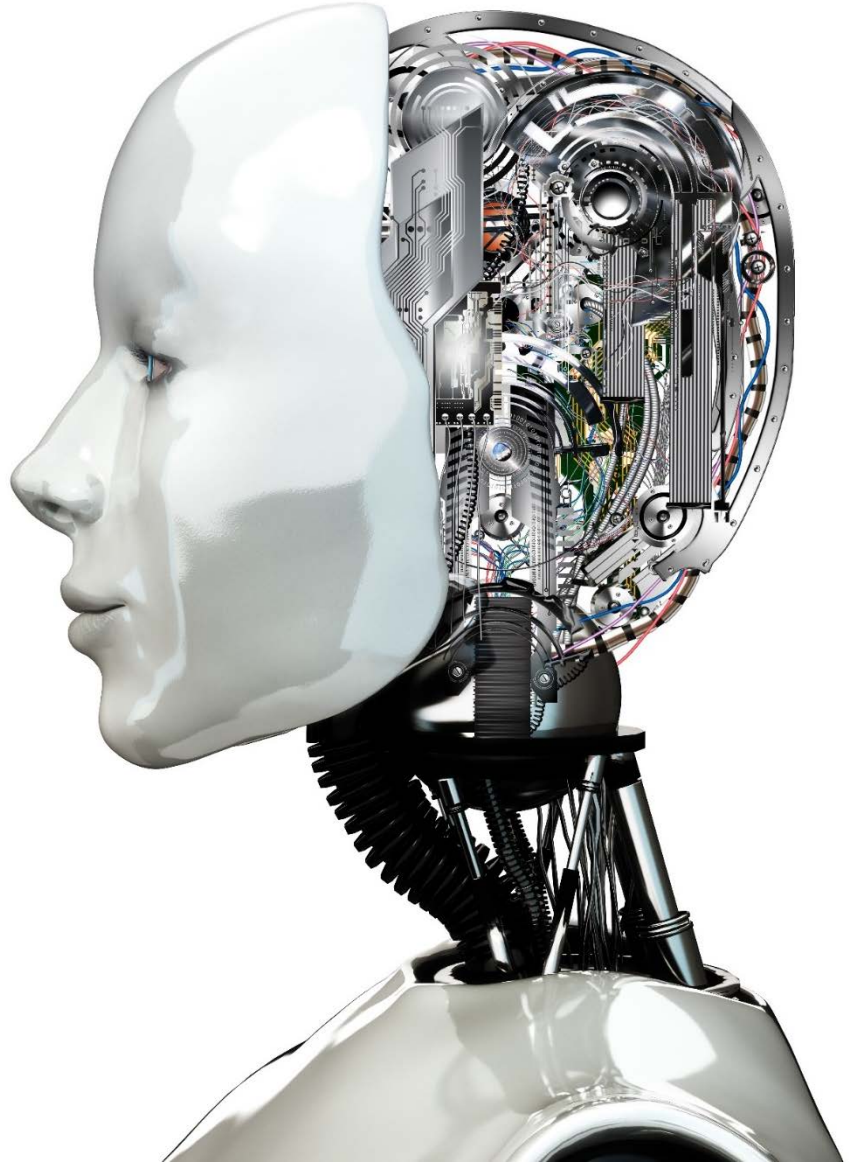
Disrupt or Be Disrupted



Owen Lewis PhD, Partner, Management Consulting

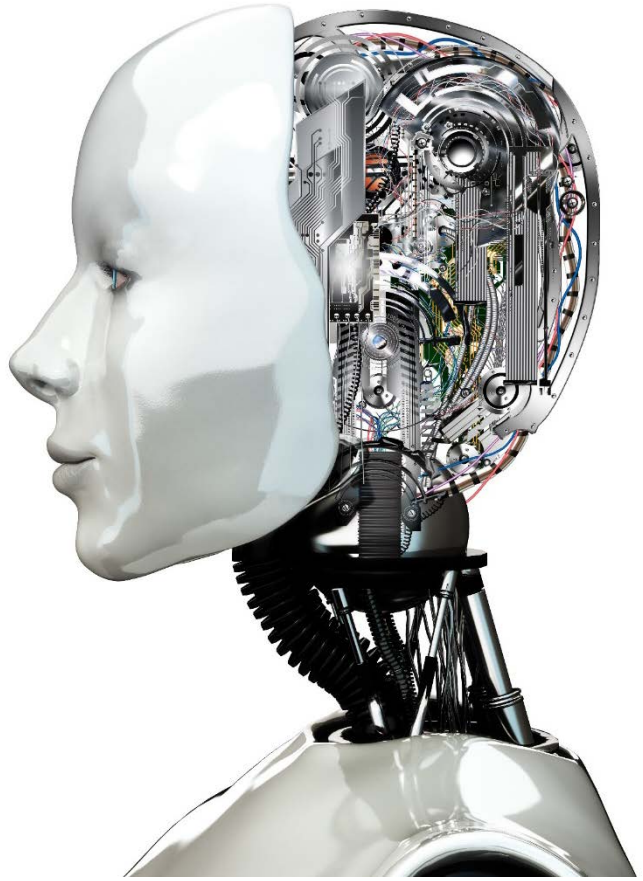
Jean Rea FSAI, Director, Actuarial Services

SAI Annual Convention

18 May 2018

KPMG

Insurtech



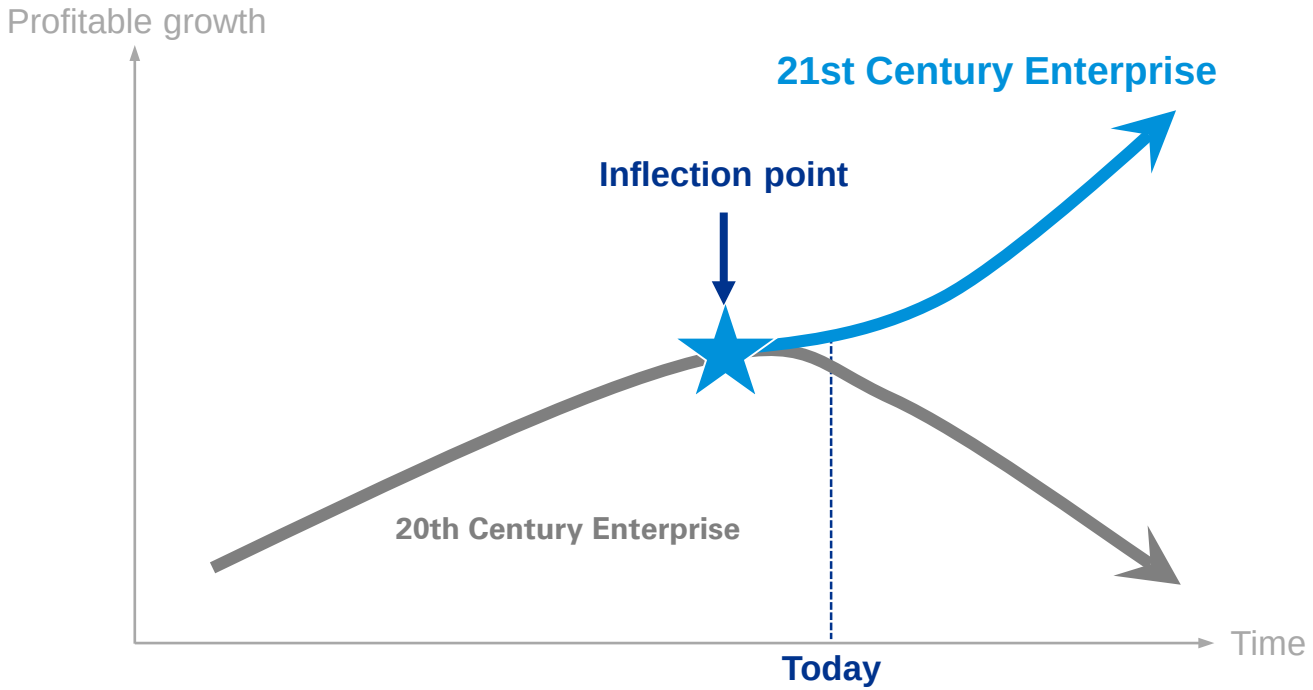
Owen Lewis

Partner

Pivot or perish

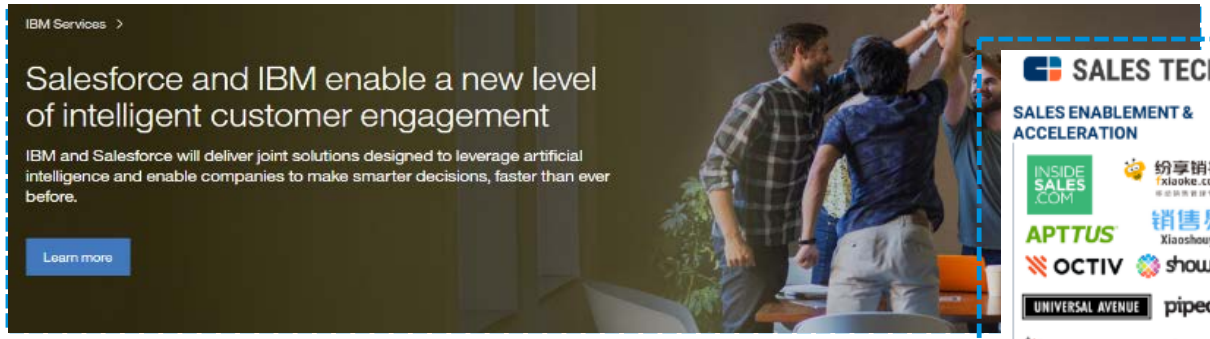
Enterprises around the world are facing a “perfect storm” of change.

