



**CHARTERED INSTITUTE OF LOAN & RISK  
MANAGEMENT OF NIGERIA**

**PAPER PRESENTATION**

**BY**

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**LEVERAGING ADVANCED ANALYTICS AND PREDICTIVE  
MODELLING FOR INFORMED DECISION-MAKING**

**IN**

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ORGANISED BY THE INSTITUTE**

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**LAGOS.**

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# LEVERAGING ADVANCED ANALYTICS AND PREDICTIVE MODELLING FOR INFORMED DECISION-MAKING

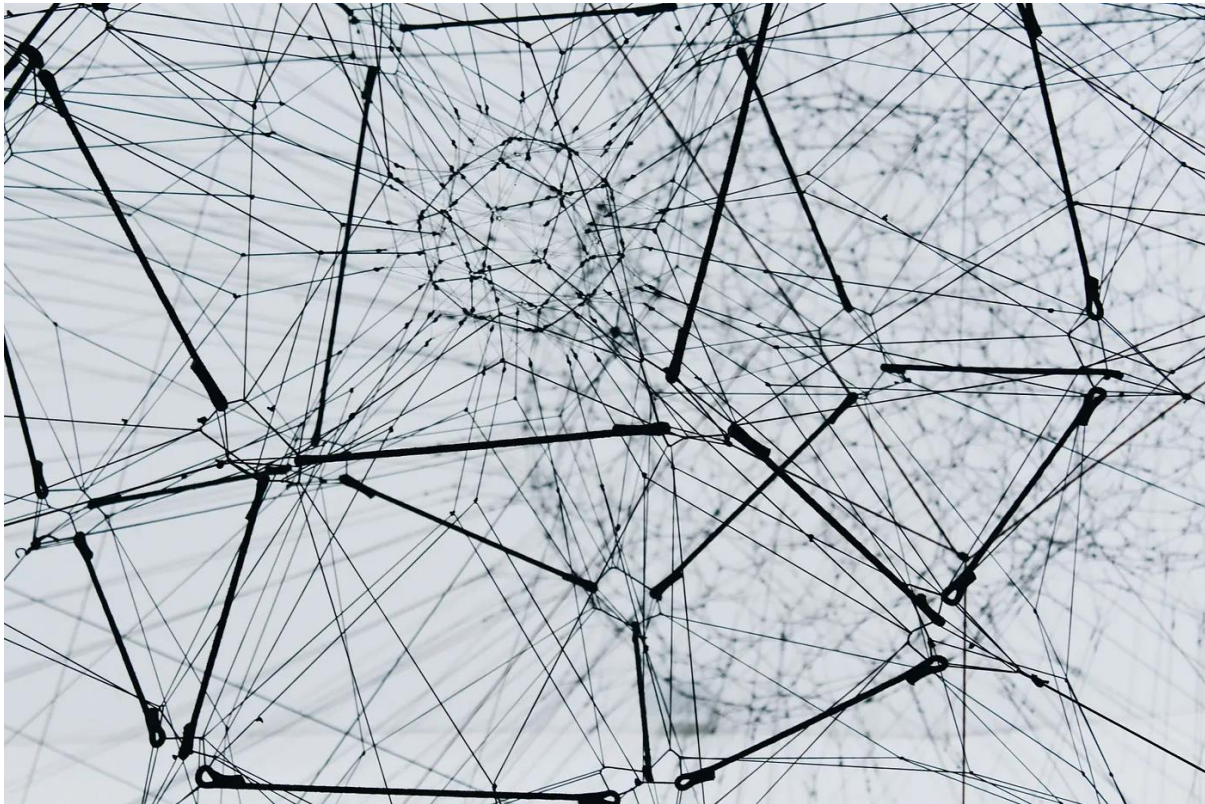
## Learning Objectives

- Understand the evolution of data analytics and the concept of advanced analytics.
- Identify the benefits and importance of advanced analytics in informed decision-making.
- Distinguish between advanced data analytics and business intelligence.
- Learn about techniques and tools used in advanced analytics.
- Explore industry-specific applications of data analytics.
- Understand the concept and types of predictive modelling.
- Develop skills in building advanced analytic and predictive models.
- Identify challenges and best practices in implementing advanced analytics and predictive modelling.
- Conclusion

*Data is the lifeblood of decision-making, innovation, and progress in the modern world. From the rudimentary tallying of crops in ancient civilizations to the real-time analytics driving industries today, the journey of data collection is as dynamic as the technology shaping it.*

## INTRODUCTION

Before the widespread adoption of computers and the internet, businesses relied on manual, labour-intensive methods to collect data, largely driven by "people, pencils, and paper". Data was stored physically in filing cabinets, and analysis was done by hand using ledger **books**.



