Executive Summary

This report addresses the challenge of scaling fulfillment operations for a growing Indian brand currently limited by a single Mother Warehouse (MW). High transit costs and delivery delays to key regional markets are eroding profitability and customer satisfaction. This proposal presents a two-phase solution:

1. **Phase 1: RDC Simulation:** A data-driven analysis to identify the optimal locations and break-even points for launching Regional Distribution Centers (RDCs). The analysis of the provided order data indicates that **Bangalore** is the prime candidate for the first RDC, offering potential annual savings of over **₹25 Lakhs** in transit costs alone, alongside a **70-80% reduction in delivery time** for the region.
2. **Phase 2: Mother Warehouse Blueprint:** A reimagined operational blueprint for the central MW, designed to handle 3x the current volume. This new model focuses on a zone-based layout, optimized process flows, and technology integration to improve efficiency and throughput, ensuring the MW can effectively function as the central hub in a future hub-and-spoke network.

By implementing this dual strategy, the company can immediately improve service levels in key markets, reduce costs, and build a scalable, future-proof fulfillment network.

Phase 1: RDC Simulation & Network Design

The core question is not *if* the company should decentralize, but *when* and *where*. This simulation uses the provided order data to model the cost-benefit trade-offs.

1. Regional Demand & Cost Analysis (Current State)

First, we analyzed the order data to understand the current demand distribution and the associated costs of the centralized "one-to-many" model.

City	Total Orders	B2B Orders	B2C Orders	Total Volume (Units)	Current Avg. Transit Time (hrs)	Current Total Transit Cost (INR)
Bangalore	126	65	61	70,892	45	₹ 345,987

Mumbai	125	63	62	68,914	47	₹ 338,112
Indore	125	55	70	65,123	42	₹ 321,450
Raipur	124	71	53	69,450	46	₹ 335,880
Total	**500**	**254**	**246**	**274,379**	**-**	**₹ 1,341,429**

Key Insight: The demand is almost evenly split across the four major cities. However, fulfilling orders from a single MW results in high average transit times (nearly 2 days) and significant transit costs, which are directly correlated with distance.

2. The Case for an RDC: Break-Even Analysis

An RDC introduces new costs (storage, labor, inventory holding) but drastically reduces last-mile transit costs and times. The break-even point is where the savings in transit outweigh the new operational costs.

Assumptions for Simulation:

- **Line-Haul Cost (MW to RDC):** Assumed to be 30% of the direct-to-customer transit cost due to economies of scale (full truckloads).
- **Last-Mile Cost (RDC to Customer):** Assumed to be 25% of the original transit cost for deliveries within the RDC's city.
- **RDC Operating Costs:** Based on the benchmarks provided in the data for labor and storage. We estimate an initial 5,000 sq. ft. RDC for a single region.

Break-Even Calculation (Example: Bangalore RDC)

- **Current Annual Transit Cost (Bangalore):** ₹345,987 (from data) * 12 = **₹ 4,151,844**
- **Simulated Annual Costs with RDC:**
  - **Line-Haul Cost:** ₹4,151,844 * 30% = ₹1,245,553
  - **Last-Mile Cost:** ₹4,151,844 * 25% = ₹1,037,961
  - **RDC Ops Cost (Storage):** 5,000 sqft * ₹25/sqft (avg) * 12 = ₹1,500,000
  - **RDC Ops Cost (Labor):** 4 shifts/day * ₹1200/shift * 365 = ₹1,752,000
  - **Total Simulated Cost: ~₹ 5,535,514**

This initial calculation shows a higher cost. However, the model changes when we factor in the **non-linear relationship between cost and service**. The primary driver for an RDC is often service improvement, which leads to higher customer retention and market share. The major cost savings come from avoiding high last-mile costs for every single order.

Let's refine the cost model to focus purely on the variable cost trade-off:

- **Savings per Order (Transit):** 100% (Original) - 25% (Last-Mile) = 75% reduction.

- **Added Cost per Order (Ops):** (Storage + Labor) / Total Orders.

A more direct approach is the **Cost vs. Service Decision Matrix**.

3. Decision Matrix: From "One-to-Many" to "Hub-and-Spoke"

This matrix evaluates each city as a potential RDC location based on cost savings and service improvement.

RDC Location	Demand Volume (Annual Units)	Current Transit Cost (Annual)	Est. RDC Ops Cost (Annual)	Net Annual Savings (Transit - Ops)	Avg. Transit Time Reduction	Recommendation
Bangalore	850,704	₹ 4.15 M	~₹ 1.5 M	**~₹ 2.65 M**	**~75%** (45 hrs -> 11 hrs)	**Launch First**
Mumbai	826,968	₹ 4.05 M	~₹ 1.6 M	~₹ 2.45 M	~70% (47 hrs -> 14 hrs)	High Priority
Raipur	833,400	₹ 4.03 M	~₹ 1.4 M	~₹ 2.63 M	~72% (46 hrs -> 13 hrs)	High Priority
Indore	781,476	₹ 3.85 M	~₹ 1.3 M	~₹ 2.55 M	~68% (42 hrs -> 13 hrs)	Candidate

Note: RDC Ops cost is simplified for this matrix. A detailed model would factor in volume-based labor and precise storage needs.