- **Is the enterprise of the past century still fit for purpose in this century?**
- **What does it take to be a 21st Century Enterprise amidst these changes?**
- **How will today’s leaders transform their business models, organisational structures and operations to thrive today and in the future?**



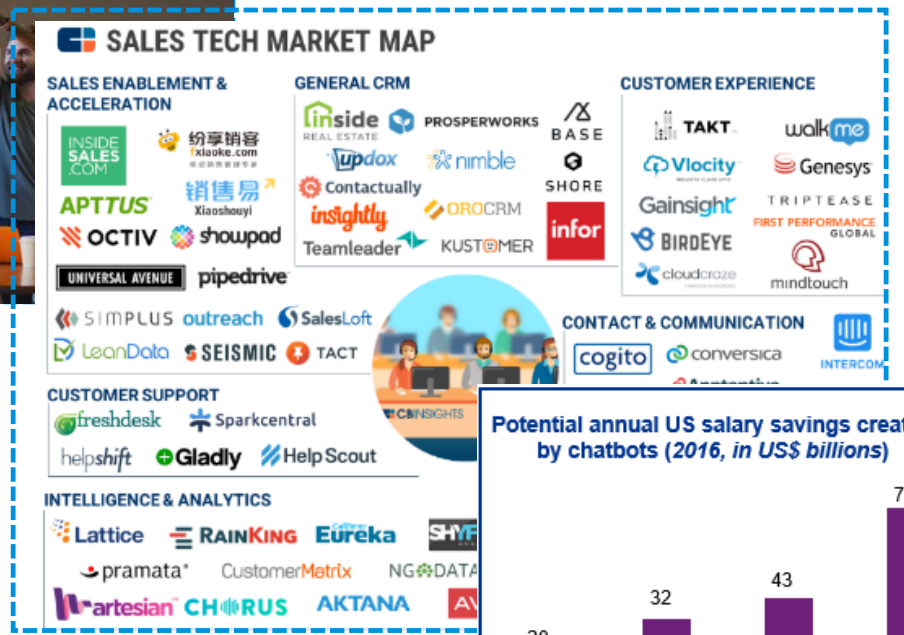
Data driven customer service…

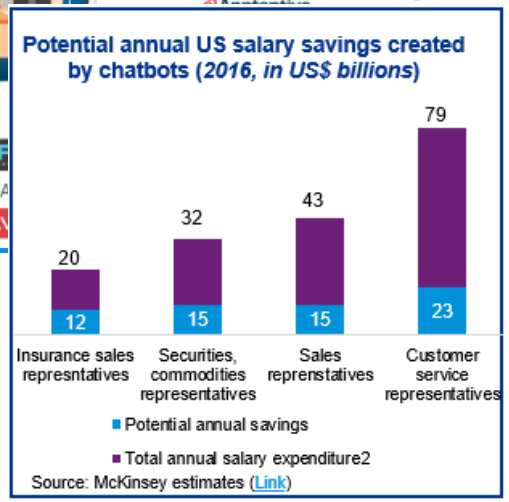
A 21st Century Enterprise unlocks value from **non-traditional assets** such as **Data, to drive decisions and efficiencies** in companies' front and back offices, and **APIs to collect and deploy data**.



Citi and other major financial institutions have adopted data-driven and automated approaches to drive business growth and enhance the services it provides to customers including user experience analytics, AI/Cognitive, and Chatbots

AIG citi JPMorgan BARCLAYS HSBC MetLife BNP PARIBAS WELLS FARGO



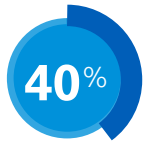


Everything-as-a-service

Organisations have been analysing the impact on their business, chosen a strategy, defined requirements, designed and implemented solutions and be able to demonstrate ongoing compliance…but what next?

As-a-Service Economy
53 percent of senior vice presidents and above see the 'As-a-Service economy' as critical or absolutely critical for their organisation, per a survey conducted in partnership with Accenture.

Digital Twins
By 2020, digital twins for industrial equipment will drive 25 percent reallocation of end-user spend from "procure and maintain" to "service" models provided by manufacturers.



Manufacturing
By 2018, 40 percent of top 100 discrete manufacturers and 20 percent of top 100 process manufacturers will provide Product-as-a-Service platforms

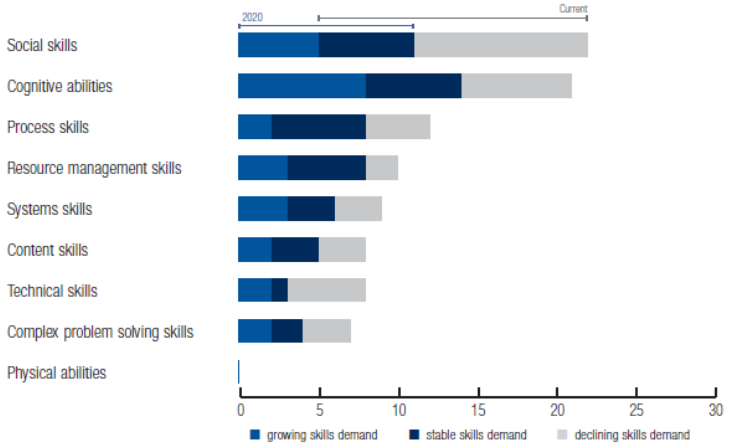
Technical & Creativity Skills Required?

Industry Profile

Financial Services & Investors

Skills Forecast

Skills Change, Overall Industry



Emerging Job Family in Focus: Computer and Mathematical

Occupations	Key skills for 2020	Skills family
Information Security Analysts	Complex Problem Solving	Complex Problem Solving Skills
Database and Network Professionals	Programming	Technical Skills
Data Analysts	Logical Reasoning	Cognitive Abilities
	Critical Thinking	Process Skills
	Creativity	Cognitive Abilities

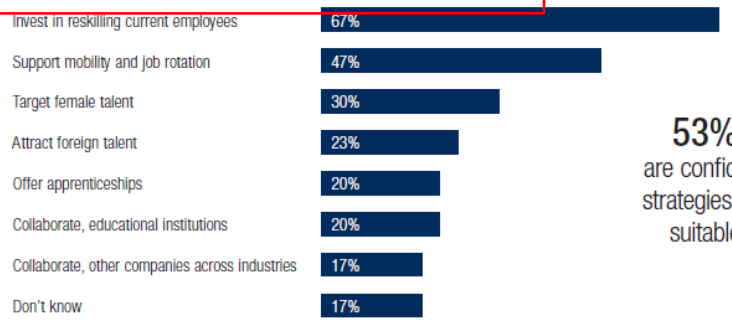
Change Management and Future Workforce Planning

Barriers

Insufficient understanding of disruptive changes	67%
Workforce strategy not aligned to innovation strategy	53%
Pressure from shareholders, short-term profitability	47%
Resource constraints	43%
Insufficient priority by top management	27%
Insufficient priority by line management	27%

