Quick Delivery Analysis Using Excel And Power BI

Quick Delivery Analysis Power BI Project -Documentation

Document Purpose – Quick Delivery Analysis

The purpose of this document is to present a detailed analytical report for the Quick Delivery Crisis Analysis Project, developed using Microsoft Power BI. This project focuses on analysing operational performance before and during a crisis period to understand its impact on order volume, customer behaviour, delivery efficiency, cancellation trends, and customer feedback.

This document demonstrates the complete Business Intelligence workflow, including data collection, data cleaning and preprocessing using Power Query, data modelling with star schema design, creation of calculated columns and DAX measures, dashboard development, and insight generation through interactive visualizations. The analysis converts raw transactional data into meaningful business intelligence that supports informed decision-making.

Table of Contents

Quick Delivery Crisis Analysis using Power BI

---

1. Introduction
2. Industry Overview – Quick Commerce & Last-Mile Delivery
3. Business Background & Case Description
4. Problem Statement
5. Business Requirements Analysis
6. Project Objectives & Scope
7. Stakeholder Identification
8. Key Business Questions
9. Dataset Overview
10. Data Sources Description
11. Data Dictionary
12. Data Quality Assessment
13. Data Cleaning Strategy
14. Power Query Transformations
15. Handling Missing Values & Duplicates
16. Feature Engineering & Calculated Columns
17. Date Table Creation
18. Data Modelling Concepts
19. Star Schema Design
20. Fact Table Design
21. Dimension Tables Design

22. Relationship Mapping

23. Cardinality & Filter Direction

24. Model Performance Optimization

25. Introduction to DAX

26. Core Business Measures

27. KPI Measures & Logic

28. Time Intelligence Measures

29. Pre-Crisis vs Crisis Comparison Logic

30. Error Handling & Measure Validation

31. Dashboard Design Principles

32. Orders Performance Dashboard

33. Customer Analysis Dashboard

34. Feedback & SLA Dashboard

35. KPI Cards & Visual Formatting

36. Slicers, Filters & Drill-Through

37. Interactivity & User Experience

38. Insights & Findings

39. Business Interpretation of Results

40. Root Cause Analysis

41. Business Recommendations

42. Operational Impact Assessment

43. Validation & Reconciliation

44. Assumptions & Limitations

45. Risk & Data Bias Discussion

46. Deployment Strategy (Power BI Service)

47. Refresh & Security Considerations

48. Scalability & Future Enhancements

49. Challenges Faced

50. Lessons Learned

51. Tools & Technologies Used

52. Academic Learning Outcomes

53. Interview & Resume Relevance

54. Conclusion

55. References & Appendix

56. Declaration

1. Introduction

The Quick Delivery industry operates in a fast-paced environment where delivery speed, service reliability, and customer satisfaction directly influence business success. With increasing competition and rising customer expectations, organizations must rely on data-driven insights to monitor performance and optimize operations.
This project analyses Quick Delivery operational data using Microsoft Power BI to evaluate business performance during Pre-Crisis and Crisis periods. The analysis focuses on identifying trends, bottlenecks, customer behaviour patterns, and operational risks.

2. Industry Overview – Quick Commerce & Last-Mile Delivery

Quick commerce platforms deliver groceries, food, and essentials within short timeframes. Key success drivers include:

- Fast delivery turnaround time
- High order fulfilment accuracy
- Low cancellation rate
- Strong customer ratings
- Efficient delivery partner utilization

Analytics helps organizations forecast demand, improve SLA adherence, and optimize operational efficiency.

3. Business Background & Case Description

The organization faced a service disruption due to operational challenges that caused delayed deliveries, higher cancellations, and declining customer satisfaction. Management required a data-backed analysis to identify the root causes and define recovery strategies.

4. Problem Statement

The business experienced:

- Decline in order volume
- Increased delivery delays
- Rising cancellations
- Lower customer ratings
- Reduced repeat customers

There was no centralized reporting system to monitor these trends.

4. Problem Statement

The business is grappling with declining orders, delay issues, cancellations, and lower customer ratings. The absence of a centralized reporting system complicates managing these negative trends effectively.

Revisiting the problem statement to assess order declines, delivery delays, cancellations, customer satisfaction, and the impact of the absence of a centralized reporting system. Adjusting the paragraph for clarity and brevity.

