Data science usage and applications in life (re)insurance

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Introduction

- Brief introduction to data science

- Results of recent [Milliman survey](#)

- Applications in life (re)insurance

- Other thoughts

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What is Data Science?
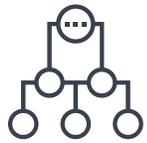
Machine Learning

Artificial Intelligence

Data Mining

Data Analytics
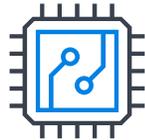
Data Cleaning

Data Engineering
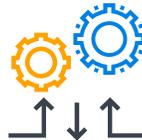
Predictive Analytics

Data Strategy

Business Intelligence

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Data Science Methods

Tools and Techniques used in the application of Data Science
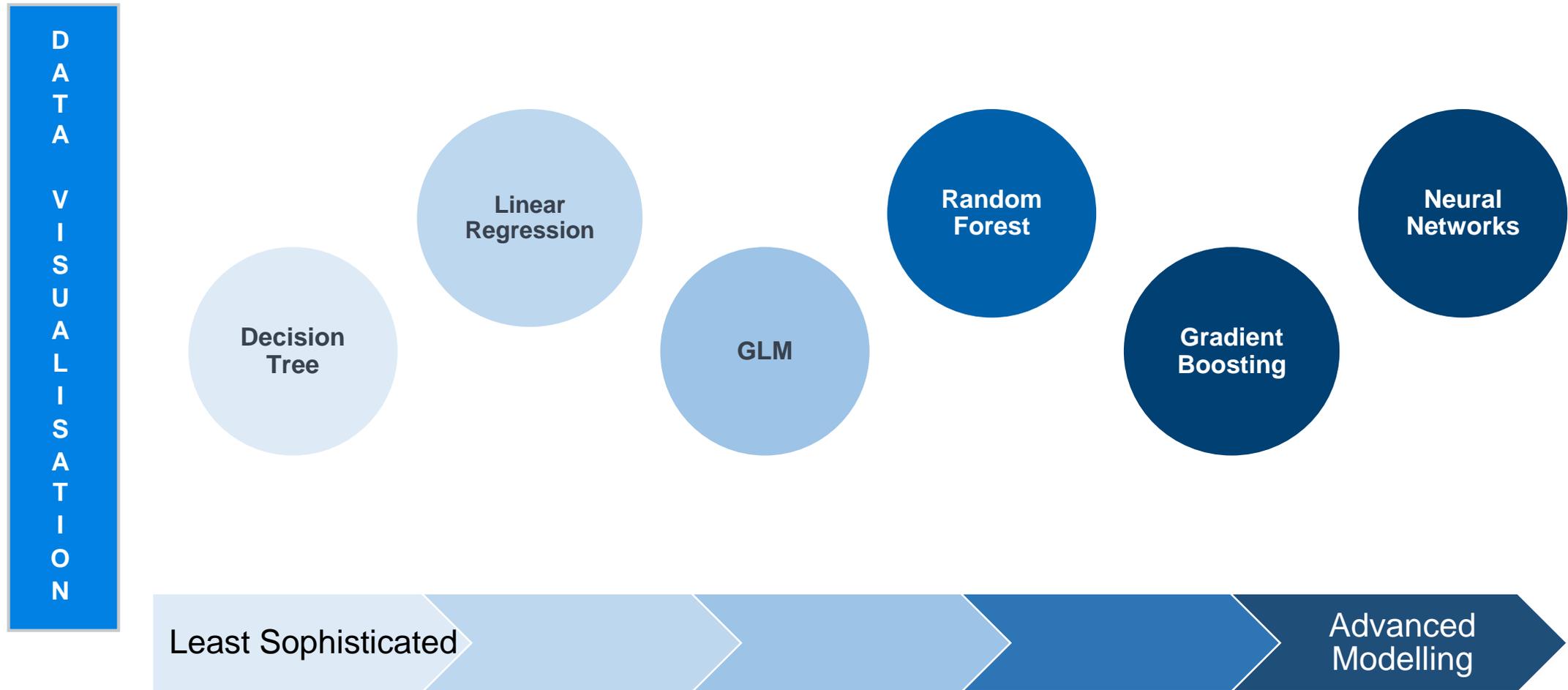
Milliman survey on the use of data science

- Scope & Strategy

- Data Usage

- Data Science Architecture and Tools

- Resourcing and Governance

- Benefits & Challenges

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Results from our Client Survey

