Data & Analytics Market Overview

Market Deep Dive with a focus on AI-led Analytics, Compete Benchmarking, and Course5 Intelligence Limited (Course5i)'s Positioning

07th January 2022

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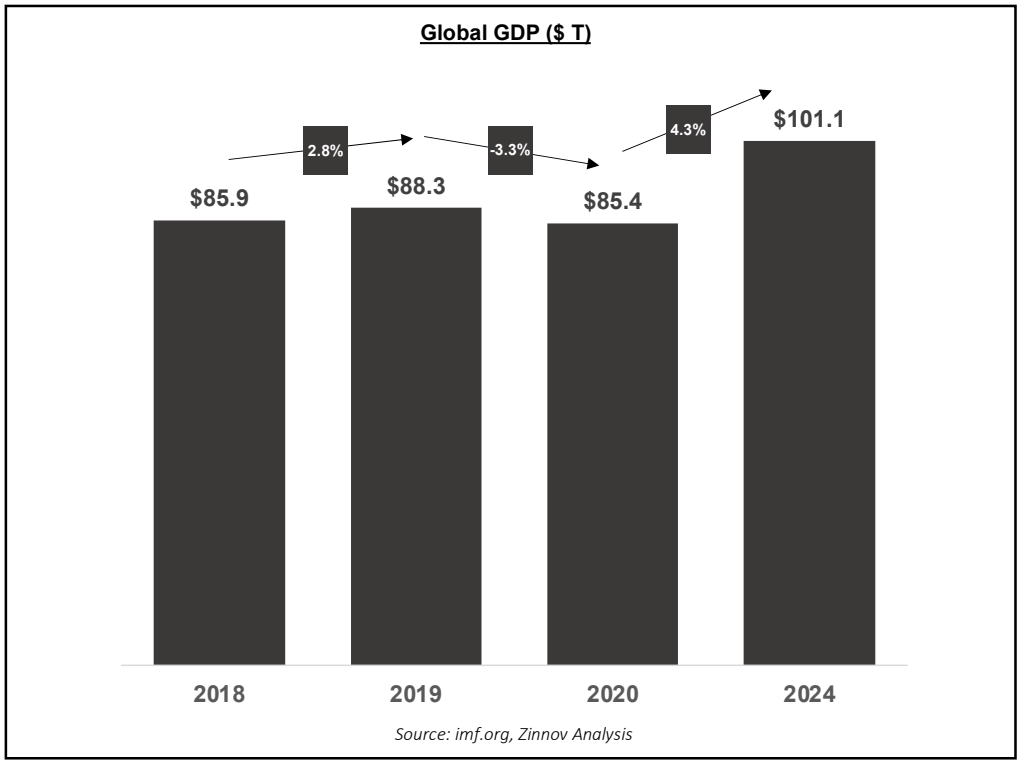
Global Macroeconomic Variables

The global economy has bounced back, despite a minor setback in 2020, and exceeded pre-pandemic growth velocity – while GDP is on a rebound, IT spending is projected to outpace the GDP growth by 2024.

In 2020, COVID-19 affected the global economy beyond anything experienced in nearly a century. However, as vaccines were rolled out at an unprecedented pace towards the end of the year, the worst estimates did not become reality, and the global economy is on the path to recovery at a pace much faster than what was initially projected.



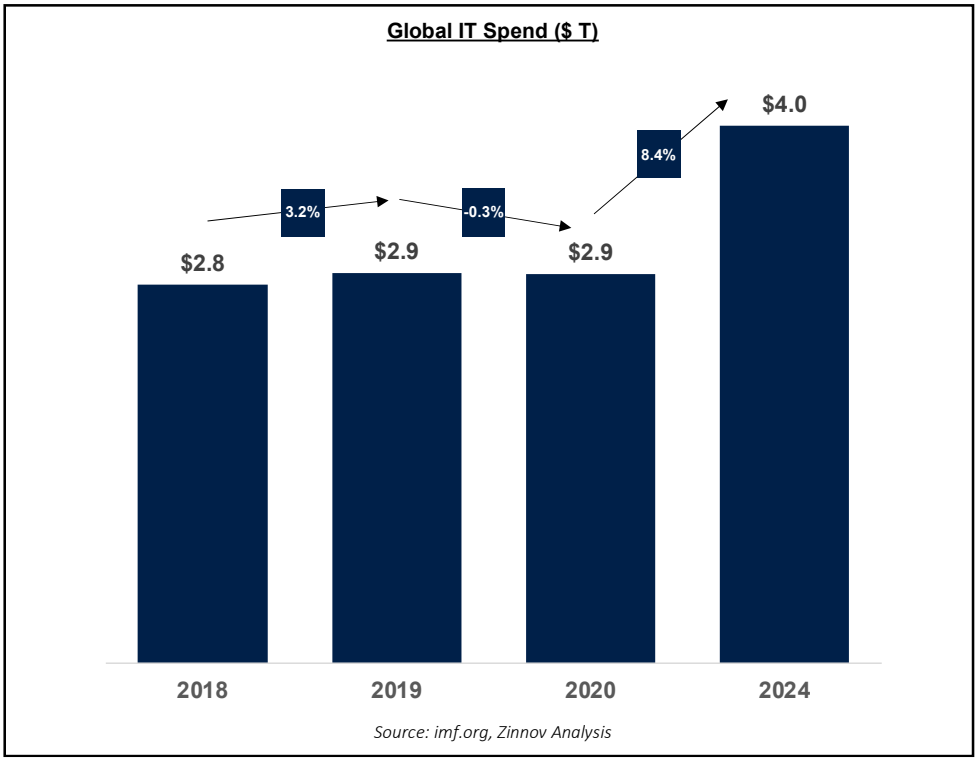
As per the recent World Economic Outlook published by IMF in October 2021, the global economy is projected to grow by 5.9% in 2021 and 4.9% in 2022 because of the accelerated growth in US and China, and in Europe and APAC regions:

- In the **US**, massive fiscal support (~$5.9T) and accelerated vaccination drives are expected to boost the economy, and GDP growth is expected to reach 6.0% by this year. Financial services, Healthcare, Retail, Manufacturing, Ed-Tech are some of the sectors that will drive the US economy and contribute in a large way, leading to forecasted GDP growth of 4.0% in 2024.
- **China**'s economy, which had limited impact in 2020, is expected to grow at a solid pace of 8.0% in 2021 as the country shifts focus on reducing financial instability. China has a forecasted GDP growth of 8.0% in 2024, with Automobile, Medical Device Manufacturing and E-Commerce industries propelling the growth.
- While **Europe** plunged into a double-dip recession during the onset of the pandemic, the easing of lockdowns and subsequent social distancing guidelines, along with huge public

investment programmes are expected to fuel a sharp recovery, driving GDP growth by 5.0% in 2021 and 4.3% in 2022 in Euro Area, compared to 3.7% and 3.9% respectively, as predicted earlier by European Commission[1]. Germany's forecasted GDP growth is 4.4% in 2024, with Automotive, BFSI, Utility & Energy and Services sectors being the major contributors, while France's forecasted GDP growth is 4.1% in 2024, driven by Manufacturing, Technology, Transport and Energy sectors.

- While there are stumbling blocks associated with vaccine rollout and containment measures in **APAC**, the economy is expected to be mostly on track and projected to grow at a rate of ~7.2% in 2021, compared to earlier prediction of 7.3%. Even in emerging economies like India, the GDP is forecasted to grow at 8.5% in 2022, despite the severe impact on recovery caused by the second wave of COVID -19. Technology, Health and Nutrition, Infrastructure and Services sectors are key contributors to the economy, and will be driving India's growth in future leading to forecasted GDP growth of 7.8% in 2024.

The global IT spending is also expected to recover from the flat growth in 2020 to reach ~ $4 T by 2024. While uncertainty around the business situation pushed enterprises to put large scale expansion plans on hold in 2020, investments on IT have since then recovered as businesses prepare for the next wave of growth supported by a buoyant economy. However, as enterprises envision a post COVID-19 future, IT spend priorities are expected to change.



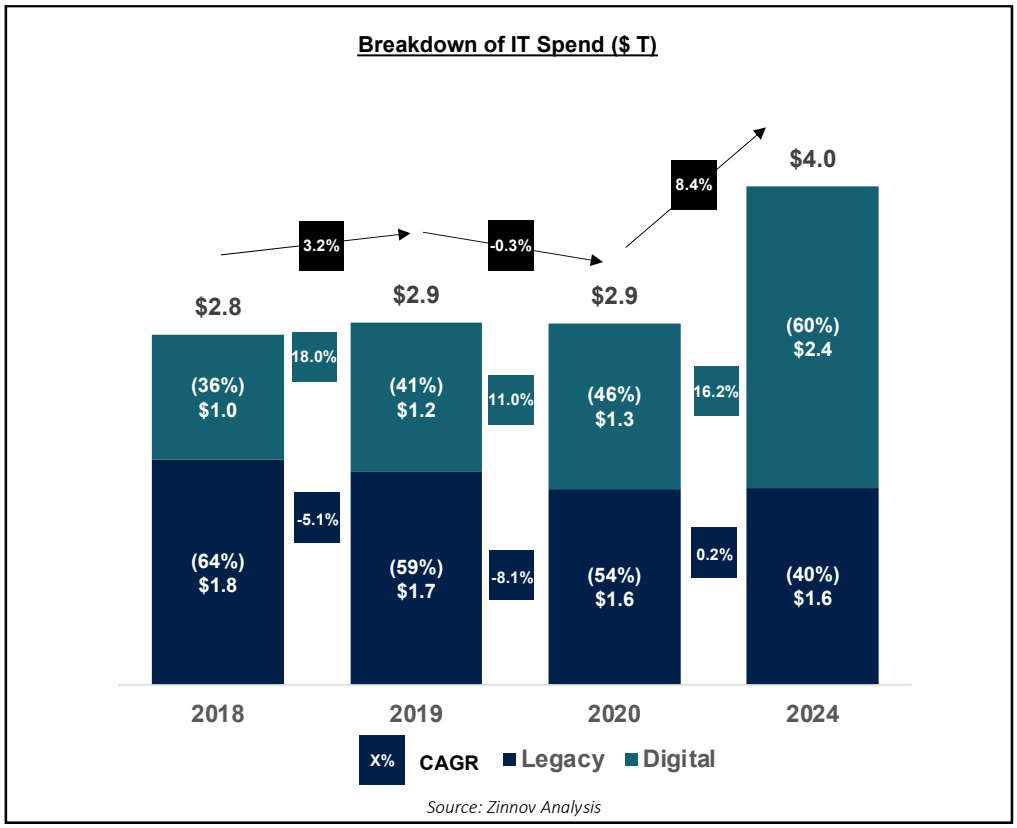
Digital Technologies will be at the forefront of transformation initiatives as enterprises globally gear up for a new normal

In the pre-pandemic era, technology leaders across industries were accustomed to incremental increases in IT budgets, with almost 60% of the budget in 2019 spent on legacy applications[2] – outdated architecture and software components that were harder to integrate

with newer systems. While most enterprises were focused on prioritizing cost and efficiency initiatives, a few of them took the lead and invested in digital initiatives such as Analytics, Cloud-based applications, Artificial Intelligence, Augmented Realities, etc. for driving innovation, growth, and improved customer experience.

On account of the COVID-19 pandemic, businesses and consumers have accelerated their shift to adopt digital models and services. COVID-19 has accelerated digital adoption and data has emerged as a valuable source of competitive differentiation across industries.

The COVID-19 pandemic has also provided substantial upside and downside to certain specific industries in a disproportionate manner. The pandemic ushered in a new era of digital divide – enterprises that had invested in digital initiatives were placed much better compared to the digital laggards[3]. Consequently, technology leaders across industries began undertaking efforts to minimize the spend on maintenance of legacy applications, and rapidly scaling up investments in digital technologies to fuel growth. As a result, growth in IT spend will be largely driven by investments in digital technologies as enterprises scale up digital transformation efforts across business units. Moreover, the COVID-19 pandemic has further accelerated digital adoption resulting in the majority of the companies globally determining to digitize their core business model to remain economically viable. The investment in digital technologies is expected to double from the 2020 levels to ~ $2.4 T in 2024.



Changing consumer preferences and organizational priorities have accelerated investment in digital technologies.

Some of the key use-cases driving adoption of digital technologies are mentioned below:

- ***Operational Efficiency***

  In a world of increasing data availability, the value proposition is shifting from the provision of core data to the generation of analytical insights to inform decision making processes and optimize workflows, across interrelated business activities. Real-time and precise insights on business operations and consumer spending patterns are critical for enterprises to maximize value at reduced costs. Enterprises are leveraging digital technologies across their entire value chain from supply chain to employees to customers to constantly discover cost optimization opportunities. Consequently, Analytics and Automation are leveraged across industries for a variety of use-cases such as forecasting demand, optimizing supply chains, maximizing ROI from promotional spend, predicting fraud and machine failures, etc.

- ***Contactless digital customer engagements***

  As a long-term impact of the pandemic, demand for contactless digital customer engagements such as telehealth, online learning, contactless payments, etc., are expected to continue. In response, investments in technologies as enablers for the new digital business model have taken a quantum leap. Data has emerged as key differentiator that enterprises are leveraging to build personalised contactless customer engagement systems. Enterprises are increasing their investments in digital technologies such as data and cloud to enhance different blocks of the customer journey for an increased conversion rate.

- ***Remote collaboration***

  A hybrid work environment leveraging remote work as well as physical offices is expected to become the norm, leading to more spending on systems and tools for virtual communication and collaboration. Enterprises have realized the benefits of a new hybrid working model over the past year and are expected to continue investing in it to support this new way of working.

- ***Infrastructure modernization***

  While public Cloud transformation was already mainstream, the COVID-19 crisis has drastically accelerated the pace of this adoption Hybrid clouds are also witnessing accelerated growth as key tool in the enterprise cloud transformation journey. Enterprise spending on Cloud infrastructure is expected to continue to grow, owing to the demand from burgeoning e-Commerce activity, virtual collaboration requirements, and the need to minimize cost while adding flexibility and scale to IT operations.

Data & Analytics is one of the fastest growing segments of the Digital Spend

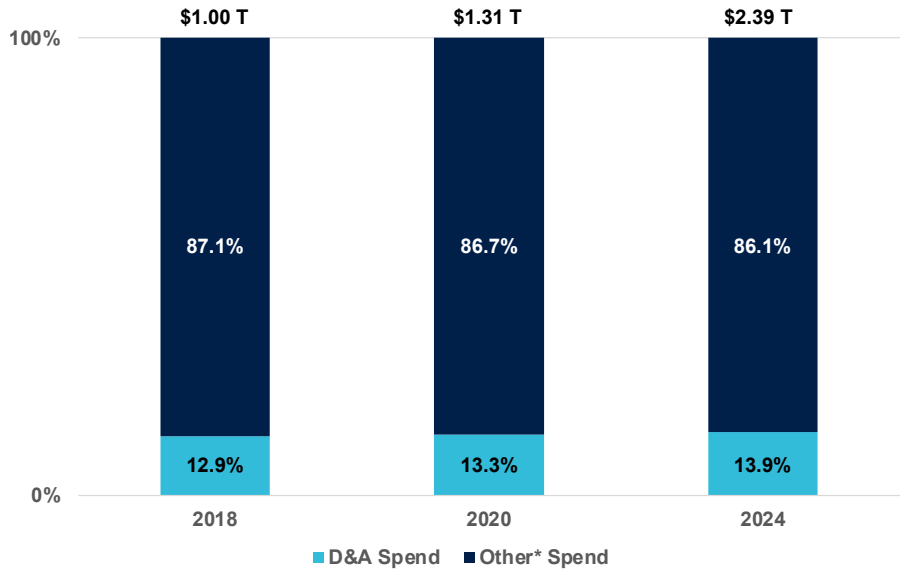
Across industries, Data & Analytics are being leveraged by enterprises to guide business strategy and optimize spending decisions amidst growing financial uncertainties. The constantly evolving business environment has made it necessary for organizations to become more agile across their value chain. As a result, the analytics and insights systems have to continuously evolve and be able to respond quickly to keep up with this accelerated rate of doing business. The growing adoption of D&A software and services across industries are driven by the need to:

- **Manage the Data Explosion:** Growing e-Commerce activities and the increased preference for contactless customer engagements have led to the creation of high volumes of customer data across industries. Increasingly, data is being collected in

different formats (media, audio, image, etc.) from a variety of sources like sensors, wearables, and other smart devices. Inherent structural inconsistencies in the data collected and the need to consolidate data residing under different departments into a single unified view have led to the growth in D&A spend across industries.

- **Understanding Consumer Psychology:** Consumers are constantly being exposed to new technologies and products. Predicting the ever-evolving consumer behaviour is one of the biggest challenges faced by companies around the world. Enterprises around the world are harnessing the power of D&A to gain insights – by segmenting customer database with cluster analysis to identify consumer segments, to attract and engage – by targeting the segment of customers with the right offers by analysing historical purchases and profiles and improve retention – by understanding customer value and enabling proactive retention approaches to retain customers.

Data & Analytics (D&A) Spend compared to Total Digital Spend, 2018-2024



Source: Zinnov Analysis

** "Others" bucket consists of spend in Artificial Intelligence (AI), Machine Learning (ML), Cloud Computing, Automation, and Internet of Things (IoT)*

- **Predict Future Business Scenarios:** To differentiate product offerings and respond quickly to changes in consumer preferences, enterprises are leveraging D&A. The power of Big Data and Artificial Intelligence (AI) & Machine Learning (ML) is increasingly being leveraged by enterprises to identify spend patterns and customer buying behaviour for customer segmentation, feature prioritization, and prediction of future demand.

- **Drive Growth:** D&A is at the core of driving key enterprise decisions across the value chain that contribute to an accelerated growth in the top-line. The importance of leveraging data to derive meaningful insights & actions across key functions such as product development, marketing & sales is being recognised across industry verticals. Marketing & Sales programs are being designed, monitored and constantly updated based on the analysis of relevant data points on customer behaviour and product usage.

- **Optimize Business Decision-making:** Business Intelligence and visualization are extensively leveraged by enterprises to track business metrics/KPIs against business goals. Data science and advanced algorithms are used to build advanced analytics applications to find optimal solutions for channel investment, promotional spending, warehouse transport, product assortment, etc.
- **Reduce Risks:** Post pandemic, increased online activity has led to a surge in fraudulent activities across industries. The BFSI (Banking, Financial Services, and Insurance) industry alone has seen double-digit growth in fraudulent activities in 2020. With Telecom firms usually at the forefront in cybersecurity and data breach prevention as the controller of data networks, there is increased traction in usage of Analytics techniques to make companies aware of these risks. Pharma companies are also using D&A to get insights on aligning internal resources versus hiring outside help, as well as figuring out investments in technology and establishing a culture that understands the importance of managing the highest risks to the business. Increasingly, enterprises are leveraging D&A, powered by ML algorithms, to detect and prevent fraud using historical transactions and social media interactions. Moreover, D&A can also help predict machine failures, minimizing risk of business downtime.

***IT Spending**: Information technology and services cost incurred by an enterprise, including hardware, software, outsourcing and personnel cost for development and maintenance of enterprise-wide systems and services.*

***Legacy Spend:** Costs incurred in maintaining outdated technology and systems built using tightly coupled architecture that renders existing systems incompatible with newer technologies, slowing the down process of developing of newer systems & solutions.*

***Digital Spend:** Costs incurred in new and emerging technologies, such as Cloud, Analytics, Artificial Intelligence, etc. to support enterprise growth and faster time-to-market of new applications and systems.*

***Glossary**:*

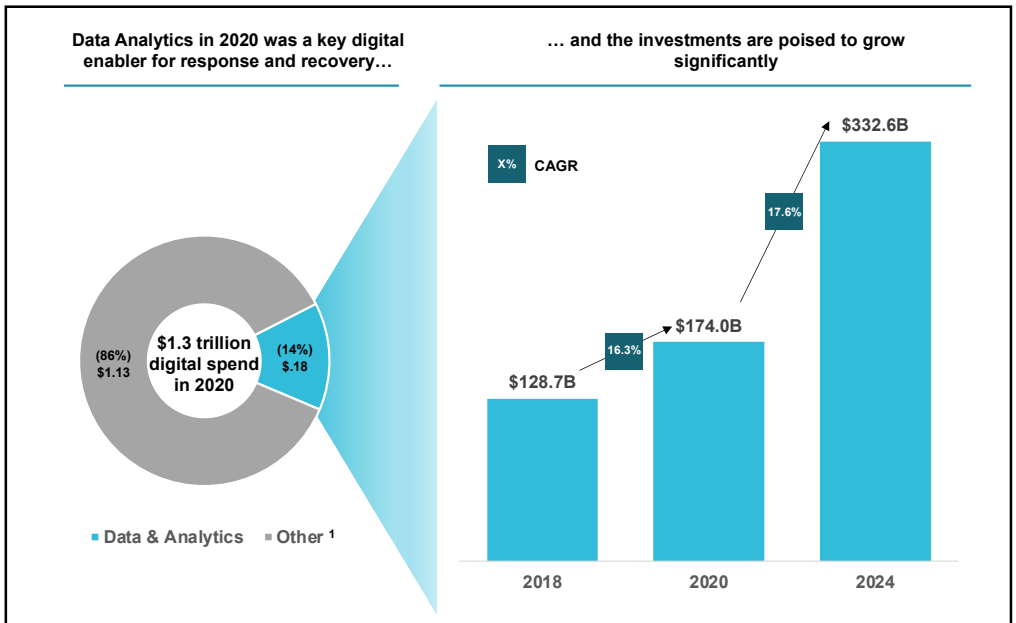
1. "Spring 2021 Economic Forecast: Rolling up sleeves", European Commission, May 2021
2. *Top IT spending priorities of 2021 by CIO - Deloitte*
3. *"COVID-19: the present storm for digital acceleration" by KPMG Perspectives*

Data & Analytics Market overview

Data & Analytics market was worth $174B in 2020 and growing at 18% CAGR

The market for Data & Analytics (D&A) was ~$174 Bn in 2020 and is expected to grow at a CAGR of 17.6% to ~$333 Bn by 2024. Technology companies have been at the forefront of adopting advanced analytics to stay ahead of the competition.

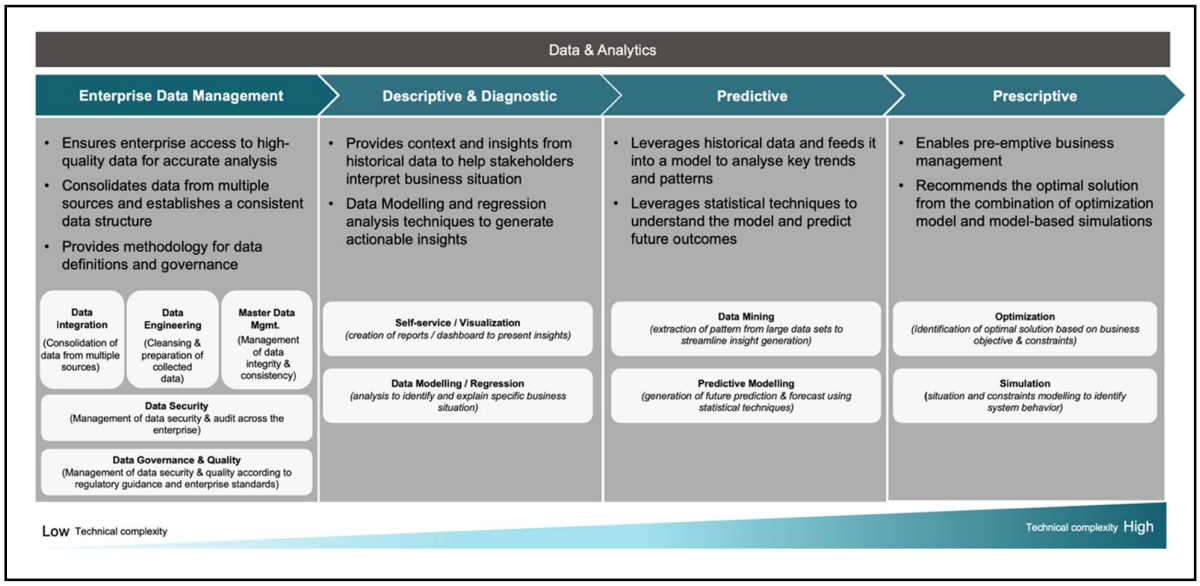
Data & Analytics Market Size, 2018-2024



1. "Others" bucket consists of spend in Artificial Intelligence (AI), Machine Learning (ML), Cloud Computing, Automation, and Internet of Things (IoT)

Source: Zinnov Analysis

D&A Value chain can be segmented into four key phases, based on the level of complexity in implementation and usage objectives



Data & Analytics value chain can be segmented into four phases – Enterprise Data Management, Descriptive & Diagnostic, Predictive, and Prescriptive.

Enterprise Data Management (EDM)

EDM refers to a set of processes, practices, and activities focused on consolidating data from disparate sources – both internal and external, while maintaining accuracy and quality of data, and providing security and governance across the enterprise according to regulatory mandates. EDM can be further segmented into five core buckets:

- ***Data Collection*** *refers to the process of gathering data from digital, syndicated, survey and social media sources.*
- ***Data Integration*** is the process of combining data as-is from several different sources into a unified repository like a data lake.
- ***Data Engineering*** is the process of addressing underlying structural inconsistencies in the data. Proliferation of different devices such as smartphones, wearables, smart machines, etc., and different data structures supported by these devices have led to structural inconsistencies in the collected data. Data Engineering aims to resolve this issue by performing data cleansing and integrity checks before storing it in data warehouses for use by downstream applications.
- ***Master Data Management*** refers to the process of maintaining a single source of truth for key business data across multiple systems, processes, and applications.
- ***Data Security*** is the process of securing key business process information or other sensitive enterprise data from any data loss or privacy breaches.
- ***Data Governance*** is a set of policies designed to protect the privacy of customer information and adheres to rules and regulations.

Descriptive & Diagnostic Analytics

Descriptive & Diagnostic Analytics provide insights on past business events using historical data and simple statistical tools. This phase leverages a combination of BI and visual analytics to describe and identify potential causes behind past business events and to understand dynamics of the internal or external business environment.

- ***Modelling and basic analytics*** techniques are applied to establish the relationship between past business events and extract insights for ad-hoc reporting.
- ***Self-service visualization*** with in-built data exploration tools is used by stakeholders to drill down and isolate confounding information for root cause analysis.

Predictive Analytics

Predictive Analytics leverages data mining and advanced statistical models to derive insights from historical and transactional data to identify patterns and predict future trends.

- ***Data Mining*** refers to the process of extracting anomalies, patterns, and correlations within large data sets, using ML algorithms.
- ***Predictive Modelling*** is a combination of different statistical modelling techniques such as forecast model, classification model, time series model, etc., to draw up predictions about future trends.

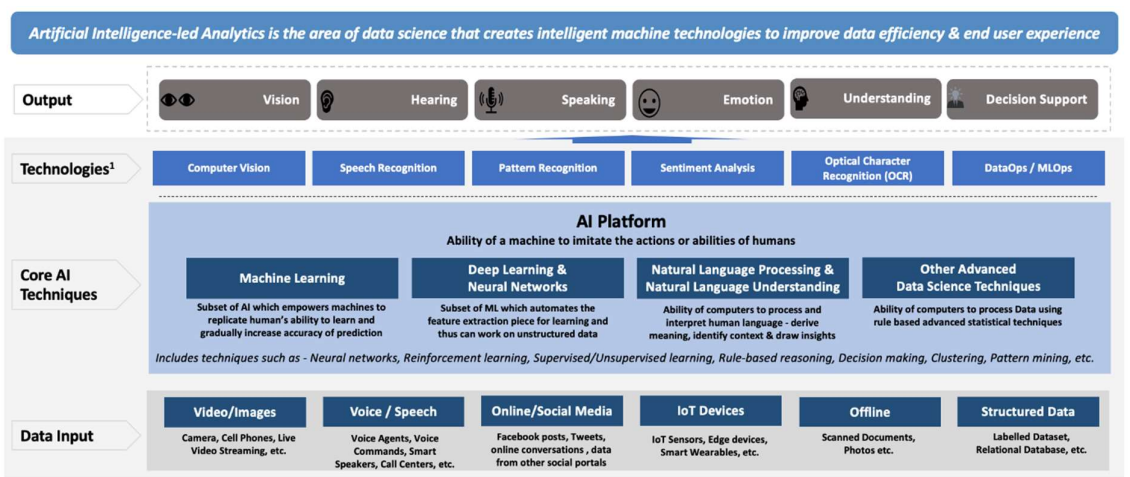
Prescriptive Analytics

Prescriptive Analytics uses several complex techniques and technologies to recommend the best course of action for business executives, managers, and operations employees. Core techniques used in Prescriptive Analytics include:

- ***Optimization* –** This is the process of finding an optimal solution to a business problem by leveraging advanced mathematical models. Real-life business events, enterprise resource constraints, and macro trends are used as inputs to the model to find the best course of action**.**
- ***Simulation*** – This technique includes building a digital replica of the mathematical model constructed in the previous optimization step to examine the change in model behavior with respect to alteration in model configuration parameters. Unlike the optimization model, which is used to find recommendations, the simulation model allows analysts to identify the impact of any unknown variables and explore alternatives.

AI-led Analytics – Enterprises are leveraging advanced core AI platform technologies like ML, DL and NLP to improve data efficiencies and end-user experience

AI-led Advanced Analytics and its key constituents



1. The above list of technologies are illustrative and not exhaustive

Data Analytics is the process of managing raw historical data and applying some form of analytical technique to find meaningful patterns in the data, that will aid in decision making. This is often augmented with data collection to gleam insights and analysis of other sources of information. This needs to be complemented with analysis of the outputs/data to gleam appropriate insights. The analytical techniques in use generally vary, although a few of the most popular methods include:

- Applied Mathematics
- Statistical Techniques
- Artificial Intelligence (AI) technologies such as Machine Learning (ML), Deep Learning (DL), etc.

Traditional Analytics methods majorly rely on applied mathematics and statistical techniques, whereas AI-led Analytics is a process to derive business intelligence using ML, DL, and other technologies to uncover insights, find new patterns and discover relationships in the data.

