**Week 1, Day 6 Case Studies**

**Case Study 1: Retail Chain Inventory Issues**

**Company: ABC Retail**

ABC Retail is a national retail chain with over 200 stores. They’ve been facing inventory issues, including frequent stockouts and high carrying costs. Here's a snapshot of their performance over the last quarter:

| **KPI** | **Value** | **Industry Benchmark** |
| --- | --- | --- |
| **Fill Rate** | 78% | 90% |
| **Inventory Turnover** | 1.8 | 4.0 |
| **Lead Time** | 12 days | 8 days |
| **OTIF** | 85% | 95% |
| **COGS** | ₹80,00,000 | ₹70,00,000 |
| **Profit Margin** | 10% | 15% |

**1. What are the key issues in the supply chain?**

**Low Fill Rate** (78% vs. 90%) → Indicates frequent stockouts → Lost sales and poor customer satisfaction.  
**Low Inventory Turnover** (1.8 vs. 4.0) → Holding too much unsold inventory → High carrying costs.  
**High Lead Time** (12 days vs. 8 days) → Slow supplier response → Delayed order fulfilment.  
**Poor OTIF** (85% vs. 95%) → Late deliveries and fulfilment issues → Customer dissatisfaction.  
**High COGS** (₹80,00,000 vs. ₹70,00,000) → Inefficient procurement and storage costs.  
**Low Profit Margin** (10% vs. 15%) → High costs and poor inventory management eroding profitability.

**2. How can ABC Retail improve its fill rate and inventory turnover?**

**Improve Demand Forecasting:**

* Use moving average and exponential smoothing to better predict demand.
* Focus on seasonal trends to avoid overstocking and stockouts.

**Optimize Inventory Replenishment:**

* Reduce reorder points to improve turnover.
* Implement Just-in-Time (JIT) to lower excess stock.

**Supplier Performance Monitoring:**

* Create a supplier scorecard to identify underperforming suppliers.
* Switch to more reliable suppliers or diversify supplier base.

**Improve Warehouse Management:**

* Use ABC analysis to prioritize fast-moving products.
* Reduce picking and packing errors with automation.

**3. What impact would be improving lead time and OTIF have on profit margins?**

**Shorter Lead Time** → Faster replenishment → Reduced stockouts → Higher sales.  
**Higher OTIF** → Better customer satisfaction → More repeat business.  
**Lower Carrying Costs** → Less overstock → Lower holding costs → Higher profit margin.  
**Improved Supplier Performance** → Fewer order delays → Better profitability.

**4. Suggest changes to inventory management to reduce COGS and improve profitability.**

**Negotiate Better Terms with Suppliers:**

* Bulk discounts or faster shipping terms.
* Diversify suppliers to reduce dependency and increase competition.

**Improve Demand Forecasting:**

* Use machine learning for predictive demand models.
* Adjust safety stock levels based on variability in demand.

**Optimize Inventory Holding:**

* Use Economic Order Quantity (EOQ) to minimize storage costs.
* Reduce slow-moving stock with discounts or promotions.

**Automate Warehouse Operations:**

* Invest in warehouse automation (barcode scanners, picking robots).
* Reduce human error and improve order accuracy.

**Summary of Recommendations:**

Improve demand forecasting → Better fill rate and inventory turnover.  
Work with suppliers to reduce lead time and increase OTIF.  
Use EOQ and JIT to reduce carrying costs and COGS.  
Focus on warehouse optimization to improve order accuracy and fulfilment speed.

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**Case Study 2: E-Commerce Demand Forecasting Failures**

**Company: XYZ E-Commerce**

XYZ E-Commerce is an online marketplace that sells electronics, clothing, and household goods. They’ve been struggling with demand forecasting, leading to frequent stockouts during sales and excess inventory during off-peak seasons. Here’s a summary of their performance over the last 6 months:

| **KPI** | **Value** | **Industry Benchmark** |
| --- | --- | --- |
| **Forecast Accuracy** | 65% | 85% |
| **Stockouts During Sales Events** | 20% | 5% |
| **Excess Inventory (Off-Peak)** | ₹12,00,000 | ₹5,00,000 |
| **Return Rate** | 18% | 10% |
| **Customer Satisfaction (CSAT)** | 75% | 90% |
| **Profit Margin** | 8% | 12% |

**1. What are the key issues in the supply chain?**

**Low Forecast Accuracy** (65% vs. 85%) → Poor demand prediction → Stockouts and overstocking.  
**High Stockout Rate During Sales** (20% vs. 5%) → Lost revenue and poor customer experience.  
**Excess Inventory in Off-Peak Season** (₹12,00,000 vs. ₹5,00,000) → High storage costs → Reduced profitability.  
**High Return Rate** (18% vs. 10%) → Poor product quality or mismatch with customer expectations.  
**Low CSAT Score** (75% vs. 90%) → Poor service → Loss of repeat customers.  
**Low Profit Margin** (8% vs. 12%) → High operational costs + returns + excess stock.