**1. Manual Recording and Paper Trails** [ Ledger Books and Journals, Paper Forms and Orders, Carbon Copying, Physical Filing Cabinets]

**2. Direct Observation and In-Person Interaction;** [ Direct Observation, In-Person Interviews and Focus Groups, Sales Calls]

**3. Early Mechanical and Physical Tools;** [Punch Cards, Adding Machines and Calculators, Typewriters and Mimeographs]

**4. Secondary Data Collection;** [Libraries and Print Resources, Government Reports, Trade Shows and Journals]

**Evolution Of Data Analytics**

Data analytics is a **strategic discipline** that enables businesses to make **data-driven decisions, optimise operations, and gain a competitive edge**. By understanding the importance of data, leveraging key analysis methods, and utilising advanced tools and technologies, organisations can transform raw data into valuable insights. Whether you are looking to enhance your current role or explore new career opportunities, **mastering data analytics is essential in today’s data-driven world**. The future of business lies in the ability to harness data effectively, and professionals skilled in data analytics are at the forefront of this transformation.

The evolution of data analytics has transformed the way businesses operate and make decisions.

<p><b>- Early Stages:</b></p>	<p>Initially, data analytics focused on simple data analysis and reporting, providing basic insights into historical data. E.g. In the insurance industry, early stages of data analytics meant focusing on basic reporting and</p>	<p>For example:          - Historical Claims Reporting: Insurers would analyse past claims data to understand frequency, severity, and types of claims.</p>
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	historical data analysis to make basic decisions on pricing, risk assessment, and marketing.	- Policyholder Demographics: Simple analysis of policyholder data (age, location, etc.) to understand customer segments.
<b>- Growth Drivers:</b>	- Exponential growth in data generation: The rapid increase in data creation has driven the need for advanced analytics techniques. In fintech and Insurtech, the exponential growth in data generation has been a gamechanger.	<p><b>Examples:</b></p> <p>Fintech: Transaction data, user behaviour, and market trends drive predictive models for credit scoring, fraud detection, and personalized financial services.</p> <p>Insurtech: Lola (a Nigerian Insurtech startup) as an example. Lola uses data analytics and machine learning to offer microinsurance products tailored to Nigerian customers. Example: Data Sources: Lola leverages mobile network data, social media, and IoT (e.g., telematics for usage-based insurance) to assess risk and personalize insurance offers.</p> <p><b>Outcome:</b></p> <p>By analysing customer behaviour and risk profiles, Lola provides affordable, customized insurance products, increasing accessibility and uptake in Nigeria's insurance market.</p>
<b>- Advancements in technology:</b>	Improvements in computing power, storage, and software have enabled more complex analytics. Those advancements have been a huge enabler for complex analytics. With increased computing power, storage, and sophisticated software, companies can now: Process large datasets quickly Run advanced algorithms (like machine learning and AI) Derive insights from unstructured data (text, images, etc.)	In Nigeria, this means companies like Lola (Insurtech) or Flutter wave (fintech) can innovate faster, offer personalized services, and manage risks more effectively.

**Concept of Advanced Analytics**

Concept of Advanced analytics employs some of the most complex data analytics techniques to help businesses and other organizations improve their decision-making.



Advanced analytics is an umbrella term referring to a range of data analysis techniques or data analysis methodology used primarily for predictive purposes, such as machine learning, predictive modelling algorithms, deep learning, business process automation, neural networks, and artificial intelligence (AI) and other statistical methods to analyse business information from a variety of data sources.

- **Predictive analytics:** Techniques like statistical modelling and forecasting help predict future trends and outcomes.

- **Machine learning:** Algorithms learn from data to identify patterns and make predictions or decisions. Example question: An insurance company wants to predict which customers are likely to renew their policies. What data would you use, and how would you approach this with machine learning? In Nigeria, Using ML to assess risk for auto insurance, considering factors like driver behaviour via telematics. Identifying fraudulent claims faster to reduce losses.

### **Machine Learning in Insurance:**

**Risk Assessment:** Algorithms analyse historical data (claims, customer info) to predict likelihood of claims, helping insurers price policies accurately.

**Fraud Detection:** Machine learning models flag suspicious claims or patterns, reducing fraud.  
**Personalized Pricing:** Insurers use ML to offer premiums based on individual risk profiles (e.g., driving habits via telematics).

