

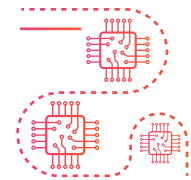


## Future-Proofing Data and Analytics in High Tech

Accelerating business  
outcomes using a robust  
data foundation

WHITE PAPER

## Abstract



Data-centric decision making is the lifeblood of high tech companies. The ability to gain foresight, embed intelligence into processes, and recommend next-best actions are fundamental to driving growth and transformation programs, directly impacting business key performance indicators (KPIs).

While high tech enterprises have routinely gathered, analyzed, and reported data across business functions, the growing need to respond to events in real time and develop ecosystem intelligence, requires long-term analytics strategies focused on building agility.

This paper highlights some of the emerging technological trends in the field of data and analytics, enabling high tech enterprises to take proactive decisions and build competitive advantage.

# A Modern Data Foundation for a New World

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With the proliferation of data and analytics technologies, enterprises must incorporate a context-aware approach to create a data foundation. Experimenting early on, identifying best-fit technologies, choosing between on-premise and cloud, deploying artificial intelligence (AI) and machine learning (ML) workbenches, and aligning an analytics strategy with existing investments are some of the key decisions to consider.

As analytics solutions become more productized, it is important to embed agile principles and feature engineering into large data and analytics programs. Taking an incremental approach across aspects such as people, process, data, security, privacy, and technology, with business value realization at each step, is critical to success. Starting small with a few KPIs or a single use case and onboarding new data sources such as additional KPIs and enabling additional platform services, as needed, can ensure data maturity in the organization<sup>1</sup>.

## Five Data and Analytics Trends to Embrace

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As data and analytics programs continue to evolve, it is imperative to understand five long-term trends integral to data and analytics maturity in the high tech industry.

### **Adopting cloud-based data warehouses**

With no upfront license costs and zero infrastructure maintenance, database-as-a-service (DaaS) lies at the heart of today's data modernization programs. In addition to separating the compute and storage costs and enabling faster processing of data, cloud data warehouses are facilitating the secure exchange of data across the ecosystem. Little wonder that cloud-agnostic technologies that afford enterprises flexibility in terms of their overall hybrid cloud strategy are becoming popular<sup>2</sup>.

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[1] TCS; DATOM™: Data and Analytics Target Operating Model; <https://www.tcs.com/data-analytics-target-operating-model>; Accessed January 20, 2021

[2] Gartner; Magic Quadrant for Cloud Database Management Systems; November 23, 2020; <https://www.gartner.com/document/3993398>; Accessed January 20, 2021

Cloud data warehouses enable high tech companies to derive new insights by analyzing data from their traditionally siloed business functions. To illustrate, consider the following:

- Staffing and recruitment firms can easily exchange skills marketplace data and upcoming demand hotspots with their vendors and clients in real time.
- Original equipment manufacturers (OEMs) from the computer platform and industrial electronics segment can derive supply chain finance insights by combining data from product lifecycle management (PLM) systems, manufacturing applications, and finance portfolios.
- Electronics distributors can exchange real-time parcel tracking information with their customers and carrier partners.
- For audit and advisory firms, data hubs built on modern data warehouses allow secure and democratized data access to consulting partners.

Modern enterprise data lakes (EDL) also take advantage of cloud data warehouses for faster time to market and ability to develop data marketplaces.

### **Harnessing signals from business ecosystems**

Recent global events demonstrate that enterprises cannot operate in isolation in an increasingly connected world. The ability to foresee external events, comprehend their impact on business, and respond to them within a defined timeframe are critical to success in the post-pandemic world. Consider these industry scenarios:

- Audit and advisory firms can leverage social media analytics from platforms such as Twitter or Glassdoor to understand customer sentiments while human resources (HR) teams can use it to enhance brand value and attract talent.
- OEMs can gain deeper insights into their multi-tiered supply chains to proactively respond to events such as inclement weather, inventory depletion, sudden surge in consumer demand, and traffic disruptions.
- The staffing and recruitment industry can tap into early signals of talent demand and economic trends by integrating new and reliable sources of information using public data such as the US Bureau of Labor Statistics or private data from labor market analytics firms like Emsi<sup>3</sup>.
- Risk and regulatory offices continuously evaluate and predict risk using a mix of political, economic, social, technological, legal, and environmental (PESTLE) data sources.

