

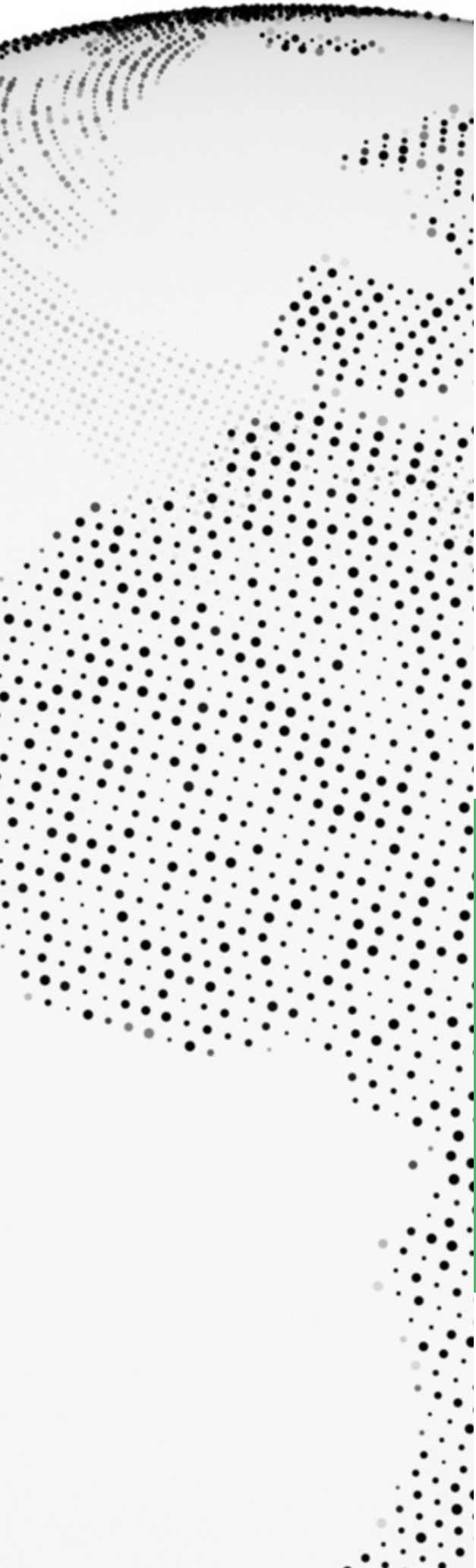


# Big Data: What it means for your business

Big Data opportunities, use cases  
and technologies explored...

“Data, and the ability to make sense of it, has been one of the greatest drivers of innovation in both business and society in recent decades, and a primary driver of economic success in the 21st century.”

(NewVantage Partners, Big Data Executive Survey).



## Introduction

More advanced forms of automation in production or service delivery, new technologies for performance monitoring, a wider variety of channels for sales, marketing and customer service, new processes for transactions, new software platforms and devices in play across the business...

Whatever your size or sector, it's likely that you have embraced some - if not most - of these changes over recent years. And in all likelihood, the primary driver for making those changes was to either increase efficiency, improve customer service (and in many cases, both).

You didn't set out to create more data as an end-goal. But with new platforms and channels in play, greater digitalisation, and, increasingly, IoT initiatives on the go, the creation of higher volumes, more sources and a wider range of data categories is inevitable.

The average number of data sources per-organisation is **400**. And one survey of technology, finance, retail, and healthcare companies suggested that data volumes within organisations are growing by an average of **63% per month**. Your business might not be at those data production levels just yet. But in all likelihood, you're heading there.

## Big Data defined

Big Data refers to **large, diverse sets of data** that are generated through the usage of devices, software and networks.

Much of this data has the **potential to be analysed** to reveal patterns, associations and trends, to predict behaviour and events - and to guide organisational decision-making. However, the volumes involved and the unstructured nature of this data means that to generate those insights, it is necessary to **look beyond traditional data management and analysis tools**.

Read on for a snapshot of how Big Data is shaping different sectors and how Big Data initiatives can be of value to different areas of your business.

## Is Big Data worth it?

If any or some of the following need states apply to your organisation, then the possibilities of Big Data demand your attention:

We want to optimise performance, by identifying and remedying any weak spots across the business and wider supply chain.

We want to identify new potential ways to increase operational efficiency and reduce operating costs.

We want to target our resources (e.g. product development, marketing and deployment of workforce resources) for maximum return on investment.

We want more effective ways to identify possible fraudulent activity and credit risks in order to reduce revenue leakage and potential compliance issues.

We want to increase our ability to predict customer demand.

We want 'early warnings' in order to be better prepared for changing market conditions and operational challenges.

We want to be more proactive in tailoring product/service offerings in response to shifting customer behaviour and preferences.

## Sector Snapshot: How is Big Data shaping your industry?

The most effective way to appreciate the potential of Big Data is to see it in action. With this in mind, here is a roundup of how Big Data initiatives make a difference in specific sectors...

## Retail

### Demand forecasting

According to McKinsey, a 10 to 20% improvement in demand forecasting accuracy results in a 5% reduction in inventory costs and a 2 to 3% increase in revenue: a huge boost - particularly in low-margin FMCG retail. POS, inventory, social media and a vast range of other data categories can be analysed in real-time to predict demand with greater accuracy.

### Pre-empting customer behaviour

In other words, building on the type of advanced demand forecasting capabilities detailed above, and using this to ensure availability and enhance the customer experience. One example is Amazon's "anticipatory shipping" approach, whereby the company analyses behavioural/transaction trends and pushes orders into the delivery network before customers have actually ordered them.

### Understand the purchasing power/ value of customers

This involves collating and analysing data from POS systems, loyalty cards and online touch-points to map buying histories and help predict future expenditure. This can also provide value intel for determining pricing strategies.

### Building a stronger customer experience

Use device data to see who's viewing what - and when. Boost the accuracy of your targeted marketing. Make hyper-relevant personalised recommendations based not just on their browsing history, but also things like shifts in weather patterns and geographic data.

### Inventory management

Use a combination of historical sales data and real-time trend predictions to inform inventory restocking actions - e.g. by triggering automatic alerts to inventory teams when certain patterns in buying behaviour emerge.

## Manufacturing / Industrial

### Boosting productivity and performance

Harnessing real-time data from production-line IoT devices to monitor output and ensure that production schedules remain on track.

### Predictive maintenance

Collecting fine-grained data from plant and machinery to detect anomalies and pinpoint and remedy potential vulnerabilities before they have an impact on operations.

### Resource planning

As well as enabling technical teams to troubleshoot potential problems with their machines quicker, Big Data is also useful for resource planning and management. Analysing performance over time, manufacturers can more accurately predict machine lifecycles with more precision and plan servicing / replacement accordingly.

### Quality assurance and ongoing customer support

Rolls-Royce Aerospace is a prime example of this. Sensors embedded into the company's aircraft engines gather millions of data points for real-time analysis aided by AI-driven analytic tools. This analysis is used for remote servicing and troubleshooting.

## Financial Services / Insurance

### Trend forecasting

Combining customer-specific data with large volumes and categories of market data to predict upcoming trends before they have an impact on portfolios.

### Analysing risk

Using detailed demographic / historical transaction data to predict with more accuracy whether a particular individual / entity / asset will be a viable customer, investment or insurance risk.

### Personalised products

With the ability to include a wider range of granular information (e.g. medical history and lifestyle habits in the case of insurance products), and using this alongside similarly-specific risk analysis relating to other customers, companies can generate much more personalised products that are both competitive and comply with the company's risk appetite.

### Faster processing

Using big data combined with algorithmic calculations, team members can allocate risk classes, generate price plans, process applications and claims more rapidly, resulting in more efficient processes and a stronger customer experience.

# The business function perspective: how will my team benefit?

Big Data initiatives have the potential to drive efficiency, optimise performance and deliver real-time insight to stakeholders right across your business.

Here's a rundown of how specific business functions can benefit...

## Finance

- Optimising pricing to increase profits. The ideal pricing strategy involves finding the optimal price that customers are willing to pay. Big Data offers the promise of using highly-specific customer insights, making you better able to gauge the true value of goods/services to customers.
- Delivering a real-world view of business performance. Using Big Data, finance teams can obtain a level of real-time, granular information on performance across operational areas that was previously not possible. This encourages a more accurate appreciation of the operational impact of financial or strategic decisions.
- More accurate forecasts. New sources of data make it possible to make predictions in new areas, with AI-driven analytics tools increasing the accuracy of prediction models. Those models become stronger, more reliable and offer genuine value to the wider business.

## Sales and Marketing

- Improving customer acquisition and retention. Big Data facilitates the harnessing of more detailed information on customer behaviour, need states and preferences. This can be used to hone marketing messaging, sales pitches - as well as product development decisions.
- A dynamic alternative to traditional marketing research. Big Data can mean less reliance on static research reports that can often be rendered quickly out-of-date. Instead, it offers the potential to interpret actual behaviour and preferences in real-time, delivering insights into what customers really want.
- Optimising marketing spend. With more accurate information in areas such as audience engagement, sentiment and lifetime value, marketing teams are better equipped to focus their resources on those customers where ROI will be highest.

## Supply Chain / Logistics Management

- Dynamic routing and space optimisation. An example of this is the possibility of using vehicle geo-location and traffic data to redirect fleet vehicles to avoid bottlenecks. This can also be used to reduce storage redundancy by allocating warehousing bays in real time.
- Resource planning. Supply chain planners can use detailed operational data to achieve a better balance of requirements and resources, to maintain optimal inventory levels and produce more accurate material location and fulfillment schedules.
- Supplier analysis. Big data makes it easier to track performance across all moving parts of your supply chain. This enables real-time tracking of KPIs such as on-time shipping, inventory velocity and pick & pack cycle time. You can highlight which suppliers are underperforming - and where necessary, take remedial action.

# Unpacking the potential and challenges of Big Data

Understanding the characteristics of Big Data can help you identify its value to your business, as well as the challenges that arise in managing and processing it. These are the essential elements worth bearing in mind:

- **Volume.** Machines and platforms in play across your business offer the opportunity to capture very large quantities of data. The potential flipside of this relates to possible information overload, where the volume, novelty and complexity of data available makes it difficult to interpret.
- **Velocity.** Big Data projects are associated with high rates of data inflow. For instance, a retailer might process thousands of orders an hour, creating a flood of data from point-of-sale equipment, mobile apps, sales platforms, sales cards and more. To be of value, this data has to be captured and collated.
- **Variety.** Much of the data produced is unstructured and is captured in diverse forms - everything from production-line machine readings and sensor data, through to transactional data, customer interactions and web data. The big challenge is in managing and consolidating these data types into usable insight.
- **Veracity.** Unrefined Big Data can be messy, noisy and uncertain. The greater the volume and variety of the data you are working with, the greater the chances of discrepancies, inconsistencies, imprecision and biases in analysis.
- **Variability.** The apparent meaning or significance of data can sometimes shift, depending on the context in which it is generated and the specific tools used to analyse it. The tools and algorithms used for analysis need to be able to understand this context.

# Key Big Data technologies

Big Data initiatives demand a new approach to data collection, storage and analysis. These are the technologies you need to be aware of.

## ETL

### Definition

ETL is a data integration process to Extract, Transform and Load data. The process is designed to overcome the major challenges inherent in Big Data usage (i.e. data volume, velocity, variability, and veracity).

In the first stage of the process, data is extracted from multiple sources (e.g. devices, applications and databases) and is held temporarily in a 'staging area' server.

The data is then transferred to a secondary server where it is converted into a standard format. This conversion process involves multiple automated optimisation procedures, including data sorting, cleansing, the deletion of extraneous data points, and data quality checks.

Finally, the data is loaded automatically into your data warehouse or destination of choice where it is ready for analytics and reporting.

### Benefits

- **Speed of availability.** The ETL approach means that massive volumes of data deriving from multiple sources can be collated and cleansed rapidly. This enables you to analyse data and generate insight - right at the point of need.
- **Accuracy.** Data quality and validation checks are handled automatically. This gives you a single, reliable source of truth that's consistent, complete and reliable.
- **Elimination of errors.** Even with structured, relatively small datasets, manual extraction processes are resource-heavy and prone to introducing errors into the data. With Big Data, this approach is simply not feasible. ETL eliminates the need for manual intervention and the associated risk of error.
- **Data governance.** Your company's specific rules linked to, for example, personal data privacy, security, and veracity can be effectively baked into your ETL process, facilitating strict adherence to data governance policies.

## Data Warehousing

### Definition

A data warehouse, or enterprise data warehouse (EDW) is a system for aggregating data into a single, scalable source to support a range of uses, including data analysis and data mining.

A data warehouse typically comprises three tiers:

The **bottom tier** consists of a server in which data is collected, cleansed and transformed, usually through an ETL process (see above).

The **middle tier** comprises an OLAP (online analytical processing) server to enable fast query speeds.

Finally, the **top tier** consists of a user-interface. Most data warehouses come with data visualisation features and analytics capabilities - although it is equally possible to use a data warehousing solution in conjunction with a separate analytics tool.

### Benefits

- **Flexibility.** It is generally possible to integrate cloud-based data warehousing solutions with existing infrastructure and data storage methods.
- **Security.** A data warehouse solution provides a single, consolidated method for Big Data processing and storage, thereby helping to minimise your cyber security 'attack surface'.
- **Scalability.** While the implementation of a data warehouse does involve a certain level of upfront cost, the now standard Software-as-a-service model for warehousing helps you to keep this to a minimum. Capacity can be easily scaled as your storage and processing requirements evolve.



# Data Analytics

## Definition

Big Data analytics describes the process of collecting, examining and analysing large amounts of data from multiple sources to uncover trends, identify patterns and insights, and make predictions.

The latest generation of advanced analytics involves the use of techniques such as data/text mining, machine learning, pattern matching, semantic analysis, scenarios and simulations to give you a deeper and more useful level of insight than ever before.

## Benefits

- **More accurate forecasting.** Drawing on vast quantities of granular data, Big Data analytics can help you generate much more accurate forecasts than is possible with traditional analytics techniques.
- **Up-to-date insights.** With an advanced analytics solution, forecasts and reports can be updated in real-time. You can move away from reliance on static annual or monthly reports and towards consistently relevant rolling forecasts.
- **Managing uncertainty.** When market conditions change, you generally have a much greater competitive advantage if you can respond in a timely manner. Advanced analytics solutions allow you to run 'what if' scenarios, analyse the likely consequences of different potential courses of action and generally respond much more quickly compared to traditional analytics methods.

## Next Steps

Ready to explore the full potential of Big Data for your business? Speak to Millennium Consulting today.

Contact Millennium Consulting at  
[assist@millenniumconsulting.com](mailto:assist@millenniumconsulting.com)