In practice, AI-led analytics is the process of automating much of the work that a data analyst would normally perform. The advent of transformational technologies like Artificial Intelligence has resulted in a major overhaul in the way organisations look at Data Analytics. Artificial Intelligence is transforming the field of analytics by offering a level of speed, scale and granularity that is difficult to achieve through statistical techniques. AI-led Advanced Analytics is thus defined as the augmentation of Traditional Analytics with the power of Artificial Intelligence, by leveraging core AI techniques such as:

1. **Machine Learning (ML)** – Machine Learning is that branch of Artificial Intelligence that uses data and algorithms to replicate humans' ***ability to learn***, thus gradually improving the accuracy to predict outcome. It is generally dependent on human intervention to process the data and uses labelled dataset i.e. more structured dataset to learn. Using statistical methods, along with inputs from human experts on the set of features differentiating data inputs, algorithms are trained to make classifications or predictions, uncovering key insights which subsequently drive decision making. Machine Learning is leveraged to drive outcomes such as product recommendations, personalised loyalty campaigns, traffic prediction, predicting loan defaults, etc.
2. **Deep Learning (DL) & Neural Networks** – Deep Learning is a subset of Machine Learning that automates the feature extraction piece of the process, and hence doesn't necessarily require a labelled dataset. This eliminates most of the human intervention required to process the data. It can ingest unstructured data in its raw form (for example, it can ingest text, images, etc.), and then automatically determine the set of features which distinguish different categories of data. This allows to scale it in more varied ways using larger dataset. Deep Learning is used to drive advanced outcomes such as face identification, handwritten text recognition, etc.
3. **Natural Language Processing (NLP) & Natural Language Understanding (NLU)** – NLP is a subset of Artificial Intelligence tasked with enabling machines to interact using natural languages, i.e. free-form text. The domain of NLP ensures that machines can process large amounts of natural language data and derive insights and information from the same. NLU is a sub-topic of NLP that makes machine interpret the natural language, derive meaning from it, identify the context and draw insights. In NLU, algorithms are used to identify the sentiment, perform Name Entity Recognition, process semantics, etc. NLP, on the other hand, focuses on processing the text in a literal sense, while NLU focuses on extracting the context and intent. NLP is typically used to process natural language through applications such as Speech recognition (Audio Transcribing, Automatic video captioning, etc.), translation (Ex: Google Translate), Voice Assistants (Siri, Alexa, etc.)
4. **Other Advanced Data Science techniques** - This includes rule-based advanced statistical techniques, such as cluster analysis, network / graph analytics (path analysis, connectivity analysis), pattern matching, etc. that are used to predict outcomes, automate decisions and prescribe actions.. Advanced data science techniques are used for market segmentation, supply chain optimization, telecom network optimization, etc.

The AI-led analytics market is characterized by technologies that discover, visualize, and narrate important findings (such as correlations, exceptions, clusters, drivers, and predictions) in datasets, and in addition helps in predicting the outcome and forecasting as well as prescribing the solution through optimization models and model-based simulations.

AI technologies have application across the value chain of Data and Analytics — from data ingestion, Data Engineering, and data preparation to data visualisation, data modelling, predictive modelling, optimization, and simulation.

As the volume and variety of data and information continues to expand, the ability to leverage this data for actionable insights and strategic business decisions has become increasingly foundational to the success of modern businesses. However, traditional data analysis tools and processes are relatively slow, difficult to use and resource-intensive. On account of the significant increase in availability of data and information, the value proposition is shifting from the provision of core data to the generation of analytical insights to inform decision making processes and optimize workflows, across interrelated business activities. The convergence of algorithmic advances, data proliferation and increase in computing power and storage has significantly increased the use of AI, and COVID-19, which has accelerated digital adoption, has further augmented this growth.

Some representative use-cases of AI-led Advanced Analytics (across industries) are:

a. **Data Interpretation**: In today's world, where organizations monitor and analyse data from a multitude of sources, AI based data interpretation accelerates the process by matching data sources in the Data Fabric.

b. **Data Quality Assessment**: Augmented data quality platforms enhance data quality using ML techniques. These platforms leverage AI, automation, and ML to identify common attributes and patterns within the data and suggest business rules based on existing data attributes for any data set

c. **Data collection**: Usage of AI-powered solutions in data gathering, helps automate tedious manual work while also ensuring a better quality of the collected data.

d. **Intelligent Data Processing**: Computer Vision, Pattern Recognition technology, and OCR are leveraged to convert unstructured data into structured data.

e. **Data Querying**: The power of Natural Language Query (NLQ) and Natural Language Generation (NLG) takes in queries in the form of natural language, translates it into machine language, and then produces meaningful results and insights, making data analytics a two-way conversation for businesses

f. **Capacity Management**: Using AI-based, data-driven recommendations, workloads can be mapped to the right combination of servers and machines to improve the capacity of IT infrastructure while reducing operational costs

g. **Business Impact Monitoring**: AIOps enables IT teams to prioritize and address issues rapidly based on critical business impact by mapping IT systems to the business services they support and analysing impact when problems occur.

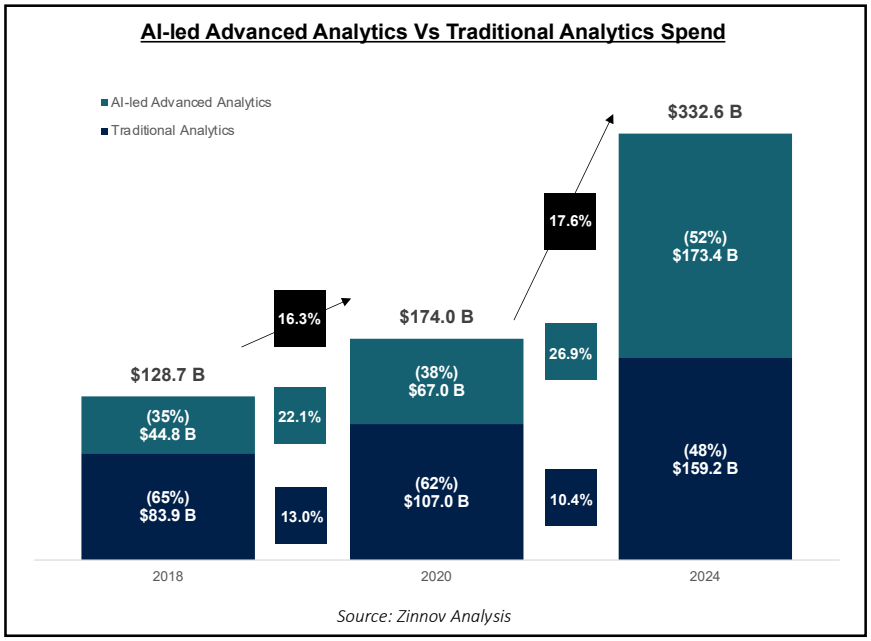
h. **Predictive Modelling:** In an age when companies place immense importance on customer experience, algorithms are being leveraged to analyse current and historical customer data, to predict and forecast demand and churn rate.

i. **Understanding of textual data using NLP:** Also referred to as Text Mining, this is a process where NLP is leveraged to transform unstructured text in documents and databases to structured data suitable for analysis.

j. **Generating insights and conveying them to business users using NLG:** After the usage of NLP to refine the unstructured data to structured data, the power of NLG is then harnessed to generate descriptions or narratives in natural language from the structured data.

k. **Automated insight generation**: Conversational AI platforms leverage ML & NLP, and intent based recommendation engines to enable personalization by generating product recommendations based on customer sentiments and history across channels

The AI-led Advanced Analytics market was ~$67 B in 2020 (~ 38% of the overall Data & Analytics market) and expected to grow at a CAGR of 26.9% to ~$173 B by 2024 (~ 52% of the overall Data & Analytics market spend). In contrast, Traditional Analytics was worth ~$107B in 2020 and expected to grow at a CAGR of 10.4% to ~$159B by 2024.



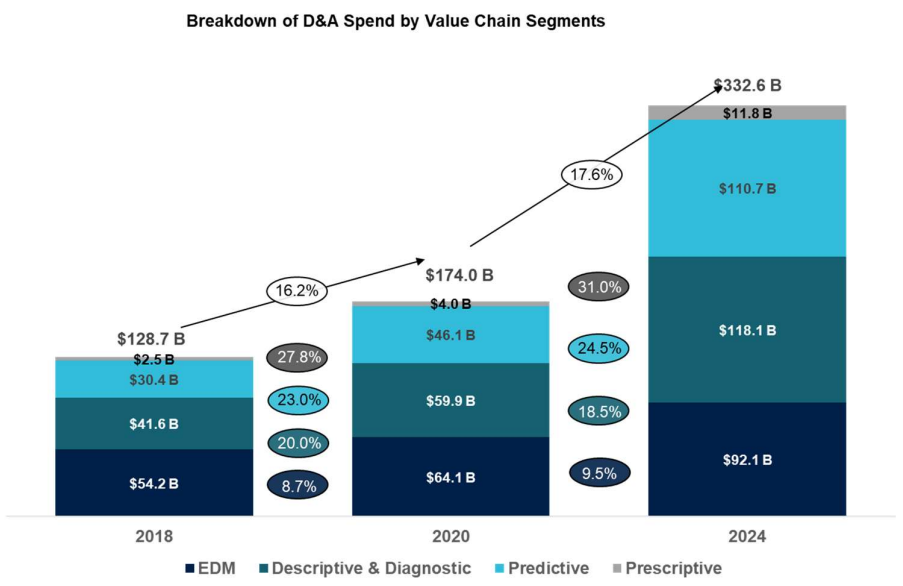
Growth of D&A market – trends, challenges and different technologies deployed; Impact of COVID 19 leading to increase in adoption and change in behaviour of enterprises

Data & Analytics spending is expected to witness robust growth driven by increased adoption of next-generation advanced analytics applications. The share of EDM and Descriptive & Diagnostic Analytics is expected to decline from ~74% of the global Data & Analytics spend in 2020 to ~63% by 2024, as spend in next generation Advanced Analytics applications in Predictive and Prescriptive will explode.

- Low-cost Cloud storage options and mature database technologies are expected to drive down the cost of enterprise data management.

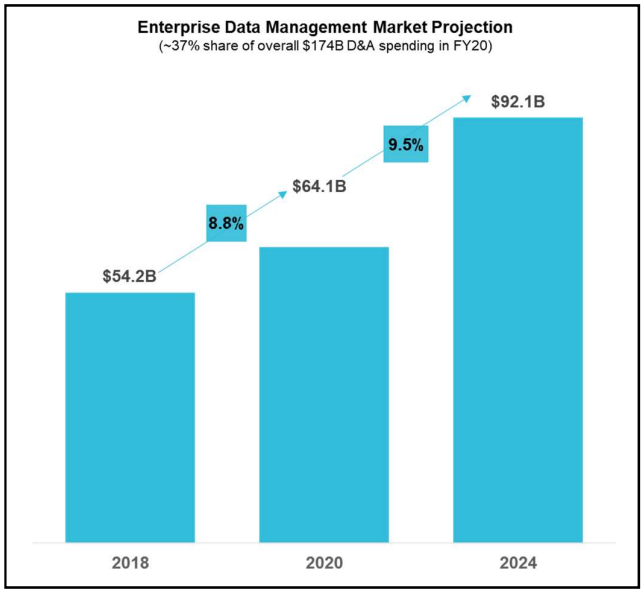
- Spend in Descriptive & Diagnostic Analytics will be augmented by an increased focus on deriving business insights from the enterprise-wide large data sets.
- Predictive Analytics will be at the forefront of estimating financial and operational risks.
- Spending on Prescriptive will grow exponentially as enterprises will leverage AI/ML techniques to optimize business decision-making across product portfolios, targeted campaigns, logistics and transport, etc.

While the use of AI is seen across the Analytics value chain, the efficiency and effectiveness of AI powered techniques over old-age statistical methods is being harnessed majorly in Predictive and Prescriptive Analytics. Extensive usage of AI for demand forecasting and monitoring is expected to drive the growth of Predictive Analytics, while AI-powered techniques to optimize operations, and obtain insights on sales/ pipeline generation and product innovation are driving the spend on Prescriptive Analytics.



Source: Zinnov Analysis

EDM will continue to be at the core of transformative Data Analytics efforts across enterprises



The global EDM spend is expected to grow from ~$ 64 B in 2020 to $ 92 B by 2024 at a CAGR of ~ 9.5%. In recent years, the growing volume of unstructured data has introduced challenges in enterprise-wide data management across industries. Moreover, the increasing number of different data sources in BFSI and CPG & Retail, owing to large product portfolio and multiple customer engagement channels, adds further complexity in data management. In response, BFSI and CPG & Retail verticals are expected to continue investment in EDM services for consolidation of unstructured data generated across different products offerings and customer channels. The TMT vertical is witnessing a great increase in Cloud-based Data Warehousing and Data Governance initiatives. Pharma is another industry which has a large amount of disparate data sources and as a result, Cloud and Data Lake solutions are being increasingly used. EDM spending in Industrial and Healthcare verticals is also expected to grow due to increased adoption of sensors and devices for smart manufacturing, and remote patient monitoring, respectively.

EDM Adoption Drivers

EDM forms the bedrock of analytics applications and will continue to be the core of any D&A effort in an enterprise. Some of the key drivers for EDM spending are:

- ***Proliferation of data*:** Growing adoption of IoT and smart devices, and increased activity in online channels such as e-Commerce, Telehealth, social media, etc., had led to high volumes of data being generated across industries. However, ~80% of this data collected is unstructured – collection of files such as media, audio, images, etc., that do not conform to typical transactional data stored in relational database systems. Consequently, enterprise spending on Data Engineering services under EDM segment is expected to grow to consolidate unstructured data across organization into a single unified repository and generate enterprise level insights.
- ***Effective management of hierarchical data:*** Organizational mandate for performance reporting and support for various forms of reporting templates across different business

units have led to increased spend in management and maintenance of master data to capture changes in cost centres, sales territories, product/account hierarchies, etc.

- ***Focus on data governance:*** Increased regulatory constraints due to globalization of the enterprise and surge in fraudulent cases across the globe have increased enterprise spending in data governance and security solutions.

EDM Key Trends

Rapid adoption of IoT, sensors, and wearables, and a continuous stream of customer data generated across different product offerings and engagement channels has increased the complexity of data management. Moreover, social distancing and stay-at-home mandates during COVID-19 led to increased online activity and the demand for contactless payment and healthcare services, resulting in an explosion of data across industries. Consequently, advanced technologies and new methodologies are being adopted to streamline data management processes while low-cost as-a-service database offerings are gaining momentum. A few emerging trends in EDM services include:

- Adoption of Cloud deployment model due to high on-demand scalability and low-cost storage resources.
- Implementation of new age distributed ledger systems enable enterprises to maintain more secure transaction records, asset tracking, and audit trails.
- Implementation of Data Fabric, which provides platform-agnostic pre-built packages for seamless integration of data across multiple endpoints.

AI-specific trends in EDM

- Integration of AI & ML with traditional master data management to augment data preparation tasks.
- Implementation of Data Ops, which combines agile software development principle with continuous delivery and deployment principles of DevOps to bring speed and agility in data factory development. As part of DataOps, AIOps supports continuous integration and deployment for the core tech functions of Machine Learning and Big Data.
- Implementation of AI and ML powered Augmented Data Quality Platforms to enhance quality of data and identify common attributes and patterns within the data.

> EDM in Action

Leading Electronics Component Manufacturer

Leveraged algorithmic approaches to find patterns in the data before implementing a **Cloud-based EDM Solution**

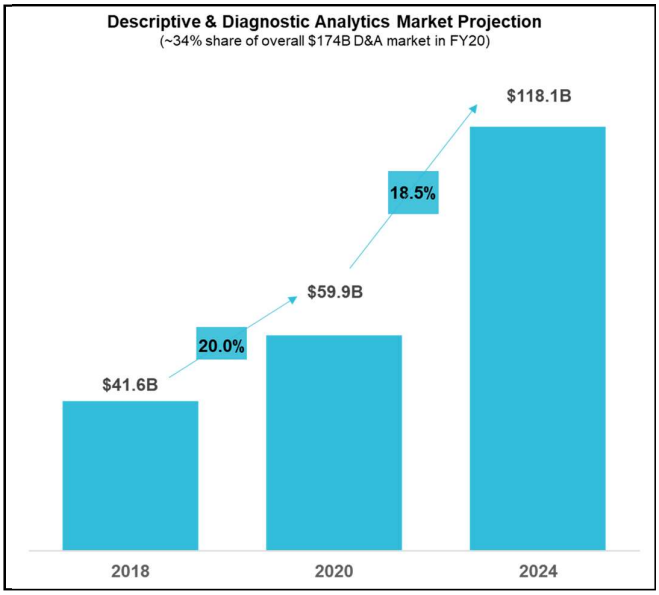
Leading Retailer in UK

Implemented a **Customer Data Platform (CDP) Solution** to segment its database, which helped improve customer personalization

Leading Pharmaceutical Company in North America

Leveraged **DataOps** to reduce manual data processing workload

Growth of Descriptive & Diagnostic Analytics will come from increased enterprise focus on deriving actionable insights from large data sets



Global Descriptive & Diagnostic Analytics spend is estimated to grow rapidly at ~19% and double from 2020 to 2024. Both CPG & Retail and BFSI verticals are driving the spend in Descriptive & Diagnostic Analytics. Increased commoditization of product offering in CPG & Retail and BFSI has led to growing emphasis on product differentiation and improved user experience for customer retention. While TMT companies are using dashboards and visualizations extensively for sales and customer service, the usage of Embedded Analytics to integrate visualization and data exploration within business applications is also on the rise. Enterprises in these industries are increasingly leveraging in-built dashboard and drill-down capabilities of Descriptive & Diagnostic Analytics to create an integrated view of customer journey across multiple channels and uncover insights to influence retention strategy and provide unique user experience.

Descriptive & Diagnostic Analytics Key Drivers

Descriptive & Diagnostic Analytics provide insights on past business events using historical data and leverage visual tools to present findings with additional data exploration capabilities. Spend in Descriptive & Diagnostic Analytics services are driven by:

- Increased adoption of operational risk dashboards across industries to track a set of KPIs and relevant metrics to measure business performance.
- Demand for refining marketing and promotional messages based on historical data of consumer spend.
- Use of data visualization with real-time map APIs by government and Healthcare sector to track infections.

Descriptive & Diagnostics Analytics Key Trends

There has been an increased focus on Descriptive & Diagnostics Analytics to augment user interaction with visual analytics. Advanced technologies like Augmented Reality, sentiment analysis, etc., are embedded in analytics applications to enhance user interaction with

visualization tools. Some of the key trends finding traction in Descriptive & Diagnostics Analytics are:

- Use of data exploration tools that support drill down and data discovery for finding the root cause.
- Integration with social media tools and sentiment analysis to identify the impact of promotional campaigns and understand unmet consumer needs
- Integration with survey data, and secondary research to gleam insights
- Implementation of Business Intelligence (BI) dashboards, such as Tableau and Power BI supported descriptive dashboards

AI-specific trends in Descriptive & Diagnostics Analytics

- Use of VR (Virtual Reality) technologies to create models, maps, graphs, etc., allowing users to interact with data.
- Implementation of ML algorithms to analyse large datasets to provide descriptive insights to business users.
- Use of NLP and NLQ to provide diagnostic solutions to customer problems.

Descriptive & Diagnostic Analytics in Action

Commercial weather forecasting company in North America

Used google analytics to generate **10% more traffic** and **80% open rate** in weather forecast email service

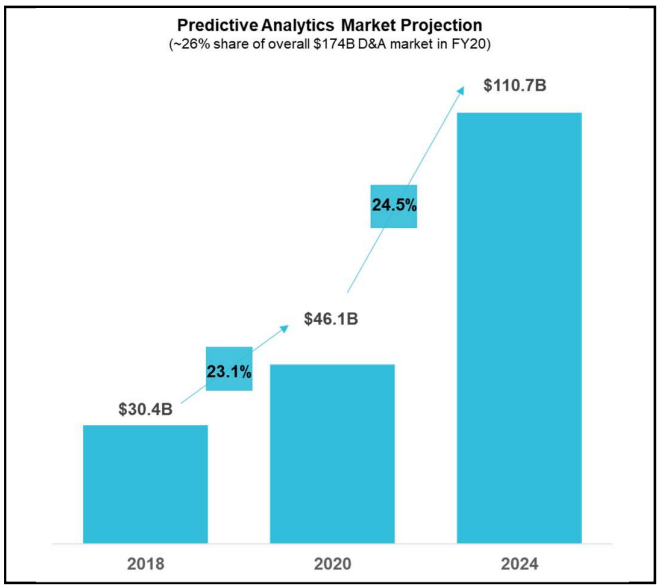
Global Manufacturer of computer equipment & peripherals

Created flexible sales dashboard that can be adapted for ad-hoc analysis, achieving **95% efficiency**

Global provider of Engineering & Construction solutions

Implemented Tableau to save **10K+ man hours** per year across **14 business units**

Predictive Analytics spend will be driven by the increasing demand for forecasting and planning multiple business scenarios



Predictive Analytics uses advanced algorithms to predict the future using historical data and trends. Global Predictive Analytics spend is estimated to expand rapidly from ~$46 B in 2020 to ~$111 B in 2024, at a CAGR of 24.5%. As enterprises across industries emerge from the ravages of COVID-19, emphasis is clearly on building resilience to withstand any future business disruption. Consequently, use of Predictive Analytics is gaining momentum across industries such as in Manufacturing, TMT, Life Sciences, CPG & Retail, and BFSI. The growing need to forecast demand to prevent stock-outs, and minimize production downtime due to machine failure, etc. has led to increased adoption of Predictive Analytics in Industrial and CPG & Retail verticals. In BFSI, Predictive Analytics with advanced ML algorithms are used to combat a surge in fraudulent transactions in credit cards, account opening, etc. The TMT industry is using Predictive Analytics extensively across its sales functions to expand new channels for revenue scaling. The use of AI-led Predictive Monitoring by Semiconductor companies to proactively track equipment failure and plan maintenance schedules is on the rise. With the focus on customer being paramount, the usage of predictive analytics techniques to identify evolving customer needs in the consumer internet space is on the rise. Enterprises are using D&A to analyse customer data such as product usage and customer support interactions to predict customer loyalty and attrition levels. Consumer Internet companies are leveraging AI-based predictive analytics techniques to redesign their sales and marketing programs to reduce customer churn. The power of AI-led Prediction is being leveraged by Pharmaceutical companies to understand and monitor the impact of the input parameters on final quality. Usage of Predictive techniques to fasten the process of drug discovery and demand forecasting are also driving the spend in the Pharmaceutical industry.

Predictive Analytics Adoption Drivers

Predictive Analytics is one such arsenal that enterprises can use extensively to identify future business challenges and minimize business as well as operational risks. Some of the key adoption drivers across industries include:

- Growing need to predict demand, inventory stock-outs, machine maintenance, etc., to reduce downtime.

- Adoption of predictive credit risk models and fraud analytics in response to a surge in fraudulent activities in BFSI.
- Increased use in Healthcare to predict patients who are at greater risks of developing chronic conditions.
- Rapid surge in e-commerce and the ever-growing need to predict and deliver hyper-personalised experiences for customers/ buyers for increased conversion rates.

Predictive Analytics Key Trends

Some of the key trends finding traction in Predictive Analytics include:

- A wider scope of the kind of data being analysed such as inclusion of text analytics to enhance predictions.
- Implementation of traditional statistical techniques to predict potential sales for a product.
- Ease of use by hiding complexity in model building via simple user interfaces for wider adoption.

AI-specific trends in Predictive Analytics

- Use of neural networks to identify relationships within data sets by mimicking mind.
- Implementation of algorithms to analyse customer feedback and predict churn rate.
- Implementation of AI powered techniques for predictive monitoring across the Supply Chain.

Predictive Analytics in Action

Ingredient-and-recipe meal kit service provider in North America

Forecasted demand based on changes in subscriber taste and preferences over time

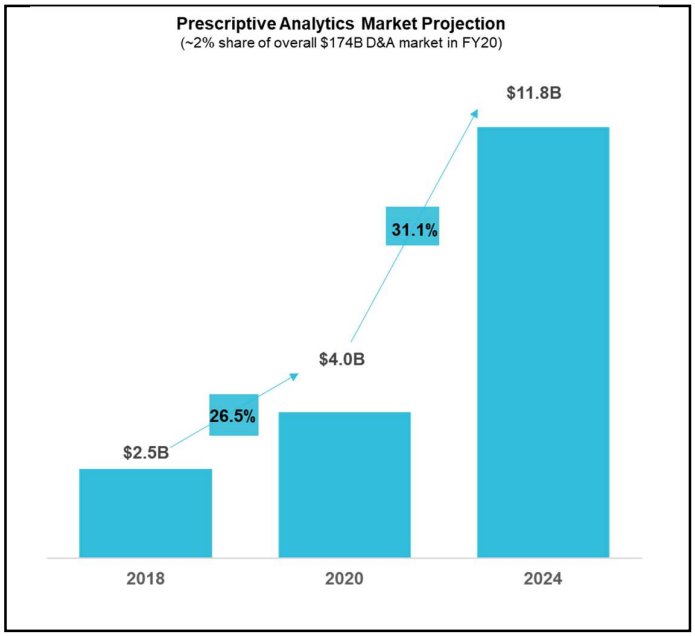
Not-for-profit Healthcare provider in North America

Integrated predictive algorithm with remote patient monitoring feed **to identify high risk patients**.

North America Headquartered Global E-Commerce Company

Created a **forecasting model** using data from prior activity, time on site, duration of views, links clicked and hovered over, shopping cart activity and wish lists to predict customer needs

Prescriptive Analytics pie is expected to grow rapidly as enterprises shift the spotlight on data-driven decision support systems



The global Prescriptive Analytics spend is expected to grow from ~$4 B in 2020 to $12 B in 2024. Prescriptive Analytics will enable enterprises to take data driven business decisions, optimizing ROI on advertising and marketing spend. Industries plagued by lower net profit margin, such as CPG & Retail (grocery, food, etc.), General Insurance, Transportation, etc. will drive the growing spend on Predictive Analytics.

Prescriptive Analytics Adoption Drivers

Prescriptive Analytics leverages a combination of advanced ML models and complex statistical techniques to support business decision-making. While Prescriptive Analytics continue to be a rather complex and advanced application of analytics, adoption across industries is being driven by:

- Improved decision-making support for enterprises to proactively shape desired outcomes.
- Growing need to optimize marketing spend, pricing, transport, tracking location, etc., to maximize ROI.
- Availability of high-speed processing and storage resources at low cost, reducing investment barriers.

Prescriptive Analytics Key Trends

The key trends that are expected to find traction as the adoption of Prescriptive Analytics continues to expand are:

- Implementation of traditional statistical techniques to provide prescriptive insights to business users.
- Implementation of Analytics to analyse historical data and to improve routing efficiency in logistics.
- Use of Analytics to enable prescriptive recommendation to help business users understand customer preferences.

AI-specific trends in Prescriptive Analytics

- Use of algorithms that will recalibrate the model mechanics in response to newly available information.
- 'Smart' prescriptive algorithms that personalize consumer experience on digital channels.
- Use of Cognitive Intelligence and AI for emerging use-cases like assisted driving.

Prescriptive Analytics in Action

Leading Shipping & Receiving company in North America	Global Power & Renewable Energy company	Leading Media & Technology company in North America
Used analytics to give their drivers **correct routing information** to save time and cost	Leveraged Analytics to develop application for **automated job scheduling** and routing capabilities	Used prescriptive analytics to identify contents that its reader will find **relevant** and **engaging**

Overall, D&A is expected to be at the core of driving critical use-cases across industries

- ***Segmentation Analysis***

Descriptive & Diagnostic Analytics can facilitate segmentation of customers based on service history, attitudinal data through market research, demographics, frequency, or recency of buying patterns, channels served and others. Broad application exists across industries to identify customer lifetime value and churn analysis.

- ***Sentiment Analysis***

Descriptive Analytics with Text Mining and NLP (Natural Language Processing) will help analyse customer and employee sentiment on various platforms, market research data or social media channels. It also has broad applications in different industries in analysis of Voice of Customer, Brand Monitoring, Customer Support, etc.

- ***Demand Forecasting***

Predictive Analytics to forecast demand based on historical data of consumer buying patterns, social media posts, price sensitivity, etc. It also has broad applications across industries to predict sales and plan for inventory stock-outs, etc.

- ***Predictive Pricing***

Predictive Analytics to help evaluate the potential impact of sales promotions and identify the right pricing point. It is used extensively in the CPG & Retail industry.

- ***Predictive Maintenance***

ML-based algorithms can help identify patterns across all sensors and building multivariate prediction models to detect the probability of equipment failure. It is used in Industrial and Manufacturing verticals to predict machine maintenance.

- ***Fraud Analytics***

Predictive Analytics with pre-trained algorithms and correlation to find the probability of fraud in transactions like credit cards, account opening, etc. It is used extensively by BFSI industry and healthcare providers and payers to detect and prevent fraud.

- ***Warranty Analytics***

A combination of Predictive Analytics with text mining can be used to forecast product reliability issues and minimize costs in warranty claims and frauds. It is leveraged across Automobile, Electronics & Semiconductor, Industrial and Telecom industries.

- ***Product Assortment***

Prescriptive Analytics optimize product portfolios and identify optimal product assortment to maximize ROI. CPG & Retail and Telecom industries primarily use this type of analytics.

- ***Decision Optimization***

Prescriptive Analytics with advanced mathematical models build scenario modelling for business problems and find optimal solutions. It is used across different industries to optimize marketing spend, warehouse transport, inventory planning, etc.

- ***Brand Equity***

While the understanding of market research data is important, the advent of social media has given consumers the ability to influence brand equity, immensely. Predictive & Prescriptive analytics techniques to understand the contribution of a multitude of factors while trying to enhance the brand equity of companies, are finding increased traction.

- **Competitive Intelligence**

Competitor monitoring programs are set in dynamic business environments that often require generating insights through innovative approaches to drive informed decisions. Descriptive and Diagnostic analytics techniques which analyse a combination of internal and external data to obtain competitive insights on the voice of consumer and customer satisfaction are finding increased traction.

- **Customer Experience**

Customer Experience Analytics is the collection and assessment of customer data – such as customer chat data, data from call centres, data from social media and customer surveys. This allows companies to make data-driven decisions on how to improve offering from first contact to customer service and discover roadblocks their customers may be facing.

D&A challenges can be mitigated when enterprises start focusing on driving centralized efforts

With the advent of high-powered computing capabilities and access to vast amounts of consumer data, enterprises are now able to harness the power of D&A for advantages against their competitors. However, a significant portion of enterprises across industries are yet to leverage the full potential of analytics. For example, in the Retail/CPG sector, which accounts for ~31% of the overall DA spend, only 40% of the companies are generating an enterprise-wide impact while others are still working on pilot projects. Significant challenges still exist that hamper the integration and management of high volumes of data isolated across various business units into a single unified view for decision making.