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[3] Emsi; Labor Market Analysis; <https://www.economicmodeling.com/>; Accessed January 20, 2021

## Deploying machine learning at scale

AI/ML are infused in all business functions today, with the AI infrastructure market expected to grow from \$14.6 billion in 2019 to \$50.6 billion by 2025<sup>4</sup>. Machine learning (ML) use cases are transitioning from point-based solutions to production level deployments. Companies are realizing that building ML models at scale requires skillsets beyond data science and data engineering. The entire modelling and algorithm development work must be iteratively integrated with ML system operations. In addition, new scenarios demand what-if analysis, auditability, reproducible ML pipelines, and integration with real-time visualization software.

MLOps brings together frameworks, tools, capabilities for model versioning, performance tuning, and monitoring model drifts, to create ML models at scale, enabling data scientists to spend more time on solving business challenges. Users have started demanding models that can be trusted, behave responsibly and can be truly explained to humans.

## Tapping into AI at the edge

The massive proliferation of internet of things (IoT) devices combined with accelerated 5G network integration enables data gathering and insight generation right where the data is produced. This helps reduce latency for time-critical decision making across use cases such as security intrusion, fire alarm activation, manufacturing defect detection, fraud detections, worker safety, and so on. AI can also vastly improve customer experience through in-store personalized recommendations, computer vision algorithms, object detection, and mixed reality applications.

AI at the edge is also set to spur innovation for contextually-aware analytics applications that are designed to respond to external disruptions in real time. This advances the entire field of image, video, and augmented analytics using mixed reality and virtual reality applications.

## Choosing knowledge graphs technologies

Although still in the nascent stages of enterprise adoption, knowledge graphs (KGs) are useful for advance searches where data from multiple sources, including unstructured content, is queried and processed to generate insights quickly.

With the phenomenal growth in web and social media data combined with AI-driven automation, KGs will play a vital role in quickly extracting relevant information from a wide variety of data sources.

- Pooling of skills and competencies within an industry and across industries. For instance, pooling of government unemployment data with existing databases using modern AI algorithms.

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[4] Markets and Markets; AI Infrastructure Market by Offering, Technology, Function, Deployment Type, End User, and Region - Global Forecast to 2025; June 2019; <https://www.marketsandmarkets.com/Market-Reports/ai-infrastructure-market-38254348.html>; Accessed January 20, 2021

- Enabling intelligent customer service centers with a holistic view of potential customer needs and problems to proactively address issues even before customers call in for support.
- Creating a 360-degree view of the customer purchasing different products or subscriptions and analyzing the lifetime customer value, including social media data analytics.
- Assessing parameters impacting supplier quality and profitability, resulting in dynamic risk profiling and de-risking, mitigating dependence on suppliers from one region for high tech OEMs.

## Using Evolutionary Paradigms to Outperform

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As the availability of computing power and open-source software increases along with the growing appetite for embedded intelligence, incrementally improving the data and analytics foundation takes precedence.

As data quality improves and data pipelines become more automated, the ability for business to work on new hypotheses and generate new insights, leveraging multiple data sources becomes a frictionless experience. The approach can be applied across different levels of data and analytics:

- Moving a business metric from descriptive to a predictive or prescriptive state.
- Shifting a specific use case from federated to centralized governance.
- Continuously improving a business KPI such as fill rates in the staffing industry or customer retention in the subscription business.
- Creating a fully automated and intelligent as-a-service business model.

# Succeeding Against Great Odds

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The high tech industry is continuously evaluating ways to improve critical operations using data and analytics, especially in light of the unprecedented challenges brought about by the pandemic. Implementing digital initiatives combined with evolutionary principles can help them gain real-time insights and accelerate transformation and growth even during uncertain times. This approach enables high tech companies to iteratively improve their analytics platform foundation and evolve their processes, data, and technology, thereby achieving competitive differentiation and strengthening market leadership.

#### About The Author

##### Sukriti Jalali

Sukriti Jalali is a digital champion and a thought leader in the HiTech Digital and Enterprise Transformation (DET) business unit at TCS. She is a key proponent of leveraging analytics and insights for growth and transformation, and works closely with customers from the computer platform, industrial electronics, software, and professional services segments. She has played several key roles across consulting, technology solutions, delivery, program management, and pre-sales in the engineering and high tech domains, and has led multiple digital streams and innovation portfolios at TCS.

She has presented at various industry and partner forums, including the Embedded World Conference, Blockchain Summit and the Institute of Electrical and Electronics Engineers (IEEE). She holds a Bachelor's degree in Technology from the National Institute of Technology, Kurukshetra, India.

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