**Claims Processing:** ML speeds up claim processing by automating decision-making for simple claims.

- **Big data analytics:** Analysing large, complex data sets to uncover hidden insights. Big data analytics can help banks and financial institutions understand customer behaviour, tailor services, and expand financial inclusion. For example, analysing mobile banking data can help identify: Customer preferences and usage patterns Areas with low financial access (using location data) Creditworthiness of underserved populations (using alternative data like mobile transactions)

In Nigeria, big data can support financial inclusion by: Enabling targeted services for the unbanked Improving risk assessment for Loans Enhancing mobile banking experiences

## Artificial Intelligence Integration:

AI enhances data analytics by **automating and improving data processing**, leading to **deeper insights**. This integration:

- **Speeds up data analysis** – AI processes large datasets efficiently
- **Enhances predictive modelling** – Machine learning improves forecasting accuracy
- **Uncovers hidden patterns** – AI detects trends not easily visible through traditional analysis
- **Automates decision-making** – AI-driven analytics supports real-time business decisions

For example, AI-powered tools can **detect fraud, personalise customer experiences, and optimise supply chain operations**, making businesses more efficient and data-driven.

## Why is advanced analytics important?

Advanced analytics empowers organisations to enhance the effectiveness of their data assets, no matter where the information is kept or which format it uses. Advanced analytics can also help address some of the more complex business problems traditional BI reporting cannot.

For example, to create a contextual marketing engine, a consumer-packaged goods manufacturer might need to ask the following questions:

- When is a customer likely to exhaust their supply of an item?
- What time of the day or week are they most receptive to marketing advertisements?
- What level of profitability is achievable when marketing at the time?
- What price point are they most likely to purchase at?

## Benefits of advanced analytics

In addition to enabling more efficient use of data assets and providing decision-makers with higher confidence in data accuracy, advanced analytics offers the following benefits:

- **Accurate forecasting.** Using advanced analytics can confirm or refute prediction and forecast models with better accuracy than traditional BI tools, which still carry an element of uncertainty.
- **Faster decision-making. Improving the accuracy of predictions allows executives to act more quickly.** They can be confident their quicker business decisions will achieve the desired results, and favourable outcomes can be repeated.
- **Deeper insight.** Advanced analytics offers a deeper level of actionable insight from data, including customer preference, market trends and key business processes. Better insights empower stakeholders to make data-driven decisions with direct effects on their strategy.
- **Improved risk management.** The higher level of accuracy advanced analytics provides predictions can help businesses reduce their risk of costly mistakes.

- **Anticipate problems and opportunities.** Advanced analytics uses statistical models to reveal potential problems on the business's current trajectory or identify new opportunities. Stakeholders can quickly change course and achieve better outcomes.
- **Providing strategic guidance:** Advanced analytics can identify potential courses of action for businesses faced with an uncertain future. Using predictive modelling and analysing complex market dynamics, advanced analytics can help businesses make more strategic decisions.
- **Reducing bias:** Cognitive biases are a well-known psychological phenomenon that can negatively impact decision-making in both business and life. Using advanced analytics, however, businesses can reduce the impact of such biases by leveraging AI and machine learning to give a more information-driven, equitable perspective.

## **Advanced data analytics vs. business intelligence**

### **Similarities:**

- Both use data analytics techniques to inform business decisions
- Both aim to drive business outcomes and improve performance

### **Differences:**

- Purpose:
  - BI: Descriptive analytics (what's happening now/past)
  - Advanced Analytics: Predictive and prescriptive analytics (what will happen, what to do)

### **- Techniques:**

- BI: Data visualization, data mining, statistical analysis, reporting
- Advanced Analytics: Machine learning, predictive modelling, forecasting

### **- Focus:**

- BI: Current state, historical trends
- Advanced Analytics: Future outcomes, strategic decisions

### **- Example:**

- BI: Analyse current subscriber numbers and popular content
- Advanced Analytics: Predict future trends and inform content production decisions

	Business Intelligence	Advanced Analytics
Answers the questions:	<ul style="list-style-type: none"> <li>What happened?</li> <li>When?</li> <li>Who?</li> <li>How many?</li> </ul>	<ul style="list-style-type: none"> <li>Why did it happen?</li> <li>Will it happen again?</li> <li>What will happen if we change X?</li> <li>What else does the data tell us that we never thought to ask?</li> </ul>
Includes:	<ul style="list-style-type: none"> <li>Reporting (KPIs, metrics)</li> <li>Automated monitoring and alerting (thresholds)</li> <li>Dashboards</li> <li>Scorecards</li> <li>OLAP (cubes, slice and dice, drilling)</li> <li>Ad hoc query</li> <li>Operational and real-time BI</li> </ul>	<ul style="list-style-type: none"> <li>Statistical or quantitative analysis</li> <li>Data mining</li> <li>Predictive modeling</li> <li>Multivariate testing</li> <li>Big data analytics</li> <li>Text analytics</li> </ul>

## Advanced Analytics Techniques

Advanced analytics can help provide organizations with a competitive advantage. Techniques range from basic statistical or trend analysis to more complex tasks requiring BI or specialized tools. The most complex techniques can handle big data, apply machine learning techniques and perform complex tasks.

