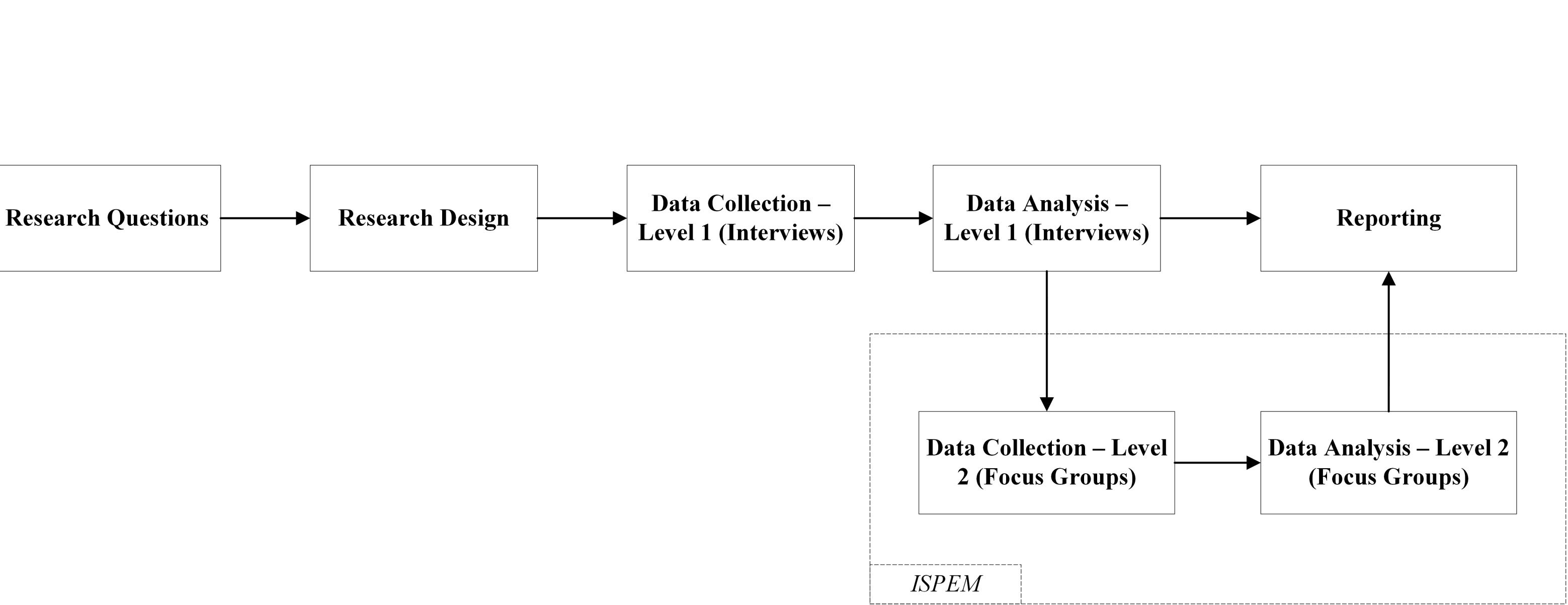
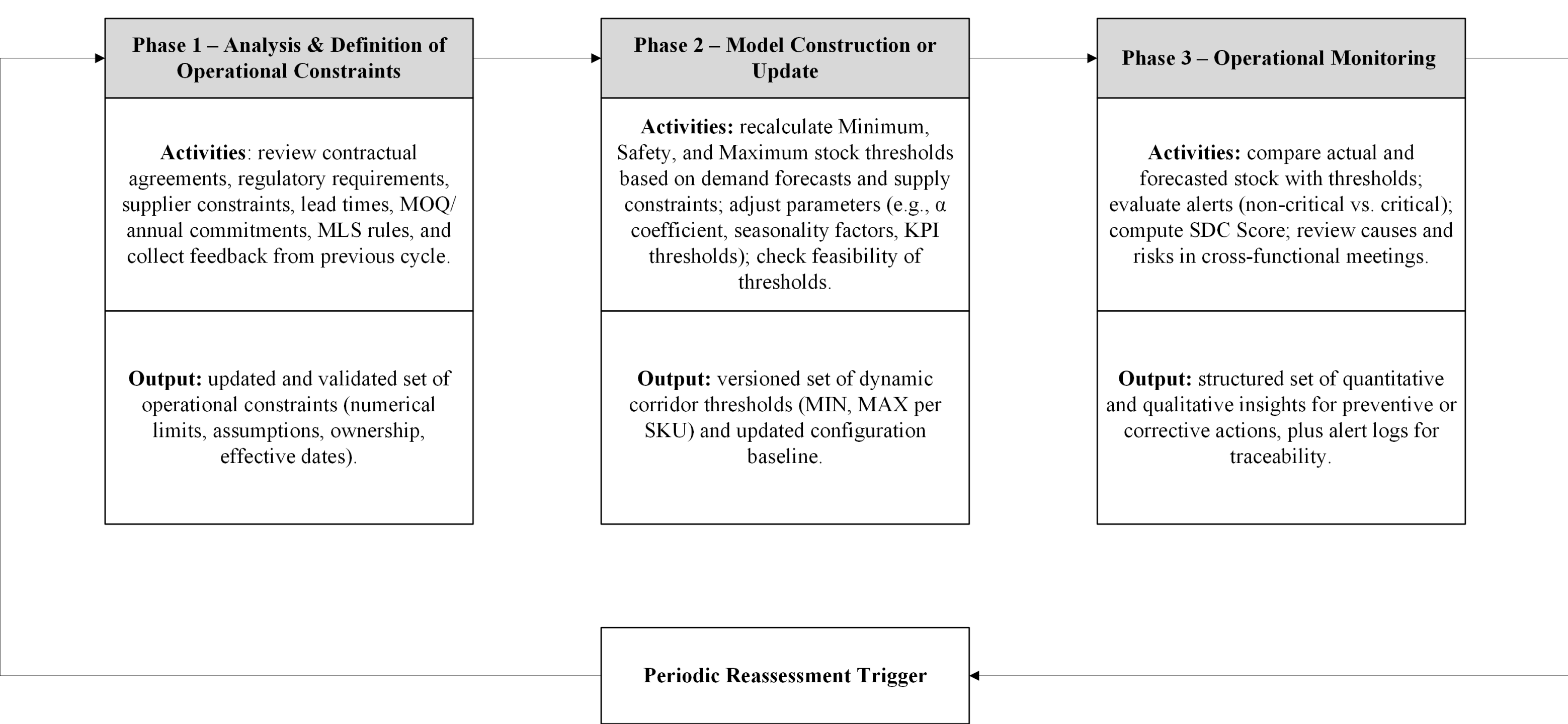