**2. Why is XYZ E-Commerce’s demand forecasting failing?**

**Lack of Historical Data Use:**

* Not incorporating historical trends and seasonality into forecasts.
* No proper time-series modelling (e.g., ARIMA, SARIMA).

**Failure to Adjust to Market Conditions:**

* Not factoring in promotions, competitor activity, and market shifts.
* No feedback loop from real-time sales data.

**Inaccurate Sales Channel Data:**

* Forecasting based on single-channel sales instead of omnichannel data.
* No adjustments for regional or product-specific variations.

**3. How can XYZ E-Commerce improve demand forecasting?**

**Use Advanced Forecasting Models:**

* Use **ARIMA, SARIMA, and Holt-Winters** models for seasonal trends.
* Try **machine learning models** (XGBoost, Random Forest) for better accuracy.

**Include External Factors:**

* Include market trends, competitor pricing, and customer behaviour in models.
* Monitor real-time sales and adjust forecasts dynamically.

**Segment Forecasting:**

* Forecast by product category, region, and sales channel separately.
* Adjust safety stock levels based on demand variability in each segment.

**Reduce Lead Time:**

* Work with suppliers to reduce order lead time.
* Switch to nearshore suppliers for faster response times.

**4. How can reducing the return rate improve profitability?**

**Lower Returns → Lower Costs:**

* Fewer reverse logistics and restocking costs.
* Reduced waste and damaged goods.

**Higher Customer Satisfaction → More Sales:**

* Fewer returns = Better product quality = Higher repeat business.
* Positive reviews = More customer trust = Higher conversion rates.

**Lower Inventory Write-Offs:**

* Fewer returned and unsellable products → Lower inventory losses.

**5. What operational changes should XYZ E-Commerce make?**

**Improve Product Descriptions and Sizing:**

* Accurate size charts and better product visuals → Reduce mismatch issues.
* Include customer reviews and FAQs for better customer decisions.

**Introduce Dynamic Pricing:**

* Adjust pricing based on demand and competitor activity.
* Use AI-based pricing models for better profitability.

**Better Returns Management:**

* Identify frequently returned products → Fix quality issues.
* Offer store credit for returns to retain customer value.

**Optimize Warehouse Management:**

* Improve picking and packing accuracy.
* Automate order fulfilment for faster processing.

**Summary of Recommendations:**

Use advanced forecasting models (ARIMA, SARIMA, ML) for better accuracy.  
Include external factors like market trends and competitor data.  
Reduce stockouts by working with suppliers to cut lead time.  
Improve product descriptions and quality control to reduce returns.  
Optimize pricing strategy to maximize profit margin.

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**Case Study 3: Manufacturing Plant Facing Inventory and Lead Time Issues**

**Company: ABC Manufacturing**

ABC Manufacturing produces industrial machinery components. The company faces high holding costs, frequent stockouts of critical parts, and increasing lead times from suppliers. Here’s a snapshot of their recent supply chain performance:

| **KPI** | **Value** | **Industry Benchmark** |
| --- | --- | --- |
| **Inventory Turnover** | 4 times/year | 8 times/year |
| **Stockout Rate** | 15% | 5% |
| **Lead Time from Suppliers** | 45 days | 25 days |
| **Holding Cost per Month** | ₹5,00,000 | ₹2,50,000 |
| **Production Downtime Due to Stockouts** | 12 hours/month | 2 hours/month |
| **Order Fulfillment Rate** | 70% | 95% |

**1. What are the key issues in the supply chain?**

**Low Inventory Turnover** (4 vs. 8 times/year) → Too much working capital tied up in inventory.  
**High Stockout Rate** (15% vs. 5%) → Frequent production delays → Missed delivery deadlines.  
**Long Lead Time from Suppliers** (45 days vs. 25 days) → Inability to react to demand changes quickly.  
**High Holding Costs** (₹5,00,000 vs. ₹2,50,000) → Excess stock piling up → Increased storage expenses.  
**High Production Downtime** (12 hours/month vs. 2 hours/month) → Loss of operational efficiency → Lower output.  
**Low Order Fulfilment Rate** (70% vs. 95%) → Poor customer satisfaction → Lost future orders.

