

Interoperability in the Digital Product Passport (DPP) Space

What is Interoperability in the DPP Space?

COPENHAGEN, DENMARK, January 29, 2025 /EINPresswire.com/ -- Interoperability in the Digital Product Passport (DPP) ecosystem refers to the ability of different DPP systems, platforms, and stakeholders to seamlessly exchange, interpret, and utilize product data across global supply chains. Since DPPs are intended to store and share critical product lifecycle information—including material composition, sustainability credentials, repair history, ownership records, and recycling instructions—ensuring interoperability is crucial for their success and adoption.



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Interoperability is the backbone of a truly connected Digital Product Passport ecosystem. Without it, data remains siloed, limiting its true potential.”

Thomas Christian Melskens

Interoperability enables smooth communication between brands, suppliers, retailers, regulators, and consumers, regardless of the underlying technology or platform. Without interoperability, the DPP ecosystem risks fragmentation, where different industries, regions, or businesses operate in silos, reducing the effectiveness of DPP implementation.

How Interoperability Challenges Manifest in DPP Implementation

Lack of Standardized Data Models: Different industries use

varied data formats, structures, and taxonomies, making it difficult to achieve consistency in how DPP information is stored and accessed.

Technology Fragmentation: Multiple technology solutions, including blockchain networks, centralized databases, and proprietary APIs, complicate seamless data exchange.

Regulatory Compliance Variability: Different jurisdictions may impose different DPP-related compliance requirements, leading to inconsistencies in implementation and adoption.

Limited Cross-Platform

Communication: DPP providers and manufacturers often develop isolated solutions that do not inherently support integration with other platforms or external services.

Security and Privacy Concerns:

Ensuring data integrity, protecting proprietary product information, and complying with data privacy laws (e.g., GDPR) add complexity to interoperability.

Integration with Legacy Systems: Many manufacturers and brands operate on outdated IT infrastructure, which makes it challenging to incorporate DPPs without significant modernization investments.

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Proposed Solutions for Achieving Interoperability in DPP

1. Adoption of Open Standards and Protocols

Global stakeholders must agree on universal DPP data structuring, storage, and retrieval standards to facilitate seamless data exchange. Key efforts include:

Leveraging GS1 standards such as GTIN, GLN, and EPCIS for product identification and supply chain tracking.

Aligning with CEN and CENELEC standards in the EU to ensure regulatory compliance.

W3C's Verifiable Credentials (VC) model is utilized to securely authenticate and share product information.

2. Decentralized and Federated Data Models

Instead of relying on isolated databases, a decentralized approach using blockchain technology or federated data-sharing models can improve trust and interoperability.

Blockchain-Based DPP: Utilizing smart contracts for cross-industry data verification.

Interoperable APIs: Creating open API frameworks that allow multiple DPP providers to interact with various enterprise systems.

3. Cross-Sector Collaboration and Governance Frameworks

Cooperation among industry consortia, governments, and technology providers is necessary for interoperability to succeed.

Forming a DPP Industry Coalition where brands, manufacturers, and technology firms define best practices for interoperability.

Engaging in multi-stakeholder governance to establish a roadmap for interoperability compliance.

Developing a regulatory sandbox to test cross-platform DPP integration before full-scale deployment.

4. Leveraging Artificial Intelligence and Data Mapping

AI-driven data harmonization tools can translate different data formats into a universally accepted structure. This would enable:

Automatic conversion of legacy product data into standardized DPP formats.

AI-driven semantic mapping to align different product classifications across industries.

5. Integration of NFC, RFID, and QR Code Technologies

DPP interoperability must also extend to the physical realm, ensuring different tracking technologies work seamlessly.

Implementing multi-protocol NFC chips that can interact with various DPP ecosystems.
Utilizing QR codes linked to interoperable digital databases, enabling universal product scanning.

6. Ensuring Compliance with International Regulations

A successful DPP framework must meet compliance requirements in different regions, ensuring that:

EU Ecodesign for Sustainable Products Regulation (ESPR) aligns with global best practices.

Circular Economy initiatives push for DPP standardization across global supply chains.

Data privacy laws (GDPR, CCPA, etc.) are incorporated to protect consumer and corporate data.

What is next?

Interoperability is the backbone of a flourishing DPP ecosystem. Without it, brands, regulators, and consumers will struggle to leverage DPPs effectively. By adopting open standards, decentralized frameworks, AI-driven data mapping, and a collaborative governance approach, we can create an interconnected DPP network that fosters transparency, circular economy practices, and sustainable product management.

To ensure long-term success, industry leaders must prioritize interoperability as a key pillar in all DPP initiatives, providing seamless data flow across borders, industries, and technologies.

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