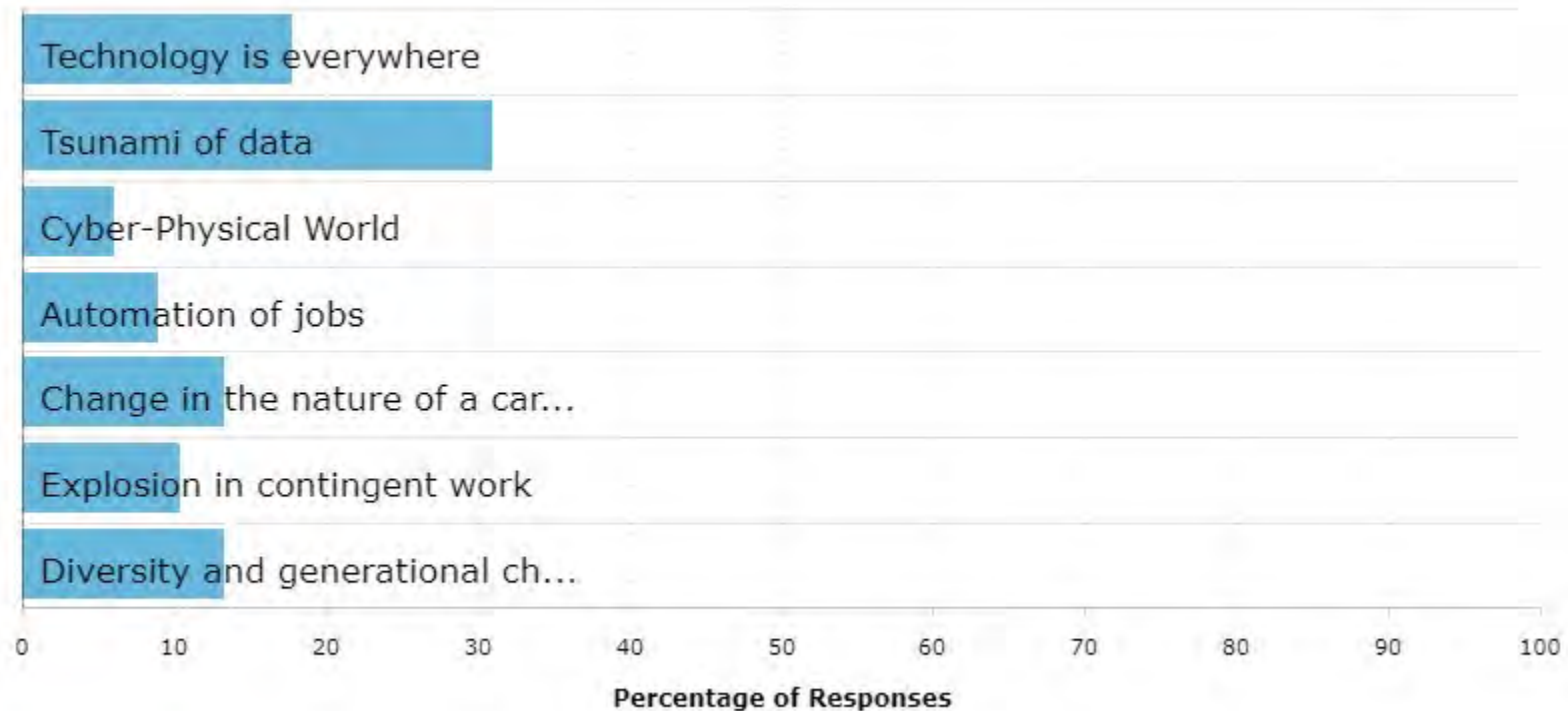


Survey Question 1

Which of these disruptors will have the most impact on your workforce in the next 3-5 years?

- A. Technology is everywhere
- B. Tsunami of data
- C. Cyber-Physical World
- D. Automation of jobs
- E. Change in the nature of a career
- F. Explosion in contingent work
- G. Diversity and generational change

Poll: Which of these disruptors will have the most impact on your workforce in the next 3-5 years?