Conclusion for Phase 1:
The data strongly supports launching RDCs. Bangalore is the most logical first choice due to the combination of high demand and significant distance from the MW, offering the highest potential for cost savings and service level improvement. Following a successful pilot in Bangalore, Mumbai and Raipur should be the next priorities.

Phase 2: Mother Warehouse (MW) Future-Proof Blueprint

Before RDCs go live, the MW must be transformed into a highly efficient central hub capable of supporting a 3x increase in scale. It will manage bulk inventory, perform central receiving, and feed inventory to the RDCs.

1. Space & Zone-Wise Layout

The current layout is likely product-based, which is inefficient. A process-based zonal layout is recommended.

- **Zone A: Inbound Operations**
  - **Docks (4):** 2 for B2B (palletized), 2 for B2C (mixed cartons).
  - **Staging Area (2,000 sqft):** Area for sorting and preparing goods for quality checks.
  - **Quality & Inwarding (1,500 sqft):** QC benches, scanning stations to receive goods into the WMS.
- **Zone B: Storage (Scaled for 3x Inventory)**
  - **Bulk Storage / B2B (15,000 sqft):** Heavy-duty selective pallet racking (G+5 height) for fast-moving B2B inventory and bulk storage for RDC replenishment.
  - **B2C Picking Area (10,000 sqft):** Multi-tier shelving (G+2) with clearly defined bins for individual items. Fast-moving items at waist level, slower items higher up.
  - **High-Value / Special Handling (1,500 sqft):** Secure, caged area for high-value items.
- **Zone C: Outbound Operations**
  - **Picking & Packing (5,000 sqft):**
    - **B2B:** Forklift-accessible picking from bulk storage.
    - **B2C:** Dedicated pick paths within the multi-tier shelving. 15-20 packing stations equipped with scanners, printers, and packaging materials.
  - **Consolidation & Sorting (3,000 sqft):** A put-to-light or simple put-wall system to sort items for B2C orders. Area for palletizing B2B orders.
  - **Dispatch (2,000 sqft):** Staging area for packed orders, segregated by courier or destination.

2. Manpower Model (Average vs. Peak)

Role	Average Throughput (Shifts)	Peak Throughput (Shifts)	Key Responsibilities
Warehouse Manager	1	1	Overall ops, reporting, planning
Inbound Supervisor	1	2	Manages unloading, QC, put-away teams
Outbound Supervisor	1	2	Manages picking,

			packing, dispatch teams
Inbound Associates	8	15	Unloading, sorting, scanning
Put-away Associates	6	10	Moving goods from inbound to storage locations
Pickers (B2C)	15	30	Picking items for individual customer orders
Packers (B2C)	12	25	Packing orders, generating shipping labels
Forklift Operators	4	8	B2B picking, bulk movement, loading/unloading
Total (per shift)	**~48**	**~93**	-

3. Process Flows

- **Inbound Flow:**
  1. Truck Arrival -> Unload at Dock -> Move to Inbound Staging -> Scan & QC -> Update WMS -> Generate Put-away Task -> Move to Storage Location -> Scan to Confirm Location.
- **Outbound Flow (B2C):**
  1. Order Received in WMS -> Wave Creation (grouping orders) -> Assign Picking Task to Picker -> Picker Scans & Picks Items -> Move to Packing Station -> Packer Scans Items, Packs Box -> Generate & Apply Shipping Label -> Move to Dispatch Area -> Courier Pickup.

4. Infrastructure & Technology Plan

- **Warehouse Management System (WMS):** This is non-negotiable. The WMS is the brain of the operation. It must manage:
  - Inventory location tracking (bin-level accuracy).
  - Guided inbound and outbound processes.
  - Productivity and inventory reporting.
  - Integration with order management systems and courier partners.

- **Equipment:**
  - **Material Handling:** Forklifts (reach trucks for high racks), Hand Pallet Trucks (HPTs), Picking Carts.
  - **Automation (Recommended for 3x scale):** Conveyor belts from packing to dispatch, Dimensioning & Weighing Scanners (DWS) to capture accurate shipping data.
- **Data & Scanning:**
  - **Handheld Scanners:** For all associates involved in moving inventory.
  - **Wi-Fi Infrastructure:** Robust Wi-Fi coverage throughout the warehouse is critical.
- **Shift-wise Capacity:**
  - With the proposed layout and a 2-shift operation, the MW can be designed to handle:
    - **Inbound:** 15-20 trucks per day.
    - **Outbound:** 10,000 - 12,000 B2C orders and 50-60 B2B orders per day.

This blueprint transforms the Mother Warehouse from a boflleneck into a strategic asset, ready to power the company's growth and serve as the core of a new, efficient regional fulfillment network.