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The Actuary in Data Science

Ashleigh Theophanides

18 April 2018

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WHAT IS A DATA SCIENTIST?

*"Data scientists use the ability to find and **interpret rich data** sources; manage large amounts of data despite hardware, software, and bandwidth constraints; **merge data sources**; **ensure consistency of datasets**; create visualizations to aid in **understanding data**; **build mathematical models** using the data; and present and **communicate** the data insights/**findings**."*

Source: Wikipedia

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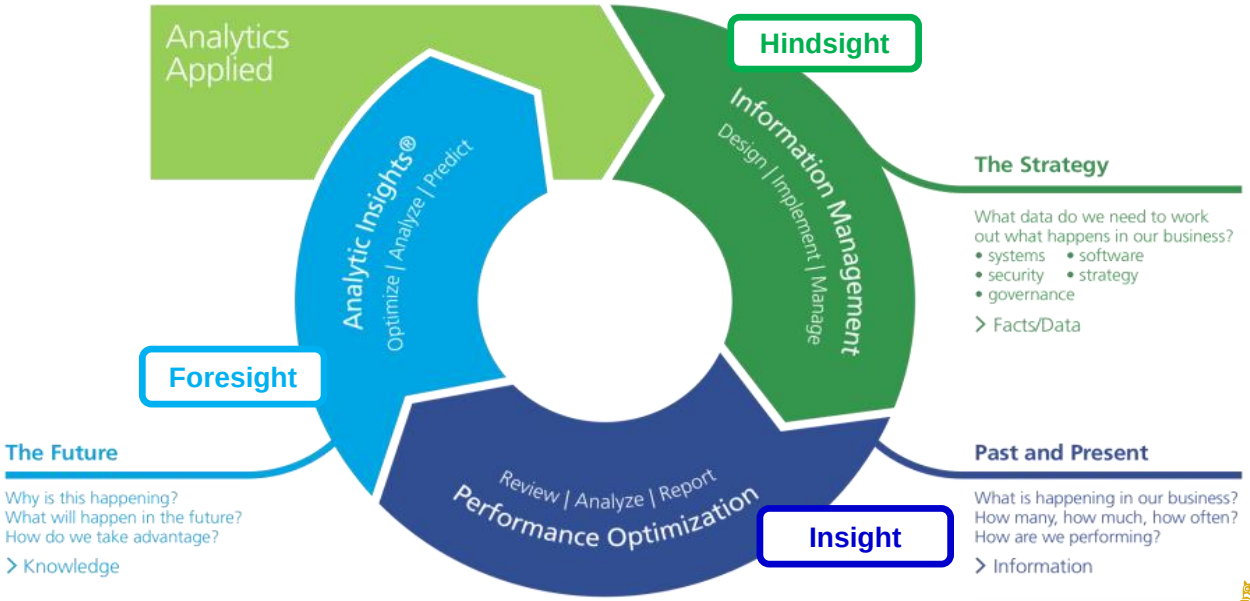
WHAT IS ANALYTICS?

Making smarter decisions that drive strategy and improve performance

Analytics is the practice of capturing, managing and analysing data to drive business strategy and performance. It includes a range of approaches and solutions, from looking backward to evaluating what happened in the past, to forward-looking scenario planning and predictive modelling.



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WHAT IS ANALYTICS?

The whole Analytics pyramid sits on top of an important support structure

Analytics combines Data Management, Business Intelligence, Performance Management and Advanced Analytics techniques. It makes extensive use of data, statistical and quantitative analysis, explanatory and predictive modelling, and fact-based management to drive integrated decision-making. It sits on top of a support structure, comprised of People & Organisation, Process & Data, and Technology, which can execute the Analytics Strategy of an organisation.

Advanced Analytics applies data mining, pattern matching, data visualisation, and predictive modelling tools to produce analyses and algorithms that enable businesses to make better decisions. Advanced Analytics answer the questions: why is this happening? what if trends continue? what will happen next? what is the best outcome? With regards to customer, pricing, supply chain, logistics and workforce Analytics.

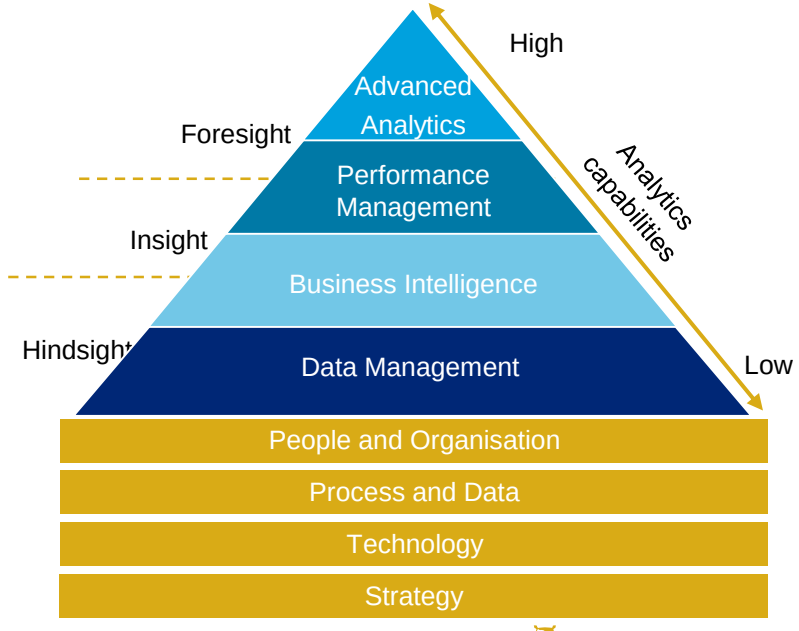
Performance Management is an umbrella term that describes the methodologies, metrics, processes, and analytical applications used to monitor and manage business performance and risk. Examples include:

- Budgeting, planning and forecasting
- Profitability modelling and optimisation
- Scorecard applications
- Financial reporting and consolidation

Business Intelligence is querying, reporting, online analytical processing, and "alerts" that can answer the questions: what happened; how many, how often, and where; where exactly is the problem; and what actions are needed.

