1. Problem Statement

Nestlé Sri Lanka relies on advanced demand forecasting and supply chain planning tools such as Python-based forecasting models, Demand Planning Systems, and ARS Demand Sensing tools. These systems work well when supported by frequent, high-quality sales data. However, a major gap exists in Sri Lanka's market structure.

A large portion of Nestlé's national sales comes from small, independent grocery stores (traditional trade). These shops do not use POS systems or digital sales records. As a result, their daily sales and stock movement data is completely invisible to Nestlé's digital systems. This creates a critical **data black hole** in the supply chain.

Why This Is Critical

- Demand planners only see **delayed distributor orders**, not real consumer demand
- Stock-outs at small shops go unnoticed until sales are already lost
- Overstocking leads to wastage, expiry risks, and higher holding costs
- Forecast accuracy at national and regional level is reduced
- The supply chain becomes **reactive instead of proactive**

This issue directly impacts revenue, service levels, and customer satisfaction across the country.

2. Stakeholders Affected (Who Is Suffering?)

1. Nestlé Supply Chain & Demand Planning Teams

- Lack of ground-level demand signals
- Inaccurate forecasts and planning assumptions
- Difficulty responding quickly to market changes

2. Business Units (BU Managers)

- Limited visibility of SKU performance by territory
- Poor insight into fast-moving or underperforming products

3. Sales Representatives

- Manual decision-making without data support
- No digital feedback on stock health or sales trends

4. Small Retailers (Indirectly)

- Frequent stock-outs

- Lost sales due to poor replenishment timing

3. Target Users of the System

Primary Users

- **Sales Representatives**: Capture shop-level stock and sales data during visits

Secondary Users

- **Demand Planning Team**: Use aggregated data for forecasting and planning

- **Business Unit (BU) Managers**: Monitor product performance and territory health

- **Sales Managers / Admin Users**: Track execution quality and data coverage

4. How Other Companies Solved This Problem

Leading FMCG companies operating in emerging markets face the same challenge with traditional trade.

Industry Approaches

- **Unilever**

    o Uses Sales Force Automation (SFA) mobile apps

    o Sales reps capture stock, availability, and order data during shop visits

    o Data feeds central dashboards for planning and execution

- **Coca-Cola**

    o Field sales teams use mobile tools to record outlet stock and sales

    o Improves visibility in non-POS outlets

    o Enables faster replenishment decisions

- **PepsiCo**

    o Retail execution platforms track availability, sales trends, and store compliance

    o Focuses on digitizing the sales force rather than the retailer

Why These Approaches Succeeded

- Did not depend on retailers adopting technology

- Leveraged existing sales rep networks

- Worked offline in low-connectivity environments

- Provided immediate business value even with simple data

5. Our Proposed Solution

We propose a **Sales Rep Mobile Application integrated with a Central Web Dashboard** to digitally capture and analyze shop-level sales and stock data from small retailers.

Instead of digitizing the shop, the solution digitizes the **sales visit**.

Solution Overview

- Sales reps record stock levels and sales during routine visits

- Data is synced to a central cloud system

- Web dashboard provides real-time visibility to planners and managers

- Existing Nestlé forecasting and planning tools can consume this data

This approach is cost-effective, scalable, and aligned with Sri Lanka's market realities.

6. Features of the System

01.Sales Rep App – Feature List (Flow-Based)

0. User & master setup (background, not daily work)

- **Rep login** (Rep ID, Name, Territory)

- **Assigned outlets list** (by territory)

- **Outlet profile**

  o Shop ID

  o QR code (scan to start visit)

  o Shop name & owner name

  o Location

- **Product master**

  o SKU

  o Case pack

  o MOQ / max cap

Done once, maintained by admin.