**Data mining.** The data mining process sorts through large data sets to identify patterns and establish relationships. It's a key part of successful analytics operations because BI and advanced analytics applications use the data that mining generates to solve problems. It has applications across a variety of industries including healthcare, government, scientific research, mathematics and sports.

**Sentiment analysis.** At its core, sentiment analysis is about understanding emotions. It processes text data to determine the attitude or emotion behind the words, which can be positive, negative or neutral. In a business setting, sentiment analysis can help the business to understand how customers feel about a brand based on their reviews, social media comments or direct feedback. Tools used for sentiment analysis range from basic text analytics software to more advanced natural language processing (NLP) tools, some of which use machine learning to improve accuracy.

**Cluster analysis.** Cluster analysis is a method of grouping. It brings together similar items in a data set. Data groups, or clusters, contain items more similar to each other than items in other clusters. For example, a telecom company could use cluster analysis to group customers based on their usage patterns. Then, they can target each group with a specific marketing strategy.

**Complex event processing.** Complex event processing (CEP) involves analysing multiple events happening across various systems in real time to detect patterns. If CEP detects patterns of interest or abnormal behaviours, it can trigger alerts for immediate action. A practical example is credit card fraud detection: The system monitors transactions and flags any suspicious patterns for investigation.

**Recommender systems.** Recommender systems use past behaviour analysis to predict what a user might want and then personalize suggestions. An everyday example is when an online shopping

site suggests products a customer might prefer based on their browsing history, or when a streaming service suggests a show, the user may want to watch next.

**Time series analysis.** Time series analysis focuses on data changes over time. It looks at patterns, trends and cycles in the data to predict future points. For instance, a retailer might use time series analysis to forecast future sales based on past sales data. The results can help the retailer plan stock levels and manage resources efficiently.

**Big data analytics.** Big data analytics is the process of examining large volumes of structured, semi structured and unstructured data to uncover information such as hidden patterns, correlations, market trends and customer preferences. It uses analytics systems to power predictive models, statistical algorithms and what-if analysis.

**Machine learning.** The development of machine learning has dramatically increased the speed of data processing and analysis, facilitating disciplines such as predictive analytics. Machine learning uses AI to enable software applications to predict outcomes more accurately. The inputs use historical data to predict new outputs. Common use cases include recommendation engines, fraud detection and predictive maintenance.

**Data visualization.** Data visualization is the process of presenting data in graphical format. It makes data analysis and sharing more accessible across organizations. Data scientists use visualizations after writing predictive analytics or machine learning algorithms to visualize outputs, monitor results and ensure models perform as intended. It's also a quick and effective way to communicate information to others.

## **Advanced analytics use cases.**

There are many real-world examples of advanced analytics operating today.

### **1. Detect fraud**

Unsurprisingly, financial institutions spend a significant amount of their time focusing on ways to prevent fraudulent transactions, which involve an individual or entity withdrawing money from a fund that is not their own. While this problem is as old (if not older) than banks themselves, today, many banks use advanced analytics techniques such as.

- Advanced analytics and machine learning algorithms to identify patterns and anomalies.
- Real-time monitoring and predictive detection to flag suspicious transactions.
- Robotic Process Automation (RPA) to automate workflows and speed up response times.
- Continuous model updating and refinement to stay ahead of evolving threats.
- Collaboration and data sharing with other institutions to build a robust defence.

### **2. Improve marketing strategy**

When designing a new campaign, marketers keep a close eye on how much their efforts will cost versus how much they will earn by attracting new customers. As a result, some marketers today employ an advanced analytics technique known as marketing-mix modelling (MMM), which can model the interactions between marketing investments, sales drivers, and other external variables like seasonality to help marketers design both short and long-term strategies.

### 3. Identify growth opportunities

One of the most common concerns for a successful business is how to grow and where to invest resources. To help spot new growth opportunities, advanced analytics can identify patterns using big data.