Data Management is the development and execution of architectures, policies, practices, and procedures that properly manage the collection, quality, standardisation, integration, and aggregation of data across the enterprise. Data management includes:

- Data Governance
- Data Architecture, Analysis and Design
- Data Security Management
- Data Quality Management
- Reference and Master Data Management
- Data Warehousing and Business Intelligence Management



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Insight Driven Organisation (IDO)

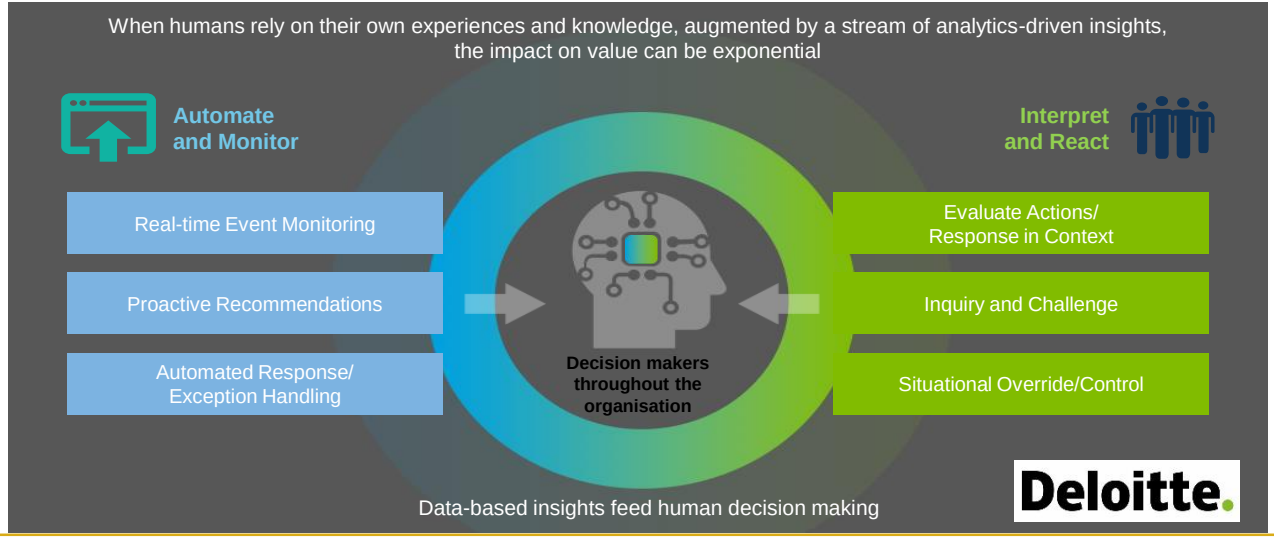
WHAT IS AN IDO?

It takes a lot more than just technology or data to become truly insight-driven.

INSIGHT-DRIVEN ORGANISATION

An Insight-Driven Organisation (IDO) is one which embeds analysis, data, and reasoning into the decision-making process. An IDO sees analytics as a core capability embedded across the organisation – from strategic planners through line workers – providing insight at the point of action and supporting decision-making at the right place and the right time.

In addition, through asking the right questions and through the application of more advanced analytical and machine learning techniques, decision-making processes can be made more efficient, focusing human input on what they do best – interpreting, evaluating hypotheses and actions within situational context and taking control of actions, rather than collecting and analysing data.



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BARRIERS TO ANALYTICS ADOPTION

Being overly platform-focused vs. insight focused, ignoring change management and failing to check blind spots are key barriers to successful analytics adoption and becoming an IDO.

Cultural Change
The bigger and older the organization, the more difficult it is to drive a cultural change or analytics transformation.

Data
Confidence in data is low due to inconsistent definitions and differing answers to the same question. There is reluctance to share data and inability to get timely access to it.

Inaccurate Metrics, Expectations, Models
Overly simplistic models, overconfident analysts, and lack of clarity on outcomes with inaccurate assumptions have led to incorrect results.

Poor Implementation
Analytics is developed in silos and data is duplicated across the organisation. It lacks implementation vision and/or strategy for enterprise-wide integration.

Analytics Skills Shortages
Talent is a critical hurdle in analytics adoption. The skills gap might delay some of the analytics implementation and integration.

Blind Spots
Privacy concerns, unintended usage, fraud, and theft concerns are real and must be monitored. Companies must manage this risk like any other risk.

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WHY BECOME AN IDO?

An insight-driven organisation embeds analytics, data, and reasoning into its decision-making process. It sweeps analytics out of lonely isolation in silos to become a company's central strength.

