ENDLESS POSSIBILITIES WITH DATA

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INTRODUCTION TO THE STUDY

Growing by 2.5 quintillion bytes every day, data is a truly inexhaustible resource. More importantly, it creates endless possibilities for enterprises to make their data do more, from delivering great customer experiences to creating new revenue opportunities.

At the start of this decade, the leaderboard of valuable companies was dominated by energy corporations. Today, there are only technology companies at the top. And data, not oil, is the most valuable asset.

Growing by 2.5 quintillion bytes every day, data is a truly inexhaustible resource. More importantly, it creates endless possibilities for enterprises to make their data do more, from delivering great customer experiences to creating new revenue opportunities. It underpins everything that is, and all that is to come.

As the technology partner of hundreds of organizations around the world, Infosys helps clients navigate the journey from their current state to the next. Facilitating clients' transition into data-native enterprises is a crucial part of this.

To understand how companies are using data analytics today and their expectations in a world of endless possibilities with data, we recently commissioned an independent survey of 1,062 senior executives from organizations with annual revenues exceeding US$ 1 billion, in the United States, Europe, Australia and New Zealand.

The respondent were from business and technology roles. They were decision makers, program managers and external consultants.

Respondents represented 12 industries, grouped into 7 industry clusters, namely Consumer Goods, Retail and Logistics, Energy and Utilities, Financial Services and Insurance, Healthcare and Life Sciences, Hi-tech, Manufacturing and Telecom.

The study tries to envision an ideal future scenario for data analytics, a scenario of endless possibilities. It explores a range of issues, including the challenges and opportunities encountered by enterprises in their data analytics journey, their preferred technologies and mode of execution, nature of outcomes, and the role of new technologies in the analytics world.

This report presents the detailed findings of the survey.

EXECUTIVE SUMMARY

The possibilities with data analytics were endless, 4 areas were found to be extremely relevant:

Risk Mitigation

Experience Enhancement

Business Model Creation

Revenue and Profitability Maximization

Respondents rated experience enhancement as the highest at 31%, risk mitigation the second highest at 28% followed by developing new business models and revenue and profitability maximization at 23% and 18% respectively.

The survey highlighted that enterprises across industries encounter challenges that prevent them from implementing their analytics. The biggest challenges stemmed was with integrating multiple datasets across sources for 44% of respondents followed by understanding the right analytics technique to be deployed at 43%.

Types of analytics

70% organizations have deployed Descriptive/Diagnostic Analytics

69% deployed Predictive Analytics

35% deployed Prescriptive Analytics

Strategies suggested by respondents for overcoming these challenges

47% Deployment of the right people with the right skills

46% Identifying the right analytics techniques

50% Choose the right analytics tools and technologies

48% Ensuring a clear roadmap or execution strategy

How functions use analytics

- Finance and accounting seemed to be most analytics savvy at 32%
- Marketing at 20%
- Operations at 17% and
- Sales at 15%

Sourcing and procurement, human resources and research and development seemed to use analytics the lowest amongst functions.

The role of allied technologies

To deliver increased outcomes, Artificial Intelligence was ranked the highest amongst technologies that would deliver increased outcomes when combined with data analytics initiatives.

DATA ANALYTICS

IN A WORLD OF ENDLESS POSSIBILITIES WITH DATA

It is almost impossible to calculate the value that data brings to an organization in the digital age. It is a strategic asset that enables enterprises to offer great memorable customer experiences, mitigate and manage risk, take efficiencies to new highs and identify new growth opportunities. Deployed at the back-end, it automates enterprise operations and facilitates innovation; at the front, it enables extreme personalization and high quality service.

Not only does data help enterprise to do more, it also enables data-driven decision making. The data-driven enterprise uses this asset smartly to build, differentiate and even reimagine its business.

There is no limit to what data can do. Data enables organizations to

1. Identify their deepest problems,
2. Find innovative solutions,
3. Spread learning through collaboration, and
4. Amplify the potential of their people.

Where do respondents find data analytics most relevant?