**2. Why is ABC Manufacturing facing these issues?**

**Poor Demand Forecasting:**

* Relying on outdated historical data → No adjustments for seasonality and market trends.
* No real-time demand updates → Unable to adjust procurement in time.

**Inefficient Supplier Management:**

* Limited supplier base → No alternative sources when delays occur.
* No penalties or incentives tied to supplier performance.

**Ineffective Inventory Management:**

* Keeping too much slow-moving stock → Blocking working capital.
* Stockouts of high-demand items → Lost production time.

**Poor Order Management:**

* No automated reorder system → Orders placed too late.
* No priority handling for high-demand items.

**3. How can ABC Manufacturing improve inventory and lead time issues?**

**Improve Demand Forecasting:**

* Use time-series models (Holt-Winters, SARIMA) for seasonality.
* Include real-time market signals (e.g., competitor activity, customer behaviour).

**Diversify Supplier Base:**

* Develop alternative suppliers → Reduce dependency on single-source suppliers.
* Create contracts with performance-based incentives and penalties.

**Use Just-in-Time (JIT) for High-Demand Parts:**

* Keep minimal stock of fast-moving parts.
* Increase reorder frequency based on demand variability.

**Introduce ABC Analysis + Safety Stock:**

* Identify high-value and fast-moving products → Keep higher safety stock.
* Reduce stock levels for low-demand and low-value items.

**Automate Reorder Points:**

* Use inventory management software (SAP, Oracle) to automate reorder triggers.
* Set dynamic reorder points based on historical sales + seasonality.

**4. How can reducing lead time improve performance?**

**Shorter Lead Time → Faster Order Fulfilment:**

* Faster procurement = Reduced stockouts = Higher production output.

**Better Forecasting → Less Excess Inventory:**

* Shorter lead time = Ability to order in smaller batches.
* Reduced holding costs + improved cash flow.

**Higher Customer Satisfaction:**

* Fast fulfilment → Improved on-time delivery rates → Higher repeat orders.

**5. What operational changes should ABC Manufacturing make?**

**Introduce Vendor Scorecards:**

* Track supplier performance (lead time, defect rate, fulfilment rate).
* Penalize poor performance and reward consistent delivery.

**Adopt ERP System:**

* Use an ERP (SAP or Oracle) to integrate procurement, production, and inventory.
* Automate demand planning and inventory tracking.

**Implement Route Optimization for Deliveries:**

* Use AI-based route planning to reduce delivery time and costs.
* Track shipments in real-time → Adjust production schedules dynamically.

**Apply Lean Manufacturing:**

* Reduce waste in production and inventory.
* Use value stream mapping to identify inefficiencies.

**Summary of Recommendations:**

Improve demand forecasting using SARIMA + machine learning.  
Diversify suppliers and introduce performance-based contracts.  
Automate reorder points using ERP systems.  
Implement JIT for high-demand parts to reduce holding costs.  
Use ABC analysis to prioritize stocking levels.  
Shorten lead times by improving supplier relationships and logistics.

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**Case Study 4: E-Commerce Company Facing High Return Rates and Order Fulfilment Delays**

**Company: XYZ E-Commerce**

XYZ E-Commerce is a leading online retailer for fashion and electronics. The company has recently been struggling with increasing return rates, delayed order fulfilment, and rising logistics costs. Below is the latest supply chain performance snapshot:

| **KPI** | **Value** | **Industry Benchmark** |
| --- | --- | --- |
| **Return Rate** | 30% | 10% |
| **Order Fulfilment Time** | 72 hours | 24 hours |
| **Stockout Rate** | 12% | 5% |
| **Customer Complaint Rate** | 18% | 5% |
| **Inventory Turnover** | 6 times/year | 10 times/year |
| **Logistics Cost as % of Revenue** | 15% | 8% |
| **On-Time Delivery Rate** | 65% | 95% |