STAY AHEAD OF THE COMPETITION

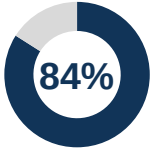
The application of analytics and its importance is anticipated to increase in the coming years, and as a result, many organizations are on an analytics journey right now, with some blazing the trail and others just setting foot on the path. Analytics and data-driven insights become a source of competitive advantage when it enables better decision making throughout the organisation.

The increased availability of rich data sets, and the sophistication of analytical tools, provides an opportunity to exploit the valuable insight that was previously not accessible.

CREATE MORE CENTRALISED COORDINATION FOR ANALYTICS

Analytics is managed by a variety of executive roles within companies, and a wide range of functions benefit from the capability. More structure around coordination and alignment—though not necessarily full centralization—is needed to realise the opportunity and benefits of a company's data throughout the organisation. Think about a small "analytics center of excellence" if you're not ready to fully centralise the capability.

DOES ANALYTICS IMPROVE COMPETITIVE POSITIONING?



84 percent of respondents reported that analytics improved their organisation's competitive positioning.

Deloitte – The Analytics Advantage Survey, June 11, 2013

BENEFITS TO BECOMING AN IDO:

Executives in an IDO can make smarter decisions than their peers in traditional instinct-driven organisations. In response to their questions, executives in an IDO receive timely intelligence. Opportunities and risks are highlighted by insights derived from data that is well-managed, secure, and accessible. As a result, decision-making, itself, becomes more open and collaborative.

Improve the speed of decision-making – e.g., improve customer experience by responding real-time while they are shopping online, or assess transaction risks in real-time.

Decrease the cost of decision-making – e.g., connect the shop floor to the 'top floor' with business intelligence and data visualization to build preventative approaches for equipment maintenance.

Make better decisions – e.g., combine data from inside and outside your organisation to add richness and granularity to better understand your customers or business performance.

Become more innovative – e.g., provide location-based services to maintenance managers using connected devices, equipment and other physical assets in the 'Internet of Things'.

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Analytics Trends

ANALYTICS TRENDS

1. Defined use cases inform analytics investments
2. Analytics success hinges on building the right capabilities
3. Privacy and security becomes a front office function
4. Artificial intelligence gets practical
5. Behavioural economics delivers analytic insight

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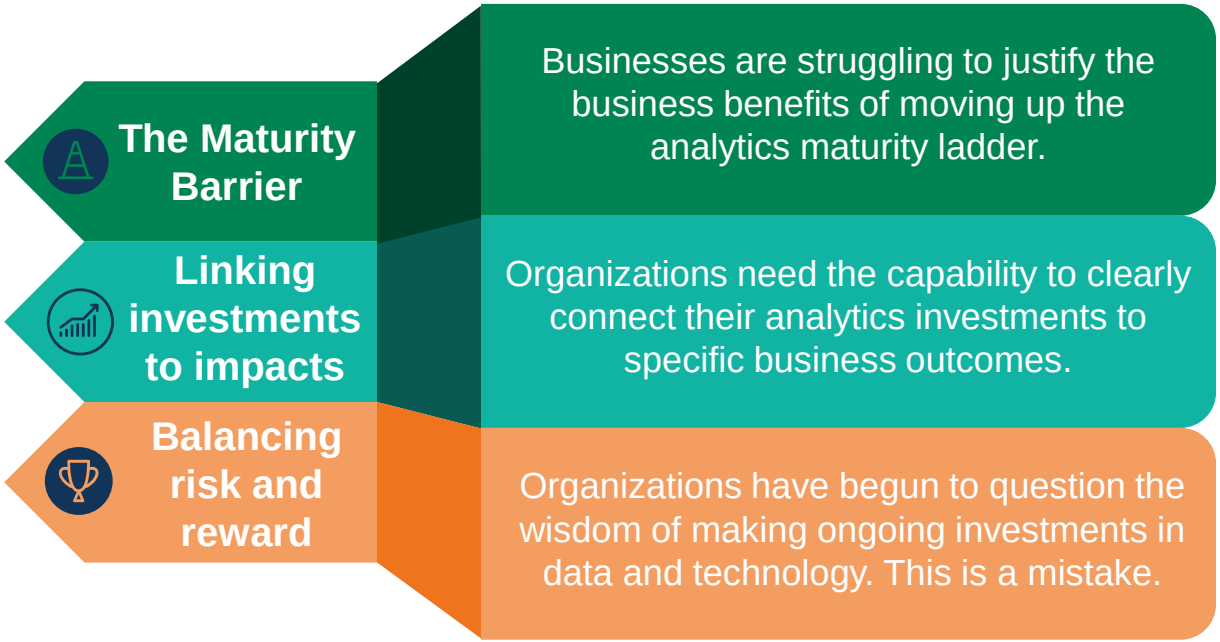
TREND 1: DEFINED USE CASES INFORM ANALYTICS INVESTMENTS