When asked where they would find data analytics to be most relevant if faced with its endless possibilities, survey respondents named the following four areas –

31% rated for Experience Enhancement i.e. creating best in class experience using intelligence from advanced analytics and being able to listen to internal and external stakeholders.

28% were interested in Risk Mitigation i.e. predicting risk to enable better decision making, and detecting anomalies that could disrupt business as usual.

The interest in mitigating risk was evident when we spoke to some respondents. For instance, a Canadian multinational banking services firm said that the intersection of AI, automation and analytics provided a deeper understanding of existing risks by highlighting correlations that were not apparent in manual analysis.

For 23%, the most relevant application for data analytics was Business Model related, specifically, acquiring strategic decision making capability, developing new business models and building competitive advantage through innovation.

18% were interested in Revenue and Profit Maximization through efficiency improvement.

Barring the Consumer Goods, Retail and Logistics and Energy and Utilities groups, for whom risk mitigation was the most important area, respondents from the rest of the industries named experience enhancement as the most relevant application for data analytics.

The regional perspective

From a regional perspective, respondents from the United States and Europe were focused on enhancing experience, while the Australia and New Zealand group thought mitigating risk was the most relevant application of analytics (Table 1).

The execution of strategy

More than 85% of total respondents claimed that their organization had an enterprise-wide analytics strategy.

53% of the healthcare and life sciences group was by far the most meticulous in executing its strategy.

50% of the telecom industry also had an enterprise-wide strategy for analytics but allowed business or regional units some flexibility to develop their own approaches.

European organizations (50%) were slightly ahead of organizations in the U.S. (44%) and Australia and New Zealand (40%) in rigorously following an enterprise-wide strategy. European organizations were also ahead of other regions in allowing various units the flexibility to develop their own approaches while having an enterprise-wide strategy (Europe 45%, versus 41% in the U.S. and 44% in Australia and New Zealand).

User Groups	Base	Geographies		
		USA	Europe	ANZ
	1062	549	313	200
Business Model Transformation	23%	20%	25%	28%
Experience Enhancement	31%	32%	34%	25%
Revenue and Profit Maximization	18%	21%	14%	16%
Risk Mitigation	28%	27%	27%	31%

Table 1: Scenarios where data analytics would be extremely relevant if possibilities with data were endless

MEETING AND BEATING DATA CHALLENGES

We saw in the preceding section that barely half of all organizations managed to evolve and execute an enterprise-wide strategy for driving data analytics initiatives. What about the rest?

Overall	Base	USA	Europe	ANZ
	1062	549	313	200
Integrating multiple analytics tools to draw synergies	41%	40%	48%	34%
Deciding on choice of tools/technologies to pick from	38%	37%	44%	32%
Maturity of existing systems/architectures and technology environments	41%	39%	47%	34%
Required resource skills in the analytics realms	40%	36%	43%	44%
Absence of a dedicated analytics team to drive the initiatives to closure	13%	14%	10%	14%
Pace of execution/implementation of the initiative	36%	34%	40%	36%
Lack of high levels of clarity in the execution roadmap	33%	28%	41%	33%
Understanding the right analysis techniques to be deployed	43%	43%	44%	44%
Integration of multiple datasets for various sources	44%	41%	56%	36%
Ensuring data hygiene (correctness of data, relevance, recency etc.)	42%	39%	46%	42%

Table 2: Key challenges in implementing data analytics-led initiatives

The survey found that enterprises in every industry encountered several challenges that prevented them from implementing their analytics initiatives fully.

The biggest challenges stemmed from integrating multiple datasets from a variety of sources for 44% of respondents, and 56% of European respondents. The healthcare and life sciences industries seemed to be impacted the most, with 50% of respondents claiming that this was the biggest obstacle to implementing data and analytics-led initiatives, followed by energy and utilities (46%) and telecom (45%).