**1. What are the key issues in the supply chain?**

**High Return Rate** (30% vs. 10%) → Customers are dissatisfied with product quality or delivery.  
**Slow Order Fulfilment** (72 hours vs. 24 hours) → Delays in processing and shipping orders.  
**High Stockout Rate** (12% vs. 5%) → Inventory mismatch → Orders cannot be fulfilled.  
**High Customer Complaint Rate** (18% vs. 5%) → Poor service and product issues.  
**Low Inventory Turnover** (6 times/year vs. 10 times/year) → Overstocking or slow-moving inventory.  
**High Logistics Costs** (15% of revenue vs. 8%) → Inefficient delivery and transportation planning.  
**Low On-Time Delivery Rate** (65% vs. 95%) → Customers receiving orders late → Reduced customer retention.

**2. Why is XYZ E-Commerce facing these issues?**

**Poor Inventory Management:**

* No real-time tracking of stock → Frequent stockouts of high-demand products.
* Excess stock of low-demand products → Increased holding costs.

**Inefficient Order Processing:**

* Orders not processed in priority order → Slower dispatch.
* No automated warehouse system → Manual errors and delays.

**High Return Rate Causes:**

* Incorrect product descriptions → Customer dissatisfaction.
* Poor packaging → Damaged items on delivery.
* Sizing issues → High returns in the fashion segment.

**Logistics and Delivery Issues:**

* Over-reliance on a single courier partner → Delayed deliveries.
* No dynamic routing → Suboptimal delivery paths.

**Customer Service Failures:**

* No real-time order tracking → Increased complaints.
* No feedback loop → Issues not resolved quickly.

**3. How can XYZ E-Commerce improve supply chain performance?**

**Improve Inventory Management:**

* Implement an ERP (SAP, Oracle) → Real-time inventory tracking.
* Use ABC analysis → Prioritize stocking high-value and high-demand items.
* Introduce JIT for fast-moving products → Reduce holding costs.

**Enhance Order Processing:**

* Introduce an automated warehouse system → Reduce manual errors.
* Use barcode scanning for faster order picking and packing.
* Implement FIFO (First In, First Out) → Reduce product aging.

**Reduce Return Rates:**

* Improve product descriptions → Include detailed size guides and photos.
* Strengthen packaging standards → Reduce damage during shipping.
* Offer virtual try-on or AR (augmented reality) → Reduce size mismatches.

**Optimize Logistics and Delivery:**

* Partner with multiple delivery companies → Improve last-mile delivery.
* Use AI-based route optimization → Reduce delivery time and costs.
* Offer delivery time slots → Improve customer satisfaction.

**Boost Customer Experience:**

* Implement real-time tracking → Reduce customer complaints.
* Automate return requests → Fast processing of refunds/exchanges.
* Collect customer feedback → Adjust based on customer satisfaction.

**4. How can logistics and fulfilment improvement reduce costs?**

**Reduced Stockout Rates = Fewer Lost Sales**

* Better forecasting → Higher order fulfilment rate.

**Higher Inventory Turnover = Lower Holding Costs**

* JIT and improved stocking → Reduced working capital.

**Optimized Delivery Routes = Lower Logistics Costs**

* Dynamic routing → Reduced fuel and transport expenses.

**Faster Order Processing = Higher Customer Satisfaction**

* Improved warehouse efficiency → Quicker dispatch and delivery.

**Reduced Returns = Lower Handling and Processing Costs**

* Fewer refunds → Reduced reverse logistics cost.

**5. What operational changes should XYZ E-Commerce make?**

**Implement an Inventory Management System:**

* Real-time stock tracking → Prevent overstock and stockouts.
* Automatic reorder triggers → Based on real-time demand.

**Introduce Order Priority System:**

* High-value orders processed first → Improve customer satisfaction.
* Real-time status updates to customers.

**Use AI for Demand Forecasting:**

* Forecast demand based on historical + real-time market data.
* Adjust stock levels dynamically based on demand shifts.

**Optimize Last-Mile Delivery:**

* AI-based route planning → Shorter delivery times.
* Use multiple courier partners → Reduce dependency and risk.

**Strengthen Customer Service:**

* Offer 24/7 support via chatbot + live agents.
* Track customer complaints and returns → Identify root causes.

**Summary of Recommendations:**

Implement ERP for real-time inventory and order tracking.  
Improve demand forecasting using AI and market signals.  
Automate warehouse processes for faster order processing.  
Diversify courier partners and optimize delivery routes.  
Improve product descriptions and packaging to reduce returns.  
Introduce real-time order tracking and automated customer service.