According to a 2021 report by McKinsey and Company, for example, a chemical company used advanced analytics to scan 120 million patents and 100 million academic papers to identify new possible patent applications. Ultimately, the company identified 30 high-yield patent applications, which led to an additional \$50 million in revenue

**4. Marketing metrics.** With advanced analytics, marketing organizations can create customized, targeted marketing campaigns and avoid wasting money on ineffective strategies. Analysing future outcomes also can help an organization identify opportunities to up-sell and optimize the marketing funnel.

**5. Supply chain optimization.** Advanced analytics can help an organization factor demand, cost fluctuations and changing consumer preferences to create an agile supply chain which can quickly adapt to changing market conditions.

**6. Risk management.** Advanced analytics can examine particular data sets and data streams in real time. Data scientists can use the results to identify potential high-risk-level patterns such as possible payment fraud or insurance liabilities.

**6. Business operations.** Advanced analytics can help organizations streamline and adapt their operations to better suit predictions on changing market conditions or trends and increase revenue.

Advanced [Predictive] analytics is widely used across industries such as:

- **Healthcare** – Analyses patient data to improve treatment outcomes and personalise care.
  - *Example:* Predictive analytics helps identify patients at risk of chronic conditions for early intervention
- **Finance** – Supports risk management, fraud detection, and investment decision-making.
  - *Example:* Banks use data analytics to detect fraudulent transactions and assess credit risk.
  - *Detect fraudulent claim or double insurance.*
  - *Insurance underwriting*
- **Marketing** – Optimises campaigns by analysing customer behaviour and market trends.
  - *Example:* Businesses personalise marketing messages based on purchasing habits and engagement patterns
- **Retail** – Enhances inventory management, demand forecasting, and customer experience.
  - *Example:* Retailers use data analytics to predict seasonal demand and personalise recommendations

- **Transportation & Logistics** – Improves route planning, fleet management, and delivery efficiency.
    - *Example:* Logistics companies analyse traffic data to optimise delivery routes and reduce costs
  - **Energy** – Supports predictive maintenance, energy consumption analysis, and efficiency improvements.
    - *Example:* Energy providers use data analytics to monitor usage patterns and optimise grid performance
- Choosing Question Pro for Predictive Modelling.

### **Advanced analytics tools**

There are countless tools you can use for advanced analytics. Some of the most popular include Google Cloud, IBM Watson Studios, MATLAB, Altair RapidMiner, Microsoft Azure Machine Learning, and SAS Viya.

### **Implementing advanced analytics**

Implementing advanced analytics requires:

- A solid plan
- The right team with skills (train existing staff or hire new ones)
- Balance between tech, people, and culture

### **Key considerations:**

- Train existing staff (cost-effective, business knowledge, but time-consuming)
- Hire fresh staff (quick skills, but expensive and integration challenges)
- Mix of skills needed (data understanding, analysis, business strategy)
- Foster a data-driven culture (empower users, unlock potential)

### **Concept of Predictive Modelling**

Predictive modelling is a specific technique within the broader field of Advanced analytics.

Predictive modelling is a process used in statistics, machine learning, and data mining to make predictions about future outcomes or trends based on historical data. It involves creating a mathematical model or algorithm that can analyse patterns and relationships within a dataset and then use that information to predict future behaviour or outcomes.

Predictive modelling finds applications in various fields, including finance, marketing, healthcare, and many others. It is used for tasks such as credit scoring, fraud detection, sales forecasting, risk assessment, and personalized medicine.

The effectiveness of predictive modelling depends on the quality of the data, the appropriateness of the chosen model, and the relevance of the features selected.

## **Types of Predictive Modeling**

### **Key Predictive Modelling Techniques to Use**

- **Regression Models:** For predicting numerical outcomes (e.g., sales forecasting).
- **Classification Models:** For categorizing outcomes (e.g., fraud detection, churn prediction).
- **Time Series Models:** For demand forecasting and trend analysis.
- **Clustering:** For customer segmentation.
- **Neural Networks:** For complex, unstructured data like images or text.

### **Common Algorithms for Predictive Modelling**

Predictive modelling involves using algorithms to analyse data and make predictions about future outcomes. Different algorithms are employed based on the data's nature and the predictive model's specific goals.

Random Forest	Random forest is an ensemble learning algorithm that combines multiple decision trees, each unrelated, to enhance predictive accuracy and mitigate overfitting. It excels in both classification and regression tasks, making it versatile for organizing and labelling large datasets.
Gradient Boosted Model	Like a Random Forest, this Gradient Model is an ensemble method utilizing multiple decision trees. However, in this approach, trees are built sequentially, with each tree correcting errors from the preceding ones. This iterative process contributes to building a more accurate overall model, often employed in tasks like ranking.
K-Means	K-Means is a clustering algorithm designed for unsupervised learning. It groups data points based on similarity, making it a popular choice for tasks like personalized retail offers. By identifying similarities among large groups of customers, it can efficiently create targeted marketing strategies.
Prophet	Prophet is a time series forecasting algorithm tailored for predicting future values in temporal data. Particularly effective in tasks like capacity planning, it demonstrates flexibility in handling time-dependent patterns, seasonality, and other temporal characteristics. Its application extends to various domains requiring accurate forecasting.