The second most important challenge was understanding which analysis techniques to deploy, cited by 43% of total respondents, and a similar proportion of respondents from the U.S. (43%) and Australia and New Zealand (44%). The financial services vertical led the pack, with 47% naming this their top challenge, followed by manufacturing and telecom (45% each). Other key challenges included difficulty in integrating multiple analytics tools (41% mentions overall and 48% in Europe), lack of maturity of the current systems architecture and technology landscape (41%), and absence of adequately skilled human resources in the analytics realms (40%). For telecom, finding the right "skill resources" in analytics was the biggest challenge (51%).

One can see why enterprises find it a problem to identify the right analytics techniques. Unless there is a threshold level of expertise, it is easy to miss fundamental issues. Organizations that hop from one option to another in search of the right solution, based on superficial knowledge, will probably never find it, and could end up paying a heavy price.

Overall	Base		USA	Europe	ANZ
	1062		549	313	200
Choosing the right analytics tools/technologies	50%		48%	56%	47%
Ensuring a clear roadmap/execution strategy is set before	48%		50%	44%	49%
Deploying the right people with the right skills	47%		48%	49%	44%
Identifying the right analysis techniques	46%		43%	55%	41%
Investing in latest IT Infra/Cloud technologies	43%		42%	51%	36%
Centralizing organisation wide data for better fungibility	41%		39%	50%	35%
Enabling/evangelizing digital culture across the organization	41%		38%	47%	38%
Partnering with external service providers, data experts	18%		17%	17%	24%

Table 3: Important aspects to drive in order to overcome execution challenges in analytics initiatives

How did the survey participants plan to overcome these challenges? Choosing the right analytics tools and technologies was the choice of half the survey respondents, and of 56% of those from Europe. Next was putting a clear roadmap and execution strategy in place beforehand, cited by 48% of participants; this was the top answer for respondents from the U.S. (50%) and also Australia and New Zealand (49%). 47% of respondents (48% in the U.S.) said deploying the right people with the right skills was the way to overcome challenges, while 46% voted for identifying the right analysis techniques (55% in Europe).

Between industries there was significant difference in opinion –

- Identifying the right analysis techniques (4th overall) was the most important way of beating challenges for telecom respondents (mentioned by 50%).

- Consumer, retail and logistics, financial services and insurance, and hi-tech respondents attached equal importance to several options.

- Investing in cloud computing and centralizing organization-wide data was more important to healthcare and life science than any other vertical.

By and large, the challenges named by respondents and the ways to overcome them map closely to each other. These responses have interesting implications for technology companies working in the data analytics space.

A respondent from a German food processing company stated that they would like to see more specific proposals from their partners for integrating various data analytics capabilities into our work.

While enterprises are already engaging with technology partners to deliver strategic outcomes, the expectation from partners are growing. They want their partners be more proactive and help them grow.

Enabling enterprises with Industrialization of analytics capabilities is where partners can help them. As the technology evolved, the top providers in the business did the same to expand their capabilities to include not just execution but also consulting, technology and advisory services. Consequently today, data analytics engagements include everything from understanding client objectives and building strategy to creating execution roadmap and finally, implementing the same.
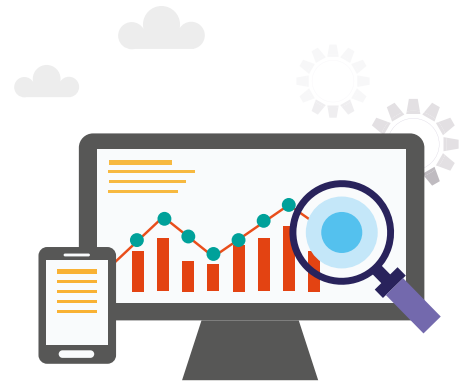
For example, Infosys helped an industrial manufacturing firm create a data and analytics strategy, build and set out an operational framework for a center of excellence in analytics, and define a process for identifying, executing and tracking analytics projects.

An agricultural equipment manufacturer undergoing digital transformation partnered with Infosys to create an end-to-end data analytics solution, spanning everything from data gathering and platform development to advanced analytics.