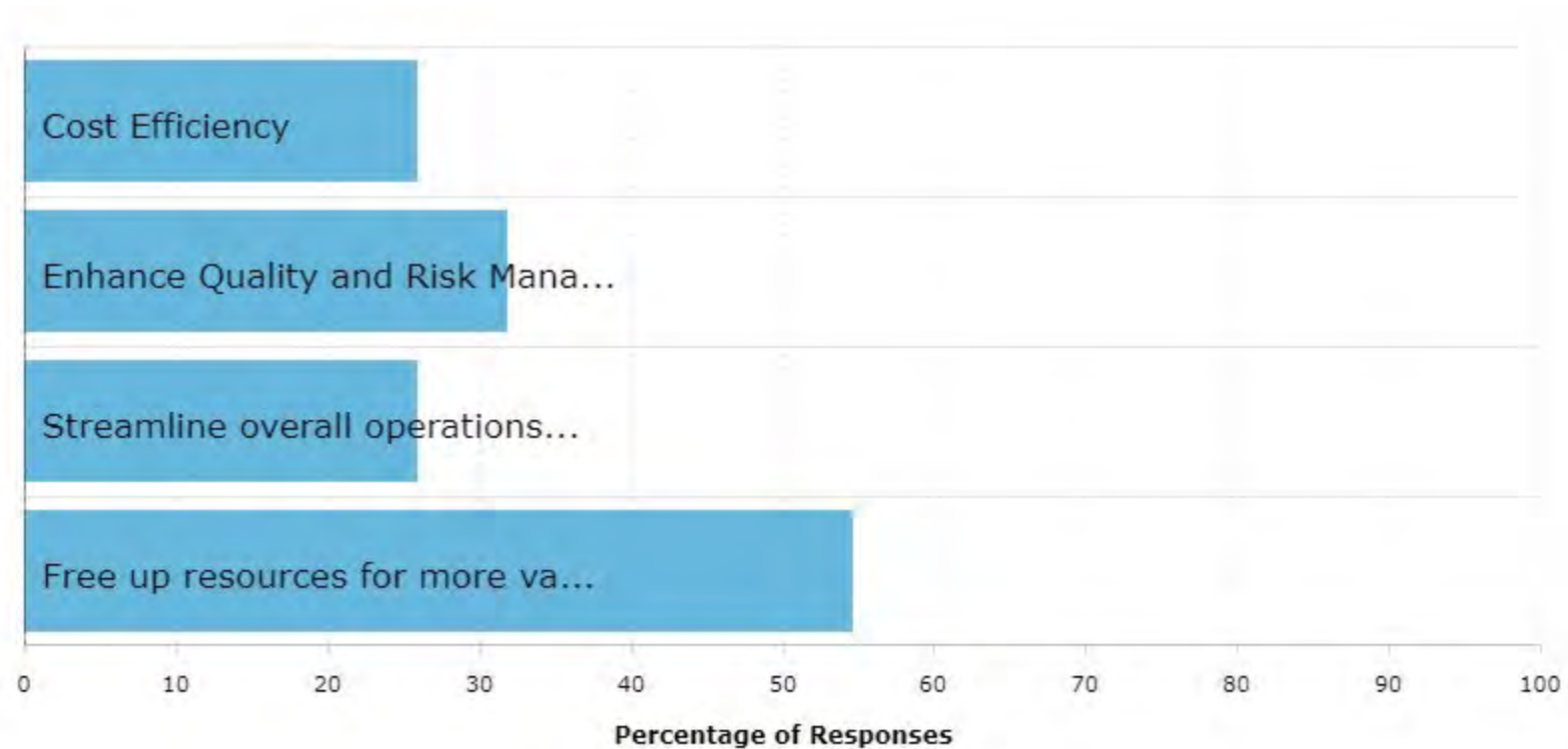


Survey Question 2

What are the biggest driving forces for automation in your organization?

