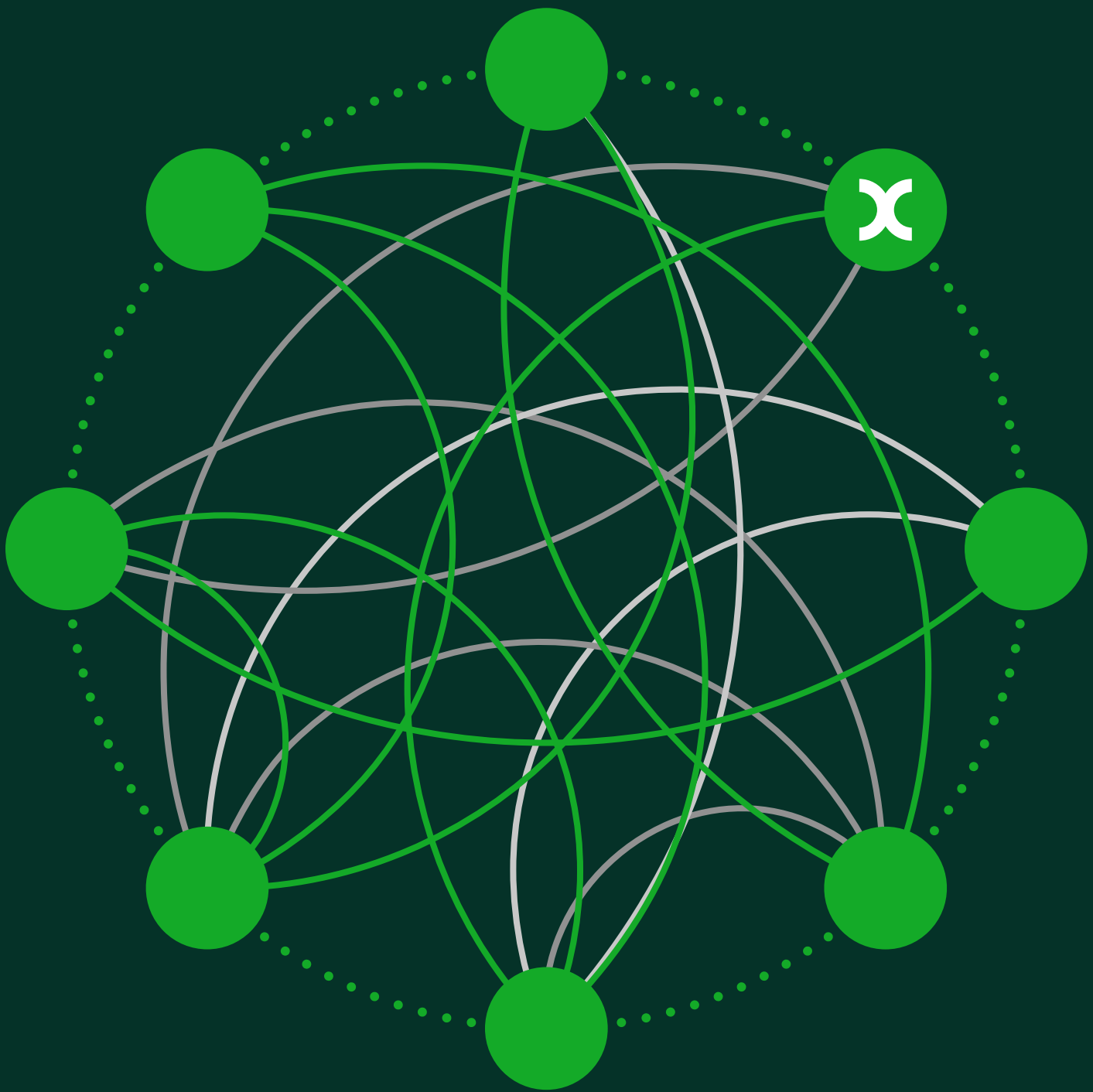
Assessment of costs associated with enabling Digital Product Passports in the EU

—

Prepared for Amazon

2 November 2026



Contents

Executive summary 1

Acknowledgements 5

1 Introduction 6

2 Overview of Digital Product Passport policies and their benefits 8
2.1 Batteries 11
2.2 Detergents 12
2.3 Toys 13
2.4 Textiles 15
2.5 EU policy landscape timeline 16
2.6 Re-cap of the benefits arising from DPPs 17

3 Framework for assessing Digital Product Passport costs 21

4 Cost assessment 24
4.1 Overview 24
4.2 Cost categorisation 24
4.3 Economic significance of cost categories and relevant variations 30
4.4 Detergent case study 32
4.5 Significant cost drivers in implementing DPP requirements 35
4.6 DPP compliance readiness 42
4.7 Available cost estimates 45

5 Cost mitigation strategies 48
5.1 Leverage existing infrastructure 48
5.2 DPP as a service/third-party outsourcing 49
5.3 Industry consortia and shared platform models 50
5.4 Design for DPP—automation, IoT and AI 51

6 Implications for overall benefits of DPPs and policy recommendations 53
6.1 Overview 53
6.2 Implications for cost efficiencies 53
6.3 Implications for trade and entry barriers 54
6.4 Implications for increased transparency 55
6.5 Additional benefits identified in this study 55
6.6 The cost–benefit of DPPs 56
6.7 Policy recommendations 60

A1 Digital Battery Passport data fields 65

Figures and Tables

Figure 2.1 Schematic illustration of EU regulation concerning DPPs 9
Table 2.1 Overview of relevant sector legislation 11
Table 2.2 Digital Battery Passport data field requirements for each access group 12
Table 2.3 Detergents digital product passport data field requirements 13
Table 2.4 Toys digital product passport data field requirements 15
Figure 2.2 Selected EU policy landscape timeline 16
Figure 2.3 Summary of economic benefits of DPPs 19
Figure 3.1 Framework for assessing DPP costs 23
Table 4.1 Cost classification 26
Table 4.2 Illustrative external sourcing options 29
Table 4.3 Cost categories' economic significance and relevant determinants 30
Figure 4.1 Illustration of cost categories, and sector- and firm-level cost drivers 42
Figure 4.2 Factors affecting DPP compliance readiness 44
Table 6.1 Baseline stylised BCRs 58
Table 6.2 Guide to interpreting BCR estimates 58
Table 6.3 Scenario analysis of BCRs 60
Table 6.4: Policy recommendations per firm-sector profiles 63
Table A1.1 Digital Battery Passport data field requirements for each access group 65

Executive summary

In 2024, the European Union enacted the Ecodesign for Sustainable Products Regulation (ESPR), which requires nearly all products sold in the European Single Market to be accompanied by a Digital Product Passport (DPP), with requirements set to be phased in progressively across product categories over the coming years. This represents an ambitious step towards improving product transparency and sustainability. DPPs provide product-related information in a digital format, going beyond traditional labels by enabling dynamic updates and significantly expanding the amount of information available to users. As implementation deadlines approach, firms across sectors facing binding DPP requirements have been preparing for their introduction and assessing the changes needed to comply.

Against this backdrop, Amazon commissioned Oxera to assess the costs associated with enabling DPPs in the EU. This study builds on previous work undertaken by Oxera for Amazon, which examined the economic benefits of DPPs for firms, consumers, regulators, and the European Single Market. The aim of this study is to gain further understanding the structure and distribution of the costs of DPP implementation. This evidence will help regulators and firms to scope future DPP requirements and adopt them in a way that reaps the benefits of DPPs while minimising adoption costs.

DPPs are entering the implementation phase

Through the ESPR, the EU has established DPPs as a central component of its future product sustainability framework, with requirements for DPPs expected to be introduced across a wide range of sectors as the legislation develops. Beyond the ESPR, DPPs also feature in the EU's New Legislative Framework, which governs the functioning of the Single Market for goods, including areas such as market surveillance and conformity assessment.

The first mandatory DPP requirements will apply from 2027 in the battery sector, with implementation subsequently expanding to other product groups through sector-specific legislation. DPPs have the potential to transform how consumers, businesses and public authorities access and use product information by replacing static product information with richer, digitally accessible datasets. In doing so, they are expected to deliver improvements in transparency, sustainability, safety and regulatory compliance. However, the extent to which these benefits are realised will depend on implementation being proportionate, practical and achievable across a diverse range of firms and sectors.

Firm-level costs of DPP compliance

While previous Oxera work for Amazon examined the broader economic impacts and potential benefits of DPPs, this study focuses specifically on the costs associated with implementation and ongoing operation at the firm level. The analysis draws on a range of evidence sources, including stakeholder submissions

© Oxera 2026

to European Commission consultations, sector-specific materials produced through early DPP pilot projects and a programme of interviews with organisations actively engaged in DPP development and implementation. Interviewees included firms that will be subject to DPP requirements, DPP service providers offering a range of solutions from standardised platforms to bespoke systems and industry associations representing affected sectors.

Following a categorisation of all relevant DPP-related costs, the study identifies the main drivers of DPP implementation and operation costs, laying out how those costs vary across firms and sectors, and assesses the factors that may increase or reduce the burden of compliance.

The scale of the identified costs can be substantial and vary considerably. Among detergent manufacturers, for example, ongoing DPP management is estimated to require between 0.5 and 5 full-time equivalents per year, depending on firm size and the breadth of the product portfolio—illustrating how the same regulatory obligation can translate into very different resource commitments across firms.

Cost outcomes depend on sector and firm context and regulatory design

The findings indicate that DPP implementation costs vary substantially across sectors and firms. For different sectors facing DPP requirements, cost outcomes are influenced by pre-existing sector regulation, supply-chain length, product complexity, sector-level digital standardisation, and infrastructure sharing, as well as regulatory clarity and timing. At the firm level, even within the same sector, firms can face markedly different cost profiles depending on their digital readiness, internal data architecture, product identification practices, position in the value chain, size, product portfolio and implementation model.

In particular, small and medium-sized enterprises (SMEs) and firms with lower levels of digital maturity are likely to face relatively higher compliance costs. Fixed implementation costs can be more burdensome for smaller firms due to lower production volumes, while less digitally mature firms may need to undertake significant investments in digital capabilities to achieve compliance.

Mitigation options exist but are uneven across firms

A range of measures can help firms mitigate DPP implementation costs. These include the leveraging of existing digital systems, using third-party DPP solutions, collaborating through shared industry approaches, and implementing DPPs using automation, IoT and AI. Firms that are already digitally mature and have a clear understanding of how DPP requirements apply to their products are generally better placed to integrate DPPs into existing processes and avoid costly last-minute investments or sunk costs.

We find that the scope for cost mitigation varies across firms and sectors. At the sector level, the extent to which costs can be mitigated depends on wider enabling conditions, including regulatory clarity, the existence of interoperable

© Oxera 2026

standards, the maturity of service-provider offerings and the availability of shared sectoral infrastructure. However, even where these enabling conditions are in place, firms' ability to manage cost will depend on their own circumstances, including data provision (the process of preparing, formatting, and delivering data from source to users), process adaptation (the adjustment of systems and procedures to enable DPP creation), and ongoing governance (the monitoring and managing of the firm's compliance with mandatory DPP requirements). These factors taken together will play an important role in determining whether DPP implementation costs remains proportionate, particularly for SMEs and less digitally mature firms.

The extent to which DPPs deliver net benefits depends on how costs and benefits balance out

DPPs have the potential to deliver significant benefits, including improvements in product transparency, sustainability, regulatory compliance, and market surveillance, as well as some additional opportunities identified in this study. However, the exact nature and scale of these benefits remain uncertain and will depend on how DPPs are implemented and used in practice. In contrast, many of the costs associated with the implementation and compliance of DPPs are incurred upfront and before the expected benefits begin to materialise.

As a result, the overall value-for-money case for DPPs remains sensitive to how both costs and benefits will be realised in practice. On the cost side, outcomes depend on how mandatory requirements are specified by the authorities, the extent to which firms can leverage existing systems, and whether implementation costs fall disproportionately on particular sectors or firm types.

Using the Commission's own impact assessment on introducing DPPs for toys, we show that unexpected additional costs could critically undermine the benefit-cost ratio of DPPs. Our analysis of the Commission's underlying cost and benefit figures estimates a mid-point benefit-cost ratio of 1.6 for toy markets, placing it in the low-to-medium value-for-money range. As an illustration of the impact of DPP costs on SMEs, a 20% increase in variable costs would be sufficient to weaken that ratio materially, reducing it to 1.3—a relatively low value-for-money result. This demonstrates that managing implementation costs is an important lever in ensuring that DPPs ultimately deliver net benefits.

Policy considerations for the European Commission

Taking these findings together, several policy implications emerge for the European Commission as it continues the rollout of DPPs. Ensuring that the benefits of DPPs outweigh the costs will depend not only on the requirements themselves, but also on how they are designed and implemented. Key actions include the following.

© Oxera 2026

- **Proportionality**: Apply DPP requirements proportionately, reserving highly granular passports for product categories where they deliver clear regulatory value and avoid unnecessary complexity for lower-risk products.
- **Recognition of firm heterogeneity**: Reflect differences in firm size, digital maturity, and organisational readiness when designing implementation timelines and compliance requirements, helping to avoid disproportionate burdens on SMEs and less digitally mature firms.
- **Regulatory certainty**: Provide timely clarity on DPP requirements and implementation expectations, enabling firms to make efficient investment decisions and reducing the risk of costly redesigns or delayed implementation.
- **Standardisation and interoperability**: Promote common data standards and interoperable formats across sectors and supply chains, reducing the cost of collecting, exchanging, and integrating DPP-relevant information.
- **Cross-sector consistency**: Coordinate DPP requirements across product categories where possible, including through common core data schemes, to minimise duplication for firms operating across multiple regulatory regimes.

© Oxera 2026

Acknowledgements

We are grateful to the following individuals for participating in interviews and sharing their time, expertise, and insights in support of this study. Contributors are listed below in alphabetical order.

• Bernd Glassl	IKW
• Claire Fioretti	Michelin
• Ghislain Vathelot	Accentis
• Mariano Pineyrua Mailhos	TraceSurfer
• Dr. Rembrandt Koppelaar	Ecowise

We extend our sincere thanks to all those who contributed to the development of this study.

© Oxera 2026

1 Introduction

1 A Digital Product Passport (DPP) is a structured digital record that accompanies a product throughout its lifecycle, providing standardised information about its origin, composition, environmental impact, repairability, and end-of-life handling.

2 By scanning a physical data carrier, such as a QR code, NFC tag, or RFID identifier attached to a product, a user is directed to the product's DPP, typically through a web-based interface. The passport then provides access to relevant product information depending on the role and permissions of the user. The DPP thus functions as a bridge between the physical product and a structured digital information system. DPPs are emerging as an important element of the EU's product regulatory framework, reflecting wider policy objectives relating to sustainability, circularity, transparency, traceability, and product safety. In practice, DPPs are intended to improve the availability of product information across value chains and to support compliance, market surveillance, and enforcement. DPP requirements arise through two main channels: the Ecodesign for Sustainable Products Regulation (ESPR), via product-specific delegated acts, and sector-specific legislation establishing passport systems directly. The digital battery passport is currently the most advanced regulatory example, with detailed requirements already set out and mandatory application from February 2027.

3 Against this background, we assessed in a previous report the potential economic benefits of DPPs and found that they fall broadly into three categories: cost efficiencies, lower barriers to trade, and increased transparency.[1] These benefits may arise through a range of channels, including reduced reliance on physical labels, lower compliance and reporting burdens, more efficient market surveillance and customs processes, and better information flows across supply chains and secondary markets. Over time, these effects may support wider gains for firms, consumers, regulators, and the functioning of the EU Single Market.

4 As implementation deadlines for DPPs approach, industry and stakeholders have given more attention to implementation matters. Concerns have also emerged relating to the specific burdens of implementing DPPs and the potentially unequal cost distribution among firms that could arise. In light of these concerns, Amazon engaged Oxera to extend the earlier analysis by assessing the costs associated with enabling DPPs in the EU, with a particular focus on firm-level implementation and operational costs. This study considers the incremental costs of moving from current practice to DPP-compliant systems and processes, and identifies the main categories of cost, the factors driving variation across firms and sectors, and the areas in which implementation burdens are likely to be most significant. The

[1] Oxera (2025), 'The Economic Impacts of Digital Product Passports in the EU', report commissioned by Amazon.

© Oxera 2026

analysis is intentionally focused on firm-level effects and does not extend to a full economy-wide cost-benefit assessment.

5 The remainder of the report is structured as follows.

- Section 2 outlines the relevant DPP policy landscape.
- Section 3 sets out the framework used to assess costs.
- Section 4 presents the cost assessment, including cost categories, cost drivers, readiness factors, and available estimates.
- Section 5 considers cost mitigation strategies.
- Section 6 discusses the implications of these findings for the wider benefits and cost-effectiveness of DPPs and policy recommendations.