WHAT ANALYTICS AND WHY

Over the years, data analytics has evolved in capability, going from a purely descriptive and diagnostic tool to an advanced solution that is intelligent enough to predict events and prescribe the right action in different situations.

While descriptive and diagnostic analytics are used the most at present, the market for predictive and prescriptive analytics is growing.

Even among the organizations in the survey, descriptive and diagnostic analytics led predictive analytics in usage, albeit by a tiny margin –

70% Descriptive and Diagnostic Analytics

69% Predictive Analytics

35% Prescriptive Analytics

Europe was ahead of the other regions in adopting all types of analytics.

Use of Descriptive and Diagnostic Analytics

78% in Europe

67% in the US

65% Australia and New Zealand

Use of Predictive Analytics

75% in Europe

68% in the US

62% in Australia and New Zealand

Use of Prescriptive Analytics

40% in Europe

35% in the US

28% in Australia and New Zealand

Most vertical groups followed the same pattern, except for energy and utilities and manufacturing, where predictive analytics overshot descriptive and diagnostic by a fair margin. This is not surprising. Oil and gas companies were among the early adopters of predictive analytics, using it to proactively maintain expensive equipment such as production platforms.

Predictive analytics can help manufacturers anticipate equipment failure, enhance operational efficiency, reduce asset downtime and optimize asset maintenance across the value chain. In the survey, the financial services vertical stood out for its use of prescriptive analytics, which at 50%, was much higher than that of any other industry group.

Overall	Base		USA	Europe	ANZ
	741		367	245	129
Cost savings/efficiency gains in operations	73%		72%	74%	75%
Performance monitoring	63%		60%	72%	56%
Business process efficiency analysis	58%		57%	62%	49%
Sales and demand estimation	55%		52%	58%	57%
Risk management	54%		53%	59%	45%
Workforce analytics	48%		50%	50%	40%

Table 4: Key outcomes by leveraging Descriptive/Diagnostic Analytics

The following discussion drills down into how different industries leverage each type of analytics.

Enterprises mainly hope to gain efficiencies from their descriptive and diagnostic analytics investments.

In the survey,

73% respondents deployed analytics to save cost and/or improving operational efficiency

63% respondents deployed analytics to monitor performance

(Only Australian respondents voted differently, putting sales and demand estimation in second place after cost efficiency).

81% of the healthcare and life sciences group was particularly focused on efficiency outcomes.

Here is an example of how a large American health insurance company used descriptive and diagnostic analytics to improve the performance of brokers experiencing significant member attrition. The company implemented a dashboard, which used a variety of customer, premium, underwriting and other data to project detailed broker performance that could be monitored by its executives. The dashboard also highlighted that the company was quoting lower premium because prior diagnosis data was not being captured in many cases, and that some agents serving multiple insurance companies were shifting customers out. Based on the insights from the dashboard, the company replaced its flat broker commission structure with a performance-based commission model.

Overall	Base		USA	Europe	ANZ
	732		372	236	124
Customer behaviour patterns	66%		64%	71%	64%
Future demand/sales forecasting	64%		65%	63%	65%
Predictive maintenance	59%		60%	62%	47%
Market/competition intelligence	56%		54%	62%	52%
Risk assessment/fraud detection	47%		47%	49%	43%

Table 5: Key outcomes by leveraging Predictive Analytics

The focus was clearly on the market as far as predictive analytics was concerned.

Top two priorities for respondents:

66% to understand consumer behavior patterns

64% forecasting demand and sales

Region-wise also, the findings followed a similar pattern. The only industry to behave differently was telecom, which did not have either of these objectives in the top two. For the telecom companies in the survey, conducting predictive maintenance (60%) and gathering market intelligence (58%) were the most important outcomes of predictive analytics.

