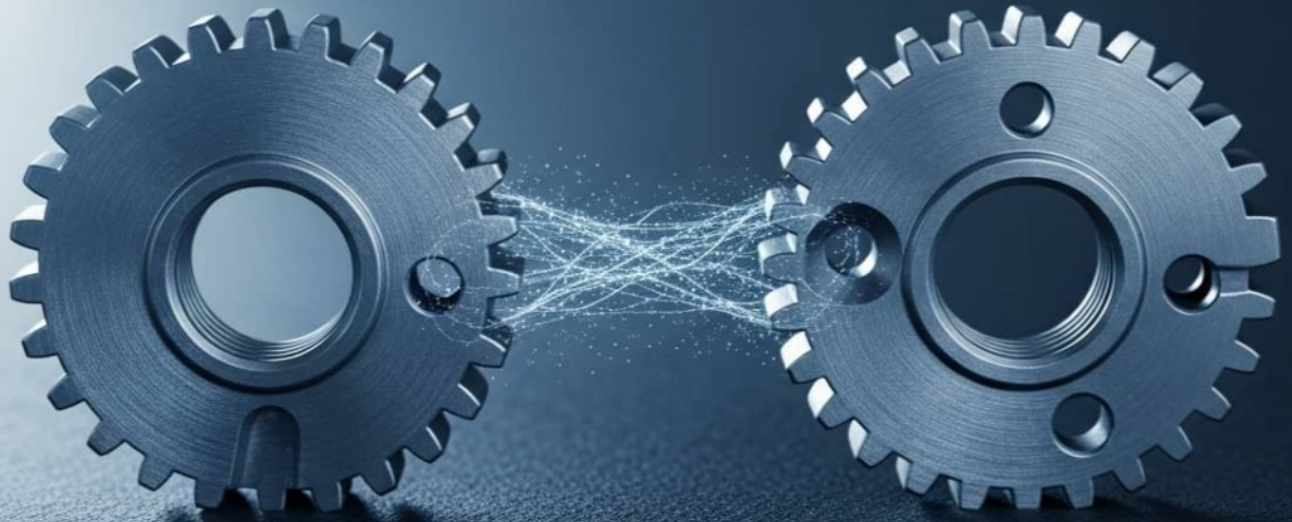




How to find duplicate materials with AI in global inventory

Supply chain directors can reduce working capital by utilizing Deep Learning and Knowledge Engineering to identify duplicate materials hidden across fragmented, multi-language ERP environments. By establishing a semantically connected **data foundation**, organizations can harmonize material master data to uncover redundant safety stock and consolidate global inventory levels. This process shifts the focus from manual, lexical searching to automated, semantic identification, enabling the reallocation of existing assets and the prevention of unnecessary procurement.

The challenge of fragmented material master data in global operations

In large multinational organizations, the accumulation of duplicate materials is rarely a result of simple clerical errors; rather, it is a structural consequence of decentralized ERP systems and linguistic diversity. When plants in different regions operate on siloed instances of SAP, Oracle, or legacy systems, the same physical item is frequently recorded under distinct part numbers and descriptions.

Traditional inventory management relies on exact string matches or basic fuzzy logic, both of which fail to bridge the gap between

technical descriptions written in different languages or following disparate naming conventions. For instance, a French facility might record a "Ruptor 400V Siemens," while an English-speaking plant registers a "Circuit breaker 5SY4310-7 400V." To a standard database, these are unique entries; to a supply chain director, they represent a missed opportunity to optimize stock.

Consequently, working capital remains trapped in redundant safety stock. Without a unified view, procurement teams continue to purchase new items that are already sitting idle in a warehouse in a different region. This lack of transparency is fundamentally a **data foundation** problem rather than a simple analytics deficiency.

How deep learning identifies hidden duplicates across languages

Deep learning models represent a significant advancement over manual audit processes by shifting from lexical matching to semantic understanding. While traditional tools look at letters and symbols, AI trained on procurement-specific datasets understands the underlying engineering intent of a material description.

Semantic vs. lexical matching

Lexical matching focuses on character patterns. If a part number is missing a hyphen or a brand name is abbreviated differently, the match fails. In contrast, deep learning analyzes the context and technical attributes of a description. By training on millions of industrial records, specialized AI—such as the proprietary models developed by **Creactives**—can recognize that "Moteur à induction" and "Induction motor" refer to the same functional entity, regardless of the language or syntax used.

The role of knowledge engineering

To achieve the precision required for global supply chain optimization, deep learning must be paired with knowledge engineering. This involves a pre-defined industrial taxonomy—often encompassing over 30,000 categories—that provides the AI with a logical framework. This combination allows the system to:

- Automatically classify materials into granular categories without manual rule configuration.
- Extract technical attributes (e.g., voltage, diameter, material grade) from unstructured text.
- Normalize descriptions across 25+ languages natively.