How does data science fit in to your organisation's overall strategy?
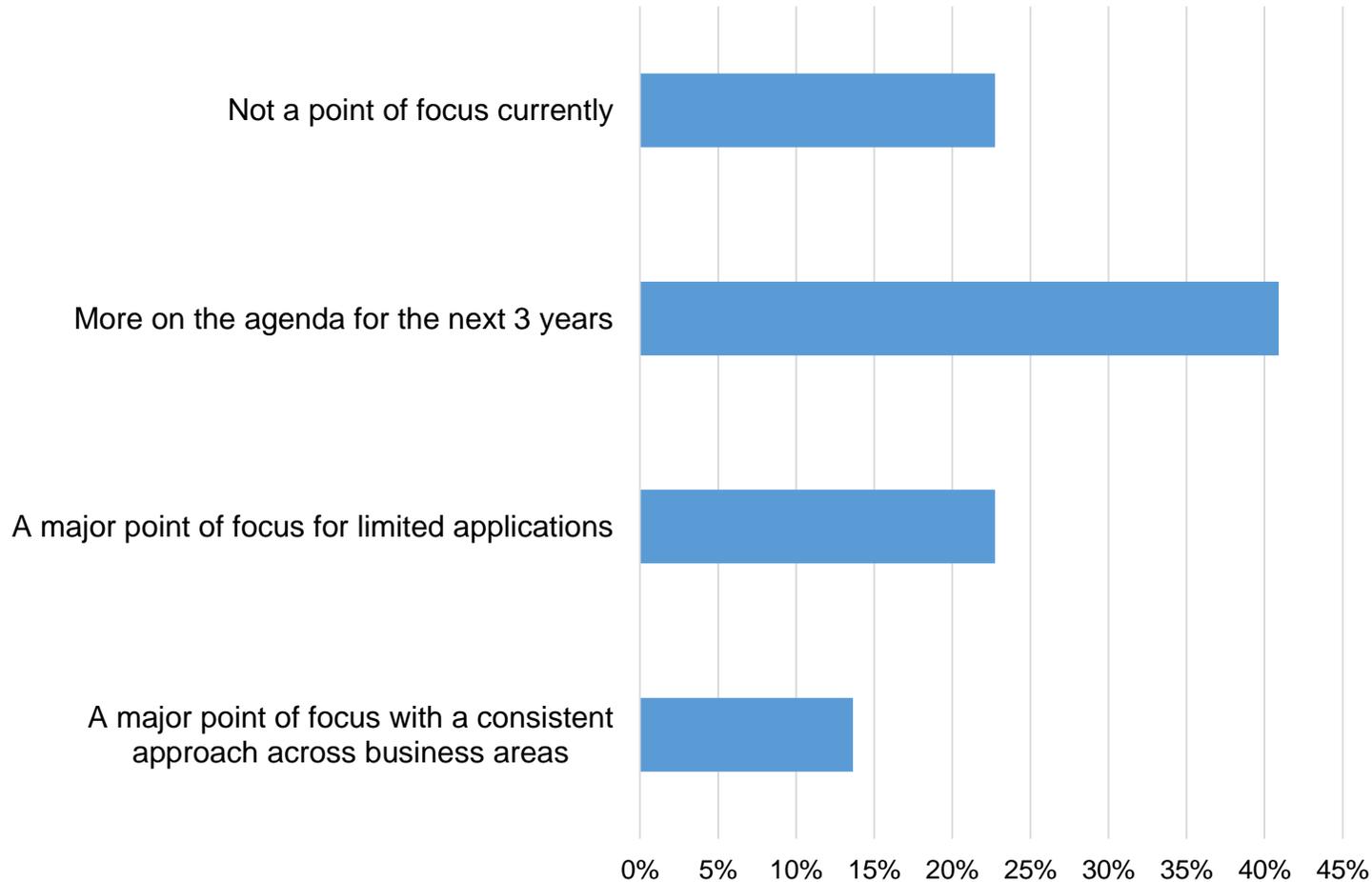
✓ Over 75% expect to be using data science within the next 3 years, with over 35% already making it a point of focus.

Results from our Client Survey

Does your organisation have a dedicated data architecture/infrastructure for Data Science?

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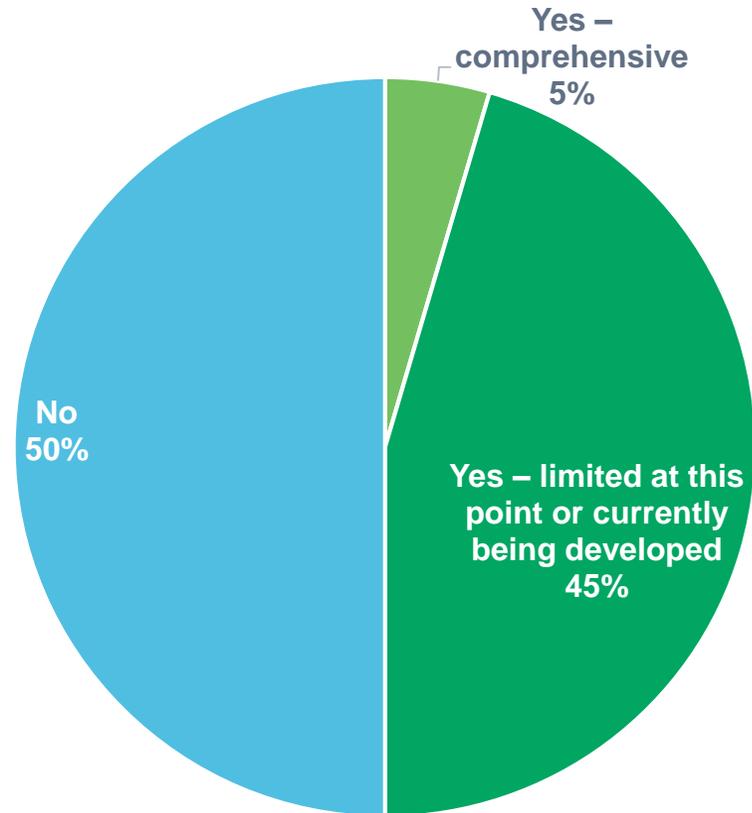
Results from our Client Survey

How would you describe your current activities relating to sourcing and accumulating data for Data Science applications?

