**Business Data Analysis Notebook Structure**

**Recommended Jupyter Notebook Organization**

**1. Header Section**

# [Project Title]: [Business Problem]

\*\*Author:\*\* [Your Name]

\*\*Date:\*\* [Date]

\*\*Objective:\*\* [One-line business objective]

## Table of Contents

1. Business Context & Objectives

2. Data Import & Overview

3. Data Cleaning & Preprocessing

4. Exploratory Data Analysis (EDA)

4.5. Advanced Business Metric & KPIs

5. Deep Dive Analysis

5.5. Statistical Analysis & Hypothesis Testing

5.6. A/B Testing & Experimentation

5.7 Cohort & Time Series Analysis

6. Business Insights & Recommendations

7. Conclusions & Next Steps

**2. Section 1: Business Context & Objectives**

## 1. Business Context & Objectives

### Business Problem

- What business challenge are we solving?

- Why is this analysis important?

- What decisions will be made based on this analysis?

### Success Metrics

- What defines success for this project?

- How will we measure impact?

### Key Questions to Answer

- Question 1: [Specific business question]

- Question 2: [Specific business question]

- Question 3: [Specific business question]

**3. Section 2: Data Import & Overview**

# Import libraries

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

import seaborn as sns

# ... other imports

# Data loading

# Explain data source and context

df = pd.read\_csv('data.csv')

### Data Source Information

- \*\*Source:\*\* [Where did the data come from?]

- \*\*Time Period:\*\* [Date range]

- \*\*Sample Size:\*\* [Number of records]

- \*\*Business Context:\*\* [What does each row represent?]

### Initial Data Overview

# Basic data exploration with business context comments

print(f"Dataset shape: {df.shape}")

print(f"Business implication: We have {df.shape[0]:,} transactions from {df.shape[1]} variables")

df.head()

df.info()

df.describe()

**4. Section 3: Data Cleaning & Preprocessing**

## 3. Data Cleaning & Preprocessing

### Data Quality Assessment

# Check for missing values with business impact explanation

missing\_data = df.isnull().sum()

print("Missing data analysis:")

for col, missing\_count in missing\_data[missing\_data > 0].items():

missing\_pct = (missing\_count / len(df)) \* 100

print(f"{col}: {missing\_count:,} ({missing\_pct:.1f}%) missing")

# Add business context: "This could impact our revenue analysis because..."

### Cleaning Steps & Business Rationale

# Each cleaning step with clear business justification

# Example:

# "Removing orders with negative quantities as they represent data entry errors"

# "Imputing missing customer ages with median to preserve customer segmentation analysis"

**5. Section 4: Exploratory Data Analysis (EDA)**

## 4. Exploratory Data Analysis

### Key Metrics Overview

# Calculate and present key business metrics

total\_revenue = df['revenue'].sum()

avg\_order\_value = df['order\_value'].mean()

unique\_customers = df['customer\_id'].nunique()

print(f"📊 Key Business Metrics:")

print(f"Total Revenue: ${total\_revenue:,.2f}")

print(f"Average Order Value: ${avg\_order\_value:.2f}")

print(f"Unique Customers: {unique\_customers:,}")

### Distribution Analysis

\*\*Business Question:\*\* [What business insight are we looking for?]

# Create visualizations with business context

# Always explain what business insights each chart reveals

**Section 4.5: Advanced Business Metrics & KPIs**

* Customer Acquisition Cost (CAC) and Customer Lifetime Value (CLV)
* Return on Investment (ROI) and Return on Ad Spend (ROAS)
* Conversion rates and funnel analysis
* Churn rate and retention metrics
* Monthly/Annual Recurring Revenue (MRR/ARR)
* Unit economics and profitability metrics

**6. Section 5: Deep Dive Analysis**

## 5. Deep Dive Analysis

### [Specific Business Question 1]

\*\*Hypothesis:\*\* [What do we expect to find and why?]

# Analysis code with step-by-step business reasoning

# Example: Customer segmentation, product performance, regional analysis, etc.

# Always connect findings back to business implications

\*\*Finding:\*\* [What did we discover?]

\*\*Business Implication:\*\* [Why does this matter for the business?]