1. Start day (van / lorry stock loading)

- **Start Day / Load Stock**

  o Select vehicle (lorry/van)

  o Enter opening stock by SKU (stock-keeping unit)

  o Auto-carry forward previous day balance (if any)

- **Stock-in-lorry dashboard**

  o **Available quantity per SKU**

2. Route & outlet planning (CORE FEATURE 01)

- **Today's outlet list** (pre-assigned by territory)

- **Map-based route order (**optimized route order (nearest-first)

- **Outlet open/closed note** + "skip reason"
- **Offline mode** (route + outlets still visible)

3. Store visit (check-in)

- **Scan shop QR or select outlet**
- **One-tap "Start Visit / End Visit"**
- **GPS check-in** (soft validation, not strict if signal weak)
- **Visit timer(** + quick notes / voice note)
- **Photo capture** (optional proof: shelf/display)

CORE FEATURE 02 : Collecting Data(4-10)

4. Shelf & stock checks

- **On-shelf availability**

  - **Quick SKU checklist**: In-stock on shelf? (Yes/No)
  - **Reason codes** when No: *no stock, in backroom, not listed, competitor blocked*
  - **Auto-generate "OSA issues list"** for that outlet

- **Backroom stock**

  - **Backroom quantity input** (simple numbers)
  - **"Bring to shelf" reminder** items (from OSA missing list)
  - **Expiry / damage flag** (just checkbox + photo)

5. Order taking

- **Smart order suggestion** (simple rule):

  - last sales avg + lead time − (shelf + backroom)

- **Case pack rounding** (e.g., order in 6s/12s)

- **MOQ / max cap warnings**

- **One-tap repeat last order**

- **"Confirm with owner" screen** + signature (optional)

6. Delivery handling

A. Full delivery (on-time)

- **If lorry stock ≥ order qty**

  - Mark order as Completed

  - Deduct from lorry stock

B. Partial delivery

- **If lorry stock < order qty**

  - Deliver available quantity

  - Mark remaining as Pending

  - Select Next delivery date

  - Auto-create backorder

7. Invoice / confirmation

- **Delivery confirmation**

    o   Shop owner signature or voice

    o   One-tap confirmation

- **Delivery status**

    o   Completed

    o   Partial

    o   Pending

8. Promotion & merchandising

- **Promo checklist**

  - **Promo library** (what promos are active today)
  - **Promo compliance checklist** (price applied? display set?)
  - **Promo uplift toggle** (to mark expected spike)
  - **Capture competitor promo** (photo + quick tag)

- **Planogram checklist (**basic: correct shelf position? correct facing**?)**
- **Photo before/after (**very practical**)**
- **POSM tracker (**materials delivered/placed: wobblers, posters, etc**.)**

9. Market feedback

- Competitor price note

- New competitor product (photo + note)

- Customer/shop-owner feedback (quick text/voice)

(Keep short; reps won't type long text)

10. Returning products

Lorry stock reconciliation

- **End-of-day stock count**
- **Compare:**
  - **Opening stock**
  - **Delivered**
  - **Remaining**

Return to warehouse

- **Select SKUs to return**
- **Enter return quantity**
- **Reason:**
  - **Overstock**
  - **Damage**
  - **Expiry**

11. Upload data summary report

- **Daily summary**: visits done, orders placed, OSA issues, photos
- **Auto-generated "daily export"** (CSV download or sync)
- **Sync status** (pending uploads, failed items)
- **Targets progress** (simple: visits target, order value target)
- **Lock the day (no edits)**

Other key features

- Works offline + sync later
- Fast UI (big buttons, minimal typing)
- Search SKU fast + favorites list
- Error-proofing (cannot submit empty order, negative stock, etc.)