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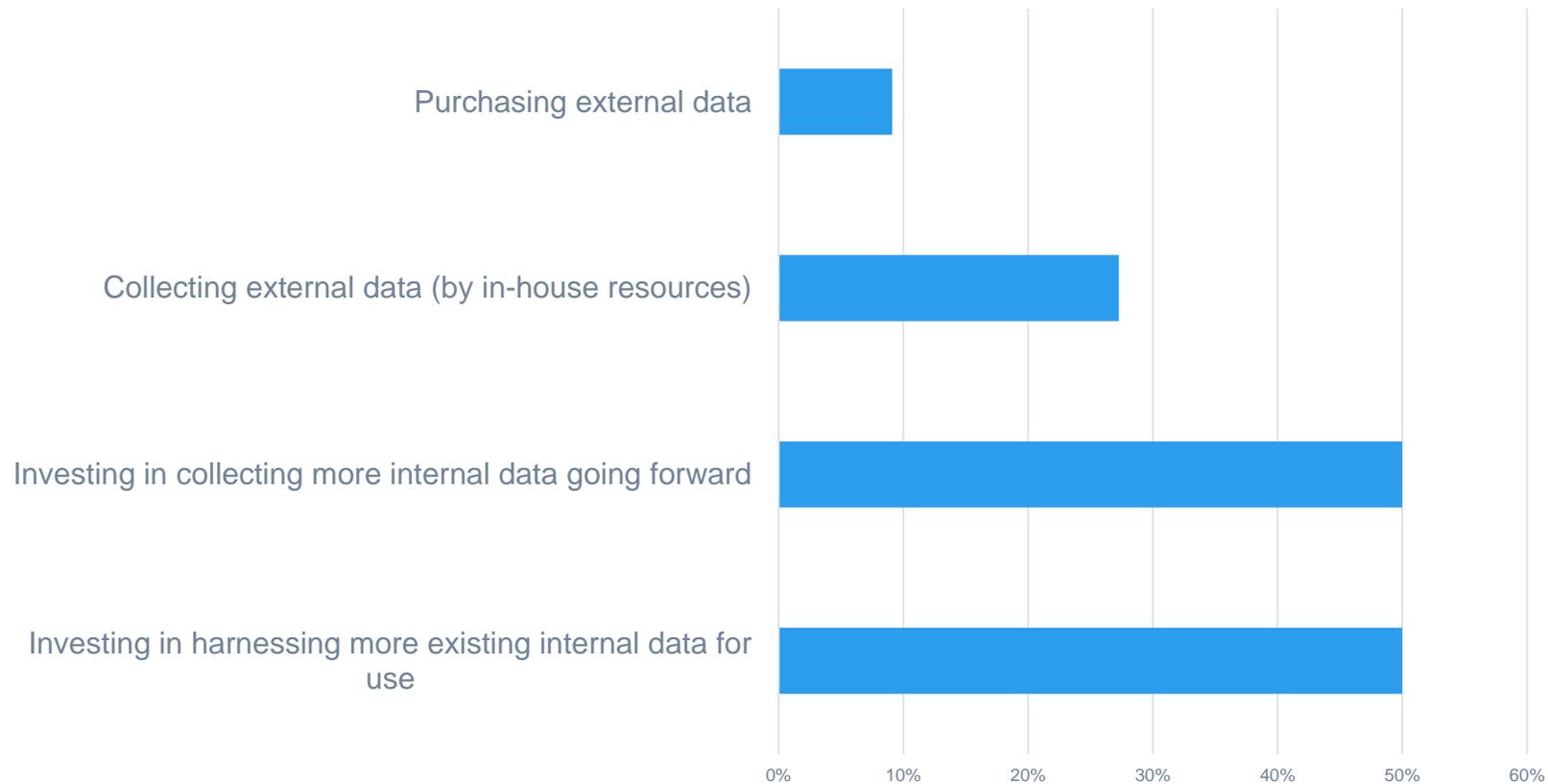
Results from our Client Survey

Which of the following sources or methods have you used to capture data for onwards Data Science processing (or plan to use in the next 3 years)?
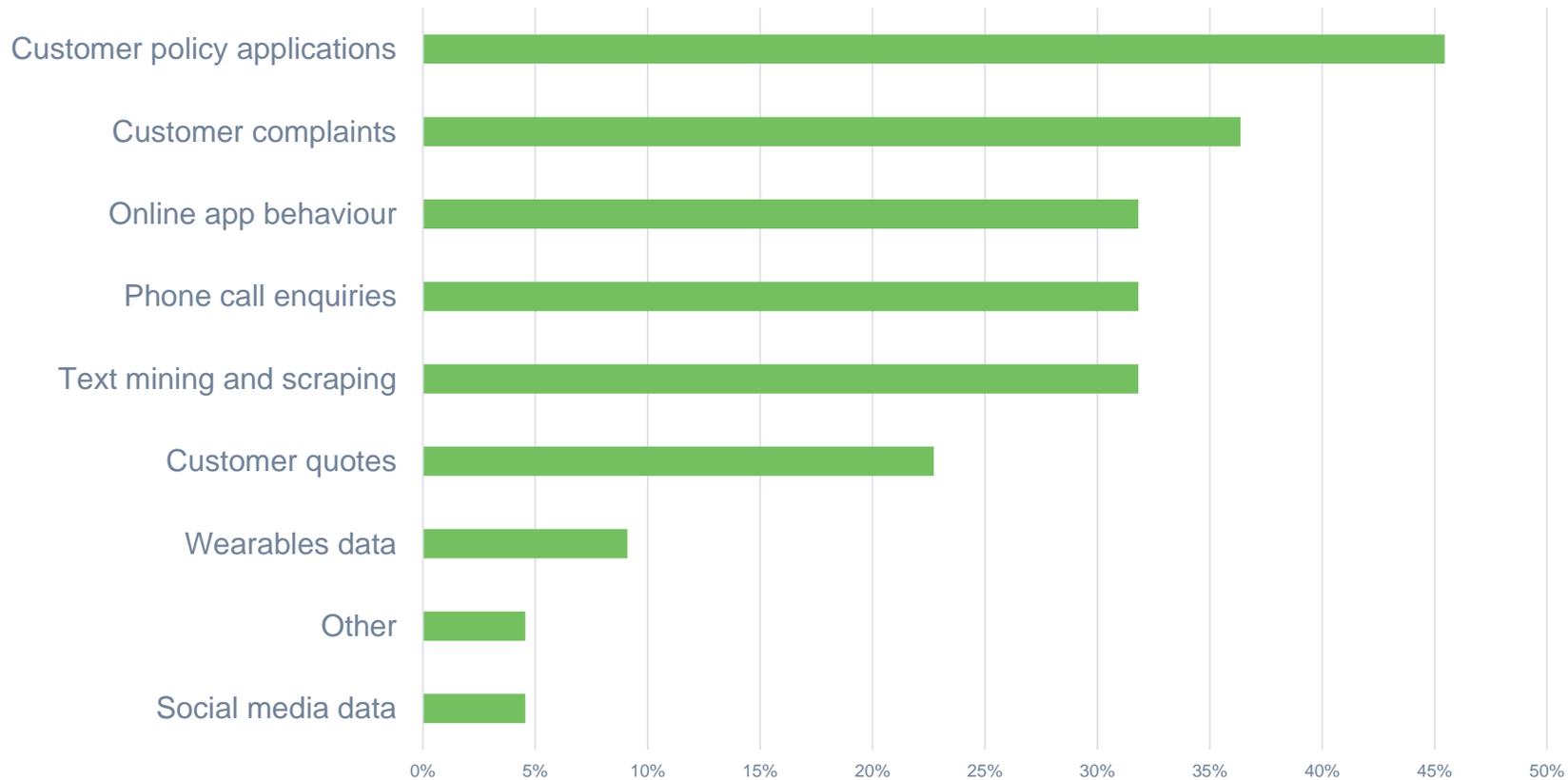
Results from our Client Survey

Which of the following types of tools or techniques have you used in the application of Data Science (or plan to use in the next 3 years)?