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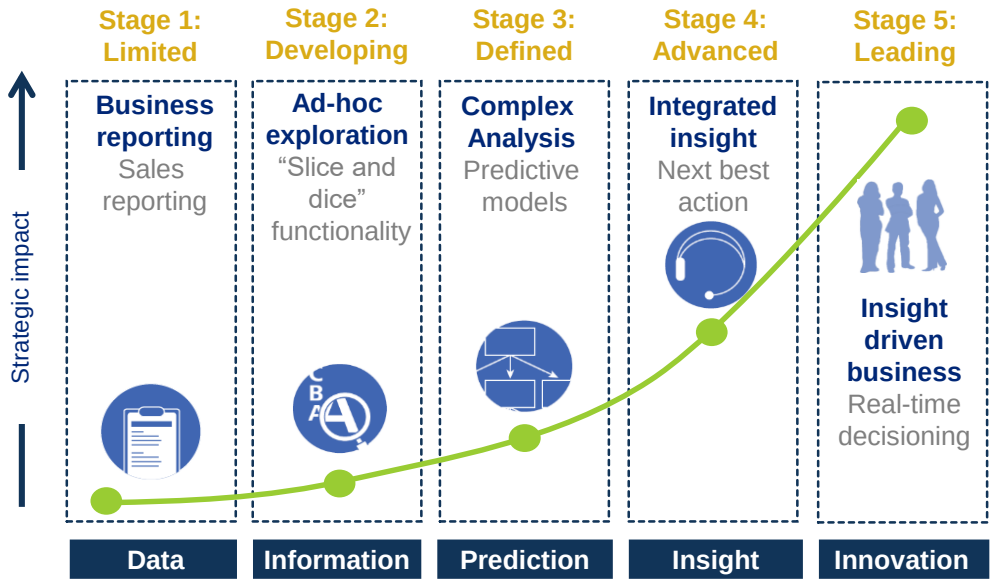
ANALYTICS MATURITY ASSESSMENT

Provides an approach to categorise and evaluate key aspects of Analytics maturity in an organisation

A scoring system is derived from a series of interviews with stakeholders from across the organisation. The exercise is conducted using 5 dimensions: strategy, people, process, technology and data. Additionally, these scores can be cross-referenced against the components of the Analytics pyramid: Data Management, Business Intelligence, Performance Management and Advanced Analytics.



Strategy
The degree to which Analytics is integral to strategy development, decision-making, and execution.
People
The extent to which there is a critical mass of personnel recruited, trained and incentivised to apply analytic techniques.
Process
The level to which Analytics and analytic approaches are embedded in core business processes.
Technology
The sophistication and proliferation of Analytics tools and technologies.
Data
The richness, availability, quality and governance of data across business functions.

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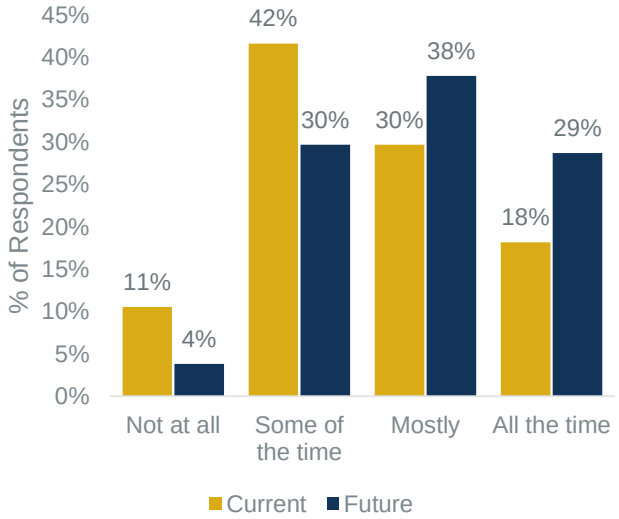
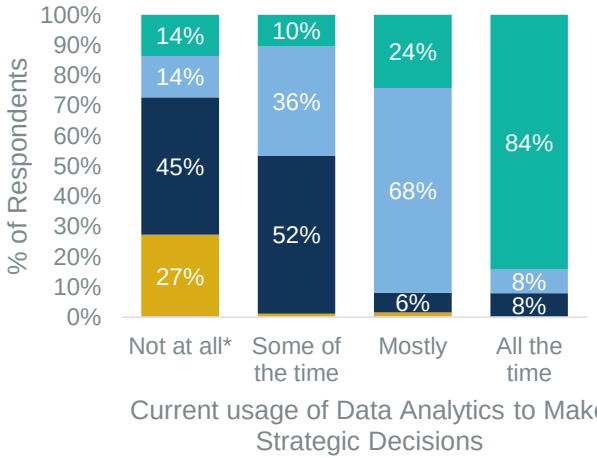
TREND 1: DEFINED USE CASES INFORM ANALYTICS INVESTMENTS

Are strategic decisions made in your company supported by data analytics?



