**DESCRIPTION OF FUTURE BOM PIM PROJECT (082825)**

## **1) Unified Data Governance & Management**

**Project description** Establishes an enterprise data governance framework, unified data platform, automated metadata management, and continuous data quality/lineage to create a single source of truth across BOM and part data.

**Objectives (What)**

* Single source of truth across product data and systems- Enterprise data governance policies, standards, and stewardship- Automated data quality monitoring and validation- End-to-end data lineage and auditability

**Why it’s important to BOM and Part Information Management**

* Removes conflicting BOM/part records by eliminating silos and duplication, preventing downstream errors in engineering, manufacturing, and quoting.
* Ensures parts have complete, accurate attributes governed by clear ownership and standards; improves trust and reusability.
* Provides authoritative sources and lineage for change traceability across eBOM/cBOM/mBOM and connected systems (PLM/ERP/ALM).
* Forms the prerequisite foundation for analytics, search, digital thread, and AI use cases.

**Suggested KPIs**

* Data quality score for BOM/part master (target ≥ 98%)
* Duplicate/contradictory records eliminated (baseline to target reduction ≥ 90%)
* Policy adherence rate for governed fields (≥ 95%)
* Mean time to resolve data quality issues (↓ 50%)

**Key capability alignment**

* Data Governance, Master Data Management, Data Quality, Metadata/Lineage, PLM/ERP integration.

## **2) Digital Thread Foundation & Integration Hub**

**Project description** Builds the integration backbone that connects eBOM, cBOM, and mBOM with real-time, bidirectional synchronization, traceability, and change propagation across PLM, ERP, ALM, and quality systems.

**Objectives (What)**

* Unified digital thread connectivity across BOM types with API standards- Automated synchronization and change propagation between systems- End-to-end product traceability and real-time production readiness visibility

**Why it’s important to BOM and Part Information Management**

* Eliminates manual, error-prone transcriptions of BOM/part data; keeps plants synchronized with current BOMs, reducing shop-floor quality issues.
* Preserves traceability between design intent and manufacturing execution for each part; accelerates NPI readiness.
* Provides the operational conduit for governed, high-quality data from the governance project to flow reliably across lifecycle systems.

**Suggested KPIs**

* Automated change propagation coverage across BOM types (≥ 95%)
* Change latency (design-to-mfg) in minutes (↓ 80%)
* Reduction in manual re-entry of BOM/part data (↓ 90%)
* Production incidents traced to outdated BOMs (0 tolerance)

**Key capability alignment**

* Systems Integration, API Management, PLM-ERP-ALM Interoperability, Lifecycle Traceability.

## **3) Parts Management Connect to Requirements**

**Project description** Creates bidirectional links between parts and their originating customer/design requirements; enables requirement-based search, completeness validation, and variant management.

**Objectives (What)**

* Part–requirement linkages with bidirectional navigation- Requirement-based search and discovery for parts- Completeness validation of part specs against source requirements- Variant/option mapping tied to requirement variations

**Why it’s important to BOM and Part Information Management**

* Ensures part records include authoritative specifications tied to requirements, reducing quality escapes and customer dissatisfaction.
* Enables faster, more accurate part selection and reuse; reduces duplicated design work and mis-specified parts in BOMs.
* Improves change impact analysis when requirements evolve, maintaining BOM integrity across variants.

**Suggested KPIs**

* Parts with validated requirement links (coverage ≥ 85% initial, ≥ 95% steady-state)
* Part reuse rate uplift (≥ +30%)
* Defects due to missing/misaligned requirements (↓ 60%)
* Time to find compliant parts (↓ 70%)

**Key capability alignment**

* Requirements Management, PLM Part Master, Variant/Option Management, Search/Discovery.

## **4) Intelligent Knowledge Management & Insight Platform (IKMP)**

**Project description** An AI-powered knowledge ecosystem that captures expert insights, extracts lessons from artifacts, and delivers contextual recommendations across the design lifecycle.

**Objectives (What)**

* Unified knowledge platform and graph across repositories- Automated knowledge capture and expert intelligence workflows- Context-aware recommendations and natural-language query- Accelerate learning, onboarding, and cross-project idea transfer

**Why it’s important to BOM and Part Information Management**

* Preserves and surfaces prior BOM/part decisions, constraints, and lessons to prevent repeated mistakes in specifications and structure.
* Shortens design research and improves first-pass correctness of part data, reducing rework in BOMs.
* Strengthens traceability of rationale behind part choices, aiding change impact assessment and compliance.

**Suggested KPIs**

* Reduction in design research time (target 50% Year 1)- First-time design success improvement (30% Year 1)- Repeat mistake recurrence rate (↓ 40% Year 2)- Time-to-productivity for new engineers (2x faster Year 2)

**Key capability alignment**

* Knowledge Management, AI/ML Insights, Engineering Enablement, PLM/ALM Knowledge Integration.