67% believe future workforce planning is a leadership priority

Strategies



53% are confident strategies are suitable

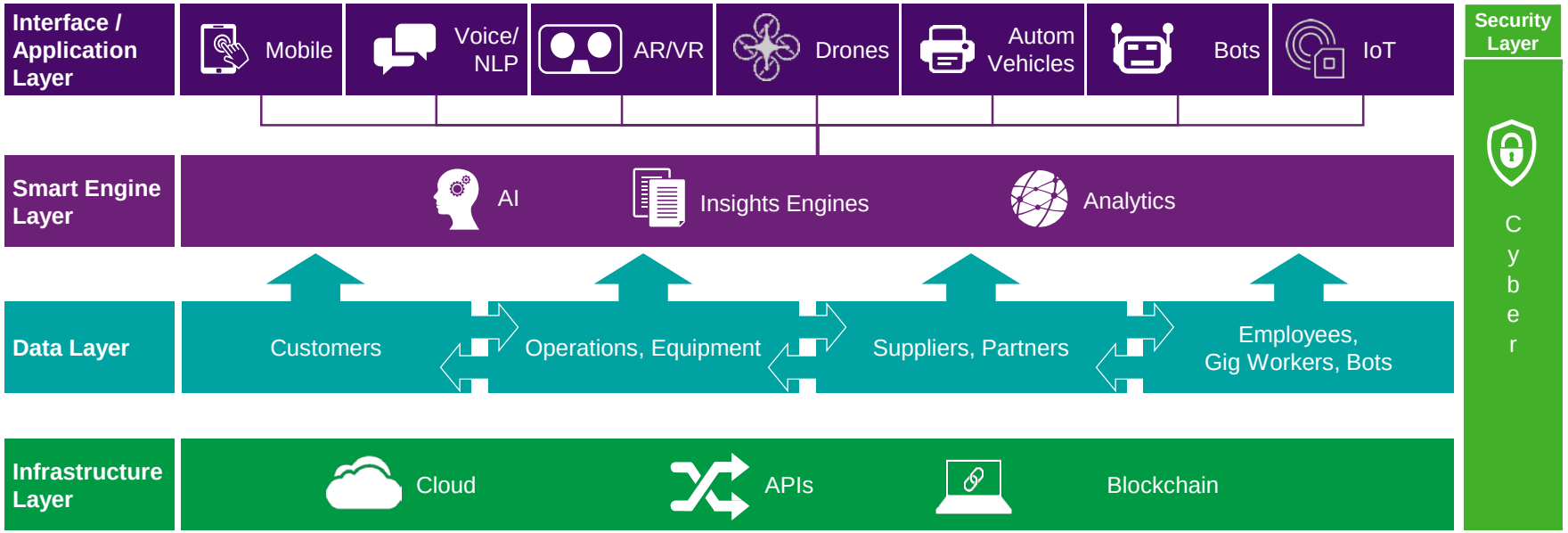
21st Century Enterprise architecture

Customer engagement

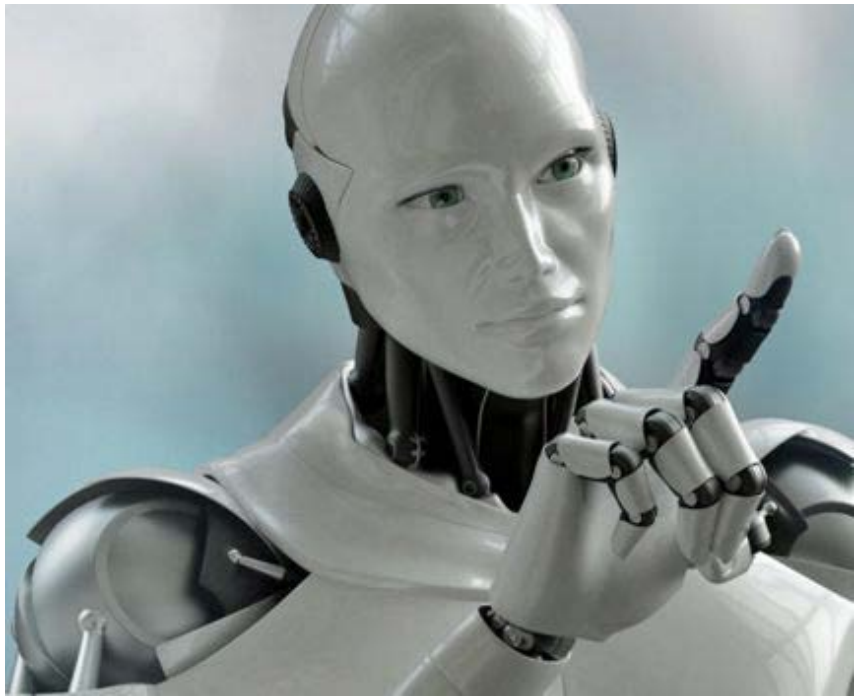
Changing nature and value of assets

Everything as a service

Workforce of the future



Rules of engagement...



A Model for Types and Levels of Human Interaction with Automation

Raja Parasuraman, Thomas B. Sheridan, *Fellow, IEEE*, and Christopher D. Wickens

HIGH 10. The computer decides everything, acts autonomously, ignoring the human.

9. informs the human only if it, the computer, decides to

8. informs the human only if asked, or

7. executes automatically, then necessarily informs the human, and

6. allows the human a restricted time to veto before automatic execution, or

5. executes that suggestion if the human approves, or

4. suggests one alternative

3. narrows the selection down to a few, or

2. The computer offers a complete set of decision/action alternatives, or

LOW 1. The computer offers no assistance: human must take all decisions and actions.

What are the risks?

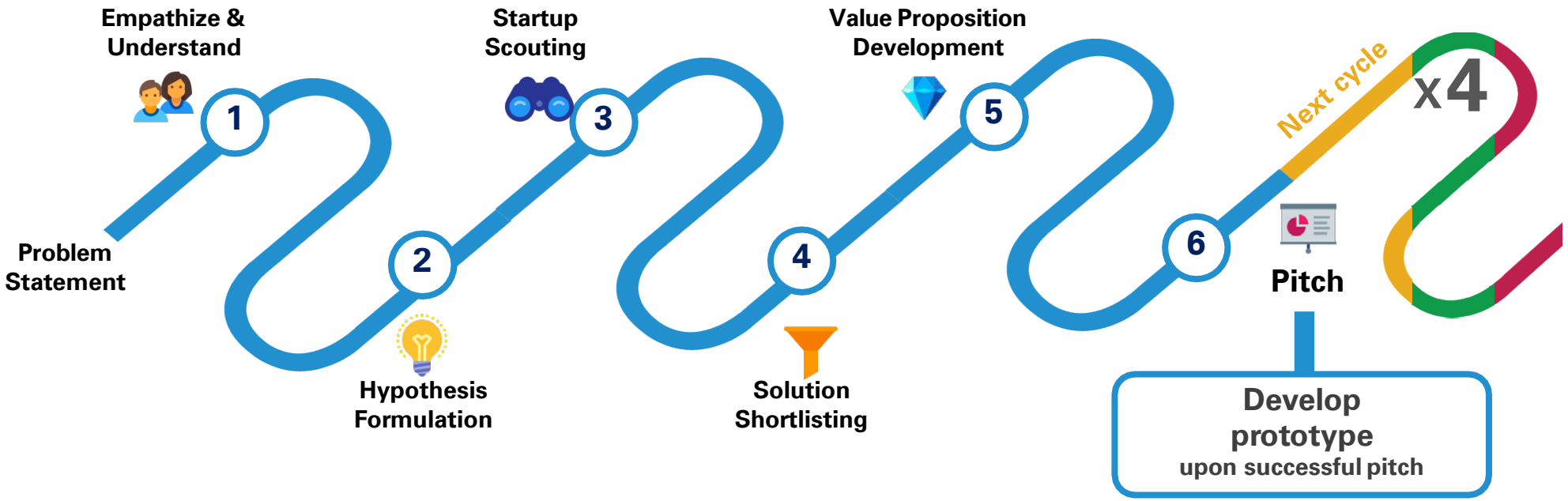
- Do you know what AI is in place in your organisation?
- Have you thought about how you might audit AI?
- What about regulations…GDPR…the right to understand an automated decision
- How do you avoid entanglement and bias?
- Augment workforce or replace
- Artificial stupidity…
- Hype: over promise and under deliver…

Setting Up for Effective Innovation

Integration of life events and business: eliminating the boundaries…

Innovation Governance and Process

Individual Innovation Cycle (4 – 12 weeks)



Leadership | Resource | Budget | Training | Awareness and engagement | Collaboration Mechanism | Strategy | Metrics

Millennial attitudes - How accurate are they?

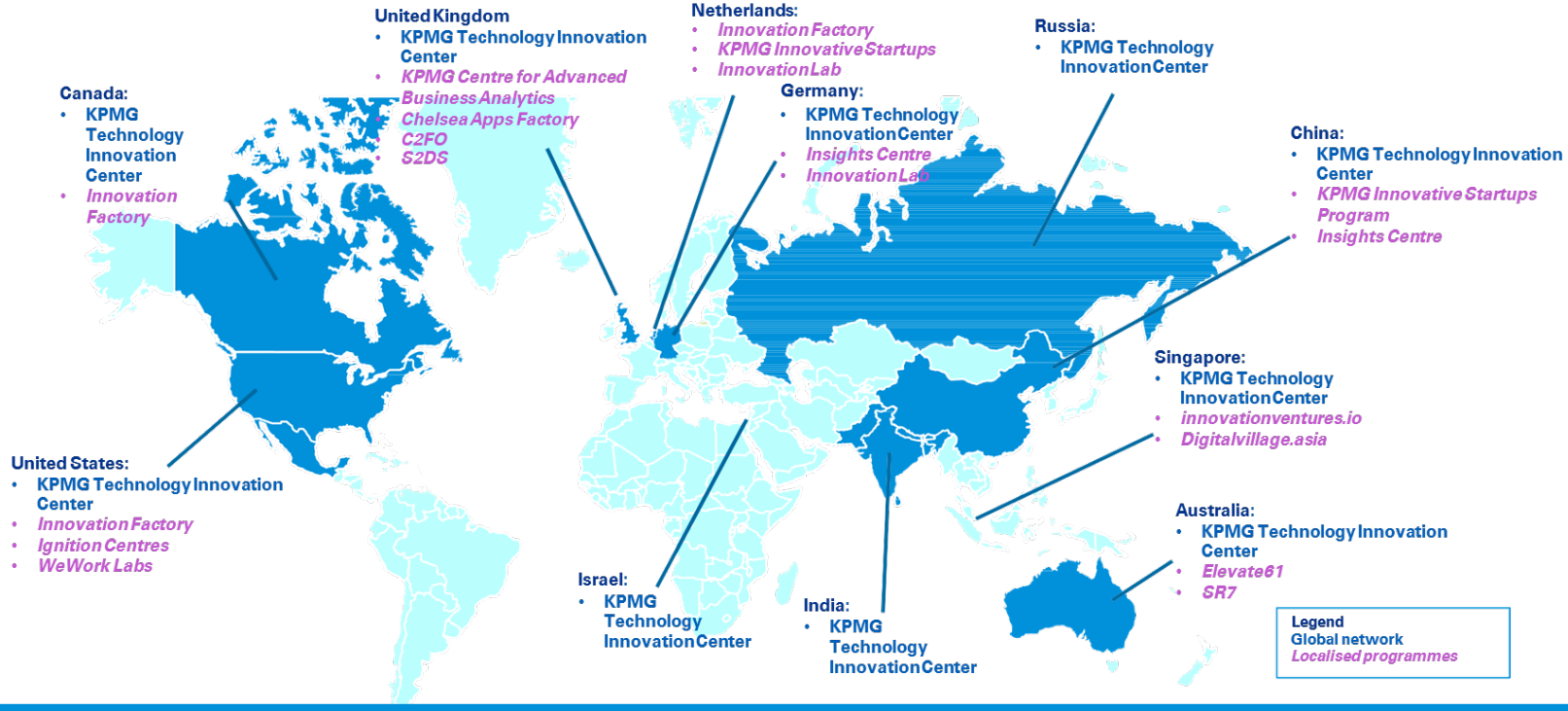
Empathy

Define

Jobs to be Done Among Consumer Segments:

- Young professionals without children
- Parents with young children
- Empty nesters
- Entrepreneurs or start-ups

Have a Global Mindset - We Leverage our Global network & Partnerships to Ensure Leading Outcomes



Fin/Insurtech innovation is evolving in unique ways in many different geographies as a result of their unique skills bases, innovation centers, government priorities and collaborations. Leading companies often have a presence in key fintech ecosystems in order to stay on top of signals of change and to help identify potential partners from outside their local jurisdictions. For example, Canada's CIBC, the National Australia Bank and Bank Leumi of Israel have formed an alliance in order to leverage joint innovation to improve the customer experience for all three banks. CIBC and the National Australia Bank have also partnered on a blockchain project.

And From the Start-up POV...

The path to successful collaboration

A research into successful startup and corporate collaboration. Both parties need each other to innovate and scale, but on the journey to success there are many things that can go wrong. Sample size: 137 startups (companies younger than five year with a strong focus on building a scalable business).