© Oxera 2026

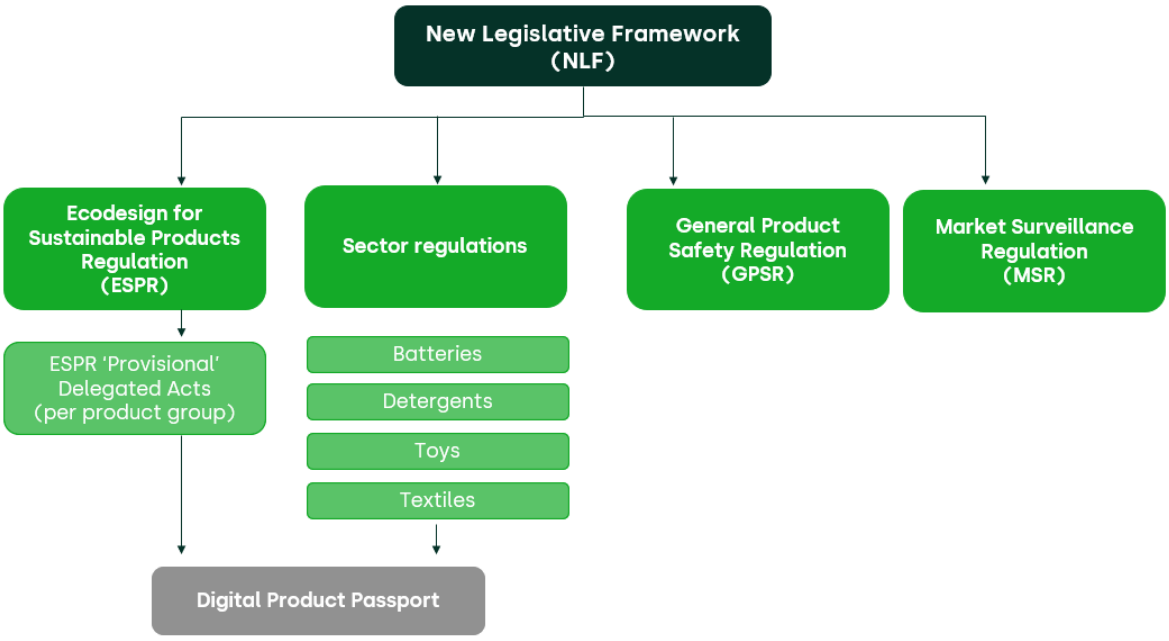
2 Overview of Digital Product Passport policies and their benefits

6 DPPs form part of a broader and evolving EU product regulatory framework aimed at improving sustainability, circularity, transparency and product safety. DPP requirements are being introduced through a layered regulatory landscape that combines horizontal and sector-specific legislation. This section outlines the main elements of that framework, focusing on the legislative pathways through which DPP requirements arise and the relationship between DPPs and wider EU product safety and market surveillance rules. We conclude this section with a summary of the benefits arising from DPPs as identified in our previous study. This re-cap provides the wider context of the potential gains that could be achieved through proportionate, practical and achievable implementation across impacted firms and sectors.

7 Figure 2.1 illustrates how DPP requirements emerge within the EU product regulatory framework and its surrounding context. The New Legislative Framework (NLF) provides an overarching structure, from which DPP obligations arise through two main pathways: (i) the ESPR, via product-specific delegated acts; and (ii) sector-specific legislation (for example, toys, detergents, and batteries), which may establish their own passport systems. The General Product Safety Regulation (GPSR) and the Market Surveillance Regulation (MSR) are closely related EU regulations. They do not create DPP obligations but provide product-safety requirements and enforcement mechanisms linked to DPPs.

© Oxera 2026

Figure 2.1 Schematic illustration of EU regulation concerning DPPs



Source: Oxera analysis.

8 The NLF was adopted as a package comprising Regulation (EC) No 765/2008 on accreditation and market surveillance and Decision No 768/2008/EC, which establishes a common framework for the marketing of products. Adopted in 2008 and subsequently reinforced, it aims to enhance the functioning of the internal market for goods and to strengthen the conditions under which a wide range of products may be placed on the EU market. It does so by improving market surveillance rules, establishing clear and transparent criteria for the accreditation of conformity assessment bodies, and increasing the quality and reliability of product conformity assessments. The NLF operates as a common 'toolbox' embedded across sector-specific legislation, contributing to greater coherence and reduced fragmentation in EU product rules.[2]

9 The NLF was subsequently amended by Regulation (EU) 2019/1020, the MSR. The MSR aims to strengthen market surveillance for products covered by EU harmonisation legislation safeguarding consumers, the environment, public security, and other public interests. It sets out rules and procedures for economic operators and establishes a framework for their cooperation with supervisory authorities, including controls on products entering the EU market. In practice, DPPs are expected to support the enforcement of the MSR by enabling authorities

[2] European Commission, 'New legislative framework - Internal Market, Industry, Entrepreneurship and SMEs', accessed 20 May 2026.

© Oxera 2026

to access structured product data more efficiently and by facilitating cross-border surveillance and control.[3]

10 The ESPR introduces the legal framework for DPPs as part of a broader sustainability regime. It sets out the architecture for DPPs, including principles such as lifecycle coverage, interoperability, and data accessibility. However, it does not define product-specific requirements. Instead, DPP obligations apply only where no equivalent system already exists under sector-specific legislation. The ESPR therefore functions as the primary horizontal instrument enabling DPPs across product groups.[4,5]

11 Delegated acts under the ESPR operationalise DPP requirements by defining product-specific rules. These acts are expected to specify the data fields, structure, access rights, and lifecycle requirements applicable to each product group (for example, textiles or electronics). They will constitute a direct source of binding DPP obligations for products not covered by sector-specific passport regimes. As of April 2026, no product-specific delegated acts establishing DPP requirements have yet been adopted, although the first such act, for iron and steel, is expected in 2026.[6] Further delegated acts are anticipated in 2027 and beyond.

12 The GPSR provides a horizontal safety framework that applies alongside ESPR and sector-specific legislation. It does not create DPP obligations but establishes general product-safety requirements, including obligations relating to risk management, traceability, and recalls. DPPs may support GPSR compliance by, for instance, improving access to product information, but GPSR operates independently and does not form part of the DPP rulemaking mechanism per se.[7]

13 Sector-specific legislation such as the Battery Regulation operates independently of ESPR and is establishing its own DPP-equivalent systems (e.g. the digital battery passport). These regulations take precedence over ESPR delegated acts where both could apply.

14 In practice, DPP requirements emerge either from ESPR delegated acts or directly from sectoral regulations.[8] Table 2.1 below presents a summary of the relevant sector legislation that has resulted in DPP requirements.

[3] Vice-President Séjourné on behalf of the European Commission (2026), European Commission response, March.
[4] European Commission, 'Ecodesign for Sustainable Products Regulation', accessed 20 May 2026.
[5] Commission notice (2025), 'Guidelines on the application of the EU general product safety legislative framework by businesses', November.
[6] Communication from the European Commission (2025), 'Ecodesign for Sustainable Products and Energy Labelling Working Plan 2025-2030', April, p. 4, section 2.2.
[7] Office for Product & Safety Standards (2025), 'Guidance EU Regulation 2023/988 on General Product Safety: detailed guidance', November, accessed 20 May 2026.
[8] Communication from the European Commission (2025), 'Ecodesign for Sustainable Products and Energy Labelling Working Plan 2025-2030', April, p. 3, section 1.3.

© Oxera 2026

Table 2.1 Overview of relevant sector legislation

Sector	Legal instrument	Status	Data fields	Mandatory from
Batteries[1]	Battery Regulation (EU) 2023/1542	Adopted July 2023	Data fields fully specified in regulation	February 2027
Detergents[2]	Detergents Regulation (EU) 2026/405	Adopted February 2026	High-level specification in regulation	Phased implementation until 2029
Toys[3]	Toys Regulation (EU) 2025/2509	Adopted December 2025	Partially specified	54-month transition period until August 2030
Textiles	ESPR textile delegated act	Pending	Not yet specified	NA

Source: [1] Regulation (EU) 2023/1542 of the European Parliament and of the Council, July 2023, Article 77 (Batteries Regulation) [2] Regulation EU 2026/405 of the European Parliament and of the Council, February 2026, p. 33 (Detergents Regulation) [3] Regulation (EU) 2025/2509 of the European Parliament and of the Council, November 2025, Article 59.

2.1 Batteries

15 The Digital Battery Passport (DBP), established under Regulation (EU) 2023/1542, represents the most advanced legislative framework for DPPs in the EU. The regulation was adopted in July 2023, and DBPs will become mandatory from February 2027, from which point producers of in-scope batteries will be required to generate and maintain a DBP.

16 As the most advanced of the sectoral DPP implementations, the DBP specification is also the most developed. It sets out a comprehensive range of data field requirements and operates across four distinct access tiers, reflecting the fact that different stakeholders require, and are entitled to, different levels of battery data. The access tiers are as follows.

- Public
- Persons with a legitimate interest
- Notified bodies, market surveillance authorities
- Persons with a legitimate interest and EU Commission

17 Each access group will be able to view different data fields on the DBP. An overview of the data field corresponding to each access group is presented in Table 2.2 below, with a more detailed version describing the data fields within each theme found in Annex A1:

© Oxera 2026

Table 2.2 Digital Battery Passport data field requirements for each access group

Access level	Theme
Public access	Battery identification and labelling
	Hazardous substance marking
	Material composition and sustainability
	Responsible sourcing and recycled content
	Technical performance and durability
	Compliance and waste management
Persons with legitimate interests	Detailed material composition
	Repairability and spare parts
	Dismantling information
	Safety
Notified bodies, market surveillance authorities	Compliance evidence
Persons with a legitimate interest and EU Commission	Performance and durability
	State of health
	Battery status

Source: Oxera analysis using information provided in Regulation (EU) 2023/1542 of the European Parliament and of the Council, July 2023, Article 77 (Batteries Regulation).

2.2 Detergents

18 The DPP for detergents and end-user surfactants is established under Regulation (EU) 2026/405, adopted in February 2026 and directly applicable across all Member States. The Regulation sets out the data field requirements for the detergents DPP, providing a defined list of information that must be included. An overview of these requirements is presented in Table 2.3 below.

19 The level of clarity regarding data field requirements for the detergents DPP is relatively limited, with the Regulation specifying a high-level set of mandatory fields that relate closely to ingredient disclosure requirements of existing legislation. This is presented in the table below.

© Oxera 2026

Table 2.3 Detergents digital product passport data field requirements

Theme	Data fields
Product identification	Trade name; unique product identifier; product image (packaging/label); commodity code; traceability identifier
Manufacturer and economic operator information	Manufacturer contact details (name, address, email, phone); importer or authorised representative details (where applicable); manufacturer unique operator identifier
DPP administration and compliance	DPP service provider reference (back-up copy); statement of manufacturer responsibility; declaration of compliance with the Regulation and other applicable EU legislation
Ingredient and substance composition	Full list of intentionally added substances (per CLP classification); relevant preservatives and micro-organisms (including identification and concentration); composition ranges for key ingredient groups (e.g. surfactants, phosphates, bleaching agents); fragrance allergens above threshold
Product characteristics	pH (or justification if unavailable); intended use; indication of professional/industrial use (where applicable); suitability for use in detergents (for standalone surfactants)

Source: Oxera analysis using information provided in Regulation EU 2026/405 of the European Parliament and of the Council, February 2026, pp. 41–42 (Detergents Regulation).

20 While these core requirements are specified, certain technical aspects remain to be defined. In particular, forthcoming implementing acts will determine the detailed technical specifications, including data formats, interoperability requirements, and the structure of data carriers. They are also expected to clarify timelines for specific requirements, such as biodegradability criteria that inform ingredient data, as well as rules on data access levels and governance.

2.3 Toys

21 The DPP for toys is established under Regulation (EU) 2025/2509 on toy safety, which repeals and replaces the existing Toy Safety Directive 2009/48/EC. The DPP requirements are set out directly in the Regulation and distinguish between mandatory core content and optional additional information. Following the commencement of the 54-month transition period, economic operators are expected to begin developing their DPP systems in advance of full compliance by August 2030.

22 The toys DPP primarily functions as a safety and conformity instrument. A central purpose is to provide a digital record demonstrating that a toy has undergone the

© Oxera 2026

applicable conformity assessment procedure and complies with the essential safety requirements set out in the Regulation, including those relating to chemical safety. In this way, the DPP effectively consolidates conformity and safety information into a structured digital format accessible throughout the product's lifecycle.

23 The Regulation specifies a set of mandatory data fields, which define the baseline obligations for economic operators and provide initial legal clarity on required disclosures. However, the detailed technical specifications governing the implementation of the DPP will be further developed through delegated acts adopted by the European Commission. These acts are expected to refine the operational requirements, including data formats, interoperability standards, and technical architecture.[9] A summary of the data field requirements set out in the Regulation is provided in Table 2.4 below.

[9] European Union (2024), 'EU's Digital Product Passport: Advancing transparency and sustainability', 27 September, accessed 21 May 2026.

© Oxera 2026

Table 2.4 Toys digital product passport data field requirements

Theme	Data field
Product identification	Unique product identifier; model reference (type number or group identifier); unique operator identifier; product image or visual identification
Manufacturer and economic operator information	Manufacturer details (name, trade name/trade mark, postal and electronic address); importer details (where applicable)
Compliance and conformity	Declaration of compliance with essential safety requirements (replacing the EU declaration of conformity); conformity assessment procedure applied; CE marking confirmation; applicable standards or common specifications; notified body details (where relevant)
Safety information	Warnings (including pictograms); age restrictions and suitability; instructions for use and safety information; substances of concern (where applicable)
Registry and traceability	Registration in the EU DPP registry; unique registration identifier; data carrier (e.g. QR code) linking the physical product to the digital passport

Source: Oxera analysis using information provided in Regulation (EU) 2025/2509 of the European Parliament and of the Council, November 2025, Annex VI.

2.4 Textiles

24 In its 2025–2030 ESPR work plan, the Commission identified apparel and textiles as a top-priority product group for DPPs.[10] As such, requirements for a textile DPP are expected to be established through a delegated act under the ESPR. This is planned for adoption in 2027, with a subsequent minimum 18-month transition period to follow. The precise data fields, thresholds and technical specifications for the textile DPP are therefore not yet legally defined.

25 Preparatory analytical work has been undertaken to inform the eventual delegated acts, most notably the ESPR Study on DPPs for the textile sector[11] and the Commission-mandated Textile Preparatory Study, published in December 2025 by the Joint Research Centre.[12] Together, these studies propose a phased

[10] European Commission (2025), 'Ecodesign for Sustainable Products and Energy Labelling Working Plan 2025-2030', 16 April, p. 3.
[11] European Parliament (2024), 'Digital product passport for the textile sector', June, p. 20.
[12] European Commission (2024), 'Preparatory study on textiles for product policy instruments'.

© Oxera 2026

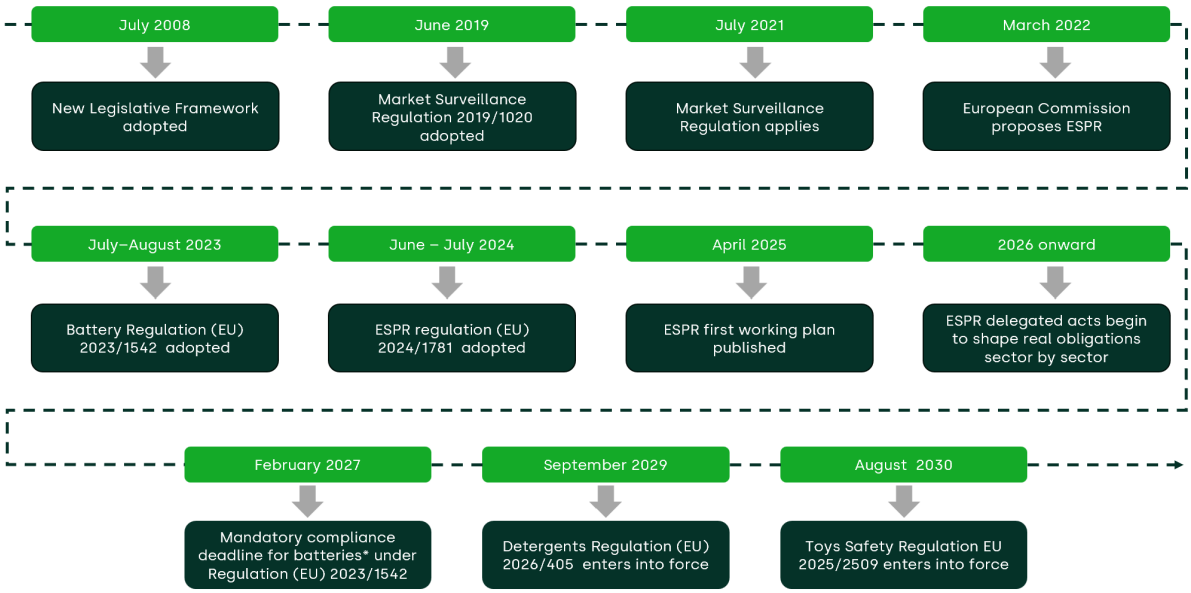
deployment approach in three stages: a 'minimal and simplified DPP' by 2027, an 'advanced DPP' by 2030, and a 'full circular DPP' by 2033.

26 The level of clarity regarding data field requirements for textiles remains limited. While preparatory studies provide an indication of likely requirements, and existing EU legislation, such as the Textile Labelling Regulation, already mandates certain disclosures (for example, fibre composition), these elements are expected to form only part of the DPP's foundation.

2.5 EU policy landscape timeline

27 Figure 2.2 below provides an overview of the indicative timelines associated with the EU policy landscape as well as the upcoming sectoral level DPP requirements.