Least Sophisticated → Advanced Modelling

Chart Title

Technique	Value
Regression	~59%
Visualisation	~50%
Machine learning	~41%
Clustering	~36%
GLM	~36%
Artificial intelligence	~18%
Bayesian methods	~14%

Legend:
- Bayesian methods
- Artificial intelligence
- GLM
- Clustering
- Machine learning
- Visualisation
- Regression
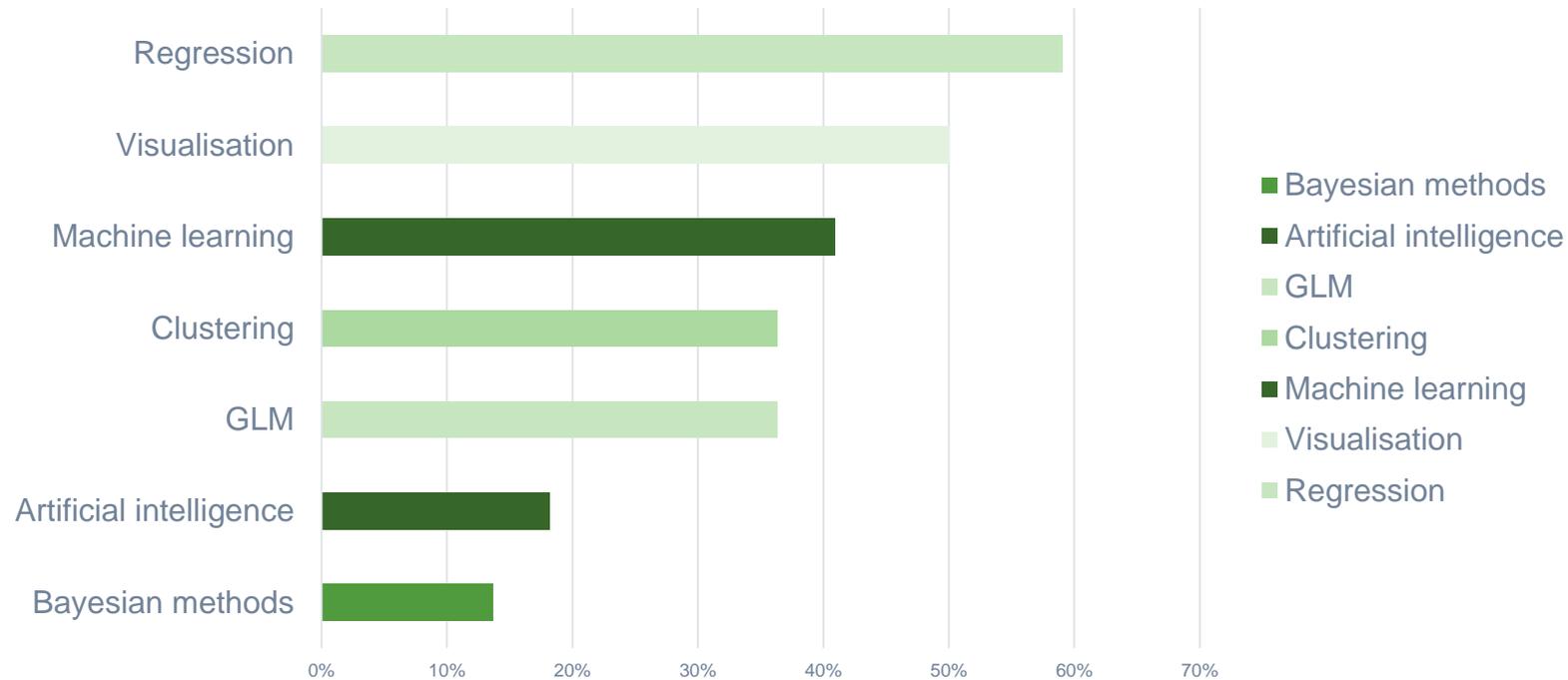
Common tools

Programming language
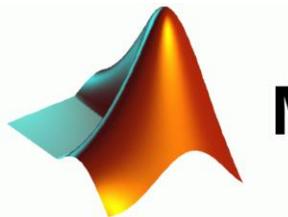
Visualisation

"Big data" sets

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Results from our Client Survey

