

Logistics & Supply Chain

Excel Capstone Project Requirements

Group	E
Team Members	<ol style="list-style-type: none">1. Mohamed Sobhy Arafa2. Tasneem Mohamed Elhoseny3. Mostafa Mohsen Yehia4. Mostafa Ramadan Ahmed5. Youssef Monir Abdelkadous
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What happens?

Over the past period, delivery delays have become a recurring issue across the supply chain. While most shipments are completed successfully, a significant portion faces delays that impact service reliability, customer satisfaction, and operational costs.

When do delays peak? (by hour and day-of-week)

Delays peak during early morning (6–8 AM) and late afternoon to evening hours (2–7 PM), particularly on weekdays such as Tuesday, Friday, and Wednesday. This pattern strongly suggests congestion-driven delays during typical commuting and operational peak periods.

Average of delay_probability	Day Name	Hour	Tuesday	Friday	Thursday	Sunday	Wednesday	Saturday	Monday
6	75.94%	70.97%	71.77%	71.47%	64.35%	73.04%	68.01%		
7	75.24%	71.58%	71.16%	69.33%	69.37%	68.76%	72.24%		
8	71.05%	74.54%	69.27%	69.43%	73.44%	65.67%	70.94%		
13	72.93%	72.86%	69.47%	70.91%	74.82%	66.14%	68.41%		
14	70.91%	76.52%	71.15%	67.25%	66.40%	70.56%	73.36%		
16	71.64%	72.60%	70.69%	75.04%	68.21%	70.98%	67.24%		
17	73.06%	69.58%	71.10%	73.23%	68.56%	69.99%	68.54%		
19	73.52%	69.69%	72.86%	68.84%	70.25%	69.31%	71.22%		
21	70.70%	67.74%	73.28%	73.04%	74.99%	71.94%	64.91%		
22	71.46%	67.57%	70.18%	72.26%	70.42%	73.14%	69.62%		

Which Geo Zones are the most expensive and the riskiest? Are they the same?

Most points around 30,-70 show **high delay probability (62%–76%)** with a medium number of shipments.

Some areas (30.1,-70 and 30,-70.3) have high delays even though the shipment count isn't the largest , and the areas that have a largest shipment like (49.8 , -70) and it cost about 645\$

Geo_Zone	Average of shipping_costs	Average of delay_probability
30.1,-70	425	76.87%
30,-70.3	458	74.67%
30,-70	485	74.06%
30.2,-70	419	73.68%
30,-120	488	70.08%
30.5,-70	516	68.54%
30,-70.1	418	67.36%
30.1,-70.1	494	66.17%
30,-70.2	476	62.40%
49.8,-70	645	61.31%

How strongly does Traffic Congestion correlate with Delay Probability and Delivery Time Deviation?

We notice that most delays occur on high-risk roads about **61%**, On highrisk roads, delays are almost equally distributed between Low and High traffic, with slightly lower delays in Medium traffic (16%).

Low-risk roads contribute only **17.6%** of delays, regardless of traffic level.

Medium-risk roads account for **21%** of delays.

Do higher shipping costs correspond to better service reliability (higher on-time rate), or not?

it's easy to assume that higher shipping costs should guarantee better service reliability, the data tell us a different. When we compare shipping costs with on-time fulfillment rates, we find no consistent positive relationship between the two.

In several cases, high-cost shipments still experience low on-time performance, while some lower-cost routes achieve similar or even better reliability.

Overall, the average on-time fulfillment rate is only **62%**, while **82%** of shipments are flagged as late.

Recommendation

- 1- Reschedule shipments away from peak hours by shifting departures to off-peak time windows to reduce exposure to traffic congestion.
- 2- Apply risk-based routing by prioritizing alternative routes or carriers for zones identified as both expensive and high risk.
- 3- Plan deliveries during low-traffic windows in congestion-prone zones to improve predictability and reduce delay.

Logistics & Supply Chain Dashboard

USD 12,394,264
Total Shipping Cost

299 stock
Avg. Inventory Level

8.0 L/Hr
Avg. fuel Consumption

2.3 Hour
Avg. Loading Duration

28%
Equipment Availability

80%
Disruption Risk

30%
Cargo Condition Status

62%
Avg. of On Time