Figure 2.2 Selected EU policy landscape timeline



Source: Oxera analysis. *DBP is mandatory from February 2027 for electric car batteries, industrial batteries > 2kWh and batteries for light vehicles.

28 As the policy landscape evolves, DPPs are likely to become closely integrated with the Responsible Person (RP) framework introduced under the GPSR and MSR. For consumer products within scope of the GPSR, an EU-established responsible economic operator must be identifiable. Depending on the supply-chain structure, this may be the EU-based manufacturer, importer, authorised representative or, in certain circumstances, a fulfilment service provider. The RP's role includes ensuring supporting compliance with applicable safety requirements, ensuring access to technical documentation, and acting as a contact for market surveillance authorities.

29 In practice, the DPP is expected to function as a key operational tool supporting the RP's obligations. DPPs will structure and centralise much of the underlying compliance and product information that the RP must be able to provide to authorities. This includes product identification data, conformity and safety information, and other relevant technical or lifecycle details, depending on the product sector.

2.6 Re-cap of the benefits arising from DPPs

30 Consumers and producers across in the EU will benefit from DPPs only to the extent that their overall economic benefits outweigh the associated costs.[13, 14] Assessing this balance requires a clear understanding of how benefits are expected to arise and which implementation costs and operational changes must be incurred before those benefits can be realised. In practice, this means that the economic case for DPPs is likely to depend not only on the scale of the benefits in principle, but also on whether the regulatory and technical design allows those benefits to emerge in a timely and proportionate way.

31 In our previous study, we identified three broad categories through which DPPs could generate benefits: cost efficiencies, reduced barriers to trade, and increased transparency. First, DPPs have the potential to create **cost efficiencies** by shifting information from static physical labels to digital systems, thereby reducing the need for repeated relabelling, repackaging and printing, particularly in sectors where packaging or product information changes frequently. They may also streamline compliance and reporting processes by allowing firms to manage information through a single digital system rather than maintaining multiple country-specific labels, while more standardised product data may improve supply-chain co-ordination, inventory management, customs processes, and market surveillance.

32 Second, DPPs may **reduce barriers to trade and entry** by helping to address fragmentation within the EU Single Market. A harmonised digital labelling framework could enable firms to comply with a common set of requirements through one system, reducing the need for country-specific product variants and lowering the complexity of operating across Member States. This is particularly significant for smaller firms and new entrants, which currently face disproportionately high administrative and compliance costs when seeking to expand into multiple markets: by providing the infrastructure to meet different national requirements through a single digital system, DPPs could simplify certification processes and make cross-border scaling more economically viable for firms that would otherwise lack the resources to maintain separate labels and packaging for each jurisdiction. DPPs may also mitigate frictions linked to

[13] Note that cost–benefit analysis in this context is typically an overall welfare assessment. Total welfare can increase, even if either consumer or producer welfare decreases.
[14] Consumers are likely to bear a substantial share of DPP-related costs, as firms operating in competitive markets are expected to pass (a large share of) these costs on through higher final prices. See Oxera (2018), 'Pass it on: the draft EU guidelines on pass-on and volume effects', *Agenda*, October.

© Oxera 2026

language differences and regulatory divergence by making information available in a more standardised and accessible form across jurisdictions—including by providing product information in multiple languages through the digital system itself, rather than requiring country-specific physical label variants.

33 Third, DPPs may **increase transparency** by improving access to detailed, up-to-date product information for consumers, firms and regulators. In principle, this can reduce information asymmetries, support more informed decision-making, strengthen consumer confidence in product quality and safety, and lower search and monitoring costs. Better access to product information may also support the development of secondary markets by making refurbishment, resale and recycling more viable, while broader transparency may contribute to stronger competition and innovation by making products easier to compare. EcoWise has suggested that DPP-enabled data mining can reduce repair-cost uncertainty for users by up to 80%, while DPP-based diagnosis can reduce repair costs by around 20%.[15] In the tyre sector, comparable systems may also deliver operational benefits by improving end-of-life sorting and reducing reliance on scarce specialist labour. More broadly, such systems may help to lower training burdens and reduce the physical intensity of sorting activities, thereby supporting the scalability of circular-economy operations.

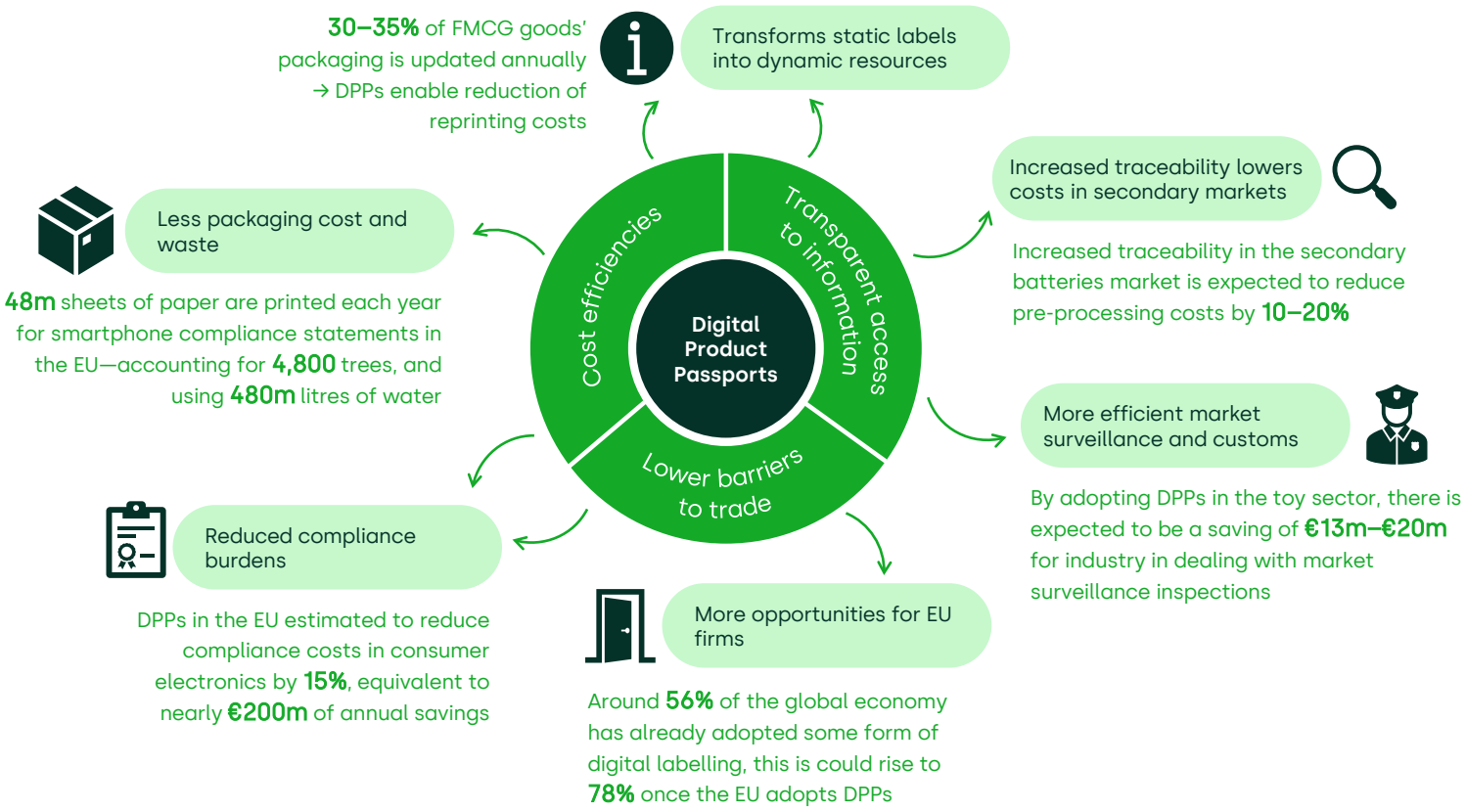
34 Figure 2.3 below summarises these three mechanisms and some of the impacts identified in our earlier report.

[15] Koppelaar, R. (2026), 'Advancing lifecycle intelligence: Operationalizing circular product management through digital product passports', conference presentation, World Digital Product Passport Conference, 27 March.

© Oxera 2026

Figure 2.3 Summary of economic benefits of DPPs

The introduction of DPPs has the potential to deliver significant benefits for firms, consumers and the wider EU single market, including...



Source: Oxera

© Oxera 2026

35 The interview and consultation evidence reviewed in this study has revealed further potential benefits of DPPs. We describe these in section 6, as part of our broader assessment of the overall benefits of DPPs.

© Oxera 2026

3 Framework for assessing Digital Product Passport costs

36 This section sets out the framework used to assess the costs associated with implementing DPPs, focusing on how these arise at the firm level and how they can be categorised and analysed in a consistent manner.

37 For the purposes of this study, costs are defined as expenditures incurred directly by firms, or indirectly through their supply chains, as a result of establishing and operating DPP systems. These include, for instance, investments in data infrastructure, process adaptation, and payments made to external providers where firms choose to outsource elements of DPP implementation or operation. The market for DPP service providers has been expanding and maturing in parallel with DPP legislation, with many providers active and typically focused on specific sectors (for example, textiles or electronics). However, the study does not separately assess the internal cost structures or operating costs incurred by DPP service providers themselves in developing and delivering these services. Nevertheless, DPP-as-a-service models may represent a viable implementation and cost mitigation strategy for firms of different sizes and levels of digital maturity. This is explored further in sections 4.3.7, 4.7.6 and 5.2.

38 As the cost assessment framework focuses on firm-level implementation and operational costs, it therefore excludes wider economic costs or disbenefits at the system level.[16] These may include, for example, demand-side impacts arising from uneven digital adoption across value chains and markets, changes in competitive dynamics between firms with differing levels of digital maturity, or broader market restructuring effects. While digital readiness is considered within this study as a factor influencing the costs faced by individual firms, the wider economy-wide consequences of differential adoption are outside the scope of the assessment. Such considerations are relevant in a full policy cost–benefit analysis examining economy-wide and distributional effects of DPP implementation.[17]

39 Costs are assessed relative to a counterfactual scenario representing the status quo ante. Under this baseline, firms are assumed to continue operating as they did prior to the introduction of formal DPP requirements. The incremental costs identified in this framework therefore reflect the additional effort needed to transition from current practices to DPP-compliant systems.

40 In practice, however, the counterfactual differs significantly across sectors and firms depending on their existing levels of digital maturity and product data

[16] For the purposes of this study, cost savings are treated as benefits, consistent with the approach taken in our previous study on benefits. Section 6.2 of this report further discusses the implications for such cost efficiencies.
[17] A full cost–benefit analysis requires granular quantitative evidence of both costs and benefits over the lifetime of the policy or relevant assets, and is a broader task than the cost assessment that is the focus of this report. We consider stylised cost–benefit implications of our cost assessment in section 6.

© Oxera 2026

management capabilities. At one end of the spectrum, some firms already operate relatively advanced digital product information systems, with structured product data, interoperable enterprise software, and established traceability processes. For these firms, DPP implementation may primarily require incremental adjustments, such as additional data fields, reporting functionality, or external interoperability measures. At the other end of the spectrum, firms with largely manual or fragmented record-keeping systems may require more substantial investment in data infrastructure, systems integration, process redesign, and staff capability development. Between these two extremes are firms that have partially digitised systems but may lack end-to-end interoperability or consistent supply-chain data exchange mechanisms. These differing baseline conditions are an important driver of the variation in implementation costs discussed later in section 4.7.

41 The scope of the analysis is intentionally high-level and primarily qualitative. Rather than undertaking a detailed bottom-up costing exercise for individual firms, the framework provides a structured overview of cost drivers, supported where possible by illustrative quantitative examples. These examples are drawn from existing literature and informed by stakeholder engagement. This approach allows for comparability across sectors while recognising the heterogeneity of firm structures and implementation pathways.

42 The framework is intended to primarily identify the main categories of costs associated with DPP implementation, the factors influencing these costs, and the areas where impacts are likely to vary most significantly across firms and sectors. As such, it is well suited to informing an understanding of implementation challenges, relative burden areas, and key cost sensitivities. However, a more granular quantitative assessment would be required to support detailed proportionality assessments of specific DPP requirements, for example, to determine whether particular data fields, reporting obligations, or interoperability requirements impose costs that are disproportionate to the policy benefits they deliver. Such analysis would typically require firm-level operational data, detailed process mapping, and sector-specific modelling of implementation pathways and compliance burdens.

43 In practical terms, the assessment of DPP costs draws on a combination of sources. These include publicly available research, policy and industry reports, consultation responses, and targeted stakeholder interviews with market participants. This evidence base enables triangulation of findings and helps ensure that the framework reflects both theoretical considerations and real-world implementation experiences.

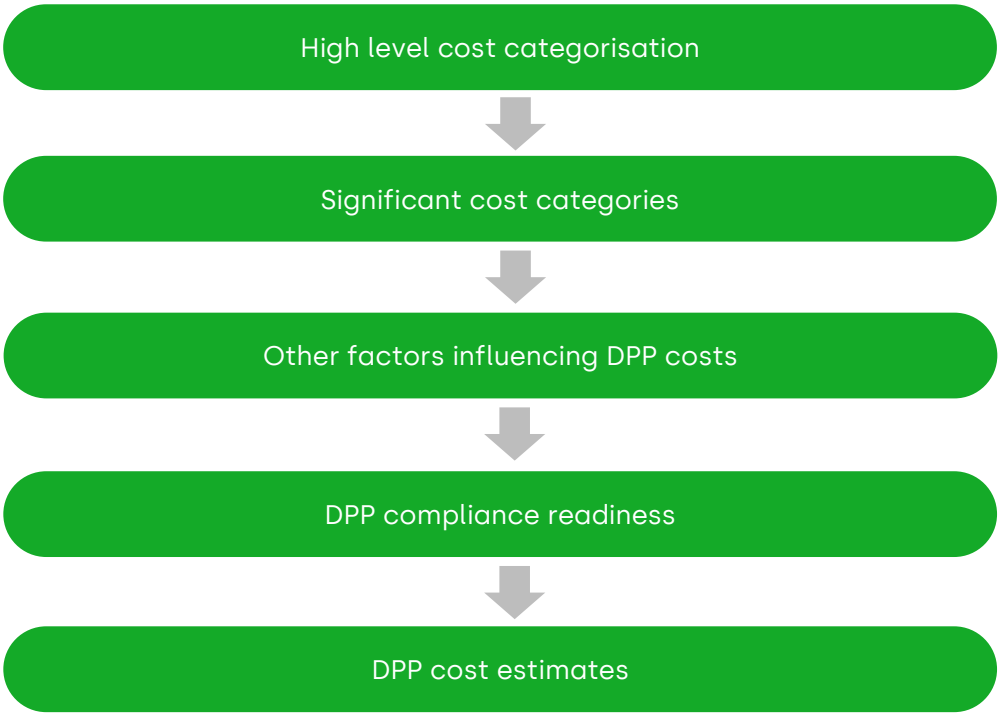
44 Costs in the context of DPPs arise to a large extent from the set-up and operation of the underlying information system and associated governance processes. A compliant DPP system requires firms to generate, structure, validate, store, and share product-related data across the value chain, often in interoperable formats. This typically involves integrating internal systems (for example, Product Lifecycle Management (PLM), Enterprise Resource Planning (ERP), compliance databases) with external interfaces that enable data exchange with business partners,

© Oxera 2026

authorities, and, where applicable, end users. Additional effort may be required to ensure data quality, maintain audit trails, manage access rights, and respond to regulatory requests such as inspections, recalls, or updates to product information over time.

45 With this context in mind, the approach to the cost assessment starts at a high level, by assessing the categories of cost (i.e. based on business processes/systems) needed to implement a DPP. At a broad level, the next step in our process is to understand the most significant cost categories that implementors face. We articulate these major costs via case study examples, to the extent available. The next step is to outline other factors that influence DPP implementation costs. A key factor is the firm/sector DPP readiness and so we examine this dimension further. Finally, we outline cost estimates for DPPs where these are available and credible. This framework is outlined below in Figure 3.1.

Figure 3.1 Framework for assessing DPP costs



Source: Oxera analysis.

46 Specific assumptions, definitions and data sources used to implement this framework are described in section 4.

4 Cost assessment

4.1 Overview

47 Understanding the structure of costs is key to a nuanced understanding of the overall benefit-cost ratio of a regulation. Sections 4.2 provides a taxonomy of DPP implementation costs in this context. Section 4.3 breaks down the most economically significant costs firms face, by business function and sourcing model.[18] Section 4.4 applies this framing to summarise DPP costs in the detergents sector. Even in a situation where there is a net-benefit, i.e. aggregate societal costs are outweighed by benefits, understanding heterogeneities in the structure and distribution of costs will help regulators and firms maximise the benefits of DPPs. A significant part of the assessment (sections 4.5 and 4.6) deals with this question of distributional differences in costs to firms of DPPs. Section 4.7 provides an overview of available quantitative cost estimates.

4.2 Cost categorisation

48 For the purposes of this study, DPP-related costs are classified along two complementary dimensions: sourcing model (internal versus external provision) and a combined dimension capturing both business function (i.e. the business activities involved, such as DPP operations) and cost nature (i.e. the underlying composition of costs, such as personnel).