Software used
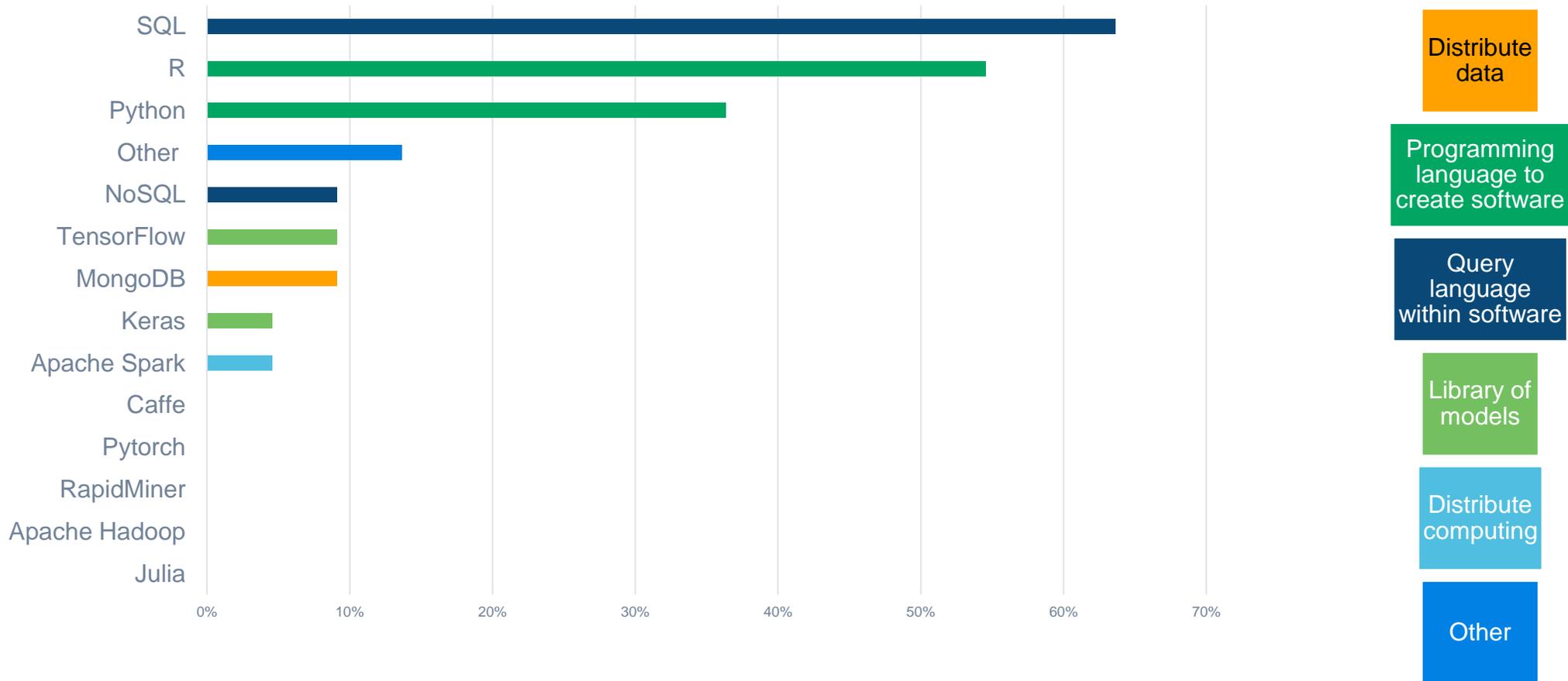
Results from our Client Survey

Main potential benefits?
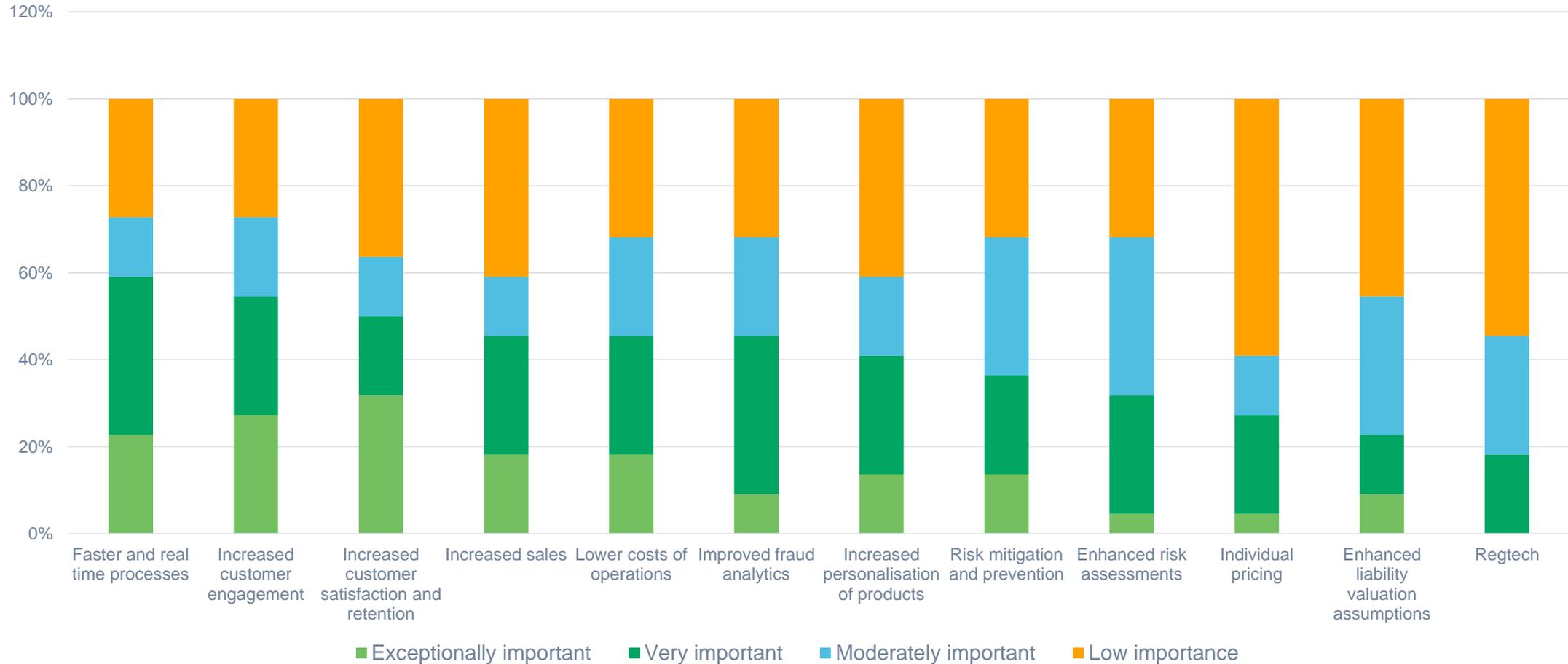
Results from our Client Survey