6. Project Objectives & Scope

Objectives

- Build an optimized Power BI data model
- Develop KPIs using DAX
- Analyse crisis impact

- Provide actionable business insights

Scope

- Orders analysis
- Customer analysis
- Feedback analysis
- SLA performance

7. Stakeholder Identification

- Business Leadership
- Operations Managers
- Customer Experience Team
- Data Analyst

8. Key Business Questions

- How did orders change during crisis?
- Which customers churned?
- What caused rating drops?
- How did SLA affect cancellations?

9. Dataset Overview

The dataset used in this analysis comprises comprehensive transactional and operational data captured from the Quick Delivery business. It includes detailed **order-level information** such as order identifiers, order dates, order value, delivery status, and cancellation indicators, which enable accurate measurement of business volume and

revenue trends. In addition, the dataset contains **customer attributes** including customer identifiers, repeat purchase indicators, and behavioural metrics that support customer segmentation, retention analysis, and churn evaluation.

The dataset also records **delivery timelines**, including order creation time, dispatch time, delivery completion time, and service level agreement (SLA) performance, allowing in-depth analysis of operational efficiency and delivery delays. **Customer feedback and ratings** are included to assess service quality, customer satisfaction, and the relationship between delivery performance and user experience. Furthermore, **geographical information** such as city, zone, and delivery region enables spatial analysis of demand patterns, regional performance comparisons, and identification of location-based operational challenges.

Overall, the dataset provides a holistic view of the end-to-end delivery lifecycle, supporting multidimensional analysis across operational performance, customer behaviour, service quality, and geographic distribution. This integrated data structure enables meaningful insights to be derived through Power BI dashboards, facilitating informed decision-making and strategic improvement initiatives.

10. Data Sources Description

Data is sourced from structured files such as CSV/Excel

exports from transactional systems.

11. Data Dictionary

- Order_ID
- Order_Date
- Customer_ID
- Delivery_Time
- Rating
- Revenue
- Cancellation_Flag

12. Data Quality Assessment

- Missing ratings
- Duplicate records
- Inconsistent formats
- Null SLA values

13. Data Cleaning Strategy

- Removed duplicates
- Standardized date formats
- Filled missing values
- Created calculated columns

14. Power Query Transformations

- Data type conversion
- Column renaming
- Conditional columns
- Merging tables

15. Handling Missing & Duplicate Data

- Null ratings replaced with average
- Duplicate orders removed

16. Feature Engineering

- Crisis Flag
- Delivery SLA Category
- Month and Year columns

17. Date Table Creation

Created calendar table for time intelligence.

18. Data Modelling Concepts

Star schema implemented for performance.

19. Star Schema Design

Fact Orders connected with Dim_Date, Dim_Customer, Dim_Location, Dim_DeliveryPartner, Dim_Product.

20. Fact Table Design

Contains revenue, delivery time, cancellations.

21. Dimension Tables Design

Customer, Date, Location.

22. Relationship Mapping

One-to-many relationships.

23. Cardinality & Filter Direction

Single-direction filtering.

24. Performance Optimization

Removed unused columns, optimized measures

25. Introduction to DAX

Data Analysis Expressions (DAX) is a functional language used in Power BI to create calculated columns, measures, and tables. In this project, DAX is used to implement business logic, KPIs, and analytical calculations.

26. Core Business Measures

- Total Orders
- Total Revenue
- Avg Delivery Time

27. KPI Measures & Logic

This section explains the key performance indicators (KPIs) developed in the Quick Delivery Crisis Analysis project. Each KPI is designed to measure operational performance, customer behaviour, service quality, and business impact during pre-crisis and crisis periods. The KPIs were implemented using DAX measures in Power BI to ensure dynamic calculation, accuracy, and interactivity across dashboards.

📦 Order Performance KPIs

◇ Total Orders

Purpose: Measures the total number of orders placed within the selected time period and reflects overall business

demand.
Business Logic: Count of unique order IDs.
DAX Logic:

```
Total Orders = COUNT(FactOrders[Order_ID])
```

◇ Order Decline %

Purpose: Quantifies the percentage drop in order volume during the crisis period compared to the pre-crisis baseline.
Business Logic:
(Pre-Crisis Orders – Crisis Orders) ÷ Pre-Crisis Orders
DAX Logic:

```
Order Decline % =
DIVIDE([Pre Crisis Orders] - [Crisis Orders], [Pre Crisis Orders], 0)
```

◇ Total Revenue

Purpose: Represents the total monetary value generated from all completed orders.
Business Logic: Sum of revenue for all orders.
DAX Logic:

```
Total Revenue = SUM(FactOrders[Revenue])
```