### [Specific Business Question 2]

[Repeat structure]

**Section 5.5: Statistical Analysis & Hypothesis Testing**

* **Hypothesis formulation (null vs alternative)**
* **Statistical tests selection (t-tests, chi-square, ANOVA)**
* **Assumptions validation (normality, independence)**
* **P-value interpretation and statistical significance**
* **Confidence intervals and effect sizes**

**Section 5.6: A/B Testing & Experimentation**

* **Experiment design and hypothesis setup**
* **Sample size and power analysis**
* **Control vs treatment group analysis**
* **Statistical significance testing**
* **Business impact measurement and recommendations**

**Section 5.7: Cohort & Time Series Analysis**

* **Customer cohort analysis and retention**
* **Time series decomposition (trend, seasonality)**
* **Customer lifetime value calculations**
* **Conversion funnel analysis**

**7. Section 6: Business Insights & Recommendations**

## 6. Business Insights & Recommendations

### 🔍 Key Findings Summary

1. \*\*Finding 1:\*\* [Data insight]

- \*\*Business Impact:\*\* [Revenue/cost/efficiency impact]

- \*\*Recommendation:\*\* [Specific actionable step]

- \*\*Estimated Impact:\*\* [Quantified benefit]

2. \*\*Finding 2:\*\* [Data insight]

- \*\*Business Impact:\*\* [Revenue/cost/efficiency impact]

- \*\*Recommendation:\*\* [Specific actionable step]

- \*\*Estimated Impact:\*\* [Quantified benefit]

### 💡 Strategic Recommendations

#### Immediate Actions (0-3 months)

- [ ] [Specific action item]

- [ ] [Specific action item]

#### Medium-term Initiatives (3-12 months)

- [ ] [Specific action item]

- [ ] [Specific action item]

#### Long-term Strategy (12+ months)

- [ ] [Specific action item]

- [ ] [Specific action item]

### 📈 Expected Business Impact

- \*\*Revenue Opportunity:\*\* $[X] annually

- \*\*Cost Savings:\*\* $[Y] annually

- \*\*Efficiency Gains:\*\* [Z]% improvement in [metric]

**8. Section 7: Conclusions & Next Steps**

## 7. Conclusions & Next Steps

### Project Summary

- \*\*Business Problem Solved:\*\* [Restate the original problem]

- \*\*Key Discovery:\*\* [Most important finding]

- \*\*Primary Recommendation:\*\* [Main action item]

### Limitations & Assumptions

- [What data limitations existed?]

- [What assumptions were made?]

- [How might these affect the recommendations?]

### Recommended Next Steps

1. \*\*Additional Analysis Needed:\*\*

- [What other data would help?]

- [What other analyses would strengthen findings?]

2. \*\*Implementation Plan:\*\*

- [How should recommendations be rolled out?]

- [What metrics should track success?]

3. \*\*Future Monitoring:\*\*

- [What KPIs should be tracked ongoing?]

- [When should this analysis be refreshed?]

**🎯 Key Principles for Business-Focused Notebooks:**

1. **Always connect technical findings to business value**
2. **Use clear, non-technical language in markdown explanations**
3. **Quantify impact wherever possible ($, %, time savings)**
4. **Focus on actionable insights, not just interesting patterns**
5. **Structure analysis around business questions, not technical methods**
6. **Include executive summary of findings early in notebook**
7. **End with concrete recommendations and next steps**

**Missing from Data Analyst Notebook:**

1. **A/B Testing & Experimentation**
   * Hypothesis formulation
   * Statistical power analysis
   * Sample size calculation
   * Statistical significance testing
   * Effect size measurement
2. **Statistical Analysis**
   * Hypothesis testing (t-tests, chi-square, ANOVA)
   * Confidence intervals
   * Statistical assumptions validation
   * P-value interpretation
3. **Cohort Analysis**
   * Customer lifetime value
   * Retention analysis
   * User journey mapping
4. **Time Series Analysis**
   * Trend analysis
   * Seasonality detection
   * Forecasting basics
5. **Advanced Business Metrics**
   * Customer acquisition cost (CAC)
   * Return on investment (ROI)
   * Conversion funnels
   * KPI dashboards