Blockchain Applications in Supply Chain Tracking:
A Private Sector Perspective

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Introduction

Modern supply chains span countries, companies, and continents. With increasing demand for transparency, efficiency, and accountability, traditional systems often fall short. Blockchain technology presents an innovative opportunity to solve these issues through decentralized, verifiable, and tamper-resistant ledgers.

This article explores the integration of blockchain into supply chain tracking—particularly focusing on the private sector's use cases and trade-offs.

Core Benefits

Blockchain introduces four foundational pillars into the supply chain:

1. **Provenance:** Tracking the origin and journey of a product from raw material to final delivery.

2. **Traceability:** Verifying each actor and action across the supply chain timeline.

3. **Transparency:** Enabling real-time, auditable visibility across all stakeholders.

4. **Automation:** Facilitating smart contracts and seamless integration with ERP systems.

Transparency vs. Confidentiality

Blockchain provides transparency—but total openness may clash with enterprise confidentiality needs.

- **Transparency** enhances trust, regulatory compliance, and customer assurance.

- **Confidentiality** is critical for protecting sensitive operational and trade information.

Private blockchains (e.g., Hyperledger Fabric) or permissioned systems strike a balance by allowing data visibility controls while preserving core blockchain benefits.

Technical Backbone: SHA-256

Data immutability in blockchain relies on cryptographic hash functions. One of the most commonly used is **SHA-256**, which outputs a fixed 256-bit hash. For example:

3c1a6fcb5ac1b3fd5982e9a29d4f5039cb90b0d7d7a7ea1d305113a8b5a86c14ea1rhdm4

Any alteration in input data changes the hash, alerting participants to potential tampering.

Automation and ERP Integration

Automation extends blockchain's value when integrated with enterprise software:

- **Smart Contracts:** Automate payments, delivery confirmations, and SLA enforcement.

- **ERP Systems:** Real-time syncing with tools like SAP or Odoo improves operational fluidity and accuracy.

This synergy reduces manual processes and enhances cross-organizational consistency.

Is a Shared Database Enough?

Critics argue a shared database can provide similar benefits. While this may be true in tightly controlled environments, blockchains excel when:

- Trust between parties is limited

- Verification and auditability are required

- Real-time cross-border traceability is needed

Ultimately, blockchain is a *strategic business move*, offering reputational, operational, and long-term scalability advantages.

Conclusion

Blockchain's promise in supply chains lies in its ability to bridge silos, eliminate opacity, and streamline operations. While not a silver bullet, it serves as a powerful enabler of digitized, secure, and efficient value chains—especially in industries where trust, traceability, and time-to-market are paramount.

Author Note: This article is based on a presentation created by Miguel Ibrahim, Carlos Vallado, and Ruben Thienpont. All data examples are illustrative.