Distribution of Future Usage of Data Analytics to make strategic decisions



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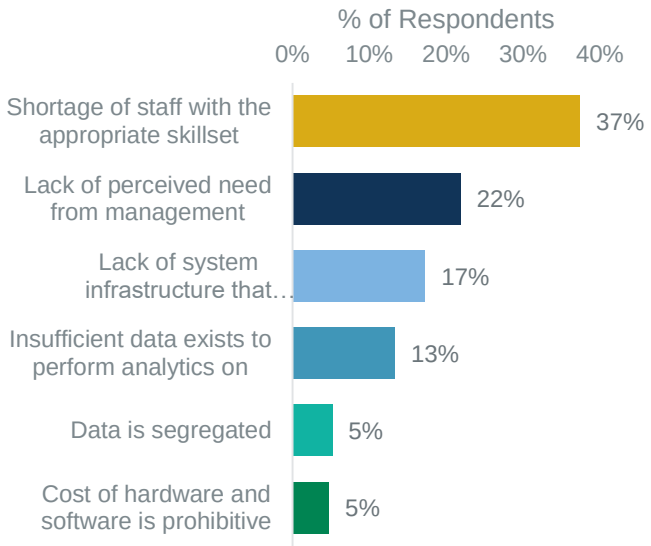
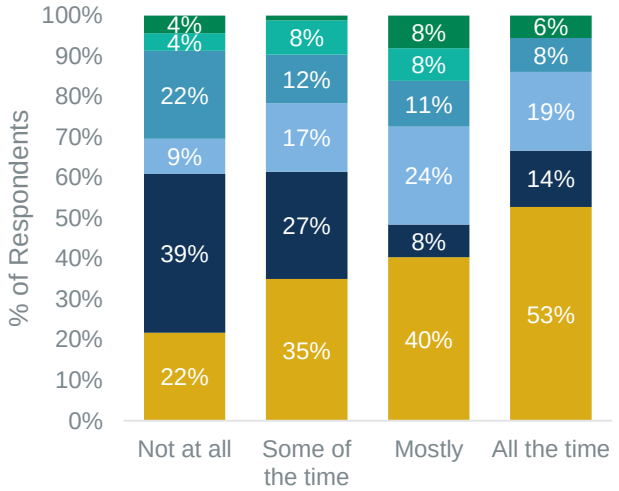
TREND 1: DEFINED USE CASES INFORM ANALYTICS INVESTMENTS

What is the greatest barrier to doing more advanced analytics?



Greatest Barrier by Current Usage of Data Analytics to Make Strategic Decisions



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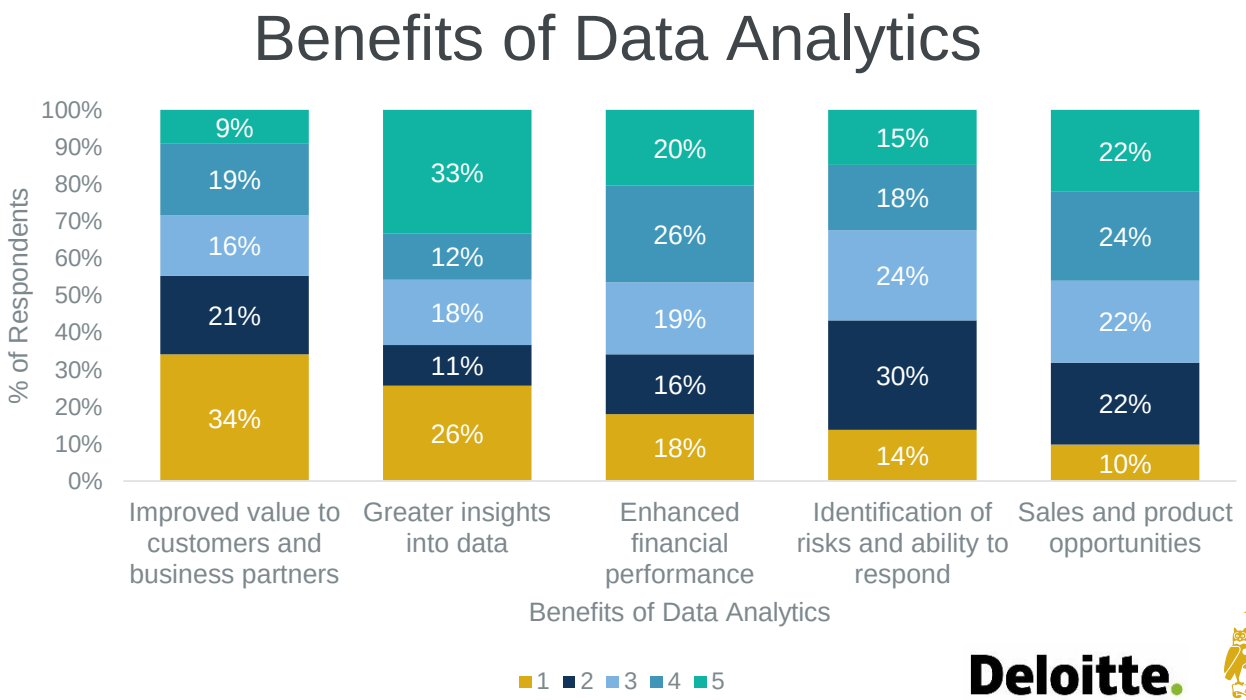

