Here’s a structured summary for the **Data-Driven Decision Making** course materials you've uploaded, following your preferred format:

**📘 1. Data-Driven Decision Making: Concepts & Applications**

**What it’s about:**  
Introduces how data is used to solve business problems using analytics: descriptive (what happened), predictive (what might happen), and prescriptive (what should we do). It also introduces big data, business intelligence, and data preparation methods.

**Why it matters:**  
Helps decision-makers move beyond gut feeling and opinions by using evidence-backed insights. Enables smarter forecasting, optimization, and risk reduction.

**What kind of decisions it supports:**

* Understanding business performance
* Predicting trends or customer behaviors
* Optimizing processes and resource allocations
* Evaluating strategic changes

**🧠 Core Concepts:**

* **Business Analytics (BA):** Using data and statistical models for decision-making.
* **Types of Analytics:**
  + *Descriptive*: Reports, dashboards (e.g., inventory, attendance).
  + *Predictive*: Forecasting using regression or time-series.
  + *Prescriptive*: Optimization and simulation models.
  + *Diagnostic*: Identifying root causes.
* **Big Data’s 5 Vs:** Volume, Velocity, Variety, Veracity, Value.
* **Data Capture Methods:** Surveys, online forms, sensors, etc.
* **Measurement Scales:**
  + *Nominal* (names, no order)
  + *Ordinal* (ranking)
  + *Interval* (equal intervals, no true zero)
  + *Ratio* (true zero, e.g., age, salary)
* **Data Preparation:** Cleaning data, handling missing values, outliers, duplicates.

**📌 Important Terms Explained Simply:**

* **Linear Programming:** A method to find the best outcome (e.g., max profit) within constraints.
* **Descriptive Analytics:** Tools that summarize past data like graphs or tables.
* **Predictive Analytics:** Uses patterns in historical data to make future predictions.
* **Prescriptive Analytics:** Tells you what decision would be optimal.

**📙 2. Descriptive Analytics (Lecture 2)**

**What it’s about:**  
Explores descriptive analytics — summarizing and visualizing past data to understand what has already happened.

**Why it matters:**  
It’s the foundation of all data analysis and helps identify patterns, track performance, and make daily operational decisions.

**What kind of decisions it supports:**

* Customer segmentation
* Goal tracking
* Operational improvements

**🧠 Core Concepts:**

* **Descriptive Statistics:** Mean, Median, Mode, Range, Variance, Standard Deviation.
* **Visualization Tools:** Graphs, dashboards, tables, pivot tables.
* **Population vs. Sample:** Understanding if data covers the whole or a subset.
* **Coefficient of Variation (CV):** Compares variability across datasets with different units.
* **Empirical Rule:** About 68%-95%-99.7% of data falls within 1-3 standard deviations of the mean.

**📌 Business Terms Simplified:**

* **Standard Deviation:** How spread out the numbers are.
* **Variance:** Square of standard deviation (shows dispersion).
* **Coefficient of Variation:** Measures spread relative to the mean (good for comparisons).
* **Skewness:** When data isn’t symmetrical (outliers affect mean).

**📗 3. Predictive Analysis (Lecture 3)**

**What it’s about:**  
Covers how we use past data to forecast future outcomes through correlation and regression analysis.

**Why it matters:**  
It helps businesses anticipate trends, demands, and customer behaviors for proactive decision-making.

**What kind of decisions it supports:**

* Sales forecasts
* Pricing strategies
* Maintenance schedules
* Marketing predictions

**🧠 Core Concepts:**

* **Correlation (r):** Measures strength/direction of linear relationship (−1 to +1).
* **Regression Analysis:** Predicts one variable based on another (e.g., sales based on calls made).
  + *Simple Linear Regression*: One predictor
  + *Multiple Regression*: Multiple predictors (e.g., heating cost from temperature + insulation)
  + *Non-linear Regression*: For curved patterns
  + *Indicator (Dummy) Variables*: Converts categories to numbers (0 or 1)
* **Time Series Forecasting:** Predicts future values based on time trends (moving averages, exponential smoothing).

**📌 Key Terms Made Simple:**

* **Dependent Variable (Y):** What you're trying to predict.
* **Independent Variable (X):** What you’re using to predict.
* **Least Squares Method:** Finds the line that fits data best.
* **Spurious Correlation:** When two variables correlate but aren’t logically connected.

**📕 4. Prescriptive Analytics (Lecture 4 + Case)**

**What it’s about:**  
Focuses on tools and models (especially Linear Programming) that suggest the best course of action to maximize or minimize a business goal.

