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Response to referral SIS/TK Digital Product Passports

Introduction

The Digital Product Passport (DPP) is a cornerstone initiative under the European Commission's Ecodesign for Sustainable Products Regulation (ESPR). It aims to improve transparency, traceability, and sustainability in product lifecycles by providing a standardized digital record of product attributes. While the framework introduces important opportunities for industry and consumers, its implementation presents both challenges and advantages. This document provides a structured analysis of the key problems and the benefits identified in the draft European standards related to the DPP framework.

Key Problems Identified

1. System Interoperability

- Difficult integration into diverse IT systems without incurring high costs.
- Risk of fragmentation from sector-specific ontologies and data models.
- Need for alignment on serialization formats and shared data dictionaries.

2. Data Carriers (Barcodes, QR, NFC, RFID)

- Durability issues: physical labels may degrade, particularly in recycling loops.
- Inconsistent user experiences due to multiple carrier technologies.
- Limited inherent security, as most carriers can be copied or cloned.

3. Data Exchange Protocols

- Ensuring secure, confidential, and tamper-proof data transfer remains complex.
- Risk of vendor lock-in if proprietary solutions dominate.
- Scalability concerns given the expected volume of queries across the value chain.

4. APIs and EC Registry

- Central reliance on the EC registry introduces risks of bottlenecks or single points of failure.
- Potential versioning issues as delegated acts evolve.
- Integration mismatches likely across manufacturers and service providers.

5. Storage, Archiving, and Persistence

- DPP data must remain accessible even if the manufacturer ceases operations.
- Replication and backup requirements increase costs and governance complexity.
- Lack of clarity on data persistence rules across different product categories.

6. Additional Problems

- Data Governance and Liability: Unclear ownership of DPP data may result in disputes.
- Cybersecurity: Registries and APIs represent attractive targets for hacking or manipulation.
- SME Burden: Smaller firms may face disproportionate compliance and cost challenges.
- Cross-Border Trade: Exporters outside the EU may face compliance barriers.
- Usability: Risk of consumer and recycler confusion if scanning and tools are inconsistent.
- Environmental Impact: Infrastructure for RFID, databases, and servers adds its own footprint.

PROs Points Identified

1. System Interoperability

- Promotes a common information model and metadata standards to minimize silos.
- Encourages reuse of existing ontologies.
- Supports both machine-readable and human-readable access.

2. Data Carriers

- Builds on widely adopted, proven technologies (QR codes, DataMatrix, RFID, NFC).
- Multiple options allow flexibility depending on product type and use case.
- Standardized carrier design ensures readability across devices.

3. Data Exchange Protocols

- Utilizes secure, established technologies such as HTTPS, TLS, OAuth2, and REST APIs.
- Promotes interoperability through open protocols, limiting vendor lock-in.
- Provides traceability and data integrity across product lifecycles.

4. APIs and Registry

- Provides clear API specifications for lifecycle management.
- The EC registry enhances accessibility and searchability of product information.
- Standardized error handling fosters consistency across implementations.

5. Storage, Archiving, and Persistence

- Ensures product data remains available beyond the lifespan of individual companies.
- Backup and replication rules improve resilience and reliability.
- Archiving supports effective market surveillance and regulatory enforcement.

Conclusion

The Digital Product Passport represents an essential tool in Europe’s transition to a circular and sustainable economy. Its implementation will strengthen product transparency, improve consumer trust, and facilitate compliance with environmental objectives. However, addressing challenges related to interoperability, security, data governance, and accessibility is critical for its success.

Balancing these problems with the framework's clear advantages will determine the pace and effectiveness of adoption across industries.

Improvements Observed and Implications for the Swedish Market

1. Improvements in Data Sharing

- Standardized APIs and exchange protocols provide a unified framework for data transfer.
- Enhanced security measures, including TLS, OAuth2, and decentralized identifiers, strengthen trust in data exchange.
- Increased searchability and accessibility through the EC registry and lifecycle APIs.

2. Improvements in Data Carriers

- Adoption of proven technologies (QR codes, DataMatrix, NFC, RFID) offers flexibility depending on the use case.
- Durability criteria, error correction, and dimensional rules improve the long-term usability of carriers.
- Recognition standards for DPP carriers reduce confusion and facilitate identification across supply chains.

3. Implications for the Swedish Market

- Sweden's strong digital maturity supports rapid adoption of standardized DPP frameworks.
- The country's established recycling and circular economy infrastructure will benefit from improved product traceability.
- Swedish manufacturers gain export competitiveness by early compliance with EU-wide standards.
- SMEs may face higher compliance costs, requiring targeted support measures.
- Sweden could position itself as a pilot market for scalable deployment of DPP systems, building on its reputation in sustainability.

Potential Improvements to the Draft Standards

- Stronger guidance on harmonizing ontologies to reduce the risk of fragmentation between product groups.
- More explicit requirements for cryptographic protection within data carriers to prevent counterfeiting.
- Clearer definition of data persistence rules, tailored by product category, to reduce uncertainty for operators.
- Enhanced SME support measures, such as simplified compliance paths or modular implementation guidelines.
- Integration of lifecycle environmental assessments for the DPP system itself to ensure the infrastructure does not introduce unnecessary environmental burdens.

- Greater focus on user experience, ensuring consumers and recyclers can interact with carriers quickly and intuitively.

Implementation Concerns and Recommendations

While the draft standards for the Digital Product Passport (DPP) provide a strong foundation, several aspects will be difficult to implement in practice. The following concerns and suggested improvements summarize the key issues and provide concise recommendations:

1. System Interoperability:
- Concern: Risk of fragmented ontologies and high IT integration costs, especially for SMEs.
- Recommendation: Provide EU-level reference ontologies and governance for consistency.

2. Data Carriers:
- Concern: Durability issues in recycling loops and risk of counterfeit through simple copying.
- Recommendation: Define clear use cases for each carrier type and introduce cryptographic protection.

3. Data Exchange Protocols:
- Concern: Scalability and security burdens may overwhelm smaller operators.
- Recommendation: Develop lightweight compliance options and stress-test protocols for large-scale use.

4. APIs and EC Registry:
- Concern: Dependence on a central registry risks outages and versioning conflicts.
- Recommendation: Consider decentralized or federated registry models, ensure backward compatibility, and define role-based access rights.

5. Storage, Archiving, and Persistence:
- Concern: Unclear rules on data lifetime and replication costs for SMEs.
- Recommendation: Define sector-specific persistence rules, provide shared storage solutions, and clarify legal liability.

To avoid placing disproportionate compliance costs on SMEs, the framework could introduce **regional or sector-based DPP service organizations**. These entities would:

- Develop, host, and maintain DPP systems on behalf of smaller firms.
- Provide standardized APIs, carrier solutions, and compliance support.
- Act as intermediaries with the EC registry, reducing technical burdens.
- Allow SMEs to focus on product sustainability rather than IT infrastructure.

The design of digital product passports (DPPs) is very important for the Swedish electronics industry. The DPP will become a key information carrier for the electronics sector, enabling a transition to circular economy and new business models. We and our partners are eager to contribute to this effort.

Kind regards,

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