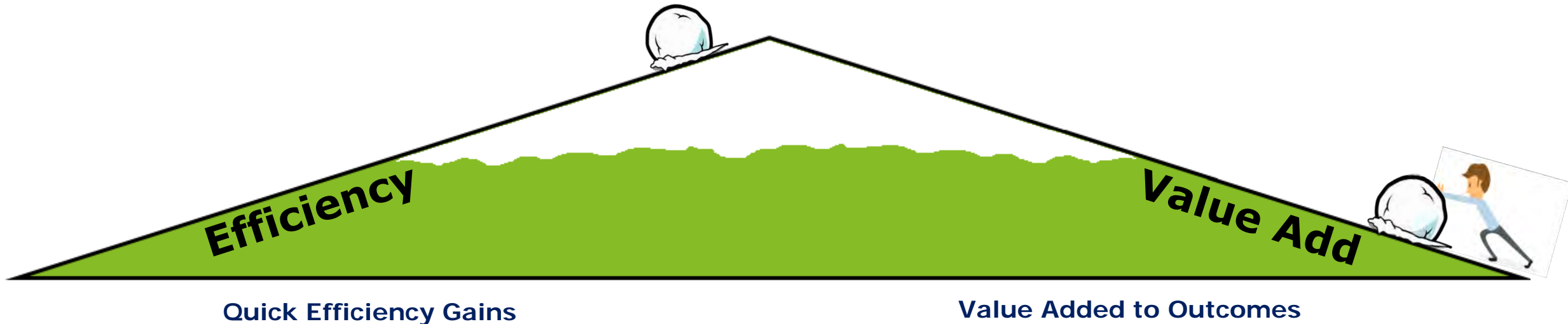
- A. Cost Efficiency
- B. Enhance Quality and Risk Management
- C. Streamline overall operations (e.g., Claims or New Business Processing)
- D. Free up resources for more value-added activities

Poll: What are the biggest driving forces for automation in your organization?



The Need for Change

As professionals transition to the Future of Work, the benefits are two-fold. First, there are quick gains in efficiency as technology automates tasks. Second, net new value is added as technology augments outcomes. This is analogous to two snowballs—one downhill and one uphill



Quick Efficiency Gains

- Conduct business faster, cheaper, and with fewer errors
 - *Increased speed allows insights to be generated quicker and on a more frequent basis*
- Allow employees to focus on other business efforts
- Enable analytics for innovation, increase revenue and help create a differentiated customer experience

Value Added to Outcomes

- Explain trends more accurately and more precisely with machine learning and advanced analytics
- Generate new insightful data
- Identify anomalies that humans couldn't
- Drive net new outcomes with freed capacity and tools

The Two-Part Value Equation



Productivity



Capacity for Insight



Performance



Perform current duties **faster, cheaper, and with less errors**



Focus judgement and analysis on high risk issues



Enable workforce to focus on more **strategic initiatives**



Strategize solutions to drive better outcomes



Innovate strategies to empower new business models



Address "what if" questions live through interactive dashboards



Expand role of the professional to drive business value



Drive management action by moving from "Why" to **explaining "So What"**



Drive shareholder value through **forward looking analysis** to identify and manage risk

Example:
Actuary



Automation of pricing models and analysis reduces time required and increases reporting frequency



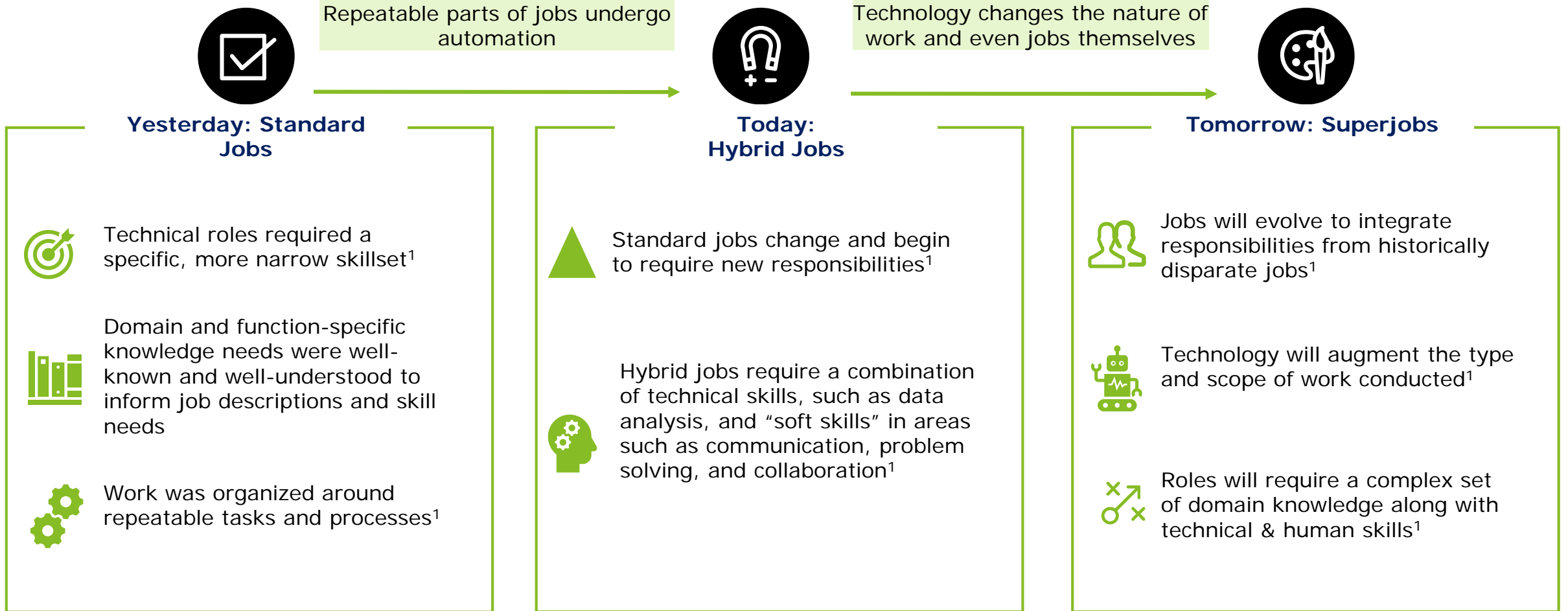
More frequent reporting and capacity to analyze and recommend opportunity leads to real time insights



