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Towards a Coherent EU Civil Liability Regime for AI-Caused Harm

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Abstract: *As artificial intelligence (AI) systems become increasingly embedded in cross-border goods and services, the European Union (EU) has undertaken the ambitious task of harmonising liability and conflict-of-laws frameworks to address AI-caused damage. This article critically examines the interaction between the AI Act (AIA), the revised Product Liability Directive (PLD), and the now-withdrawn AI Liability Directive (AILD). The paper explores whether this regulatory architecture sufficiently provides legal certainty, accountability, and access to redress for victims of AI-related harm, particularly in cases involving multiple jurisdictions.*
Using doctrinal and comparative legal analysis, the article evaluates the substantive, temporal, and territorial scopes of these instruments and their interface with private international law, especially Article 5 of the Rome II Regulation (Rome II). It argues that while the AIA and revised PLD represent a coordinated ex-ante and ex-post regulatory scheme, gaps remain, particularly regarding immaterial harms, collective injuries, and causal complexity in opaque AI systems. The AILD, though withdrawn, would have played a crucial procedural role in harmonising fault-based liability across Member States, particularly by introducing presumptions of causation and disclosure mechanisms.
The article concludes that harmonisation of EU liability frameworks requires not only legislative alignment among the AIA, PLD, and future initiatives, but also targeted reforms to private international law rules. Without such integration, the EU risks fragmented litigation, legal uncertainty, and under-enforcement of AI accountability norms across borders.

Keywords: *AI liability; product liability; tortious civil liability; algorithmic harm; cross-border non-contractual damage; EU law harmonisation.*

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Acronyms:

AI	Artificial intelligence
AIA	Artificial Intelligence Act
AILD	AI Liability Directive
API	Application Programming Interface
AV	Autonomous Vehicle
CJEU	Court of Justice of the European Union
EU	European Union
GAI	Generative Artificial Intelligence
GDPR	General Data Protection Regulation
GPAI	General-Purpose Artificial Intelligence
HCLAPL	Hague Convention on the Law Applicable to Product Liability
LLM	Large Language Model
MID	Motor Insurance Directive
PLD	Product Liability Directive
Rome II	Rome II Regulation
SaaS	Software-as-a-Service
SME	Small and Medium-sized Enterprises

Introduction

AI is transforming not only industrial and administrative processes but also the legal frameworks that underpin civil and commercial relations. In the EU, AI systems are increasingly embedded in goods and services that cross borders, operate autonomously, and interact with human users in complex and sometimes unpredictable ways. These systems, defined in the EU as systems that display intelligent behaviour by analysing their environment and taking actions—with some degree of autonomy—to

achieve specific goals (European Commission, 2018), range from automated driving assistants to algorithmic medical diagnostics and financial trading tools, pose novel legal questions that cut across traditional domains of private law, particularly in the fields of non-contractual liability and product safety. Implicitly, legal complexity multiplies when such systems cause harm that transcends national borders and brings about uncertainties concerning who the liable actors are when an **AI system or AI-enabled product causes damage** in one Member State but was developed, trained, or deployed from another, and respectively what the law applicable to disputes concerning AI-caused damage is.

Liability has long served as a foundational mechanism in legal systems to allocate the costs of harm in society, and historically, European tort law was anchored in the notion of subjective fault, holding actors liable when they acted negligently or intentionally. However, as industrialisation introduced new sources of risk, firstly from machines and mass-produced goods, and more recently to AI systems, the law began embracing objective or strict liability, whereby producers could be held liable independently of fault. In this context, liability serves not only a compensatory and **corrective** function, but also a **regulatory** one, ensuring that innovation proceeds in a way that is aligned with Community-imposed standards of public and consumer safety, respect for fundamental rights and the environment, and optimal market conditions for economic growth.

The **autonomous and unpredictable** nature of AI systems, and the complex organisational structures leading to diffused lines of accountability are what infer liability. In turn, having a comprehensive framework for ensuring liability enables the Community to achieve its standards of ***legal certainty*** and ***foreseeability*** for the market, and provide proportionately ***effective redress tools*** and proactive risk management measures, while allowing for the AI ecosystem to innovate further (European Commission, 2018). In this regard, establishing liability for AI systems is subject to impediments caused by a collective or distributed process, known in governance as the "many hands problem" (Thompson, 1980). This is due to the fact that firstly, AI systems often emerge from multi-actor collaborations with fragmented control over their design, training, deployment and use, secondly, the decisional logic of an AI system can be opaque and non-linear, even to its own developers, as is the case for black-box systems, and lastly, the prospective resulting tortious harm can be the result of cumulative or latent design choices, data biases, or interactions with external systems, none of which are solely attributable to one actor.

Therefore, liability for harm caused by AI systems ought to be based first and foremost on regulatory *ex-ante* clarity about role-based responsibilities along the development and deployment pipeline, facilitated by presumptive rules of causation where full technical traceability is unavailable and collective liability mechanisms. For this purpose, the EU has adopted a multi-instrument approach to liability for AI, whose pillars are the AIA, PLD and the AILD proposal.