Overall	Base		USA	Europe	ANZ
	374		194	124	56
Driving process enhancements	69%		72%	70%	55%
Enhancing customer journey experiences	66%		65%	67%	64%
Bringing in new product/offering mix	63%		58%	70%	66%
Identifying new revenue streams from adjacent opportunities	61%		60%	65%	54%
Developing new business models	60%		60%	65%	48%
Unearthing effective pricing opportunities	47%		52%	45%	38%

Table 6: Key outcomes by leveraging Prescriptive Analytics

Although prescriptive analytics is still in the early stages of adoption, organizations do recognize it's potential.

How respondents use prescriptive analytics

69% use prescriptive analytics to enhance processes

66% use prescriptive analytics to improve customer journeys and experiences

By region, 72% of U.S. respondents mentioned process enhancement, while 70% of Europeans did the same. Improving the product mix was an important outcome for 70% and 66% of respondents from Europe and Australia and New Zealand respectively. Enhancing customer journeys and experience was uniformly important in all regions.
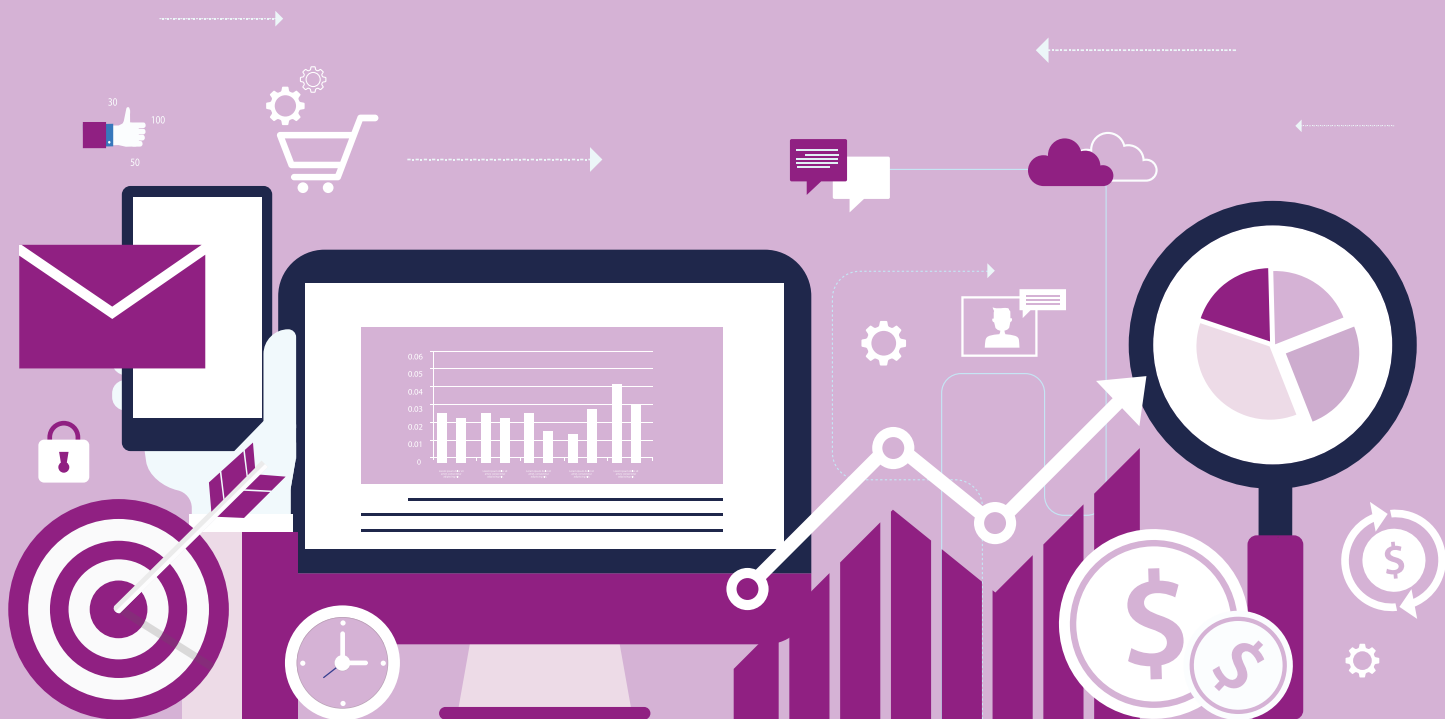
ANALYTICS USAGE BY FUNCTION

Although IT is the early adopter of analytics and continues to lead usage, all other enterprise functions are catching up. Today, there is virtually no function that does not employ analytics to a significant degree in day-to-day operations.