## **5) Enhanced Semantic Search & Intelligence Assistant**

**Project description** Implements semantic, natural-language search with an AI assistant that understands engineering context to unify discovery across PLM, ERP, and document systems.

**Objectives (What)**

* Semantic/NLP search beyond keywords with engineering ontology- Conversational assistant for refinement and recommendations- Federated search across repositories with unified ranking- Advanced discovery of related patterns and solutions

**Why it’s important to BOM and Part Information Management**

* Dramatically reduces time to locate correct parts, specs, and historical BOM decisions; decreases duplication and errors from partial information.
* Improves reuse and speeds quoting/engineering by finding analogous components and BOM patterns.
* Complements governance by making the single source of truth easily findable across roles.

**Suggested KPIs**

* Search time reduction (target 80%)- Relevant result precision/recall uplift (≥ +60% relevant discovery)- Design reuse increase (≥ +50%)- User satisfaction with search (>90%)

**Key capability alignment**

* Enterprise Search, Ontology/Taxonomy, AI Assistant, Cross-System Federation.

## **6) Design Cost Optimizer**

**Project description** Real-time, AI-driven cost visibility and optimization within the design process, with alternative component suggestions and design-for-cost guidance.

**Objectives (What)**

* Instant cost feedback and target tracking in design tools- Cost-effective alternative recommendations meeting requirements- Predictive total cost modeling (materials, manufacturing, lifecycle)

**Why it’s important to BOM and Part Information Management**

* Aligns part choices and BOM configurations with cost targets early, minimizing late-stage redesigns and margin leakage.
* Informs part selection with validated requirement and supplier data, improving BOM quality and competitiveness.
* Feeds real-time cost context into BOM authoring and variant decisions.

**Suggested KPIs**

* Product cost reduction (15–25%)- Cost-related redesigns (↓ 50%)- Time-to-market for cost-optimized designs (↓ 30%)- Margin improvement (+20%)

**Key capability alignment**

* Design-to-Cost, Supplier/Cost Data Integration, CAD/PLM Integration, Optimization Analytics.

## **7) Real-Time BOM Analytics & Cost Intelligence**

**Project description** Provides instantaneous costed BOMs with multi-level rollups, analytics, what-if simulation, and AI-driven insights to support quoting, pricing, and cost control.

**Objectives (What)**

* Real-time costed BOM visibility at all levels- Advanced analytics, trends, and drill-downs- Cost anomaly detection and optimization recommendations- Scenario modeling for BOM changes and variants

**Why it’s important to BOM and Part Information Management**

* Equips teams to make informed BOM changes with immediate cost impact, speeding quotes and improving pricing accuracy.
* Creates closed-loop feedback from cost insights to part selection, variant strategies, and supply decisions.
* Operationalizes cost transparency as a standard attribute of BOM and part information.

**Suggested KPIs**

* Quote-to-order cycle time (↓ 40%)- Pricing accuracy (↑ 30%)- Product cost reduction (≈ 20%)- Time spent on cost analysis (↓ 50%)

**Key capability alignment**

* BOM Intelligence, Cost Analytics, What-if Simulation, PLM/ERP/Procurement Data Integration.

## **Portfolio Alignment, Overlaps, and Gaps**

**Reinforcing sequence (recommended):** 1) Unified Data Governance & Management → 2) Digital Thread & Integration Hub → 5) Enhanced Semantic Search → 7) Real-Time BOM Analytics → 3) Parts–Requirements → 6) Design Cost Optimizer → 4) IKMP.  
 Rationale: Establish trustworthy data and connectivity first; then discovery, analytics, requirement integrity, embedded cost optimization, and finally institutionalizing knowledge.

**Key overlaps (positive synergies)**

* Governance (1) + Digital Thread (2): Data quality and lineage carried through integrations.
* Semantic Search (5) + IKMP (4): Discovery boosts, context delivery, and lessons learned reuse.
* Cost Optimizer (6) + Real-Time Analytics (7): Shared cost data/services and feedback loops.

**Potential gaps**

* Formal engineering ontology and part taxonomy governance to support Search (5) and Parts–Requirements (3).
* Master variant/option modeling standard across PLM/ERP to harmonize (2), (3), and (7).
* Data product ownership model to operationalize governed BOM/part datasets for analytics and AI.

## **Next Steps**

* Confirm capability ownership: Data Governance, Integration, PLM Master, Cost Intelligence.
* Approve a phased roadmap and dependency plan as outlined.
* Stand up KPI baselines and dashboards per project before build.
* Define ontology/taxonomy and variant standards as shared enablers.

If helpful, I can produce a concise roadmap diagram and a KPI scorecard template for each project.