Identify expense drivers to redesign products to minimize costs

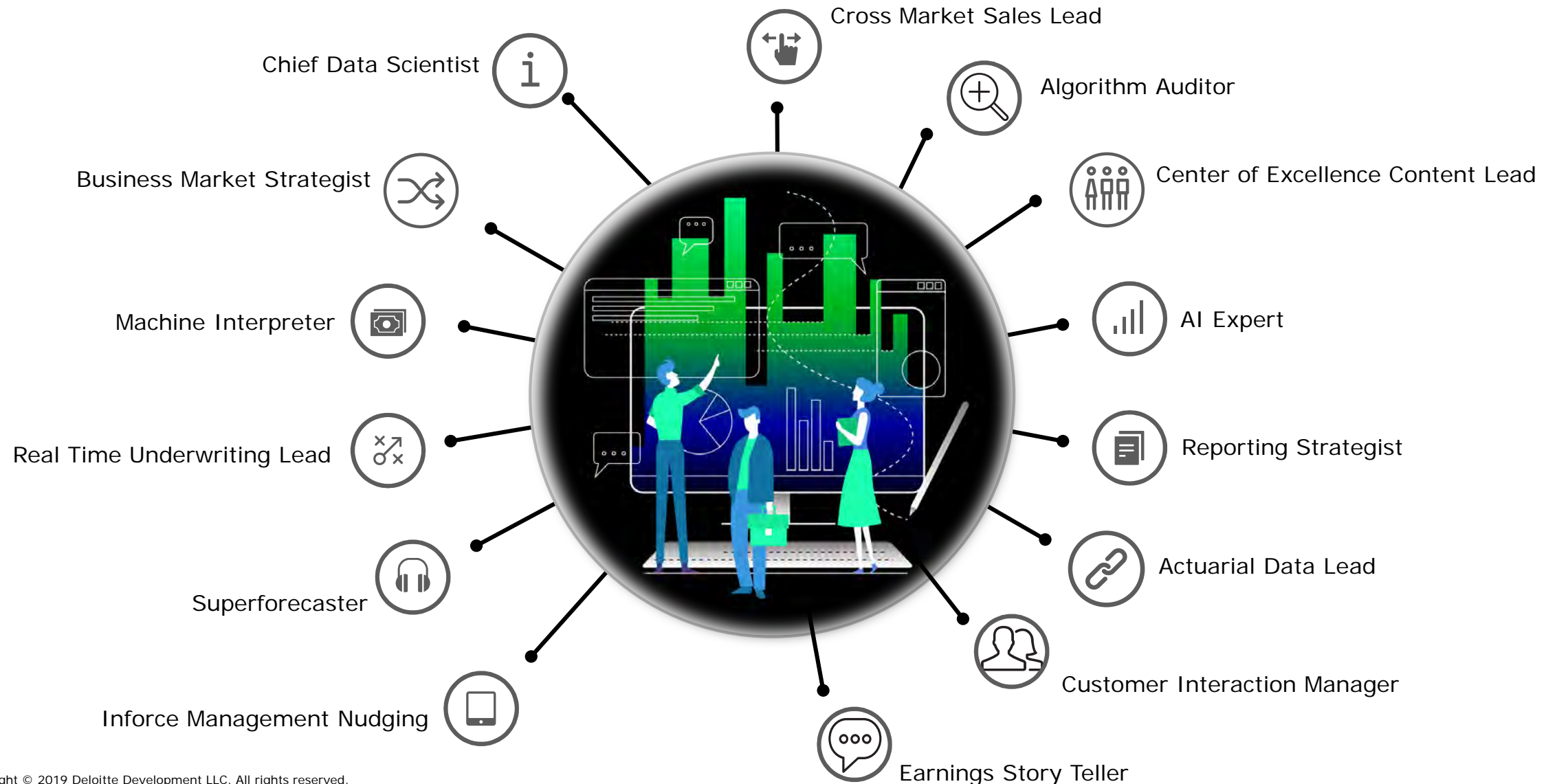
From Jobs to Super Jobs™

The professional of the future will require a combination of core domain skill sets, the ability to work with a diverse array of technologies and automated solutions, and evolved “soft skills” to add increased value



¹ [Deloitte Human Capital Trends: Impact of AI Turning Jobs into Superjobs](#)

Superjobs for Actuaries



Capabilities Powering the Actuary of the Future

Highly Scientific/Technical



Data Science

Applying scientific methods to generate insights from data

- Algorithm Design
- Coding Skills
- Statistical Concepts



Cutting Edge Technology