Governance model of the collaboration

- Joint venture **(21%)** or equity investment **(10%)**
- Customer – supplier **(24%)**
- Licensing agreement **(19%)**

Thumbrules

1. Define and discuss the objective for the startup-corporate collaboration upfront
2. Use standardized governance of partnership establishment
3. Setup clear evaluation phases

Why collaborate?

1. Access to the market **(65%)**
2. Capital / Funding **(54%)**
3. Sales network / economies of scale **(54%)**

How to enter?

1. Come prepared and know the problem you will be solving
2. Use your investor network to get introductions at the right level
3. Go to the preferred supplier of the large organization

What are roadblocks?

1. Slow decision making and red tape
2. Culture clash
3. The difficulty in finding the right person that actually needs the product and has budget

Speed up forces at the corporate side

1. Establish a clear entry point, have a process in place to deal with startups
2. Have a budget ready for pilots and experiments
3. Alliance manager: someone dedicated to help the startup to navigate internally

Joint Venture: **11.5** months
Licensing agreement: **10.1** months
Customer – supplier: **2.7** months

months to go

Company DNA of Outperforming startups with a successful collaboration

- Funding: at least **58%** is funded
- Startup-phase: **44%** is maket-ready, **24%** is ready to scale up and **4%** is already beyond scaling
- Company age: **2 years**
- Team: **9** full time employees with a total of **23** years sales and business experience and **28** years technical experience (e.g. software development)

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Emerging technology – illustrative packages

The emergence of new technology, coupled with enhanced computing power, has the potential to radically disrupt this historic approach.

Data preparation	R, HIVE, hadoop
Cognitive – machine learning	sas THE POWER TO KNOW., R
Visualization	tableau, Qlik
Robotic process automation	AUTOMATION ANYWHERE Go be great., blueprism

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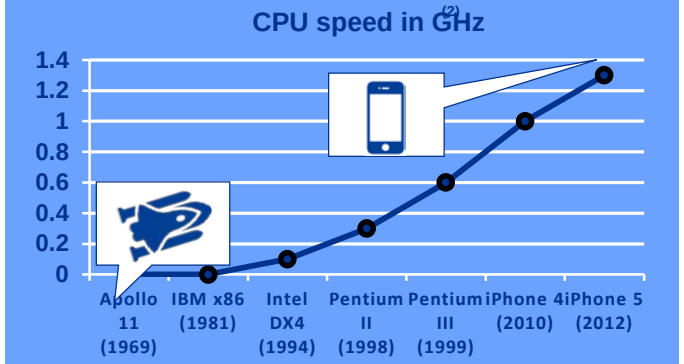
Today's smartphone has more computing power than the Apollo 11 Guidance Computer



Source: (1)Experts Exchange, "Processing Power Compared"
Source: (2)Frost & Sullivan, "Addressing Mobile Cybersecurity"

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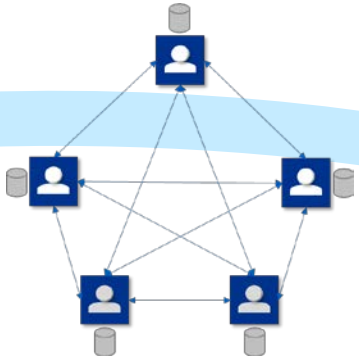
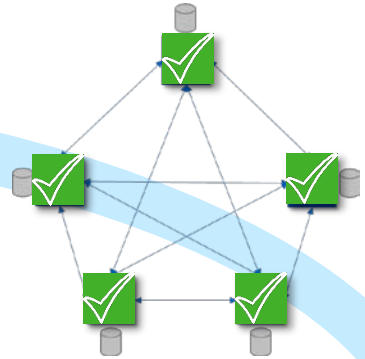
Blockchain Transaction - How it Works

Entity A wants to send value, e.g. a Bitcoin, to **Entity B**, and creates a request

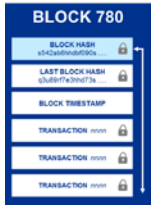


Entity A's request is broadcast to every User (node) across the entire network

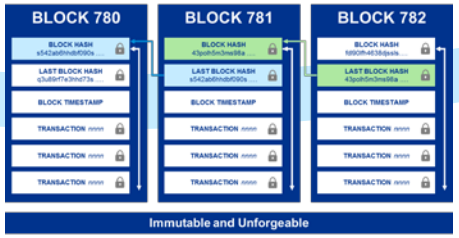


Each node verifies the transaction using blockchain algorithms

consensus



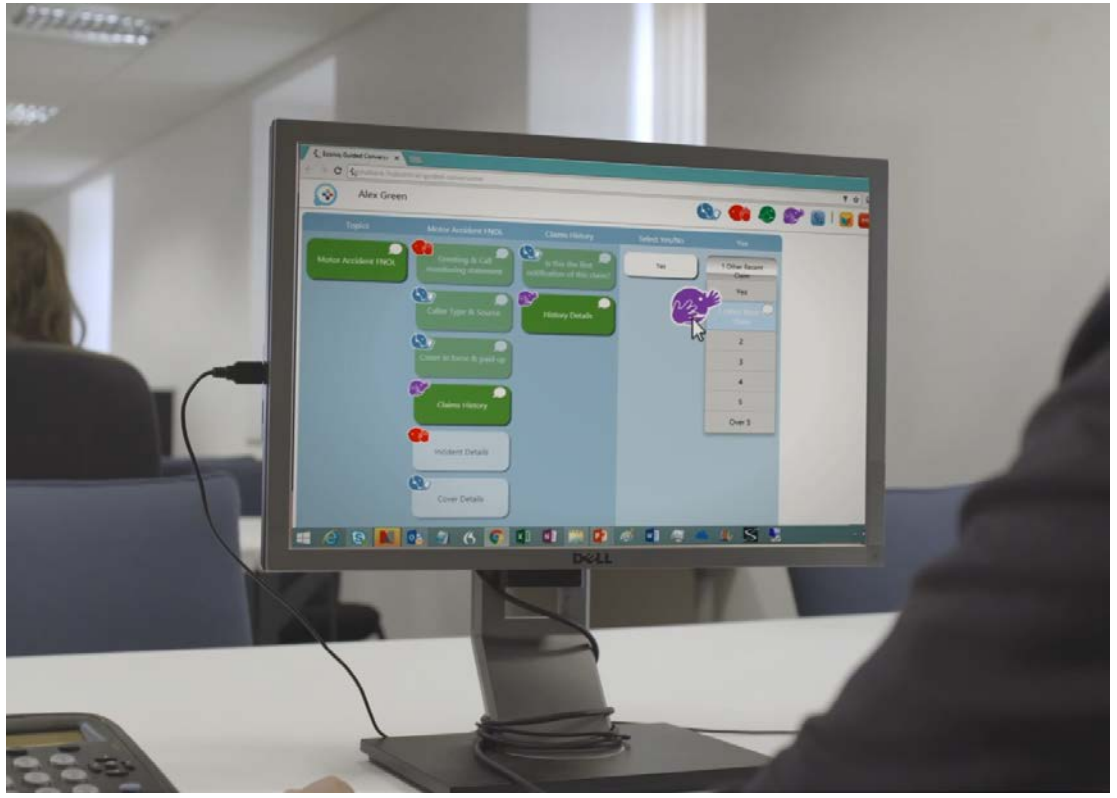
Once verified the transaction is combined with other verified transactions into a block of data for inclusion in the ledger



The new block is added to the ledger and is replicated on all nodes across the entire network

Entity A's transaction is complete and **Entity B** is now the owner of that Bitcoin

Bots in the Back-Office -NLP & ML are helping customer care agents standardise their responses (quality, compliance & cross-sell opps)



How to train your chat bot...