How relevant are the following challenges for your organisation?
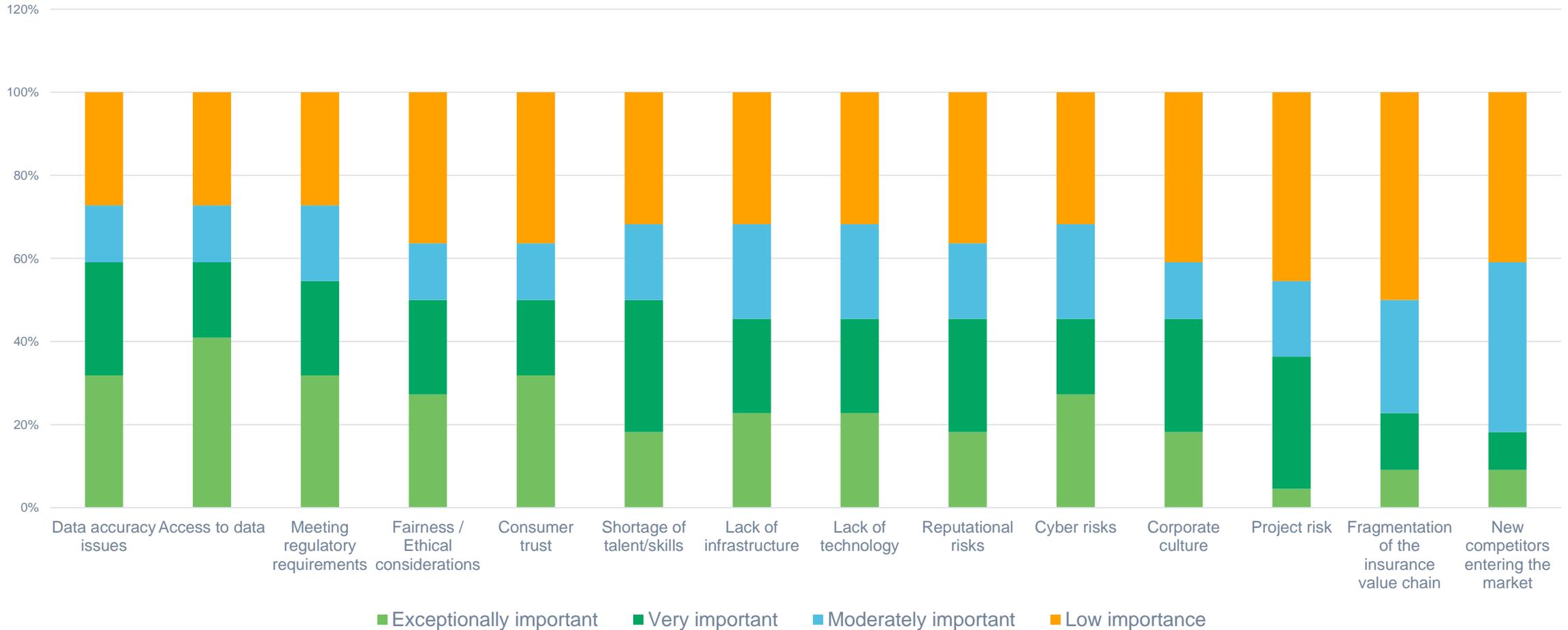
Results from our Client Survey

How involved are the business areas with data science applications?
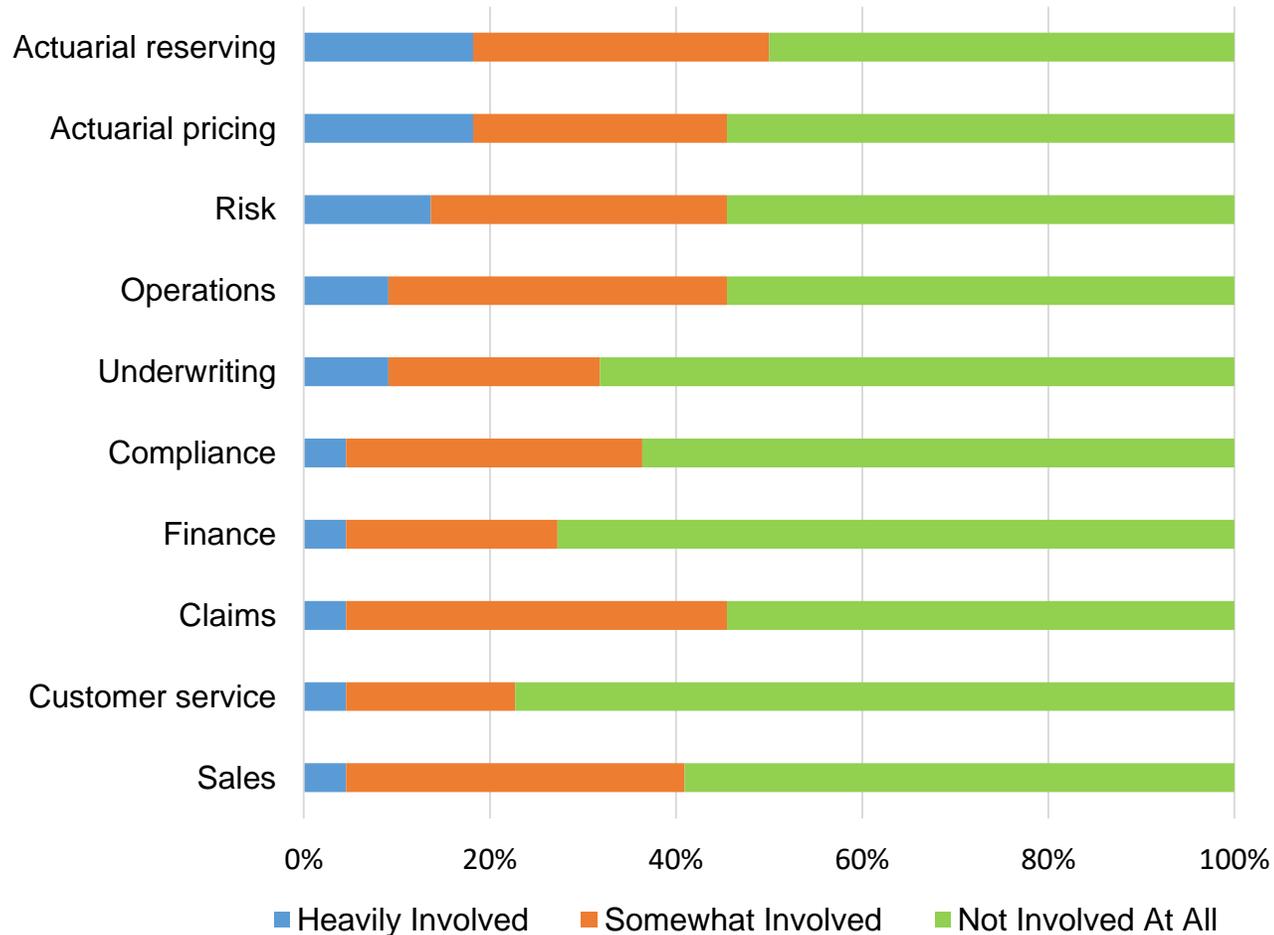
✓ Actuarial and risk roles are the most heavily involved in data science applications.