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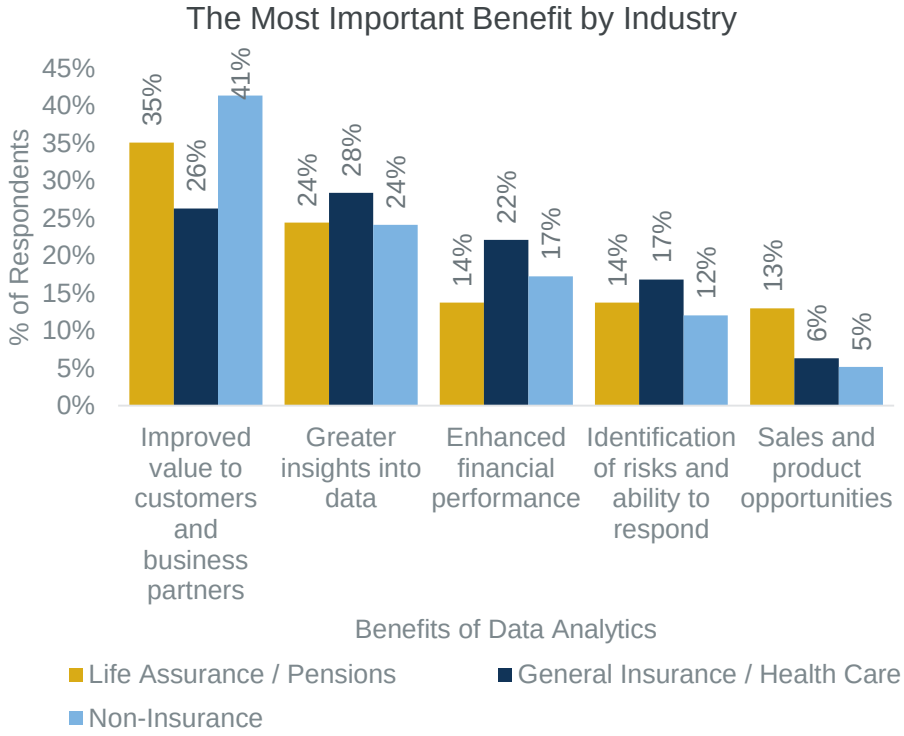

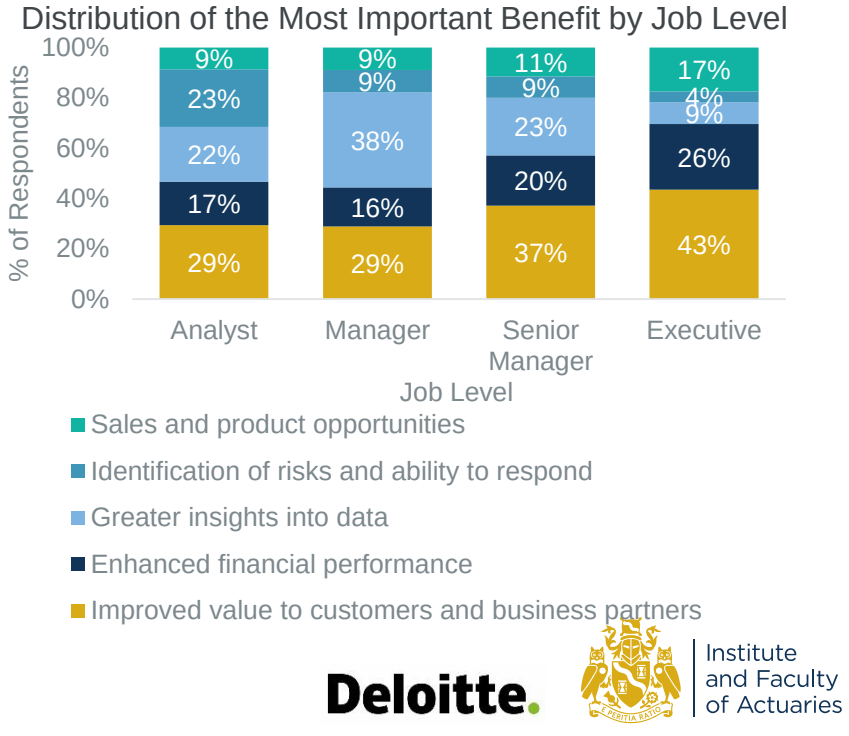

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TREND 2: ANALYTICS SUCCESS HINGES ON BUILDING THE RIGHT CAPABILITIES

Leadership

- Transformation-savvy executive sponsors.
- **Do not** appoint a sponsor who runs a cost centre.

Operating model

- Centralize scattered talent into a hub or centre of excellence.
- Empower analytics capability to lead and champion analytics.

Talent and capability development

Demonstrating a willingness to challenge business norms.

Culture and change management

Co-create internally with the business to build “purple teams” and externally with partners to fast track returns and avoid years of investment.

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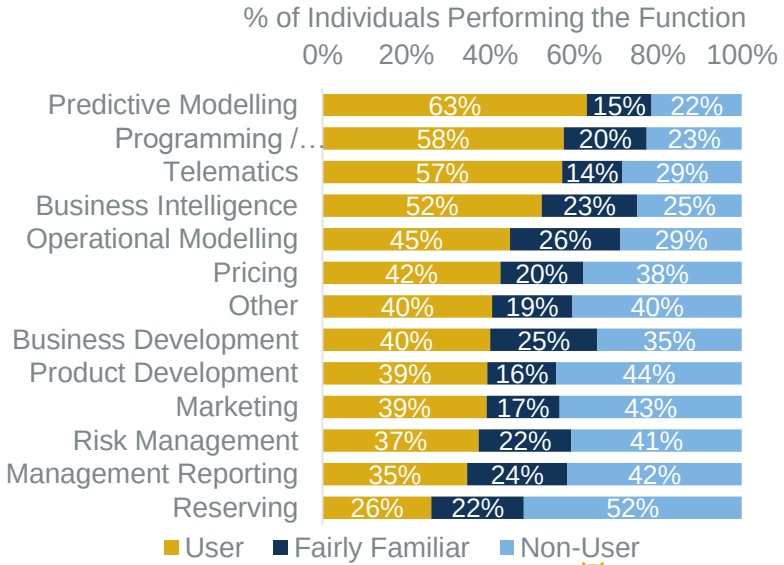
TREND 2: ANALYTICS SUCCESS HINGES ON BUILDING THE RIGHT CAPABILITIES