49 Within this framework, the analysis also considers cost scaling dynamics, distinguishing between fixed and variable costs and, for the latter, how they scale. Variable costs may scale with production volume, production batches, stock keeping units (SKUs), or a combination thereof, as well as the smallest level required by DPP regulation ('DPP unit' or 'DPP-U'). This unit corresponds to the level at which sector-specific regulation requires data provision, which may, for example, be defined at the batch-SKU level for certain product categories, or at the SKU level in others.

50 Combining insights from industry interviews with Oxera's industrial expertise and findings from the CIRPASS project[19] yields a high-level overview of qualitative cost elements for firms subject to DPP obligations, as presented in Table 4.1. The table compares relevant cost components under an internal sourcing model (left) and an external sourcing model (right), and outlines how each of these scales. Costs that must be incurred are marked via 'X', costs that are optional are marked with 'O', costs that are only partially incurred in an external sourcing model compared to internal sourcing are marked with 'P', and costs that are not incurred internally are marked with '-'. In practice, external sourcing arrangements typically reduce or share certain fixed technical and infrastructure costs, but do not eliminate the

[18] Sourcing model refers to how a DPP is established. This can either be achieved internally (i.e. in-house) or externally (i.e. via a third-party).
[19] CIRPASS (2024), 'A study on DPP costs and benefits for SMEs'.

© Oxera 2026

need for firm-level investment in areas such as data provision, internal governance, process adaptation, and compliance oversight. The table should therefore be interpreted as illustrating how sourcing models affect the allocation of costs, rather than whether costs disappear entirely.

© Oxera 2026

Table 4.1 Cost classification

Functional cost component	Internal sourcing	External sourcing	Scale factors
Labelling			
Software	X	O	Fixed
Hardware	X	O	Fixed
Creation and updating	X	X	DPP-U
Integration with production	X	X	Fixed
Physical data carriers	X	X	Production volume
DPP development			
DPP software development	X	-	Fixed
Software licences	O	-	Fixed
Additional software modules (e.g. ERP, PLM)	O	O	Fixed per module
DPP software maintenance	X	-	Fixed
Hardware	X	-	Fixed
DPP operation			
Cloud hosting services	X	-	DPP-U
Purchase of product identifiers	X	-	DPP-U
Maintenance	X	-	Fixed
Updating	X	P	DPP-U
(Long-term) data retention	X	-	DPP-U
Security and access management	X	-	Fixed
Authority access administration	X	-	Fixed
Helpdesk	-	X	Fixed
Data collection, integration, and certification			
Internal collection and integration	X	X	DPP-U
External collection and integration	X	P	DPP-U, ingredients/suppliers
Translation of documentation	X	P	DPP-U
(Third-party) data certification	X	P	DPP-U
Processes and personnel			
Project management	X	P	Fixed
Personnel training	X	P	Fixed, DPP-U
Compliance monitoring	X	P	Fixed, DPP-U
Third-party consulting	O	O	Fixed

© Oxera 2026

Source: Oxera illustration, based on interviews, CIRPASS evidence and European Commission DPP consultation responses.
Note: The categorisation reflects our understanding of DPPs overall, rather than a sector-specific or firm-specific ability to externally source or scale costs. External sourcing costs refer to whether the cost is directly incurred by an undertaking using third-party DPP provision. DPP service provider charges would likely reflect the cost incurred by the DPP provider in conducting these activities.

51 Labelling costs cover everything required to physically attach a DPP-compliant data carrier to a product and to keep the information it points to current. This includes the software used to generate and manage label content, the hardware involved in printing or embedding data carriers on the production line, and the ongoing effort to create and update labels as products change. Where DPP systems must be connected to existing manufacturing or packaging lines, integration costs also fall under this category. In essence, labelling represents the physical interface between the digital product passport and the product itself.

52 DPP development costs encompass the investment required to design and build the software infrastructure that will create, store, and serve DDPs. For companies building their own solution, this includes software development, the procurement of any necessary licences, the integration or extension of existing enterprise systems such as ERP, PLM, or MES platforms, and the hardware needed to support the solution. These are primarily one-off or upfront costs, incurred before the system goes live, and their extent is determined largely by the complexity of the technical environment into which the DPP must be integrated.

53 Once a DPP system is live, a distinct set of recurring costs arises to keep it running reliably and compliantly over time. These include cloud hosting for the DPP database, the purchase of unique product identifiers, routine maintenance and data updating, long-term data retention in line with regulatory requirements, and the security and access management infrastructure needed to control who can read or write DPP data. This category also covers the administrative function of granting access to market surveillance authorities and managing helpdesk support for users of the system. Operational costs are ongoing by nature and persist for as long as the product and its passport remain active.[20]

54 Data collection, integration, and certification covers the cost of assembling the product information that actually populates a DPP, integrating it into the DPP system, and—where required—having it certified. Data collection involves gathering the relevant attributes of a product, which may include material composition, environmental performance metrics, substance information, and supply-chain provenance data, from internal systems and from suppliers across the value chain. Integration refers to the technical work of combining data from different sources—often previously held in separate systems—into a single, machine-readable DPP format. Certification encompasses any (third-party)

[20] For instance, interviewees suggest that DPPs have to be stored for up to ten years after creation, incurring back-up costs for that entire time period.

© Oxera 2026

verification of the data itself or of the DPP solution, providing assurance that the information it contains is accurate and trustworthy.

55 Beyond the technical infrastructure and its operation, DPP implementation requires a sustained organisational effort that generates its own costs. Process and personnel costs cover the project management needed to coordinate implementation across internal teams and external partners, the training of staff in new processes and systems, ongoing compliance monitoring to ensure the DPP remains accurate and up to date as products and regulations evolve, and any third-party consulting engaged to support the process. These costs reflect the human and organisational investment required to embed DPP management as a functioning part of a company's operations, rather than treating it as a one-off technical exercise.

56 Finally, as illustrated in Table 4.1 above, internal sourcing models are characterised by a relatively high share of fixed costs, particularly in system development, integration, and capability building. This can lead to duplication of similar investments across firms, especially within the same sector. External sourcing models, by contrast, allow for a degree of cost sharing, as service providers can develop functionalities and spread the corresponding fixed costs across multiple clients. This is particularly relevant for DPP development, system operation, and specialised activities such as data validation or certification.

57 To reflect the varying degrees of external sourcing associated with DPP implementation, Table 4.2 below presents an illustrative range of sourcing approaches for the relevant cost components. Ordered from least to most externally intensive, these scenarios provide a high-level overview of how firms subject to DPP requirements may rely on third-party providers when implementing and operating DPP systems. The indicators 'X', 'O', 'P', and '-' follow the same structure as in Table 4.1. Costs related to labelling, DPP development, and DPP operation are generally incurred in the same way across all sourcing intensity scenarios.

© Oxera 2026

Table 4.2 Illustrative external sourcing options

Functional cost component	External sourcing Intensity of external sourcing Low → High (1) Mere DPP operation	(2) DPP operation and external data collection support	(3) Full outsourcing
Data collection, integration, and certification			
Internal collection and integration	X	X	P
External collection and integration	X	-	-
Translation of documentation	X	X	-
(Third-party) data certification	X	-	-
Processes and personnel			
Project management	X	X	-
Personnel training	X	X	P
Compliance monitoring	X	X	-
Third-party consulting	O	O	O

Source: Oxera illustration based on interviews
Note: Costs that must be incurred are marked via 'X', costs that are optional are marked with 'O', costs that are only partially incurred in an external sourcing model compared to internal sourcing are marked with 'P', and costs that are not incurred internally are marked with '-'.

58 Our analysis indicates that a significant proportion of DPP-related costs remain inherently firm-specific regardless of sourcing model. Firms typically retain responsibility for generating and maintaining product data, adapting internal business processes, ensuring the quality and accuracy of information submitted to the DPP system, managing supplier engagement, and overseeing regulatory compliance. As a result, external sourcing often changes the composition and concentration of costs rather than eliminating them entirely. In many cases,

© Oxera 2026

outsourcing reduced upfront technical investment while leaving substantial operational and organisational costs at the firm level.

59 This distinction is important when assessing the proportionality of DPP requirements across different firm profiles. Cost-sharing opportunities are greatest where common technical infrastructure or standardised services can be used across firms and sectors. Conversely, requirements that depend heavily on firm-specific data collection, process redesign, or ongoing data maintenance are less susceptible to economies of scale and may therefore impose proportionately higher burdens on firms with lower levels of digital maturity or smaller compliance functions.

4.3 Economic significance of cost categories and relevant variations

60 Table 4.3 below lays out the general significance of each of the identified cost categories above and shows the most significant cost drivers for each of these cost categories.

Table 4.3 Cost categories' economic significance and relevant determinants

Cost category	General economic significance	Most significant determinants
Labelling	Low (highly variable)	• DPP granularity relative to existing labelling practice
DPP development	High for in-house solutions, low for delegated models	• Pre-existing IT infrastructure
DPP operation	Low to medium (recurring)	• Size of product portfolio • Required data retention period
Data collection, integration, and certification	High (highly variable)	• Pre-existing regulatory requirements • Supply-chain depth and digitalisation
Processes and personnel	Medium	• Scale and complexity of implementation • Supply-chain depth and digitalisation
External DPP service provision	Low (highly variable)	• Efforts incurred in-house • Data complexity

Source: Oxera analysis.
Note: These are high-level cost characterisations. Further sector- and firm-level heterogeneity is detailed in the case studies (section 4.4) and the cost driver assessment (section 4.7).

© Oxera 2026

4.3.2 Labelling

61 Labelling costs are generally modest, though they are among the most variable across firms. The key determinant is the extent to which DPP requirements alter a company's existing labelling practice. Where no physical change is required beyond adding a data carrier to an existing label, the incremental cost is negligible. Where DPP obligations impose a finer level of product identification than a firm currently operates, however, reconfiguration of production or packaging lines becomes necessary, and costs rise substantially. Labelling costs are therefore best understood as a spectrum: low for the majority of firms, but potentially significant for those whose existing practice diverges from DPP requirements requiring a change in the production line.

4.3.3 DPP development

62 DPP development represents the most significant upfront cost of DPP implementation for firms pursuing an in-house solution, and the sharpest point of divergence between sourcing models. The primary determinant is the nature of a firm's pre-existing IT infrastructure: flexible, well-integrated systems reduce the cost of achieving the necessary integrations, while rigid, fragmented or legacy environments increase it considerably. For firms opting for external provision, upfront development costs are substantially reduced, though they are replaced by recurring service fees. In both cases, development costs are largely fixed in nature—incurred once at implementation and largely independent of product volume or portfolio size thereafter.

4.3.4 DPP operation (cloud hosting, product identifiers, maintenance, back-up)

63 Operational costs are individually modest: they arise for all firms subject to DPP obligations, regardless of sourcing model, and persist for as long as a product and its passport remain active. Their aggregate significance therefore depends primarily on the size of a firm's product portfolio and the duration of applicable data retention requirements. While no single operational cost item is likely to be material in isolation, the cumulative burden across hosting, identifiers, maintenance, security, and access management warrants consideration, particularly for firms with large and diverse product ranges.

4.3.5 Data collection, integration, and certification

64 This category represents the dominant cost of DPP compliance for most firms and is the most variable across sectors and companies. Its economic significance is determined principally by three factors: the breadth of data required under applicable regulation, the depth and digitalisation level of the supply chain from which that data must be sourced, and the granularity at which it must be maintained and updated. Where firms face new data requirements with no existing collection infrastructure, and where supply chains are long, fragmented, or poorly digitalised, costs in this category can be substantial. Conversely, firms operating

© Oxera 2026

in sectors with established data-sharing infrastructure or pre-existing regulatory reporting obligations face a materially lower incremental burden.

4.3.6 Processes and personnel

65 Process and personnel costs are of moderate economic significance. Their magnitude depends on the scale and organisational complexity of the implementation—including the number of internal functions and external partners involved—and on the firm's existing digital maturity. Where internal capability is limited, dependency on external consulting increases costs further. Unlike most other categories, these costs have a strong recurring component: compliance monitoring and data governance require ongoing attention as products, data requirements, and the regulatory environment evolve, meaning the personnel burden does not cease once initial implementation is complete.

4.3.7 External DPP service provision

66 Evidence from stakeholder interviews suggests that the costs of procuring external DPP services are, at this stage of market development, relatively modest and predominantly recurring in nature.[21] DPP-as-a-service models—where a client pays an external provider to host and manage its DPP infrastructure on an ongoing basis—represent the primary recurring cost item.

67 It is important to note that the DPP service market remains nascent and not at scale as providers currently operating are generally still small. Pricing therefore reflects an early-stage market, and interviewees broadly expect the cost of external DPP service provision to fall over time as the market matures and clients' underlying IT systems are established. Overall, the external service-provision component of DPP costs appears secondary in significance to the broader implementation costs laid out above.

68 However, consulting engagements for DPP implementation and strategy represent a separate, typically one-off, category of external service cost, as depicted in Table 4.2 under the full outsourcing column. These engagements can be considerable, with costs varying significantly according to project scope.

4.4 Detergent case study

69 To better understand the practical implications of DPP requirements in the detergent sector, Oxera conducted an interview with the head of the detergent division at IKW (the German Cosmetic, Toiletry, Perfumery and Detergent Association). IKW represents more than 470 small, medium-sized, and large companies in the beauty care and home care sectors, approximately 130 of which

[21] Note in Table 4.1 above that important costs relating to data collection, labelling and updating typically remain with the producer, even with the DPP-as-a-service model.

© Oxera 2026

produce detergents.[22] This case study summarises the key insights from that engagement, focusing on the nature of requirements, the main cost drivers, and areas of uncertainty affecting implementation.

4.4.1 The DPP requirements

70 The DPP requirements for detergents are comparatively limited in scope. The data fields required are relatively simple and do not involve the complex, multi-layered access structures observed in other product categories such as batteries (see section 2.1). In addition, the regulatory approach for detergents is broadly aligned with pre-existing obligations that already require firms to disclose key product information, such as ingredient composition and safety-related data. As a result, the incremental burden associated with data collection is generally low, and implementation efforts are more focused on structuring, formatting, and maintaining this information within a DPP-compatible system rather than generating entirely new datasets. The main implementation effort is expected to involve updating data-carriers on pack in the event of changes to the detergents' composition, for example where ingredients are temporarily not available and must be substituted by other ingredients that are chemically very similar but have another chemical name.

4.4.2 Main costs

71 **Staffing.** Ongoing DPP management in the detergent sector requires dedicated personnel, representing a recurring cost that persists beyond initial implementation. IKW's cost study estimates staffing needs in the range of 0.5 to 5 full-time equivalents (FTEs) per year, depending primarily on firm size and the breadth and complexity of the product portfolio. Smaller firms with limited product ranges tend to operate at the lower end of this range, while larger manufacturers with extensive SKU portfolios and frequent product updates require more substantial staffing capacity.

72 **Internal processes and IT.** The cost of adapting internal processes and IT systems to DPP requirements varies significantly across firms and depends on the maturity and flexibility of existing systems. Companies operating integrated enterprise platforms that already support structured product data management may be able to incorporate DPP requirements with relatively limited incremental investment, particularly where modular extensions or existing functionalities can be leveraged. For the moment, costs are still unclear for data service providers who will be required to store back-up copies of each DPP for ten years after the detergents are placed on the market.

[22] For the purposes of this study, we define small and medium-sized enterprises (SMEs) in accordance with the European Commission definition. In the EU, an SME is an enterprise with fewer than 250 employees and either annual turnover not exceeding €50 million or an annual balance sheet total not exceeding €43 million. Anything above that threshold we consider 'large'. Companies exceeding these thresholds are classified as large enterprises for the purposes of this report.

© Oxera 2026

4.4.3 Most significant ambiguities and concerns in the industry

73 **Formulation volatility.** The primary source of cost uncertainty in the detergent sector relates to formulation volatility. Detergent formulations are frequently adjusted in response to supply chain conditions, particularly where specific ingredients become temporarily unavailable and must be substituted with functionally equivalent alternatives. Such substitutions may involve changes in chemical identifiers (such as International Nomenclature of Cosmetic Ingredients (INCI) names), which must be reflected in the DPP. A key unresolved regulatory question is whether such changes require the creation of a new DPP or can be managed as updates to an existing passport. If a new DPP is required, firms may need to generate and apply new data carriers (for example, QR codes) to packaging each time a formulation changes, potentially rendering existing packaging stock obsolete or necessitating investment in on-line printing solutions. By contrast, an update-based approach would allow firms to design systems around more streamlined data maintenance workflows.

74 Given the frequency of formulation changes in practice, uncertainty on this point materially affects firms' implementation strategies and investment decisions. Industry feedback suggests that some firms are reluctant to commit to specific DPP architectures or labelling approaches until greater regulatory clarity is provided, as investing in systems optimised for one interpretation may require costly redesign if the regulatory approach ultimately differs. In this sense, regulatory ambiguity does not merely create uncertainty around future costs; it can directly incentivise delayed investment and 'wait-and-see' behaviour as a rational cost-minimisation strategy.

75 **Mandatory product photograph.** A second area of uncertainty concerns the requirement to include a photograph of the product's packaging label within the DPP. Existing product data systems in the detergent sector are typically designed to handle structured data rather than image files, requiring the development of additional technical solutions to link visual assets with product records. The cost impact of this requirement depends on the degree of automation achievable. Where image integration can be automated within existing workflows, incremental costs remain limited. However, where manual processes are required, ongoing personnel costs may increase significantly. A related ambiguity concerns whether minor visual changes to packaging, such as adjustments in colour or typography, trigger the need for a new DPP or can be accommodated through updates. The absence of clear guidance on this point introduces further uncertainty into cost projections.