Expertise with cutting-edge technology to support actuarial work

- Machine Learning
- Actuarial Modeling Platforms
- Other emerging technologies



Predictive Analytics

Mastery of predictive analytics and model building

Business and Functional



Risk Management

Thorough understanding of risk management including:

- Identification
- Quantification
- Mitigation
- Monitoring



Product Knowledge

Engage in continued learning to deepen product knowledge

- Insurance Products
- Retirement/Financial Products
- Non-traditional products (oil, gas, etc.)



Business Knowledge

Understanding of broader business concepts to facilitate big picture thinking

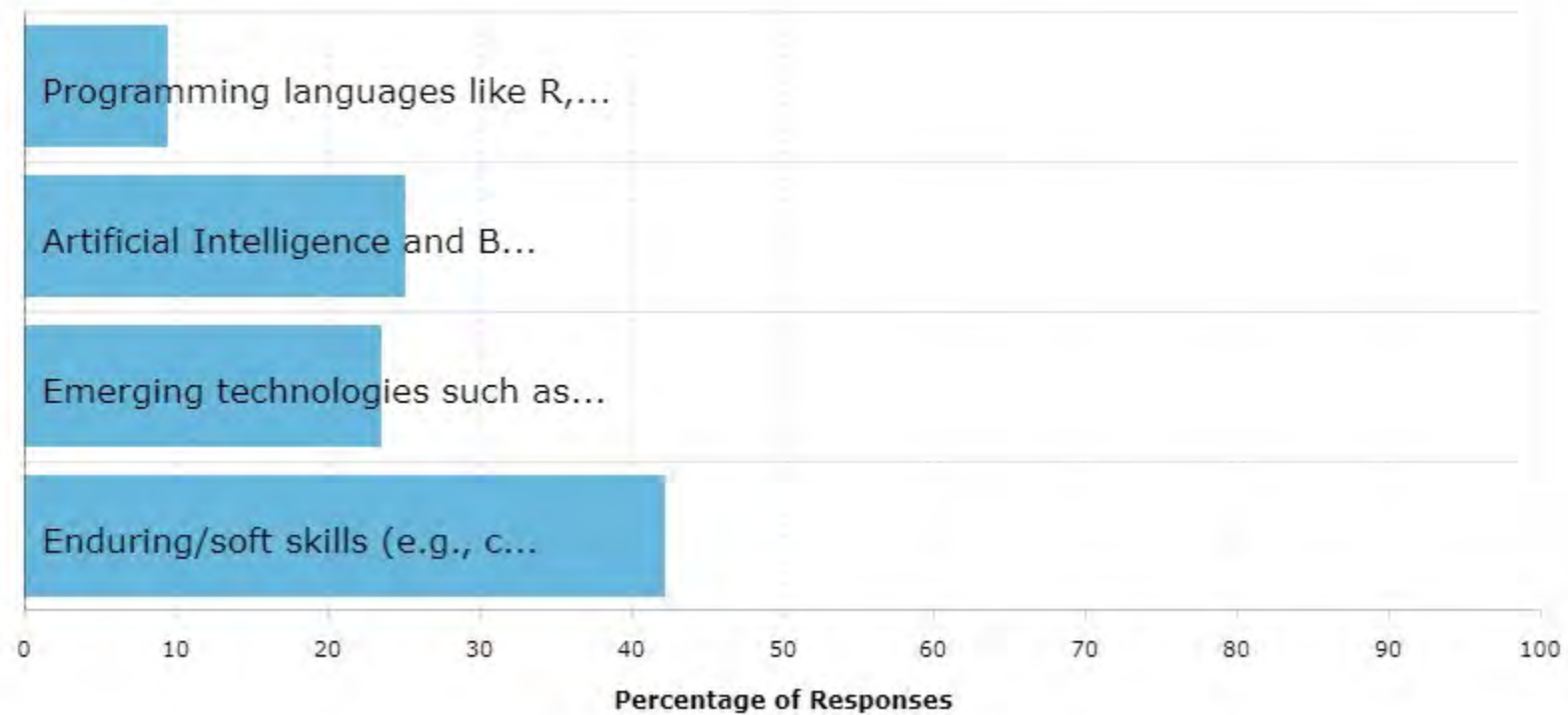
- Finance/Accounting
- Sales/Marketing
- Operations

Survey Question 3

Enhancing training and development programs for the actuary of the future should be focused on?

- A. Programming languages like R, SAS, Python
- B. Artificial Intelligence and Big Data Platforms
- C. Emerging technologies such as data visualization
- D. Enduring/soft skills (e.g., communication skills)

Poll: Enhancing training and development programs for the actuary of the future should be focused on?



The Workforce is Changing

Who can perform the work, is changing. It is critical to transform the workforce and capitalize on the talent continuum



Actuarial departments have traditionally followed an on-balance sheet model with full-time employees and traditional reporting structures. But with a significant trend to alternative workforce arrangements, such as the gig economy and crowdsourcing, Actuaries are transitioning to this new future of working.

- Capitalizing on different types of off-balance sheet workers
- Creating strategies to leverage the hybrid workforce that involves different types of workers, cross-country borders, and other changes
- Enhancing training and development programs for the roles of the future
- Employing workforce modeling to optimally allocation of resources and types of resources

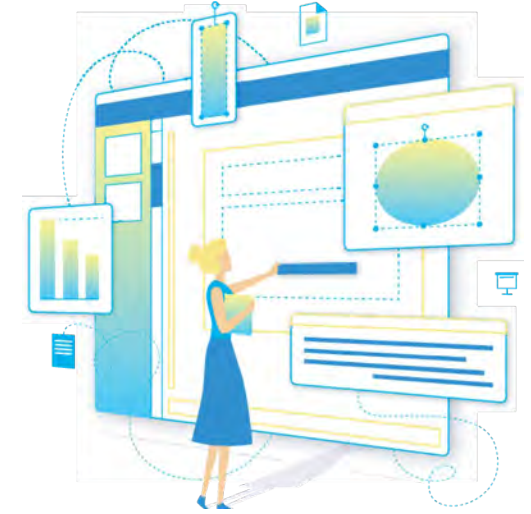
Current Market Trends

WORKPLACE

- Britain's booming gig economy has **more than doubled** in size over the **past three years** and now accounts for **4.7 million workers**. ([The Guardian](#))
- A recent study by the **U.S. Bureau of Labor Services** found that workers in **management, professional, and related occupations** (MPR) are **3X more likely** to work from home than other occupations. ([HR Dive](#))