Roles Performed by Respondents

	Life Assurance / Pensions	General Insurance / Health Care	Non-Insurance
Business Intelligence	35%	47%	62%
Management Reporting	44%	47%	40%
Predictive Modelling	24%	47%	43%
Risk Management	33%	47%	32%
Programming / Development	31%	40%	40%
Pricing	31%	39%	29%
Business Development	35%	29%	33%
Product Development	34%	26%	25%
Other	24%	22%	40%
Reserving	29%	32%	14%
Operational Modelling	19%	20%	29%
Marketing	13%	9%	17%
Telematics	1%	6%	3%

Familiarity by Individuals Performing Functions



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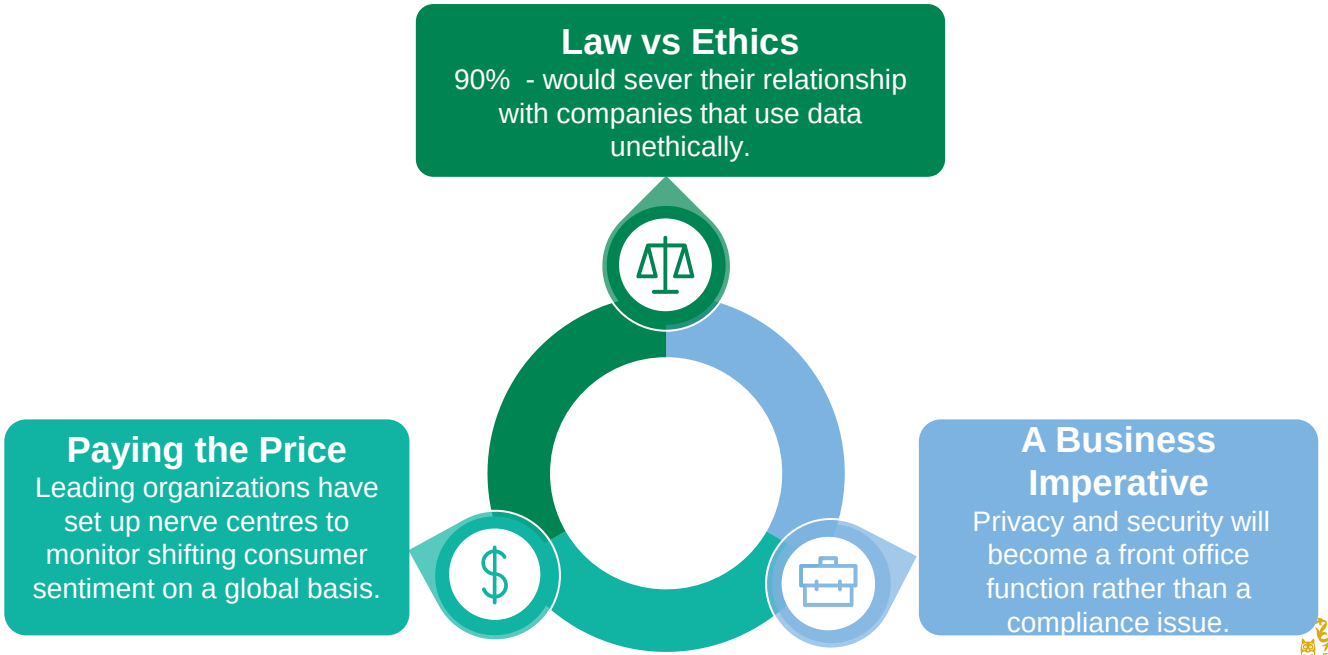
TREND 3: PRIVACY AND SECURITY BECOMES A FRONT OFFICE FUNCTION



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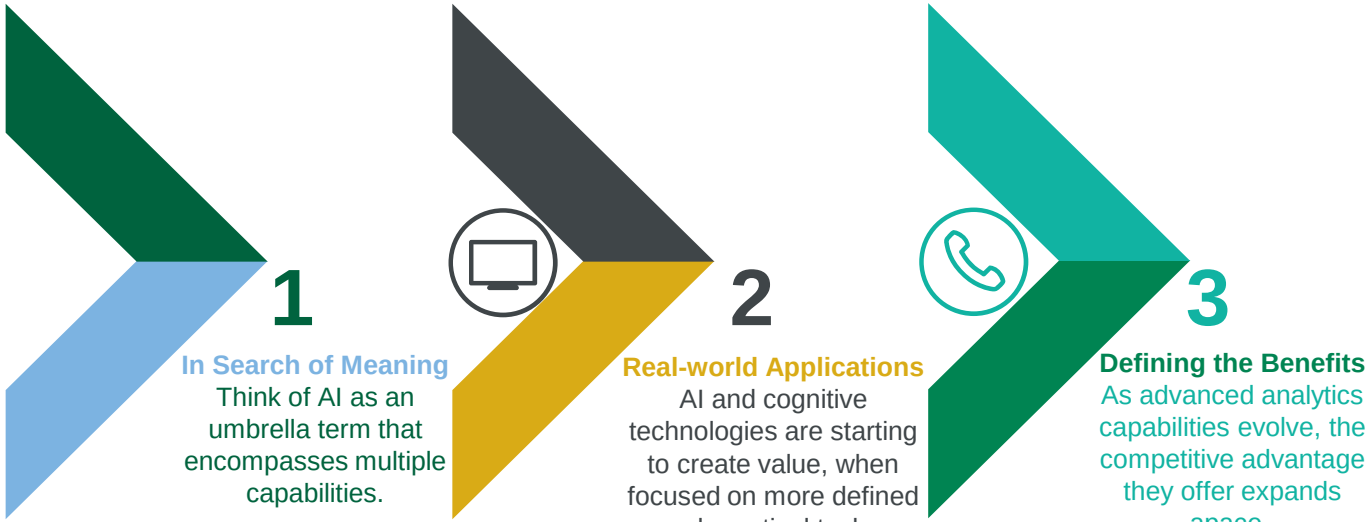
TREND 4: ARTIFICIAL INTELLIGENCE GETS PRACTICAL