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**Case Study 5: Automotive Manufacturer Facing Supply Shortages and Production Delays**

**Company: ABC Motors**

ABC Motors is a global automotive manufacturer. Over the last six months, they’ve faced production delays due to supply shortages of critical components (like semiconductors). Competitors have managed to maintain production levels despite similar market conditions.

**Latest Supply Chain Performance Snapshot:**

| **KPI** | **Value** | **Industry Benchmark** |
| --- | --- | --- |
| **Order Lead Time** | 45 days | 20 days |
| **Supplier Fill Rate** | 70% | 95% |
| **Production Downtime** | 12% | 3% |
| **Cost of Goods Sold (COGS)** | 65% of revenue | 55% of revenue |
| **Inventory Holding Cost** | 8% of total cost | 4% of total cost |
| **On-Time Customer Delivery** | 60% | 90% |

**1. What are the key issues in the supply chain?**

**Long Lead Time** (45 days vs. 20 days) → Delayed delivery from suppliers.  
**Low Supplier Fill Rate** (70% vs. 95%) → Supply shortages from vendors.  
**High Production Downtime** (12% vs. 3%) → Lack of materials causing production stops.  
**High COGS** (65% vs. 55%) → Higher raw material and manufacturing costs.  
**High Inventory Holding Cost** (8% vs. 4%) → Excess stock of low-demand components.  
**Low On-Time Customer Delivery** (60% vs. 90%) → Customers receiving cars late → Lower customer satisfaction.

**2. Why is ABC Motors facing these issues?**

**Over-Reliance on Single Suppliers:**

* Single-source supplier for semiconductors → No backup when supply chain breaks down.
* Lack of supplier diversification → High risk of disruptions.

**Poor Inventory Planning:**

* Excess stock of low-demand components → High holding costs.
* Stockout of critical parts (semiconductors) → Production halts.

**High Lead Time from Suppliers:**

* No long-term contracts → Suppliers prioritizing other customers.
* Geographic distance from key suppliers → Higher transport time and costs.

**Inefficient Production Scheduling:**

* Just-In-Case (JIC) approach → Building up buffer stock → Higher holding costs.
* Lack of real-time production monitoring → Delays in reacting to shortages.

**3. How can ABC Motors improve supply chain performance?**

**Supplier Diversification:**

* Work with multiple semiconductor suppliers → Reduce risk of supply disruption.
* Secure long-term contracts with key suppliers → Ensure priority during high demand.

**Improve Demand Forecasting:**

* Use AI and machine learning for real-time demand shifts.
* Improve visibility into market trends → Adjust production levels accordingly.

**Implement Inventory Optimization:**

* Use EOQ and JIT to balance stock levels → Reduce holding costs.
* Classify components using ABC analysis → Prioritize high-value parts.

**Reduce Lead Times:**

* Establish regional supplier partnerships → Reduce transit times.
* Optimize order frequency → Smaller but more frequent orders.

**Enhance Production Scheduling:**

* Introduce real-time production tracking → React faster to shortages.
* Use AI for dynamic production scheduling → Adjust based on supply and demand shifts.

**Improve Logistics and Distribution:**

* Work with multiple logistics partners → Avoid over-reliance on one provider.
* Optimize shipping routes → Reduce transit time and costs.

**4. What operational changes should ABC Motors make?**

**Develop a Supplier Scorecard:**

* Measure supplier performance → Lead time, fill rate, quality.
* Drop low-performing suppliers → Focus on reliable partners.

**Introduce a Safety Stock Strategy:**

* Maintain buffer stock for critical components → Reduce production downtime.
* Use demand forecasts to adjust safety stock levels dynamically.

**Enhance Production Flexibility:**

* Implement modular manufacturing → Easier to adjust to supply constraints.
* Cross-train workforce → Reduce dependency on specialized labor.

**Introduce a Supply Chain Control Tower:**

* Real-time monitoring of supply chain health → Early warning of disruptions.
* Improve communication with suppliers → Faster problem resolution.

**Summary of Recommendations:**

Diversify suppliers and secure long-term contracts.  
Improve demand forecasting using AI and market signals.  
Optimize inventory using JIT and EOQ.  
Strengthen logistics partnerships to reduce lead times.  
Improve production scheduling using real-time data.