✓ We would also expect an increased involvement over time from customer service, underwriting and sales functions.

Results from our Client Survey

What is the level of upskilling required by individuals in your organisation for the following areas?
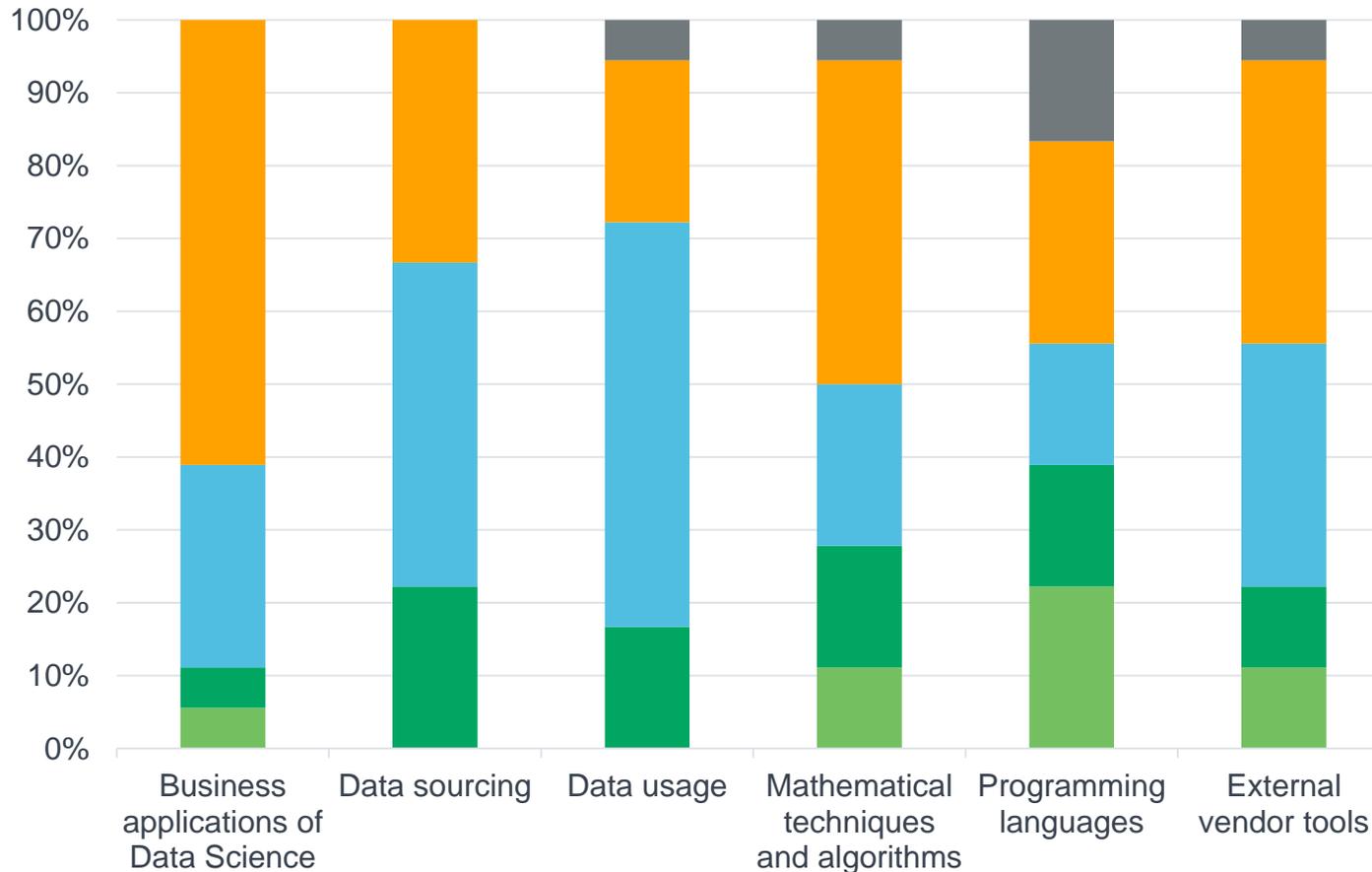
- ✓ Significant skills gap in business applications of Data Science.
- ✓ All areas would benefit from an increase in the levels of training available to individual

- ❖ Range of 1-5
  - ❖ 1 = No upskilling
  - ❖ 5 = Significant upskilling

Data Science Applications for Life (Re)insurance

Milliman Case Studies

Data validation and imputation
Dealing with incomplete and dirty data as well as a large number of diverse legacy portfolios

✓ Use of advanced techniques to identify missing data patterns to develop more credible experience analysis

Distributor Oversight
Improving distributor retention and performance

✓ Pinpoint underperforming distributors and improve allocation of company's resources

Model Validation
Validating an internal model that forecasts future risk exposure