## **How to Build an Advanced Analytic and Predictive Model**

### **Define Your Objective**

Before diving into the world of predictive modelling, clearly define your objective. What are you trying to predict or understand? Whether it's forecasting sales, predicting customer behaviour, or analysing trends, having a well-defined goal is the foundation of a successful predictive model.

## **Gather Data**

Data is the fuel for any predictive model. Collect relevant and accurate data that aligns with your objective. Make sure to clean and preprocess the data to remove any inconsistencies or missing values. The quality of your predictions heavily depends on the quality of your data.

## **Select a Model**

There are various predictive modelling techniques, and choosing the right one depends on your data and objective. For beginners, linear regression is a good starting point for predicting numerical values, while logistic regression is suitable for binary outcomes. Decision trees and random forests are also user-friendly and powerful for classification tasks.

## **Split Your Data**

To evaluate your model's performance, divide your dataset into two parts: a training set and a testing set. The training set is used to train the model, while the testing set is used to assess how well the model generalizes to new, unseen data.

## **Train Your Model**

Using the training set, teach your model to recognize patterns and relationships within the data. The model will adjust its parameters to make accurate predictions based on the input features.

## **Evaluate and Fine-Tune**

After training, use the testing set to evaluate the model's performance. Common metrics include accuracy, precision, recall, and F1 score. If the performance is not satisfactory, fine-tune the model by adjusting parameters or trying different algorithms.

## **Make Predictions**

Once satisfied with the model's performance, it's time to use it for making predictions on new, real-world data. Input the relevant features into the model and let it generate predictions based on what it learned during training.

## **Training and Validation:**

Testing models using historical data to improve accuracy

## **Interpret Results**

Understand the implications of your predictions and how they align with your initial objective. If the model predicts a sales increase, for example, consider what factors contributed to this prediction and how you can leverage this information for decision-making.

## **Deployment and Monitoring:**

Applying the model to new data and refining it over time

## **Challenges in Advance Analytics and Predictive modelling**

- **Data Privacy Concerns:** Maintaining compliance with GDPR, CCPA, and other regulations
- **Model Interpretability:** Explaining complex models to non-technical stakeholders
- **Scalability Issues:** Managing large-scale data processing and model deployment

- **Data Bias and Accuracy:** Addressing biases that may affect predictive outcomes
- **Integration with Existing Systems:** Seamlessly embedding predictive analytics into workflows
- **Integration with Existing Systems:** Seamlessly embedding predictive analytics into workflows.

## **Best practices for implementing advanced analytics and predictive modelling for informed decision-making:**

### **1. Strategy and Business Alignment**

- **Define Clear Business Objectives First:** Start with a specific business problem (e.g., reducing customer churn, optimizing inventory) rather than data availability.
- **Align Analytics with Strategic Goals:** Ensure every model has a measurable KPI, such as a percentage increase in accuracy or a tangible reduction in cost.
- **Adopt an Incremental Approach:** Start with focused pilot projects or proof-of-concepts (PoCs) to demonstrate value quickly before scaling organization-wide.

### **2. Data Governance and Quality**

- **Implement Robust Data Governance:** Create a "rulebook" that defines data ownership, security, and usage policies to ensure trustworthiness.
- **Prioritize Data Cleansing and Preparation:** Data preparation is often the most time-consuming step; focus on removing anomalies, handling missing values, and validating data accuracy.
- **Ensure Data Consistency:** Create a unified "source of truth" by connecting disparate systems (CRM, ERP, IoT) to avoid siloed, conflicting data.

### **3. Model Development and Technical Best Practices**

- **Use Ensemble Models for Robustness:** Combine multiple models (e.g., Random Forest, Gradient Boosting) to improve prediction accuracy and reliability over single models.
- **Avoid Overfitting:** Ensure models generalize well to new data rather than just memorizing training data. Use cross-validation techniques (e.g., K-Fold) to validate performance.
- **Focus on Explainable AI (XAI):** As models become more complex, ensure they are interpretable so stakeholders trust the insights and regulators can review the decisions.
- **Leverage Feature Engineering:** Transform raw data into meaningful features that represent the underlying business process, which often improves model performance more than algorithm tuning.