76 **Concerns about regulatory ambiguities.** A further source of concern for the detergent industry relates not to the current regulatory text but to its potential evolution. The Detergents Regulation grants the Commission the power to extend or modify requirements through delegating acts, and industry representatives have flagged this as a meaningful source of forward-looking uncertainty. The practical implication is that firms investing in DPP infrastructure today cannot be confident that current requirements represent a stable end-state: additional data fields, more granular disclosure obligations, or revised access arrangements may

© Oxera 2026

be introduced in subsequent acts, potentially requiring further system adaptation and labelling changes.

4.4.4 Alleviating factors

77 **Pre-existing documentation requirements.** Compared with many other sectors, detergent manufacturers benefit from established regulatory frameworks that already require the disclosure of key product information, particularly regarding ingredient composition. As a result, supplier data collection is not a major incremental cost driver in this sector. The necessary data is largely already available, and firms have existing processes for managing and publishing it. More broadly, this pre-existing documentation infrastructure provides a strong foundation for DPP implementation. Rather than building data systems and disclosure practices from the ground up, firms can adapt and extend current capabilities. This reduces both the scale and complexity of implementation relative to sectors where structured product data is not routinely collected or shared. Consequently, in the detergent sector, the cost of DPP compliance is driven primarily by internal process adjustments, IT system adaptation, and ongoing data maintenance, and the data carrier on pack rather than by the upstream challenge of obtaining new information from suppliers.

4.5 Significant cost drivers in implementing DPP requirements

78 Based on the detergent case study above, additional interviews with DPP service providers, and our review of consultation documents, we have identified sector- and firm-level factors that are likely to influence the costs. We discuss each dimension in turn.

4.5.1 Sector level

79 The significance of DPP implementation costs varies materially across sectors because sectors differ in their regulatory starting point, supply-chain structure, product complexity, data maturity, and exposure to circular-economy use cases. As a result, the same nominal DPP obligation can imply very different cost burdens across industries, even before firm-specific characteristics are considered. In practice, sector-level heterogeneities matter because they determine the level of effort required to comply with relevant DPP obligations. Higher compliance efforts generally translate into higher costs across the five cost categories considered in this study, as presented in Table 4.1: labelling, DPP development, DPP operation, data collection/integration/certification, and processes and personnel. The determinants of these sector-level heterogeneities are discussed below.

Pre-existing sector regulation and adjacent disclosure requirements

80 Where sectors already operate under established sustainability, traceability, or product-information obligations, the incremental cost of DPP compliance is lower because some of the necessary data or governance routines already exist. For example, one consultation respondent queried whether a DPP would be required

© Oxera 2026

for a relevant product that contains a lighting component, where that sector is already covered by eco-design, sustainability, and labelling regulation.[23] While this suggests that much of the relevant data may already be captured under existing obligations, it does raise the concern relating to the duplication of processes.

81 By contrast, in sectors where DPP obligations are genuinely novel, firms face more of a greenfield exercise, requiring investment in new systems, workflows, and staff capabilities. For instance, consultation evidence for textiles suggests that DPPs will largely be a new territory for the sector, whereas in other areas existing disclosure or commercial practices already provide a partial foundation for DPP-related compliance activities.

Supply-chain length, fragmentation, and transparency

82 Sectors with long, multi-tier, globally dispersed supply chains face structurally higher costs because data must be gathered from a larger number of upstream actors, often with uneven digital capabilities and weak traceability practices. Textile and fashion supply chains are a clear example: products typically comprise multiple materials and components sourced through global, multi-stage chains, creating a very large number of underlying data points and verification steps. This raises costs not only for data collection and integration, but also for internal coordination and supplier engagement. By contrast, sectors with shorter and more concentrated supply chains, such as steel, generally face lower traceability and coordination costs.

Product complexity and the number, type, and dynamism of required data points

83 Products with complex bills of materials, embedded chemical information, or demanding environmental accounting requirements impose higher costs because firms must collect, structure, and maintain more extensive datasets. For instance, electronics products are particularly data-intensive given their component complexity and lifecycle information requirements, while textiles may involve lower technical product complexity (but still substantial data burdens because of material diversity and supply-chain fragmentation). In formulation-intensive sectors, such as detergents, the issue is not merely the number of data fields but also their volatility: relatively small changes in ingredients or product specifications may trigger repeated DPP updates, with implications for both operating costs and, potentially, labelling costs where QR codes or passport identifiers need to be changed.

84 Where complex products or a large variety of disparate SKUs need to be covered, a pareto-type distribution of costs could emerge, where the most significant

[23] Syndicat du Luminaire (2026), 'Stakeholder response to public consultation on Digital Product Passport – rules for service providers,' Consultation response, 20 May.

© Oxera 2026

source of costs arise from a small number of sources or data fields. One respondent illustrated this point by stating that:

'... the most difficult use case is for a limited number (~5%) of economical viable activities but will be ~80% of the cost'[24]

Sector-level digital standardisation and shared infrastructure

85 Some sectors already have common data models, standardised product information systems, or industry-wide data-sharing arrangements that can be repurposed for DPP implementation, such as GS1 standards in retail and consumer goods, the Catena-X data ecosystem in automotive, and the European Product Registry for Energy Labelling (EPREL) for energy-related products. Where such infrastructure exists, DPP development costs are generally lower because firms do not need to resolve basic questions of taxonomy, identifiers, or interoperability from scratch, assuming that (future) regulations will be streamlined with existing systems and standards. The tyre and electronics sectors have been cited as examples where pre-existing sector standards may reduce implementation friction. Conversely, in sectors lacking shared digital governance, firms and service providers must incur higher upfront costs to establish compatible formats, data flows, and interfaces, such as in parts of the textiles supply chain where no common data infrastructure exists and businesses will likely need to develop solutions independently.

86 Closely related is cross-sector and cross-border interoperability. In globally integrated sectors, costs rise where firms must respond to multiple data formats, channels, and standards across different customers, service providers, and jurisdictions. Consultation responses stress the need for unified information flows and standardised formats precisely because fragmented information requests would otherwise create avoidable duplication, administrative burden, and market disruption.[25] This issue is particularly significant for non-EU businesses providing inputs to many firms across several sectors.

Regulatory clarity, timing, and sequencing at the sector level

87 Costs tend to be higher where implementing acts, technical standards, or compliance pathways remain uncertain, because firms cannot scope investments efficiently and may either delay preparation or invest in solutions that later require reworking. Evidence from interviews suggested that sectors facing unclear ESPR requirements have often adopted a 'wait-and-see' stance, whereas sectors with clearer regulatory timelines are better able to plan phased implementation.

[24] icecat N.V. (2026), 'Stakeholder response to public consultation on Digital Product Passport – rules for service providers', Consultation response, 20 May.
[25] European Commission Consultation responses from RE&UP Technologies Holding B.V., Minespider GmbH, Ministry of the Economy of Luxembourg, and Norsk Byggtjeneste AS.

© Oxera 2026

Uncertainty therefore acts as a cost amplifier, not only because it delays action, but because it increases the risk of duplication and misaligned investment.

88 This point on regulatory clarity, timing and incentives is also reflected in the responses to the consultation, where one respondent noted:

> 'From our experience working with various industry sectors, the feedback regarding DPP implementation is clear: companies recognize significant business value in adopting DPPs, provided that the requirements set in the delegated acts are scalable and allow sufficient freedom for market development. The Commission should ensure that it does not mandate, for example, specific technologies or impose too restrictive requirements early on. Such mandates could limit how economic operators and DPP service providers implement the ESPR and related delegated acts.'[26]

Baseline supplier digitisation and data reliability

89 In some sectors, especially those characterised by fragmented supplier bases and lower digital maturity, firms cannot rely on automated data transfer or consistent digital records. Interview and consultation response materials indicate that data often still arrive in non-standardised formats (such as spreadsheets or PDF and Word documents), that existing IT tools are difficult to integrate, and that firms frequently regard supplier data as incomplete, unreliable, or hard to verify.[27] In these sectors, the dominant cost driver is not necessarily the technical passport itself, but the manual effort required to discover, cleanse, validate, and maintain the underlying data.

Degree of circular-economy intensity and end-of-life complexity

90 Where products are commonly repaired, refurbished, resold, remanufactured, or recycled, DPPs must function across multiple lifecycle stages rather than only at the point of first (and last) sale. This materially increases operating complexity because information may need to be updated, retained, transferred, or reinterpreted as products change hands or are reconditioned. Consultation evidence indicates that the most complex circular use cases may account for a disproportionate share of total DPP cost, even if they apply to a relatively small share of products or transactions. [28] Waste management and recycling stakeholders also point to the risk that overly burdensome reporting obligations could impose substantial new costs while offering limited operational value.[29]

[26] IOXIO (2026), 'Stakeholder response to public consultation on Digital Product Passport – rules for service providers', Consultation response, 20 May.
[27] See, for instance, European Commission Consultation responses from Horizon 2020 TRICK Project and Real Capital Systems.
[28] icecat N.V. (2026), 'Stakeholder response to public consultation on Digital Product Passport – rules for service providers', Consultation response, 20 May.
[29] European Battery Recycling Association (2020), 'Stakeholder response to public consultation on Batteries – modernizing EU rules', Consultation response, 9 July.

© Oxera 2026

Geographic organisation of production and the sector's exposure to non-EU suppliers

91 Sectors with high import dependence or globally distributed production networks face higher compliance costs because DPP requirements imposed in the EU must be translated into operational practices across jurisdictions with different levels of capability, institutional support, and regulatory familiarity. Consultation responses highlight that importers may become responsible for compliance for products, components, and intermediary goods sourced globally, thereby extending the DPP cost burden beyond EU-based firms and increasing the complexity of supplier onboarding, data assurance, and accountability allocation.

Confidentiality, access rights, and data ownership

92 The cost significance of DPP implementation is likely to be higher in sectors where the required information is commercially sensitive. This is particularly relevant where product composition, sourcing relationships, process data, or compliance documentation are regarded as proprietary and cannot simply be made broadly visible across the value chain. In such sectors, DPP implementation may require more complex governance arrangements, including differentiated access rights, stricter authentication and verification mechanisms, contractual safeguards on data use and reuse, and technical solutions that allow traceability without disclosing sensitive business information more widely than necessary. As a result, sectors in which DPP-relevant information is especially sensitive are likely to face higher development, governance, and compliance costs than sectors where most passport information can be shared more openly.

4.5.2 Company-level cost heterogeneities

93 In addition to sector-level variation, the significance of DPP implementation costs depends strongly on firm-specific characteristics. Even within the same sector, firms can face markedly different cost profiles depending on their digital readiness, internal data architecture, product identification practices, position in the value chain, size, product portfolio, and implementation model.

94 A particularly important determinant is **digital maturity** and **in-house technical capability**. Interview evidence indicates that companies with in-house teams may make changes rapidly through internal coordination, while those reliant on external providers incur additional administrative and contractual costs. More broadly, firms that are already digitally native in managing product information are better positioned to combine compliance, sales, and sustainability data than firms starting from fragmented and partly manual systems.

95 Closely related is the quality and flexibility of the firm's **existing product information systems**. Firms with simple or robust product information management systems, flexible CRM architectures, or compatible enterprise systems can often incorporate DPP requirements by extending existing infrastructure. By contrast, firms relying on basic sales-oriented CRM systems, spreadsheets, or disconnected databases face materially higher development

© Oxera 2026

and integration costs because information historically kept separate must be harmonised and transformed into machine-readable form. This affects not only DPP development costs, but also ongoing operating costs where repeated updates or API changes are required. Interview evidence suggests that firms with a medium level of portfolio breadth may be most affected. Firms with narrow product portfolios may be able to comply through limited manual adjustments to existing data sources. At the other end, firms with very broad portfolios typically require system upgrades and API reconfiguration, but can distribute these fixed costs across a larger number of products and units. By contrast, firms with intermediate portfolio breadth often face similar system upgrade requirements without sufficient scale to spread these costs efficiently, resulting in relatively higher per-unit compliance costs.

96 A third key determinant is **product identification granularity**. The cost significance of DPP implementation depends heavily on whether a firm already identifies products at model, batch, or item level. Where existing product identification aligns closely with the granularity required for DPP compliance, implementation is relatively straightforward. Where it does not, firms may need substantial system redesign and, in some cases, changes to physical labelling processes. Interview evidence indicates that steel firms already tracing products by batch face relatively low incremental costs, whereas firms operating primarily at SKU level may face higher costs if DPP requirements are imposed at batch level. Within textiles, fast-fashion firms that already manage high product variation and finer-grained labelling may be better prepared than more traditional textiles businesses.

97 Relatedly, **labelling alignment with existing business practice** is an important firm-level source of variation. If the DPP can operate at product-model level without requiring changes to physical labels beyond the addition of a carrier (for example, a QR code), costs may remain modest. However, if DPP rules require a change in label granularity relative to the firm's current practice, labelling lines, packaging procurement, and production workflows may need to be redesigned. This is particularly significant for firms with high product turnover or tightly optimised packaging processes.

98 A further major determinant is the **firm's position in the value chain**. Manufacturers, component suppliers, importers, brand owners, retailers, wholesalers, refurbishers, and resellers do not bear the same types of DPP cost. In practice, upstream manufacturers and suppliers will be in charge of creating DPPs and will often bear the brunt of primary data generation and traceability costs, while downstream operators will update DPPs and thus face costs related to updating, displaying, or transferring passport information. Interview evidence suggests that pressure is currently felt more strongly at manufacturer level than at retailer level, because suppliers already risk losing business if they are not DPP-ready. Consultation responses also show that retailers and wholesalers need clear rules on when they are responsible for creating and updating DPPs, especially for private-label, repaired, refurbished, or resold products.

99 Another major determinant of DPP implementation cost is a **firm's size**. As discussed in sections 4.2 and 4.3, a substantial share of DPP-related expenditure

© Oxera 2026

consists of fixed costs. According to one industry estimate, such fixed costs may account for more than 90% of total implementation expenditure.[30] Because these investments must be spread across a firm's output, smaller firms with lower production volumes or revenues are likely to face significantly higher per-unit compliance costs than larger firms, thereby affecting their price competitiveness disproportionately relative to firms operating at greater scale.

100 Within this, the role of **private-label operators** deserves separate attention.[31] Retailers selling private-label products may effectively become DPP creators rather than merely downstream users of passport data. This may give them a DPP cost profile that differs materially from that of retailers selling third-party branded goods. Where the retailer bears quasi-manufacturer responsibilities for data compilation, DPP creation, and ongoing updates, costs are likely to rise across development, operation, and internal compliance processes. Consultation evidence explicitly points to the need for clearer guidance on the retailer's role in such cases.

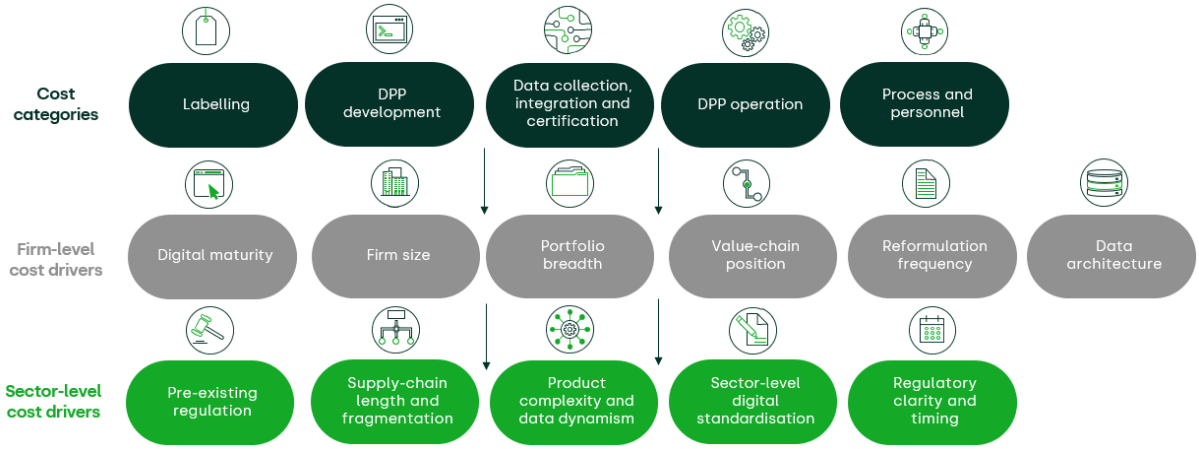
101 Another major source of variation is product **portfolio breadth**. Firms with broad portfolios will face higher absolute costs because they manage more products and thus more complex data flows. Firms with narrow portfolios will have lower absolute compliance costs, but these costs may still be higher in relative terms (see also the discussion on the importance of firm size above).

102 Finally, DPP costs depend on the **frequency of product reformulation** or specification change. This is especially relevant for firms in formulation-intensive, highly dynamic, or frequently updated product categories. Where small changes in composition, packaging, or product attributes trigger passport updates, the ongoing cost of DPP operation can rise materially. In detergents, for example, consultation evidence suggests that formulation volatility is a central cost driver and that even relatively small ingredient substitutions may have implications for whether a passport must be updated or recreated, with potential knock-on effects for packaging and QR code management. Firms with more stable product characteristics will face a much lower recurring burden than firms whose products change frequently in response to input markets or commercial requirements.

[30] Sulzer, S. (2026), 'What is the added value of Digital Product Passports for industrial manufacturers?', Presentation delivered at the World Digital Product Passport Summit, Berlin, 26–27 March, Hilti.
[31] A private-label operator is a retailer or business that sells products manufactured by a third party but branded under the retailer's own name or an exclusive brand it controls.

© Oxera 2026

Figure 4.1 Illustration of cost categories, and sector- and firm-level cost drivers



Note: Oxera illustration.

4.6 DPP compliance readiness

103 Despite approaching deadlines for DPP compliance, current evidence suggests that industry readiness remains limited. For instance, a representative survey conducted in autumn 2024 among 1,078 German industrial and business-related service companies found that only 4% had already taken measures to prepare for the introduction of DPPs, while a further 11% planned to engage with the issue. At the same time, 17% of firms stated that they were aware of the DPP concept but did not intend to engage with it further, while 38% reported having no knowledge of the concept at all.[32]

104 The evidence from the interviews and consultation documents suggests that firms' readiness to comply with DPP requirements is shaped by a combination of enabling and inhibiting factors. The key factors on both sides are discussed in turn below.

4.6.1 Factors promoting compliance readiness

Preservation of market access and commercial relationships

105 Firms are more likely to invest early where DPP readiness is perceived as a condition for continued participation in EU value chains. This dynamic appears especially strong among upstream manufacturers and suppliers, who face the risk of losing business to more prepared competitors. Interview evidence indicates that some East Asian manufacturers in the fashion sector are already investing actively in DPP readiness due to concerns about losing access to EU markets and

[32] Neligan, A. and Büchel, J. (2025) 'Kreislaufwirtschaft. Nur wenige Unternehmen sind auf den digitalen Produktpass vorbereitet', transforming economies, 28 May.

the possibility that brands will shift towards more DPP-ready suppliers. By contrast, interviewees suggested that parts of the fashion industry in the Near East, currently facing economic constraints, are delaying or foregoing such investments, illustrating how DPP regulation may differentially affect market access across global supply chains.

Strategic, operational, and commercial value beyond immediate compliance

106 In the interviews, DPP is repeatedly described not simply as an additional reporting requirement, but as a broader transformation in the way firms manage product information, traceability, and sustainability data. Firms that invest early in these capabilities may therefore expect to not only be better positioned for DPP itself, but also support value-creating applications such as second-hand markets and prepare for future regulatory requirements that rely on similar digital foundations. Readiness is therefore stronger where firms can identify a credible business case that combines compliance preparedness with wider efficiency gains, commercial opportunities, or longer-term regulatory resilience.

Adjacent regulatory pressure

107 An already developed compliance baseline can promote compliance readiness. Where firms are already subject to related sustainability, traceability, or disclosure obligations, they appear more willing to begin investing in DPP readiness. Interview evidence suggests, for example, that French firms are somewhat ahead because national legislation such as Loi AGEC has already required them to prepare elements of the information infrastructure relevant to DPP compliance.

Desire to shape the emerging DPP ecosystem

108 This factor is particularly visible among service providers and more digitally advanced actors, who may see value in engaging early, testing solutions, and helping define future standards and operating practices. Early investment in such cases reflects not only compliance preparation, but also ecosystem positioning and shaping.

4.6.2 Factors harming readiness

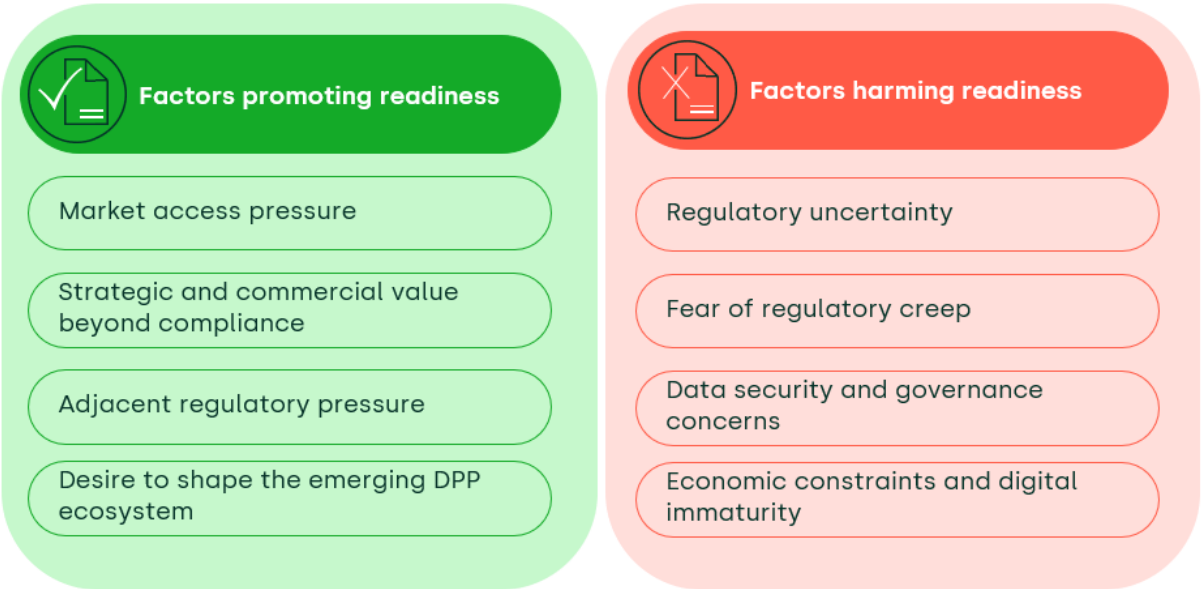
109 One of the strongest factors reducing readiness across both interviews and consultation evidence is **regulatory uncertainty**. Firms are often reluctant to invest significantly where they do not yet know the precise scope of the obligations, the applicable standards, the relevant implementation dates, or the eventual governance architecture of the DPP system. The interviews repeatedly describe markets as being in a 'wait-and-see' mode because the ESPR framework remains insufficiently defined, with no signed act and no clearly fixed start date. Regulatory uncertainty is explicitly identified as delaying meaningful investment decisions, while in some sectors, such as detergents, the majority of firms are said to be waiting for implementing acts and technical standards before taking action.

© Oxera 2026

110 Closely related is the fear of **regulatory creep** and **repeated adjustment costs**. Firms are concerned not only about current requirements, but also about the possibility that initial obligations may later expand in scope or detail, rendering early investments suboptimal or requiring costly rework. Interview evidence from the detergent sector points to a clear fear that regulation may begin with something manageable but progressively become more extensive over time. This concern is particularly acute where firms would need to redesign labels, packaging, or product-data systems more than once because the sequence of regulatory acts is poorly aligned. In such situations, waiting can be economically rational if it allows firms to avoid sunk cost issues.

111 Finally, **data security, confidentiality,** and **governance concerns** appear to discourage early readiness in some cases. Firms are reluctant to invest where they do not yet have confidence that commercially sensitive information will remain protected, that access rights will be appropriately controlled, or that the DPP architecture will not expose them to new cyber-risks. Consultation responses note concerns both about centralised service-provider models becoming targets for cybercrime and about decentralised systems creating risks if data access and modification rights are not sufficiently restricted. Where such governance questions remain open, firms may prefer to defer investment until clearer safeguards are defined.

Figure 4.2 Factors affecting DPP compliance readiness



Note: Oxera illustration.

4.7 Available cost estimates

112 The available evidence on the quantitative cost of DPP implementation remains limited. Most content provides qualitative descriptions of cost drivers rather than robust cost estimates. First, our interviews provide some illustrative benchmark figures for particular sectors or firm types. Second, a cost study conducted by IKW provides a more structured set of estimates for the detergent sector. While these figures do not constitute a harmonised cross-sector evidence base, and some relate to specific regulatory design assumptions rather than DPP costs in a narrow sense, they are nonetheless directionally consistent across sources and with wider industry. Taken together, they provide a meaningful indication of where costs concentrate across the industry and the likely order of magnitude within each of the five cost categories used in this study.

4.7.1 Labelling

113 Our interviews suggest that labelling costs are generally low. Where the DPP can function at the previously used labelling level (for example, SKU), compliance may require little more than the addition of a QR code on packing, which keeps labelling costs very low. By contrast, if DPP granularity does not match the firm's existing labelling practice, labelling lines may need to be reconfigured, which is described as highly costly, although no general cost range is provided.[33] Overall, therefore, what little is known suggests that labelling costs may be low under favourable regulatory design choices, but can rise sharply where DPP requirements force a change in existing labelling production infrastructure.

4.7.2 DPP development

114 For larger companies, one-off DPP software development costs are estimated by interviewees at €150,000 to €500,000 for larger firms. Taken together, the available interview evidence suggests that development costs are likely to be modest for smaller firms with simple systems, but can be significant for firms requiring substantial integration work.

4.7.3 DPP operation

115 The evidence on ongoing operating costs is limited, but it suggests a potentially wide range depending on sector and business model. The interview material

[33] We note that the IKW study on costs for DPPs in the detergent sector identified certain policy scenarios (for example, scenarios 1 and 3, where the data carrier must be applied after product filling) that would incur significant labelling costs. Such scenarios could generate a cost on average of €100,000 (ranging between €50,000 and €250,000) per firm for each filling line, covering the establishment of new printers, cameras and quality control equipment, all of which relate to labelling. Oxera understands that these scenarios will not be adopted, however we consider this a helpful datapoint in understanding labelling costs.

© Oxera 2026

reports that a simple externally sourced DPP service model may cost approximately €2,000 to €3,000 per year.

116 By contrast, the detergent-sector estimates in the IKW study imply a much higher recurring cost in a setting where products require regular passport creation and updating. The study estimates €50,000 per company per year if operational services were provided externally.

4.7.4 Data collection, integration, and certification

117 This is one of the most important cost categories conceptually, but also one of the least well quantified. The interview material provides a small number of indicative benchmarks. For a medium-sized European fashion company, data preparation and traceability are estimated at around €50,000 per year, while environmental performance data are estimated at around €25,000 per year. In addition, the initial cost of assembling and organising product data internally is described as amounting to a few thousand euros for small firms and €50,000 or more for large firms. While these costs are principally incurred upfront, they are unlikely to be entirely non-recurring, as changes in supply chains, personnel, and R&D activities create an ongoing need for data maintenance, updating, and internal coordination.

118 The IKW study adds a further set of estimates, but these relate to a specific and more demanding issue: the provision of protected authority access to technical documentation and conformity-assessment material. For this element, the study estimates additional personnel costs of €300,000 to €500,000 per company per year, alongside external service-provider costs of €50,000 to €200,000 per company per year. The study also notes further potential costs associated with translation, including at least €20 per page for translating test reports into official EU languages. Because these figures depend on a particular interpretation of what must be included and made accessible in the DPP, they should not be treated as the baseline cost of data collection as such. Even so, they illustrate that costs in this category can increase substantially where certification, authority access, or frequent reformulation updates are required.

4.7.5 Processes and personnel

119 The most consistent quantified evidence across the two sources concerns staffing requirements. In the IKW study, the preferred detergent-sector assumptions imply a need for 0.5 to 5 additional permanent full-time positions per company, depending on the number of products and the frequency of updates. The study assumes a cost of €100,000 per full-time position per year in Germany, implying a recurring staffing cost of approximately €50,000 to €500,000 per company per year. These positions are likely to span a range of functions, including data management and governance, regulatory compliance monitoring, supplier engagement and onboarding, and technical integration with DPP platforms and enterprise systems such as ERP and PLM.

© Oxera 2026

120 The interview material is broadly consistent with this range, with company size and product-portfolio breadth identified as the main determinants. In addition, the implementation phase may involve one-off process and project-management costs in the form of external consulting, again estimated at €30,000 to €50,000 on average. Of all the cost categories, this is perhaps the one where the quantitative evidence is both most plausible and most transferable across sectors: DPP implementation appears likely to require non-trivial ongoing staff effort even where technology costs are relatively modest, reflecting the fact that maintaining accurate, up-to-date product data across a live supply chain is an inherently people-intensive activity.

4.7.6 External DPP service provision

121 The available quantification of external DPP service costs is limited, reflecting the nascent state of the market. That said, the evidence available suggests that recurring fees for external DPP provision are generally low. In particular, DPP-as-a-service fees were estimated in one interview at around €2,000–€3,000 per year, and some providers even operate freemium models, with no initial platform charge and costs scaling incrementally with usage, such as cloud storage consumption. By contrast, one-off external engagements linked to implementation, architecture design, and strategy can be much more significant, with costs varying substantially depending on the scope and complexity of the project. General consulting fees are placed at around €30,000 to €50,000 on average, depending on the size and complexity of the project. Overall, this suggests that ongoing platform fees are unlikely to constitute the principal cost burden, whereas one-off project work required to establish the underlying DPP architecture and operating model can be substantial.

4.7.7 Cost category weighting

122 Although precise cost figures remain difficult to establish, proportional estimates from industry practitioners provide a useful indication of the distribution of DPP implementation effort. At the World DPP Summit held in Berlin in March 2026, which convened more than 15 companies and organisations across regulatory, industrial implementation, and technology domains, a representative from Sika estimated that approximately 90% of total DPP effort is attributable to data preparation, followed by publication (5%), maintenance (3%), and archival (2%).

123 These estimates align closely with findings from stakeholder interviews conducted for this report, which consistently identified data collection, structuring, validation, and preparation as the primary cost drivers.

© Oxera 2026

5 Cost mitigation strategies

124 While the compliance costs associated with DPPs can be material, particularly for SMEs or firms with limited readiness, a range of practical strategies may help reduce the financial burden associated with implementing DPP requirements. This section outlines the principal approaches available and assesses their respective strengths, limitations, and suitability across different firm profiles.

5.1 Leverage existing infrastructure

125 Firms that already store product data digitally can reduce the incremental cost of DPP compliance by building on existing systems—such as ERP, PLM, or Product Information Management (PIM) platforms—rather than constructing entirely new data architectures.[34]

126 Where DPP requirements are factored into such systems at the design phase, rather than applied as retrospective modifications, updating processes is likely to be considerably cheaper. For new products, associated upstream procurement can be specified to include the relevant DPP data requirements as a supply requirement. Firms may also consider aligning product refresh cycles or planned obsolescence schedules to minimise the cost of deploying DPPs across legacy product lines.

127 Survey evidence suggests that around two thirds of German companies already store product data digitally, meaning a significant share of firms have a partial foundation to build on.[35] However, only 18% of companies share product-specific data in a standardised form, indicating that the gap to full DPP-readiness, while real, is not always a complete rebuild.[36]

128 **Strengths:** Avoids duplicating (sunk) costs; shorter implementation timelines for digitally mature firms.

129 **Weaknesses:** Only effective if existing systems are DPP-interoperable or can be adapted; firms with legacy or siloed architectures may face high retrofitting costs.

130 **Best suited to:** Large firms and digitally advanced mid-sized firms. Large companies are significantly more digitally advanced: three quarters of German companies with more than 250 employees share digital product data (39%

[34] ERP, PLM, and PIM systems are integrated software environments used by businesses to manage and share operational, design, and product information across their organisations.
[35] Büchel, J. and Neligan, A. (2025), 'Digital Product Passport: Finding the right balance between transparency for circularity and added red tape', accessed 21 April 2026.
[36] Ibid.

© Oxera 2026

standardised), compared to only around one in two companies with fewer than 50 employees (17% standardised).[37]

5.2 DPP as a service/third-party outsourcing

131 Rather than building in-house capability, firms may outsource DPP creation, hosting and ongoing management to specialist third-party providers—such as Software-as-a-Service (SaaS) platforms or compliance-technology firms—paying a subscription or per-product fee in lieu of capital investment. We observe that in the nascent DPP service market, providers tend to focus on certain sectors.

132 It is likely that outsourced DPP services cannot mitigate all associated costs. Expenditure on personnel, legal advice, system integration and ongoing operational oversight will remain necessary regardless of the provider arrangement.[38] Furthermore, the third-party service market for DPPs is still maturing, as discussed in sections 4.3.7 and 4.7.6.

133 A further challenge with this cost mitigation strategy is regulatory uncertainty, also discussed in section 4.7. Interview evidence suggests that the potential clients of DPP service providers are taking a 'wait-and-see' approach in light of the lack of clear requirements.

134 **Strengths:** Converts large upfront capital expenditure into manageable operational expenditure; removes the need for specialist in-house IT or regulatory expertise; enables faster time-to-compliance.

135 **Limitations:** Ongoing subscription costs may be disproportionate for firms with very small product portfolios; risks include data sovereignty concerns, confidentiality exposure and vendor lock-in despite regulatory requirements intending to prevent this.[39] Sector specificity of some service providers could limit their ability to cover all SKUs that a firm may offer. This could make it challenging for firms that offer products in multiple sectors that are expected to require DPPs. More broadly, because the DPP service market remains nascent, operational efficiency and domain expertise among providers are still being developed, meaning service quality and pricing may be inconsistent in the near term. There is also a risk of market concentration: if only a small number of providers come to dominate the market, client firms may face reduced choice, higher switching costs and greater bargaining power on the part of suppliers—outcomes that could undermine the competitive benefits that outsourcing is intended to deliver.[40] Finally, DPP-as-a-service models could create a new legal liability issue. Disputes could arise between producers and DPP service providers if errors in the data give

[37] Ibid.
[38] Table 4.1 provides an overview of the high-level activities that DPP service providers might offer and the expected gaps that operators would need to cover.
[39] Regulation (EU) 2024/1781 of the European Parliament and of the Council, June 2024, Article 10.
[40] See the discussion on sector level standardisation in section 4.4.1.

© Oxera 2026

rise to compliance or product liability claims, as it may be unclear who is responsible for such errors.

136 **Best suited to:** Firms facing relatively high fixed implementation costs relative to their scale or digital maturity, particularly SMEs and firms with intermediate-sized product portfolios that are too broad to manage efficiently through manual processes, but insufficiently large to spread the fixed costs of in-house DPP infrastructure across substantial volumes or revenues. Outsourced DPP services may also be particularly relevant for firms with lower levels of existing digital capability or limited regulatory compliance resources. By contrast, firms with very narrow and stable product portfolios may in some cases be able to rely on simpler or more manual compliance approaches, reducing the relative advantage of third-party DPP solutions. Firms that lack digital maturity more generally may also benefit from the infrastructure and experience of a DPP service provider.

5.3 Industry consortia and shared platform models

137 Firms—particularly those operating within the same sector—can collaborate to build or subscribe to shared DPP infrastructure. This allows participants to spread fixed costs such as platform development, data standards and legal compliance tools across multiple participants. A standardised DPP system could reduce market fragmentation, lowering the complexity and cost for firms operating across multiple countries.[41] A standardised, interoperable DPP system that can be accessed by as many firms as possible could help address sectors or regions with low DPP readiness.[42] Platform sharing could also occur vertically, within the supply chain requiring a DPP. This would allow participants to reduce cost by sharing infrastructure and aligning data standards.

138 A shared infrastructure and standards model could be particularly effective in addressing one of the main drivers of DPP implementation cost: fragmented and opaque supply-chain data flows. Under such a model, data entered by upstream suppliers would become automatically accessible to downstream manufacturers, assemblers, distributors, or recyclers through interoperable interfaces and common data standards. This could reduce duplicative data requests, manual data reconciliation and repeated verification processes. Economically, these efficiencies could be significant where DPP compliance depends on obtaining granular upstream information relating to materials, components, carbon footprints, repairability, or recycling content. Shared infrastructure and standards could also reduce coordination failures by creating common technical protocols and governance arrangements across supply chains, improving interoperability and reducing uncertainty over data quality and liability allocation. However, achieving these benefits would require substantial coordination between firms, agreement on data governance and access rights, and sufficient trust regarding

[41] Oxera (2025), 'The Economic Impacts of Digital Product Passports in the EU', report commissioned by Amazon, p. 4.
[42] Büchel, J. and Neligan, A. (2025), 'Digital Product Passport: Finding the right balance between transparency for circularity and added red tape', accessed 21 April 2026.

© Oxera 2026

the handling of commercially sensitive information. The effectiveness of such models may therefore depend on sector characteristics, supply-chain concentration and the presence of industry bodies capable of coordinating standards and participation.

139 For instance, the Chem-X initiative provides an example of an industry consortium approach to shared digital infrastructure within the chemical sector. Chem-X is a German industry initiative under the broader Manufacturing-X programme that seeks to support interoperable data exchange across chemical and material supply chains, including through the development of Digital Material Passports.[43] A comparable example can be seen in the tyre sector through the Global Data Service Organisation (GDSO), an international non-profit association established in 2022 to develop and manage a global tyre data service and to facilitate secure, standardised access to tyre data for digital applications. Founded through a joint industry effort involving major tyre manufacturers, GDSO is designed to standardise tyre-related data, define common access and exchange solutions and provide a shared technical basis for connected services across the tyre value chain. The shared infrastructure and standards support applications such as fleet management across brands and circular-economy use cases including retread lifecycle management, end-of-life sorting, recycling and second-hand tyre markets.[44]

140 **Strengths:** Significantly reduces per-firm fixed costs; promotes interoperability by design; enables smaller firms to participate without building proprietary infrastructure.

141 **Limitations:** Requires trust and governance agreements between competitors; slower to deploy than firm-level solutions; may not accommodate highly differentiated product portfolios. There are also attendant competition-law considerations, particularly where shared platforms could facilitate coordination on matters beyond DPP compliance. As mentioned in section 5.4, DPP data could contain proprietary information—intellectual property, or other commercially sensitive information. Sufficient access control and data sharing mechanisms would need to be established to ensure trust among participants.

142 **Best suited to:** SMEs and firms with standardised, commodity-like products in sectors such as textiles, steel and aluminium—sectors explicitly flagged under the ESPR Working Plan.

5.4 Design for DPP—automation, IoT and AI

143 Firms developing new product lines have the opportunity to embed DPP data collection into the product and process design from the outset, avoiding costly retroactive data mapping. This could entail embedding sensors, standardised

[43] See Chem-X, 'Project', accessed 20 May 2026.
[44] See Global Data Service Organisation, 'About Us', accessed 20 May 2026.

© Oxera 2026

component labelling, and material tracking at the product design stage. DPP information can then be populated and maintained automatically, particularly if firms can achieve further data integration with suppliers (hence, obtaining a direct link to supply data).

144 Artificial intelligence solutions could streamline the population of DPP data, particularly once the underlying data systems are established. This could be particularly efficient for settings where firms have SKUs with a high degree of input overlap (for example, fashion/textiles, toothpaste, smartphones). AI tools could be used to predict DPP entries for additional products, possibly using in-house documentation (design, marketing and procurement materials) to complete the data. Sufficient safeguards would need to be in place to ensure reliability. Alternatively, such a process could be done in reverse: regular processes could be used to complete a DPP, with AI tools being used to highlight likely differences, commonalities and high-risk areas to assist a DPP audit.

145 **Strengths:** Eliminates costly retroactive data mapping; creates long-term operational efficiencies; positions the firm well for future regulatory tightening.

146 **Weaknesses:** Only viable for firms with new product development pipelines; requires upfront investment in redesign; not an option for firms with mature, fixed product lines. The approach also assumes a relatively high degree of digital capability, including the availability of structured and machine-readable product data. This may limit applicability for capital-constrained firms or early-stage businesses that have not yet developed integrated digital systems or formalised data-management processes. The AI-enabled elements of this approach are likely to be less effective where underlying data quality and documentation remain limited or fragmented. This solution assumes a high level of technology adoption, which may not be well suited to labour-intensive sectors or low-value-added products. Solutions that use AI may also generate additional liability issues in the event that erroneous data is inserted into the DPP. Addressing this issue (for example, by manually checking the results) could undermine the efficiency rationale for using AI for this task.

147 **Best suited to:** Digitally mature start-ups, technology-enabled entrants, firms launching new product lines, and larger firms undergoing planned product refreshes. The approach is likely to be most effective where firms are already building integrated digital infrastructure and standardised product-data systems as part of their operating model. By contrast, start-ups with limited financial resources or low levels of digital integration may face difficulties realising the full benefits of automation- and AI-enabled DPP solutions in the near term.

© Oxera 2026

6 Implications for overall benefits of DPPs and policy recommendations

6.1 Overview

148 We outlined the main **cost efficiency, reduced barriers to trade and entry**, and **increased transparency** benefits as identified in our previous study in section 2.6. This section combines the cost evidence from earlier sections in this report with these three benefit categories to assess the overall economic implications for DPPs. Sections 6.2, 6.3 and 6.4 describe the implications of our cost assessment on the three identified benefit mechanisms of DPPs. Drawing on the interviews and further evidence gathered as part of our cost assessment, Section 6.5 outlines additional potential benefits that could arise. Section 6.6 combines cost and benefit evidence to further understand the key conditions under which DPPs are most likely to deliver net economic gains. This stylised 'what-if' value-for-money analysis shows that net-benefits of DPPs are not certain, and that limiting the cost burden of implementation can help deliver positive societal benefits. Section 6.7 concludes with policy recommendations aimed at delivering this goal, and we identify a number of options that could assist in keeping implementation costs phased, proportionate and achievable.

6.2 Implications for cost efficiencies

149 The interview evidence suggests that the cost-efficiency case for DPPs is credible, but only under specific conditions. First, at a high level, DPPs can reduce inefficiencies by replacing fragmented, manual and document-based information handling with more integrated, machine-readable data flows. Interviewees noted, for example, that many firms still move compliance, sales and product information across systems using PDF documents or other manual processes, and that DPPs could create genuine and significant operational savings where they replace these workarounds with structured digital information flows. However, whether these savings create a net benefit depends on how demanding novel DPP requirements prove to be relative to a firms' existing requirements.

150 Second, labelling and data requirements need to be aligned with existing production line infrastructures. Where DPP implementation necessitates significant adjustments to production processes, firms may incur significant additional capital and operational costs that reduce or delay net benefits. The interviews indicate that costs rise materially where the granularity of DPP information does not match the granularity of existing physical labelling systems, creating friction between digital and physical compliance requirements. By contrast, where DPPs can be accommodated through limited adjustments, such as the addition of a QR code to an existing label, implementation is more straightforward and lower cost. In some sectors, even relatively small changes in product characteristics may trigger consequential costs if they require revised on-pack identifiers and associated packaging changes.

© Oxera 2026

151 Third, achieving operational efficiencies from standardised and centralised product data, as well as streamlined compliance processes, depends on the timely establishment of clear and interoperable communication standards. Without early standardisation, firms risk investing in systems that later require modification or replacement, leading to sunk costs and reduced incentives to invest early on. Interviewees emphasised the importance of embedding recognised standards, including GS1, EPCIS and the UN Transparency Protocol, in order to minimise duplication and avoid unnecessary traceability costs.

152 Finally, cost efficiencies are more likely to materialise where firms can integrate DPP-related systems into existing digital infrastructures, rather than developing novel systems and processes. The extent to which DPPs build on, rather than duplicate, current data management systems will therefore be a key determinant of whether anticipated efficiency gains are realised in practice.

6.3 Implications for trade and entry barriers

153 The extent to which DPPs reduce barriers to trade depends on whether they result in genuine harmonisation across the EU, rather than the layering of new digital obligations onto already complex compliance structures. In principle, a common digital framework should reduce fragmentation within the Single Market by enabling firms to comply with a common set of requirements through one system. However, interview evidence suggests that this outcome depends heavily on the early establishment of shared technical standards and interoperable infrastructure. In the absence of such common standards, firms and sectors may instead invest in proprietary or sector-specific systems that reproduce—or even amplify—fragmentation rather than resolving it.

154 While DPPs are likely to reduce barriers internally within the EU Single Market, it is also important to note that they may increase barriers externally. The creation of additional traceability, data assembly and digital compliance requirements may raise the cost of accessing the EU market for (non-EU) suppliers, particularly where those suppliers are less digitally mature. Although DPPs may reduce intra-EU trade frictions, they could simultaneously operate as an additional import barrier if implementation requirements become sufficiently onerous.

155 This risk is compounded by uncertainty over the future development of the regulatory framework. Interviewees highlighted concern not only about current requirements, but also about the possibility of 'regulatory creep', whereby data fields and compliance obligations expand over time beyond what is initially envisaged. If this occurs, firms may face repeated compliance adjustments and additional costs, and external suppliers in particular may find it harder to remain compliant. As a result, the net effect of DPPs on trade barriers is likely to depend on whether the framework remains proportionate, stable and sufficiently harmonised to reduce internal frictions without creating excessive new obstacles for market access from outside the EU.

© Oxera 2026

6.4 Implications for increased transparency

156 The transparency benefits of DPPs depend not simply on making more information available, but on ensuring that the information is reliable, sufficiently granular, and usable by relevant actors. Interview evidence suggests that many firms still face significant gaps in the underlying data needed to populate DPPs. In this sense, transparency is not costless: it requires investment in data collection, structuring and maintenance before the informational benefits can be realised.

157 A related issue concerns data quality and trust. The interviews indicate that the mechanisms for certifying and verifying DPP information are not yet fully established, which may limit the extent to which DPPs can reduce information asymmetries in practice. Where users cannot rely on the accuracy or comparability of disclosed information, the consumer and market benefits of transparency are weakened.

158 The extent to which transparency yields broader market benefits also depends on the existence of the underlying traceability infrastructure. Interviewees described traceability as the foundational bottleneck: without a trusted and shared data chain across the supply chain, many of the anticipated benefits for refurbishment, resale, recycling and other secondary-market uses cannot be achieved at scale.

159 Finally, the benefits of transparency depend on actual user engagement. Interview evidence suggests that DPPs will not generate substantial value if they function merely as a compliance repository. To support adoption and yield commercial as well as social value, the consumer-facing interaction must provide genuine utility, for example by enabling repair or recycling. If DPPs are designed in a way that makes them accessible, useful and relevant to end users, the transparency benefits identified in the earlier Oxera work are more likely to materialise. If not, the informational infrastructure may exist in formal terms without generating commensurate economic value.

6.5 Additional benefits identified in this study

160 This study has also revealed further potential benefits that DPPs could unlock. Firstly, interview evidence indicates that in addition to transparency, DPPs can potentially **open a new channel of communication** with consumers. Consumers accessing information via a DPP will likely reveal valuable context (such as possession of specific product or SKU). In addition to serving the consumer request for DPP information, firms may also be able to offer other relevant consumer information—offers for replacement products, add-on services, or directions to in-store recycling facilities. For instance, in a pilot study, L'Oréal has explored the use of DPPs beyond compliance purposes to provide additional product information, deliver educational materials on product usage, and

© Oxera 2026

integrate consumer engagement features such as rewards programmes.[45] Such capabilities could provide firms with an additional tool to increase sales, strengthen brand engagement, and build customer relationships across the product lifecycle.

161 A second potential benefit is that firms may be able to **monetise data** collected and produced for the DPP. Operators will be obliged to provide access to DPP data to EU consumers, market surveillance authorities, Member States, the European Commission and certain interested parties (such as recyclers). However, there may be important groups outside these specific parties to which operators could provide access on commercial grounds. This could include data aggregators, market intelligence firms, AI and web-search firms, and non-EU firms. Operationalising this may require the construction of tiered-access systems, as with, for example, the DBP.

162 Both of these benefits are likely to depend on the digital maturity of the operator firms. Those that have well-developed IT, CRM and e-commerce infrastructure are more likely to be able to implement these strategies. Developing an effective data monetisation approach may also require other capacity within the firm (such as legal and commercial expertise), or third-party advice (for example, on valuation or risk management).

6.6 The cost–benefit of DPPs

163 As detailed in section 4, a DPP policy will imply a set of largely fixed costs that producers incur that may be offset by the economic benefits the policy generates. The relationship of these two parameters—the cost–benefit ratio—helps policymakers understand the extent of the net impact of the policy on wider society.

164 In this section, we review available cost–benefit analyses drawn from regulatory impact assessments, and consider how these might be altered under different cost assumptions. This will serve two objectives. First, it will enable us to understand a baseline for the effectiveness and efficiency of an example DPP intervention. Second, this will allow us to overlay some of the cost drivers identified in section 4 and consider their implications on the policy.

165 Across the stylised benefit-cost ratios (BCRs), DPPs represent at least an economically viable policy, with the potential to deliver medium to high value for money. While these estimates remain sensitive to the assumptions underlying both costs and benefits, they nonetheless provide a useful indication of the relative scale of costs and benefits across the scenarios considered.

[45] Marom, G. (2026), 'The Passport Wears Prada: DPP for Product Managers, Turning Compliance into Customer Value', presentation at the World DPP Summit, Berlin, 26 March.

© Oxera 2026

6.6.1 Cost–benefit scenario analysis based on data within the European Commission's toys regulatory impact assessment

166 We consider that the European Commission's regulatory impact assessment on the toys sector is the most relevant for this purpose.[46] It identifies quantitative measures of costs and benefits, although the public documents do not present the underlying cost–benefit calculations and metrics (for example, BCRs). We use the cost and benefit figures from that study as the basis of further analysis, and have prepared a baseline cost–benefit ratio using the following parameters.

- A discount rate of 3%. This is standard guidance from the EU better regulation toolbox.[47]
- A ten year appraisal period. Overarching European Commission guidance suggests matching the appraisal period to the lifetime of the policy's implementation or the useful economic life of the assets. In particular, guidance from DG REGIO suggests between ten and 15 years for business infrastructure.[48] IT infrastructure (relevant to the costs incurred here) can have asset lifetimes of less than ten years.
- Fixed and incremental costs and benefits based on option 2b. We have selected option 2b in the European Commission toys impact assessment as this option best aligns with a policy of implementing DPPs as considered in this report.[49] We have retained the low, mid and high cost and benefit estimates as modelled under option 2b, noting that this range is due to the variation in benefits not costs.[50] We have assumed that the costs and benefits presented in the European Commission's toys regulatory impact assessment are real, rather than nominal costs, in line with assessment guidance.[51]

167 With these assumptions, our analysis produces €167m present value (PV) in total benefits and €106.5m PV in total costs under the medium scenario. Combining these two measures gives a BCR of 1.6. Our stylised BCRs for the low, medium and high cost–benefit scenarios are shown below in Table 6.1.