Key Challenges	Description
Data Explosion	• The volume and diversity of data being generated is growing at a rapid pace (~2.3 trillion GB per day) • Data is generated from various trusted & untrusted sources, adding to further complexity in data management & compliance
Data Engineering and Pipeline Management	• As the volume of both structure & unstructured[1] data increases, the process of data discovery & unearthing insights becomes critical • Moreover, data is generated from heterogenous sources with different formats, increasing challenges in data integration and collation • Data pipeline creation, management & maintenance are also complicated task that must deal with batch & incremental loads of data
Data Silos	• Organization silos in industries such as BFSI and Retail impede adoption of data centralization leading to challenges in scaling analytics applications • Customers today move seamlessly between online & off-line platforms leading to isolated customer data across channels
Legacy Infrastructure	• In most sectors, core systems still rely on legacy components that are expensive to maintain, and not suited for handling Big Data • Moreover, migration from legacy system is costly and carry significant risk of business disruption
Lack of Talent	• Large gap between demand & supply for analytics talent at all levels. • Entry level positions are as challenging to fill in as those are at the senior levels • Moreover, sector specific knowledge need to be contextualized, requiring investment in re-training existing managers & supervisors

Note: 1. Unstructured data refers to data that do not conform to traditional Relational database management and contains multitude of different formats collected from number of sources like, Sensors, machines, IoT, etc.

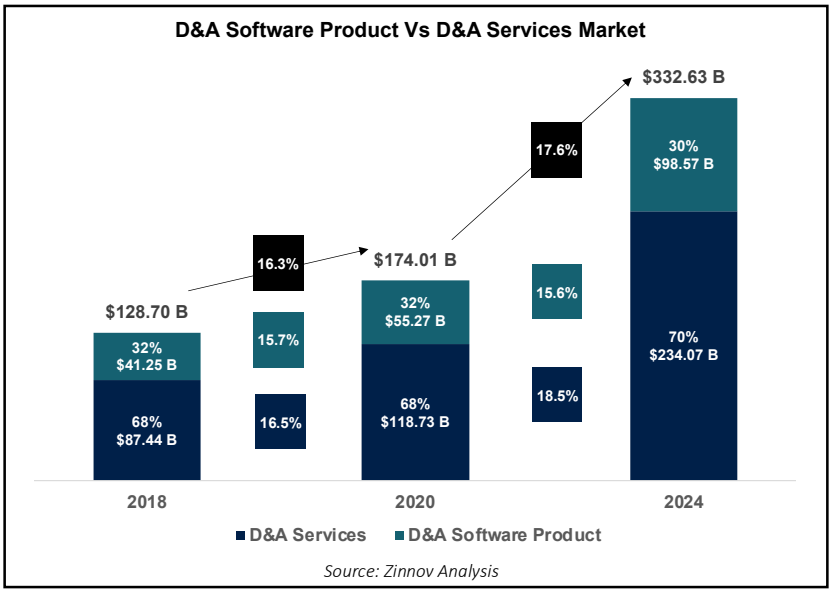
Services spend on D&A is expected to grow at a CAGR of ~18.5% (2020 – 2024)

D&A product spend corresponds to the spend by companies towards acquisition of licenses of D&A products, platforms, and tools. On the other hand, D&A service spend by the enterprises corresponds to people cost associated with building Data & Analytics applications in-house as well as the spend corresponding to outsourced Data & Analytics work to Service Providers. Various factors are driving the spend on D&A products – including the growing focus on digital transformation, rising adoption of AI/ML technologies, and continued acceleration in the adoption of Cloud Computing. D&A Software spend consist of spend towards the following software/ platform category:

- *Analytic Data Management Platforms* that include relational data warehouse management software, non-relational analytic data applications, continuous analytics software, and analytic data integration & integrity software. For example, Amazon Redshift, Databricks Lakehouse Platform, Snowflake, Google BigQuery, Apache Hive, SAP BW, Microsoft Azure SQL etc.
- *Business Intelligence and Analytics Software* that include end-user query, reporting, and analysis software, predictive analytics software, spatial and location information analytics software, and AI software platforms such as cognitive software platform, intelligent knowledge discovery software, and content analytics software
- *Enterprise Performance Management and Analytic Applications* that include Enterprise Performance Management (EPM) applications and analytic applications related to Customer Relationship Management (CRM), production planning, services operations, supply chain, product management and workforce management

D&A service spend by the enterprise companies corresponds to people cost associated with building data & analytics applications in-house, and having people who can interpret the results as well as the spend corresponding to outsourced data & analytics work to service providers.

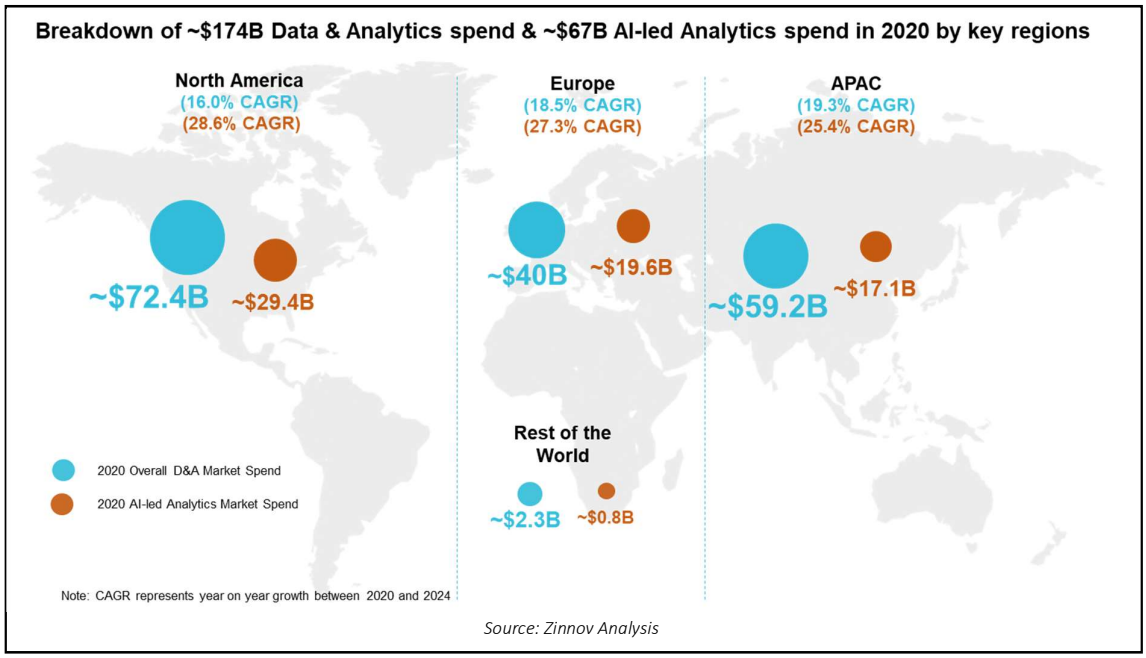
The D&A Software product market was worth ~$55 B in 2020 (~ 32% of the overall Data & Analytics market) and is expected to grow at a CAGR of 15.6% to ~$99 B by 2024. In contrast, D&A Services market was worth ~$119 B in 2020 and expected to grow at a CAGR of 18.5% to ~$234 B by 2024.



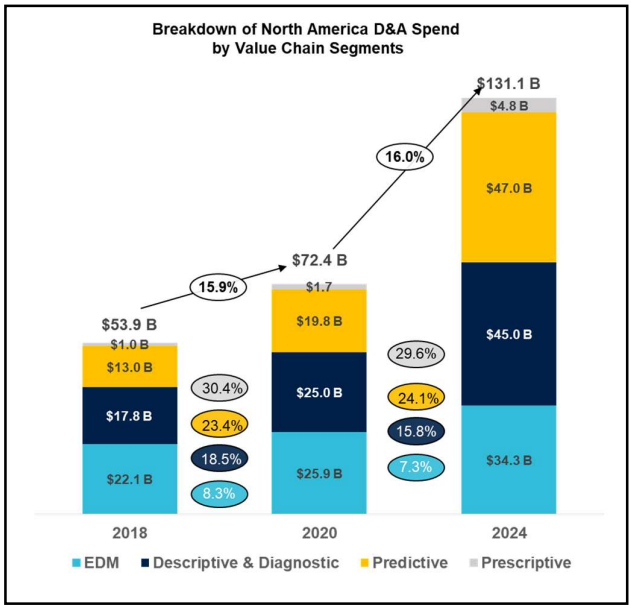
As D&A products and platforms mature, they are expected to have increased efficiencies and reduction of Total Cost of Ownership (TCO) for customers. The specialized nature of the D&A workstreams coupled with the talent crunch currently being experienced in the market will lead to an increase in the services spend in the next 4 years. As a result, the services spend growth rate is expected to outpace the spend of products between 2020 and 2024

D&A Geo-Split – while North America will continue to account for the largest market share of Data & Analytics and AI-led Analytics Spend, APAC is quickly emerging as a growing market

Growing adoption of IoT (Internet of Things) and smart devices, increased use of mature technologies like AI and ML, and the availability of subscription-based low-cost storage solutions are some of the common D&A adoption drivers across the globe.

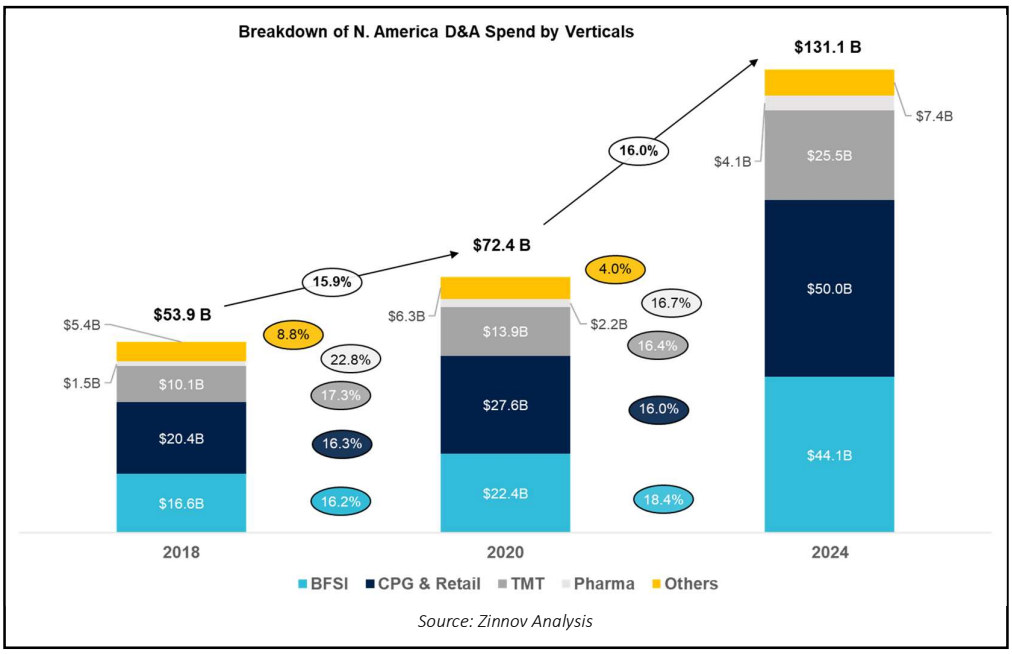


North America



North America accounts for the largest share (~40%) of the global D&A spend, with top three verticals – CPG (Consumer Packed Goods) & Retail, BFSI, and TMT – contributing to more than 88% of the overall D&A spend in the region. The Overall Analytics market in North America has been growing at a CAGR of 16.0% over the last few years. Like most other developed markets, US & Canada are facing a significant shortage of Analytics talent. COVID has accelerated the demand for Analytics traditional sectors such as Retail, Banking, and Insurance have significantly accelerated their investment in digital transformation.

Traditional Analytics - EDM and Descriptive & Diagnostic Analytics - will continue to be the large spend areas in the region. However, the Predictive and Prescriptive Analytics pie is expected to grow rapidly by 2024, due to advent of Advanced AI-led Analytics techniques which offer enormous potential to transform the industry.

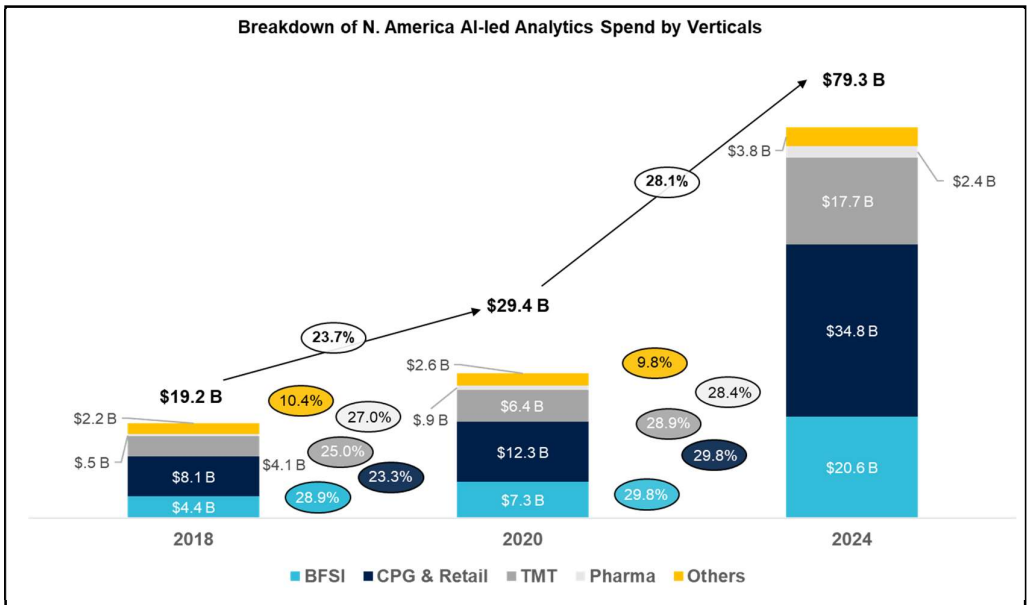


Source: Zinnov Analysis

Double-digit growth[1] (~30%) in fraudulent transactions across Retail and Banking industries in North America has led to increased spending on Risk Analytics applications – leading to North America contributing ~38.5% of the global spend on Risk Analytics[2]. With almost half of US consumers showing willingness to try out new brands[3], CPG & Retail brands are ramping up their investments in Customer Analytics to re-align product and consumer strategies to drive competitive differentiation.

Being the early adopter of cutting-edge solutions, the TMT sector in North America is the third largest contributor to the regional D&A spend. As the Software & Internet industry is moving towards a subscription-based service model, Independent Software Vendors (ISVs) are leveraging D&A and access to large volumes of customer data to influence product development, sales planning, and customer service experience management. Moreover, D&A services like operation intelligence are consumed internally to streamline infrastructure operations. Consumer electronic companies are leveraging the vast amounts of consumer data to achieve efficiency and lower costs, while enhancing the customer experience. The Telecom and Media & Entertainment industry leaders are driving innovation by increasing their spend on Predictive Analytics and taking a data-driven approach to process optimization.

In 2020, the U.S. pharmaceutical market generated around 48% of the global market's sales[4]. The country's large market share coupled with the introduction of the Affordable Care Act (in the US) has completely altered the regulatory framework, scrutiny, and reimbursing based on health outcomes. As a result, the companies in the US are spending big on analytics solutions to not only tackle the regulatory challenges but also in early-stage drug development, analysis of adverse incidents and reporting in clinical trials, revenue forecasting and prediction of health outcomes.



Source: Zinnov Analysis

North America currently accounts for ~44% of the Global AI-led Analytics spend and the top industries – BFSI, CPG & Retail and TMT segments account for ~88% of the spend.

The adequate availability of the supporting infrastructure required for the implementation of Advanced AI-led Analytics techniques, coupled with the high volumes of data generated

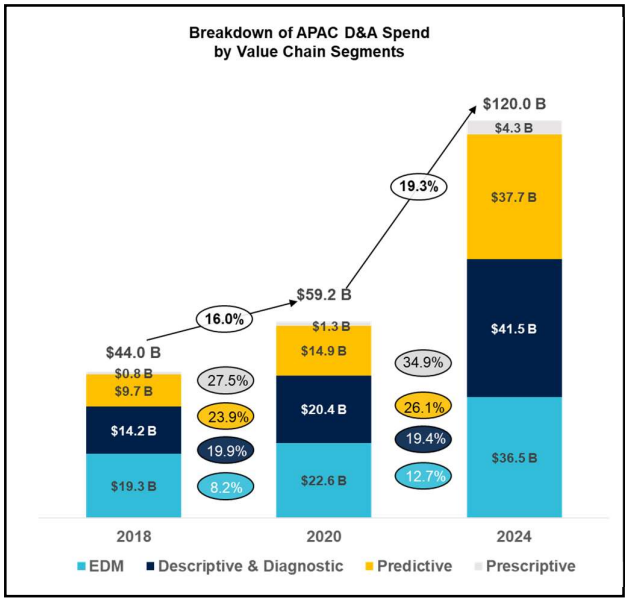
within the continent makes North America, the biggest spender on AI-led Analytics. BFSI companies are leveraging AI-led Analytics to mitigate frauds, optimize processes followed by the bank, and to manage risks. While the emergence of social networking has resulted in a flood of information for e-Commerce companies, traditional analytics techniques fail to make the most of this unstructured data. Hence, advanced AI-led Analytics techniques are being preferred to uncover patterns.

Product feature optimization enabled by AI-powered Predictive Analytics techniques is attracting attention of the industry leading technology players of the continent. Leading Telecom and Media & Entertainment players are using AI & ML models to monitor operations, while Pharma companies in the region are using AI-powered techniques to scrape through the internet to capture safety-related information, given the importance of regulation in the industry. Further, the usage of AI-led Analytics techniques to improve clinical trials, drug research, drug recommendation is widely observed.

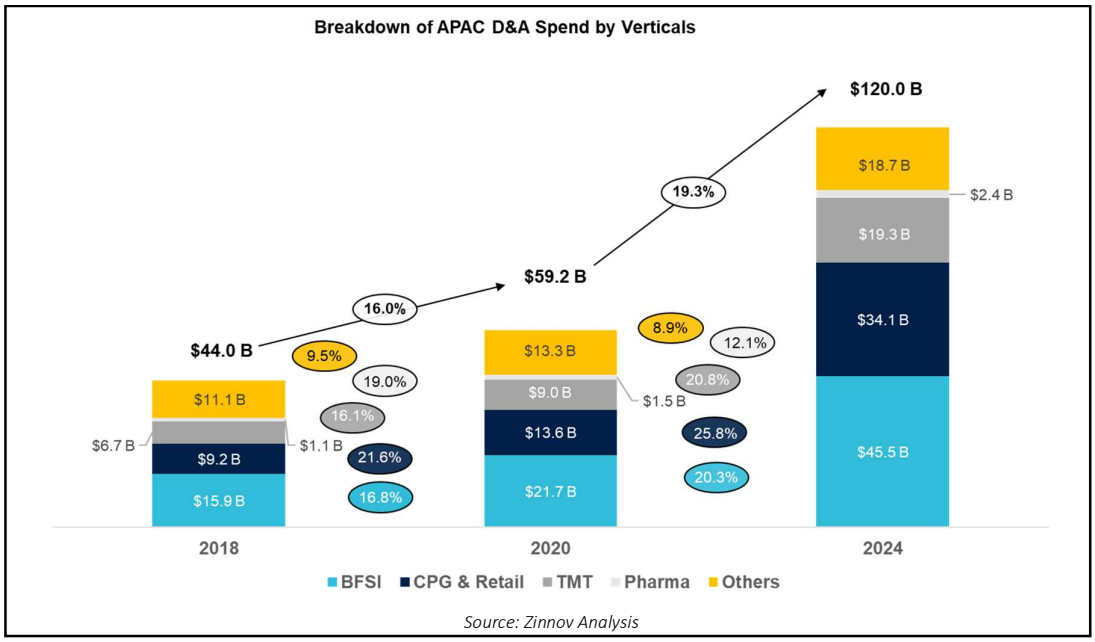
APAC

APAC accounts for the second highest share (~34%) of the global D&A spend. The top three verticals – BFSI, CPG & Retail, and TMT – account for ~75% of the regional D&A spend. China accounts for the largest market share of D&A spend; while India, Japan, and Singapore are the other major spenders in APAC.

Rapid digitization and the growth of consumerism in APAC have led to a surge in consumer data volume across industries, and hence, enterprise spending in EDM services is expected to grow. Access to large volumes of customer data and growing digital commerce activities have led to increased spend on Prescriptive Analytics by marketing and sales teams across industries to identify optimal marketing strategies, devise precise campaign messages, etc.

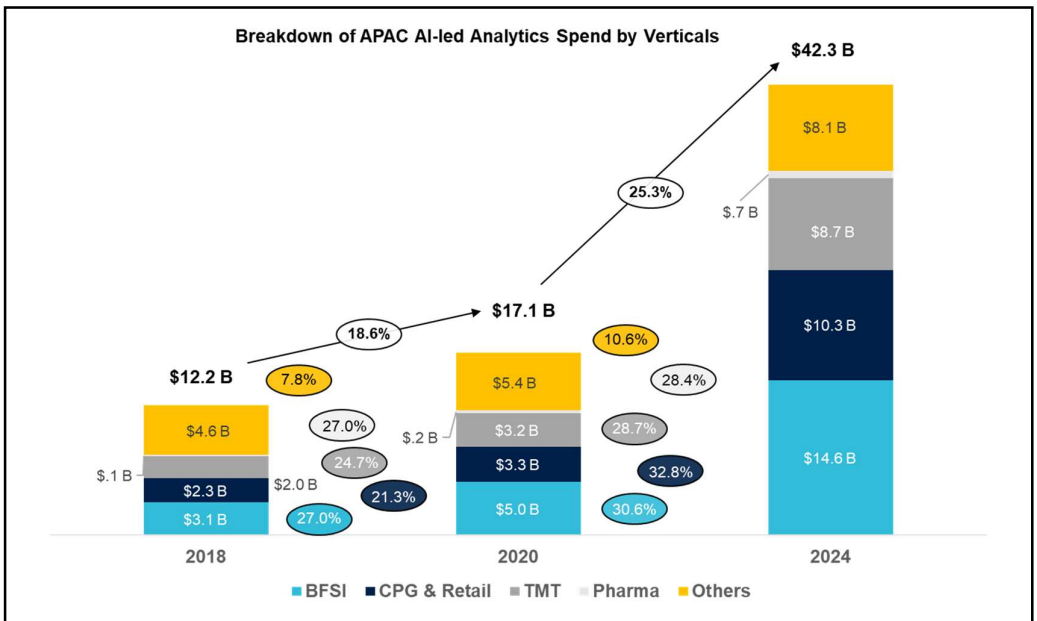


New government-led initiatives, increased regulatory mandates, and growing adoption of analytics in Banking and Healthcare industries are driving the spend in the region. Spending on Customer Analytics in APAC is also expected to grow (~21%[5]), as enterprises are leveraging analytics to understand customer behaviour and preferences to provide differentiated customer experience in otherwise commoditized industries, such as Retail and Banking.



Source: Zinnov Analysis

Industry-leading Semiconductor companies in the region are making big investments on the setup of rigid data governance to clean the vast amounts of unstructured data related to manufacturing, which is then used to optimize their production and workforce. The impact of the pandemic was severe on the supply chain of the industry. But the recovery has been swift and Semiconductor companies are adopting Cloud-based analytics to manage the large amounts of critical data generated during the manufacturing processes and drive real-time insights to improve efficiencies. Mobile data traffic in APAC is expected to increase by seven-fold[6] between 2019 to 2023, due to high penetration of smartphones and mobile devices. Consequently, telecom operators are expected to increase investments in D&A to optimize internal operations, improve customer experience, and monetize subscriber data to other verticals.



Source: Zinnov Analysis

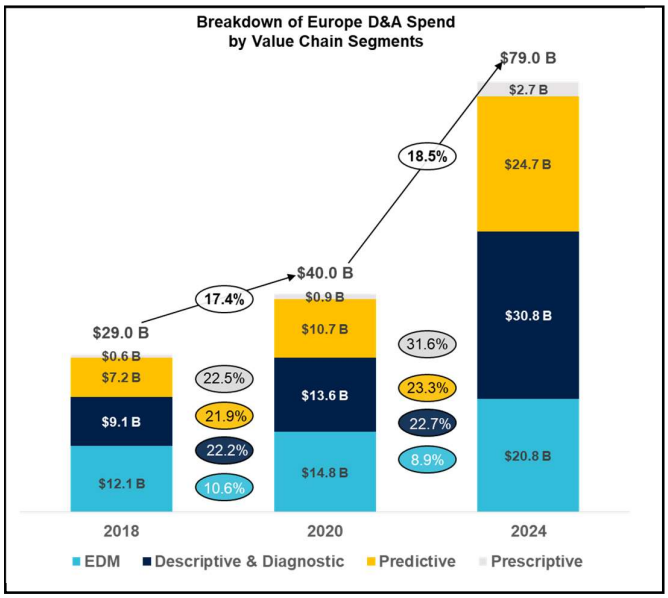
APAC currently contributes to ~25% of the global spend on AI-led Analytics techniques and the top industries – BFSI, CPG & Retail and TMT segments contribute to ~67% of the spend. Increased regulatory focus on fraud management in APAC has led to growing adoption of Fraud & Risk Analytics applications, with the region leading the growth (~16%[7]) in global Risk Analytics spend. The APAC region is expected to see an uptick in digital fraud incidents, and AI-led Analytics techniques are expected to see increased adoption to proactively prevent these events.

The adoption of AI-led Analytics in APAC is expected to develop at a rapid pace due to the region's expanding e-Commerce and retail industries. The rise in the e-Commerce industry in nations like Malaysia, China, Singapore, India, and Japan has contributed to the rising demand for AI-powered predictive analytics over the forecast period.

Governments in India and Singapore are expected to increase spending in D&A to drive their digital transformation programs. For example, the Government of India recently announced plans to use a combination of Advanced Analytics with Text Mining to aid in regulatory filing, track tax evasions, and support natural language translation for major regional languages to dispense policy and government-related information. Similarly, GovTech, the government technology agency of Singapore, is planning to build central platforms to support common use-cases in Video Analytics, Fraud Analytics, and Natural Language Processing (NLP) across different public agencies to lower cost [8].

Europe

Europe accounts for ~23% of the global D&A spend. The top 3 industries – BFSI, CPG/Retail, and TMT segments account for ~73% of the overall spend in the continent. Complexity of the data and diverse language preference for logging the data in the system have created hurdles for data access and analysis in the European continent. However, the increased investments in data management by public and private institutions are enabling accelerated adoption of Data & Analytics across the continent.



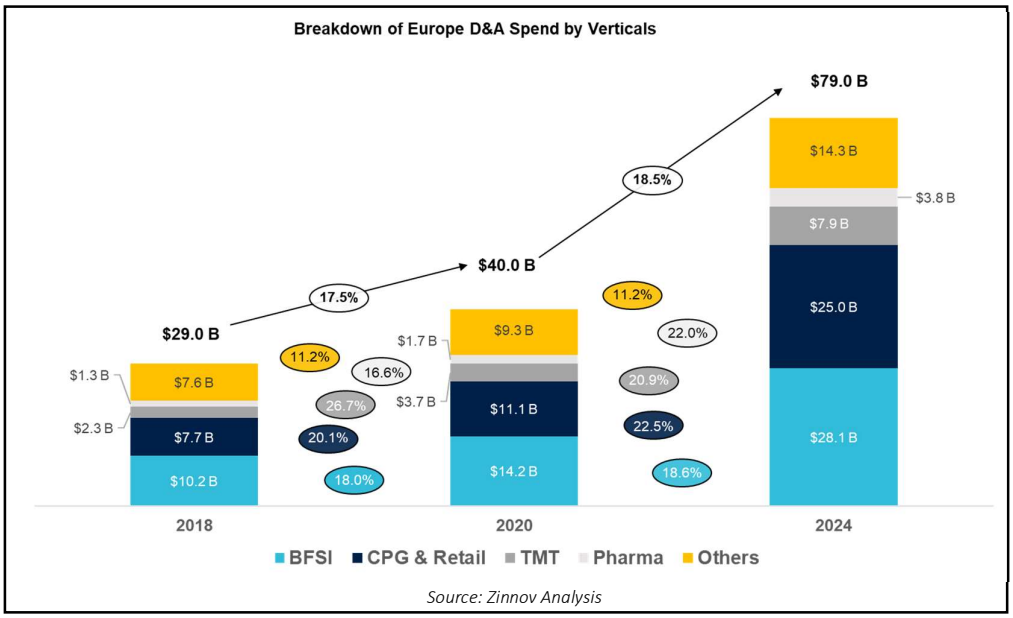
The rise in the amounts of data generated coupled with the diverse nature of the data generated in the continent is expected to ensure that the EDM spend accounts for a substantial amount.

CRM analytics, Collection analytics, customer relations, fraud detection, direct marketing, retail analytics, risk management are some of the use cases where the Predictive Analytics techniques are being widely applied in the region. The need to structure complex data that is essential for the company and technological development act as the major driving force for the widespread adoption of Predictive Analytics in the region

The growing need for real-time Data Analytics and Decision Making, the rapidly changing business environments and the increasing focus on data from asset management firms are driving the BFSI spend in Europe.

The rapid growth of e-Commerce in the continent has led to a surge in volumes of customer data. Subsequently, enterprises are leveraging D&A to uncover insights on consumer spending patterns and buying behaviours to make informed decisions on their product and marketing strategies.