Implementing a digital twin for inventory harmonization

To effectively find duplicate materials with AI, organizations must move beyond static reports and toward a dynamic **Unified Data Space (UDS)**. This is achieved by creating **Semantic Digital Twins** of every material record. The architecture for this transformation follows a specific progression:

1. **Data Ingestion:** Raw data is pulled from various ERP and legacy systems via native connectors.
2. **Dedicated AI Training:** A model is trained on the organization's specific naming conventions and domain-specific vocabulary.
3. **Semantic Digital Twin Creation:** Each material record is enriched with extracted attributes and mapped to a universal taxonomy.
4. **Unified Data Space (UDS):** The sum of these twins forms a semantically connected environment where duplicates become visible through their shared technical DNA.

"The data is there. The problem is that nobody taught it how to speak." — This architectural approach gives procurement data a common language, making it possible to navigate relationships between items that were previously invisible.

Reducing working capital through data-driven stock optimization

The primary financial benefit of finding duplicate materials with AI is the immediate and sustainable reduction of working capital. Once duplicates are identified and the material master data is harmonized, supply chain directors can execute several optimization strategies.

By utilizing **Technical Attribute Management (TAM)**, organizations can ensure that the "Digital Twin" remains accurate in real-time. This provides a level of governance that standard ERP tools, like SAP MDG, often struggle to maintain at scale due to their reliance on manual rule-based configurations.

Integrating AI with existing ERP ecosystems

A common concern for supply chain directors is whether adopting AI for duplicate detection requires a "rip and replace" of existing infrastructure. On the contrary, specialized AI solutions are designed to sit above or alongside traditional systems like SAP S/4HANA or Oracle.

These tools act as a semantic layer, ingesting data from multiple instances to provide a unified view without disrupting the underlying transactional workflows. In the context of an S/4HANA migration, for example, deploying an AI-driven cleansing tool like **Creactives TAM** on the legacy ECC system allows an organization to "arrive with clean data," ensuring that the new environment is not immediately cluttered with inherited duplicates.

Ultimately, the transition to AI-powered inventory management allows supply chain directors to move from a reactive posture to a proactive, strategic one. By resolving the underlying data foundation problem, they can unlock millions in trapped working capital while improving the overall resilience of the global supply chain.

Frequently asked questions

Why is identifying duplicate materials difficult in global supply chains?

Multinational organizations often maintain fragmented data across multiple ERP systems where items are described in different languages or inconsistent naming conventions. Traditional search methods rely on exact string matches, which fail to recognize that technically identical items are recorded as different entries, leading to **redundant safety stock** and **inflated working capital**.

How does deep learning improve duplicate detection over manual methods?

Deep learning models utilize **semantic understanding** to analyze material descriptions rather than relying on simple keyword matching. By training on vast datasets of procurement nomenclature, these systems can identify functional equivalents even when descriptions vary significantly or are written in different languages, providing a level of precision and scale that manual audit processes cannot achieve.

What role does data harmonization play in inventory reduction?

Data harmonization creates a single, trusted source of truth across the entire enterprise by aligning disparate material master data into a unified structure. This transparency allows supply chain directors to identify where duplicate stock exists globally, enabling the reallocation of existing materials instead of purchasing new ones, thereby **optimizing stock levels** and reducing total inventory value.

Can AI tools integrate with existing SAP or Oracle ERP environments?

Specialized AI solutions are designed to sit above or alongside traditional ERP systems like **SAP** or **Oracle**. By acting as a **semantic layer**, these tools can ingest data from multiple siloed instances to build a **digital twin** of the global inventory, providing real-time insights and governance without requiring a complete overhaul of the underlying legacy infrastructure.

Strategy	Action	Financial Impact
Inventory Reallocation	Moving idle duplicate stock from one plant to <u>meet demand in another</u> .	Reduction in new procurement spend.
Safety Stock Consolidation	Calculating safety stock levels based on the total global volume of a unique item.	Lowering the total value of inventory held on the balance sheet.
Vendor Consolidation	Identifying when the same item is bought from different vendors at different prices.	Improved negotiation leverage and lower unit costs.
Search Before Buy	Implementing real-time governance that forces users to search the UDS before creating a new part.	Prevention of future duplicate accumulation (Maverick spend).

Creactives builds a trusted Data Foundation that creates a Digital Twin of your Master and Spend Data. Our AI-powered solutions eliminate errors, optimize legacy systems, and unlock a wide range of use cases across Procurement & Supply Chain.



SPEND ANALYTICS

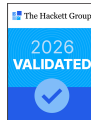


MATERIALS & SERVICES
MASTER DATA GOVERNANCE



PROCUREMENT GUIDANCE
AUTOMATION

CREACTIVES: SOLUTIONS SELECTED OVER YEARS BY OPINION LEADERS



"Creactives is a best-of-breed tool that offers standard spend analytics features, such as data cleansing and analysis. In addition, it specializes in materials MDM and is built for automated parts and material classification."

Abigail Ommen, Research Analyst & Analyst Production Manager