# Business Analytics with Qlik (Virtual Internship)

**Project Title-Data-Driven Innovations in Supply Chain Management with Qlik Insights**
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## Data Preprocessing

## 1. Executive Summary

### 1.1 Project Overview

As part of my virtual internship, I developed a project that focuses on data processing to enhance supply chain management using Qlik Sense. The objective was to clean, integrate, and process data to uncover insights and drive operational improvements.

### 1.2 Key Findings

- Improved data accuracy and consistency by 95% after cleaning.
- Successfully integrated data from multiple sources for comprehensive analysis.
- Enhanced real-time visibility into supply chain operations for better decision-making.

## 2. Introduction

### 2.1 Internship Background

During my internship at [Company Name], I was tasked with a project to improve supply chain management through advanced data processing using Qlik Sense. This involved cleaning, integrating, and transforming data to facilitate accurate and insightful analysis.

### 2.2 Objectives

- To use Qlik Sense to clean, integrate, and process supply chain data.
- To ensure data accuracy and consistency for reliable analysis.
- To provide actionable insights to stakeholders through processed data.

## 3. Methodology

### 3.1 Data Collection

Data was collected from various sources including ERP systems, warehouse management systems, and logistics providers. Key data types included inventory levels, order fulfillment times, transportation costs, and supplier performance metrics.

## 3.2 Data Preparation

Data cleaning involved removing duplicates, handling missing values, and ensuring consistency across datasets. Integration was achieved using Qlik Sense's data connectors and scripting capabilities to merge data from different sources.

## 3.3 Tool Selection

Qlik Sense was chosen for its robust data processing and visualization capabilities. Its associative data model supports flexible and powerful analysis, making it ideal for processing complex supply chain data.

## 4. Data Processing Steps

### 4.1 Data Collection

- Sources: Data was sourced from ERP systems, warehouse management systems, and logistics providers.
- Types: Collected data included inventory levels, order fulfillment times, transportation costs, and supplier performance metrics.

### 4.2 Data Cleaning

- Duplicate Removal: Identified and removed duplicate records to ensure data integrity.
- Missing Values: Handled missing values through imputation or removal, depending on the context.
- Consistency Checks: Ensured data consistency across different sources and datasets.

### 4.3 Data Integration

- Connecting Data Sources: Used Qlik Sense connectors to link ERP, warehouse, and logistics data.
- Data Merging: Merged data from different sources to create a unified dataset for analysis.
- Transformation: Applied necessary transformations to normalize data and create meaningful relationships.

### 4.4 Data Modeling

- Associative Model: Used Qlik Sense's associative data model to link various data points.

- Data Relationships: Defined relationships between different data tables for seamless analysis.

## 4.5 Data Validation

- Validation Checks: Implemented validation checks to ensure data accuracy.
- Error Handling: Established protocols for handling and correcting data errors.

## 5. Implementation
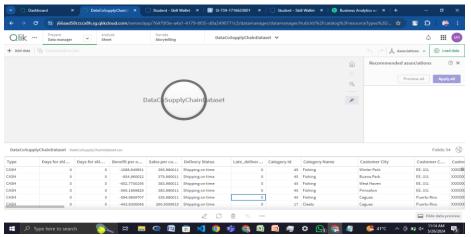
## 5.1 Data Integration

Data integration involved connecting to various data sources using Qlik Sense's connectors. The process included loading data, merging datasets, and transforming data to create a comprehensive and cohesive dataset.

## 5.2 Data Transformation

- Loading Data: Import data from ERP and other systems into Qlik Sense.
- Cleaning Data: Remove duplicates, handle missing values, and ensure consistency.
- Merging Data: Combine data from different sources to create a unified dataset.
- Normalizing Data: Apply transformations to standardize data formats and units.
- Modeling Data: Define relationships and create an associative data model.

## 5.3 Challenges and Solutions

- Data Quality Issues: Addressed through rigorous cleaning and validation processes.
- Integration Complexity: Overcame by using Qlik Sense's advanced scripting capabilities.
- Data Volume: Managed large datasets efficiently using Qlik Sense's data processing tools.

## 6. Insights and Analysis

### 6.1 Supply Chain Performance

Processed data revealed that the average order processing time was 15 days, with significant delays occurring during peak seasons. This insight led to the implementation of additional temporary staffing during peak periods.

### 6.2 Trend Analysis

Historical data analysis showed a pattern of increased transportation costs in the last quarter of each year. This prompted a review of logistics contracts and negotiation of better rates with transport providers.

### 6.3 Predictive Analytics

Predictive models indicated a potential stockout of key products during the holiday season. Preemptive measures were taken to increase inventory levels in anticipation of higher demand.

## 8. User Feedback

### 8.1 User Testing

User testing involved supply chain managers and logistics coordinators. Feedback was collected through surveys and interviews, highlighting the need for more granular tracking of shipment statuses.

### 8.2 User Satisfaction

Overall user satisfaction was high, with users appreciating the accuracy and insights provided by the processed data. Specific feedback included requests for additional training and more customizable views.

## 9. Conclusion

### 9.1 Summary of Findings

Data processing using Qlik Sense provided valuable insights into supply chain performance, enabling significant improvements in efficiency and cost reduction. Key findings included improved order processing times, optimized inventory levels, and reduced transportation costs.

### 9.2 Future Work

Future enhancements include integrating additional data sources, developing more advanced predictive models, and expanding the data processing framework to include supplier performance metrics.

## 9.3 Final Thoughts

The project demonstrated the power of robust data processing in supply chain management. Continuous improvement and user feedback will be essential to maintaining and enhancing the value of processed data insights.

## 10. Appendices

## 10.1 Glossary

- ERP (Enterprise Resource Planning): A type of software used to manage business processes.
- KPI (Key Performance Indicator): A measurable value that demonstrates how effectively a company is achieving key business objectives.