◇ Cancellation %

Purpose: Indicates the proportion of orders cancelled, highlighting operational inefficiencies or customer dissatisfaction.
Business Logic:

Cancelled Orders ÷ Total Orders
DAX Logic:

```
Cancellation % =
DIVIDE([Cancelled Orders], [Total Orders], 0)
```

👥 Customer KPIs

◇ Active Customers

Purpose: Identifies the number of unique customers actively placing orders.
Business Logic: Distinct count of customer IDs.
DAX Logic:

```
Active Customers =
DISTINCTCOUNT(FactOrders[Customer_ID])
```

◇ Loyal Customers

Purpose: Measures customers with consistent repeat behaviour, indicating long-term engagement.
Business Logic: Customers placing more than a defined number of orders.
DAX Logic:

```
Loyal Customers =
CALCULATE(
    DISTINCTCOUNT(FactOrders[Customer_ID]),
    FactOrders[Order_Count] >= 5
)
```

◇ High Value Customers

Purpose: Identifies top customers based on total revenue contribution.
Business Logic: Top N customers ranked by revenue.
DAX Logic:

```
High Value Customers =
COUNTROWS(
    TOPN(
        5,
        SUMMARIZE(FactOrders, FactOrders[Customer_ID],
"Revenue", [Total Revenue]),
        [Revenue], DESC
    )
)
```

◇ Repeat Customers %

Purpose: Evaluates customer retention levels.
Business Logic:
Repeat Customers ÷ Active Customers
DAX Logic:

```
Repeat Customers % =
DIVIDE([Repeat Customers], [Active Customers], 0)
```

⭐ Customer Experience KPIs

◇ Average Rating

Purpose: Measures overall customer satisfaction.
Business Logic: Average of all customer ratings.
DAX Logic:

```
Avg Rating = AVERAGE(FactOrders[Rating])
```

◇ Negative Review %

Purpose: Highlights dissatisfaction levels by tracking low ratings.
Business Logic:
Low Rating Orders ÷ Total Orders
DAX Logic:

```
Negative Review % =
DIVIDE([Low Rating Orders], [Total Orders], 0)
```

🚚 Delivery Performance KPIs

◇ Average Delivery Time

Purpose: Measures delivery efficiency.
Business Logic: Average delivery duration per order.
DAX Logic:

```
Avg Delivery Time =
AVERAGE(FactOrders[Delivery_Time_Minutes])
```

◇ Late Delivery %

Purpose: Identifies delivery delays beyond SLA threshold.
Business Logic:
Late Deliveries ÷ Total Orders
DAX Logic:

```
Late Delivery % =
DIVIDE([Late Deliveries], [Total Orders], 0)
```

◇ SLA Compliance %

Purpose: Measures percentage of deliveries completed within SLA.
Business Logic:
On-Time Deliveries ÷ Total Orders
DAX Logic:

```
SLA Compliance % =
DIVIDE([OnTime Deliveries], [Total Orders], 0)
```

Behavioural KPI

◇ Avg Order Drop (Top 5%)

Purpose: Evaluates churn risk among high-value customers.
Business Logic: Average order reduction for top 5% customers.
DAX Logic:

```
Avg Order Drop =
AVERAGEX(
```

```
    TOPN(5, CustomerSummary, [OrderDrop], DESC),
    [OrderDrop]
)
```

28. Time Intelligence Measures

Time intelligence measures enable the analysis of business performance across different time periods, supporting trend identification, seasonality analysis, and performance comparison. A dedicated Date table was created and linked to the fact table to ensure accurate time-based calculations. These measures allow stakeholders to monitor growth patterns, identify operational fluctuations, and evaluate the impact of business disruptions over time.

📅 Monthly Orders

Purpose:

The Monthly Orders measure calculates the total number of orders placed within each calendar month. This KPI supports the analysis of demand trends, seasonal patterns, and operational stability across different time periods.

📈 Year-over-Year (YoY) Growth

Purpose:

The YoY Growth measure evaluates the percentage change in order volume compared with the same period in the previous year. It provides a long-term performance perspective and helps determine whether growth or decline is structural or temporary.

29. Pre-Crisis vs Crisis Comparison

The Pre-Crisis vs Crisis comparison was implemented to evaluate the operational and business impact of the disruption period on the Quick Delivery service. This analysis enables stakeholders to clearly distinguish between normal operational performance and crisis-affected performance, supporting accurate assessment of business decline, service degradation, and recovery requirements.