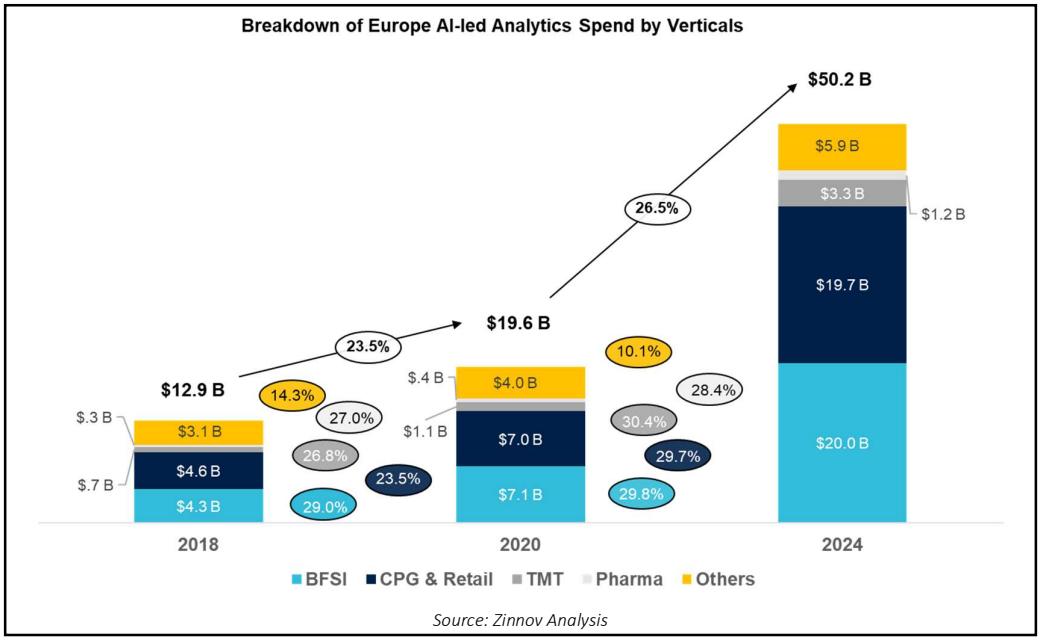
In 2020, Pharmaceutical and Biotech companies in Europe increased spending on D&A services to accelerate development of therapeutic drugs and vaccines for COVID-19. This is expected to continue with constant support from governments to further R&D activities. Additionally, the usage of AI-led analytics method is expected to optimize drug discovery and development apart from getting insights on end users' behaviour, response to marketing campaigns, product performance, and upcoming industry trends.



Source: Zinnov Analysis

Europe currently accounts for ~29% of the Global Spend on AI-led Analytics where the top industries – BFSI, CPG/Retail & TMT segments account for ~78% of the AI-led Analytics spend in the continent.

The e-Commerce market in Europe is expected to grow by 30% in 2021, with almost half a billion customers shopping online. The stay-at-home mandates have also accelerated adoption of digital banking channels. Consequently, enterprises in these industries are leveraging customer data using AI-led Analytics techniques to make informed decisions on optimal product strategy, marketing messages, channel investment strategy, etc.



Source: Zinnov Analysis

The onset of COVID-19 had a significant impact on the Manufacturing sector in the UK and Germany owing to supply chain uncertainties. Enterprises are now accelerating their investments in D&A to improve visibility on supply chain operations and predict demand to minimize losses due to disruptive events in the future.

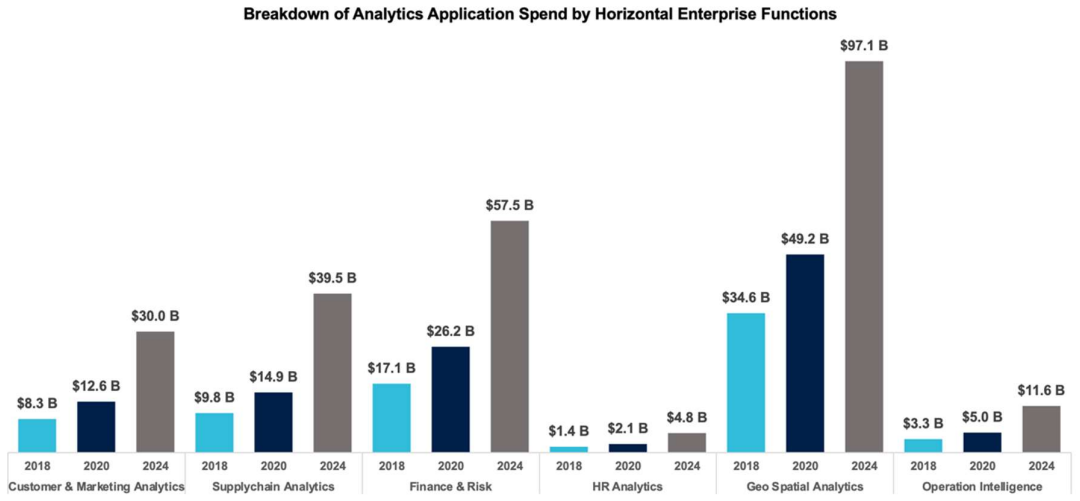
RoW

RoW, which constitutes MENA (Middle-East & North Africa), Rest of Africa and LATAM (South America, Mexico, Central America, and the islands of the Caribbean), accounts for less than 1.5% of the global D&A spend. In RoW, 55% of the overall spend comes from MENA while 40% comes from LATAM. The top 3 industry segments – Industrial (oil & gas, mining, aerospace, etc.), CPG & Retail, and Pharma account for ~ 55% of the overall spend in RoW. In MENA, Pharma companies are leveraging D&A to support the process of drug discovery and speed up clinical trials, while Oil & Gas Producers are leveraging advanced algorithms to manage energy consumption, flare emissions, and crude quality. In LATAM, while Industrial companies (mining, etc.) are heavy D&A spenders, Retail companies are also investing on Analytics Labs to prioritise product quality and customer requirements. Telecom companies in LATAM are leveraging D&A for customer value management and to enable a consistent, seamless and personal experience for their customers across all touchpoints and channels.

***Glossary*:**

1. *2020 True cost of Fraud report by LexisNexis Risk Solutions*
2. *Risk Analytics Market Analysis by Reports & Data*
3. News article published in Digital Commerce 360 - “US ecommerce grows 32.4% in 2020” (Jan 29, 2021)
4. *Global Pharma Sales by Statista*
5. *Customer Journey Analytics Market Analysis by Report & Data*
6. *6 ways extreme analytics will transform APAC telcos by Telecomasia.net*
7. *Industrial production and capacity utilization report by Federal Government*
8. *Increased ICT spending in FY2021 to accelerate government digitization by GovTech Singapore*

D&A Applications spend across Horizontal Enterprise functions

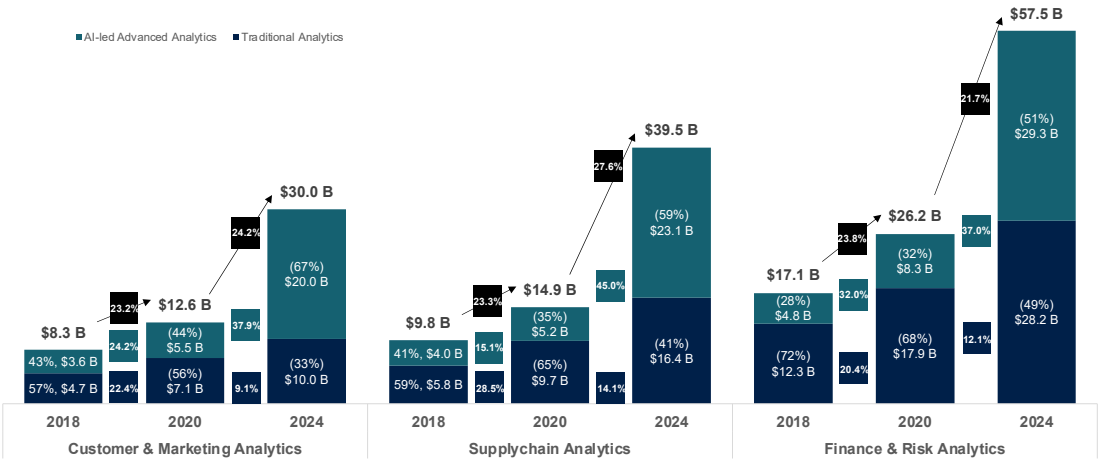


Source: Zinnov Analysis

Note: Excludes Enterprise Data Management spend that cut across all application

Overall analytics application market spends (which excludes EDM spend) is estimated to grow to $240 B in 2024. Almost 50% of this spend on Analytics applications are attributed to five key enterprise functions – Customer, Marketing, Supply chain, Finance & Risk, and HR.

AI-led Advanced Analytics market finds applications in top-line-oriented function such as marketing and sales, as well as in bottom-line-oriented operational functions, including supply-chain management and manufacturing. In general, horizontals dealing with Consumer data find more potential in AI-based solutions purely because frequent digital interactions between business and customers generate larger data sets for core AI technologies to tap into.



Source: Zinnov Analysis

Customer & Marketing Analytics

The global Customer & Marketing Analytics market is expected to grow from ~$13 B in 2020 to ~$30 B in 2024 at a CAGR of 24.2%. Customer & Marketing Analytics accounts for ~12% of overall Analytics application spend.

Enterprises leverage Marketing Analytics to identify the right campaign or channel strategy and optimize return on investments (ROI) in advertising costs, based on historical analysis of marketing effectiveness across different channels and target consumer groups. Marketing Analytics is leveraged in a variety of applications such as email marketing, SEO marketing, social media marketing, etc. Each of these is geared towards analysing the traffic in a specific channel to provide recommendations that maximize the effectiveness of marketing campaigns. Various data and information sources are leveraged by companies to gain competitive insights to inform their business initiatives.

On the other hand, enterprise's sales and marketing function leverage Customer Analytics to map individual customer journeys by integrating customer data from multiple interaction points across a multitude of channels for the purpose of customer segmentation, optimization of customer experience and hyper-personalization. Static customer segmentation leads to lack of differentiation in marketing and product strategy, resulting in lower return on investment from marketing and sales efforts. Data & Analytics is being increasingly used to build systems that can provide dynamic customer segmentation. Companies are prioritizing product development and marketing decisions based on the real-time insights from customer buying behaviours, spending patterns and social media interactions. The increased customer preference for SaaS models has also led to a creation of vast volumes of real-time customer data. Enterprises are leveraging this data to constantly improve customer engagement and designing relevant cross-selling and upselling opportunities. The abundance of customer data has made it possible for enterprises to leverage Customer Analytics in a variety of use-cases – product development, feature prioritization, customer churn analysis, etc.

Customer & Marketing Analytics requires strong business analysis expertise combined with technical expertise to interpret results and gleam insights. Today's complex customer problems need multiple data sources. Market research and survey data is one of the important sources of data for market decision making. In order to understand customer behaviour, organizations need to collect data on their views and opinions through surveys. Large enterprises are augmenting primary customer data with secondary data to understand their customers better. With Digital data, Social data, Syndicated data, Survey data, and other sources of information all contributing to the analysis, it is becoming increasingly important for enterprises to triangulate and generate quality insights from this array of disparate sources. With these insights, enterprises have a better understanding of the end user's behaviour (in terms of the response to their product), while also proactively improving their products with insights generated from market research.

CPG and Retail industries are expected to contribute to the majority share of Customer & Marketing Analytics spend, thanks to the growing need for predicting consumer behavioural trend and product positioning efficiency. TMT industry is also contributing to the spend with e-Commerce giants betting big on Advanced analytics techniques to track click through rate, sales trends, etc. to measure marketing success and to generate new leads.

North America is the largest contributor of the global Customer & Marketing Analytics spend due to increased adoption of social media as an advertising and promotional channel. While North America will continue to be the largest contributor to the spend, APAC is expected to grow faster during the forecasting period. Enterprises in APAC have invested on Customer Analytics to provide differentiated customer experience, owing to lack of product differentiation and decreased brand loyalty in digital savvy young population group.

AI-led Analytics' contribution in Customer & Marketing Analytics accounts for ~ 43% of overall Customer & Marketing Analytics spend. Companies across the globe are adopting a strategy of using AI & ML algorithms to analyse the vast amounts of data to optimize their marketing functions right from monitoring their marketing spend and ROI, to high level analysis on their brand equity and competitive benchmarking. The ever-growing importance placed by industries to create a differentiated customer offering has greatly enhanced the application of AI. The power of AI is leveraged across the entire Customer lifecycle, right from identification & acquisition to development & retention, all the way to dynamic customer insights. AI & ML powered algorithms which provide real-time customer insights helps businesses drive greater value for customers while improving efficiency and performance.

Some use-cases where AI contributes majorly to Customer & Marketing Analytics:

- "**Next product to buy" recommendations** – AI & ML algorithms analyse the vast amounts of consumer data and provide recommendations that target individual customers
- **Price and Promotion** – Companies leverage the power of AI to study the price of best sale and customized promotions to generate a substantial increase in the rate of sales conversions
- **Marketing Budget Allocation –** AI is also used extensively to keep tabs on the spends and the ROI generated, using which recommendations and insights are provided to key decision makers
- **Customer Service Management** - where customers are given real time actionable solutions and insights to their problems through AI powered chatbots and analytics solutions
- **Customer Acquisition/ Lead Generation** - where AI/ML algorithms analyse the huge piles of customer data and identify potential targets leading to sales enablement
- **Churn Reduction** - where AI is leveraged to map the customer journey and identify the reasons for the attrition and proactively apply these learnings in future scenarios

○ Supply Chain Analytics

Supply Chain Analytics accounts for ~14% of overall Analytics application spend. Use of Supply Chain Analytics enables enterprises to collect, evaluate, and react upon the data generated across the different stages of a supply chain such as sourcing, manufacturing, distribution, and logistics. Increased globalization and expansion of businesses into newer markets have led to increased complexity in managing disparate supply chain processes. In addition, as the delivery timelines gets shorter and volume/ quantity of products being shipped reduces, there is a distinct need for supply chain functions to become agile leveraging digital technologies. Moreover, the rise in quantum of unstructured data, owing to growing adoption of IoT and smart sensors, has further complicated the process of data consolidation and insights generation, leading to increased adoption of Supply Chain Analytics across industries.

The global Supply Chain Analytics market is expected to grow from $15 B in 2020 to $40 B in 2024, growing at a CAGR of 27.6%. Supply Chain Analytics is being leveraged by enterprises, especially in Retail and Industrial sectors, to improve end-to-end visibility across the enterprise supply chain, identify the root causes for lost productivity, and boost the speed of production. The US accounts for the largest market share of the global Supply Chain Analytics spend. The country's demand for Supply Chain Analytics is expected to be driven by the need to achieve cost optimization, increase operational efficiency, and optimization of warehouses and logistics.

AI contributes to ~35% of overall Supply Chain Analytics spend. AI has had a significant impact on Supply Chain, predominantly due to its ability to reduce costs through real-time forecasts and behavioural coaching. Companies across the globe have been applying AI techniques such as continuous estimation to optimize logistics operations by improving routing, and thus the fuel efficiency and delivery times; and prediction algorithms to have a proactive view of problems that could arise in the day-to-day Supply Chain operations.

Leading use-cases of AI in Supply Chain Analytics:

- **Inventory Optimization –** The predictive power of ML is very well leveraged by companies across the globe to forecast exact safety stock and cycle stock to meet the predictive demand, thus freeing unnecessary locked working capital from raw material and finished goods inventory
- **Procurement Cost Optimization –** Companies have quotations from multiple vendors to procure raw materials and products. AI & ML algorithms study the data and help companies with insights on the purchase quantity and price, thus enabling massive savings
- **Demand Forecasting and Capacity Planning –** In today's VUCA world, companies often face an issue with forecasting the demand for their products. AI & ML algorithms account for a multitude of parameters and help companies with near estimates on the expected demand – which then enables companies to plan their production capacity efficiently.

○ Finance & Risk Analytics

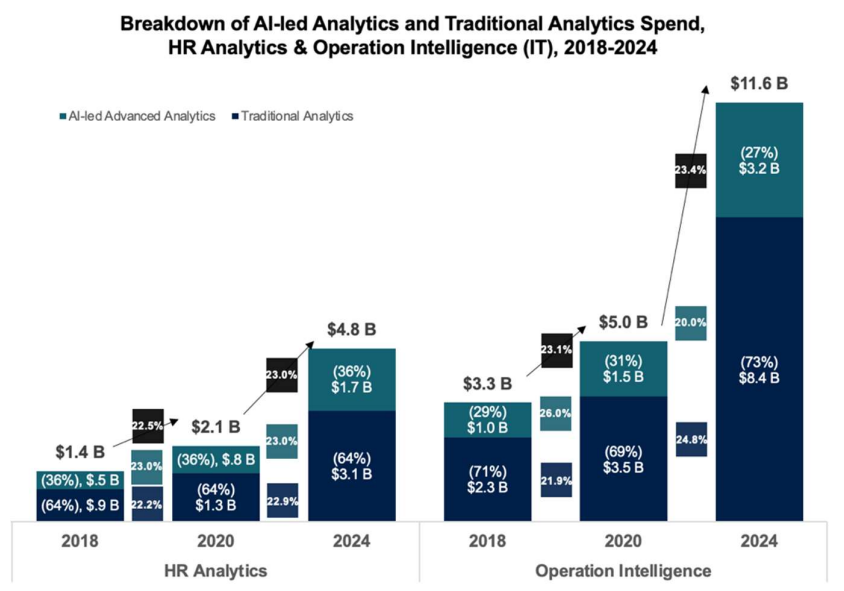
Finance and Risk Analytics accounts for ~23% of overall Analytics application spend. Finance & Risk Analytics combines several different statistical models and ML algorithms to measure and predict risks with a higher degree of certainty. Financial & Risk Analytics solutions include simple anomaly-based fraud detection that leverages historical transactions to detect fraud, as well as advanced ML-based algorithms that leverage social media interactions and pattern recognition to identify fraud in account opening or card transactions for customers without prior transaction history. Finance & Risk Analytics is being leveraged across industries to quantify cyber risks, automate security operations, and make intelligence-driven decisions.

The global Finance & Risk Analytics market is expected to grow from $26 B in 2020 to $58 B in 2024, at a CAGR of 21.7%. BFSI and Retail verticals are the largest spenders for Risk analytics applications, owing to surge in fraudulent transactions and rising cyber-attacks. While North America continues to be the largest market for Finance & Risk Analytics, APAC is expected to be the fastest growing region due to rapid digitization and increasing concerns about data and security breaches in developing countries like China and India.

AI-led advanced analytics spend in Finance & Risk Analytics amounts to ~32% of overall data and analytics spend. AI powered Analytics solutions provide real-time insights and warning signals into the various factors (distress signals) that go unnoticed by human experts. Several companies are leveraging intelligent algorithms not only for trading, virtual assistants and chatbots, credit scoring, and market risk analysis, but also to optimize the decision-making process related to loans and prevent unwanted risks associated with financial wrongdoings.

Leading use-cases of AI in Finance & Risk Analytics:

- **Fraud & Debt Analytics –** Companies are harnessing the power of AI & ML algorithms to analyse and mitigate risk of fraudulent activity, leveraging intelligent algorithms to identify and remove such factors proactively
- **Stress Testing –** Complex AI & ML Simulation models analyse financials of companies with hypothetical extreme scenarios and proactively identify distress signals in terms of Capital Market risk
- **Credit Risk Analytics –** AI powered Credit Risk analysis and Scoring is being widely used by Financial services companies to improve their accuracy and efficiency



Source: Zinnov Analysis

○ HR Analytics

HR Analytics accounts for ~2% of overall Analytics application spend. HR Analytics enables companies to make data-driven decisions in critical tasks such as compensation planning, recruitment & retention, and workforce task automations. The remote working model, along with adoption of Cloud-based communication tools, etc., has led to easy access to employee data and activities, allowing enterprises to deploy HR Analytics applications to improve employee experience and automate workforce management.

The global HR Analytics market is expected to grow from $2 B in 2020 to $5 B in 2024, growing at a CAGR of 23.0%. The Retail industry is expected to emerge as the fastest

growing end-user vertical due to a unique blend of full-time employees, part-time staff, contractual workers, and multi-regional stakeholders across distribution networks.

~38% of the overall spend in HR Analytics leverages AI technologies. Business leaders are betting big on the power of AI to transform their HR functions and expect AI to reinvent and change the overall HR responsibilities.

Some use-cases where AI is contributing:

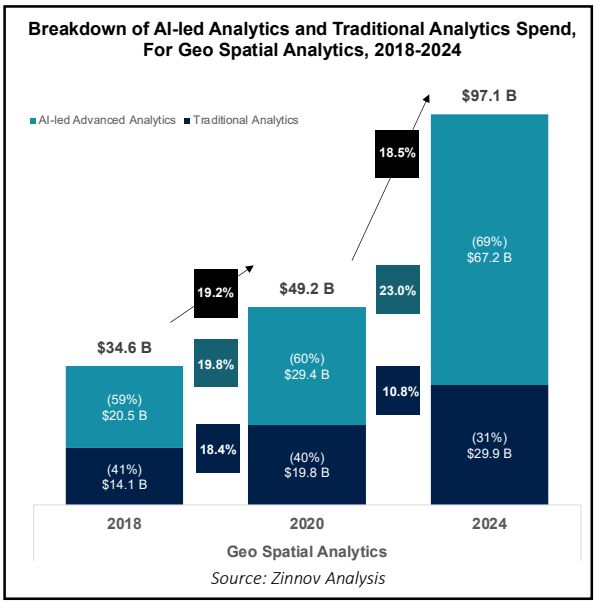
- **Personalized Employee Experience –** Companies are using AI to create a differentiated employee experience by ensuring employees have all the access to the necessary information and insights to their queries
- **Candidate Assessments -** NLP powered candidate assessments are widely being used with their ability to assess the candidate under a multitude of parameters, and most importantly without human bias
- **Employee Churn -** Most critically in today's times where attrition rates are sky-high, organizations leverage AI to analyse Big Data to determine the employees' activity patterns – which can help the employers to predict the overall tone of the employees who might be thinking to quit.

○ Operational Intelligence (IT)

Operational Intelligence leverages data collected from enterprise-wide IT systems, analyses the real-time data feed, and presents insights in a simplified manner, allowing IT operators to take real-time action. AI contributes ~31% of the overall Operational Analytics market.

AI applications in Operational Intelligence include:

- **Real Time Awareness –** AI solutions offer the ability to be more responsive to real-time changes in process conditions, even to the point of providing predicting upcoming conditions and adapting control based on rapidly evolving data trends
- **Smart Assistance** – AI powered business operational assistance is gaining traction, with companies leveraging NLP to answer analytical queries related to business problems
- **Predictive Service Intervention –** In today's world where monitoring is of paramount importance, companies harness the power of AI & ML to monitor deployed services to proactively handle exceptions



Source: Zinnov Analysis

○ Geospatial Analytics

Geospatial Analytics accounts for the largest share (~45%) of the overall Analytics application spend. Geospatial Analytics harnesses the power of geo-referenced data from GPS, mobile devices, location sensors, social media, satellite imagery, etc. to contextualize the traditional data with timing and location information, allowing enterprises to uncover trends based on location, distance, or proximity. Geospatial Analytics can help decision makers understand why solutions that work in one place often fail in another and has several use-cases across industries – locational intelligence in Engineering & Construction, natural resource exploration in Oil & Gas, network analysis in Telecom, Geo-Visualization in maps.

The global Geospatial Analytics market is expected to grow from $49 B in 2020 to $97 B in 2024 at a CAGR of 18.5%. Spending in Geospatial Analytics by the government sector is expected to account for a large share of the market due to growing emphasis on location-based intelligence in border security operations. North America will continue to hold the largest market share as Geospatial Analytics applications are increasingly being used in construction, agriculture, transportation, and utilities.

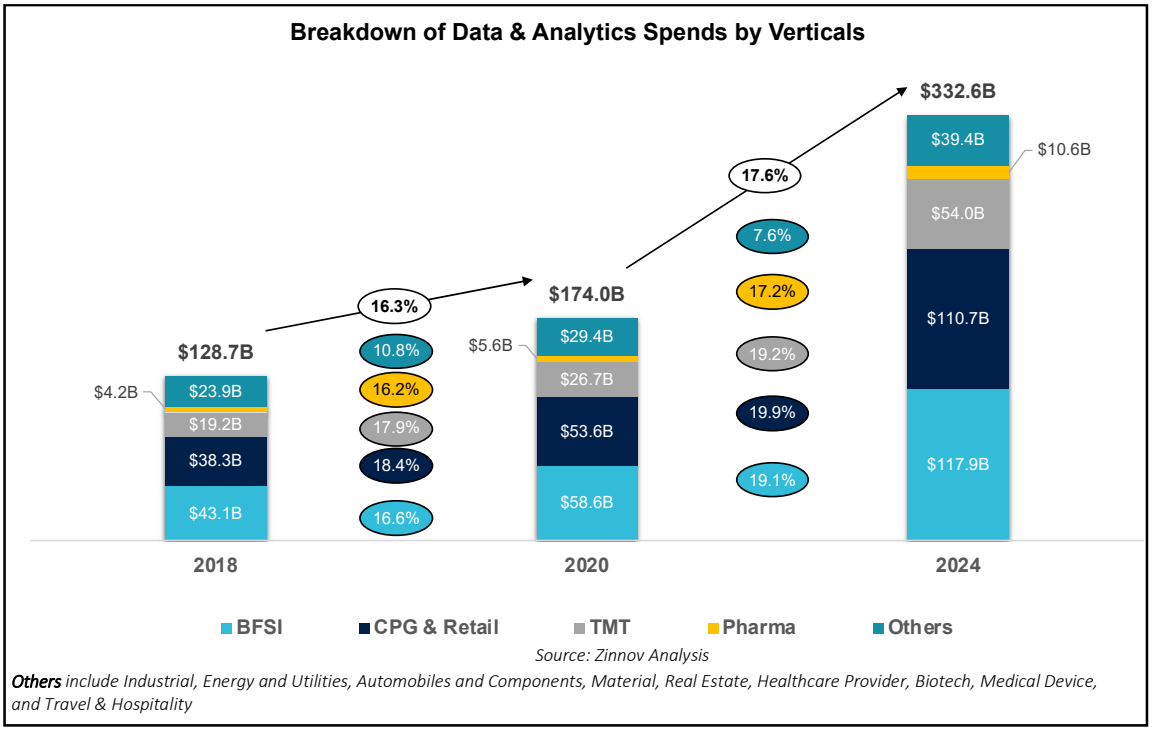
Geospatial Analytics is one of the largest markets in terms of spend and AI contributes to ~60% of the overall data and analytics spend. Artificial Intelligence GIS (AI GIS) technology is a combination of AI technology with various GIS functions. It consists of 3 parts: GeoAI – which is a spatial data processing and analysis algorithm that integrates AI and is the product of AI and GIS; AI for GIS – which uses AI capabilities to enhance the functions and user experience of GIS software; and GIS for AI – which uses visualization and analysis technology of GIS to perform spatial visualization and further spatial analysis of AI output.

Some use-cases where AI is leveraged in Geospatial Analytics:

- **Satellite Imagery** - Advances in computer vision have made it possible to get credible intelligence from Satellite Imagery using AI techniques such as Deep Learning.
- **Route Visualisation –** AI enabled optimization of routing is in great demand given the ability to generate savings and reduce carbon footprint.

- **Vegetation Risk Management –** AI/ML algorithms analyse data and predict where mitigating actions need to be taken to reduce risk from natural disasters.

D&A Vertical spend – CPG & Retail, TMT (Technology, Media & Entertainment, and Telecom) and Pharma drive nearly 50% of the total spend



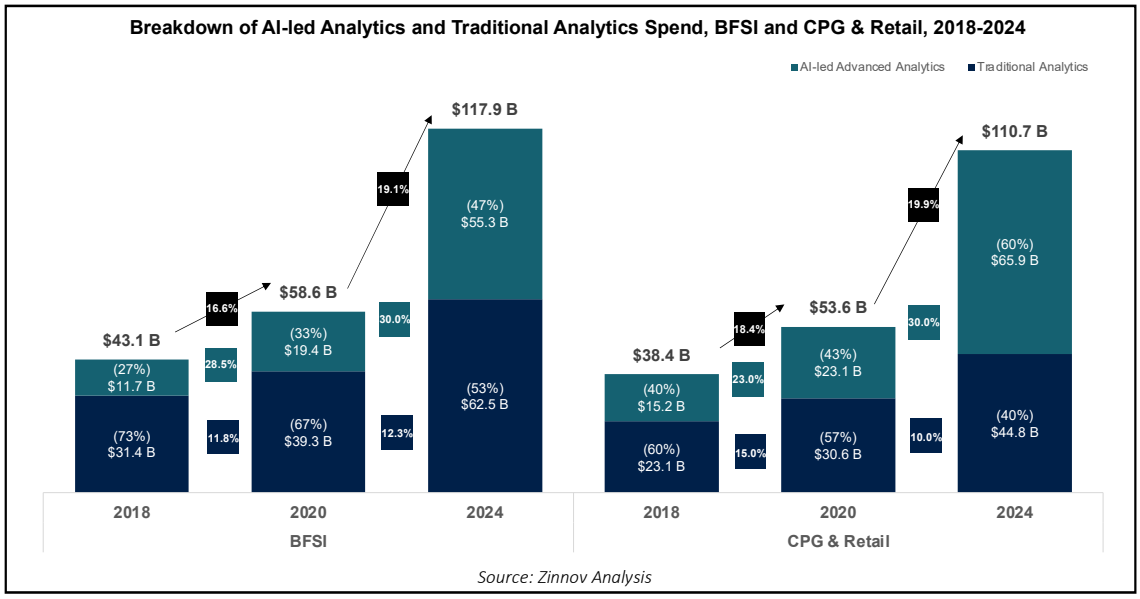
Source: Zinnov Analysis

Others include Industrial, Energy and Utilities, Automobiles and Components, Material, Real Estate, Healthcare Provider, Biotech, Medical Device, and Travel & Hospitality

Demand for digitization services is expected to increase sharply due to remote working environments accelerated by COVID-19. Across industries, data has become a valuable source of competitive differentiation among companies. Companies prioritize product development and marketing decisions based on the real-time insights from consumer buying behaviours, spending patterns, and social media interactions.

The TMT, Pharmaceuticals, and CPG & Retail industries are among the largest contributors to the analytics and insights. These verticals are expected to have significant tailwinds post the COVID-19 pandemic, specifically in data and analytics, with TMT, Pharmaceuticals, and CPG & Retail expected to grow at a CAGR of 19.2%, 17.2%, and 19.9% respectively, during 2020 and 2024. TMT companies have taken the lead in digital transformation. The High-Tech and Pharma industries are more technical in nature on account of their business operations and require greater domain expertise.

Both BFSI and CPG & Retail industries offer a multitude of products across a variety of channels and collect enormous amounts of data daily. Big Data and Analytics are leveraged to analyse consumption patterns and customer behaviour to facilitate informed product and marketing decisions as well as in fraud prevention and detection.