**Why it matters:**  
Helps businesses optimize decisions involving constraints (budget, resources, ratios).

**What kind of decisions it supports:**

* Resource allocation
* Product mix optimization
* Financial planning (e.g., ECS case)

**🧠 Core Concepts:**

* **Prescriptive Analytics:** Suggests best actions based on forecasts.
* **Linear Programming (LP):** Optimizes objectives (e.g., profit) given constraints.
* **Objective Function:** The formula you want to optimize (maximize or minimize).
* **Constraints:** Limits like budget, workforce, time, etc.
* **Sensitivity Report:** Tells how changes affect your results.
* **Analytic Hierarchy Process (AHP):** Helps decide when multiple criteria are involved (e.g., vendor selection).

**📌 Key Terms Explained:**

* **NPV (Net Present Value):** Present value of future cash flows minus costs.
* **Shadow Price:** Tells how much the objective would improve if the constraint was relaxed.
* **Slack:** Unused resources in the solution.

**🧪 Case: Equuleus Car Sharing (ECS)**

* ECS wants to expand into new cities but must decide whether to finance or buy cars outright.
* LP model helps decide how many vehicles to buy (type and number) to maximize profit.
* Constraints: Budget, down payments, vehicle type mix, payment timelines.

**📝 Final Takeaways for Quick Revision:**

1. **Analytics comes in 3+1 types** — Descriptive (past), Predictive (future), Prescriptive (advice), Diagnostic (why it happened).
2. **Good decisions need good data** — Check for missing values, outliers, correct formats, and measurement levels.
3. **Descriptive stats (mean, median, mode)** help summarize — but use **dispersion (range, SD, variance)** to understand spread.
4. **Predictive models** use correlation and regression — regression helps predict future values.
5. **Prescriptive models** use LP and simulations — to find optimal choices under constraints.
6. **ECS Case:** A real-world LP application to decide on car purchases with limited budget and constraints.
7. **AHP** helps with multi-criteria decisions (e.g., project or supplier selection).

Here is a concise summary of the two Excel-based files to complete your **Data-Driven Decision Making** batch for midterm revision:

**📊 5. Correlation & Regression Analysis (Day 3 Excel File)**

**What it’s about:**  
This spreadsheet complements predictive analytics topics — especially correlation and regression — with **practical calculation examples** using real-life-style data.

**Why it matters:**  
It shows how to calculate and interpret:

* Correlation strength
* Regression coefficients (slope, intercept)
* Forecasting future outcomes (e.g., sales based on calls)

**What kind of decisions it supports:**

* Predicting outcomes (e.g., sales, demand)
* Understanding relationships between business variables

**🧠 Core Elements You’ll See Inside the File:**

* **Data Table:** Contains pairs of values for two variables (e.g., sales calls vs. copiers sold).
* **Correlation Coefficient (r):** Automatically calculated to show strength of association.
* **Regression Equation (y = a + bx):**
  + a = intercept (value of Y when X = 0)
  + b = slope (how much Y increases per unit increase in X)
* **Prediction Example:** You’ll see what happens if X = 100 (e.g., 100 calls made).

**📌 Friendly Terms:**

* **r = 0.9:** Means strong positive correlation.
* **If b = 0.4:** Every extra sales call leads to 0.4 more copiers sold (on average).

**🧮 6. LP Model Case Solver (Day 4 Excel File)**

**What it’s about:**  
This Excel file solves the **Equuleus Car Sharing case** using **Linear Programming (LP)** in Excel Solver to find the most profitable combination of vehicles to buy.

**Why it matters:**  
It turns a real-world business scenario (vehicle purchasing under budget and revenue constraints) into a **quantitative decision model**.

**What kind of decisions it supports:**

* Choosing how many of each vehicle type to purchase
* Maximizing Net Present Value (NPV) of investments under multiple conditions
* Balancing cost, payments, interest, and revenue over time

**🧠 Core Sections in the File:**

* **Input Section:** Vehicle prices, revenue (year 1 and 2), budget, interest rate, down payment constraints.
* **Decision Variables (X1 to X4):** Number of Minivans, SUVs, Sedans, and Economy cars.
* **Formulas:** Used to calculate:
  + NPV
  + Year-wise payments and interest
  + Cash flows and constraints
* **Solver Configuration:** Set to maximize NPV while satisfying all constraints.

**📌 Friendly Terms:**

* **Decision Variables:** What Excel Solver adjusts (how many cars to buy).
* **Objective Function:** Formula to maximize (NPV).
* **Constraints:** Rules Solver must follow (e.g., total budget, minimum down payment, max % for any car type).

**✅ Final Batch Revision Takeaways:**

1. **Correlation** tells you how strong a relationship is; **regression** lets you predict values.
2. **Predictive analytics** turns past data into future insights (via Excel functions or statistical models).
3. **Prescriptive analytics** helps choose optimal decisions under constraints using tools like Excel Solver.
4. The **ECS case** (car sharing) applies real-world logic and LP modeling — very likely exam material!
5. Always check if the **data satisfies the assumptions** (e.g., linearity for regression, budget for LP).

Let me know if you want visual aids (e.g., formula breakdowns or solved examples) for exam practice!