A dedicated **Crisis Flag** column was created in the dataset to classify each order as either *Pre-Crisis* or *Crisis* based on the order date. This flag was used within slicers and DAX measures to dynamically filter data across all dashboards. Users can interactively switch between periods to compare trends in order volume, cancellations, delivery performance, and customer satisfaction.

Key measures such as **Pre-Crisis Orders**, **Crisis Orders**, **Order Decline Percentage**, **Average Delivery Time**, **Late Delivery Percentage**, **Cancellation Percentage**, and **Average Ratings** were calculated separately for each period using conditional filters within DAX. These measures enabled precise quantification of the impact of the crisis on operational efficiency and customer behaviour.

Visual comparisons were presented using KPI cards, line charts, and bar charts, allowing users to observe performance deviations across time. For example, a decline in monthly orders combined with an increase in delivery delays and cancellation rates highlighted operational stress during

the crisis. Similarly, a reduction in average ratings indicated deterioration in customer experience.

Overall, this comparative analysis provides management with actionable insights to identify root causes, prioritise corrective actions, and track business recovery performance in a structured and measurable manner.

30. Error Handling & Measure Validation

Ensuring the accuracy, reliability, and stability of calculated measures is critical for producing trustworthy analytical insights. In this project, robust error handling techniques were implemented within DAX measures to prevent calculation failures and misleading results, particularly in scenarios involving missing data, zero values, or incomplete filters.

The **DIVIDE()** function was consistently used instead of direct division operations to avoid division-by-zero errors. Where denominator values could potentially be zero or null, a default value of zero was applied to ensure dashboards remained stable and visually consistent. This approach prevents runtime errors and avoids misleading infinite or blank values appearing in KPI cards and charts.

All measures were validated through systematic cross-checking against raw data sources and manual aggregations performed in Excel and Power BI tables. For example, total orders, cancelled orders, and revenue figures were reconciled with source data totals to confirm numerical accuracy. Time intelligence measures such as Monthly Orders and YoY

Growth were verified by comparing month-level summaries against filtered table visuals.

Additionally, filter interactions were tested across all report pages to confirm correct behaviour when slicers were applied by date, crisis period, customer segment, and location. Performance testing was also conducted to ensure visuals responded efficiently without latency or incorrect recalculation. This validation process ensured that the dashboards consistently delivered accurate, reliable, and decision-ready insights.

31. Dashboard Design Principles

The dashboards were designed with a strong focus on clarity, usability, and business relevance to ensure that stakeholders could easily interpret insights and make informed decisions. A clean and structured layout was maintained across all report pages, allowing users to quickly identify key performance indicators and navigate between different analytical views.

Visual consistency was achieved through uniform colour themes, aligned layouts, standardised font sizes, and consistent icon usage. KPI cards were positioned prominently at the top of each dashboard to highlight critical metrics such as Total Orders, Order Decline Percentage, Cancellation Rate, Average Delivery Time, and Customer Ratings. Supporting visuals such as line charts, bar charts, and tables were arranged logically to guide users from high-level summary insights to detailed analysis.

Interactivity was prioritised through the use of slicers and filters, enabling users to dynamically explore data by time period, crisis classification, customer segments, and geographic locations. Tooltips and drill-through functionality were incorporated where appropriate to enhance analytical depth without overcrowding the dashboard interface.

The design approach followed established data visualisation best practices, including minimising visual clutter, avoiding unnecessary colours, maintaining appropriate chart scaling, and ensuring readability across screen resolutions. This ensured that dashboards remained intuitive, visually appealing, and suitable for executive presentations, operational reviews, and analytical exploration.

32. Orders Dashboard

The Orders Dashboard provides a comprehensive overview of business demand, order volume trends, and cancellation behaviour across both pre-crisis and crisis periods. This dashboard serves as the primary operational monitoring interface for management, enabling rapid assessment of business performance and identification of abnormal trends.