—**Define outcomes / intent (what services should the chatbot cover?)**

—**Collect corpus of knowledge (e.g. real demand from customers and responses)**

—**Train the chatbot using the training set**

—**Develop the dialogue**

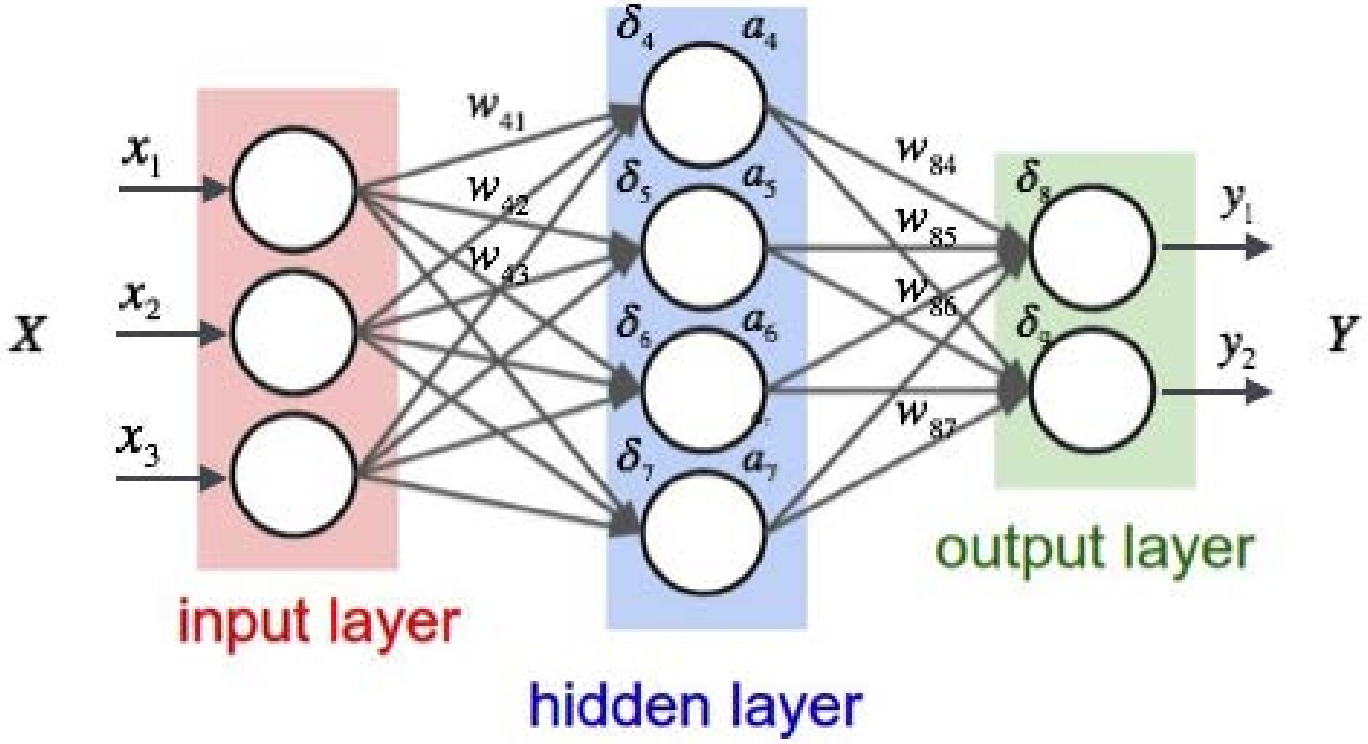
—**Review errors and refine training**

—**Use the trained chatbot with alpha / beta community**

—**Continue to train with additional utterance**

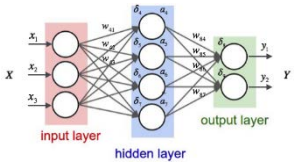
—**Add new outcomes / intents over time**

What really is AI?

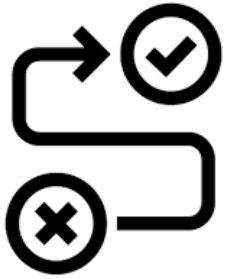


What really is AI: contact centre example?

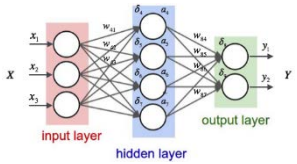
Biometrics



ID&V

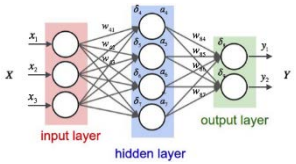


Voice to Text



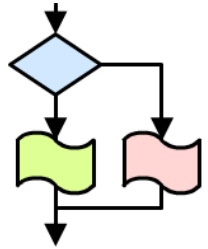
What words did they say?

Text to Intent

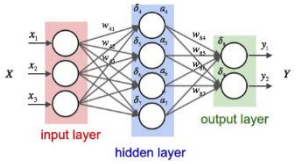


What do they want?

How to respond?



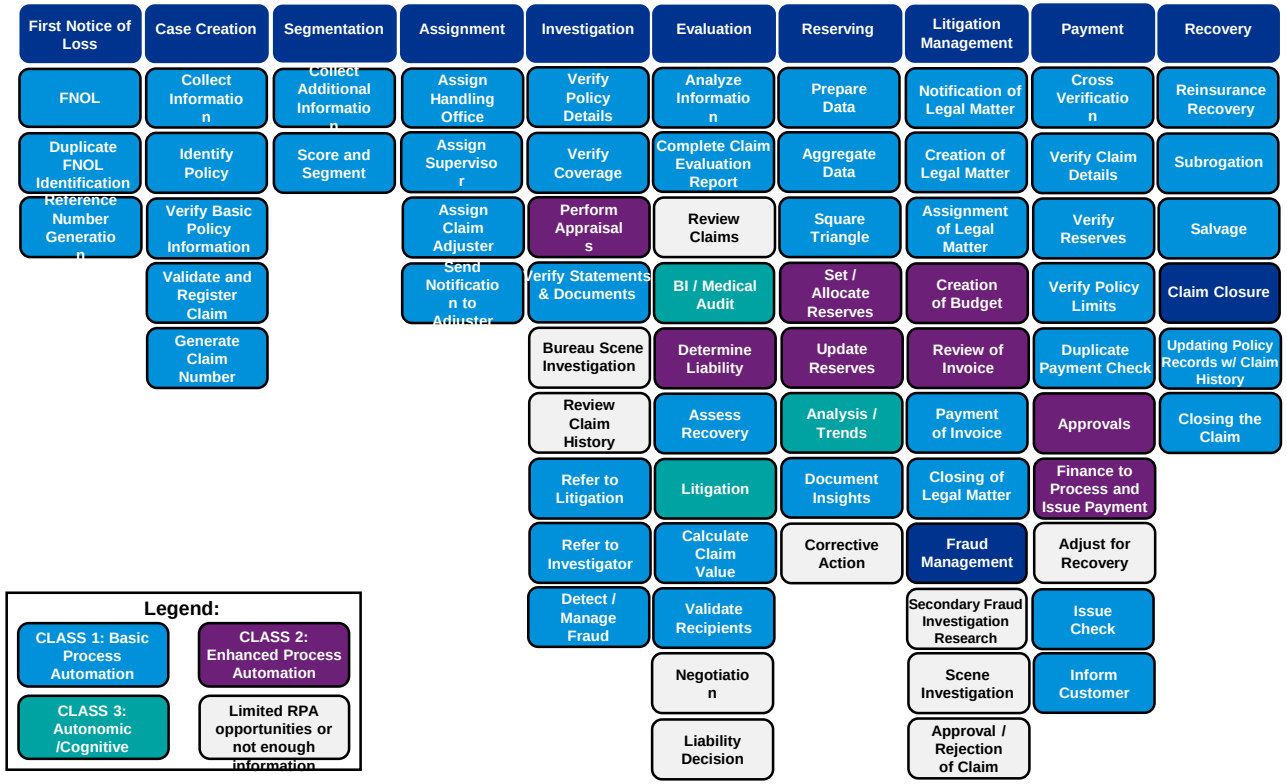
What else did I detect?



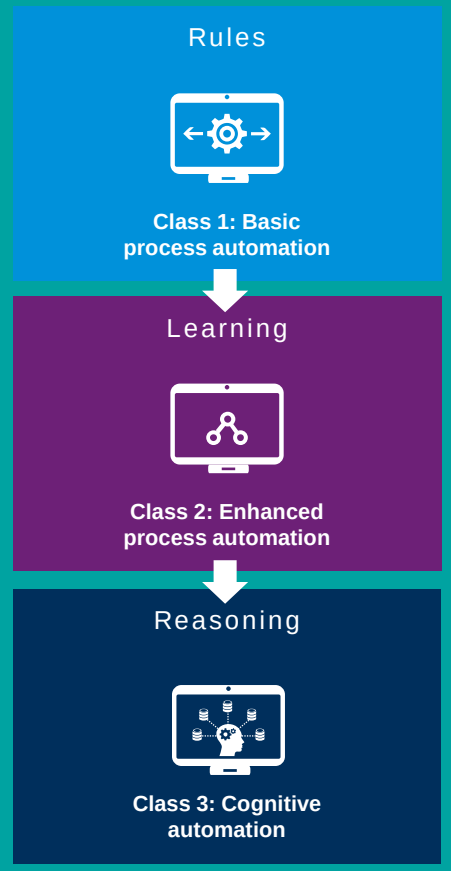
- Emotions
- Fraud
- Opportunity

RPA – Reserving as part of broader claim play

Robotic process automation has the ability to improve operational efficiencies across the entire claims operation. The reserving process is particularly ripe for automation.