Source: Zinnov Analysis

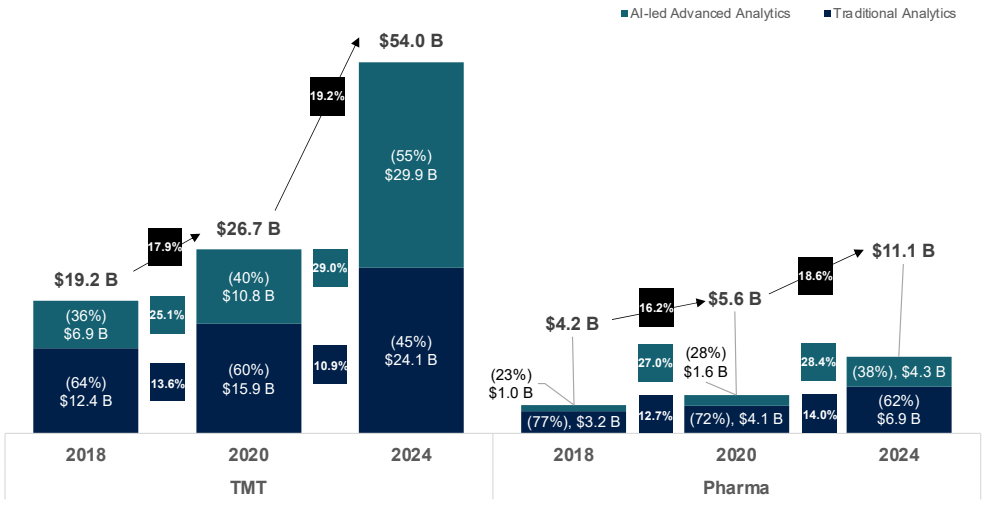
BFSI: BFSI is one of the most customer data-centric industries, where players have a bundle of new business opportunities from Artificial Intelligence and Cognitive Systems. Further, the growing demand for digital technology and changing customer demands have led the BFSI players to adopt cognitive systems and AI implementation in their operations to deal with ever-changing regulatory and compliance laws to face the market risk and understand both income tax and corporate tax laws in an efficient way. It is also showing a strong presence in analysing consumer behaviour patterns to bring new offerings and is finding new distribution channels for the financial institutions.

CPG: With the advent of Artificial Intelligence in **CPG & Retail** market ecosystem, Advanced Data Analytics and Predictive Analytics techniques have been introduced to assist companies in making business decisions via a data-driven approach. Most retailers have realized that the new technologies like AI have the potential to innovate retail operations and customer experiences. The amount of usage of AI applications like demand forecasting and pricing optimization in the CPG & Retail industry have been increasing greatly, and this growth is due to the shift of market to online shopping during the COVID-19 outbreak. As a result, companies are spending big on ensuring an effortless online shopping experience for their customers such as investments in AI-based conversational analytics (Chatbots), etc. which has further accelerated the growth of AI-led Analytics in this industry.

Businesses in the **TMT** vertical – Software & Internet, Semiconductor, Consumer Electronics, Media & Entertainment and Telecom – continuously need to reinvent and protect themselves from global disruptions. With increased competition, TMT companies are finding it more difficult to acquire and retain customers.

The global TMT industry is highly competitive and continues to evolve rapidly driven by disruptive innovations in AI, cloud, edge computing, internet of things (IoT) and mobility. As a result, TMT companies, in order to remain competitive, must remain ahead of the curve of disruptive technologies and keep pace with significant shifts in customer journeys driven by digital transformation and ecommerce. This requires such companies to continuously assess the rapidly changing customer needs, perceptions and experiences, in order to acquire and retain customers.

Breakdown of AI-led Analytics and Traditional Analytics Spend, TMT and Pharma, 2018-2024



Source: Zinnov Analysis

Software & Internet: As more and more independent software vendors are adopting subscription-based SaaS business models, they increasingly have access to large customer usage data. Data & Analytics presents a huge opportunity for these enterprises to uncover consumer usage patterns and identify customer whitespaces for product and sales / marketing decisions, respectively. Competitive dynamics require combining internal data with external data and information sources like social media, market research, industry reports, competitor information etc. Software and Internet companies are also embedding analytics in their products to improve user flows and end user experience. Software & Internet companies focus majorly on disruptive technologies such as Artificial Intelligence, RPA, and many more. The industry has historically been one of the key promoters of a data-driven approach to decision making. Off late, there have been numerous examples where the industry has utilized AI applications to boost productivity, enhance customer engagement, automate tasks, etc. to boost top-line and bottom-line.

Semiconductor: Data & Analytics spend in Semiconductor companies has been considerable and growing at a rapid pace, with the average budget ranging between 2.5% and 3.5% of company revenue. It is expected that there is going to be a widespread adoption of Advanced AI-led Analytics techniques applied in the industry to improve predictive maintenance and yield. Prescriptive insights are also seeing an increased traction with companies harnessing the power of AI for enhanced pricing. market-entry strategies, portfolio optimization, etc.

Consumer Electronics: Device manufacturers are seeking to use information assets to improve customer relationships, business outcomes, and operational efficiency which is driving the growth in D&A market. In addition, social media sentiment analysis can help these manufacturers to identify key problem areas, build product roadmaps, and modify online marketing strategies based on both the positive and negative reactions of consumers. In order to understand the buying preferences and increase sales, the Consumer Electronics industry has transitioned to a data-driven approach. The industry has been actively investing

in AI-led Analytics techniques to predict sales and proactively make changes to the production planning of consumer electronic goods.

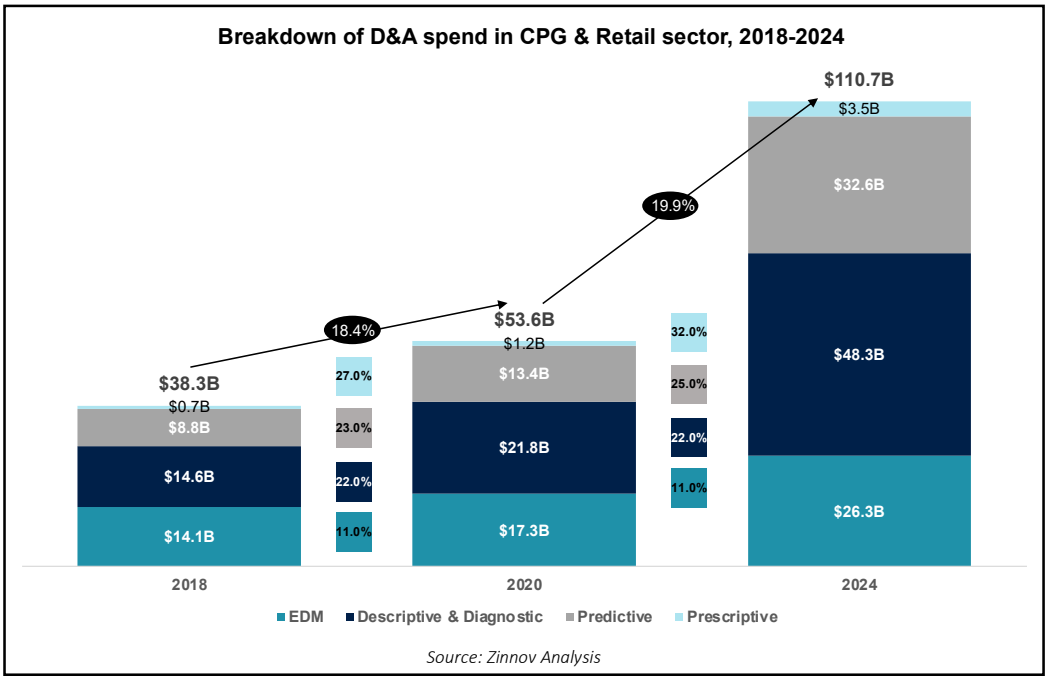
Media & Entertainment: Data Analytics in Media & Entertainment industry holds immense potential to revolutionize the future of content personalization. In the new media landscape, companies generate value by predicting appropriate content (movies, music, videos, and games) for various sets of audiences. Moreover, media & entertainment companies could also micro-target channel preferences-based content for consumers. Advanced Analytics is helping media & entertainment companies unlock hidden insights in their data – from social media listening to predictive models to test advertising, pricing, and sales forecasting. By applying this insight, media & entertainment companies can better understand and target consumers, improve the user experience, streamline their business processes, and identify new products and services to offer customers.

Telecom: The rapid rise in the use of smartphones and other connected mobile devices has triggered a massive growth in the volume of data flowing through the networks of operators. It is critical for Telecom companies to process, store, and extract insights from the available data. Data Analytics is helping the Telecom industry increase profitability by helping optimize network usage and services, enhance customer experience, and improve security. AI-led Analytics techniques and ML powered algorithms have been enabling Telecom companies to both detect and predict network anomalies, while also allowing them to proactively fix problems before customers are negatively impacted.

Pharma: The Pharma industry has been seeing rapid growth and much of this growth has relied on empirical data, which has presented significant challenges over the last decade. The utilization of Data Analytics to comb through the vast amounts of available structured and unstructured data is offering valuable insights to pharma companies regarding the necessities, use, contradictions, market trends, and sales performance. The Pharma industry has been bridging the gap from experimentation to scale by leveraging advanced AI-led Analytics techniques to make the most of the vast amount of customer data present. Big Data analytics is helping pharma businesses to reduce the cost and speed up clinical trials by identifying and analysing various data points. Further, pharma companies have also been leveraging ML, NLP, and other cognitive reasoning technologies to support the process of drug discovery. They are also used to understand competitive dynamics in various disease areas and regions and to optimize their strategic decisions around product development, marketing, and investments.

The Pharmaceutical industries are increasingly facing rising costs and more stringent regulatory environments, which has made it important for large and medium-sized pharmaceutical companies to have a strong and pro-active business development and licensing ("BD&L") program. For BD&L teams, achieving the required goals often rely on their ability to source new opportunities and filter them down to discover products and alignments that will generate value. As a result, there is a significant need for niche technologies like AI to speed-up this process and make it real-time, which will also result in a change in the collaboration and importance of BD&L teams within Pharma companies.

CPG & Retail sector D&A spend is projected to reach ~$110 B by FY24; Prescriptive Analytics to optimize promotional spend, channel investment, product placement, etc., will drive growth



Global D&A spend by CPG & Retail vertical is estimated to grow from $53.6 B in 2020 to reach $110.7 B by 2024, growing year-on-year at 19.9%. CPG and Retail industries are evolving rapidly to keep up with shifting consumer demand. CPG and retail clients are experiencing rapid changes in consumer behavior and digital transformation led disruptions to their business models. CPG companies are growing exponentially and remaining competitive by introducing multiple brands, diversifying product lines, and expanding sales channels. With increased focus on operational efficiencies and ever-increasing pressures on managing supply chains, CPG and retail clients require data backed decision inputs on a near real-time basis. With e-Commerce platforms and direct-to-consumer online marketplaces serving as major sales channels, it is crucial for businesses to remain updated with actionable insights to gain commercial success. Consequently, Customer Analytics is increasingly being leveraged by enterprises in CPG and Retail industries to uncover real-time precise insights into consumer buying pattern, allowing companies to quickly respond to changing consumer preferences.

Rise of consumerism has led to a high volume of data being generated across both online and traditional offline channels. In an increasingly competitive CPG & Retail market, data is being leveraged by enterprises to decide product assortment, channel strategy, marketing spend, etc. However, only 20% of that data is being used to make informed business decisions[1].

Challenges to scale up the Analytics operation

- ***Data collation in a multi-channel environment***
  - While 96% of US consumers utilize online shopping, in-store purchases account for 65% of the budget[2].

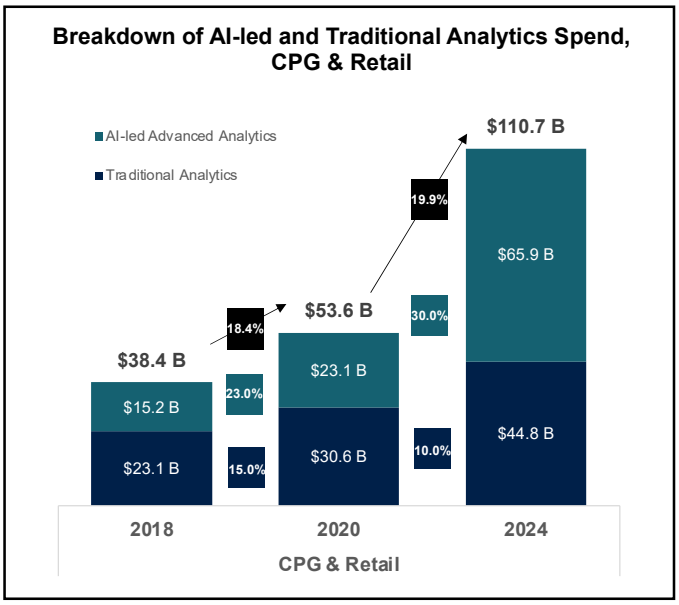
- Customers today move seamlessly between online and offline experiences.
- Retailers need accurate and identifiable data to create an omnichannel experience.
- However, collation of data hosted in disparate systems across channels is a cumbersome process.

- ***Matrix organization structure***
  - Traditionally, CPG and Retail industries have a matrix organization structure, aligned with a specific product offering.
  - While the structure led to strong GTM capabilities, it also created challenges for a large-scale transformation.
  - Isolated customer data and duplication of systems & tools across departments are hindering large-scale adoption.

- ***Data security and compliance***
  - Retailers have access to volumes of data that can be mined for insights.
  - However, non-compliance with regulations or privacy breaches are expensive.
  - For example, Equifax spent $1.4 B on upgrading its security in the wake of a leak that cost $500 Mn in fine[3].
  - Significant investments required for security architecture and compliance processes act as a barrier for industry-wide adoption.

- ***Access to talent base with domain knowledge***
  - Successful implementation of analytics in Retail requires technical skill-sets complemented by domain knowledge.
  - In addition to hiring data science specialists, investment is required to retrain managers and supervisors accustomed to old ways of working.

AI-led Analytics in the CPG & Retail sector



Consumer industries such as retail and e-Commerce will see more potential from marketing and sales AI applications because frequent and digital interactions between business and

customers generate larger datasets for AI techniques to tap into. For the Retail/CPG industry, large amount of data provides a greater understanding of consumer shopping habits and the way to attract new customers. AI-led Analytics using this data in Retail/CPG enables companies to create customer recommendations based on their purchase history, resulting in personalized shopping experiences and improved customer service. These super-sized data sets also help with forecasting trends and making strategic decisions based on market analysis. AI-led Analytics contributes ~$23.1 B (or 43% of the overall CPG/Retail sector Analytics spend) in 2020 and this value is expected to increase to ~$65.9 B (or 60% of overall CPG/Retail sector Analytics spend) by 2024. AI is empowering brands and retailers across the globe to understand their customers and their businesses better to deliver unique, differentiated, personalized experiences.

Some of the key AI-led Analytics use-cases in CPG & Retail are:

1. **Demand Forecasting**: An AI-based forecasting solution uses a cluster of Algorithms to optimize forecasts. Basically, AI enables forecasting to consider more variables that influence demand and find patterns in the data that would be hidden to the human eye or statistical methods. This in turn leads to more accurate predictions that can be used to make more well-informed decisions.
2. **Predictive Pricing**: AI has enabled pricing solutions to track buying trends and determine more competitive product prices. Companies are using AI-led techniques to offer dynamic pricing to different customers, based on external factors and their individual buying habits.
3. **Hyper Personalization**: AI-powered algorithms are helping companies adjust and create customer profiles in real time. With the power of AI, behavioural data is readjusted incrementally based on each new interaction which helps companies make marketing campaigns progressively smarter.
4. **Recommendation Engines:** Recommendation Systems are using AI to provide insights to companies to help them increase their sales and attract more customers by making personalized suggestions on products and services.
5. **Product Assortment Optimization:** AI models look at a variety of factors including past sales, store display space, local trends, online behaviour, predicted weather patterns, etc. to determine what products would be the best fit for a given store in a location.

AI-led Analytics in Action

Leading Technology company with its flagship stores, franchise and online stores

Application of **Advanced Analytics with intelligence** and transition layer helped identify sales drivers quickly and contributed to the smart expansion strategy

Leading American multinational retail corporation

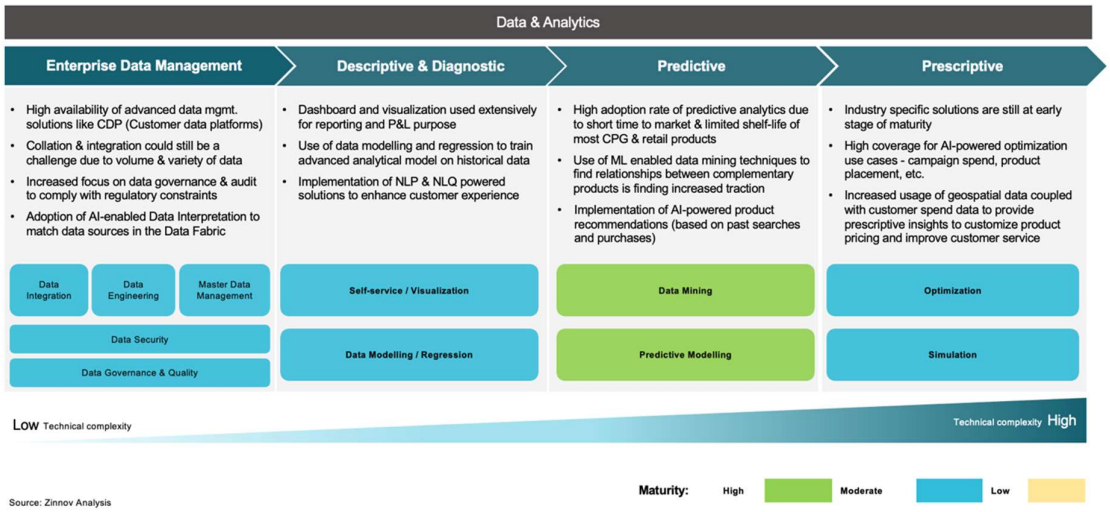
The retail giant leveraged **AI enabled predictive insight generation** capabilities to manage its inventory

American Apparel products giant

The company is leveraging **IBM Watson's cognitive computing technology** to help consumers with prescriptive insights on choice of clothing, based on variables like location and gender preference.

D&A Maturity

In recent years, adoption of a customer data platform (CDP) has also picked up, enabling marketing teams to capture, process, and unify data and then leverage it through various channels such as email, social, display ads, and sales campaigns. Predictive and Prescriptive Analytics are increasingly being leveraged by large retailers and digital native enterprises for feature prioritization and marketing spend optimization.



D&A Use-cases

Due to the limited shelf-life of the products, D&A will play a major role and have industry-wide use-cases, starting from planning product assortment to forecasting demand for an individual product, to creating a micro-segmentation strategy of consumers for hyper-personalization.

Use Cases	Description
Demand Forecasting	• Predictive analytics uses historical data on consumer buying pattern, social media posts, price sensitivity, etc. to forecast demand • Advanced ML algorithms trained on large data sets with many attributes like weather patterns, fluctuation in exchange rates, etc. for improved accuracy in demand forecasting • A global alcohol brand deployed Prevedere predictive analytics solution and **saved ~$9M** per year from over production
Predictive Pricing	• Advance analytics to set the right pricing strategy based on historical data about **price optimization** and **sales dynamics** • Using AI and advanced analytics, retailers are checking and continuously monitoring the prices of competitors to come up with optimum pricing • Machine learning powered algorithms to evaluate the potential impact of sales promotions and identify right pricing point for each product • A UK based online retailer reduced **repricing** effort by **50%** and automated pricing process for over a half a million SKU using predictive pricing
Hyper Personalization	• Analysis of a **single customer view** created from interaction data across different touch-points & channels to deliver hyper personalization • Improved customer segmentation, retention & acquisition strategy, and optimized campaign performance management using prescriptive analytics • **Fair Price** leveraged analytics to understand customer journey and deployed contextual & location-based **personalized** in-store notifications

Recommendation Engine

- Implicit and explicit customer data filtered through AI & machine learning powered algorithms to generate recommendation for consumers
- China based e-commerce giant reported **51% increase** in annual revenue in 2019 after introduction of recommendation based advertising
- US based e-commerce leader, reported a **23.7% increase** in second quarter of 2016 after the concentration of online sales with product recommendation engine
- Companies are using AI/ML models to analyse reasons for customer churn, along with providing proactive **recommendations** for improved customer interactions

Product Assortment Optimization

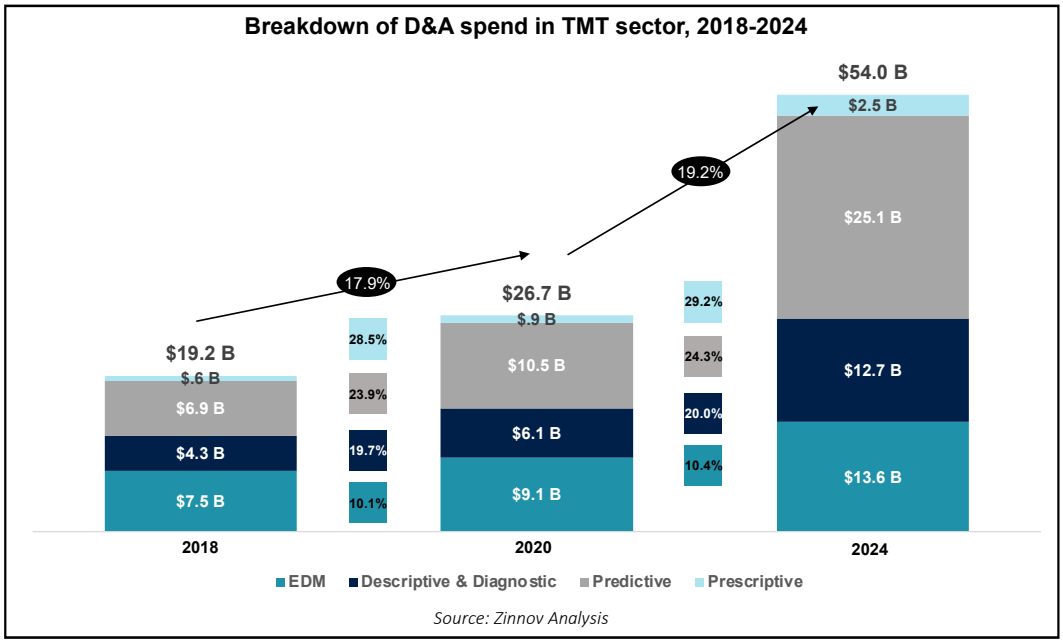
- Data science & machine learning techniques to **optimize** product **portfolio and** identifying optimal product assortment to maximize value
- Companies are using AI for category-based clustering to zoom in on specifics and to group items and products of a certain category
- Identification of the **optimal location** in shelf for products with **limited shelf life** using prescriptive analytics
- A US based **grocery retailer** used analytics to identify right portfolio of products to be sold in their "lite" chain of stores near city

Glossary:

1. "How can consumer products companies stay relevant and be future-ready with analytics" by Deloitte Consumer Industry Center, Deloitte Insights
2. National Public Radio (NPR), an US Government Agency, Poll
3. News article – "Equifax data breach costs hits $1.4 Billion" published by Bank Info Security (May 13, 2019)

TMT (Technology, Media & Entertainment and Telecom) sector D&A spend is projected to reach ~$54.0 Bn by FY24

Global D&A spend by the TMT vertical is estimated to grow from $26.7 B in 2020 to $54.0 B by 2024, growing at a CAGR of ~19.2%. The TMT vertical comprises of Technology companies (Software & Internet, Semiconductor & Consumer Electronics companies) along with Media & Entertainment and Telecommunication companies.



Source: Zinnov Analysis

Businesses in the Technology segment continuously need to reinvent and protect themselves from global disruptions. Many Independent Software Vendors (ISV) are moving away from custom building software and solutions for each enterprise and adopting Software-as-a-service model, leading to a wealth of information about customers' usage and

interaction patterns. This often needs to be combined with external data sources like industry reports, social media, market research, competitor information etc. Newer products and solutions are being launched at a rapid pace with focus on end user experience. As a result, Customer Analytics is being leveraged by ISVs to uncover insights from usage data and inform product development decisions.

Semiconductor Companies have been generating vast amounts of data historically. Off late, this data is being put to good use in streamlining R&D processes, optimizing product portfolios, and helping business leaders reduce costs. Consumer Electronics segment is leveraging analytics to understand their consumers better, to optimize their business model, and reduce costs. The industry generates vast amounts of unstructured data with details related to the technical issues, device usage history, customer experience, etc. These large amounts of user data are then analysed to obtain insights which go into product re-designing and subsequent upgradation to match customer expectation. Companies also leverage customer data to analyse and understand the pain points of customers, which supports them in taking data-driven decisions to improve customer experience.

The Telecom segment has been witnessing a massive increase in the amount of data generated, due to increasing digital connectivity. Telecommunication Service Providers are making the most of these large data sets by harnessing the power of Data & Analytics with real-time querying, filtering, and visualization of these large datasets. Data & Analytics is helping the Telecom industry in ensuring better LTE deployments, deeper network insights, and enhanced customer experience. As consumers are viewing, sharing, and listening to more content than ever before, Media & Entertainment companies now have access to this unparalleled level of consumer data. These large data sets are being leveraged for Data Analytics techniques to help entertainment and media companies unlock hidden insights in their data – from social media listening to predictive models, to test advertising, pricing, and sales forecasting.

Challenges to scale up the Analytics operation

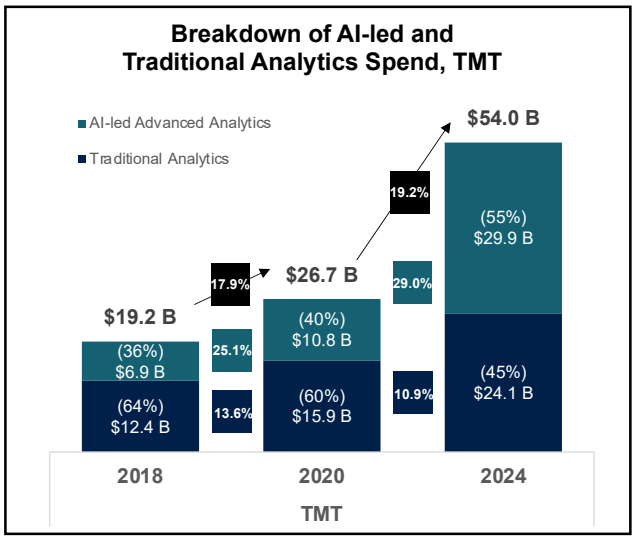
- ***Data explosion***
  - Constant barrage of real-time streaming data on product usage, customer preferences, etc., from embedded product analytics and external sources such as social media, product reviews, industry reports etc.
  - Data flowing in from multiple channels (which is usually the case for technology companies) makes it extremely difficult to interpret and use the same for Advanced Analytics techniques.
  - The global unique subscriber base in the Telecom industry was close to 5 million in the year 2016. With the advent of 5G this number is only expected to increase. Players in the Telecom industry will face Big Data challenges in terms of storing all this information.
  - Since AI algorithms require clean, well-structured data, around **80% of the time of any ML project is dedicated to ETL** (extracting, transforming, loading) and data clean-up
- ***Data security and privacy***
  - Growing emphasis on data privacy among users globally.

- Compliance to local data storage, governance, and data transfer regulations can impact the quality of data available for analytics.
- Robust systems required to retrieve, modify, and delete user data based on user preferences.

- ***Talent gap and Need for Expertise***
  - Increased demand for Big Data scientists and data engineers across TMT industry and other industry verticals such as BFSI, Retail, Healthcare, etc.
  - High attrition rates as skill sets are easily transferrable across other TMT companies and industry segments.
  - Given the niche nature of AI-led Analytics solutions, building an in-house team can take a significant amount of time and yield little result, considering the talent crunch.
- ***Technical Integration***
  - Large Telco and Media players have access to massive amounts of data in different sources – so, it is important to set up a unified database where all the data required by the system will be stored
  - To harness the full power of AI-led Analytics techniques, TMT companies might have to invest on an overhaul of their hardware and software, in case they have a large amount of old legacy systems
  - Due to the changing trends in the consumption of data services over voice service, capital expenditure is one of the highest in the Telecom industry – purely due to the growth in amount of data.
  - Significant investments required for security architecture and compliance processes act as a barrier for industry-wide adoption in TMT segment.

AI-led Analytics in the TMT sector

The AI-led Analytics spend by the TMT vertical is expected to grow from ~$11 B in 2020 (40% of overall Analytics spend in 2020), to ~$30 B in 2024 (55% of overall analytics spend in 2024).



Hi-Tech companies and Consumer Electronics companies are using AI-led Advanced Analytics techniques to analyse large amounts of customer data, to tailor their offerings and products based on the needs of the consumer. These companies are using AI-based Analytics solutions to understand the risks that they're facing and to also forecast demand – which in turn allows them to plan their production. On the other hand, Semiconductor companies are investing in data governance setups, to make the most of the large amount of unstructured data. This cleaned data is then being leveraged to optimize their production and workforce. Predictive Monitoring of equipment is also finding increased traction, which in turn helps in efficient and effective predictive maintenance.

Telecom companies are using AI-led Analytics techniques across the value chain, right from improving Customer Service, to Network Optimization, to Fraud Detection, all the way to Predictive Analytics and AI-powered Network Monitoring & Maintenance. Media & Entertainment companies are using AI powered Advanced Analytics to understand and create value for customers by presenting content that they might like and that might be relevant to them. AI-powered recommendation engines are being widely used, with companies also looking at Hyper-Targeted Advertising and Real-Time Predictive Modelling for segmentation and anticipating demand.

Some of the ways AI-led Analytics is contributing to the TMT industry are:

1. **Customer Analytics**: AI-powered Analytics techniques are offering the bridge that companies are looking for to transform how they connect with their customers, create customized marketing campaigns, and improve the overall customer sentiment.
2. **Predictive Analytics & Monitoring:** AI is enabling TMT companies monitor the performance in real-time and detect anomalies. AI models analyse a large number of variables in past data to predict future events and proactively provide insights to companies to take preventive actions.
3. **Recommendation Engines**: Smart AI/ML powered algorithms are used by companies to understand the requirements and provide personalized content to customers.
4. **Operational Optimization Analytics**: AI is helping companies analyse business processes and provide insights on the improvement of the efficiency and effectiveness of operations. AI models consider multiple parameters to track the performance and provide insights on optimizing the operations.
5. **Embedded Analytics**: The integration of Advanced AI-powered Analytics methods and self-learning algorithms is helping software and internet companies get deeper insights into usage patterns and predict future events instead of merely drawing conclusions from the past.
6. **Content Analytics**: Content Analytics uses Machine Learning and AI to help enterprises unlock business value from unstructured data. The reaction to the content is also monitored to help companies make informed decisions on future content.