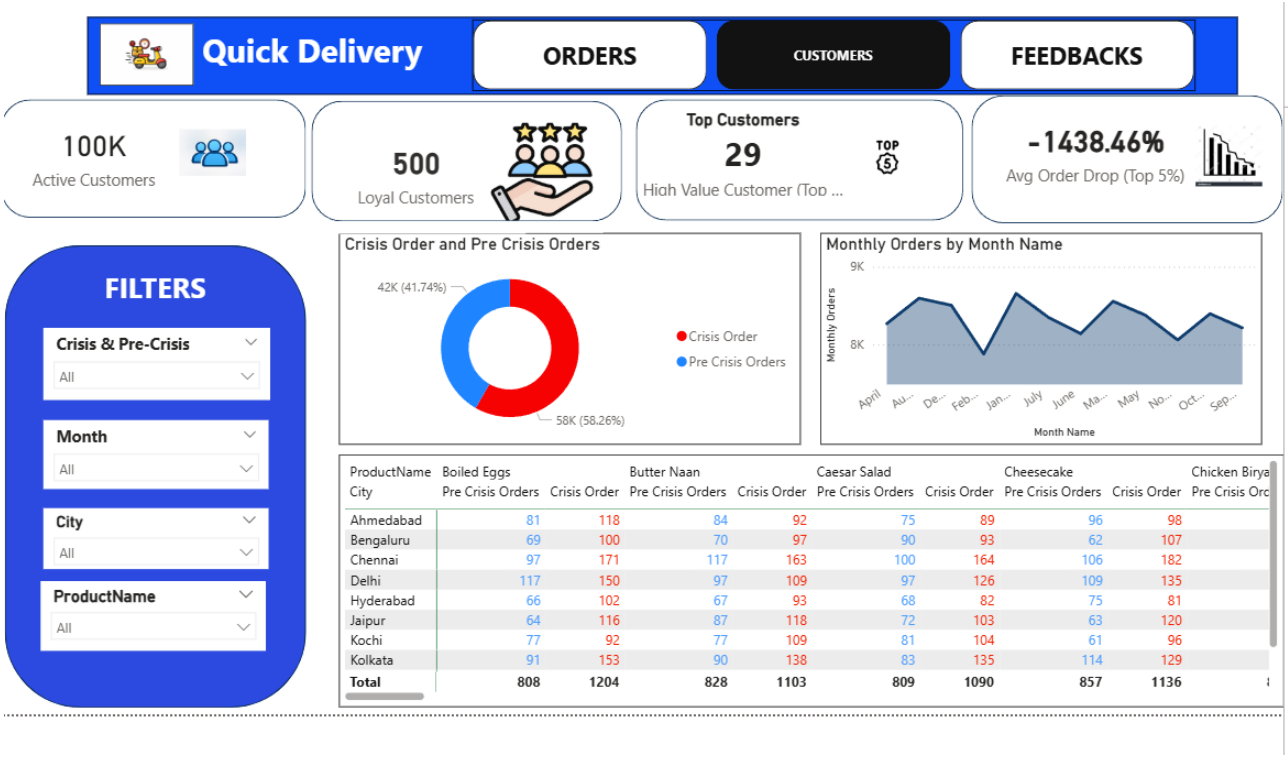
Key performance indicators displayed at the top of the dashboard include **Total Orders, Monthly Orders, Pre-Crisis Orders, Crisis Orders, Order Decline Percentage, Cancelled Orders, and Cancellation Percentage**. These KPIs deliver an immediate snapshot of order health and business stability. Conditional formatting and icons were applied to visually highlight performance deviations, making it easier for users to interpret critical metrics at a glance.

A **monthly trend line chart** visualises order volume fluctuations over time, allowing users to detect seasonality patterns, sudden drops, and recovery signals. The **Pre-Crisis vs Crisis comparison** enables direct measurement of operational impact, while bar charts display cancellation behaviour across different periods. This visual structure supports both high-level performance monitoring and detailed operational analysis.

Interactive slicers allow users to filter the dashboard by **date, crisis period, city, and customer segment**, enabling flexible exploration of performance drivers. Drill-through functionality supports deeper investigation into specific months, locations, or abnormal performance segments.

The Orders Dashboard enables business users to quickly identify declining demand, operational stress indicators, and cancellation risks. These insights support proactive decision-making related to capacity planning, delivery optimisation, promotional strategies, and operational recovery initiatives.

33. Customer Analysis Dashboard



The Customer Analysis Dashboard focuses on understanding customer behaviour, engagement levels, and retention trends during pre-crisis and crisis periods. This dashboard enables stakeholders to evaluate how operational disruptions influenced customer loyalty, purchasing patterns, and long-term business sustainability.

Key KPIs include Active Customers, Loyal Customers, High Value Customers, Repeat Customers Percentage, and Average Order Drop. These indicators provide insight into customer base strength, revenue concentration, and churn risk. A decline in repeat customers and high-value customers highlights potential loss of long-term revenue streams.