To understand where enterprises leveraged data analytics the most, the survey asked respondents to name the function that had seen the maximum number of initiatives. Finance and accounting came out on top, recording

32% of the vote, well ahead of marketing which was named by 20% of respondents overall.

Overall	Base		USA	Europe	ANZ
	1062		549	313	200
Finance and Accounting	32%		33%	34%	30%
Marketing	20%		17%	23%	24%
Operations (Production, Supply chain, Support)	17%		20%	12%	17%
Sales and Presales	15%		15%	15%	15%
Research and Development	9%		9%	8%	10%
Human Resources	4%		4%	6%	2%
Sourcing and Procurement	3%		2%	2%	2%

Table 7: Analytics savvy functions in an organization

Across geographies, finance and accounting was the highest user of analytics with Europe being the highest followed by USA and Australia and New Zealand. While the marketing function in Europe and Australia and New Zealand deployed analytics the most, the operations function used analytics the most in USA.

Using spreadsheets since long, and now, sophisticated analytical solutions to manage operations and risks, the finance and accounting function is an early adopter of analytics. Marketing also consumes insights, advanced analytics and AI for everything from marketing campaign attribution to spend optimization to recommendation. Operations has started adopting analytics and AI in demand forecasting, procurement optimization, predictive maintenance etc.

When the same data was split by industry group, it threw up a more interesting pattern.

40% of energy and utilities used analytics in finance and accounting

Utilities, with their complex billing requirements (huge volumes, real-time measurement, two way flow of energy) offer a great opportunity for analytics to work its magic.

31% of telecoms used analytics in marketing much more than any other industry

21% of consumer, retail and logistics was second in using analytics for marketing

This supported the earlier finding that telecom companies were deploying predictive analytics for market intelligence.

Although overall, there were not many initiatives in R&D, healthcare and life sciences companies led the pack, with 13%, which was not surprising.

Here is an example of how the healthcare industry uses analytics for R&D and other functions. U.S. healthcare and life sciences companies face stringent regulatory requirements that are impacting R&D productivity by reducing approvals and increasing cost. The move to outcome-based healthcare reimbursement is compounding the pressure to reduce cost while improving outcomes. Here, big data and machine learning applied to a wealth of clinical trial and other data used in R&D, can provide valuable insights during drug development. A medical technology leader used an integrated modern analytics/visualization platform to analyze a variety of data that would help in prediction and prevention of diabetes. It also built a data lake with large volumes of data to develop predictive models for issuing an early warning about catastrophic medical events.

HOW OTHER TECHNOLOGIES IMPACT ANALYTICS AT THE CORE AND AT THE EDGE

AI is the foundational technology that enterprises leverage the most to drive their analytics initiatives. The Internet of Things (IoT) and data analytics together interconnect assets, devices, technologies and networks. For all of this to scale and deliver quick insights enterprises leverage Cloud Technologies which houses core assets, and analytics applications at the edge. Analytics is not just at the core but also about the edge.

Hence it is no surprise that when asked to pick the digital technology with the greatest impact on data analytics outcomes, 37% of respondents chose AI which also ranked highest across geographies.

19% voted for IoT and was most preferred across Europe and Australia and New Zealand. Cloud technologies followed with the highest rank in USA.

Technologies	Base	Geographies		
		USA	Europe	ANZ
	1062	549	313	200
Artificial Intelligence	37%	35%	37%	40%
Internet of Things	19%	18%	22%	17%
Cloud Technologies	16%	19%	12%	14%
Big Data	12%	12%	11%	12%
Machine Learning	9%	8%	10%	11%
Automation, Robotics, Bots	7%	8%	8%	6%

Table 8: Most preferred technologies that would deliver increased outcomes when combined with data analytics initiative

Respondents from manufacturing led the pack, with 45% voting for AI, while 23% of healthcare and life sciences respondents chose IoT. AI was the top answer for respondents in all regions. However, U.S. respondents placed cloud (19%) in second spot just above IoT (18%).