On the one hand, the AIA establishes technical compliance obligations and the revised PLD provides for strict product liability for material harms. On the other hand, the withdrawal of the proposed AILD left a gap in fault-based, non-contractual liability rules, which are still governed by diverging national laws and subject to assessments in regard to the law applicable to the dispute by private international law instruments.

This paper addresses several questions concerning the effectiveness of the current AI-relevant body of EU legislation:

a. Are the regulatory logics of the AIA and PLD consistent or complementary?

b. Do the AIA and PLD provide sufficient means to establish liability and the law applicable to cases involving AI-caused damage?

c. What role could the proposed AILD have played in harmonising liability for AI-caused damage and what gaps does its withdrawal leave behind?

d. Is there a necessity to revise private international law instruments to align with contemporary EU law on AI and product liability?

This paper will address these concerns by analysing the complementarity between the AIA and PLD, the role of conflicts-of-law rules in cross-border AI litigation, and the background of the AILD.

The AIA and PLD

The AIA, proposed by the EU Commission in April 2021 and enforced starting from August 1, 2024, is the EU's first **horizontal regulatory instrument for AI systems**, grounded in a risk-based framework that imposes obligations on providers, users, importers, and distributors of high-risk AI systems. It ought to be understood as an *ex-ante* device whose primary objective is to prevent harm by ensuring AI systems are safe and rights-respecting before they enter the market.

The revised PLD, proposed by the European Commission in September 2022 and to be transposed by Member States by December 9, 2026 (Article 22(1) PLD), amends its 1985 predecessor and modernises its **strict liability regime** in response to digitalisation and the rise of AI

systems. The PLD serves as an *ex-post* device which complements AIA, and extends strict liability to defective autonomous vehicles, AI-powered medical devices, decision-making algorithms and AI embedded in consumer electronics, facilitating efficient compensation schemes to victims and incentivising accountability for AI-enabled products. The PLD is to be interpreted as wholly harmonising within its substantive scope, since it explicitly covers liability for AI systems and confirms that software, AI systems and AI-enabled goods belong within the definition of a product (Article 4(1) PLD). The PLD also successfully addresses the evolving nature of AI systems that modify themselves after deployment (Recital 17 PLD), since liability now extends not just to the AI-enabled product at the moment of its release on the Community market, but also to subsequent updates, upgrades and learning processes. To boot, in order to tackle the information asymmetry and the opacity of AI systems, the PLD introduces a rebuttable presumption of defect and causation, which eases the burden of proof on injured parties where the AI-enabled product fails to comply with safety requirements or cannot be assessed due to lack of disclosure, or when a defect is likely to have caused the damage.

In contrast, the PLD's predecessor, adopted in 1985, was designed for a world of tangible, physical goods, providing an EU regime of strict liability of traditional manufacturers and distributors for damage caused by defective products. The revised PLD changes the narrow categories of liable persons introduced by its predecessor narrow conception of liability, and extends strict liability to AI developers, importers, authorised representatives, online platforms, and component or software developers involved in modern AI supply chains (Recital 38, Article 8 PLD). Not only that, but the PLD now bridges a crucial legal gap, because previously individuals who suffered damage caused by an AI system had to often rely on national tort law, which was often outdated and ill-equipped for modern technology, and prove fault—a complex task given some AI systems' black-box nature. Nonetheless, victims of AI-caused harm often remain ineligible for damages under the PLD, because the respective black-box AI system may either not fit within the definition of a defective product under national law, or the harm it produced cannot be causally linked to the provider (Duffourc & Gerke, 2023).

Together, the AIA and the PLD embody the **EU's dual-track approach to AI regulation**: combining *ex-ante* market controls with *ex-post* civil liability. However, an uncertainty underlying the assumption that an intra-EU case would be efficiently governed by the recent EU body of legislation tackling AI systems remains: Are the AIA and PLD harmonised

in such a way as to permit a consistent interpretation? The answer lies within the extent of the complementarity and gaps between the definitions, presumptions and scopes posed in the AIA and PLD (Poesen, 2025).

Risk management, conformity, causation and evidentiary presumptions as inputs to liability

The AIA's conformity requirements play a grand role in shaping the definitions and interpretation of defectiveness under the PLD, even though the PLD does not directly incorporate the AIA. The compatibility between the two instruments is first made evident by the **definition** of 'AI system' common to both (Recital 12, Article 3(1) AIA, Recital 13 PLD).

The PLD significantly eases the **burden of proof** that falls upon the claimant, because despite still having to prove the existence of a causal link between the defectiveness of the product and the damage suffered as a result of its defectiveness (Article 10(1) PLD), it presumes defectiveness where the product fails to comply with safety requirements under EU or national law (Article 6(2)(c) PLD). To boot, the PLD requires national courts to presume the existence of both a defect and a causal link where it is excessively difficult for the claimant to prove so due to the technical intricacies of the product (Article 10(4), Recital 48 PLD). This opens the door for national courts to consider non-compliance with AIA obligations, such as inadequate risk assessment or lack of human oversight, as indicative of a defect, thereby linking the AIA's regulatory standards to the civil liability adjudication covered by the PLD.