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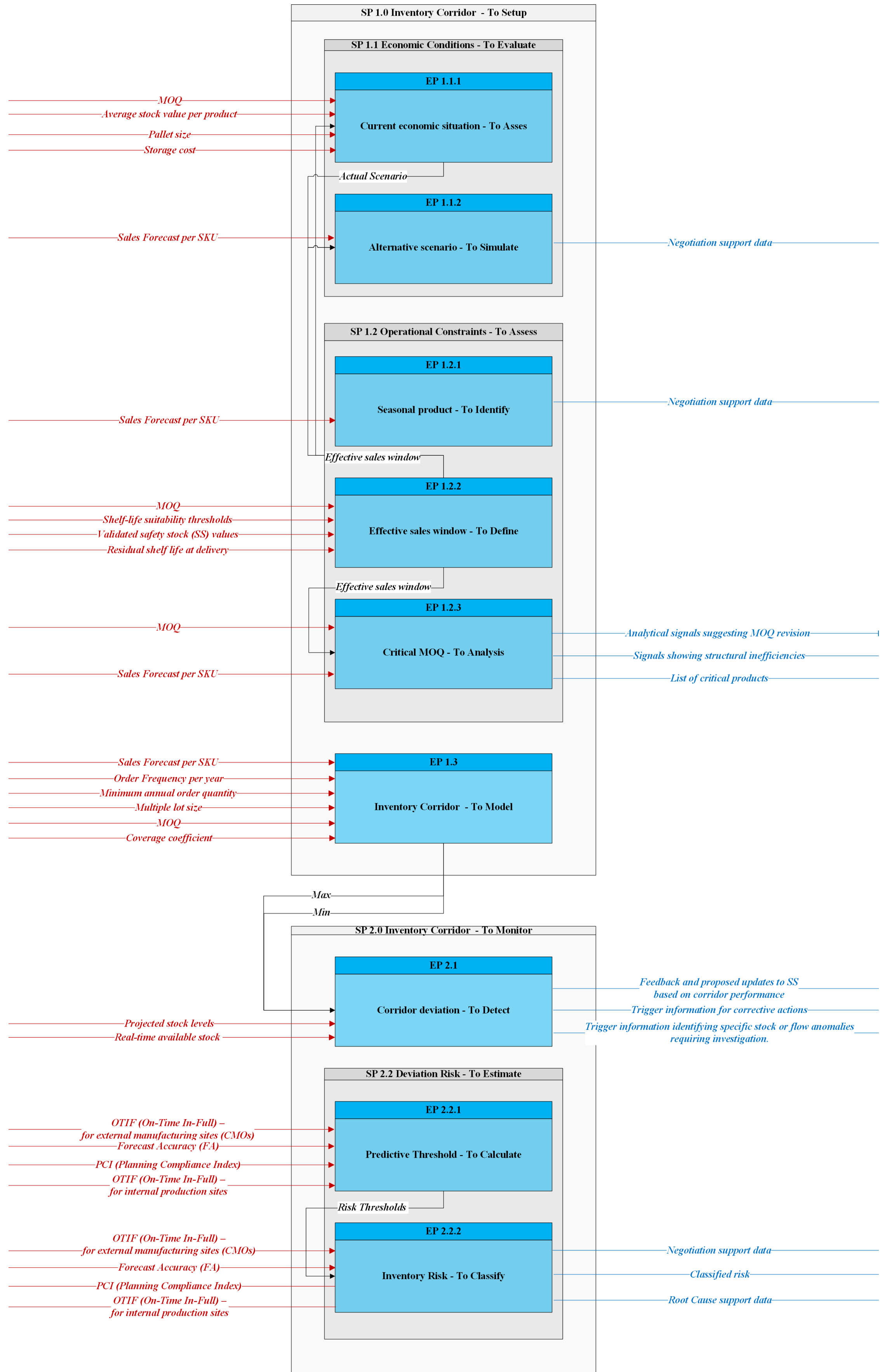
Design of a Process-Based Model for Inventory Monitoring and Deviation Detection in Pharmaceutical Supply Chains