A respondent from an American grocery manufacturing and processing company explained the importance of AI by citing its potential for enhancing the value of data and bringing forth insights that helped optimize their supply chain to meet growing demands.

For an Australian telecom company, AI was the way to predict network system failures and take preventive action. Tools, such as chatbots, and a recommendation engine were adding to the quality of customer experience.

Overall	Base		USA	Europe	ANZ
	1062		549	313	200
Automation					
Ability to scale current analytics initiatives and deploy	57%		56%	62%	49%
Standardization of data and analysis techniques	53%		53%	55%	50%
Drawing higher efficiencies	46%		45%	49%	42%
Artificial Intelligence					
Possibility for creating new business cases/models	52%		48%	62%	50%
Driving prescriptive and predictive modeling	51%		51%	52%	48%
Effective risk detection and mitigation	31%		30%	33%	31%

Table 9: Role of AI and Automation in the analytics world

Survey participants did recognize the role of automation in enabling enterprises to scale and deploy analytics initiatives (57% agreed), standardize data analytics techniques (53%), and draw higher efficiencies (46%).

In financial services, one can see automation being used with analytics to predict the intent behind a service call, and employing that knowledge to improve call center experience and efficiency. In the hi-tech vertical, chatbots are being used in product search and to answer frequently asked questions.

When it came to AI, respondents were excited about its potential to create new business cases and models (52%) and drive prescriptive and predictive modeling (51%).

60% of respondents from the financial services and healthcare verticals said that AI would help to build new business cases and models.

The consumer, retail and logistics group voted strongly in favor of prescriptive and predictive modeling (59% versus 51% average).

Overall	Base		USA	Europe	ANZ
	1062		549	313	200
Effective data management	58%		56%	65%	55%
Predictive and prescriptive analytics	50%		49%	54%	47%
New business models/cases	49%		46%	55%	49%
Scalability and repeatability of analytics frameworks	49%		51%	49%	44%
Cross organizational synergies	48%		46%	55%	42%
Real-time impact on decision making	34%		33%	39%	30%

Table 10: Key outcomes envisaged with the convergence of Cloud, Big data and IoT

Respondents were also of the opinion that the convergence of cloud, big data and IoT would positively impact data management (58%) and was ranked highest across USA, Europe and Australia and New Zealand. Predictive and prescriptive analytics (50%) was the second highest followed by new business models (49%) and scalable analytics frameworks (49%).

Effective data management was the top response of all verticals barring energy and utilities, which said that the greatest impact would be felt by predictive and prescriptive analytics. Financial services, manufacturing and telecom respondents believed that the convergence of these technologies would bring cross-organizational synergies.

IN A FUTURE OF ENDLESS POSSIBILITIES WITH DATA...

Going back to the question we started with, where would the different verticals find data analytics to be most relevant, assuming that there was no end to its possibilities?

The survey highlighted that organizations wanted to ensure experience enhancement, risk mitigation, business model creation, and revenue and profitability maximization. We believe that data monetization is in effect, an aggregation of these elements and the end state that enterprises can attain.

Enterprises today want to be digitally native in order to be ahead of their competition. For this to happen they need to be data-native enterprises where data is an integral part of the enterprise's culture. This transformation to a data native enterprise is needed so enterprises can monetize data. A data-native enterprise will be able to industrialize analytics capabilities that can be applied right from consulting to technology in an integrated way that is either homegrown or in collaboration with a partner.

About Infosys Knowledge Institute

As enterprises navigate the path to being digital, Infosys Knowledge Institute offers thought leadership to guide their transformation. With decades' worth of business and technology experience we help enterprises strategize how they reinvent themselves from the core: their people, processes, and proposition.

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