

THE ECODESIGN FOR SUSTAINABLE PRODUCTS REGULATION WITH THE DIGITAL PRODUCT PASSPORT: A COMPLEX LEGAL TOOL FOR THE DIGITAL CIRCULARITY¹

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Abstract: The top priority of the of the European Commission of Ursula von der Leyen for 2019–2024 was the European Green Deal and it keeps its position along with the Clean Industrial Deal for 2024–2029. Consequently, the projection of the circularity in the EU consumer protection could get reinforced and moved from Directives to the Ecodesign for Sustainable Products Regulation (ESPR) in 2024. Since 2026, a digital file with detailed information about a product's life-cycle will have to be posted on a web portal run by the European Commission regarding a growing pool of products. The aim of this contribution is to conceptually analyze the legal nature of this instrument *sui generis*. Methodologically, it is to be achieved by the appreciation of its (i) policy foundation, (ii) legislative setting, (iii) parameters definition, (iv) academic discussion, if not controversies, along with (v) comparative glossing in regard to a partially similar digital project, TLD .eu. One time more, the EU crossed the Rubicon and has opened either the box of Pandora or the door of opportunity.

Resumé: Hlavní prioritou Evropské komise Ursuly von der Leyen pro období 2019–2024 byla Evropská zelená dohoda a tou zůstává spolu s Dohodou o čistém průmyslu pro období 2024–2029. V důsledku toho by se oběhového hospodářství mohlo silněji propstat do ochrany spotřebitelů v EU a posunout se v r. 2024 ze směrnic do nařízení o ekodesignu pro udržitelné výrobky (ESPR). Od roku 2026 bude muset být na webovém portálu provozovaném Evropskou komisí zveřejněn digitální soubor s podrobnými informacemi o životním cyklu rostoucí množiny výrobků. Cílem tohoto příspěvku je koncepčně analyzovat právní povahu tohoto nástroje *sui generis*. Metodologicky má být toho dosaženo zhodnocením jeho (i) politického základu, (ii) legislativního nastavení, (iii) definice parametrů, (iv) akademické diskuse, ne-li kontroverzí, a (v) srovnávacím oglosováním ohledně částečně podobného digitálního projektu, TLD .eu. EU opět překročila Rubikon a otevřela buď Pandořinu skříňku nebo dveře k dalším příležitostem.

Key words: EU law, Consumer protection, Ecodesign, Digital Product Passport, EU, right to repair, circularity, sustainability

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Introduction

The evolution of the EU policies and law is marked by rather short periods during which are laid down sets of milestones which dramatically accelerate pre-existing trends and have decades long multi-spectral, multi-sectorial and multi-jurisdictional impacts. The time between November 2019 and March 2020 was definitely one of these periods and in particular three key strategic documents of the European Commission have gradually advanced, in a more revolutionary than evolutionary manner, the EU drive for sustainability and competitiveness. The first of them was the Political Guidelines for the next European Commission 2019–2024 – A Union that strives for more from 27 November 2019 (“Political Guidelines 2019–2024”) which brought six priorities and of which the first was “*Europe to strive for more by being the first climate-neutral continent*”,² i.e. the acceleration of the drive to turn the EU into the first climate-neutral continent. The second of them was the iconic declaratory and strategic materialization of this priority, the famous COM(2019) 640 Communication from the Commission – The European Green Deal from 11 December 2019 (“EGD”), which recognized that “*achieving a climate neutral and circular economy requires the full mobilization of industry*.”³ The third of them was COM(2020) 98 Communication from the Commission – A new Circular Economy Action Plan – For a cleaner and more competitive Europe from 11 March 2020 (“New Circular Economy Action Plan” aka “(new) CEAP”). This new CEAP targets a sustainable product policy framework and requires widening of the Commission legislative initiative, see the “*Ecodesign Directive beyond energy-related products so as to make the Ecodesign framework applicable to the broadest possible range of products and make it deliver on circularity*.”⁴

Then it took four years to go ahead with a set of legislative initiatives for greening the EU consumer law⁵ and this culminated in a quartet of proposals of which three were enacted: Regulation (EU) 2024/1781 establishing a framework for Ecodesign (“Ecodesign Regulation” or “ESPR”),⁶ Directive (EU) 2024/825 empowering consumers for the green transition,⁷

² European Commission: Directorate-General for Communication and Luyen, U. v. d., A Union that strives for more – My agenda for Europe – Political guidelines for the next European Commission 2019-2024, Publications Office, 2019, <https://data.europa.eu/doi/10.2775/018127> – Opening statement in the European Parliament plenary session 16 July 2019 ; Speech in the European Parliament plenary session 27 November 2019.

³ COM(2019) 640 final Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal, 11 December 2019.

⁴ COM(2020) 98 final Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of The Regions – A new Circular Economy Action Plan For a cleaner and more competitive Europe, 11 March 2020.

⁵ MacGREGOR PELIKÁNOVÁ, R. (2024). New pro-sustainability consumer protection directive – the conceptual foundation of the Right to Repair in the current EU law? *Czech Yearbook of Public and Private International Law – CYIL*, 2024, 15, 165–174.