WORKFORCE



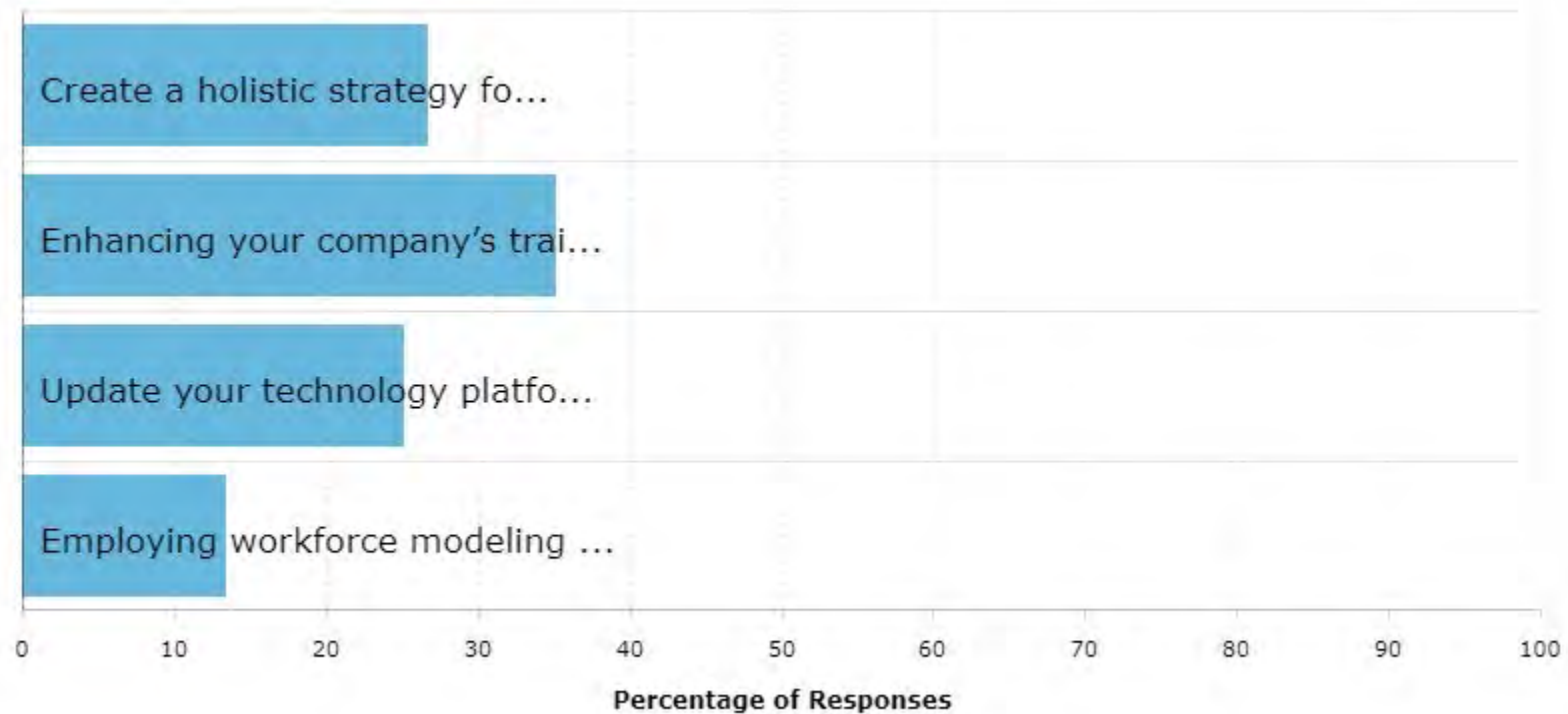
- Amazon plans to spend \$700 million over approximately six years to retrain a third of its U.S. workforce as automation, machine learning and other technology upends the way many of its employees do their jobs. ([Wall Street Journal](#))
- Fueled by the rise of digital apps such as Uber, Lyft, Postmates, DoorDash, and Grubhub, **alternative work** has grown **3X faster in high-growth hubs** than in trailing cities and nearly 10X faster than in rural county segments. ([McKinsey Global Institute](#))

Survey Question 4

Which of these is the most important first step to transforming your actuarial workforce for the future?

- A. Create a holistic strategy for leveraging the hybrid workforce
- B. Enhancing your company's training and development programs for the roles of the future
- C. Update your technology platform to include newer, exponential technologies
- D. Employing workforce modeling to optimally allocation of resources and types of resources

Poll: Which of these is the most important first step to transforming your actuarial workforce for the future?





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