The path to cognitive automation



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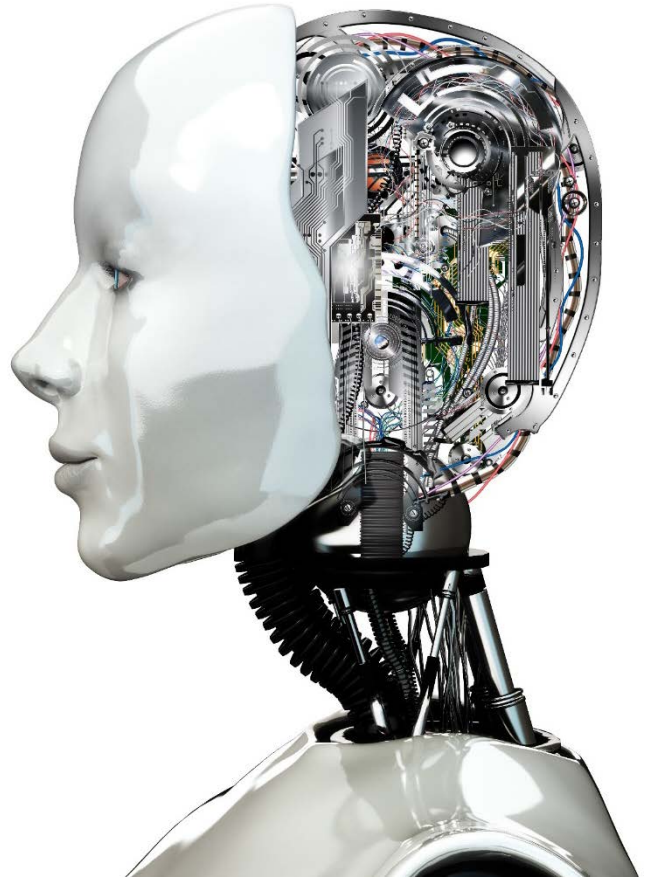
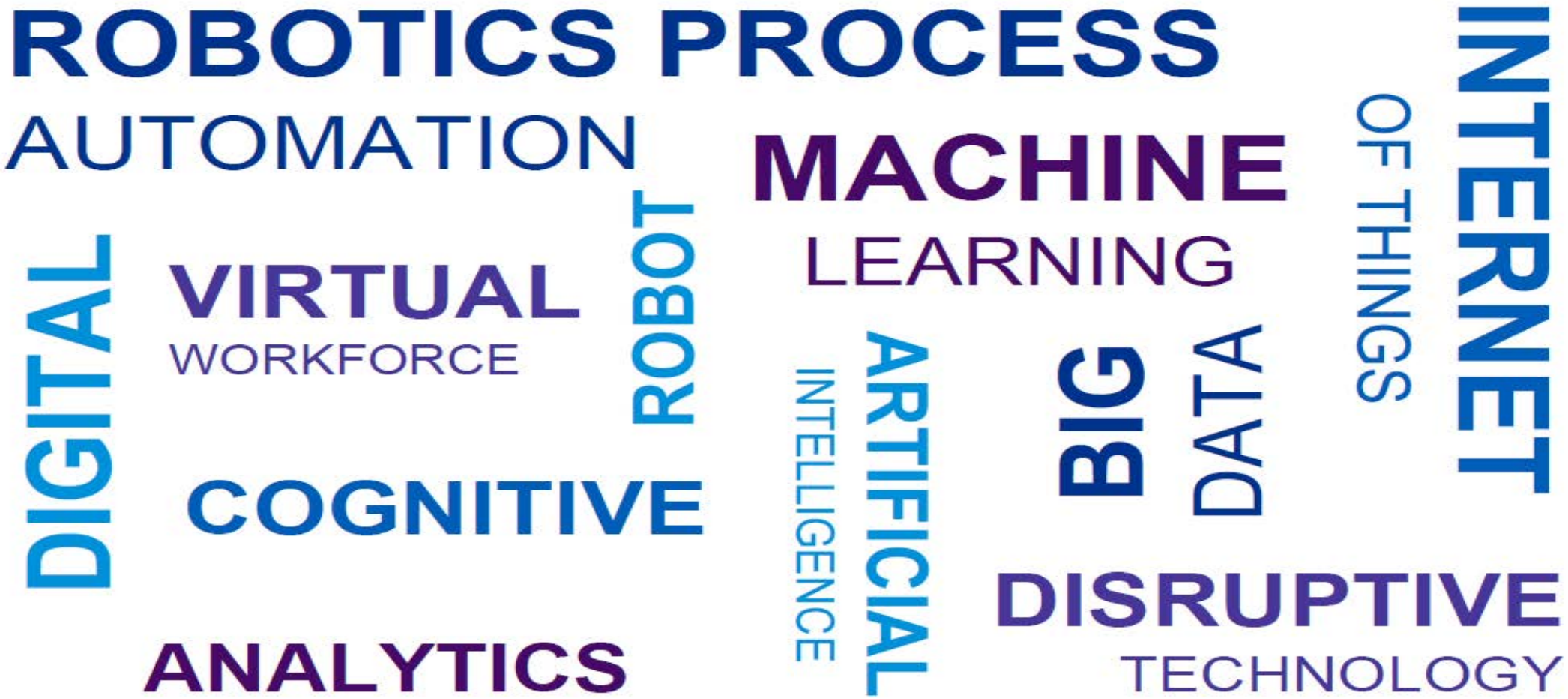
Act Tech

Jean Rea
Director

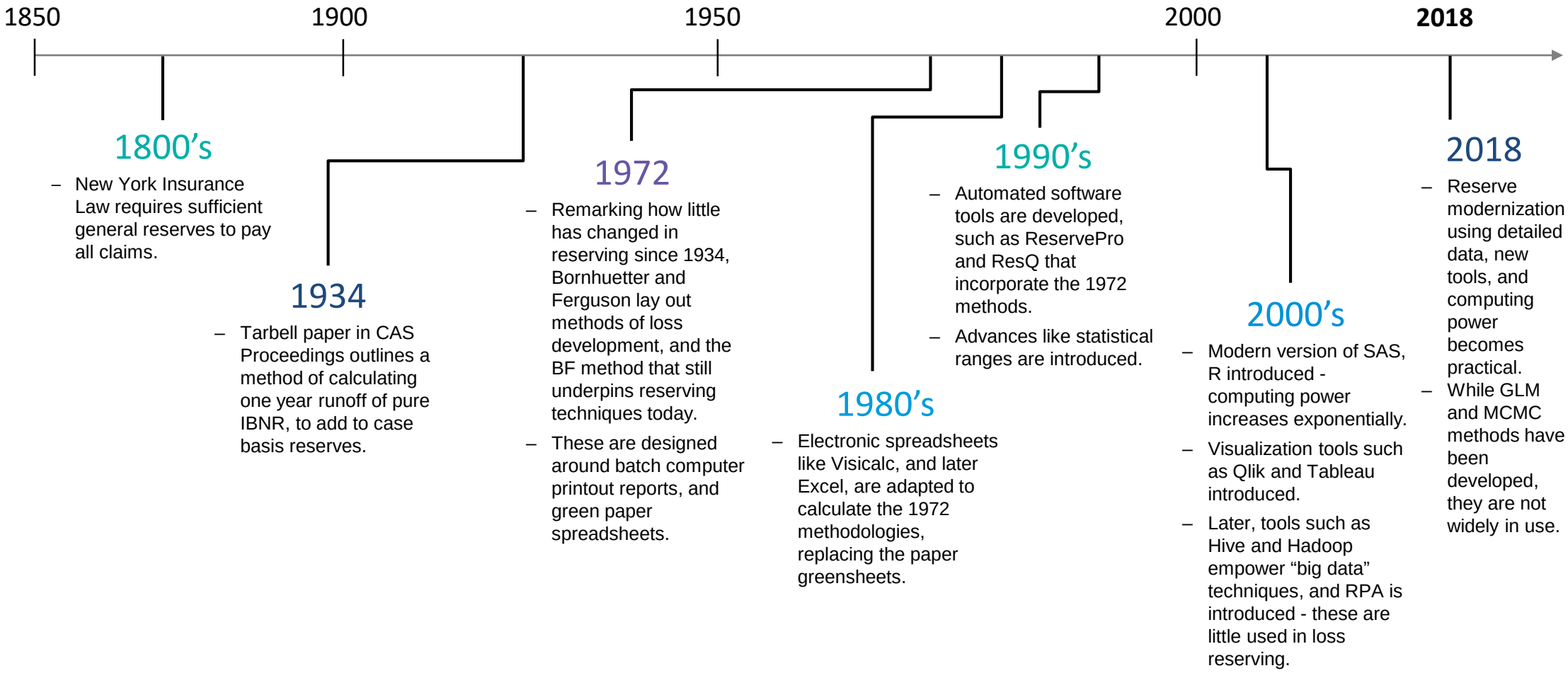


Buzzwords



Non life claim reserving - decades of the same approach

How reserves are established has changed little over the last century.



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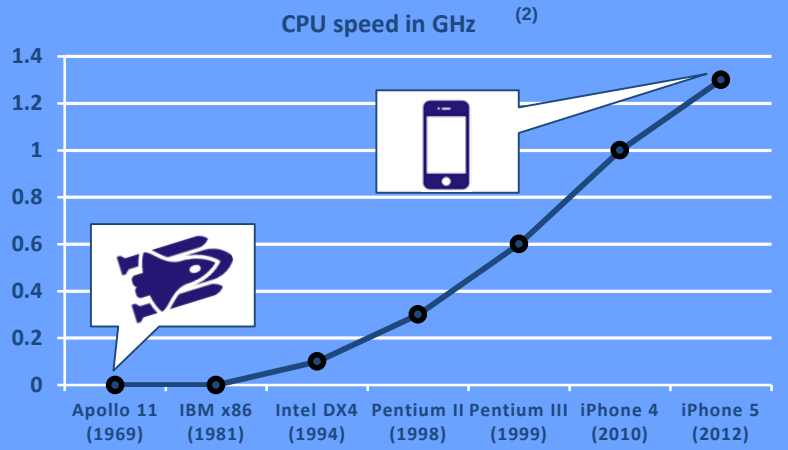
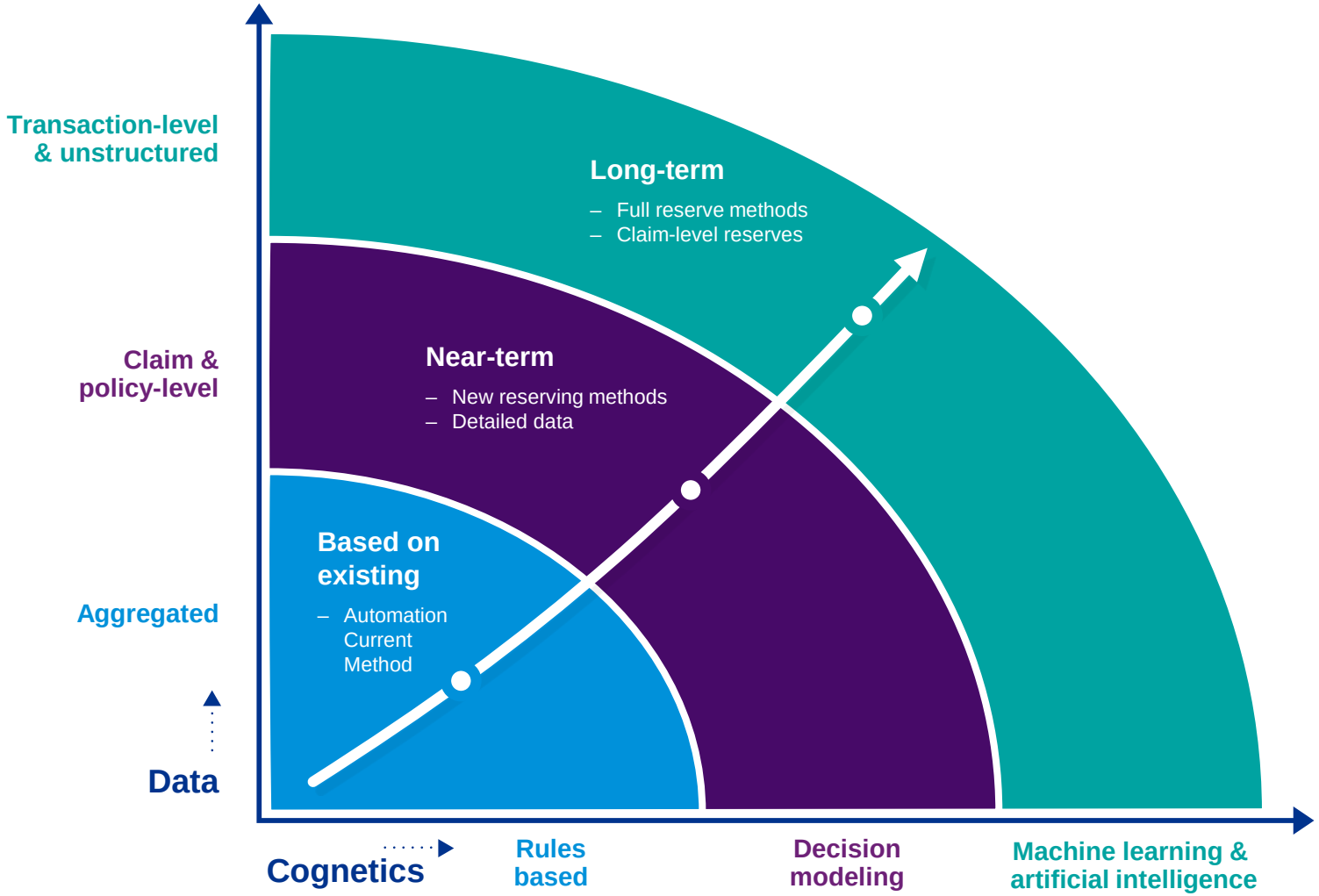