AI-led Analytics in Action

Canadian Consumer Electronics Giant

Application of AI-led **Advanced Analytics techniques** helped understand consumer behaviour, potential customer base and aided the development of a customer segmentation strategy

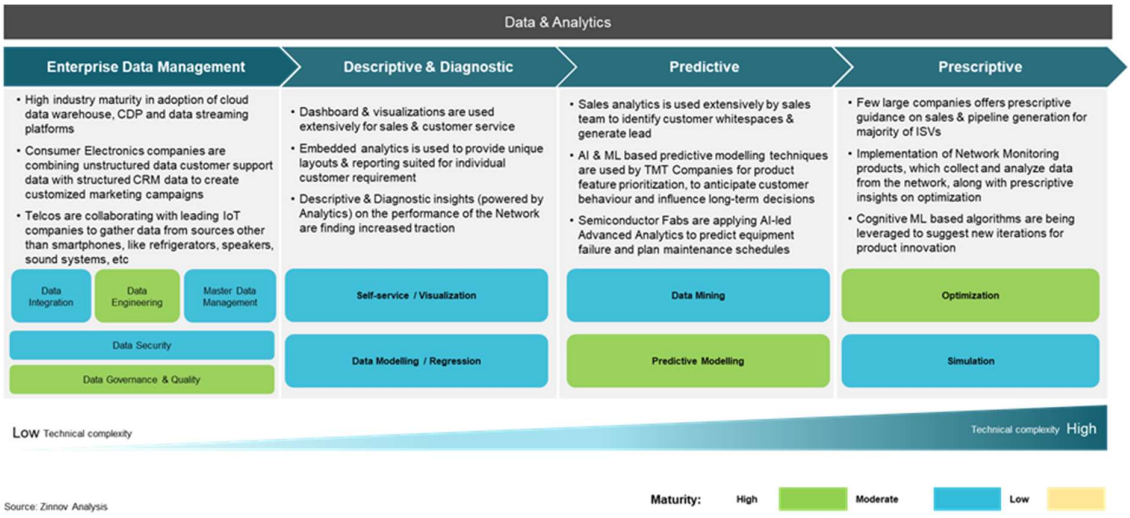
Leading Music and Streaming Platform

Leveraged **AI and ML algorithms** to understand user behaviour and demographics, to provide personalised recommendations to customers

Leading Chip Manufacturer

The company used an **Advanced Analytics tool** to improve the productivity of over 7,000 engineering personnel responsible for designing and implementing complex electromechanical projects

D&A Maturity



While most of the independent software vendors have modernized their infrastructure, moved to a Multi-Cloud environment, and leveraged operational intelligence to streamline internal workings, only a handful of them have started to leverage Advanced Analytics like Prescriptive to define their product prioritization strategy. Most vendors are, to an extent, dependent on Customer Analytics solutions provided by large vendors or third-party platform ecosystem providers like Microsoft, Salesforce, and AWS to build their sales and services strategy.

Consumer Electronics companies are adopting Cognitive techniques to understand and create relationships between the customer data coming from multiple channels. Semiconductor Companies have started to use AI-led Prescriptive Analytics solutions to improve the efficiency of their R&D operations.

The Telecom segment has transitioned from focusing on voice-based services to messaging and data-centric networks. This has resulted in a shift in preference towards making the most of the colossal amounts of data. Telecom operators are now looking for ways to optimize, disrupt, and innovate - by embracing data, ML, and AI. These technologies not

only lead to greater efficiencies, but also to increased revenue and improved margins. Media & Entertainment companies are having to find ways to add value to the user experience, i.e. it is crucial to have a differentiated and tailored experience for each customer rather than providing the same blanket service. This has resulted in the requirement for an in-depth understanding of user behaviour, preferences, and consumption patterns.

D&A Use-cases

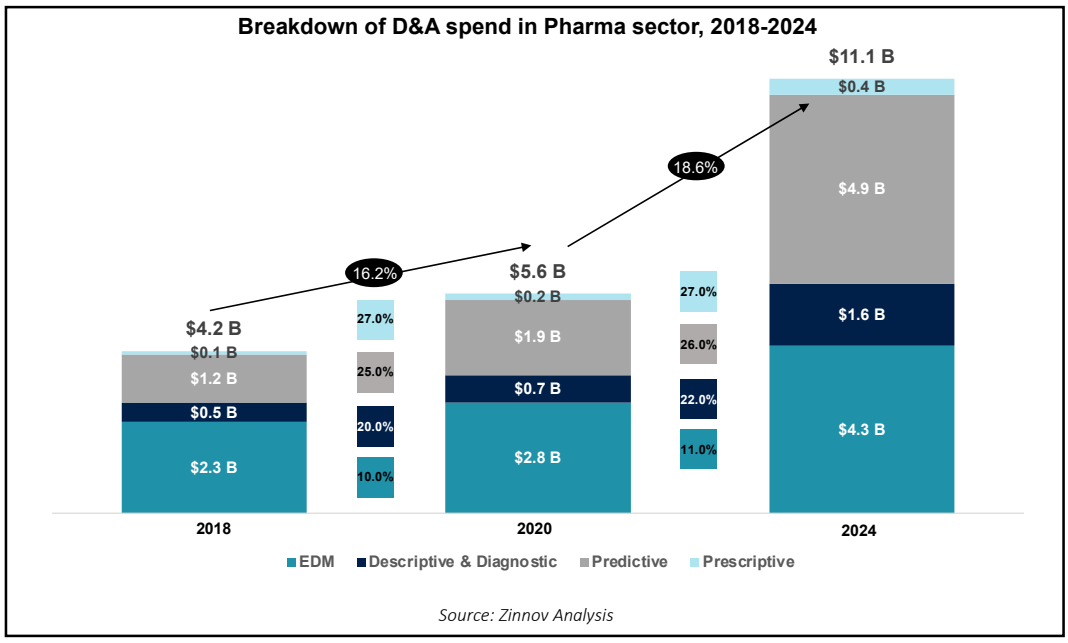
Increased use of SaaS-based applications across different verticals have led software vendors to adopt subscription-based models, which in turn have led to the growth of consumer usage and interaction data for vendors to leverage. In today's data-driven world, Consumer Electronics, Semiconductors, Telecom and Media & Entertainment companies are leveraging large amounts of data at their disposal for product differentiation, unique customer value proposition, and subsequent boost in revenue, through niche use-cases of D&A across the value chain.

Use Cases	Description
Customer Analytics	• Marketing departments of M&E companies use clustering and unsupervised machine learning to segment the audience and subsequently target individual customers • Advanced Customer Profiles (with secondary data from sources like Social Media) are being used for **Customer Sentiment Analysis** • Leading Consumer Electronics company analysed large amounts of consumer data and reported **$57 million increase** in sales, through AI and ML based scientific scheduling • A large telco used cognitive technologies like AI to analyse and support customer requests. This helped improve the **Customer Satisfaction by 68%** • Large telecoms use **fraud detection systems** that are based on data mining algorithms to tag fraudulent customers and suspicious behaviour in almost real-time.
Predictive Analytics & Monitoring	• Data Analytics techniques are applied on categorized data by M&E Companies to **predict audience interest**, based on which the viewer experience is enhanced dynamically • With low latency being one of the characteristics features of **5G networks**, companies are leveraging **Analytics solutions at the Edge** to monitor this latency and ensure real-time actions are taken • Consumer Electronics giants are working on **real-time predictions** based on current trends and customer behaviour, to make informed investments to design **customer centric products** • **AI Powered Predictive Maintenance** is leveraged by Telcos, to look for patterns within the data, enabling telcos to both detect and predict **network anomalies**, and allowing them to proactively fix problems and help in **Network Optimization** • A leading business and employment oriented company uses operational intelligence gathered from in-house "ThirdEye" monitoring platform to track performance and proactively detect any anomaly
Recommendation Engine	• AI-powered recommendations engines provide engineers **real-time feedback** on optimizing the **network performance** • **Smart Algorithms** are leveraged to help provide insights to Telco and M&E companies on the future requirements of a product or service based on previous data • Understanding **audience disengagement**, is helping M&E companies with insights on better viewer friendly content • **Leading Social Media player** makes use of NLP to analyse thousands of tweets per second and AI for recommending tweets on the user's timeline and ensuring that the relevant tweets are catered to them first • **Leading Tech Media Players** are moving from simpler content recommendation systems to an entire AI-driven personalized content experience provide better
Content Analytics	• AI based technologies like NLP and NLG are being used to generate **subtitles and description for video content** • Start-up news companies are leveraging combination of **machine learning technologies (to gather content)** as well as human journalists for creating its news stories • Leading Social Media companies are using advanced analytics techniques to **monitor and remove hateful content** • **Large Entertainment houses** monitor popularity of content based on the audience reaction and then decide on making the content part of the content set for members and non member viewers
Embedded Analytics	• Embedded analytics to integrate visualization & data exploration within business application, reducing the need to **toggle** between different applications • **Multi-tenant** self-service analytics incorporated to provide visualization & interactive reports and visual workflows specific to individual customer need • A learning management system, used embedded analytics to provide unique layouts & reporting, custom built for specific customers

Operational Efficiency

- Real-time analytics to extract insights about infrastructure/application **performance** from streaming data feeds to deliver operational instructions
- Advanced machine learning algorithms to analyse and detect deviation from baseline IT operational metrics to eliminate or minimize impact of outages
- A large chip manufacturer used **advanced-analytics tools** to shorten the product-development cycle and improve revenue by $100million
- A leading business and employment oriented company uses operational intelligence gathered from in-house "ThirdEye" monitoring platform to track performance and detect any network anomaly

D&A spend in the Pharma sector is projected to reach ~$11.1 B by FY24



Source: Zinnov Analysis

Global D&A spend by the Pharma industry is estimated to grow from $5.6 B in 2020 to $11.1 B by 2024, growing at a year-on-year rate of ~18.6%.

Drug Development has always been a very lengthy and complicated affair, with innumerable processes, applications, and approvals. This has resulted in vast amounts of unstructured and structured data being produced by multiple systems and in different forms. Companies have been leveraging technological advancements in storage, network, and computing techniques, by harnessing the power of Data Analytics to turn these vast amounts of data into a source of business strength.

With the ever-growing pressure on Pharma companies to drive innovation to maintain revenue streams, companies are leveraging the power of data-driven insights. Therefore, it is imperative for conclusions drawn from clinical trials and drug development to be coupled with Analytics to foster growth. It is critical to constantly assess competitive actions through published and external data sources to guide actions as companies compete in specific disease areas. Analytics techniques are helping Pharma companies in reducing costs, enhancing quality, and improving efficiency. Data is analysed to better the design of products, trials, and treatments, apart from also helping companies understand diseases better and in detecting serious/adverse events.

Challenges to scale up the Analytics operation

- ***Inconsistency of Data Source***
  - In the Pharma Industry, a lot still relies on traditional data streams, i.e. internal sales, operations, and external data from sales audit and prescription audit companies and data published in clinical trials and medical conferences.
  - Most business units in a Pharma company continue to work in silos creating fragmented data within an organization.
  - New-age Data Analytics companies are now starting to create standardized and universal data foundations. The adoption of such models can generate clinical and commercial insights for Pharma companies.
- ***Need for Investment***
  - Given the fragmented and unstructured nature of the data sources in the Pharma Industry, companies have to make large investments starting from establishing a data governance function, all the way to creating dedicated in-house analytics teams.
- ***Talent Crunch***
  - Analytics techniques for Pharma-specific use-cases require people with particular skill sets to handle and derive insights from real-world Pharma data which is mixed and marred with inconsistencies.
  - With other industries (such as BFSI, Telecom, Media & Entertainment, Retail) being large scale users of Analytics across their value chain, Pharma companies are finding it difficult to attract the best of talent and offer competitive compensations.

AI Analytics in the Pharma Vertical

The AI-led Analytics spend by Pharma companies is expected to grow from $1.6 B in 2020 (or 28% of the overall Analytics spend in 2020), to $4.8 B in 2024 (or 43% of the overall analytics spend in 2024).

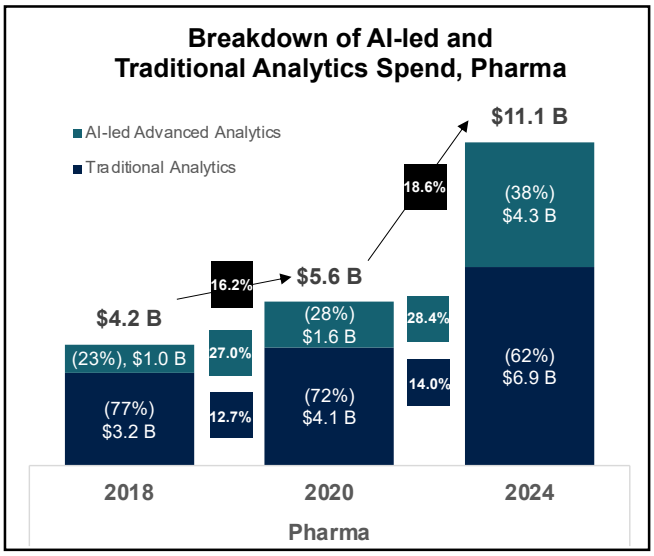
With the increasingly data-driven nature of the Pharma industry, companies are looking at ways to organise and streamline the increasing volume of complex information generated by the sector. This has resulted in Pharma companies using AI-powered advanced analytics techniques to get better insights into end users' behaviour patterns, response to marketing campaigns, product performance, and upcoming industry trends which if comprehensively analysed and interpreted can result in improved marketing and sales. Pharma companies are also harnessing the power of AI-led Analytics techniques to improve clinical trials, drug research, drug recommendation by analysing vast number of datasets produced through clinical trials and research.

AI-led Analytics is contributing to the Pharma industry in the following ways:

1) **Research Analytics**: AI and ML powered algorithms are being used to ingest, create, and analyse relationships between the large amounts of research data acquired from various sources.

2) **Predictive Analytics & Simulation**: AI is helping companies predict, the yield of the final product or drug, trials, experiments, and observations. AI models also consider a multitude host of parameters which can simulate the working of the end-products, this helps companies test the products before going to market.

3) **Optimization & Monitoring**: Machine Learning models perform the granular analysis of key metrics affecting the performance and provide insights to companies to improve the effectiveness and efficiency of the process.



AI-led Analytics in Action

British-Swedish Pharma Company

Pharma giant used **Azure's ML Platform and NLP** to create machine learning models for recommending drug targets

Leading Pharma Company

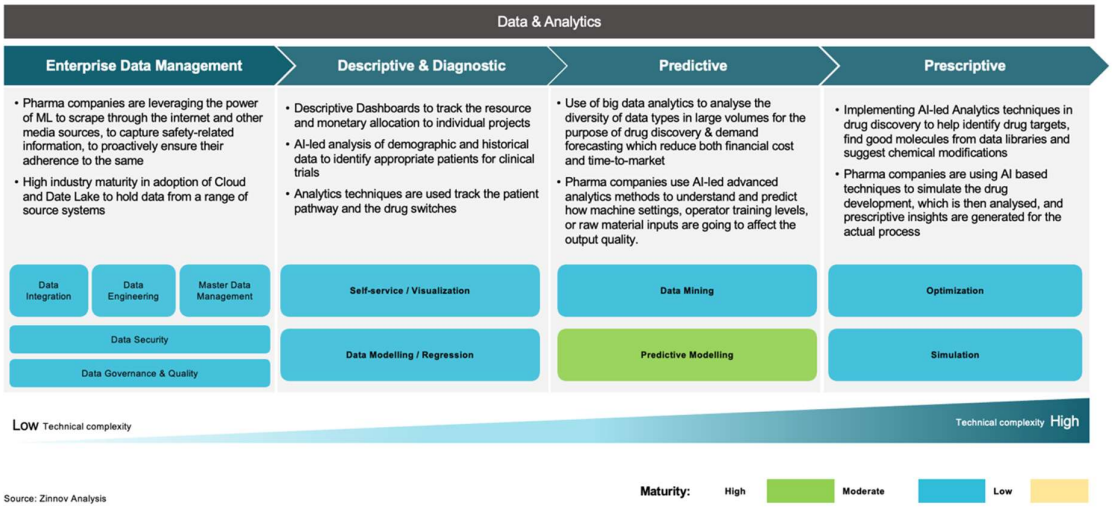
Used an **ML based approach to data mastering on AWS**, to obtain a global view of its consumer products and improve sales strategies

Multiple Pharma Doyens

Leading Pharma companies are using **AI-powered predictive search analytics** to comb through unstructured data of patents, clinical trials and scientific publications efficiently and fast track the development process

D&A Maturity

Pharmaceutical companies have always relied on empirical data to identify patterns, test theories, and understand the efficacy of treatments. The capability now exists to process and make sense of that data through analytic technology, and it represents a great opportunity for scientists and pharmaceutical companies. The industry is now transitioning from having been one of the laggards in the adoption of new-age Analytics to having widespread adoption of Analytics across the entire Pharma value chain.



D&A Use-cases

Implementation of Big Data Analytics is enabling faster data processing, which is, in-turn, allowing organizations to support scientific analytics and derive more focused business outcomes for next-gen research. Pharma companies are looking to tap into the massive potential of Analytics techniques by using it right from accelerating drug discovery, all the way to better understand patient trends and behaviour.

Use Cases	Description
Research Analytics	• Use of big data analytics to analyze the diversity of data types in large volumes for the purpose of **drug discovery** & demand forecasting is gaining increased traction • Pharma companies are utilizing Big Data to analyze large amounts of scientific data together with **ML-based algorithms** to discover connections between drugs and diseases • **A Pharma giant** has partnered with IBM Watson, **using AI and big data analysis**, to power its search for immuno-oncology new drugs – which will enable researchers to analyze and test hypothesis to generate evidence based real time insights
Predictive Analytics & Simulation	• Companies are utilizing **Computer Vision & Virtual Reality** coupled with **Data Analytics** techniques, to analyse and understand molecules and gene structures in life size • Leading companies use **AI/ML based algorithms** to predict trials, experiments and observational studies in clinical trials transforming key steps like study preparation to execution towards improving trial success rates • **A British-Swedish Pharma company** is using AI-powered Analytics platform which builds a knowledge graph of biological insights and facts, and powers a **predictive-recommendation system** for scientists to generate novel target hypotheses • **A leading Pharma company** is using **ML based algorithms** to study historical data and predict lost cellular information & associated gene data
Optimization and Monitoring	• Companies **use Data Analytics techniques** for the granular analysis of key metrics such as average ingredient cost per prescription, rebate as a percentage of total drug spending, drug utilization review savings per member per year • Companies are monitoring Patient feedback and using **AI-led Sentiment analysis** techniques to understand the end-customer better • Large Pharma companies are using **advanced analytics techniques** to monitor and analyse the parameters affecting yield and optimize yield of the final product

Digital Analytics Spend – CPG & Retail and TMT, inclusive of e-Commerce companies, constitutes ~ 50% of the total spend

The digital transformation has resulted in customers interacting with organizations increasingly through digital channels and often in an omnichannel mode where the customer engagement occurs on both digital and traditional channels. Digital business models produce a large amount of data for analytics from each and every recorded interaction with

the customer. Digital Analytics, thus, provides the organization with the opportunity to customize and personalize experience in real time.

Digital Analytics is part of Data & Analytics spend associated with digital business models across verticals. This includes analysing data collected from multiple digital channels such as email, websites, social media, and mobile applications associated with a customer's buying journey to uncover how they are behaving and what actions can be taken to improve their online experience. Digital Analytics, thus, refers to analytics that drives adoption of business models to digital streams and/ or omnichannel streams by organizations, who are also moving their customer engagement, customer acquisitions, customer commerce and customer service to these digital channels, which affects their downstream teams such as sales, marketing, and supply chain. This digital transformation results in a significant amount of data and information along with various types of problems.

Digital Analytics focuses on providing enhanced online experience, real-time or otherwise, to existing clients as well as potential customers, while also helping companies to obtain an insight into the areas where they need improvement to ensure market competitiveness. Some of the Digital Analytics applications (non-exhaustive) are:

1. **Customer Retention & Churn analytics**: Tracking customer behaviour and feedback in real-time to forecast demand, understand activities, and predict churn rate – and accordingly identify the reasons for attrition and proactively apply learnings to orchestrate the customer journey.

   Case-in-point: Amplitude announced *Journeys*, in 2020, which is an ML solution that help teams to focus on the most notable times of customer lifecycle. Journeys, by assessing the millions of potential outcomes along a customer path in real-time, centres teams on the precise moments that have the largest business effect, such as churns or journey paths that provide the best conversion.

2. **Customer Monetization**: Using AI technologies on audience data to determine which types of customers are most likely to respond to certain advertisements leading to cross-sell and up-sell.

   Case-in-point: e-Commerce players create targeted ads based on click insights of brands and advertisers for site monetization. This enables them to lower their prices, meeting the needs of their customers (i.e., brands and advertisers) while also helping them remain profitable.

3. **Product Discovery & Personalization**: Helping deliver the right product recommendation by using AI-based predictive recommendation engine helps businesses increase the potential Marketing ROI by optimizing their customer service efforts. It also helps in bringing flexibility in personalizing product offerings as well as cross-selling and up-selling new products.

   Case-in-point: Google launched *Product Discovery Solutions suite* for retail industry, in 2021. This suite enhances retailer's e-Commerce capabilities, along with providing enhanced customer experience. This is achieved by bringing together AI algorithms and Cloud Search for Retail, which leverages Google Search technology to power retailers' product recommendation and personalization.

4. **Customer Data Platform**: Helps in providing real-time information on 360-degree customer perspectives, thus unlocking the value of customer data. This leads to determining customer segmentation, what drives each conversion, and determining single customer view for campaign management.

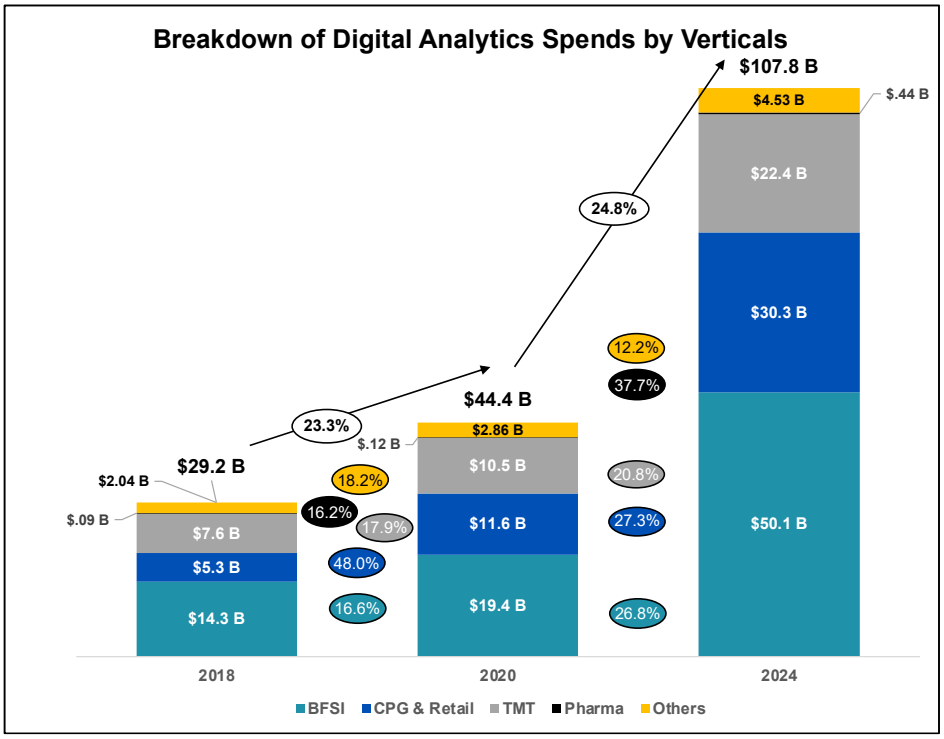
   Case-in-point: Adobe announced *Customer Data Platform*, in 2021, where users can merge, match, and analyse data using Adobe Analytics at any point in the consumer's digital journey, thus, helping in predictive intelligence and flexible reporting.

5. **Conversational intelligence** – Retrieving and analysing insights from customer interactions such as emails, chats, social streams, images, and videos in near real-time.

   Case-in-point: Veritone announced *Veritone's Interaction Analytics solutions*, in 2021, which are pre-configured AI solutions for conversational intelligence that instantly retrieve insights from customer interactions leading to smarter decision-making on enhancing customer satisfaction.

6. **Social Media Sentiment Analysis**: Analysing the voice of customer which includes review responses collected from social media. It combines monitoring, measurement, and analysis of user sentiment data of businesses, collected through social media platforms by associating it with e-Commerce sites. This helps in monitoring people, fostering relationships, and maintenance of brand image.

   Case-in-point: Prominent retailers, such as Amazon and Walmart, have successfully managed to harness the user sentiment data from different social media platforms, such as Facebook and Twitter, and subsequently analyse the voice of customer (including reviews) to improve user's online experience.



Others include Industrial, Energy and Utilities, Automobiles and Components, Material, Real Estate, Healthcare Provider, Biotech, Medical Device, and Travel & Hospitality

○ Digital Banking & Insurance

The BFSI vertical accounts for ~ 44% ($19.4 B) of the overall spend on Digital Analytics in 2020 because of sweeping digital transformation of banks globally, which has been massively accelerated by the pandemic. Modern customers have begun to place more importance on online banking capabilities. In a survey conducted in 2016, 66% of consumers said that a great digital presence is an important characteristic of their chosen bank[1]. This has forced banking institutions across the globe to launch new products and adjust their digital strategies with countries like Norway leading this mandate. The high internet penetration has resulted in 97%[2] and 96%[2] of the customers using digital banking services for bill payments and updating account details, respectively. Naturally, with the increased digital presence, banks have started to make the most of the large amounts of data at their disposal by leveraging analytics techniques to have a data-driven approach to decision making across their Mortgage/ Mortgage re-financing, Wealth Management, Checking Account Management and Credit Card offerings.

The Insurance market is also seeing rapid innovation in the growth of technology-enabled products and services. Data monetization is quickly finding increased focus in the industry, as a potentially new stream of revenue. Digital revenue is expected to be $480 B of the overall $7.5 T gross written premium (GWP) by 2025[3]. Insurance Companies are quickly realising the immense value that advance analytics techniques have to offer in accelerating their growth. Insurance companies, thus, are using analytics powered insights to understand customer demographics and reduce churn rate, mitigate risks & cyber threats, and most importantly improve customer experience.

○ D2C in CPG & Retail and TMT

The D2C (direct-to-customer) segment i.e. – online CPG, e-Retail commerce, and TMT companies - contributes about 49.8% of the overall spend on Digital Analytics (e-Commerce companies have been considered under the TMT vertical) and is expected to contribute approximately 48.8% by 2024. CPG and Retail vertical accounts for ~ 26.1% ($11.6 B) of overall Digital Analytics spend in 2020 and is expected to contribute approximately 28.1% by 2024, while TMT vertical, inclusive of e-Commerce companies, accounts for ~ 23.7% ($10.5 B) of overall Digital Analytics spend and is expected to contribute approximately 20.8% by 2024.

With retail companies across the globe looking at increased adoption of an omni-channel approach, the e-Retail market is seeing rapid growth. Retailers are pressed with finding ways to lower costs by fulfilling orders more efficiently to boost the bottom line. To address the fundamental issue with profits, while improving customer experience, retail companies are leveraging analytics techniques to take a obtain insights on Product Recommendations, Market Basket analysis (to group products bought together), Price Optimization, and Demand Forecasting, among others.

The online CPG Digital Analytics spend has been seeing enormous growth with the Online CPG sales in the US increasing by ~$63 B[4] in 2020, as compared to 2019 (majorly driven by the food and beverage sales). The rise of smaller customer-centric, digital native brands has revolutionised the CPG industry. For example, D2C consumer brands like Dollar Shave Club doubled Gillette's sales in just three years[5]. With the rise in online sales, companies are

naturally gathering plenty of customer data which is being harnessed for the effective usage of analytics techniques for product personalization and customer monetization.

Consumers are constantly evaluating new brands, diminishing brand advocacy, and experimenting with new purchase channels to fulfil their needs that provide product benefit and add convenience to their lives while aligning with their larger societal and environmental goals. Traditionally, large CPG companies have primarily been brand-focused. However, with digitally native brands introduced in the recent few years and the impact of the COVID-19 pandemic, technology enhancements, and data privacy norms, CPG companies are required to build direct partnerships with end consumers and create a long-lasting relationship. Brands that have been able to construct D2C associations had to transform their internal and external business digitally, which have led them to commence programs that drive impact. To develop a strong D2C model, CPG companies are focussing on the following key elements:

- Connecting their own brand's assets with the consumers and invest in areas such as 'Consumer 360' as well as set up lifetime value and touchpoints.
- Understanding the rapidly changing consumer needs and perceptions to optimize product development and marketing.
- Demand sensing and onboarding onto the brand in an ongoing manner and beyond just sale.
- Own third party digital platform enablement with optimization to offer the right product at the optimum time and price with high-quality consumer experience.
- Agile supply chains and fulfilment channels.
- Personalization beyond marketing and foraying into innovation such as pack-format and product mix, which will help in satisfying consumer needs.
- Real-time competitive intelligence to update price and promotions for maximum revenue impact
- Revenue generation management: shifting from a traditional and historical view of reporting to a more dynamic and technology lead real-time solution; and
- Leveraging technology and AI to create personalized products and services for consumers.

e-Commerce is transforming the industry as the industry's sales in the US are expected to surpass $1 T, to make up 18.1% of the total retail sales by 2024[6]. Major e-Commerce players are increasing the adoption of advanced analytics methods to make their operations efficient, maximize profits, and gain a competitive edge over their rivals, which will also play a role in boosting the market growth. The global digital commerce industry is growing at a significant rate, with revenues amounting to US$ 4.2 trillion in 2020 and expected to reach US$ 5.4 trillion in 2022[7].

Every function of value chain is required to evolve to adapt to change when an organization engages in D2C services. e-Commerce and D2C companies are required to manage different GTM routes and set up targets, as well as track each of the targets for the said market, route, and channel. Large-sized organizations undertake substantial digital campaigns; and to track the efficacy, click-through rates, and return on advertising spend,

such organizations are required to build and set up a suitable tracking mechanism for each campaign and uniform resource locator ("URL") which would allow the consumers to arrive on the right digital platform. Organizations are required to manage product taxonomy and categorization through pre-defined e-catalogue templates. However, the marketing definitions on e-Commerce engines typically do not align with industry standards of the product and component definitions. e-Commerce also requires a different command over the supply chain than offline commerce and that is throwing up demand for supply chain analytics.

Apart from e-Commerce, digital payment companies such as PayPal, SQUARE, as well as new age OTT platforms, such as Netflix, Spotify, and digital gaming and e-sports companies such as Zynga, Electronic Arts, comprise the second biggest contributor group to the Digital Analytics spend in the TMT vertical. Making smart use of digital technologies created a wholesale digital transformation in Telecom, while Media & Entertainment sector witnessed a surge across content, distribution, consumption, and monetization as it pivoted towards a B2C operating model driven by the ability to create D2C relationships.