Here’s a concise, beginner-friendly summary of the **Day 5 materials** from your **Data-Driven Decision Making** course at IBA. This includes five items: a leader's guide PDF and four HTML simulation tools.

**🔹1. A Leader’s Guide to Data-Driven Decision Making**

**What it's about:**  
This guide shifts your mindset from “gut feeling” to “fact-based” decision-making using data. It explains why DDDM (Data-Driven Decision Making) matters, where data comes from, how to use it, and how to build a data-driven culture in an organization.

**Why it matters:**  
Leaders who make decisions based on evidence instead of assumptions are:

* **23x more likely** to acquire customers
* **6x more likely** to retain them
* **5–6% more productive**

**Supports decisions like:**  
Strategy, marketing, operations, customer experience, risk management, and innovation.

**Core Concepts:**

* **Descriptive to Prescriptive Analytics:** Know what happened → why → what might happen → what you should do.
* **Data Sources:** Internal (CRM, ERP, website data) and external (market reports, public data).
* **Frameworks for decision-making:** DMAIC, CRISP-DM, PDCA, Decision Trees.
* **Common challenges:** Poor data quality, lack of skills, cultural resistance, “paralysis by analysis.”
* **Leadership tips:** Lead by example, invest in data tools/training, foster a data culture.

**Simple Definitions:**

* **KPIs:** Key Performance Indicators—metrics to measure success.
* **DMAIC:** Define, Measure, Analyze, Improve, Control—used in Six Sigma.
* **CRISP-DM:** Cross-industry standard for data mining.

**🔹2. Pricing Strategy Simulator (Price Elasticity)**

**What it's about:**  
An interactive tool that lets you adjust product prices and instantly see how it affects revenue and profit.

**Why it matters:**  
It helps you understand **price elasticity**—how sensitive customer demand is to price changes. You can use it to optimize pricing decisions for better profit.

**Supports decisions like:**  
Product pricing, promotions, revenue forecasting.

**Core Concepts:**

* **Elasticity:** Measures how much demand changes with price.
  + Product A: -1.5 → less sensitive
  + Product B: -2.0 → more sensitive
* As price increases, demand drops (for elastic products), and vice versa.
* You can compare **revenue**, **COGS (Cost of Goods Sold)**, and **profit** across different price points.

**Simple Definitions:**

* **Elastic Product:** Demand changes a lot when price changes.
* **Inelastic Product:** Demand doesn’t change much with price.

**🔹3. What-If Analysis (Business Scenario Planner)**

**What it's about:**  
A simulation tool that lets you play with **price** and **marketing spend** to estimate sales, revenue, and profit.

**Why it matters:**  
This teaches how different business decisions impact the bottom line—and helps in choosing the best strategy in uncertain scenarios.

**Supports decisions like:**  
Budgeting, campaign planning, scenario analysis.

**Core Concepts:**

* Sales increase with more marketing, but not forever (diminishing returns).
* Higher prices reduce demand.
* Profit = Revenue - Cost of Goods - Marketing Spend

**Simple Definitions:**

* **What-if Analysis:** A way to explore outcomes of changing business inputs (e.g., price, ad budget).
* **Diminishing Returns:** At some point, spending more gives you less extra benefit.

**🔹4. A/B Testing Simulator**

**What it's about:**  
This tool helps you run virtual A/B tests—comparing two versions of a product or webpage to see which performs better.

**Why it matters:**  
Instead of guessing which design or strategy works, A/B testing helps you **experiment with evidence**.

**Supports decisions like:**  
Web design, user experience, ad performance, feature rollout.

**Core Concepts:**

* A/B test splits users into two groups to compare version A vs. B.
* You measure which version gets better **conversion rates** (e.g., more clicks, signups, purchases).
* Tests must be run on enough users to get reliable results.

**Simple Definitions:**

* **Conversion Rate:** % of users who take the desired action.
* **Statistical Significance:** Confidence that your result isn’t just due to chance.

**🔹5. Presentation on Business Tools (Price Elasticity, A/B, What-If)**

**What it's about:**  
Slides summarizing all three tools and how they fit into data-driven decision-making. It's a wrap-up of Day 5 hands-on learning.

**Why it matters:**  
Helps connect simulation tools with real-world business strategy and learn how to present data-backed findings clearly.

**Core Concepts:**

* Price changes affect sales and profit depending on elasticity.
* Marketing spend can boost sales, but only up to a point.
* Testing ideas with A/B tests helps avoid costly mistakes.

**✅ Final Revision – Day 5 Key Takeaways**

* Data-driven leaders rely on **facts, not hunches**—and build cultures that encourage using data.
* Use **elasticity models** to find optimal prices and maximize profit.
* Apply **what-if tools** to plan different business scenarios.
* Use **A/B testing** to validate changes before implementing them.
* DDDM success comes from a mix of tools, culture, leadership, and experimentation.