02. Admin Web Dashboard Features (Flow-Based)

0) Access & roles

- **Role-based login**

    - BU Admin (full access)
    - Regional Manager (their region only)
    - Analyst/Planner (view + export + reports)

1) Master setup (foundation)

A) Rep management

- Create reps (Rep ID, name, username)

- Assign territory/region

- Activate/deactivate reps

B) Outlet (shop) management

- Create outlet profile (Shop ID, name, owner name, phone, address)

- Assign outlet to territory + rep

- Generate/print QR code per shop

- Outlet status (active/inactive)

C) Product/SKU master (needed for correct orders/exports)

- SKU list + case pack + MOQ + max cap

- Price (optional)

- Promo flags (optional)

CORE FEATURE 03: **Monitoring and Approving (2-3)**

(for trust)

2) Daily operations monitoring (what admins do every day)

A) Visit tracking

- Planned vs actual visits (by rep / territory / date)

- Missed visit reasons (closed, not found, etc.)

B) Orders & deliveries tracking

- **View orders per shop / rep / date**

- **Status filters:**

    o   Completed

    o   Partial delivered

    o   Pending/backorder

- **Next delivery date list (what must be delivered later)**

C) Lorry/van stock tracking

- **Start-of-day load vs end-of-day balance**

- **Returns to warehouse (by SKU, by rep, by day)**

- **"Stock mismatch" flags (data quality)**

3) Data review & approval

Because small shops don't have POS, our system data must be trusted.

- Approve/reject/edit submissions (with audit log)

- Duplicate detection (same shop same SKU same date)

- Outlier warnings (huge unusual order/sales)

- Mandatory fields checker (no missing shop/SKU/date/qty)

Result: "Approved dataset" used for exports & reports.

4) Reporting dashboards (two sections)

4A) POS-like dashboards (what ARS cares about)

These are reports built from our approved data:

- Daily sales (by shop / SKU / territory)

- Sales trends (weekly/monthly)

- Stock snapshots (lorry stock, shop stock if collected)

- Service level proxy:

    o Full vs partial delivery rate

    o Backorder rate

4B) Non-POS dashboards (what BU/CDT care about)

Based on your app features:

- On-shelf availability (OSA%) by shop/territory

- Shelf vs backroom mismatch

- Promo execution compliance

- Returns rate (overstock indicator)

- Competitor price tracking (simple index)

- Complaint/feedback tags (top issues)

5) ARS integration exports (CORE FEATURE 04)

This is practical and real-world.

Recommended export options (the best way is keep it optional since we don't know what ARS model they use)

    i.   CSV flat files (most suitable, easiest to plug into anything)
            JSON via API (modern integration, future-ready)
            XML (optional if want "enterprise-looking")

Export types System generate

- Sales feed (POS-like): store+SKU+date+qty sold

- Inventory feed (if capture stock): store/lorry stock snapshots

- Orders feed: recommended/confirmed orders + deliveries

- Master data feed: SKU list, pack size, outlet list

Admins can:

- Choose date range / territory / region

- Download files

6) Forecast (CORE FEATURE 05)

This is **NOT full industry-level demand planning.** But it can prove our data is usable and give us a rough idea of sales and demand.

What it does

- **Simple forecasting methods:**

  - **Moving average (7/14/28):** A simple way to predict future demand using recent past sales.

  - **Weighted average:** Similar to moving average, but recent days matter more**.**

- **Compare:**

  - **Forecast vs actual (MAPE or simple error %)**

- **"What-if" promo multiplier toggle(***If a promotion runs, demand might increase by X%.")* The system temporarily multiplies demand to show the impact.

Why it's useful

- Shows your exports are consistent

- Helps BU see demand direction

- Gives a validation story without ML

7) "Context-based" forecast insights: non-POS assisted(CORE FEATURE 06)

This is also achievable as decision support, not perfect forecasting.