Digitalization offered Telecom companies an opportunity to rebuild their market positions and reimagine their business systems, thus enabling them to create innovative offerings for customers. Digital is now the leading channel in many customer-service transactions, as digital touchpoints now influence customers' preferences across the whole decision journey. Among these touchpoints, websites, and mobile apps both have influenced customers' brand preferences. It has been observed that, social media platforms play a part only in case of negative coverage which can hinder customer acquisition. Large telcos are already using real-time 360-degree data of customers to personalize promotions, campaigns, and service interventions along the entire customer journey.

Media & Entertainment companies are analysing the large amounts of data collected across their five segments – Cinema, Traditional Pay-TV and Video, OTT Video, Video games and e-Sports, and Internet advertising – to drive their D2C relationships. Among them, the Internet advertising industry segment accounts for approx. 50% of M&E Digital Analytics spend and will grow at a healthy rate of CAGR 7.5% between 2020-2024. This is expected despite the potential hurdles in the space, such as anti-trust lawsuits against the leading players in the market, the continued crumbling of the cookie and policies restricting the viability of mobile identifiers within programmatic advertising environments, and the continuing threat of ad fraud[8].

***Glossary*:**

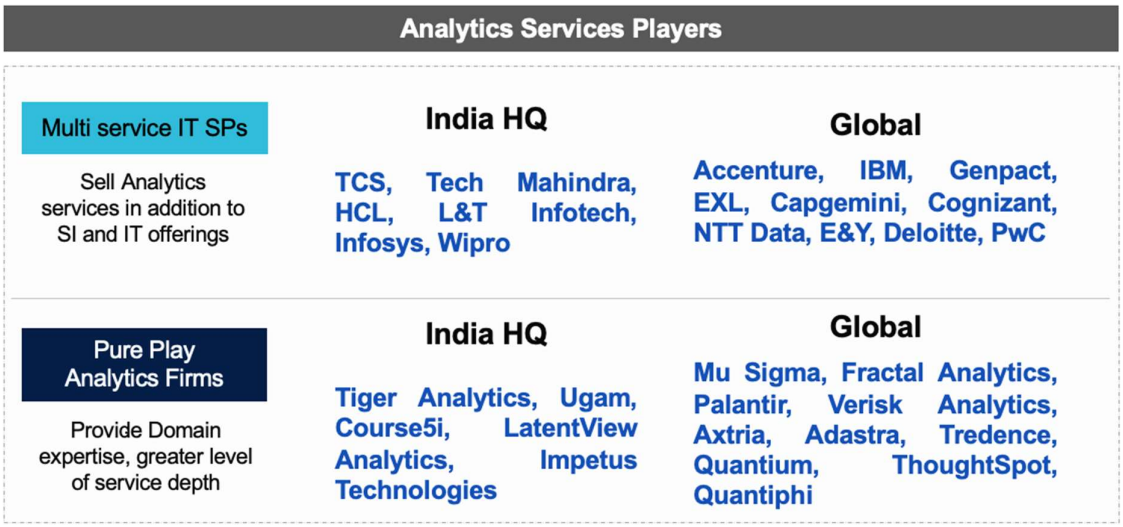
1. 2016 Global Consumer Banking Survey by Ernst & Young
2. "Recognizing the value of bank branches in a digital world" by Deloitte Center for Financial Services
3. "Insurance Revenue Landscape 2025: Innovate for Resilience" by Accenture Research
4. "Online CPG Sales in US are booming, but there is still room for growth" – Analysis by Nielson IQ
5. Perspective published by Digital Commerce 360 - "Brands selling direct: What does Unilever's $1 billion bet tell us?" (July 21, 2016)
6. "Data Analytics in E-Commerce Retail" published by Towards Data Science in Medium (Nov 09, 2020)
7. Retail Ecommerce Sales Worldwide, 2019-2024 chart in the article "Worldwide ecommerce will approach $5 trillion this year" published by Insider Intelligence Inc. in eMarketer (Dec 12, 2020)
8. "Power Shifts: Altering the dynamics of the E&M industry" – perspective from Global Entertainment & Media Outlook 2021-2025 by PwC

D&A Addressed Market overview

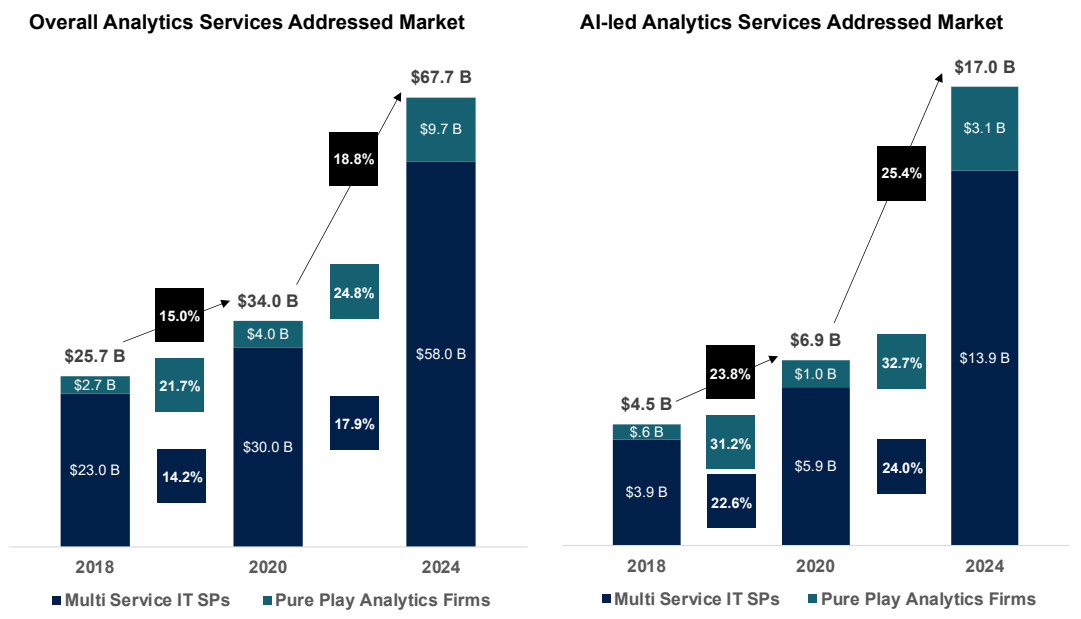
The analytics capability is no longer restricted to MNCs, domestic IT companies, and global centres of enterprises. Additionally, the broader data science domain has transformed beyond just supporting business functions. Analytics has now emerged as a necessary capability across organizations, with businesses developing data science capabilities that transcend the entire business model and operational value chain of companies. Companies across verticals, including CPG & Retail and TMT, are increasingly adopting analytics, and investing both capital and operational resources in the Data Science domain to gain a competitive edge in the market.

Increasing demand for Advanced Analytics functions and lack of in-house talent are the reasons driving the demand for outsourced Analytics services. Moreover, advanced analytics is a highly value-added segment in the analytics industry with the ability to target higher billing rates. The Analytics services market is addressed broadly by two types of players:

1. Multi Services IT SPs who offer analytics offerings at scale along with their System Integration (SI) and other IT offerings. The advantages of this setup are –
   - Large IT SPs have access to a large client base to cross sell analytics offerings along with other IT/BPM requirements.
   - During the course of engagements, it is easier for large IT SPs to provide enterprises with scale in terms of resources, skill-sets, and geographical presence.
2. Pure Play analytics players who solely provide niche analytics offerings. Advantages of this setup are –
   - Focused Analytics Domain expertise and offerings as the main differentiator.
   - Can provide greater level of service depth and talent for analytics to enterprises as compared to large IT SPs.



The overall analytics services market size was $34.0 B in 2020 and is expected to grow at a CAGR of 18.8% and poised to touch $67.7 B in 2024. AI-led analytics services market was $6.9 B (20% of overall analytics addressed market) in 2020 and is expected to grow at 25.4% CAGR to $17.0 B (25% of overall analytics addressed market) by 2024.



Source: Zinnov Analysis

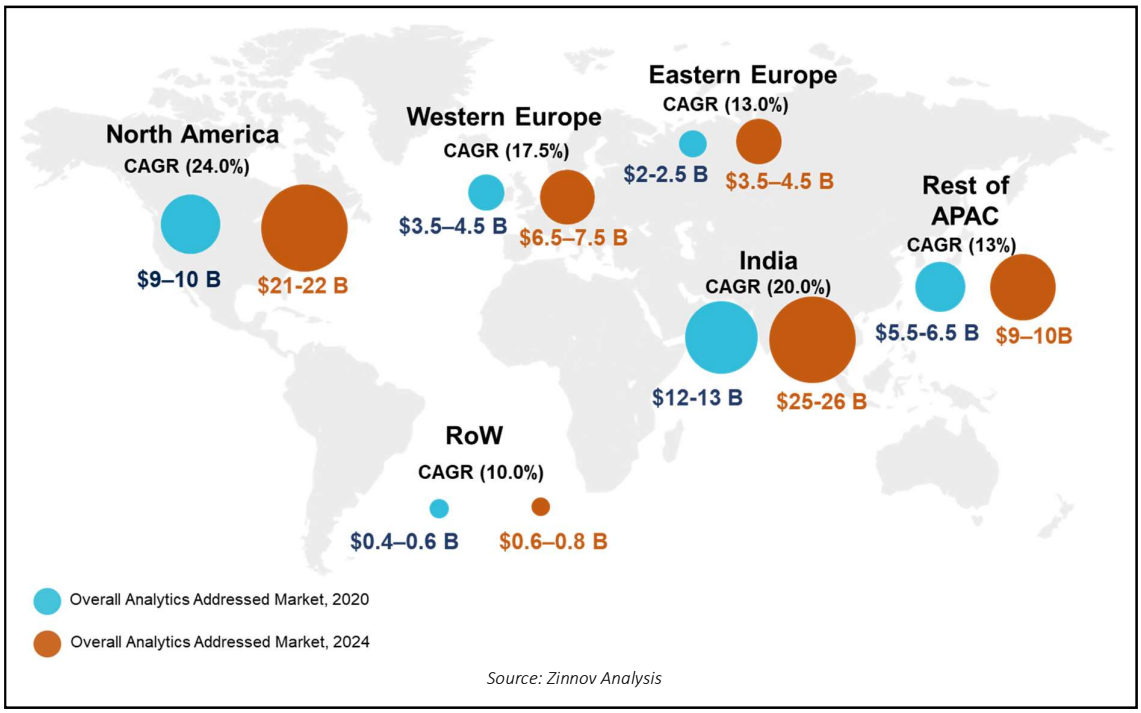
While for Pure Play analytics firms, the overall analytics services market size is expected to grow at CAGR of 24.8% (2020-24), AI-led analytics services market size is expected to grow at CAGR 32.7% (2020-24). In contrast, Multi Service IT SPs' overall analytics market size is expected to grow at 17.9% CAGR (2020-2024), while AI-led analytics services delivery market is estimated to grow at 24.0% (2020-2024). AI-led Analytics services constitute 20% of Multi Service IT SPs' addressed market, and 25% of Pure Play analytics firms addressed market in 2020.

- The services market is highly fragmented with the top 5 players, which are Multi Service IT SPs, making up 35% of the overall analytics services addressed market and 42% of AI-led analytics services addressed market.
- Multi services IT SPs have vast experience in providing EDM services at scale, whereas Pure Play analytics players are trying to build differentiation by offering targeted Descriptive, Diagnostic, as well as Predictive Analytics offerings. The focus of the Pure Play Analytics Players on these growth areas coupled with the strong capabilities that they have built across advanced technologies (AI/ML, NLP, etc) is expected to drive high growth rates among this category as compared to the multi-service line players. Pure Play Analytics firms also have a strong focus on building IPs and solutions targeting industry specific use cases
- Globally, there is a rising acknowledgement in the market of the niche capabilities being developed by the category and as a result the total Pure Play analytics services market is expected to grow at a CAGR of 24.8% from $4 B to reach $9.7 B in 2024.

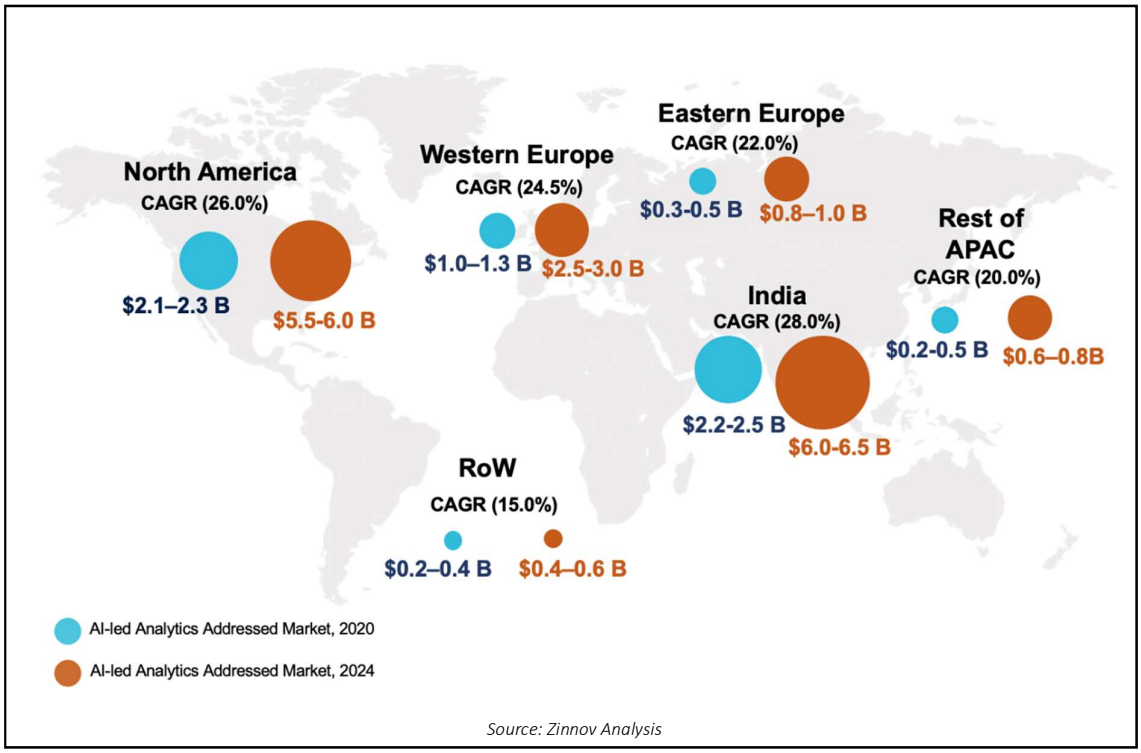
Global Analytics Services Delivery Footprint

India is the top outsourcing destination for analytics, and Indian companies including Multi Service Providers (ex: TCS, Infosys, Tech Mahindra, Persistent etc) and Pure Play Analytics

firms (ex: Mu Sigma, Fractal Analytics, LatentView, Course5i, etc) have a share of ~40% of the overall analytics addressed market, and 33% of AI-led analytics services addressed market in 2020. The overall Indian analytics services delivery market is estimated to grow at a ~20.0% CAGR (2020-2024), while AI-led analytics services delivery market is estimated to grow at ~28.0% (2020-2024).



Source: Zinnov Analysis

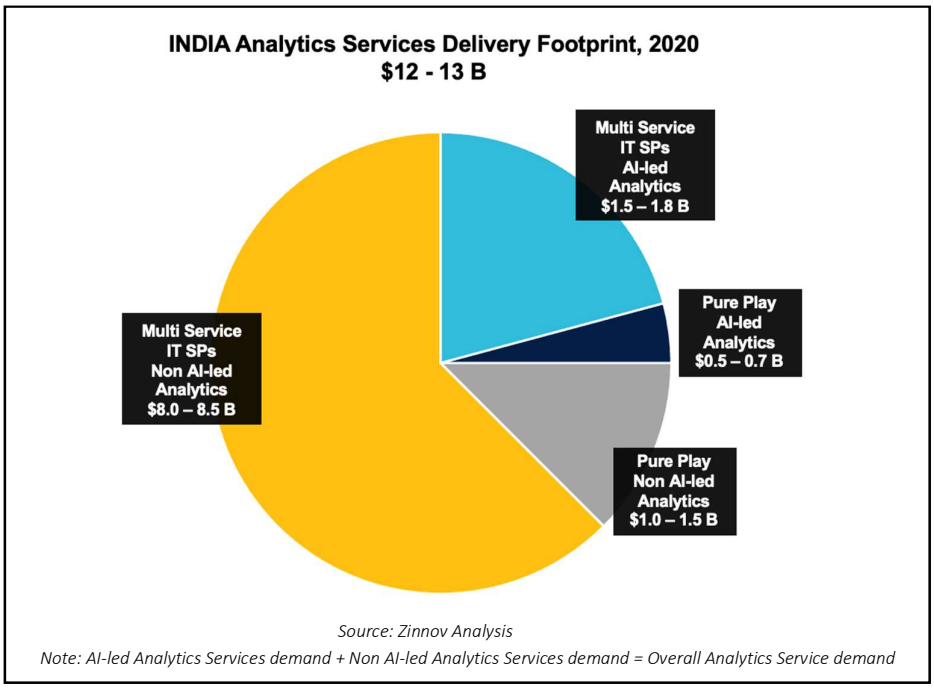


Source: Zinnov Analysis

North America (NA) and Western Europe (WE) have a larger concentration of Pure Play Analytics players, who create differentiation through their expertise in niche solutions and products. NA & WE have a share of ~27% & 12% of the overall analytics addressed market and 32% & 17% of AI-led analytics services addressed market, respectively in 2020. North America's overall analytics services delivery market and AI-led analytics services delivery market are estimated to grow at ~24.0% & ~ 26.0% CAGR (2020-2024) respectively.

Players from different geographies have distinct characteristics as outlined below –

- The large Multi Service Providers (Accenture, Cognizant, etc.) are dominant in North America along with Pure Play analytics firms and staffing companies who cater to the onshore demand of North American customers.
- Indian SPs address the demand from across the globe and the market is dominated by Multi Service IT Providers driving $9.5-10.5 B of overall analytics services revenue and $1.5 - 1.8 B of AI-led analytics services revenue. This is followed by Pure Play Analytics firms contributing $1.5 - 2.5 B of overall analytics services revenue and $0.5 - 0.7 B of AI-led analytics services revenue.



- Service Providers from China and Japan largely cater to the analytics spend of local TMT companies.
- UK and Ireland serve as the hub for analytics delivery in Western Europe, largely through Pure Play analytics firms and Consulting companies. Large Multi Service Providers (Capgemini, Accenture, etc.) are dominant in France and Germany.
- Eastern European market is dominated by Multi Service Providers. They are still largely seen as System Integrators who cater to the less complex spectrum of analytics outsourcing.

FAGMA companies (Facebook, Apple, Google, Microsoft, Amazon) outsourcing deep dive

FAGMA companies outsourced a sizeable portion of their traditional as well as AI-led analytics work to Service providers in 2020, across the D&A value chain. And this outsourcing spend will continue to grow. Some of the notable outsourced work streams are discussed below:

Facebook: Facebook has outsourced work related to content moderation as well as part of its analytics/AI ML projects to flag/censure content. Some of the outsourced activities in D&A segment are:

Traditional Analytics:

- Design, build, and maintain data pipelines for data warehouses; optimization of existing data pipelines; database management, and BI for data center operations

AI-led Analytics:

- Build and deploy AI/ ML models for Facebook Ads
- Testing of Artificial Intelligence System to assess video and picture contents on FB
- Application of e-Content AI for marketing operations

Apple: Business Units such as App store, Apple Pay & iOS are outsourcing as Apple is leveraging technologies like AI, sensors, and analytics to personalize user experience, enhance features of its hardware devices and use computer vision to improve security across different product lines. Some of the outsourced activities in D&A segment are:

Traditional Analytics:

- Development of ETL program related to usage of different applications on App Store (data is received from the Hadoop cluster via agents and subsequently being sent for further downstream processing for loading into database)

AI-led Analytics:

- Development of classification model using ML and DL algorithms
- Developing Conversational Kit, an internal Apple application, built on ML to automate conversations for common contact drivers
- Apple Care customer analytics to deliver personalized solutions to customers (using ML technique to predict Apple Care product in relation to purchased Apple product)

Google: Ads & Analytics and Search & Explore business units outsource large portion of their D&A spend. Some of the outsourced activities in D&A segment are:

Traditional Analytics:

- Managing Geo Database and collection of data from various sites to help improve the accuracy of the user-locator element of Google's mapping services

AI-led Analytics:

- Content operations for Knowledge Graph, which is used by google to enhance its search engine results and perform data quality analysis
- Providing linguistic support to Google Assistant which involves developing and maintaining ontologies, writing grammar rules, POS tagging, phonetic transcription
- Analysis of optical character recognition that helps to identify text by scanning and integrated with google pixel

Microsoft: Microsoft Office and Microsoft Dynamics are the highest outsourcing business units within Microsoft, followed by Azure. Outsourcing for Azure continue to rise as Microsoft attempts to address scalability and faster time to market. Apart from these, End-of-Service products require outsourcing partnerships to reduce costs and focus on business priorities. Some of the outsourced activities in D&A segment are:

Traditional Analytics:

- Development of Power BI application dashboard to capture and reporting gaps
- Development, Testing, and Maintenance of Digital Store Analytics, a BI platform to track customer behaviour, track sales performance, and analyse optimization efforts.

AI-led Analytics:

- Developing propensity models to prioritize audience targeting to increase adoption rate of the Azure Services
- Game telemetry analytics and UX research with the Xbox Research team
- Testing of Human-Machine Interaction among Microsoft Surface and other devices

Amazon: AWS has been outsourcing part of its development work on vertical specific customization/integration which is happening across multiple product groups. Feature development and lifecycle management are also their key outsourced areas. Some of the outsourced activities in D&A segment are:

Traditional Analytics:

- Development of BI tools to understand customer purchasing trends
- Developing an end-to-end BI solution for a financial module called ER Actuals
- Development of the ETL program using Informatica to create mapping to extract data of all the orders, sales, invoice, customer, and store in Amazon DWH for reporting

AI-led Analytics:

- Amazon Redshift data upload using AWS(S3) and migration of Oracle data to AWS Redshift using Amazon ETL tools

Emerging Trends of Outsourced Analytics Services market

Owing to the huge growth in demand and a highly fragmented market, multiple trends have been emerging across SPs addressing this market. Some of them are –

1. **Convergence of Artificial Intelligence (AI) with Data Science to deliver smarter insights and faster outcomes –**

   AI-led Analytics is becoming –

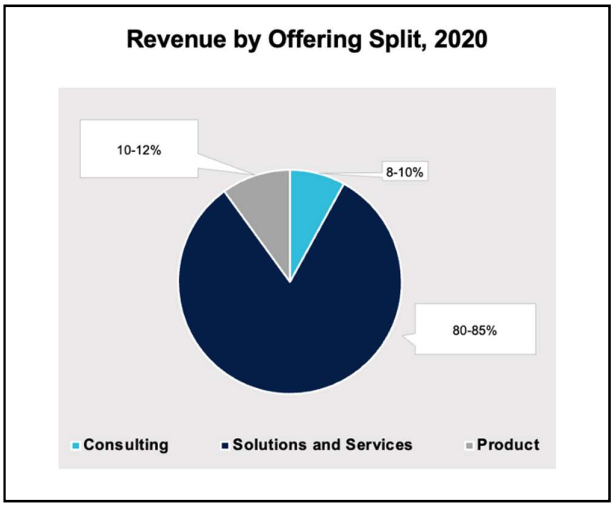
   - More efficient – through automation.
   - More accessible – through improved User Interface (NLP enables analytics tools to understand natural language queries).
   - More powerful – since previously difficult to analyse data such as text and videos are now easily analysable.

   SPs are now investing heavily in R&D as well as in tech partnerships and academic collaboration to develop AI-led analytics products and solutions. SPs are also building solutions and IPs for various industry use-cases and horizontal functions by leveraging AI. Thus, they are obtaining domain expertise in offering analytics solutions to various sectors like BFSI, Tech, Retail, Pharma. Some notable examples include:

- AbsolutData – *Navik Marketing AI:* Customer-driven Marketing
- Fractal – *Qure.AI:* AI for Radiology
- Bridgei2i – *BridgeFunnel:* AI-powered Sales Assistant
- Capgemini – *Perform AI:* Insights for designing and launching new products, services, business models by leveraging AI.
- Course5i – *Discovery:* NLP driven platform providing conversational insights through AI based voice and chat intelligence

2. Focus on delivering end-to-end Analytics offerings

SPs are now seeing analytics as a key initiative in all digital transformation initiatives across enterprises and are helping them define a roadmap. Consulting-led Analytics engagements, usually high margin engagements for SPs, are forming 8-10% of the total addressed market, followed by software product-led analytics service or productized-services which constitutes 10-12% of the total addressed market.



The SPs are offering specialized analytics products and massively replicable frameworks that can be used by clients for quick insights, real time tracking, quick time to market, etc. These SPs are differentiating themselves by developing the ability to address digital business models through selling their offerings over a digital platform, building SaaS analytics products, etc.

3. Increasing consolidation of the Analytics Services addressed market by large IT players

The Pure Play Analytics Service Provider market is highly fragmented with a long tail of specialized SPs. Multi Service Providers (mid-sized and large) are adding niche analytics capabilities through tuck-in acquisitions of small Pure Play Analytics companies.

- Infogain, a mid-sized IT player, acquired AbsolutData – a provider in AI-led analytics, in October 2020
- Cognizant acquired Servian, a Data Consulting company, in April 2021
- Accenture acquired CoreCompete, a specialized Supply Chain Analytics SP, in April 2021
- Zensar, a mid-sized IT player, acquired M3BI, a data engineering firm, in May 2021.
- Accenture acquired Bridgei2i, a provider in AI-led analytics, in October 2021

GCC vs Outsourcing Service Providers

Demand for Data and Analytics (D&A) and Artificial Intelligence (AI) & Machine Learning (ML) technologies has grown drastically over the years. Enterprises are placing huge bets on products and solutions built on new-age concepts such as facial recognition, AI-based chatbots, digital healthcare, self-driving vehicles, etc. Companies across industries, such as BFSI, Automotive, Healthcare/ Lifesciences, Retail, and CPG, TMT (Technology, Media & Entertainment and Telecom) derive value and generate revenue by leveraging these technologies. To meet these demands, companies are either setting up in-house Global Captive Centers (GCCs)/ Global Centers of Excellence (GCoEs) or are outsourcing to service providers (SPs) across globe.

Depending on the level of maturity of GCCs, they can be classified into –

i) *Low maturity centers* – these are the newly established centers that act as support centers/ delivery centers and are involved mostly in same kind of work that is outsourced to SPs such as Big Data management, Operational Analytics, BI & Reporting (Descriptive & Diagnostic analytics), etc. They generally have nascent AI/ML technologies adoption.

ii) *Medium maturity centers* – these are the established centers in Data and Analytics and/or AI/ML technologies. These centers have significant engineering and portfolio leadership and engage in significant ecosystem engagements, including collaborations with SPs in setting up joint center of excellences (COEs), design studios, analytics labs, etc.

iii) *High maturity centers* – these centers act as transformation hubs as they own multiple technology driven transformation objectives, global change management projects, and deliver a direct impact on the bottom-line of the enterprise vis-à-vis these initiatives. These centers, not only have multiple ecosystem engagements but also are found to outsource D&A work to matured Service Providers.

Enterprises across the globe are either setting up joint GCCs or collaborating with SPs to make the most of their distinguished capabilities and technical know-how, particularly in the areas of Big Data Management, Operational Analytics, BI & Reporting. Some of the notable examples are:

Strategic Alliance between CoE of Enterprise Software company and leading Indian multi-service IT SP

As part of a strategic alliance, the COE collaborated with the SP on **AIOps and Analytics** work. The collaboration enabled the Software Company's clients to leverage its services **powered by the SP's Infrastructure Services** (Cloud Operations, Hybrid & Multi-Cloud Management Platform), leading to faster time to market.

Mortgage Finance Software company outsources to mid-tier multi-service IT SP

The Indian GCC of the cloud based mortgage finance software company outsourced work related to **Data Stack Modernization** to the Indian IT SP to deliver data monetization **by moving to AWS and Snowflake**. This resulted in reduction of infrastructure costs and addition of new revenue streams.

Data Center CoE of leading Indian multi-service IT SP was leveraged by Large US Bank's GCC

The SP's Open Data Center, which is a **CoE of Software Defined Infrastructure (SDI)** was leveraged by a large US bank. The collaboration involved **migration of Hadoop platform to AWS** and helped the bank reduce its infrastructure costs and optimize it's data centre footprint.

Course5i's Positioning and Competitive landscape

About Course5 Intelligence Limited (Course5i)

Course5 Intelligence Limited is one of the leading Indian* Pure Play Data Analytics & Insights companies in terms of revenues in FY 2020, with a strong focus on AI capabilities across its products and services offerings. With a dedicated AI Lab and a strong bank of IPs, the company has emerged as a trusted partner for leading enterprises looking to develop next-best-experience solutions for their customers. Course5 Intelligence Limited is an independent Digital Analytics and Marketing & Customer Analytics company, with a deep understanding of the omnichannel customer journey coupled with an ability to work on Digital, Social, Syndicated, and Survey data. Course5 Intelligence Limited has been providing business impact from analytics, insights and applied AI to global customers.

Course5 Intelligence Limited has significant expertise in analytics for Digital, D2C and Omnichannel models, which includes areas such as customer analytics, supply chain analytics, enterprise AI and social media analytics and insights.

Course5 Intelligence Limited provides services to four out of the seven world's largest companies by market capitalization as of November 30th 2021, four out of the top ten pharmaceutical companies in terms of net revenue in 2020, and two out of the five largest CPG companies in terms of net revenue in 2020. The company's offerings are across high growth verticals such as TMT, Retail & CPG, and Pharmaceutical, with a focus in Customer Analytics, Sales & Marketing Analytics, and Supply Chain Analytics.

** Indian – Companies who have entities incorporated in India*

Competition

The competition for Course5i consists of Analytics Service Providers in 2 broad categories:

1. The large Multi Service IT Providers – Providing multiple service offerings and have an ability to offer analytics services at scale. Multi-Service IT SPs like Accenture, TCS, Genpact, EXL and LTI have been included for comparison as they have manged to scale up their analytics business by offering similar offerings and serving similar markets as compared to Course5i.
2. Pure Play Analytics players – Specialize in only analytics services and offer an in-depth understanding of solving complex customer problems. Pure Play Analytics Companies like Tiger Analytics, Fractal Analytics, LatentView Analytics, ThoughtSpot and Palantir have been included for comparison as they offer similar offerings and services, target similar market segments and are of similar size as compared to Course5i.

