Demand and Supply Analysis

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Assumptions

- Undersupply % = (Demand - Supply)/Demand
- Every 1% of shrinkage highlighted in data is equal to losing 0.25% of potential orders every hour
- Cost - each additional courier hour costs 8 Euro
- Revenue: The average order value is 16 Euro, merchant commission is 25% and delivery fee per order is 1 Euro

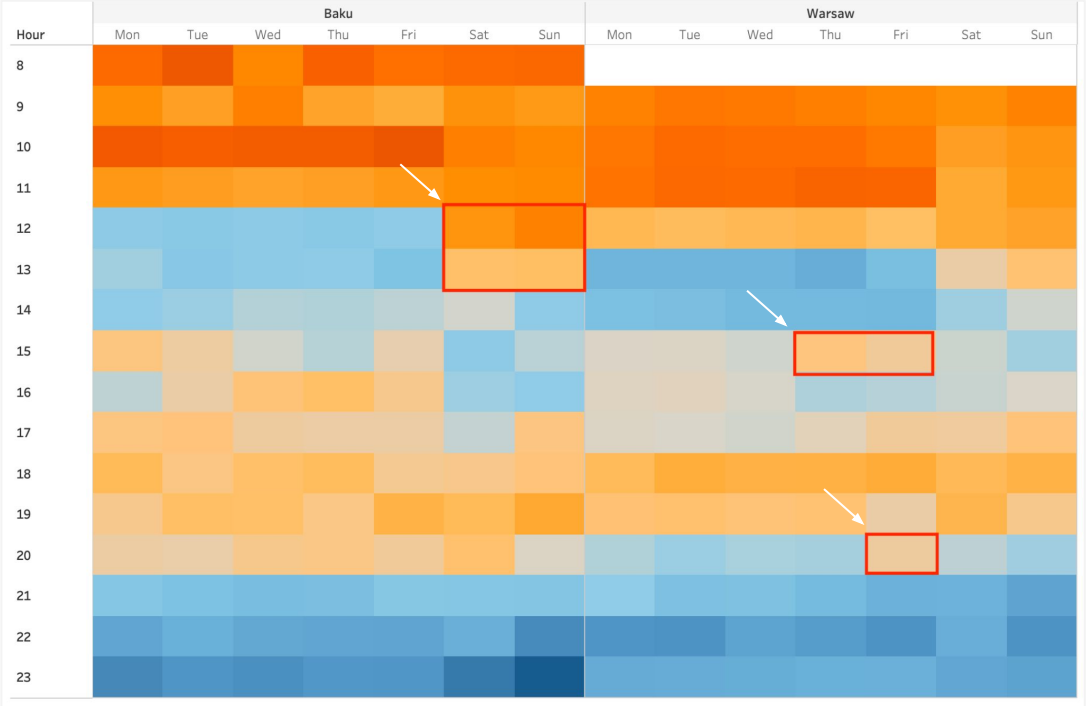
Task 1: Peak Hour and Potential Orders per City

- **Baku:**
  - The peak hour is at 11AM, with peak potential orders reaching to 599, assuming 0% shrinkage
- **Warsaw:**
  - The peak hour is at 12PM with peak potential orders reaching to 1573, assuming 0 % shrinkage
- **Nairobi:**
  - The peak hours are afternoon, between 12PM and 3PM, with peak potential orders reaching to 1388, assuming 0 % shrinkage
  - Different working conditions and work hours may indicate a shift towards a late lunch preference

City	Date	Peak Hour	Potential Orders
Baku	2022-03-11	11	599
	2022-03-10	11	577
	2022-03-18	11	577
	2022-03-16	11	567
	2022-03-17	11	563
Nairobi	2022-03-07	14	1,388
		13	1,378
		15	1,361
		12	1,269
	2022-03-08	12	1,265
Warsaw	2022-03-24	12	1,573
	2022-04-07	12	1,542
	2022-05-05	12	1,510
	2022-05-26	12	1,503
	2022-03-23	12	1,496

Task 2: Significant Undersupply during Morning and early Evening Hours (8-11 AM & 5-7 PM)

- **Baku:**
  - **Critical Undersupply Hours**: 8-11 AM and 5-8 PM. 11 AM is peak hour in terms of demand, improving supply at this time can lead to increased revenue
  - **Revenue Impact**: Undersupply during peak hours (6-8 PM) can lead to significant revenue loss
  - **Weekend Insight**: Lunch hours (12-1 PM) on weekends are also undersupplied, likely due to a preference for dining out. Still an area to focus on to improve supply
- **Warsaw:**
  - **Undersupplied Hours**: 9 AM-12 PM and 6-7 PM. 12 PM is peak hour in terms of demand, improving supply at this time can lead to increased revenue
  - **Optimization Opportunity**: Enhance supply at 8 PM on Fridays to capture peak demand
- **Nairobi:**
  - Similar trends are observed for Nairobi with potential to improve in 11-13 hours on weekends and 18-19 hours in general