Source: [1]Experts Exchange, "Processing Power Compared"

Source: [2]Frost & Sullivan, "Addressing Mobile Cybersecurity"

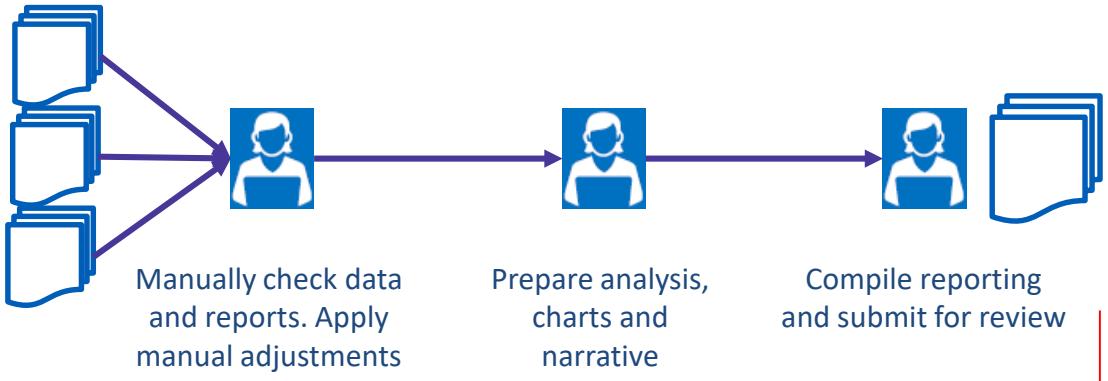
Reserve modernization – movement along the maturity curve

Reserve capabilities will mature through a combination of advances in both data and cognetics.

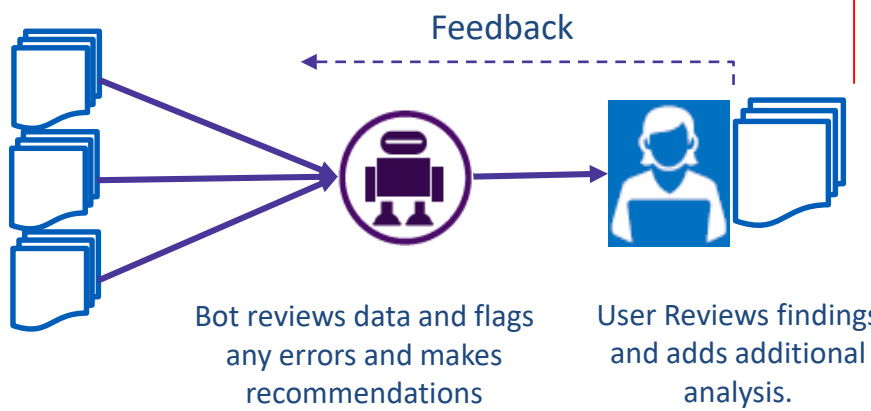


Optimisation

Manual Analysis:



Optimised Process:



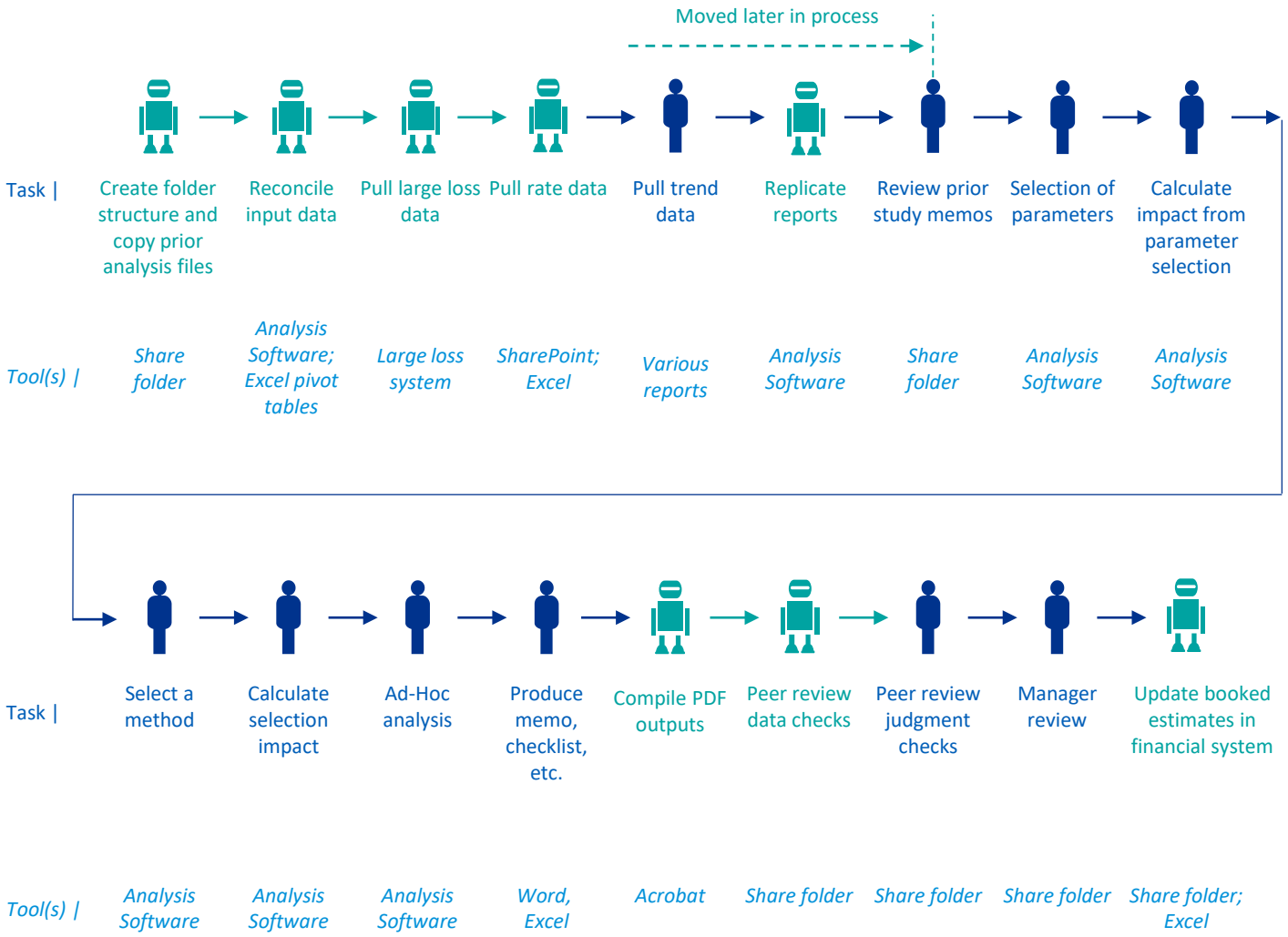
- Review data architecture and process flow
- Identify areas for efficiency gains:
  - Step reduction
  - Automation
  - Collaboration and reporting
- Control
  - Strategic validation
  - Review, challenge and feedback
  - Continuous improvement

Automation - non-life reserving example

Streamline a manual reserving process in 10 weeks:

- 8 of the 18 high-level manual tasks automated in the analysis process.
- automated 18% of analyst effort in analysis
- We also identified process re-engineering opportunities (incl. RPA)

Expected to reduce analyst effort approximately 50%

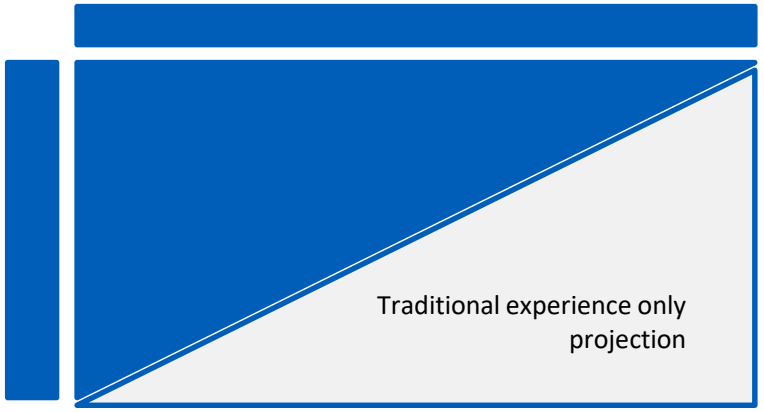


Task executed by an RPA bot with analyst interaction for exception handling only

Next generation development - non life reserving example

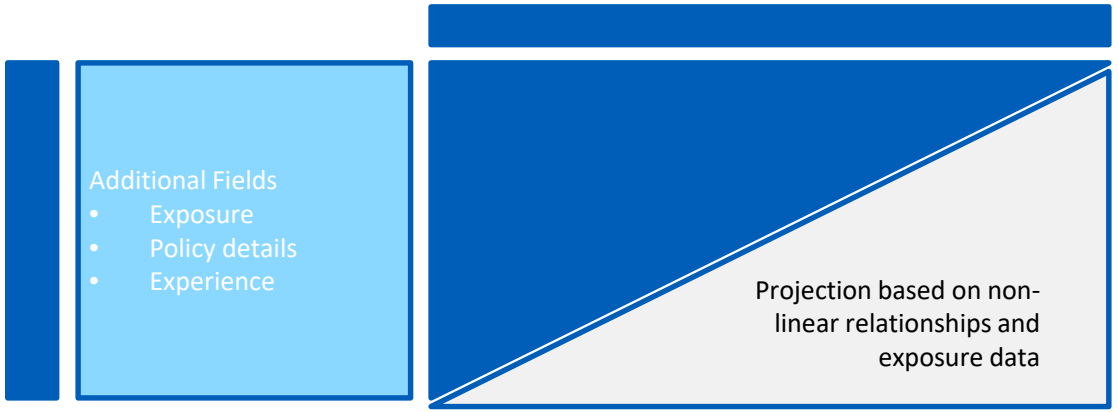
Traditional methods

- Existing chain-ladder and reserving techniques link development factors to development period



Machine Learning Methods

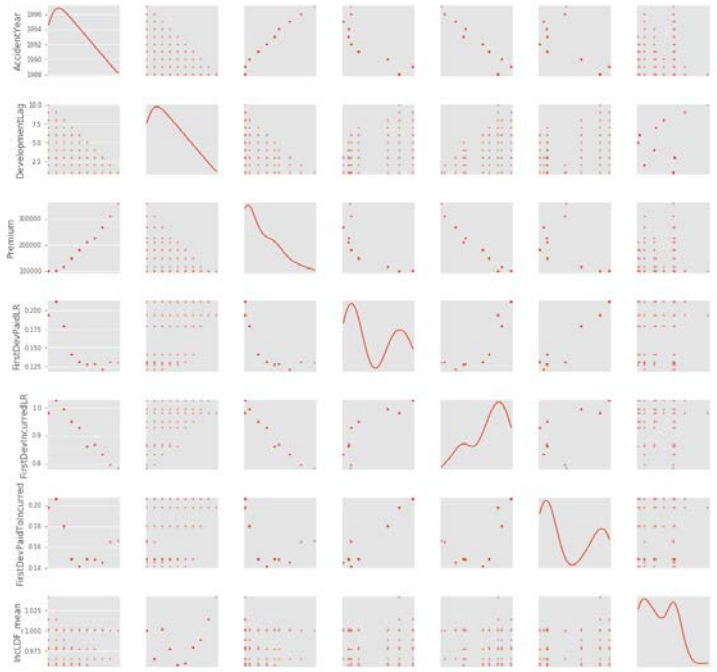
- At an triangle level, we can include more information to compare
- Build towards a more granular approach



Machine Learning Example

Machine Learning approach

- Machine learning techniques can be employed to provide a more detailed analysis.
- For an aggregate triangle, this means
  - More predictive factors can be included in the analysis
  - The pattern is estimated separately for each accident year
- Projected triangles can be validated against existing methods



Predictor	Weight in Data Model
Accident Year	5%
Development Lag	4%
Premium	5%
First Dev Paid LR	3%
First Dev Incurred LR	8%
First Dev Paid To Incurred	7%
Inc LDF Mean	28%
Incurred LDF min	4%
Incurred LDF max	9%
Average Driver Age	5%
Average NCB	5%
Average Veh Value	5%
Paid LDF min	4%
Paid LDF max	4%
Paid LDF mean	5%

Policy-Level Reserving

- The same methods can be employed to reserve on a policy-by-policy basis
  - using features of individual policy and claims
- Aggregate triangles can still be created, and compared against the new methods
- **Analysis tailored to the risk profile of each year**

Accident Year	Premium	First Year Paid / Incurred	Avg. Driver Age	Avg. Driver NCD	Avg. Vehicle Value	1	2	3	4	5	6	7	8	9	10
1988	98,658	20%	28.70	2.68	2,351	96,661	91,122	94,748	95,847	92,518	89,087	87,827	86,727	89,541	93,263
1989	99,860	21%	28.99	3.01	2,664	102,387	105,727	105,101	103,817	101,737	97,331	95,841	94,602	94,168	0.99
1990	115,339	18%	29.65	3.10	2,728	114,563	120,860	116,530	115,167	112,542	108,505	105,573	104,558	0.98	0.98
1991	148,270	15%	30.63	3.22	2,742	140,708	135,980	131,180	136,037	127,123	122,509	119,437	0.99	0.98	0.98
1992	180,313	14%	30.94	3.33	3,571	167,166	150,172	152,042	147,005	142,620	135,698	0.96	1.00	1.01	1.0
1993	209,457	15%	31.17	3.62	3,783	180,072	174,823	182,437	173,562	162,630	0.95	0.95	1.02	1.04	1.0
1994	225,356	15%	31.21	3.83	4,112	195,314	184,302	184,126	173,711	0.94	0.95	0.94	0.98	1.00	1.0
1995	266,022	14%	31.31	4.20	4,280	221,355	210,412	208,135	0.95	0.95	0.95	0.95	0.98	0.99	0.99
1996	308,206	16%	31.37	4.50	4,539	244,749	239,482	1.04	0.96	0.98	0.98	0.96	1.03	1.04	1.0
1997	358,511	17%	32.31	4.52	4,971	280,808	0.98	1.04	0.96	0.98	0.98	0.96	1.03	1.04	1.0

Why is Data Science important?

Machine learning is great as a theme, but why do we need it?

Iceberg Analogy

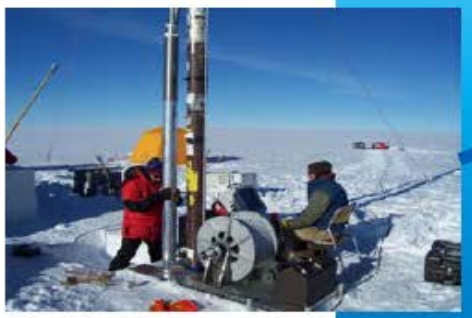
Looking to understand centuries of climate change by profiling ice production

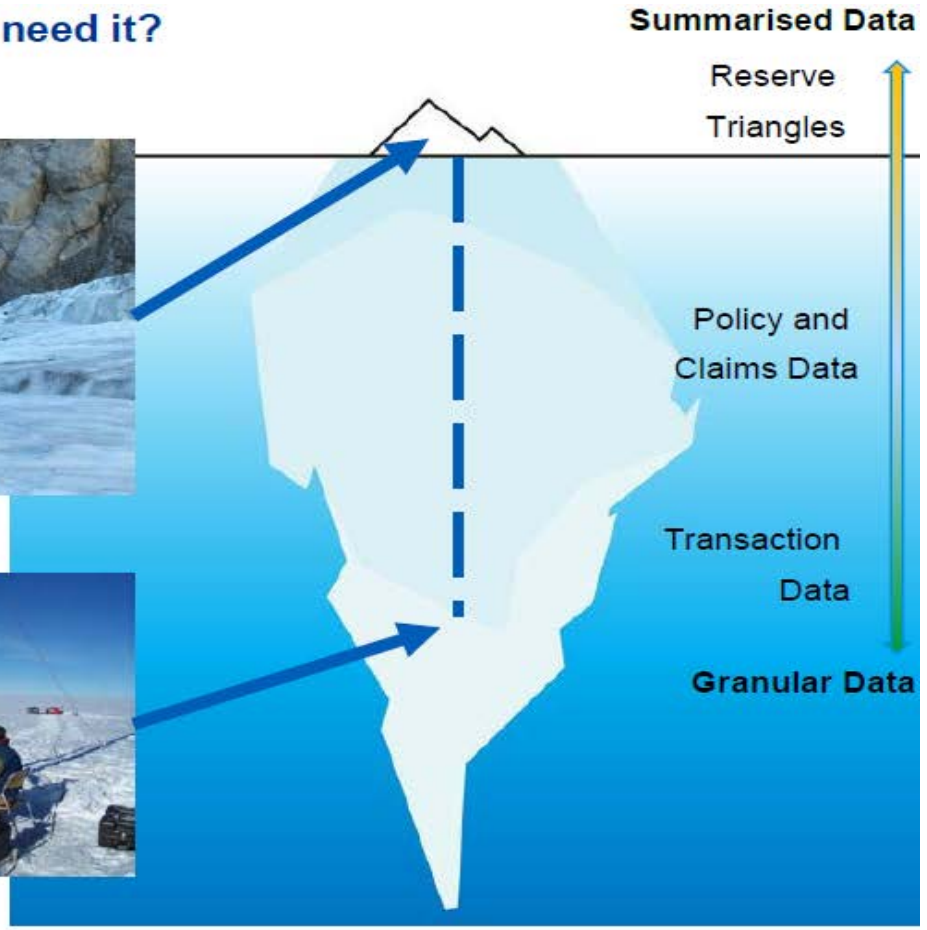
Triangle Reserving: Ice Axe

- Based on latest summarised data. Much of the detail is lost but gives the latest behaviour
- Well understood analysis but only scratches the surface

Machine Learning: Icemaster 3000

- Tools to drill down to capture a lower level of data in the analysis
- Same objective but ML scales to handle more factors and information to make the predictions more accurate
- However, it require different tools to evaluate results





KPMG

Thank you

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