⁶ Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC (Text with EEA relevance) (OJ L, 2024/1781, 28.06.2024, ELI: <http://data.europa.eu/eli/reg/2024/1781/oj>).

⁷ Directive (EU) 2024/825 of the European Parliament and of the Council of 28 February 2024 amending Directives 2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better protection against unfair practices and through better information (Text with EEA relevance) (OJ L, 2024/825, 06.03.2024, ELI: <http://data.europa.eu/eli/dir/2024/825/oj>).

and Directive (EU) 2024/1799 on common rules promoting the repair of goods (“Right to Repair Directive”).⁸ Only the proposal for Green Claims Directive about substantiation and communication of explicit environmental claims has not been legislatively finalized, see the review.⁹ The Political guidelines 2024-2029 Europe’s choice – Europe from 18 July 2024 (“Political Guidelines 2024-2029”)¹⁰ with the Clean Industrial Deal from 26 February 2025 (“CID”)¹¹ have not dramatically shaken the drive launched by the mentioned trio – the Political Guidelines 2019-2024, EGD, and New Circular Economy Action Plan.

Considering this trend stabilization, its direct validity and applicability and its broad and heterogenous reach, the Ecodesign Regulation and EU norms about taxonomic and standardized reporting,¹² such as the Taxonomy Regulation¹³ and ESRS Regulation,¹⁴ belong to the most visible, the most current and perhaps even the most important legislative outcomes of the crusade of the EU towards sustainability, circularity and perhaps even competitiveness. The Ecodesign Regulation impacts a myriad of EU law branches and contributes to the transformation of consumers, as well as other stakeholders, from the *homo economicus* into *homo responsabilis*.¹⁵ Arguably, it has the potential to contribute to the competitiveness, modernization and digitalization,¹⁶ the traceability in the context of the circularity,¹⁷ the

⁸ Directive (EU) 2024/1799 of the European Parliament and of the Council of 13 June 2024 on common rules promoting the repair of goods and amending Regulation (EU) 2017/2394 and Directives (EU) 2019/771 and (EU) 2020/1828 (Text with EEA relevance) (OJ L, 2024/1799, 10.07.2024, ELI: <http://data.europa.eu/eli/dir/2024/1799/oj>).

⁹ European Commission: Directorate-General for Climate Action, Oeko-Institut e.V, HAASE, I., LAUER, S., SCHNEIDER, L. et al., Review of existing initiatives to inform potential climate-related delegated act(s) under the Green Claims Directive – Task 1 & 2, Publications Office of the European Union, 2025, <https://data.europa.eu/doi/10.2834/9180992>.

¹⁰ European Commission: Directorate-General for Communication and Leyen, U. v. d., Europe’s choice – Political guidelines for the next European Commission 2024–2029, Publications Office of the European Union, 2024, <https://data.europa.eu/doi/10.2775/260104>.

¹¹ COM(2025) 85 final Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The Clean Industrial Deal: A joint roadmap for competitiveness and decarbonization, 26 February 2025.

¹² RUBÁČEK, F., MacGREGOR PELIKÁNOVÁ, R., & MacGREGOR, R.K. The sustainability of ESAs triumvirate for sustainability-related disclosures in the financial sector – all for one and one for all. *Acta Universitatis Lodzianis. Folia Iuridica*, 2023, 105, 123–143, <https://doi.org/10.18778/0208-6069.105.08>.

¹³ Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088 (OJ L, 198, 22.6.2020, pp. 13–43, ELI: <http://data.europa.eu/eli/reg/2020/852/oj>).

¹⁴ Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards (OJ L, 2023/2772, 22.12.2023, ELI: http://data.europa.eu/eli/reg_del/2023/2772/oj).

¹⁵ MacGREGOR PELIKÁNOVÁ, R. (2024). EU legislative proposals to involve customers in the greening of the economy. *The Lawyer Quarterly*, 2024, 2, 218–235.

¹⁶ TUREČKOVÁ, K., NEVIMA, J., VAŇOVÁ, A., & VITÁLIŠOVÁ, K. Society 4.0: general economic implications. *Journal of European Economy* [online]. 2023, 22(2), 146-157 [viewed 6 April 2024]. <https://doi.org/10.35774/jee2023.02.146>.

¹⁷ VOULGARIDIS, K., LAGKAS, T., ANGELOPOULOS, C.M. et al. Digital product passports as enablers of digital circular economy: a framework based on technological perspective. *Telecommunication Systems*, 2024, 85, 699–715. <https://doi.org/10.1007/s11235-024-01104-x>.

proper functioning of the internal single market¹⁸ and perhaps, via supply chains, even further beyond.¹⁹

The importance, length, complexity and heterogenous nature all make the study of the Ecodesign Regulation both very much needed and very difficult. A critical and comparative step-by-step content and contextual analysis with a focus on one selected (key) aspect could be instrumental and more suitable than an overwhelming attempt to cover the entire Ecodesign Regulation. Such a key aspect of the Ecodesign Regulation is the famous, and so far rather mysterious and technically unsettled, Digital Product Passport (“DPP”). Since 2026, the DPP as a digital file with detailed information about a product’s life-cycle should be posted on a web portal run by the European Commission regarding a growing pool of products. The DPP should provide comprehensive and easily accessible information on products during their entire life-cycle and this should improve educated and considered decision-making and contribute to both sustainability and circularity.²⁰

Therefore, the aim of this contribution is to conceptually analyze the legal nature of this instrument sui generis. The first step for doing so is to engage with the study of the policy foundation, in particular the EGD and New Circular Economy Action Plan (1.). Then the legislative setting of the Ecodesign Regulation is to be explored (2.), while in particular focusing on the determination and definition of parameters and requirements used by the ESPR and for the DPP (3.). Such a foundation allows for appreciating the ongoing academic discussion (4.). Further, it generates the potential for an indicative comparison with a perhaps similar technical and legal project – TLD .eu. (5). These 5 steps could lead not only to a better understanding of the DPP and Ecodesign Regulation, but as well more generally to a better understanding of the development of the EU policy and law.

1. Policy foundation of the ESPR – DPP as digital sustainability sword

The EU was involved, prepared, contributed to and endorsed both UN Resolution A/RES/71/1 Agenda for Sustainable development 2030 from 25 September 2015 (“UN Agenda 2030”) and the UN Framework Convention on Climate Change which adopted the Paris Agreement on 12 December 2015 (“Paris Agreement”). Namely, for over one decade the sustainability and climate neutrality multi-stakeholder drive has become fully advanced in the internal single market.²¹

Since 2019, the alpha and omega of the policy, and consequently as well legislative endeavors of the European Commissions of Ursula von der Leyen was, is and will be the

¹⁸ GALLARDO-VÁZQUEZ, D., VALDEZ-JUÁREZ, L.E., & CASTUERA-DÍAZ, A.M. Corporate Social Responsibility as an Antecedent of Innovation, Reputation, Performance, and Competitive Success: A Multiple Mediation Analysis. *Sustainability* [online]. 2019, **11**(20), 5614 [viewed 16 September 2023]. <https://doi.org/10.3390/su11205614>.

¹⁹ ZHANG, A., & SEURING, S. Digital product passport for sustainable and circular supply chain management: a structured review of use cases. *International Journal of Logistics Research and Applications*, 2024, **27**(12), 2513-2540. <https://doi.org/10.1080/13675567.2024.2374256>.

²⁰ WAN, P.K.F., & JIANG, S. Enabling a dynamic information flow in digital product passport during product use phase: A literature review and proposed framework. *Sustainable Product and Consumption*, 2025, **54**, 362-374. <https://doi.org/10.1016/j.spc.2025.01.014>.

²¹ VAN TULDER, R., & KEEN, N. Capturing Collaborative Challenges: Designing Complexity-Sensitive Theories of Change for Cross-Sector Partnerships. *Journal of Business Ethics* [online]. 2018, **150**(2), 315–332 [viewed 15 September 2023]. <http://dx.doi.org/10.1007/s10551-018-3857-7>.

self-imposed determination to make Europe the first climate-neutral continent. The plan to do so is the EGD and since its issuance in December 2019, there have not been any doubts about it. Namely, new policy and legislative instruments keep referring to the EGD. Even the Political Guidelines 2024-2029 with “... *We must and will stay the course on all of our goals, including those set out in the European Green Deal.*” and their CID with “*Building on the experience of the EU budget, which contributes to climate-relevant measures supporting the European Green Deal...*” are not the exception. For better or worse, the EGD is the key policy foundation for the ESPR with the DPP.

The EGD has the following four parts: 1. Introduction – Turning a urgent challenge into a unique opportunity, 2. Transforming the EU’s economy for a sustainable future, 3. The EU as a global leader and 4. Time to act – together: A European Climate Pact. The most developed is the 2nd part which deals with eight special transformative policies and with the general mainstreaming of sustainability in all EU policies. Regarding the mentioned eight transformative policies, one of them is labelled Mobilizing industry for a clean and circular economy (2.1.3 EGD) and is based on the finding that “*achieving a climate neutral and circular economy requires the full mobilization of industry.*” This is not just an empty proclamation, because the EGD explicitly indicates that the European Commission will adopt in March 2020 an EU industrial strategy and a new circular economy action plan to assist with the climate neutrality and product circularity in the EU and even beyond.

As announced by the EGD, in March 2020, the European Commission issued the New Circular Economy Action Plan, aka CEAP, which replaced the old Circular Economy Action Plan from 2015. They both share the same vision of a circular economy, but have a different approach – in 2015, the priority was to reduce the waste sent to landfills and incinerators (destruction of garbage), while in 2020, the priority was to tackle the sources of waste (prevention of garbage).²²

This new plan, i.e., CEAP from 2020, has nine parts and already the 2nd part provides for a sustainable product policy framework. This framework has two intra-related pillars to prevent even the emergence of the waste: designing sustainable products (2.1 CEAP) and empowering consumers and public buyers (2.2 CEAP), i.e., to make products less likely to turn into waste. The core of the legislative initiative for designing sustainable products was the widening and intensifying the Ecodesign Directive beyond energy-related products (2.1 CEAP) and this led to the ESPR, while the core of empowering consumers and public buyers (2.2 CEAP) was the new right to repair as a horizontal material right for consumers. Naturally, the ESPR and the Right to Repair Directive are very close, are founded by the EGD and CEAP, they predominantly belong in the same legislative branch (EU consumer protection law), but still they exhibit policy and law differences.