Measure = Undersupply %

Undersupply

Demand Met

Task 3: Addressing Delivery Undersupply: Weekly Analysis and Optimization

Strategic Recommendations

- To reduce delivery shrinkage to 0%, we recommend increasing courier hours during the identified weeks
- Investment in additional courier hours is minimal compared to the potential revenue gain, making it a cost-effective solution

Key Takeaway

- By strategically increasing courier hours during peak shrinkage weeks, we can optimize delivery operations and significantly boost potential revenue

Explanation:
The shrinkage percentage (Shrinkage %) indicates the lost potential orders. To eliminate this shrinkage, additional couriers are needed.

- Each 1% of shrinkage is equivalent to 0.25% of potential orders, so multiplying the shrinkage percentage by 0.25 gives the additional courier hours required to reduce shrinkage to 0%.
- **Cost**: Calculated by multiplying the additional courier hours by the cost per courier hour (8 EUR).
- **Revenue per Order**: Fixed at 5 EUR (16 EUR * 0.25 commission + 1 EUR delivery fee).
- **Additional Revenue**: The potential revenue from completing the orders lost due to shrinkage. It is calculated as the difference between potential orders and completed orders, multiplied by the revenue per order.

City	Week	Completed Orders	Shrinkage %	Potential Orders	Additional Courier Hours	Cost	Revenue per Order	Additional Revenue
Baku	22	2,537	67,0%	2,541	0,17	1,34	5	12,707
Nairobi	18	71,921	25,1%	71,964	0,06	0,50	5	359,821
Warsaw	16	53,748	27,9%	53,794	0,07	0,56	5	268,971

Task 4: Predicted Orders and Online hours for Warsaw

Model Selection Rationale:

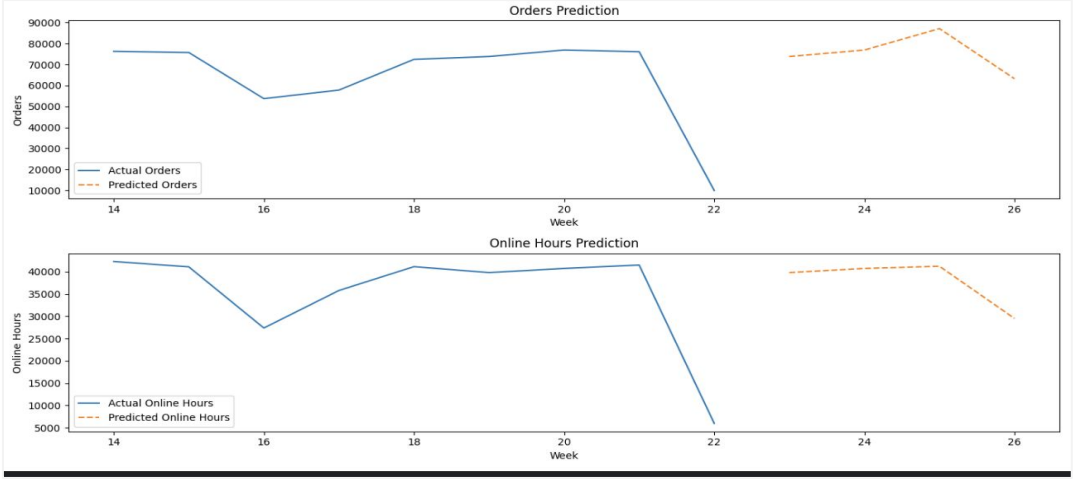
- The Linear Regression model was chosen based on its lower RMSE values for both orders and online hours, indicating better predictive accuracy compared to other models.
- Linear Regression offers simplicity and interpretability, making it a practical choice for forecasting in this scenario.

Trends and Observations:

- **Orders:** There is an expected increase in orders in weeks 23 and 24, peaking at week 25, followed by a decline in week 26.
- **Online Hours:** Online hours show a steady increase up to week 25, with a significant drop anticipated in week 26.

Recommendations

- **Resource Allocation:** Based on the predicted increase in orders and online hours, it is advisable to prepare for higher demand in weeks 23 to 25 by ensuring adequate staffing and inventory.
- **Monitoring:** Keep a close watch on the trends and compare actual data against predictions to adjust strategies dynamically.
- **Further Analysis:** Consider deeper analysis and additional data points to refine predictions and improve model accuracy over time.



Appendix

Link to Queries and Python file

https://docs.google.com/spreadsheets/d/1CR1k0GKNuIMzeZrZjVYwDh0pxOFDc7645K0uZpd1YSQ/edit?gid=172458351#gid=172458351