Companies Overview

Course5 Intelligence Limited has been providing business impact from analytics, insights, and applied AI to global leaders in the AI industry. The company serves some of the prominent players in the TMT, Pharmaceutical, CPG & Retail verticals in the US helping them solve Data & Analytics problems. Key Pharma and CPG players in Europe are also clients of the company.

Multi Service IT SPs

		Accenture	TCS	Genpact	EXL	LTI	Course5i
Overview	Founded	1989	1968	1997	1999	1996	2000
	HQ	Dublin, Ireland	Mumbai. India	New York, USA	New York, USA	Mumbai, India	Mumbai, India
	Key Delivery Locations	US, UK, Germany, India, Philippines	US, UK, Ireland, India	US, UK, Germany, Romania, India	US, UK, India, Philippines, Romania	US, India, France, UK, South Africa, Poland, Luxembourg	US, India
	Customer Geography	USA, Europe, APAC	USA, Europe, APAC	USA, Europe, APAC	USA, Europe, APAC	USA, Europe, APAC	USA, Europe, APAC
	Industry Exposure	• Technology, Media, Telecom • Healthcare • Retail & CPG • Chemicals & Natural Resources • Banking & Financial Services • Transportation & Logistics	• Banking & Financial Services • Technology, Media, Telecom • Healthcare • Public Services • Industrials & Manufacturing • Retail & CPG • Transportation & Logistics	• Banking & Financial Services • Technology • Retail & CPG • Life Sciences • Media and Entertainment • Aerospace & Defense • Energy • Chemicals • Automotive	• Banking & Financial Services • Healthcare and Life Sciences • Retail • Transportation and Logistics • Travel • Media and Entertainment	• Banking & Financial Services • Retail & CPG • Energy & Utilities • Technology • Healthcare and Life Sciences • Media and Entertainment • Manufacturing	• Technology, Telecom and Media (TMT) • Life Sciences • Retail and CPG • Telecom & Media

Pure-Play Analytics Firms

		Tiger	Fractal	LatentView	ThoughtSpot	Palantir	Course5i
Overview	Founded	2011	2000	2006	2012	2003	2000
	HQ	California, USA	New York, USA	New Jersey, USA	California, USA	Colorado, USA	Mumbai, India
	Key Delivery Locations	US, UK, India, Singapore	US, India	US, India	US, India	US, UK, Germany, France, Singapore	US, India
	Customer Geography	USA, Europe, APAC	USA	USA, Europe, APAC	USA, Canada, Europe	USA, Europe, APAC	USA, Europe, APAC
	Industry Exposure	• Retail & CPG • Banking & Financial Services • Industrials & Manufacturing • Technology, Media, Telecom • Transportation & Logistics	• Retail & CPG • Healthcare • Banking & Financial Services • Technology, Media, Telecom	• Technology • Retail & CPG • Banking & Financial Services • Industrials	• Banking & Financial Services • Retail & CPG • Healthcare • Technology • Industrials & Manufacturing • Transportation & Logistics	• Retail and CPG • Energy & Utilities • Banking & Financial Services • Healthcare • Industrials & Manufacturing • Technology, Media, Telecom • Transportation & Logistics	• Technology, Telecom and Media (TMT) • Life Sciences • Retail and CPG • Telecom & Media

Key Financial Figures

Large IT Service Providers make up ~85%+ of the addressed market in 2020, given their scale and access to large accounts. While the analytics market grew by ~16.0% CAGR (2018-20), the Indian IT SP analytics revenues have grown by ~20.0% CAGR (2018-20), owing to increased demand in offshore outsourcing. The Pure Play Analytics companies have grown by 25-30% CAGR (2018-20), driven by a focus on large accounts and their ability to differentiate by providing an in-depth understanding of customer problems.

FY20-21/ CY 2020 Financial Metrics

Multi Service IT SPs

	Accenture	TCS	Genpact	EXL	LTI	Course5i*
	Sep 2020-Aug 2021	Apr 2020-Mar 2021	Jan 2020-Dec 2020	Jan 2020-Dec 2020	Apr 2020- Mar2021	Apr 2020- Mar2021
Revenue	USD 50,533 M	INR 1,641,770 M	USD 3,709 M	USD 958 M	INR 123,698 M	INR 2,572 M
2 Year CAGR (FY 2019-21/ CY 2018-20)	8.1%	5.9%	11.2%	4.2%	14.4%	5.2%
EBITDA Margin	16.7%	27.4%	16.9%	16.2%	20.6%	18.7%
PAT Margin	11.7%	19.8%	8.3%	9.3%	15.7%	11.6%
Employee Expense %	67.6%	55.9%	64.8%	65.1%	60.1%	49.0%
Return of Equity	30.7%	37.7%	16.8%	12.4%	26.5%	22.3%
DSO	70	90	87	57	95	73

*Based on Company Financials

Pure-Play Analytics Firms

	Tiger	Fractal	LatentView	ThoughtSpot	Palantir	Course5i*
	Apr 2020-Mar 2021	Apr 2020-Mar 2021	Apr 2020- Mar2021	Apr 2020- Mar2021	Jan 2020-Dec 2020	Apr 2020- Mar2021
Revenue	INR 1,314 M	INR 8,921 M	INR 3,267 M	INR 817 M	USD 1,093 M	INR 2,572 M
2 Year CAGR (FY 2019-21/ CY 2018-20)	68.6%	19.5%	4.4%	64.4%	35.5%	5.2%
EBITDA Margin	12.5%	13.3%	38.4%	16.9%	(106.1%)	18.7%
PAT Margin	7.9%	4.0%	28.0%	10.7%	(106.7%)	11.6%
Employee Expense %	78.6%	73.9%	57.9%	68.2%	32.3%	49.0%
Return of Equity	127.9%	11.5%	20.9%	47.7%	(76.6%)	22.3%
DSO	34	59	73	39	52	73

*Based on Company Financials

FY19-20/ CY 2019 Year Financial Metrics

Multi Service IT SPs

	Accenture	TCS	Genpact	EXL	LTI	Course5i*
	Sep 2019-Aug 2020	Apr 2019-Mar 2020	Jan 2019-Dec 2019	Jan 2019-Dec 2019	Apr 2019 - Mar 2020	Apr 2019 - Mar 2020
Revenue	USD 44,327 M	INR 1,569,490 M	USD 3,521 M	USD 991 M	INR 108,786 M	INR 2,654 M
EBITDA Margin	16.3%	26.0%	14.8%	13.5%	17.2%	11.7%
PAT Margin	11.5%	20.6%	8.7%	6.8%	14.0%	6.4%
Employee Expense %	67.5%	54.8%	65.2%	66.1%	59.9%	52.3%
Return of Equity	30.5%	38.6%	18.0%	10.1%	28.1%	16.3%
DSO	65	94	95	64	107	99

*Based on Company Financials

Pure-Play Analytics Firms

	Tiger	Fractal	LatentView	ThoughtSpot	Palantir	Course5i*
	Apr 2019 - Mar 2020	Apr 2019 - Mar 2020	Apr 2019 - Mar 2020	Apr 2019 - Mar 2020	Jan 2019 - Dec 2019	Apr 2019 - Mar 2020
Revenue	INR 836 M	INR 7,903 M	INR 3,297 M	INR 558 M	USD 743 M	INR 2,654 M
EBITDA Margin	11.1%	0.8%	30.3%	16.0%	(72.8%)	11.7%
PAT Margin	7.1%	(9.7%)	22.1%	10.3%	(78.1%)	6.4%
Employee Expense %	72.7%	76.6%	63.8%	61.8%	32.6%	52.3%
Return of Equity	81.4%	(27.8%)	20.9%	60.1%	(395.4%)	16.3%
DSO	41	73	62	18	25	99

*Based on Company Financials

Glossary:

1. *Global IT Service provider's revenue includes analytics as well sales from other services*
2. *Return on Equity is calculated as (Net Income after Tax – Minority Interest in Earning) / Total Common Equity*
3. *PAT Margin is calculated as Income after Tax / Total Income (Operation and Other)*
4. *DSO is calculated as (Year-end trade receivables * 365) / Revenue from Operations*
5. *Employee Expense % is calculated as (Employee Benefits Expenses / Income from Operations); wherever Employee Benefits Expense(s) is not reported in the Annual Report, Cost of Revenue(s) or Cost of Service(s) has been used instead*
6. *Private company information is taken from Ministry of Corporate Affair (www.mca.gov.in)*
7. *Financial figures for ThoughtSpot represent the data for "ThoughtSpot India Private Limited" entity registered in India*
8. *Financial figures for Fractal Analytics represent the data for "Fractal Analytics Private Limited" entity registered in India*
9. *Financial figures for Tiger Analytics represent the data for "Tiger Analytics India LLP" entity registered in India*

IP/ Product Offerings

While the large multi service SPs have access to big accounts and can provide scale, the Pure Play Analytics players are identifying niche solutions to cater to. They are building product solutions in Descriptive and Diagnostic solutions and Predictive Analytics segments which are expected to offer the highest growth. Leveraging product offerings and end to end analytics solutions including consulting services, is expected to help Pure Play players to break free from the linear growth, create differentiation, and increase their profit margins much faster than the larger players. Course5i has carved out a niche for itself by developing an independent AI lab to focus on creating AI and IP led innovation.

Non-exhaustive list of IP/Solutions/Services offered by large IT SPs and Pure Play Analytics players across different analytics segments:

Multi Service IT SPs

	Accenture	TCS	Genpact	EXL	LTI	Course5i
Solutions/IP/Products	• **Intelligent Data Suite (IDS)** – Optimizing data capital to draw useful insights • **AIP+** - AI powered services leveraging data to generate insights • **Warranty Analytics** – Estimates probability of suspicious activity and detects fraud • **Energy Predictive Analytics** – Machine based monitoring of energy spend and leakage • **Lender Channel Analyzer** - improves the lending process for residential mortgages • **Procurement Market Intelligence Advisor** – Generating reports to formulate supplier development strategies • **Data Veracity** – addressing inaccurate data by assessing the quality, risk and relevance • **myWizard Analytics** – data driven knowledge management	• **ADD platform** - Analytics & Insights, AI-powered adaptive monitoring solution • **PredictCX** – Forecasting Customer experience • **DATOM** – Prescriptive analysis of data • **MFDM™ Enterprise, Decision Fabric** – combination of AI and analytics to analyze structured and unstructured data • **Vitellus** – BI Platform • **Active Archive** - Store structured & unstructured data • **DAEzMO** - modern data warehouse/data lake implementation, and data marketplace set-up	• **Cora APFlow & Cora ARFlow**– AI based platform helps in prioritizing Account Payables and Account Receivables respectively and in data visualization • **Cora OpsManager** – Advanced dashboard and reporting tool gives managers the visibility they need to track, troubleshoot, and respond to issues to improve customer service metrics • **Cora LiveSpread** – AI solution to automate financial spreading that provides auditable insights • **CoraOrderAssist** – ML powered order management solution provides insights to reduce cost-to-service • **Cora LiveWealth** – AI powered wealth management offering automates all forms of data gathering, digitization and normalization	• **EXL Exelia.AI** – AI powered solution which make consumers self sufficient and able to instantly solve their queries through next-gen natural language processing and contextual understanding • **EXL Smart Audit** – Predictive AI powered solution which highlights gaps and provides insights on the audit process • **EXL Paymentor** – AI based collections and receivables management solution which helps improves debt collection by increasing liquidation rate and improves customer experience/retention • **EXL Xtrako.AI** - AI/NLP powered content extraction solution with a Capability to ingest and process multiple document types	• **LTI Mosaic AI** – Cognitive AI Platform accelerates data preparation and enables faster data-to-insights by using pre-build functions • **LTI Mosaic AIOps** – AI powered solution which enhances asset monitoring, automated situation detection & remediation • **LTI Mosaic Catalog** – Cognitive solution enables data discovery, generates deeper insights via crawlers and provides recommendations • **LTI Mosaic Decisions** – Data Logistics Platform to accelerate Data Ops and Data Lake Setup • **LTI Mosaic Agnitio** – Deep learning powered solution helps uncover insights from unstructured texts	• **Compete** - AI-Powered real time competitive insights platform which provides insights and recommendations • **Discovery** – NLP driven product which provides decision makers to get conversational insights through AI based Voice and Chat Intelligence • **Optimizer Suite** – AI powered cognitive platform that uses NLP and ML to accelerate each stage of the Market Research cycle right from getting studies in the field faster to generation of end reports • AI-ready Data Platforms, AI-based Cloud DevOps, Enterprise Grade MLOps Framework and Solution

Pure-Play Analytics Firms

	Tiger	Fractal	LatentView	ThoughtSpot	Palantir	Course5i
Solutions/IP/Products	• Delinquency Modeling • Pipeline Forecasting, IoT and sensor analytics • Marketing Reach and Resource Optimization, Inventory Management • Cloud Data Platform Engineering, Lean Data Governance, X Ops (AI, ML & DL Ops)	• **Cure.ai** - Diagnosing using medical imaging data • **Cuddle.ai, Concordia, ConsumerHub, AIDE** – Insight generation through AI • **Dynamic Demand.ai** – Planning/Forecasting platform • **Forsient** - forecasting at scale with high accuracy and speed • **eugenie.ai** - AI-driven operational efficiency, decision making and root-cause analysis • **AI @ Scale** – AI powered solution which converts unstructured data into quality structured data and delivers automated and immediate insights	• **Casper** – AI-driven conversational analytics platform • **Matchview** – Platform that consolidates data and helps to analyze it in an effective manner • **SmartInsights** - AI-powered platform that helps companies predict consumer trends ahead of the curve to drive product innovation • Self-Service Platform for Media Mix Modelling and Budget Optimization • Data-as-a-Service (DaaS) and Advanced Analytics Workbenches for at-scale analytics • Cloud-Based Data Lake and Data Pipelines for ML solutions and to enhance analytics operations	• **Search** – NLQ powered intelligent search engine that analyses and executes queries on large datasets • **Visualize & Auto-Analyze** – Data Visualization and insight generation enabled by AI • **Monitor** – AI Powered predictive and proactive monitoring • Search & AI-Driven Prediction solution along with **DataRobot** • **Connect** – Helps in connecting to leading cloud data warehouses	• **Palantir Gotham** – Complex Data Integration and decision intelligence using AI/ML Models • **Palantir Foundry** – AI based solution which translates and integrates customers' data • **Palantir Apollo** – On premise DBMS for continuous delivery	• **Compete** - AI-Powered real time competitive insights platform which provides insights and recommendations • **Discovery** – NLP driven product which provides decision makers to get conversational insights through AI based Voice and Chat Intelligence • **Optimizer Suite** – AI powered cognitive platform that uses NLP and ML to accelerate each stage of the Market Research cycle right from getting studies in the field faster to generation of end reports • AI-ready Data Platforms, AI-based Cloud DevOps, Enterprise Grade MLOps Framework and Solution

Partnerships

Partnerships and alliances help in creating and delivering a compelling suite of solutions:

- ***Cloud Partnerships*** – They are becoming relevant for D&A players today, as they provide enterprises access to an ecosystem that can encompass technologies, platforms, and analytics solutions to harness the data effectively. It aids in the creation of new business models and services, competitive product differentiation, and more effective and efficient processes leading to significant business impact. Additionally, discounted pricing, co-innovation, and joint GTMs are key benefits of getting into Cloud partnerships.
- ***Data Integration/Processing Partnerships*** – Integration and processing large volumes of data is critical for Data Analytics use-cases. Partnerships with data platforms provide the infrastructure to deal with massive volumes of data and add solutions on top of it.
- ***University Collaborations*** – Academic partnerships are helping Analytics companies to harness the power of the available diverse talent as well as high-end analytics infrastructure to drive high-level research in Advanced Analytics and AI/ML technologies.

Non-exhaustive list of partnerships with Cloud Platform Providers/ Data Warehousing Companies/ Data Aggregators/ Universities of large IT SPs and Pure Play Analytics Players:

Multi Service IT SPs

		Accenture	TCS	Genpact	EXL	LTI	Course5i
Alliances	Cloud Partnerships	• Microsoft Azure • AWS • Google Cloud Platform	• Microsoft Azure • AWS • Google Cloud Platform	• Microsoft Azure • AWS • Google Cloud Platform	• AWS • Microsoft Azure	• Microsoft Azure • AWS • Google Cloud Platform	• Microsoft Azure • AWS • Google Cloud Platform
	Data Aggregators/ Processing Platforms	• Snowflake • Talend • Teradata • Databricks • MyWizard • MyNav	• Snowflake • Talend • Databricks • Teradata • Cloudera	• Snowflake • Databricks • Talend • Cloudera	• Snowflake • Collibra	• Snowflake • Talend • Databricks • Teradata • Cloudera	• Cloudera • Databricks • Apache Spark • Talend
	Universities Partnership on R&D	• The Alan Turing Institute, UK *(Accenture launched five-year strategic partnership to advance data science and AI research)*	• Macquarie University, Australia *(Collaboration will provide impetus to exploration of innovation opportunities in the financial services using data analytics and AI)*	• NITIE, India *(Digital Manufacturing and Supply Chain Center to focus research on Digital Twin, Digital Thread, Analytics and Lean deployment in Manufacturing and Supply Chain risk and resilience)*		• Chennai Mathematical Institute (CMI), India *(Partnered with CMI to collaborate in developing solutions around digital, analytics, data science, AI/ML)*	• BITS Pilani – Goa, India (Joint research on Cognitive Neuroscience technologies to understand consumer behaviour) • Woxsen University, India (Joint research in Customer and Marketing Analytics)

Pure-Play Analytics Firms

		Tiger	Fractal	LatentView	ThoughtSpot	Palantir	Course5i
Alliances	Cloud Partnerships	• Microsoft Azure • AWS	• AWS • Google Cloud Platform • Microsoft Azure	• AWS • Microsoft Azure	• AWS • Microsoft Azure • Google Cloud Platform	• AWS • Amazon EC2	• AWS • Microsoft Azure • Google Cloud Platform
	Data Aggregators/ Processing Platforms	• AWS Sagemaker • Databricks • Apache NiFi • Kafka • Teradata • Cassandra	• Snowflake • Databricks • Tamr • Talend	• Snowflake • DBT • Amazon RedShift • Apache Hive	• Snowflake • Databricks • Amazon Redshift • Google BigQuery • Azure Synapse Analytics • Teradata	• Apache Spark • DataRobot • React • Cassandra • Postgres	• Hadoop • Databricks • Apache Spark • Talend
	Universities Partnership on R&D	• IIT Madras, India *(Collaborated with Robert Bosch Center for Data Science and AI by creating Covid-19 response dashboard to support Tamil Nadu Covid War Room. This is being used by researchers and policy makers)*		• IIT-Madras, India *(Jointly set up Data Science & Analytics Lab to further research in Healthcare & Water Resource Mgmt.)* • Chennai Mathematical Institute (CMI), India *(Partnership with AlgoLabs Platform of CMI to develop new techniques in Predictive Analytics)*			• BITS Pilani – Goa, India (Joint research on Cognitive Neuroscience technologies to understand consumer behaviour) • Woxsen University, India (Joint research in Customer and Marketing Analytics)

Talent Acquisition and Retention

There is demand for highly qualified, experienced and technically-adept talent in the field of Data & Analytics (D&A) and this demand is set to increase exponentially. D&A roles, including that of AI-led analytics, such as Data Engineer, Data Scientist, Data/BI Analyst, Business Analyst etc. needs certain niche skillsets like statistical and quantitative analysis skills, programming language skills, data structures & analytical skills, etc. The quality of talent has emerged as a key differentiating factor among service providers. However, there is a substantial demand-supply gap of D&A talent which is posing challenges in acquiring and retaining talent for companies. Companies hence are doubling down on their talent acquisition and retention efforts to ensure a steady supply of D&A talent. They are increasing their focus on initiatives such as University tie-ups, Hackathons, etc. for tapping the relevant talent groups. Companies are also redesigning their retention system by offering increased value to employees through initiatives such as ESOPs, Training, Scholarships, Flexible Rewards & Recognitions, etc.

Multi Service IT SPs

		Accenture	TCS	Genpact	EXL	LTI	Course5i
Talent	Illustrative Talent Acquisition Initiative	• Accenture hosts *Applied Intelligence Hackathon* to encourage participants to dive into the depths of AI and develop tools, apps, bots and other advanced solutions to address and solve real-world problems	• Provide research scholarships to PhD and Masters students at *Macquarie University*, Australia giving them opportunity to work on the use of Artificial Intelligence technologies in the financial services industry	• Genpact has been running a research and analytics program with *IMT Ghaziabad, India* since 2012 and is the first ever MBA analytics program developed jointly by the industry and Indian academia	• Extends scholarships and career development partnership with the *City University of Pasay, Manila, Philippines*	• LTI is hiring people on HTD (hire-train-deploy) basis • Fresher hiring through both – campus and off-campus route • Non-tech hiring and subsequently putting them through a 6-month training programme for technical roles	• Campus hiring from top tech & business schools such as IITs, IISc, NMIMS, BITS Pilani, GIM, SDA Bocconi for AI talent as well as mid-level management roles • Pharma talent hiring from premier institutes such as NIPER, DIPSAR
	Illustrative Talent Retention Initiative	• 5 regional learning hubs, 91 connected classrooms, 24000+ online courses and 2700+ learning boards with expert-curated contents help in upskilling • Unique leave pooling system *Hours That Help* that allows employees, who have exhausted their paid-time off, to receive leaves from colleagues	• *Gamified learning* is a well-known practice where associates participate in *quarterly hackathons* • Global Reward & Recognition tool - *TCS GEMS* • Employee engagement platform - *TCS Maitree* • One of the best *Health Insurance* policy in the industry	• *ML Incubator* program, the in-house AI/ML university, *Genome* and *ML Upgrade* aims to upskill employees • Workforce mobilisation programme, *TalentMatch* for employee career growth • Global Reward & Recognition - *Genpact Diamond Awards*	• EXL focuses strongly on learning and development to upskill its employees • EXL offers several employee benefits such as Maternity & Paternity leave, work from home flexibility, etc. • EXL's diversity, equity and inclusion philosophy is to create an inclusive work environment	• *LTI Shoshin School* - L&D platform • *My Career My Growth* programme empowers employees with career progression guide and competency framework • Effective hybrid model of working in place termed as *LTI xFH or Everything from Home*	• *Course5 University*, flagship program on learning and development • Global Awards & Recognition program – *Circle of Excellence* • *Excelerate* - Global Career Management Program • Employee Assistance Program (EAP) for all round wellness - mental and physical

Pure-Play Analytics Firms

		Tiger	Fractal	LatentView	ThoughtSpot	Palantir	Course5i
Talent	Illustrative Talent Acquisition Initiative	• For entry-level hiring, company visits top tech & business schools while does lateral hiring through Employee referrals • Conducts Hackathons, case study competitions, etc. to engage with passive candidates	• Fractal Analytics has partnerships with several Indian universities – IITs, IIMs, ISI Kolkata, Delhi College of Engg, etc.	• Hiring from the top business schools, technical institutions, and those with prior experience in the data and analytics industry	• ThoughtSpot organizes hackathon - *CodeX* to attract talent • ThoughtSpot's internal recruiting team partnered with *The Sourcery* to supercharge recruiting	• Palantir's summer internship program - *Palantir Path* is world renowned and is aimed for students looking to accelerate their personal and technical growth in preparation for a successful, impactful career	• Campus hiring from top tech & business schools such as IITs, IISc, NMIMS, BITS Pilani, GIM, SDA Bocconi for AI talent as well as mid-level management roles • Pharma talent hiring from premier institutes such as NIPER, DIPSAR
	Illustrative Talent Retention Initiative	• Ongoing learning programs are a norm which are run through the *Tiger Academy* • Tiger Analytics design *Personalized Learning Program* for each employee as well as have structured mentorship program for long-term career guidance	• *Fractal Academy of Analytics* is a key Training and Development initiative • Fractal has a dedicated "*Wellbeing Function*" headed by its Chief People Officer and stress a lot on Diversity and Inclusion	• L&D initiatives include peer-learning webinars, learning excellence acceleration program, and online training programs • Through a structured *Rewards and Recognition* regularly celebrate high achievers and doers	• ThoughtSpot have processes in place to give employees unique roles, granting them autonomy to design their own paths • ThoughtSpot have rolled out *global fitness challenge*, yoga, and meditation to help its team practise mindfulness	• For mental health and wellbeing offers access to virtual therapy, coaching, complementary medicine, meditation, and fitness • Unique benefits such as – *Take-What-You-Need* Time-off and generous paid Parental Leave policy • Gender-affirming healthcare coverage, including families	• *Course5 University*, flagship program on learning and development • Global Awards & Recognition program – *Circle of Excellence* • *Excelerate* - Global Career Management Program • Employee Assistance Program (EAP) for all round wellness - mental and physical

Mergers & Acquisitions

There has been heightened activity in M&A transactions of IT service providers over the past few years. Over the past 3 years there have been ~ 900[1] mergers/acquisitions of IT Service providers adding up to a total valuation of $40 - 45 B[2]. M&A has emerged as a strategic tool for bolstering digital capabilities for Service providers

In the analytics space, there has been a recent spate of acquisitions leveraging AI/ML technologies for Big Data and Analytics use cases including Predictive Analytics.

Multi Service IT SPs

		Accenture	TCS	Genpact	EXL	LTI	Course5i
Acquisitions	2019	**Silveo** – Supply chain Consulting firm **Clarity Insights** – Deep Data science, AI,ML expertise consulting firm **Sutter Mills** – Data driven marketing **Analytics8** - big data, analytics consultancy **Pragsis Bidoop** - big data, AI, advanced analytics	-	**Rightpoint** – Data Science and Digital Consulting Company	-	**Lymbyc** – a specialist AI, Machine Learning and Advanced Analytics Company	-
	2020	**Icon Integration** - Australia-based warehouse automation and BI consulting company	-	-	-	-	-
	2021	**Novetta** - government analytics expertise **Infinity Works** - AWS and Snowflake data cloud partner **BRIDGEI2I** – AI powered Analytics Company **Core Compete** – Cloud Analytics Services Company	**DataSmart Solutions, LLC** - predictive risk analytics software company	**Enquero** –Data Engineering and Advanced Analytics Company	-	-	-

Pure-Play Analytics Firms

		Tiger	Fractal	LatentView	ThoughtSpot	Palantir	Course5i
Acquisitions	2019	-	-	-	-	-	-
	2020	-	-	-	-	-	-
	2021	-	**Zerogons** – Cloud AI solutions platform company **Samya.ai** - Revenue Growth Management (RGM) AI company	-	**Diyotta** – Data Integration Platform Company **Seekwell** – Data analytics platform Company	-	-

Additionally, in the last 10 years there have been several acquisitions in the data and analytics space with an objective to ramp up analytics capabilities and offerings.

Acquirer	Target Company	Target Company Details	Deal Value (INR Cr)	Acquisition Date
Adknowledge, Inc.	AdParlor Holdings, Inc	Insight generation from advertising data	180-190	Nov-11
Wipro Technologies Limited	Promax Analytics Solutions Pty Ltd	Data management, Analytics-driven insights	180-190	Apr-12
Accelrys Inc.	Aegis Analytical Corporation	Operational analytics, Performance analytics	160-170	Oct-12
Nutanix, Inc.	PernixData Inc.	Big Data analytics, Database management	250-260	Aug-16
Alviva	Datacentrix	Consulting & Advisory, Data analytics, Data management, AI	250-260	Feb-17
AdSwerve, Inc.	Analytics Pros, Inc.	Big data and machine learning solutions	160-170	Aug-18
AppFolio Inc	Dynasty Marketplace Inc	AI solutions for real estate industry	420-430	Jan-19
Alteryx, Inc.	ClearStory Data Inc.	Intelligent analytics solutions for unstructured data, Automation platform	140-150	Apr-19
Neoway Tecnologia Integrada Assessoria e Negócios S.A.	Legal Labs Inteligência Artificial LTDA	Data mining and AI, ML, machine learning, NLP and Deep learning	180-190	Jun-19
Alteryx Inc	Feature Labs, Inc.	Data Analytics, Data management, Data visualization, Data Preparation	180-190	Oct-19
Amdocs Limited	Openet Telecom Limited	Data management solutions	40-50	Jul-20
Coforge Limited	Whishworks IT Consulting Pvt. Ltd.	Data & Analytics	160-170	Apr-21
Altus Group Limited	StratoDem Analytics, LLC	Predictive analytics, data integration, business intelligence	180-190	May-21
Affle International Pte. Ltd.	Jampp (Ireland) Limited	Marketing solutions using AI, ML and predictive algorithms	310-320	Jun-21
SNP Schneider-Neureither & Partner SE	Datavard AG	Data Management & warehousing, Data Integration, Business Intelligence	140-150	Jul-21

There has been a spate of acquisitions undertaken in the data and analytics space over the last 3 years. Some of the other notable acquisitions in Data & Analytics space in last 3 years with undisclosed deal values are:

Acquirer	Target Company	Target Company Details	Deal Value (INR Cr)	Acquisition Date
Hitachi Vantara	Waterline data	Data cataloging solution provider	Undisclosed	Jan-20
Databricks	Redash	Dashboarding and visualization capabilities on curated data lakes	Undisclosed	Jun-20
Informatica	Compact Solutions	automated data governance provider	Undisclosed	Jul-20
Vector Capital	MarkLogic	Self-service data integration	Undisclosed	Oct-20
Idera	Qubole	Data lake tools solution provider	Undisclosed	Oct-20
QlikView, inc.	Blendr.io	Embedded iPaaS provider	Undisclosed	Oct-20
TIBCO Software	Information Builders	Data management and analytics capabilities	Undisclosed	Oct-20
Infogain	AbsolutData	Artificial intelligence (AI) and Analytics	Undisclosed	Dec-20
Bentley Systems, Inc.	Aarhus GeoSoftware	Geo Intelligence	Undisclosed	Jul-21
Accenture, Inc.	Bridgei2i Pvt. Ltd.	Artificial intelligence (AI) and Analytics	Undisclosed	Oct-21
CGI Federal Inc.	Array Holding Company, Inc. (ARRAY)	Digital services provider that includes data and analytics	Undisclosed	Oct-21

Glossary:

1. *Represents the total number of M&A transactions by IT Service Providers and Institutional investors*
2. *Represents summation of enterprise valuation of transactions publicly disclosed*