The ESPR was approved and published in June 2024, exactly during the European Parliamentary election. The European People’s Party, led by Ursula von der Leyen, won the most seats in the European Parliament, but still the total number of these seats, 188, was pretty far from the very needed majority of 361, especially since 187 seats were obtained by deputies from hard-right parties. Plainly, Ursula von der Leyen and her new European

²² ZHANG, A., & SEURING, S. Digital product passport for sustainable and circular supply chain management: a structured review of use cases. *International Journal of Logistics Research and Applications*, 2024, 27(12), 2513-2540. <https://doi.org/10.1080/13675567.2024.2374256>.

Commission have witnessed a strong criticism of environmental, climate and immigration policies and the EGD was often used as the shortcut. To the surprise of some, the EGD stayed, but still the CID represents a certain development. In this very context came the consumer policy strategy called “New Consumer Agenda”²³ with the famous “Fitness Check of EU consumer law” to evaluate the pillars of the EU consumer protection law. This pathway organically led to the definitely ambitious ESPR.²⁴

Regarding the policy foundation of the ESPR with the DPP in the narrower sense, the key source of information is the Preamble of the ESPR. In particular, the following wording is relevant *“This Regulation will support production and consumption patterns that are aligned with the Union’s overall sustainability targets, including climate, environmental, energy, resource-use and biodiversity targets, while staying within planetary boundaries, by establishing a legislative framework which contributes to enabling products fit for a climate-neutral, resource-efficient and circular economy, reducing waste and ensuring that the performance of frontrunners in sustainability progressively becomes the norm. It should provide for the setting of new ecodesign requirements to improve product durability, reliability, repairability, upgradability, reusability and recyclability, improve possibilities for the refurbishment and maintenance of products, address the presence of hazardous chemicals in products, increase the energy and resource efficiency of products, ...”* (Preamble 6 ESPR). Further, a number of Preamble provisions deals with the DPP, such as *“The information requirements set under this Regulation should include the requirement to make a digital product passport available. The digital product passport is an important tool for making information available to actors along the entire value chain and the availability of a digital product passport is expected to significantly enhance end-to-end traceability of a product throughout its value chain. Among other things, the digital product passport is expected to help customers make informed choices ...”* (Preamble 23 ESPR). The ecodesign requirements and the DPP are linked to the identification of the product itself, i.e., *“Unique identification of products is a fundamental element as regards enabling traceability across the supply chain. Therefore, the digital product passport should be linked to a unique product identifier”* (Preamble 36 ESPR). The complete digital information is to be freely and easily accessible to the public at large, i.e., *“Digitalised information about the product and its life cycle or, where applicable, its passport should be easily accessible by scanning a data carrier, such as a watermark or a quick response (QR) code.”* (Preamble 37 ESPR).

The policy message is clear, a significant part of products sold in the EU should have to be provided with their DPPs so everyone can have an easy access to digital information about the origin, provenience, ingrediencies, components, involved parties and most importantly its environmental impact.

In sum, the goal of the ESPR is to push for sustainability of all products sold in the EU, regardless whether they are from the EU or not. Waste should be reduced, reparability simplified, product life-span increased and, about all of that (or lack of that), freely available information should be posted. Namely, each product covered by the ESPR should have

²³ European Commission. Press Release. New Consumer Agenda: European Commission to empower consumers to become the driver of transition. 13 November 2020. Brussels [online]. Available from: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2069.

²⁴ MacGREGOR PELIKÁNOVÁ, R. EU legislative proposals to involve customers in the greening of the economy. *The Lawyer Quarterly*, 2024, 2, 218–235.

a unique identity and a link leading to the DPP, i.e., a digital file with detailed information about a product's life. This is the policy vision which was projected in the legislations.

2. Gradually broader and stronger legislative development towards ESPR – DPP as a sharp sword

The over four decades long history of the EU consumer protection started with the Directive 93/13/EEC on unfair terms in consumer contracts (“Unfair Contract Terms Directive”),²⁵ which has been amended and is still valid. This shows that the protection of consumers from unfair terms and conditions in contracts for goods and services is still relevant and that the good faith is not automatic in B2C relationships.

Interestingly, the sister instrument, Directive 98/6/EC on consumer protection in the indication of the prices of products offered to consumers (Price Indication Directive),²⁶ has been amended and is still valid also. So, both unfairness and price misinformation, if not disinformation, are not the past, but rather the present problem. Consequently, the modern consumer protection regime in EU law is founded upon these two classic Directives complemented by an additional three critically important Directives:²⁷ Directive 2005/29/EC concerning unfair business-to-consumer (B2C) commercial practices in the internal market, i.e., Unfair Commercial Practices Directive (“UCPD”),²⁸ Directive 2006/114/EC concerning misleading and comparative advertising (“Advertising Directive”)²⁹ and Directive 2011/83/EU on consumer rights (“Consumer Rights Directive”).³⁰

The UCPD crossed the Rubicon by moving from the fragmented and rather minimal traditional harmonization to systemic full harmonization³¹ while clashing with conceptual disparities in EU Member State laws.³²

²⁵ Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts [online]. In EUR-Lex. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31993L0013&qid=1714464894357>.

