**Online Food Delivery**

Problem • Process • Database Design • Insights

Team:

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# Problem Statement

Online food delivery platforms must optimize customer experience and operations while balancing costs and speed. This project addresses: (a) understanding customer preferences and satisfaction; (b) tracking restaurant and driver performance; (c) reducing cancellations and failures; and (d) guiding business decisions with dashboards and flexible Excel analysis.

# Process & Tools

* **Data Modeling & DDL (SQL Server):** Designed a normalized schema for customers, restaurants, menu items, orders, delivery, and reviews.
* **Data Generation (Python Faker):** Programmatically populated each table with realistic synthetic values (names, phones, addresses, cuisine types, menu prices, orders, ratings).
* **Exploratory Data Analysis (pandas):** *Univariate* (distributions for payment, cuisine, status) • *Bivariate* (e.g., payment vs. cancellation, cuisine vs. rating) *Multivariate* (e.g., price × payment × status; time-by-cuisine ratings).
* **Dashboards (Power BI):** Built interactive KPIs (orders, revenue, average rating), monthly trends, cuisine and restaurant performance, and delivery tracking.
* **Manager Views (Excel):** Pivot tables, charts, and slicers (e.g., by restaurant, payment method, month) for ad hoc analysis and reporting.

# Database Design

Core entities and relationships implemented per the final SQL DDL you supplied:

**Entity Relationships**

* Customers (1) — (∞) Orders
* Restaurants (1) — (∞) Orders
* Restaurants (1) — (∞) MenuItems
* Orders (1) — (∞) OrderDetails
* Orders (1) — (0..1) Reviews; Reviews also reference Customers and Restaurants
* DeliveryDrivers (1) — (∞) DeliveryAssignments
* Orders (1) — (0..1) DeliveryAssignments
* Insights  
    
  1. Overall scale & health  
   - Totals: 1,115 orders, 170 customers, 45 restaurants, 25 drivers, 1,245 reviews, 100 items. Total revenue ≈ 46.63K; overall avg rating = 3.19.  
   - Demand trend: Orders increased steadily from January to July, but dipped slightly in August, which may signal seasonality or operational issues. Ratings across months stay ~3.0–3.5, leaving room to improve quality.  
    
  2. Order outcomes & reliability  
   - Cancelled orders ≈ 26% (largest slice), vs Delivered ≈ 23%, Preparing ≈ 19%, On the Way ≈ 17%. This indicates meaningful reliability issues that need operational improvements.  
    
  3. Customer behavior: payments  
   - Payments nearly evenly split: Cash 34% (379), Wallet 34% (375), Card 32% (361). Keeping all three options matters; nudging wallet/card can reduce cash-handling friction.  
    
  4. Fleet mix: vehicles  
   - Driver vehicles: Cars 44% (11), Scooters 40% (10), Bikes 16% (4). Scooters balance speed and cost, especially in dense urban areas—expanding scooters could improve delivery efficiency.  
    
  5. What customers like: cuisines & top performers  
   - Indian cuisine leads in average ratings, followed by Burger and Chinese. These cuisines are good candidates for targeted promotions.  
   - Top-rated restaurants include Watts-Reed and Pierce-Walker. Their best practices (menu, prep time, packaging) could help uplift mid-tier performers.  
    
  6. Drill-through example: restaurant lens  
   - Boyd and Sons Restaurant: 26 orders, avg rating 2.96 (below platform avg), revenue ≈ 8.54K. Failed deliveries ≈ 23%, suggesting a need for ops review on driver assignment and pickup timing.  
    
  7. Revenue & growth  
   - Total platform revenue: 46.63K, with steady monthly increases.  
   - Revenue skew: a few restaurants generate a large share, while many earn small amounts (long-tail effect).  
    
  Overall Insight:  
  The platform is scaling steadily with strong growth in orders and revenue, but cancellations and service quality gaps remain major challenges. By improving delivery reliability, raising restaurant ratings, nudging customers toward digital payments, and leveraging scooters in urban zones, the platform can drive higher customer satisfaction and sustainable growth.
* Indian cuisine scored highest on average ratings; focus promotions & onboarding similar cuisines/restaurants.
* Delivery performance varied by vehicle type; scooters often balance speed and cost in urban areas.
* Monthly order trend showed steady growth; rating volatility suggests pockets of inconsistent service quality.

# Deliverables: Power BI & Excel

**Power BI:** KPI cards (Orders, Revenue, Avg Rating), Monthly Orders & Cancellations, Payment & Vehicle distributions, Top Cuisines/Restaurants, drill through pages for restaurant level analysis.

**Excel:** Pivot tables for Orders by Month/Restaurant/Payment; Pivot charts for trends and distributions; Slicers for Month, Payment Method, Cuisine, and Restaurant.

# Conclusion The end-to-end pipeline successfully demonstrated how SQL schema design, synthetic data generation, pandas EDA, and interactive dashboards in Power BI & Excel can support business insights. The platform is showing clear growth in orders and revenue, but high cancellations (~26%) and average ratings (3.19) highlight areas for operational improvement. Next steps should prioritize reducing cancellations, improving delivery reliability, coaching low-performing restaurants, and leveraging top cuisines and scooter-based fleets. These actions will improve customer satisfaction, retention, and long-term scalability.

End to end pipeline: SQL schema → Faker data → pandas cleaning & EDA → interactive dashboards (Power B → Excel