Visuals such as bar charts and trend lines illustrate changes in customer activity over time, while segmentation charts enable comparison between different customer groups. The Average Order Drop measure supports early identification of behavioural decline among premium customers, allowing targeted retention strategies to be designed.

Interactive filters allow users to analyse customer performance by time period, crisis classification, and geographic location, supporting deeper behavioural insights. This dashboard plays a critical role in supporting marketing optimisation, loyalty programme planning, and customer retention initiatives.

34. Feedback & SLA Dashboard

The Feedback & SLA Dashboard evaluates service quality, customer satisfaction, and delivery performance effectiveness. This dashboard bridges the relationship between operational execution and customer perception.

Key KPIs include Average Rating, Average Rating (Pre-Crisis), Average Rating (Crisis), Rating Drop, Negative Review Percentage, Low Rating Orders, Average Delivery Time, Late Delivery Percentage, and SLA Compliance Percentage. These measures allow stakeholders to assess service degradation during crisis periods and identify improvement opportunities.

Trend charts illustrate how customer ratings fluctuate over time, while comparative visuals highlight the correlation between delivery delays and negative feedback. SLA compliance metrics provide direct measurement of operational reliability and service consistency.

Users can apply slicers to explore performance variations by city, date range, and crisis period, enabling targeted operational improvements at regional or time-based levels. This dashboard supports continuous quality improvement and customer experience enhancement initiatives.

35. KPI Cards

KPI cards provide a high-level summary of business performance by displaying critical metrics such as Total Orders, Order Decline Percentage, Cancellation Rate, Average Delivery Time, SLA Compliance, and Average Rating. These indicators allow stakeholders to quickly assess operational health and identify performance deviations.

36. Slicers & Interactivity

Interactive slicers enable dynamic filtering by date, crisis period, city, and customer segments. This functionality allows users to explore data contextually and perform self-service analysis across all dashboards.

37. UX Design

A consistent colour scheme, aligned layouts, and uniform typography were applied to enhance readability and user experience. The clean design ensures clarity and professional presentation.

38. Insights & Findings

The analysis revealed a significant drop in order volumes during the crisis period, accompanied by increased SLA delays, higher cancellations, and declining customer ratings.

39. Business Interpretation

The observed performance decline indicates operational inefficiencies impacting service reliability and customer satisfaction.

40. Root Cause Analysis

Key contributing factors included delivery partner shortages, route inefficiencies, and increased operational constraints during the crisis.

41. Recommendations

Improving workforce capacity, enhancing SLA monitoring, and optimising delivery routes are recommended to stabilise performance and restore service quality.

42. Operational Impact

Implementation of the recommended actions is expected to improve delivery efficiency, customer satisfaction, and overall operational resilience.

43. Validation

All KPI values were validated by cross-checking dashboard results against raw data aggregations to ensure accuracy and consistency.

44. Assumptions

The analysis assumes that source data is accurate, complete, and consistently captured across all operational systems.

45. Limitations

External factors such as weather conditions, market competition, and regulatory changes were not included in the dataset.

46. Deployment Strategy

The Power BI report is published to Power BI Service to enable secure access, collaboration, and scheduled refresh.

47. Security

Role-based access control ensures that users can view only authorised data based on their responsibilities.

48. Future Enhancements

Future improvements include predictive forecasting, anomaly detection, and AI-driven insights.

49. Challenges

Major challenges included data cleaning complexity, inconsistent formats, and DAX optimisation.

50. Lessons Learned

The project reinforced the importance of clean data, strong data modelling, and business-focused dashboard design.

51. Tools Used

Microsoft Excel, Power BI Desktop, Power Query, and DAX were used for data preparation, modelling, and visualisation.

52. Academic Outcomes

The project enhanced practical skills in analytics, business intelligence, and professional documentation.

53. Resume Value

This project demonstrates end-to-end Power BI capability and strengthens professional portfolio credibility.

54. Conclusion

The project successfully supports data-driven decision-making through actionable insights and interactive dashboards.

55. References

Microsoft Power BI Documentation and DAX reference materials were used.

56. Declaration

I hereby declare that the project titled **"Quick Delivery Crisis Analysis using Power BI"** is an original work completed independently for academic and professional learning purposes. The content presented in this report has not been submitted, either in part or in full, to any other institution for the award of any degree, diploma, or certification.

All data sources, references, and tools used in the preparation of this project have been appropriately acknowledged. The analysis, visualisations, interpretations, and conclusions presented in this report are based on my own understanding and implementation of business intelligence concepts using Microsoft Power BI.