²⁶ Directive 98/6/EC of the European Parliament and of the Council of 16 February 1998 on consumer protection in the indication of the prices of products offered to consumers [online]. In EUR-Lex. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31998L0006>.

²⁷ MacGREGOR PELIKÁNOVÁ, R. Harmonization of the protection against misleading commercial practices: ongoing divergences in Central European countries. *Oeconomia Copernicana*, 2019, 10(2), 239–252. <http://dx.doi.org/10.24136/oc.2019.012>.

²⁸ Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market [online]. In EUR-Lex. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32005L0029&qid=1695126831241>.

²⁹ Directive 2006/114/EC of the European Parliament and of the Council of 12 December 2006 Concerning Misleading and Comparative Advertising [online]. In EUR-Lex. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0114>.

³⁰ Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights. [online]. In EUR-Lex. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011L0083&qid=1695281718275>.

³¹ MacGREGOR PELIKÁNOVÁ, R. New pro-sustainability consumer protection directive – the conceptual foundation of the Right to Repair in the current EU law? *Czech Yearbook of International Law – CYIL*, 2024, 15, 165–174.

³² OSUJI, O.K. Business-to-consumer Harassment, Unfair Commercial Practices Directive and the UK – A Distorted Picture of Uniform Harmonisation? *Journal of Consumer Policy*, 2011, 34: 437. <http://dx.doi.org/10.1007/s10603-011-9175-4>.

Prima facia, the ESPR does not bring such a drastic legislative move and merely expands the pre-existing Directive 2009/125/EC on ecodesign requirements for energy-related product.³³ However, a closer examination reveals that the ESPR is much more ambitious and that this Directive from 2009 just harmonized rules regarding energy efficiency without bringing any universal instruments such as the DPP. It cannot be overemphasized that after decades of the EU consumer law, EU reporting law and other EU law branches, the European Commission of Ursula von der Leyen made the move from Directives to Regulations. In the arena of taxonomic and standardized reporting, this occurred in 2020–2023,³⁴ and in 2024 this occurred for the consumer protection law with the ESPR.

Consequently, it can be proposed that the ESPR is a true milestone which further pushed the pendulum of responsibilities and involvement. For better or worse, the EU made the choice for all and in order to make it real, it moved to a detailed substantiation via compulsory parameters setting and to an enhanced transparency via the DPP.

3. ESPR with the Ecodesing requirements – towards the ephemeral almighty DPP

Arguably, the change of the EU consumer law in 2024 turned the famous average European consumer from the *homo economicus* into *homo responsabilis*, armed and equipped with repair rights and other rights to boost sustainability (as opposed to waste and negative life cycle impacts), competitiveness and, generally, a proper functioning of the internal single market.³⁵ However, this right to repair is a Directive based instrument and its enforceability is still questionable.

The ESPR has for its aim to significantly improve environmental sustainability aspects of products placed on the single internal market of the EU. The ESPR is the materialization of the EGD and CEAP by setting ecodesign requirements and making the information about them public via the DPP. In addition, it is the foundation for delegated norms, the regime regarding destruction of unsold consumer products and for setting minimum mandatory requirements to be observed by public authorities within the green public procurement.

Naturally, the most important feature of the ESPR is the compulsory framework of ecodesign requirements to be complied by physical products placed on the EU market in order to boost sustainability and reduce the carbon footprint (Art. 1 ESPR). Consequently, the ESPR does not apply to intangibles, in particular intellectual property assets. In addition, food, medicinal products, plants, animals, etc. are excluded from the reach of the ESPR (Art. 1 ESPR). The rather ephemeral term “ecodesign is defined as the *“the integration of environmental sustainability considerations into the characteristics of a product and the processes taking place throughout the product’s value chain”* (Art. 2 (6) ESPR), i.e., it entails both the

³³ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related product.

³⁴ RUBÁČEK, F., MacGREGOR PELIKÁNOVÁ, R. & MacGREGOR, R.K. The sustainability of ESAs triumvirate for sustainability-related disclosures in the financial sector – all for one and one for all. *Acta Universitatis Lodzianensis. Folia Iuridica*, 2023, 105, 123–143, <https://doi.org/10.18778/0208-6069.105.08>.

³⁵ GALLARDO-VÁZQUEZ, D., VALDEZ-JUÁREZ, L.E., and CASTUERA-DÍAZ, A.M. Corporate Social Responsibility as an Antecedent of Innovation, Reputation, Performance, and Competitive Success: A Multiple Mediation Analysis. *Sustainability* [online]. 2019, 11(20), 5614 [viewed 16 September 2023]. <https://doi.org/10.3390/su11205614>.

substantive and procedural features of one sustainability pillar. Namely, this follows rather the pathway of the environmental taxonomy by the Taxonomy Regulation (4 criteria for environmentally sustainable activities via 6 environmental objectives in the context of the no harm) than the all-encompassing standardization of the CSRD and ESRS Regulation.