✓ Develop a transparent and robust validation process

Customer Behaviour
Identifying the key drivers leading to transfers between unit-linked funds and guaranteed funds

✓ Understand policyholder behaviour and develop marketing actions to encourage/discourage the propensity to switch
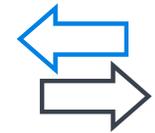
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Data Science Applications for Life (Re)insurance

Milliman Case Studies

Cross selling and discounts
Offering customers a discount for purchasing multiple product types

✓ Identify best targets, offers and delivery channels for different customer segments

Customer Engagement
Reducing high rates of policy lapsation

✓ Analytics on customer behaviour (e.g. premium payments, queries, complaints) to produce early warning indicators & trigger communications

Quotations and pricing
Asking fewer questions when offering an online quotation

✓ Improve customer experience and overall efficiency

Targeted Products
Understanding a complex target market with varied customer needs

✓ Improved product design and reduced conduct risk

Data Science Applications for Life (Re)insurance

Milliman Case Studies

**Data Analysis Architecture**
Developing a cohesive data strategy

Inforce Management
Understanding customers' use of policy options

✓ Development of a standardised data science framework across the organisation

✓ Identify distinct customer segments and apply predictive modelling to create behavioural profiles for each segment

✓ Use insights from behavioural finance, consumer behaviour, family, health, and other facets of the lives of customers

Results from our Client Survey

For what business decisions or applications is Data Science used at your company?
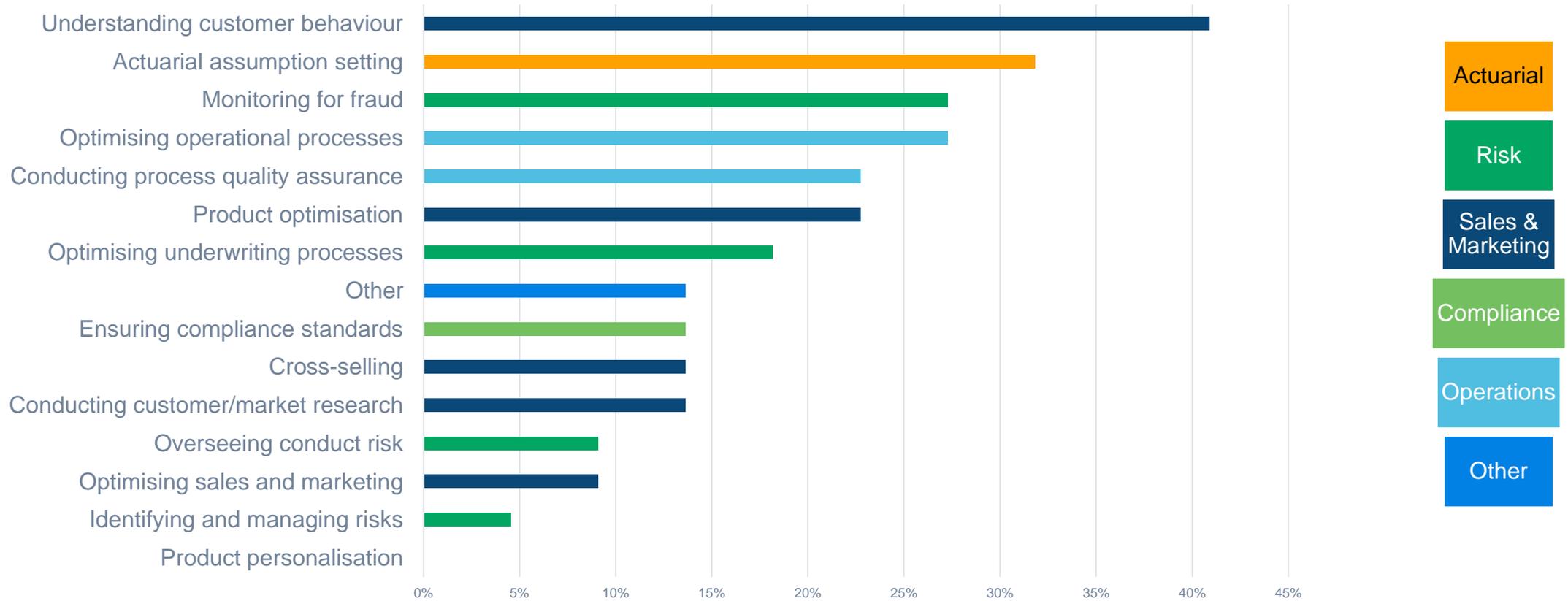
Starting a Data Science Initiative

Choosing the right project

Start with a narrowly scope and build on it

Align data science activities with the organisation's overall goals

Ensure adequate funding and access to data

Hiring the right people

Identify tradeoffs between budget and salaries, specialisation and generalisation etc.

Domain knowledge

Start small and grow over time

Key to Success

Creating the team

Encourage cross-functional knowledge sharing

Ensure that project managers have a strong technical understanding in order to have right expectations of their team

Data Governance

Develop an enterprise-wide set of principles around governance of data

Take advantage of emerging data sources such as sales and marketing data, lifestyle data captured by wearable devices, electronic medical records, etc.

The Data Question

- ✓ Data is everywhere
- ✓ First define the problem to be solved
- ✓ Importance of domain expertise
- ✓ Develop a framework for collecting data that is needed for this purpose
- ✓ Pay attention to GDPR and other legislative requirements
- ✓ Put a good data management structure in place

Key takeaways from survey

- Over 75% expect to be using data science within the next 3 years, with over 35% already making it a point of focus

- Most common uses of data science right now involve either assessment of customer behaviour or assumption setting

- Limited use of external datasets so far

- Actuaries and risk roles currently most heavily involved in applications

- Limited standardisation thus far around collection and use of data

- Data science is seen as a way to deliver major benefits in increasing customer engagement, increasing customer satisfaction and retention, increasing sales, improving fraud detection and achieving process efficiency

- Biggest challenges facing companies involve a lack of infrastructure and technology, cyber risks, regulatory expectations, a shortage of talent, data quality, and access to data

Thank you

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