- **Overlay charts:**

    o   OSA drops vs sales drops

    o   Backorders vs sales dips

    o   Promo execution vs sales uplift

    o   Competitor price change vs demand change

Output:

- **A simple "drivers report" (PDF/CSV export optional)**

8) Alerts & action lists (makes it operational)

- Shops with repeated low OSA

- Shops with repeated partial deliveries

- SKUs with high return rates (possible over-forecast)

- Reps with low visit completion

9) Audit, security, and reliability (must-have for admin systems)

- Full activity log (who edited/approved/exported)

- Data backup/export history

- Offline sync monitoring (failed uploads list)

07 Core POS outputs (MOST IMPORTANT)

01 Sales transaction data

- Store ID

- SKU ID

- Date / time

- Quantity sold

- Selling price

- Total sales value

This is the primary demand signal

02. Daily sales summary (commonly used by ARS)

- Store ID

- SKU ID

- Date

- Total quantity sold (per day)

- Total sales value

Preferred over raw transactions for planning

03. Inventory / stock on hand

- Store ID

- SKU ID

- Stock on hand

- Last updated date

Used to prevent over-ordering

04. Stock movement data

- Goods received

- Returns

- Adjustments (damage, expiry)

Explains inventory changes

05. Pricing data

- Regular price

- Promo price

- Effective dates

Helps explain demand spikes

06. Promotion flag

- SKU ID

- Store ID

- Promo active (Yes/No)

- Promo period

 Used to adjust forecasts

Optional / advanced POS outputs

- Hourly sales

- Payment type (cash/card)

- Basket data (what sells together)

(Not required for ARS MVP)

08 Valuable Non-POS Data Collected from Your App

01. Shelf & availability data (VERY valuable)

Collected via

- On-shelf availability check

- Backroom stock check

- Shelf photos

Data points

- On-shelf availability % (OSA)

- Number of OOS incidents

- Shelf vs backroom mismatch

- Time product stays off-shelf

Used by

- CDT

- Sales excellence teams

Why it matters

- Explains **lost sales**

- POS can't tell *why* sales dropped

02. Distribution & listing data

Collected via

- "SKU listed / not listed" flags

Data points

- Numeric distribution (% stores carrying SKU)

- Range gaps by territory

Used by

- BU

- Category managers

Why

- Helps decide **which SKUs to push or delist**

03. Partial delivery & backorder data

Collected via

- Full vs partial delivery

- Pending quantity

- Next delivery date

Data points

- Service level %

- Backorder frequency

- Supply shortfalls

Used by

- Supply planning

- BU heads

Why

- Shows **supply constraints**, not demand weakness

04. Van / lorry stock movement data

Collected via

- Start-of-day load

- Delivered quantities

- End-of-day balance

- Returns to warehouse

Data points

- Van stock accuracy

- Return rate %

- Overstock issues

Used by

- Logistics

- Demand planners

Why

- Indicates **forecast errors** or poor routing

05. Promotion execution data

Collected via

- Promo executed (Yes/No)

- Promo photos

Data points

- Promo compliance %

- Promo vs non-promo sales

- Execution quality score

Used by

- BU

- Marketing

Why

- Separates **promo design** from **promo execution failure**

06. Customer satisfaction & feedback (human insight)

Collected via

- Quick feedback notes
- Repeat complaints
- Delivery delay flags

Data points

- Satisfaction trend (qualitative)
- Frequent issue categories

Used by

- BU
- Sales leadership

Why

- Predicts **future demand loss**
- Not visible in POS

07. Competitor intelligence (VERY valuable)

Collected via

- Competitor price capture
- New competitor product photos
- Promo visibility notes

Data points

- Price index vs competitors
- Competitor promo frequency
- New product threat signals

Used by

- CDT
- Strategy teams

Why

- Explains sudden demand shifts
- Supports pricing decisions

08. Execution quality data

Collected via

- Visit completion
- Shelf photos
- POSM placed

Data points

- Rep execution score
- Outlet execution health

Used by

- Sales managers
- BU

Why

- Separates **people issues** from **market issues**

09. Coverage & visit discipline data

Collected via

- Planned vs actual visits
- Visit duration
- Missed visit reasons

Data points

- Coverage %
- Route efficiency

Used by

- Sales ops

- BU

Why

- Shows whether poor sales are due to **lack of coverage**