In particular, the “ecodesign requirement” is a “*requirement aimed at making a product, including processes taking place throughout the product’s value chain, more environmentally sustainable*” (Art. 2 (7) ESPR), while details are provided in Art. 5 and Annex I ESPR (product requirements) and Art. 7 (2) ESPR (information requirements). Annex I provides a very long list of product parameters, which include usual categories such as durability, reliability, repair, etc., as well as more advanced and sophisticated requirements such as the use of recycled materials or the environmental footprint. All these parameters should serve as a basis for improving the (environmental sustainability) aspects of the product. Art. 7 (2) ESPR stipulates that the meeting of these requirements is to be included in the information in the DPP.

To put it differently, a product can be placed on the EU market only if the DPP with the information about these requirements is available, accurate, complete and up to date (Art. 9 ESPR). Namely, on each product or its packing or its accompanying documentation should be placed the so-called data carrier, i.e., a linear barcode, QR-Code or other automatic identification data capture medium that can be read by a device (Art. 2 (29) ESPR). This data carrier permits getting to the digital file with the information, the DPP (Art. 2 (28) ESPR), which is placed on the special digital platform, i.e., Web portal set up and managed by the European Commission (Art. 14 ESPR).

This rather massive substantive and information duty applies to a broad pool of economic operators – manufacturers, representatives, importers, dealers, and even supply chain actors (Art. 27 et foll. ESPR). The near future will show how this and, in particular, the surveillance and enforcement will work out. However, already right now, the academic discussion tackles the ESPR with the DPP and offers interesting propositions, predictions and even conclusions.

4. Academic discussion about the ESPR with the DPP – controversies and the DPP as the double edge sword

The ESPR is becoming a popular subject of the academic discourse, which predominantly focuses on the DPP. As a matter of fact, perhaps due to the delegation matters, fragmentation or other legal aspects, the DPP is at the center of attention, while the ecodesign and its content or foundation are rather passed on, i.e., the (misleading) simplicity of the DPP makes it attractive for an analysis. The DPP is portrayed as a very modern and transparent digital record, aka electronic tool,³⁶ which serves as a centralized hub for all product-related information boosting sustainability with circularity and the data security of which requires the use of blockchain technology.³⁷ It is even argued that the DPP is a transition instrument

³⁶ ZHANG, A. & SEURING, S. Digital product passport for sustainable and circular supply chain management: a structured review of use cases. *International Journal of Logistics Research and Applications*, 2024, 27(12), 2513–2540, <https://doi.org/10.1080/13675567.2024.2374256>.

³⁷ WAN, P. K. F. & JIANG, S. Enabling a dynamic information flow in digital product passport during product use phase: A literature review and proposed framework. *Sustainable Product and Consumption*, 2025, 54, 362–374, <https://doi.org/10.1016/j.spc.2025.01.014>.

toward the digital circular economy.³⁸ Well, the DPP is a new instrument, but definitely not pioneering, see the product passport concept as advanced by the UK government since 2018.³⁹

Pursuant to the prevailing tenor, the DPP should help manufacturers and dealers to optimize their processes⁴⁰ and consumers to make educated and considered decisions and enhance the resilience of European industries and reduce their dependence on the global supply chains.⁴¹ Some even argue that the DPP should help not only them but as well other stakeholders by generally increasing the transparency and confidence.⁴²

From the technical perspective, it is observed that the DPP is accessed typically via QR codes and RFID tags.⁴³ Regarding technologies to be used by and for the DPP, some authors prefer blockchain technologies⁴⁴ or Hyperledger Fabric technology,⁴⁵ while others go rather for a combination of different technologies – IoT for data collection, AI for data curation and blockchain for leveraging and sharing.⁴⁶ At the same time, there is observed the limitation of blockchain networks due to the scalability, because with the increase of nodes, the entire system might face performance issues, including the growing network latency.⁴⁷ Many authors complain and even lament about the low infrastructure maturity for the DPP and demand its revision and/or very slow, gradual implementation⁴⁸ with real-time adjustments.⁴⁹

³⁸ VOULGARIDIS, K., LAGKAS, T., ANGELOPOULOS, C.M. et al. Digital product passports as enablers of digital circular economy: a framework based on techno-logical perspective. *Telecommunication Systems*, 2024, 85, 699–715, <https://doi.org/10.1007/s11235-024-01104-x>.

³⁹ KING, M.R.N., TIMMS, P.D., & MOUNTNEY, S. Aproposed universal definition of a Digital Product Passport Ecosystem (DPPE): Worldviews, discrete capabilities, stakeholder requirements and concerns. *Journal of Cleaner Production*, 384, 135538. n. <https://hdl.handle.net/2134/21673550.v1>.

⁴⁰ PSAROMMATIS, F., & MAY, G. Digital Product Passport: A Pathway to Circularity and Sustainability in Modern Manufacturing. *Sustainability*, 16 (1), 396. <https://doi.org/10.3390/su16010396>.

⁴¹ WAN, P. K.F., & JIANG, S. Enabling a dynamic information flow in digital product passport during product use phase: A literature review and proposed framework. *Sustainable Product and Consumption*, 2025, 54, 362–374.

⁴² HONIC, M., KOVACIC, I., & RECHBERGER, H. Concept for a BIM-based Material Passport for buildings. Presented at the IOP Conference Series : Earth and Environmental Science. 2019, 225, 1. <https://doi.org/10.1088/1755-1315/225/1/012073>.

