



BBA

Semester V

Calicut University

Communicating with AI

Course Code: BBA5FS114 • Module 2 Notes

1. Business Analytics Continuum and Core Concepts

Business Analytics (BA) refers to the systematic iteration and exploration of an organization's data through statistical analysis, predictive modeling, and quantitative methods to drive evidence-based business planning and decision-making.

The Three Tiers of Business Analytics

Business Analytics is structured into three progressive analytical levels:

Analytics Level	Primary Question Addressed	Core Techniques & Tools	Business Focus
Descriptive Analytics	"What happened in the business?"	Data aggregation, SQL queries, data warehousing, summary statistics, dashboards.	Historical performance reporting and trend tracking.
Predictive Analytics	"What is likely to happen?"	Regression models, time-series forecasting, decision trees, machine learning algorithms.	Estimating future demand, churn risk, and market shifts.
Prescriptive Analytics	"What specific action should we take?"	Optimization algorithms, Monte Carlo simulations, heuristic decision engines, AI agents.	Recommending optimal price points, inventory levels, and resource routing.

Big Data Architecture in Analytics

Modern analytics handles high-velocity data streams across the 5 V's of Big Data:

- Volume:** Massive scale of transactional logs, social interactions, and IoT sensor metrics.
- Velocity:** Speed at which real-time streaming data arrives and requires processing.

- **Variety:** Mixing structured SQL tables with unstructured text, images, and video feeds.
- **Veracity:** Managing data quality, noise reduction, and bias elimination.
- **Value:** Converting raw data pipelines into actionable financial and operational insights.

2. Decision Support Systems (DSS)

Architecture and Components

A Decision Support System (DSS) is an interactive, computer-based information system that assists business managers in analyzing semi-structured or unstructured decision problems by combining raw data, complex analytical models, and user-friendly interfaces.

Core Structural Components of a DSS

1. Data Management Subsystem

Contains internal corporate databases, data warehouses, and external data feeds. Serves as the authoritative single source of truth for analytical queries.

2. Model Management Subsystem

Stores quantitative financial, statistical, linear programming, and simulation models that transform raw data into decision insights.

3. User Interface Subsystem

The graphical front-end (dashboards, portal controls) allowing non-technical managers to input parameters, run "what-if" analyses, and view charts.

4. Knowledge-Based Subsystem

Provides rule-based intelligence or AI algorithms that suggest initial interpretation of complex model outputs.

3. Data-Driven Decision Making (DDDM)

Lifecycle

Data-Driven Decision Making (DDDM) is the operational practice of basing corporate strategy on verifiable data analysis rather than intuition, observation, or executive bias.

The DDDM Implementation Lifecycle

Executing a successful data-driven decision sequence involves six distinct stages:

1. **Problem Definition:** Formulating clear, measurable business questions aligned with strategic objectives.
2. **Data Collection & Ingestion:** Gathering structured and unstructured data from transactional systems, IoT sensors, and external APIs.
3. **Data Processing & Cleaning:** Removing duplicate entries, handling missing values, standardizing formats, and verifying data integrity.
4. **Exploratory Data Analysis:** Applying statistical tools and visualization techniques to uncover patterns, anomalies, and relationships.
5. **Model Execution & Insight Generation:** Running predictive or prescriptive models to generate actionable recommendations.
6. **Execution & Feedback Loop:** Implementing the decision in business operations and continuously monitoring outcomes to refine future models.

4. AI-Powered Business Intelligence and Analytics Platforms

The integration of Artificial Intelligence into Business Intelligence (BI) platforms has created **Augmented Analytics**—enabling natural language querying, automated anomaly detection, and automated insight generation.

Modern AI-Driven Analytics Tools & Platforms

Platform / Tool	AI Capabilities & Integrations	Primary Business Application
Power BI (Microsoft)	Q&A natural language queries, Key Influencers visual, automated anomaly detection.	Enterprise executive reporting and interactive dashboarding.
Tableau Einstein (Salesforce)	Predictive modeling, automated statistical explanations, conversational data discovery.	Visual data exploration and predictive sales analytics.
Python / R Ecosystem	Pandas, Scikit-Learn, TensorFlow, PyTorch for custom ML model development.	Bespoke data science, advanced machine learning, and quantitative modeling.
Google Looker AI	LookML semantic layer, automated insight discovery, AI-driven data modeling.	Cloud-native enterprise business intelligence and data mesh analytics.

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