[46] European Commission (2023), 'Impact assessment report - Proposal for a regulation of the European Parliament and of the Council on the safety of toys and repealing Directive 2009/48/EC', Staff working document, 28 July.
[47] European Commission (2025), 'Better regulation toolbox', Guidance note, chapter 8.
[48] DG REGIO (2014), 'Guide to Cost–Benefit Analysis of Investment Projects', Guidance note, December, p. 42. Table 2.1.
[49] Other costs options in the toys regulatory impact assessment referred to non-DPP interventions. It is standard to consider multiple policy options.
[50] The mid scenario was calculated by Oxera as the midpoint between the high and low ranges presented in the study.
[51] European Commission (2025), 'Better regulation toolbox', Guidance note, chapter 8.

© Oxera 2026

Table 6.1 Baseline stylised BCRs

Low	Medium	High
1.24	1.6	1.9

Source: Oxera analysis of costs and benefits in the European Commission's toys impact assessment. European Commission (2023), 'Impact assessment report - Proposal for a regulation of the European Parliament and of the Council on the safety of toys and repealing Directive 2009/48/EC', Staff working document, 28 July, pp. 49–50.

168 The BCR is a useful measure of the value for money of a policy or investment. The higher the number, the more social benefits arise from the scheme. While investment and policy appraisal takes into account other economic indicators and non-economic factors, this is a key measure. Table 6.2 below outlines some of the implications of differing levels of BCR for appraisal.

Table 6.2 Guide to interpreting BCR estimates

BCR	Approximate ranking	Typical implications
2 or above	High	Project or policy likely to exceed common value-for-money thresholds, and unlikely to be rejected on economic value-for-money grounds.
Between 1.5 and 2	Medium	Additional justification (e.g. the presence of non-monetised benefits) may be required to demonstrate the economic merit of the policy/intervention.
Between 1 and 1.5	Low	Project or policy typically required to meet additional criteria (e.g. strong alignment with overarching strategy, the presence of non-monetised benefits, the presence of overriding social value or distributional effects, and the project representing the least-cost alternative)
Below 1	Poor	Costs exceed benefits, and therefore unlikely to meet value-for-money criteria. Justification for policy would be based on considerations such as whether the preferred option represents an economically efficient cost saving (relative to alternatives).

Source: Oxera analysis and Department for Transport (2024), 'Value for Money-Supplementary guidance on categories', guidance document, November.
Note: These rankings are based on UK sources, and EU policymakers may have different interpretations for value for money.

169 The baseline results suggest that the toys DPP policy as appraised could be considered low or medium value for money. In these situations, the assessment as

© Oxera 2026

to whether the case is ultimately beneficial and worth proceeding with can depend on small marginal changes.

170 Based on our cost assessment in section 4, we identify several factors that could critically affect an appraisal in these categories. First, industry participants highlight that upfront costs are a major factor, and that there is uncertainty associated with those costs.[52] Second, SMEs may face relatively higher recurring costs than large firms.[53] Third, there is potential for economies of scale to reduce recurring unit costs over time.[54]

171 We present some stylised scenarios that assess these points to guide policy discussion. Scenario 1 models the baseline with a 100% uplift on upfront costs, reflecting an adjustment for optimism bias.[55] It is unclear whether the costs presented in the European Commission's toys regulatory impact assessment account for optimism bias; however, we note that single-point estimates were used, even though benefit ranges were presented.[56] UK Treasury guidance on optimism bias suggests an uplift of between 10% and 200%, depending on the phase of assessment.[57] We have adopted a 100% uplift as an approximate mid-point in this range.

172 Scenario 2 models the baseline with a 20% uplift on variable costs, reflecting the potential for SME costs to be higher. We note that uncertainty on costs could be particularly challenging for SMEs, which could also mean that SME costs are under-represented in the European Commission's toys study. For simplicity, we apply the SME-non-SME split as suggested by the European Commission.[58]

173 Scenario 3 models the baseline with an economies of scale adjustment on variable costs, applying a 20% cost reduction starting in year six of the appraisal. The three scenarios are presented in Table 6.3 below.

[52] See sections 4.3.3 and 4.4.1.
[53] See section 4.4.2.
[54] See section 4.1 and Table 4.1.
[55] Optimism bias in this context refers both to the tendency for planners to prepare budget estimates that undershoot reality, and for unmitigated, unmodelled risk factors—sometimes informally referred to as 'unknown unknowns'.
[56] Qualitative evidence discussed in section 5 suggests that there is uncertainty around the costs of implementation.
[57] HM Treasury (2013), 'Supplementary Green Book guidance', guidance document, 21 April.
[58] The European Commission's toys study notes that SMEs account for 99% of the toy manufacturers in Europe, employ about half of the workforce, and account for a quarter of the revenue. See 'Annex 5'.

© Oxera 2026

Table 6.3 Scenario analysis of BCRs

	Low	Medium	High
Baseline	1.2	1.6	1.9
Scenario 1: 100% optimism bias on upfront costs	1.1	1.3	1.6
Scenario 2: 20% uplift on recurring costs	1.1	1.3	1.6
Scenario 3: 20% reduction in costs from year six onwards	1.3	1.7	2.1

Source: Oxera analysis.

174 These results show that under reasonable adjustments to implementation costs (for example, accounting for optimism bias), the overall assessment of the impact of the policy could be negatively affected (scenarios 1 and 2). The upside impact of economies of scale is attenuated due to the effect being discounted.

175 We note that the unmodelled cost risk of scenario 1 could be relevant when considering regulatory uncertainty, firm readiness and the capacity of SMEs to assess and implement the necessary changes. The UK Treasury guide on optimism bias refers to 'complexity', 'degree of innovation', 'poor project team', 'project intelligence', 'regulations' and 'technology' as all being contributory factors in optimism bias in these kinds of projects.[59]

176 This analysis demonstrates that, while the baseline estimates show that the policy represents reasonable quantified value for money, there is scope for cost overruns, or a more complete understanding of costs, to tip the balance on this example of DPP intervention. This result has policy implications, which are discussed in the following subsection.

6.7 Policy recommendations

177 This report has identified five core issues in relation to DPP costs, which can be grouped and summarised as follows:

- significant heterogeneity in DPP and digital readiness across sectors and firms, with SMEs typically facing the greatest challenges;
- complexity and granularity as important cost-drivers of DPP implementation, with a firm's position in the value chain and the need for coordination with suppliers representing a further related challenge;
- digital infrastructure and standardisation gaps: firms and sectors lacking shared data models, common identifiers, or interoperable systems face

[59] HM Treasury (2013), 'Supplementary Green Book guidance', guidance document, 21 April.

© Oxera 2026

higher upfront development costs, and cross-border and cross-sector fragmentation of data formats and information requests compounds this burden, particularly for non-EU suppliers;
- the fixed-cost structure of DPP implementation: a substantial share of implementation expenditure is fixed in nature, meaning smaller firms bear significantly higher per-unit compliance costs, with adverse implications for price competitiveness relative to larger-scale operators;
- regulatory uncertainty affecting the urgency of DPP preparation, including uncertainty about the precise scope of DPP data requirements and whether such requirements may expand over time, alongside related concerns on data privacy, confidentiality, and security.

178 Several general policy recommendations arise from the qualitative and quantitative evidence in this study.

179 First, policymakers should pay significant attention to **scoping the DPP requirements in line with sector- and firm-level readiness**. This could involve further identification of difficult to identify data variables and careful consideration of the granularity and dynamism of the DPP structure. The European Commission should consider data-field-level phasing of DPP requirements over time, providing as much clarity as possible on the DPP dimension (for example, batch-level) as the dimensions materially drive costs. Such an approach could reduce the impact of differing readiness gaps across firms and help maintain a level playing field on compliance. In practice, this could mean phasing DPP data-field requirements according to their current availability, starting with information firms already generally hold, and deferring more demanding fields (such as full supply-chain provenance) to later deadlines

180 Second, policymakers should **carefully consider proportionality when specifying data requirements and designing structures**. Linked to the recommendation above, data fields that are granular or that require regular effort to change may impose additional costs on firms. The insight from the cost–benefit analysis of the toys regulatory impact assessment in this section also suggests that the overall net benefit of DPPs could critically depend on how tightly implementation and operation costs are controlled. It may be the case that benefits of marginal expansions in the scope of DPPs are not outweighed by their costs.[60] To mitigate this issue, simplified compliance pathways should be introduced that permit the use of verified proxies where primary data is very costly to provide.

181 Third, policymakers can assist with **supply-side measures that help mitigate the costs of implementing DPPs** and reduce the impact of some of the heterogeneities that have been identified in DPP readiness. On the technical side, measures to develop data interoperability standards would assist firms to share data across

[60] In addition to this, we recommend that addressing liability assignment issues that could arise from the policy or mitigation measures should be considered in the designing structures of data requirements.

© Oxera 2026

their supply chains. Mandates for interoperability standards can help prevent fragmented proprietary systems and related sunk cost investments. Related to this, data sharing frameworks and guidance on governance could be provided to facilitate the emergence of vertical data platforms across supply chains. This could potentially pool some of the DPP costs across players and thereby lower the unit costs of DPPs. Other possible supply-side options could be to explore pilots aimed at either demonstrating to SMEs how to set up the relevant systems and IT infrastructure, or providing that infrastructure and storing DPP data on their behalf.

182 Fourth, policymakers should seek to **finalise regulatory requirements as early as possible**. Regulatory uncertainty is itself a material cost driver, as it encourages firms to adopt a 'wait-and-see' approach and increases the risk of delayed or misaligned investment. Early clarity on core requirements, implementation timelines and compliance expectations would allow firms and service providers to plan more efficiently, reduce unnecessary reworking of systems and support earlier market development.

183 Fifth, policymakers should introduce a **formal mechanism for the periodic reassessment of DPP requirements**. This would help ensure that requirements remain proportionate over time, rather than expanding incrementally without sufficient scrutiny. Regular review points could provide an important safeguard against 'regulatory creep', while allowing the framework to evolve where there is clear evidence that additional fields generate commensurate policy benefits.

184 The following table sets out additional recommendations for specific firm-sector profiles.

© Oxera 2026

Table 6.4: Policy recommendations per firm-sector profiles

Firm/sector profile	Key cost drivers and challenges	Recommended European Commission policy actions
Firms with complex global supply chains	Data collection across multi-tier, globally dispersed supply chains, requiring engagement with upstream actors of uneven digital maturity.	Promote the provision and sharing of DPP-relevant data via standards (e.g. development of further standards such as for access rights management, information system security, business confidentiality, and authentication, reliability, and integrity).
	High cost of integrating data from multiple sources, formats, and jurisdictions.	
Firms operating across multiple DPP regulatory regimes	Divergent compliance obligations where products span several sectoral DPP regimes simultaneously, each potentially with distinct data architectures.	Coordinate and promote common core data schemes across all relevant DPP requirements.
		Extract policy lessons via ex-post evaluations and use insights to apply field-level requirements in a proportionate manner to DPPs for new sectors.
SMEs and firms with intermediate product portfolio breadth	High fixed costs of DPP system development and integration that cannot be spread efficiently across a limited product range.	Default to higher-level DPPs for lower-risk product categories, reserving batch- or item-level granularity for sectors where individual lifecycle tracking delivers clear regulatory value.
	Relatively low digital maturity, non-standardised internal processes, and constrained personnel capacity.	Grant extended compliance timelines calibrated to digital readiness, avoiding a uniform deadline that disproportionately burdens smaller firms; or, alternatively, apply a phased implementation schedule uniformly across firms
Firms with frequently reformulated products	High DPP update frequency driven by minor ingredient or formulation changes, each of which may trigger new compliance obligations.	Permit composition range disclosures in lieu of exact values for formulation-intensive product categories.
	Associated labelling and operational costs where product identifiers or data carriers must be revised alongside reformulations.	Limit mandatory update obligations to changes crossing a defined materiality threshold—such as the introduction of a new ingredient category or a change in a regulated substance—so that minor reformulations within a pre-disclosed range do not necessarily trigger passport updates or require a new passport. Alternatively, specify data requirements that limit the cost of firms of changing formulation (e.g. where changes are made only digitally, rather than in labelling/packaging).
Low-margin importers of goods into the EU	Compliance costs that are disproportionate relative to product margins, particularly for basic consumer goods sourced from non-EU manufacturers.	Ensure that, for low-margin import categories, where circularity objectives and market access risks are both significant, delegated acts provide phased and proportionate implementation pathways, distinguishing between core circularity data fields that must apply in full, and supplementary data fields where simplified compliance routes are appropriate for non-EU manufacturers.
	Limited digital infrastructure.	

© Oxera 2026

185 As the cost–benefit scenario analysis in section 6.6 shows, the overall value for money of DPPs to consumers can be improved by lowering the costs of their implementation and operation, particularly as the costs are likely to be passed on to consumers.

© Oxera 2026

A1 Digital Battery Passport data fields

Table A1.1 Digital Battery Passport data field requirements for each access group

Theme	Data fields
Public access	
Battery identification and labelling	Manufacturer identification (name, trade name/mark, postal and electronic address); battery category and model identifier; place of manufacture (geographical location of plant); date of manufacture (month and year); weight; capacity; chemistry.
Hazardous substance marking	Separate collection symbol; chemical symbols for cadmium (Cd) where content exceeds 0.002%; chemical symbol for lead (Pb) where content exceeds 0.004%.
Material composition and sustainability	Material composition, including chemistry, hazardous substances (excluding Hg/Cd/Pb, which are provided at label level), and critical raw materials; carbon footprint (kg CO_2e per kWh over expected service life, broken down by lifecycle stage); carbon footprint performance class.
Responsible sourcing and recycled content	Information on responsible sourcing (derived from the battery due diligence policy report); recycled content (percentage share of cobalt, lithium, nickel and lead recovered from waste, per model, per year, per plant); share of renewable content.
Technical performance and durability	Rated capacity (Ah); minimum, nominal and maximum voltage (including temperature ranges); original power capability (W) and applicable limits; expected lifetime (charge/discharge cycles, with reference test cited); capacity threshold for exhaustion (EV batteries only); temperature range when not in use; commercial warranty period; initial round-trip energy efficiency (at placement on the market and at 50% of cycle life); internal cell and pack resistance; C-rate of relevant cycle-life test.
Compliance and waste management	Marking requirements (including non-rechargeable indication; minimum average duration; and capacity for rechargeable, LMT and SLI batteries); EU declaration of conformity; information on waste battery prevention and management (including collection and return options, meaning of symbols, and impacts of hazardous substances on health and the environment).
Persons with legitimate interests	
Detailed material composition	Detailed composition of cathode, anode and electrolyte materials.
Repairability and spare parts	Part numbers for components; contact details of sources for replacement spares.
Dismantling information	Exploded diagrams of the battery system/pack showing cell location; assembly sequences; type and number of fastening techniques to be unlocked; tools required for disassembly; warnings where there is a risk of damaging parts; number and layout of cells.
Safety	Safety measures to be observed during dismantling.
Notified bodies, market surveillance authorities	
Compliance evidence	Results of all test reports proving compliance with the Regulation and any associated delegated or implementing acts.
Persons with a legitimate interest and EU Commission	

Theme	Data fields
Performance and durability	Values for performance and durability parameters at the time of placing on market and upon any subsequent change of status.
State of health	State of health of the battery, determined in accordance with Article 14 methodology.
Battery status	Status classification: 'original', 'repurposed', 're-used', 'remanufactured' or 'waste'.
In-use operational data	Number of charging and discharging cycles; record of adverse or negative events (e.g. accidents); periodically recorded operating environmental conditions (including temperature); state of charge.

© Oxera 2026



Contact

David Jevons
Partner
+44 (0) 1865 253033
david.jevons@oxera.com

Peter Gerrish
Senior Consultant
+44 (0) 1865 253038
peter.gerrish@oxera.com

oxera.com

Oxera Consulting LLP is a Limited Liability Partnership registered in England no. OC392464, registered office: Park Central, 40/41 Park End Street, Oxford, OX1 1JD, UK, with an additional office in London located at 200 Aldersgate, 14th Floor, London, EC1A 4HD, UK; in Belgium, no. 0651 990 151, branch office: Spectrum, Boulevard Bischoffsheim 12–21, 1000 Brussels, Belgium; and in Italy, REA no. RM - 1530473, branch office: Rome located at Via delle Quattro Fontane 15, 00187, Rome, Italy, with an additional office in Milan located at Piazzale Biancamano 8, 20121 Milan, Italy; and in Spain, CIF W0306516F, branch office: LOOM Azca, Plaza Pablo Ruiz Picasso 11, Planta 1, 28020 Madrid, Spain.

Although every effort has been made to ensure the accuracy of the material and the integrity of the analysis presented herein, Oxera accepts no liability for any actions taken on the basis of its contents. With regard to our services to you, in the absence of any other signed agreement between you and us, you agree to be bound by our standard Terms of Engagement, which can be found https://www.oxera.com/wp-content/uploads/2025/03/ToE-UK-en-GB.pdf.

No Oxera entity is either authorised or regulated by any Financial Authority or Regulation within any of the countries within which it operates or provides services. Anyone considering a specific investment should consult their own broker or other investment adviser. Oxera accepts no liability for any specific investment decision, which must be at the investor's own risk.

© Oxera 2026. All rights reserved. Except for the quotation of short passages for the purposes of criticism or review, no part may be used or reproduced without permission.