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TREND 5: BEHAVIOURAL ECONOMICS DELIVERS ANALYTIC INSIGHT

Behavioural economics will play a key role for organizations interested in tailoring communications to their customers' mind-set, or iterating rapidly to understand the best timing and type of intervention.

The way in which organizations design their offers or present choices has a meaningful impact on a transaction's ultimate outcome. In fact, it is often possible to see major behavioural responses by making only small architectural alterations.

It is imperative to adopt strong governance practices around the way in which behavioural economics are used and applied.

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Analytics Use Cases

DOMAIN AREAS

	Domain Definition	Sample Sub-Components	
Customer Analytics	Customer Analytics is the use of Analytics to enhance the customer lifecycle, sales and pricing processes, and overall customer experience	• Marketing • Sales force • Customer Service	• Customer Segmentation • Pricing, etc.
Supply-chain Analytics	Supply Chain Analytics is the use of Analytics to provide insights across the organizational value chain	• Supply Chain Efficiency • Inventory Productivity • Planning and Forecasting	• Sourcing and Procurement • Logistics and Distribution, etc.
Financial Analytics	Finance Analytics is the use of Analytics to measure, control, and optimize financial management processes	• Reporting & Valuation • Revenue Leakage • Working Capital	• Bankruptcy Administration • Tax Analytics, etc.
Workforce Analytics	Workforce Analytics is the use of Analytics to enhance and optimize workforce processes and intelligence	• Talent Acquisition • Talent Retention	• Organizational Design • Workforce Planning, etc.
Risk Analytics	Risk Analytics is the use of Analytics to measure, monitor and mitigate enterprise risk	• Enterprise Risk Management • Compliance • Risk Management and Reporting	• Fraud • Assurance Analytics, etc.
Cross-Functional / Other	Analytics pertaining to cross-functional and hybrid solutions that offer multi-dimensional benefits	• Risk Based Performance Management • Anti-Corruption	• Sustainability • Lease Accounting, etc.

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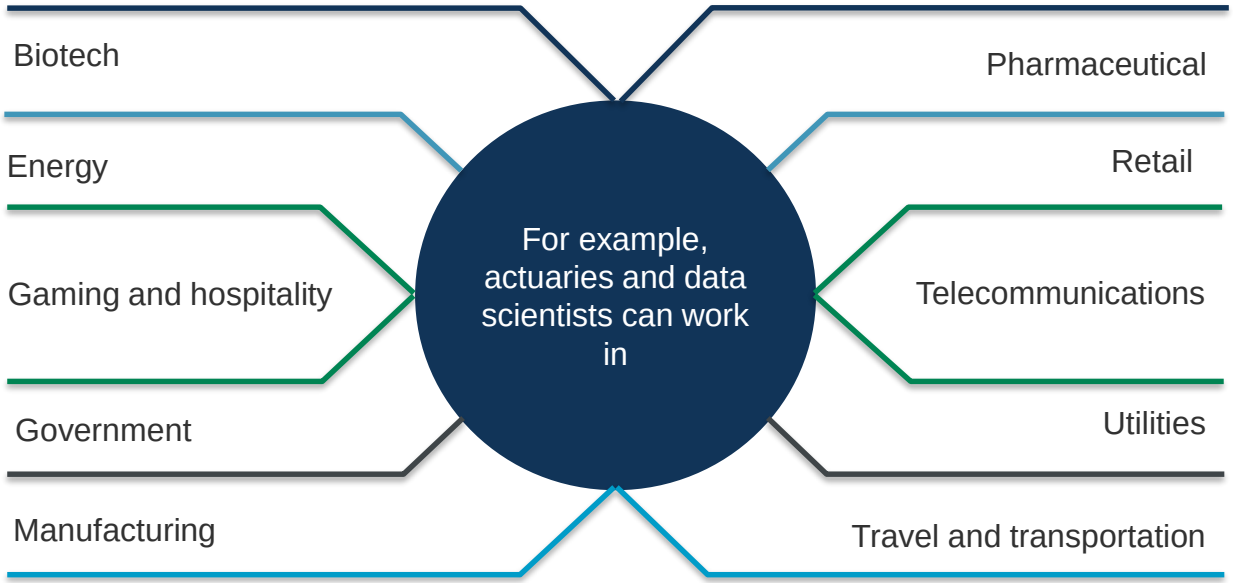
WIDENING OUR PLAYING FIELD

Data Science opens up a world of new opportunities for actuaries outside the “classic” fields of practice.



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Questions

Comments

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