⁴³ WAN, P. K.F., & JIANG, S. Enabling a dynamic information flow in digital product passport during product use phase: A literature review and proposed framework. *Sustainable Product and Consumption*, 2025, 54, 362–374, <https://doi.org/10.1016/j.spc.2025.01.014>.

⁴⁴ WAN, P. K.F., & JIANG, S. Enabling a dynamic information flow in digital product passport during product use phase: A literature review and proposed framework. *Sustainable Product and Consumption*, 2025, 54, 362–374, <https://doi.org/10.1016/j.spc.2025.01.014>

⁴⁵ HULEA, M., MIRON, R., & MURESAN, V.D. Digital Product Passport Implementation Based on Multi-Blockchain Approach with Decentralized Identifier Provider. *Applied Science*, 2024, 14, 4874. <https://doi.org/10.3390/app14114874>.

⁴⁶ VOULGARIDIS, K., LAGKAS, T., ANGELOPOULOS, C.M. et al. Digital product passports as enablers of digital circular economy: a framework based on techno-logical perspective. *Telecommunication Systems*, 2024, 85, 699–715, <https://doi.org/10.1007/s11235-024-01104-x>.

⁴⁷ HULEA, M., MIRON, R., & MURESAN, V.D. Digital Product Passport Implementation Based on Multi-Blockchain Approach with Decentralized Identifier Provider. *Applied Science*, 2024, 14, 4874. <https://doi.org/10.3390/app14114874>.

⁴⁸ JENSEN, S.F., KRISTENSEN, J.H., ADAMSEN, S., CHRISTENSEN, A., & WAEHRENS, B. V. Digital product passports for a circular economy: Data needs for product life cycle decision-making. *Sustainable Production and Consumption*, 37, 242–255. <https://doi.org/10.1016/j.spc.2023.02.021>.

⁴⁹ PSAROMMATIS, F., & MAY, G. Digital Product Passport: A Pathway to Circularity and Sustainability in Modern Manufacturing. *Sustainability (Switzerland)*, 16 (1), 396. <https://doi.org/10.3390/su16010396>.

However, neither the complex policy and legislative setting nor the technical aspects are considered as the biggest challenge for the ESPR with the DPP. Instead, as the most burning is mentioned the confidentiality of the information and the alignment between various stakeholders.⁵⁰ Unsurprisingly, the GDPR and similar instruments and concerns are raised and their impact on the DPP is emphasized.⁵¹ Naturally, the eternal balancing between the transparency and confidentiality generates numerous intellectual property issues in this arena.⁵² It cannot be overemphasized how inventions and innovations are important for the EU and for sustainability in general, but here the balancing might be extremely difficult due to entirely contradictory position.

However, these are not the only challenges that are caused by the DPP. In addition to them, it has to be underscored that the DPP ecosystem is a socio-technical system of systems which is allegedly “owned” by the producers, users and disposers of the given product.⁵³ Therefore, as a boomerang, the legal complexity bounces back pointing to so called ownership and responsibility vis-à-vis information in the digital setting. This brings two decades old memories about an EU project demonstrating a number of similarities – the TLD .eu.

5. The ESPR with the DPP v. TLD .eu – same, similar or different?

The endeavor of the European Commission to get their “own” national TLD for the EU to boost the integration, competitiveness and cooperation led to the launching of TLD .eu in 2006 with a very favorable pricing policy, and a registrants and registrars very friendly register. The EURid low bureaucracy and a special legal regime sui generis via Regulation 733/2002,⁵⁴ and later on Regulation 2019/517⁵⁵, looked promising.

However, after one decade, it became clear that the massive hope for TLD .eu as the choice number one in the EU will never be met.⁵⁶ Namely, in December 2015, the total number of registered domain names in TLD .eu was 3.8 million and in December 2025 even under 3.7 million. In contrast, the most popular generic TLD, TLD .com, has increased by 50% and is over 160 million. Various studies discussed it, i.e., why Europeans pass on TLD

⁵⁰ JANSEN, M., MEISEN, T., PLOCIENNIK, Ch., BERG, H., & POMP, A. Stop Guessing in the Dark: Identified Requirements for Digital Product Passport. *Systems*, 2023, 11, 123. <https://doi.org/10.3390/systems11030123>.

⁵¹ JANSEN, M., MEISEN, T., PLOCIENNIK, Ch., BERG, H., & POMP, A. Stop Guessing in the Dark: Identified Requirements for Digital Product Passport. *Systems*, 2023, 11, 123. <https://doi.org/10.3390/systems11030123>.

⁵² JENSEN, S.F., KRISTENSEN, J.H., ADAMSEN, S., CHRISTENSEN, A., & WAEHRENS, B. V. Digital product passports for a circular economy: Data needs for product life cycle decision-making. *Sustainable Production and Consumption*, 37, 242–255. <https://doi.org/10.1016/j.spc.2023.02.021>.

⁵³ KING, M.R.N., TIMMS, P.D., & MOUNTNEY, S. A proposed universal definition of a Digital Product Passport Ecosystem (DPPE): Worldviews, discrete capabilities, stakeholder requirements and concerns. *Journal of Cleaner Production*, 384, 135538. n. <https://hdl.handle.net/2134/21673550.v1>.

⁵⁴ Regulation (EC) No 733/2002 of the European Parliament and of the Council of 22 April 2002 on the implementation of the .eu Top Level Domain (Text with EEA relevance). OJ L 113, 30.4.2002, p. 1–5. ELI: <http://data.europa.eu/eli/reg/2002/733/oj>.

⁵⁵ Regulation (EU) 2019/517 of the European Parliament and of the Council of 19 March 2019 on the implementation and functioning of the .eu top-level domain name and amending and repealing Regulation (EC) No 733/2002 and repealing Commission Regulation (EC) No 874/2004 (Text with EEA relevance.) OJ L 91, 29/03/2019, p. 25–35. ELI: <http://data.europa.eu/eli/reg/2019/517/oj>.

⁵⁶ MacGREGOR PELIKÁNOVÁ, R. *New trends in perception and use of domain names – Critical and Comparative Analysis of the Modern Domain Name Universe*. Ostrava : Key Publishing and Praha : MUP Press, 2015, 144 p. ISBN 978-80-7418-251-8.

.eu and instead take national TLDs, such as German .de, or TLD .com,⁵⁷ and the prevailing conclusion is that this reflects intrinsic motivations, intimate preferences and self-identity perceptions – firstly being “business” (TLD .com) and from a state, e.g., Germany (TLD .de) and only thereafter the European.⁵⁸

Plainly, TLD .eu was an objectively well-conceived and suitable project, which did not exactly suit the preferences of Europeans and this made it the eternal second choice. This testifies that the multistakeholder is the key which can lead to a success only with the support across the society. The ESPR with the DPP is presented as the flagship sailing towards more environmentally sustainable and circular products.⁵⁹ However, very little attention is paid to the intrinsic motivation, intimate preferences and self-identity preferences of Europeans and the positioning of the ESPR with the DPP in the entire sustainability panorama.⁶⁰ Both, the TLD .eu and DPP are well meant pro-integration, pro-competitiveness and pro-sustainability tools, but it is up to Europeans whether they will be genuinely employed and cause the desired effects or whether they will be perceived as obsolete bureaucratic formalism from Brussels. Interestingly, the Web portal for the DPP will be operated by the European Commission and it is highly likely to be placed on the domain from TLD .eu. So let’s see whether the DPP will become a viable instrument pulling up even TLD .eu or merely share the same grim destiny of TLD .eu.

Conclusions

The ESPR is a complex Regulation with hybrid features and covering various law branches and addressing substantive, procedural, technical and even delegation aspects. The legal nature of the DPP is sui generis and due to the unclear technical setting, the academic discussion about it is rather blurred. Certainly, the ESPR with the DPP are the materialization of the EGD and the (new) CEAP. They are determined to strongly advance environmental sustainability and circularity in a regulatory-mandatory manner. They belong to the consumer law area and show how the original minimal harmonization and later on the full harmonization are replaced by a much stricter, more substantiated and detail-oriented approach. They demonstrate similarities with the taxonomy and standardization of the EU recent reporting regime. In addition, their novelty, delegation potential and massive reach make them very relevant.

However, it is so far overlooked that the DPP has an extremely serious overlap in other law spheres and, unlike other measures from the consumer protection and reporting areas, might lead to serious legal controversies. In particular, the confidentiality, security, “ownership”, and

⁵⁷ MacGREGOR PELIKÁNOVÁ, R., & MacGREGOR, R.K. One decade with the TLD of the EU – domain names for all Europeans as a (un)wanted mission (im)possible for three European Commissions. *AA Law Forum*, 2016, 7, 14–33.

⁵⁸ MacGREGOR PELIKÁNOVÁ, R. *New trends in perception and use of domain names – Critical and Comparative Analysis of the Modern Domain Name Universe*. Ostrava : Key Publishing and Praha : MUP Press, 2015, 144 p. ISBN 978-80-7418-251-8.

⁵⁹ WAN, P. K..F., & JIANG, S. Enabling a dynamic information flow in digital product passport during product use phase: A literature review and proposed framework. *Sustainable Product and Consumption*, 2025, 54, 362–374. <https://doi.org/10.1016/j.spc.2025.01.0149>.

⁶⁰ PRAJAPATI, S., & PANDYA, C. ESPR chronicles: unveiling environmental and pollution science trends across time. *Discover Environment*, 2024, 2, 59. <https://doi.org/10.1007/s44274-024-00083-9>.

responsibility identification are extremely problematic. The DPP is a hub for information about the entire life-span of the product and parties involved with it, which can be from not only EU jurisdictions. The effectiveness and efficiency of the DPP strongly depends upon the commitment of all stakeholders and, similarly to TLD .eu, the imposition from above is not sufficient per se. At the same time, the DPP can bring a myriad of international public and private law issues, including chronic issues linked to cross-border transactions in the digital setting. Finally, it needs to be underscored that the DPP will be placed on the Web portal operated by the European Commission. So, the DPP can be a sword and perhaps even a shield in the hands of the EU as well as against the EU. Plainly, the DPP is an interesting instrument for environment sustainability which can fire back.