### **4. Implementation and Deployment**

- **Integrate Models into Workflows:** Embed analytical results directly into operational systems (e.g., CRM dashboards) to ensure decisions are truly data driven.
- **Automate Data Pipelines:** Use modern data engineering (ELT/ETL) to keep models updated with real-time or near-real-time data.

- Establish Model Monitoring and Maintenance: Actively monitor model performance for degradation due to "data drift"—when the real-world changes and the model become outdated. Retrain models periodically.

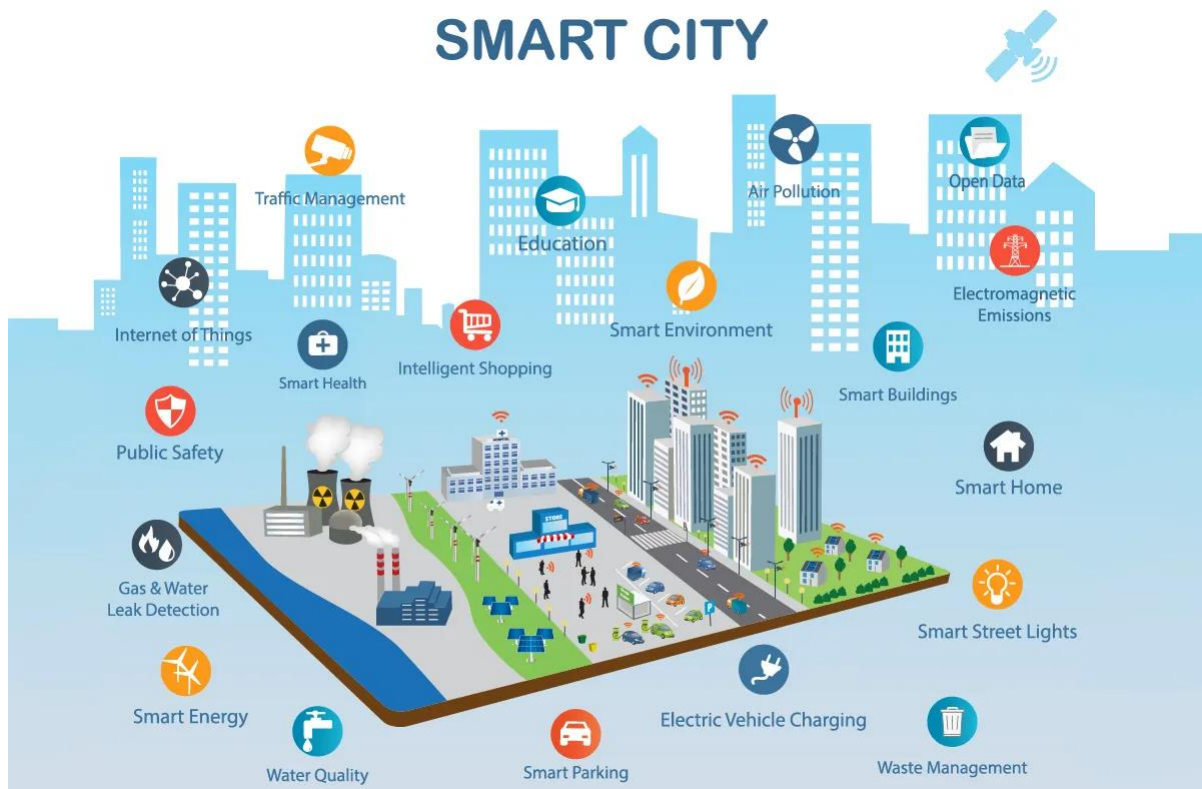
## 5. Talent and Culture

- Build Cross-Functional Teams: Combine the skills of data scientists, data engineers, and domain experts (business leaders) to ensure models are technically sound and practically relevant.
- Foster a Data-Driven Culture: Encourage decision-makers to use predictive insights rather than relying solely on intuition.

## The Future

**The Internet of Things (IoT) will increasingly drive the future of data collection. Cities of the Future will be Interconnected.**

- Smart Devices: From wearables that track our health to smart homes that monitor energy usage, IoT devices will create an almost constant stream of data.
- Smart Cities: Cities of the future will be interconnected, with sensors monitoring everything from air quality to traffic flow. Data from these sensors will help optimize city services, reduce energy consumption, and improve quality of life for residents.
- Data Collection without Borders: With IoT devices integrated into everything, the collection of data will become more seamless and less intrusive. This will enable industries like healthcare, transportation, and agriculture to capture detailed, real-time information that can drive **innovation**.