Step-by-step methodological procedure of the research.



Process overview of the Inventory Corridor model



ISPEM Phase 2: Decomposition of the Inventory Corridor “to Operate” process

Problem Statement

Pharmaceutical supply chains face high complexity due to strict regulations, heterogeneous product portfolios, and sensitive shelf-life constraints. Despite regular inventory reviews, the company lacks a standardized process to define and manage critical deviations. Without common thresholds or escalation rules, issues such as overstocking, expiry risks, or insufficient coverage are typically handled in a reactive manner, often depending on individual judgment. Monitoring practices remain fragmented across warehouses, geographies, and IT systems, leading to inconsistent routines and reduced data comparability. Limited visibility on key parameters further prevents the consolidation of a reliable, network-wide inventory picture. These challenges delay corrective or preventive actions, weaken supply chain resilience, and emphasize the need for a structured, process-based model that supports proactive deviation detection and decision making.

Methodology

The study followed a two-level qualitative design. Exploratory interviews captured contextual insights and guided the selection of actors. Three focus group workshops then applied the ISPEM methodology (context definition, decomposition, description, modeling) to co-create validated process representations reflecting real operational dynamics.

Solution Concept

The solution operationalizes the Inventory Corridor – to Operate through three integrated components. An Excel-based diagnostic tool consolidates inventory data to reveal structural inefficiencies, quantify waste risk, and support MOQ renegotiation with scenario analysis. A Dynamic Stock Strategy (DSS) Corridor Model sets adaptive min/max thresholds, factoring in demand variability, seasonality, and supplier constraints to trigger proportionate alerts.

The Stock Deviation Cause (SDC) Score adds a predictive layer, translating KPIs into early-warning signals of potential deviations. Combined, these elements enable diagnostic insight, adaptive monitoring, and proactive risk management within a single, coherent framework.

Marco Lotti

Advisor:
Prof. Dr. Clemente Minonne

Expert:
Prof. Dr. Filippo De Carlo

Company Expert:
Chiara Stirpe, Corporate Supply Chain Manager – Menarini group

Industry Partner:

