Supply Chain Management and Inventory Replenishment Process Specification

This document outlines the Supply Chain Management and Inventory Replenishment Process BPMN model for a large multinational retail company, covering steps from inventory monitoring through replenishment completion. Errors in specific files highlight necessary corrections for seamless supply chain operations.

Process Steps and Details
Inventory Monitoring

Step Summary: The system continuously monitors stock levels across all warehouses and retail stores, triggering replenishment orders when stock falls below a predefined threshold.
Process Details: Automatic notifications prompt replenishment when stock levels are low.
Exit Criteria: Replenishment order triggered or no action required if stock is adequate.
Demand Forecasting

Step Summary: The system integrates with forecasting models that adjust order sizes based on anticipated demand.
Process Details: Predicts future demand based on historical trends, seasonality, and other factors. Manual intervention is required if forecast inaccuracies are identified.
Exit Criteria: Forecasted order size adjusted accordingly.
Supplier Selection

Step Summary: System selects suppliers based on product type, pricing, and lead times, choosing from pre-approved options.
Process Details: Checks supplier availability and lead time before placing an order. If no suppliers are available, the procurement team reviews manually.
Exit Criteria: Supplier chosen or flagged for manual review if unavailable.
Errors Identified:
Logical Error File: Incorrect logic in supplier selection could allow orders without supplier verification.
Purchase Order Creation

Step Summary: System generates a purchase order for the selected supplier with product details, quantities, and delivery specifications.
Process Details: PO is logged and tracked in the procurement system. Any discrepancies trigger a correction request.
Exit Criteria: PO created and verified.
Errors Identified:
Task Error File: Missing or incorrect tasks in PO creation, such as skipping supplier verification.

Shipping and Logistics

Step Summary: Supplier prepares and ships the order, with logistics partners notified and tracking enabled.
Process Details: Shipment status is monitored, and any delays trigger system alerts. Warehouse staff are updated on expected arrival.
Exit Criteria: Shipment initiated and monitored.
Errors Identified:
End Start Error File: Missing start or end event in logistics, potentially disrupting shipment tracking.
Receiving and Quality Check

Step Summary: Inventory team inspects received goods against the purchase order for quality and completeness.
Process Details: Checks quality and quantity; flags defective or missing items for replacement.
Exit Criteria: Stock levels updated upon approval, or replacement initiated if needed.
Inventory Update and Replenishment Completion

Step Summary: System updates stock levels across affected locations in real-time and closes the replenishment cycle.
Process Details: System adjusts stock based on received quantities, and any remaining needs are flagged for review.
Exit Criteria: Replenishment cycle marked as complete.
Errors Identified:
Incorrect Link File: Incorrect link may skip quality check, directly updating inventory without inspection.
Error Summary
Logical Error File: Incorrect logic in supplier selection, potentially bypassing necessary verification.
Task Error File: Missing or incorrect tasks, such as skipping supplier verification in PO creation.
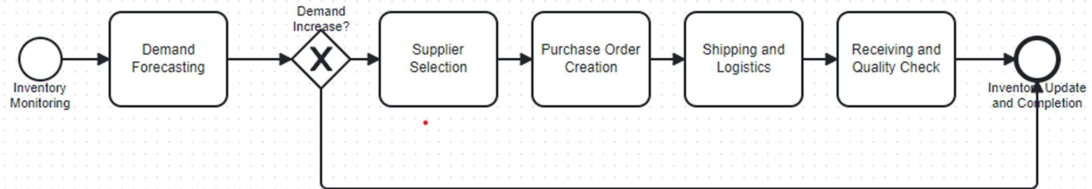End Start Error File: Missing start or end event in Shipping and Logistics.
Incorrect Link File: Direct linking error that could skip the quality check before inventory update.
Ground Truth File: No errors detected; this is the correct model.

BPMN Diagram Images
Ground Truth:-

Incorrect Link File:-

End/Start event error file:-

Task Error file:-

Logical Error file:-

Inventory
Monitoring

Demand
Forecasting

Update Stock
Levels

Inventory Update
and Completion

Summary of Named Entities

Entity Type	Entity	Description
Process	Supply Chain Management	Overall supply chain process management in the company.
Process	Inventory Replenishment Process	Specific process for inventory replenishment within the supply chain.
Role	Multinational Retail Company	The entity implementing the process
a large retail organization.		
Step	Inventory Monitoring	Step where the system monitors stock levels in warehouses and stores.
Step	Demand Forecasting	Step where demand is forecasted to adjust order sizes.
Step	Supplier Selection	Step for selecting appropriate suppliers based on certain criteria.
Step	Purchase Order Creation	Step where a purchase order is generated for the chosen supplier.
Step	Shipping and Logistics	Step involving the preparation and shipment of orders by suppliers.
Step	Receiving and Quality Check	Step where inventory is inspected for quality and completeness upon arrival.
Step	Inventory Update and Replenishment Completion	Final step to update stock and close the replenishment cycle.
Error Type	Logical Error File	Identified logical errors particularly in supplier selection logic.
Error Type	Task Error File	Errors related to missing or incorrect tasks such as skipping supplier verification.
Error Type	End Start Error File	Errors in missing start or end events in the Shipping and Logistics process.
Error Type	Incorrect Link File	Errors due to incorrect linkages that could skip essential steps like quality check.
Error Type	Ground Truth File	File representing the correct model without errors.
Criteria	Exit Criteria	Criteria for determining the completion of each step in the process.
Criterion	Replenishment order triggered	Exit criteria for the Inventory Monitoring step if stock is below threshold.
Criterion	Forecasted order size adjusted	Exit criteria for Demand Forecasting based on adjusted demand predictions.
Criterion	Supplier chosen	Exit criteria for Supplier Selection upon selecting a supplier.
Criterion	PO created and verified	Exit criteria for Purchase Order Creation after logging and verification.
Criterion	Shipment initiated and monitored	Exit criteria for Shipping and Logistics once the shipment is started and monitored.
Criterion	Stock levels updated	Exit criteria for Receiving and Quality Check upon successful inspection.
Criterion	Replenishment cycle marked as complete	Exit criteria for Inventory Update marking the replenishment as completed.
System Component	Procurement System	System used for logging and tracking purchase orders.
System Component	Notification	Automated notifications used to prompt actions in Inventory Monitoring.
System Component	Tracking Enabled	Tracking system component used in Shipping and Logistics for monitoring shipment status.