## Conclusion

Integrating advance analytics and decision-making is crucial for data scientists to develop effective solutions.

Implementing advanced analytics and predictive modelling requires a structured approach that moves beyond simple data analysis to forecast future outcomes, optimize processes, and guide strategic decisions. Success is achieved by aligning technical models with clear business objectives, maintaining high data quality, and fostering a data-driven culture, rather than treating these projects solely as IT initiatives.

By combining these technologies, businesses can achieve higher levels of accuracy and gain deeper insights into historical, current, and future scenarios. Advanced analytics plays a vital role in processing data to enhance decision-making accuracy. It enables organizations to leverage historical data and statistical algorithms to anticipate outcomes and make more informed choices. On the other hand, decision-making processes provide structured approaches to reaching optimal solutions for various problems or situations.

**In the digital economy, the ability to turn data into information, and information into insight, is the ultimate competitive advantage" — Adapted from Carly Fiorina.**

**Practical examples of how advanced analytics turns raw data into strategic intelligence in insurance/banking. raw data → analytics method → strategic output:**

Raw Data	Advanced Analytics Applied	Strategic Intelligence Output
Claim notes + adjuster reports: 50,000 unstructured text files.	NLP + Anomaly detection: Text mining for fraud signals: “no police report”, “garage owned by cousin”, repeated phone numbers	Fraud Strategy: Flagged 4% of claims as high-fraud probability. Investigating just these saved ₦180M in 6 months. Intelligence: Ringleader operates via 3 brokers. Board action: blacklist + NAICOM report.
Telematics data: 500M GPS pings, speed, braking, time-of-day from 10,000 motor policies.	Behavioural clustering + Predictive modelling: Group drivers by risk score, not just age. Build GLM to predict claim frequency	Usage-Based Pricing: Identified 2,000 “low-risk night drivers” currently overcharged by 40%. Action: Launch pay-how-you-drive product. Keep them from leaving to competitors. +₦300M GWP, -15% loss ratio
Call center voice logs + lapse data: 100k calls + 20k lapsed policies.	Speech analytics + Churn model: Detect dissatisfaction keywords, sentiment. Predict who will lapse in 60days	Retention Intelligence: Model flags 1,400 high-value policies at risk next month. Action: Proactive call + 5% discount saves 65%. Protects ₦420M annual premium. CAC vs. retention cost = 8:1 ROI.

Loan application data + external data: 100 fields per app + BVN, credit bureau, social media, satellite images of business	Machine learning credit scoring: Gradient boosting model with 400+ features vs. traditional 15-field scorecard	Risk-Based Pricing + Inclusion: Approve 18% more SMEs with same default rate. Decline 5% of “approved by old rules” who default 3x more. Intelligence: RWA efficiency up, NIM +60bps. Board can grow loan book without more capital.
Mobile app clickstream: Every tap, scroll, drop-off for 500k users.	Digital journey analytics + Uplift modelling: Identify where users abandon. Test which nudges work on whom.	Revenue Intelligence: 42% drop off at “add BVN” step. A/B test shows removing BVN to later stage lifts onboarding 31%. Also, users who see “investment” banner in first session have 4x higher LTV. Action: Redesign flow, personalize home screen. + <del>₦</del> 250M fee income/year.

**Key Difference: Basic Report vs. Advanced Analytics**

Basic Report	Advanced Analytics Intelligence
NPL is 5.2%	NPL will be 6.8% in 90 days unless we restructure these 1,200 obligors flagged by early-warning model
Motor loss ratio = 72%	Loss ratio will drop to 61% if we reprice these 3 driver clusters and exit these 2 brokers”
Dormant accounts = 68%	If we SMS these 40k customers with ₦100 airtime, 18% reactivate with ₦12k avg balance = ₦86M CASA

Advanced analytics adds prediction, prescription, and optimization to raw data. It tells the Board not just “what happened” but “what will happen, why, and what we should do about it

**Key takeaways**

Advanced analytics is a collection of data analytics techniques, such as machine learning and predictive modeling, used to improve decision-making.

- Advanced analytics uses complex techniques, including machine learning, to predict future possibilities and inform strategic planning.
- Businesses can leverage advanced analytics to navigate complex markets, predict market trends, improve decision-making by reducing bias, and decrease risk.
- You can perform advanced analytics using popular data science and analytics tools, such as SAS Viya and Altair RapidMiner.

**Data is not just an advantage—it is a necessity. By leveraging advanced analytics and predictive modelling, we turn passive historical records into initiative-taking strategic intelligence, moving from 'What happened?' to 'What should we do?'"**

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