These provisions therefore prove to be particularly useful in AI contexts involving adaptive or opaque systems, where establishing the exact causal chain between an algorithmic malfunction and the resulting harm is prohibitively complex. Nonetheless, one could argue that the definition of set forth in the PLD, which links defectiveness to the **expectations** of the public at large (Recital 31 PLD) and the manufacturer's **reasonable foreseeability** of the product's use (Article 7(2)(b) PLD), is rather subjective when interpreted directly, given that the public can rarely form accurate safety expectations for complex AI systems (Borghetti, 2023).

Scopes of application

Although the AIA and PLD operate distinctly— *ex-ante* regulatory governance and respectively *ex-post* liability—they are intended to function coherently within the EU's internal market to secure consumer safety and predictability and certainty in the EU legal order. To achieve this goal, the two instruments must provide the basis for harmonised judicial interpretations of their substantive, territorial and temporal scopes of application.

Substantive scope

On the one hand, the AIA is first and foremost a technology regulation, since it establishes a general framework for the safe design, placing on the market, and use of AI systems. It targets primarily high-risk AI systems, defined by their intended use and sector, such as critical infrastructure, education, employment, law enforcement, and healthcare (Articles 6–9, Annex III AIA), and thus, its normative focus is prospective: preventing harm through design-time obligations such as risk management, data governance, robustness testing, human oversight, and post-market monitoring (Articles 8–15, AIA).

On the other hand, the PLD is a civil liability instrument, grounded in the principle of strict liability for defective products. It is thereby triggered after harm has occurred and applies to material and digital products, including AI systems and software (Article 4(1) PLD), that fail to provide the safety which the public is entitled to expect (Article 6 PLD). The PLD's substantive reach is arguably broader in one sense, as it covers all defective products regardless of risk category, but narrower in another sense, as it is limited to compensable damage, defined as death, personal injury, or damage to property (Article 6(1) PLD). Under the PLD, a defective product is one that lacks the safety an individual is entitled to expect or that is required under EU or national law (Recital 30 PLD).

Although the AIA does not contain such liability provisions, it still successfully plays a normative and evidentiary role in PLD claims, since, as stated in the precedent section, non-compliance with AIA obligations can be considered a rebuttable presumption of defectiveness (Article 9(2) PLD). In this sense, the AIA complements PLD by providing technical benchmarks for interpreting what constitutes a defective AI product and thereby helping establish strict liability. The strict liability in question, under the PLD, extends to producers of AI systems and AI-enabled products, including the manufacturer of the product or component, the developer or modifier of software, the importer or authorised representative, and, in the absence of these, the supplier who places the product on the market (Article 7 PLD). The AIA has an even more comprehensive scope, imposing its regulatory regime on providers of AI systems, deployers, which are broadly defined (Recital 13 AIA), importers, distributors and authorised representatives, and affected users (Article 2 AIA), each with tailored obligations to their respective role.

One could argue that this actor-wise discrepancy in scope between the AIA and PLD represents an actor misalignment which may raise concerns about effective accountability. For a proper assessment, we ought to consider that AI systems, especially those using machine learning, can be

designed to adapt or improve over time via retraining. Where retraining is done by the end-user, for example a hospital fine-tuning a diagnostic model with local patient data, the risk profile of the system may significantly change. Therefore, one could raise two relevant questions, namely whether the hospital is now a producer under the PLD, and respectively whether the retraining it conducted triggers post-market obligations under the AIA.

The AIA and PLD jointly provide a clear answer to the former: 'under certain specific conditions, any distributor, importer, deployer or other third-party should be considered to be a provider of a high-risk AI system and therefore assume all the relevant obligations' (Recital 84 AIA). The Recital further clarifies that a case that would fall under the 'specific conditions' would be one where the party in question makes a 'substantial modification to a high-risk AI system that has already been placed on the market or has already been put into service in a way that it remains a high-risk AI system' or if it 'modifies the intended purpose of an AI system which has not been classified as high-risk and has already been placed on the market or put into service, in a way that the AI system becomes a high-risk AI system'. Whether the retraining of the AI-enabled diagnostic system constitutes a substantial modification thereby depends, in both the AIA and PLD, on whether the changes in its risk profile occur at the level of its algorithm and performance, and on whether the changes have been 'pre-determined by the provider and assessed at the moment of the conformity assessment' (Recital 128 and Article 3(23) AIA, Recital 39 and Article 4(18) PLD). Therefore, if a hospital or end-user retrains a machine learning model in a way that substantially changes its risk profile, for example altering the accuracy of the diagnostics, this action can be deemed a substantial modification. The PLD further clarifies whether the hospital or end-user becomes the manufacturer or producer in the case at hand within the meaning of Article 4(10)(a) PLD, by stating that where the substantial modification is made through machine learning, the modified AI-enabled diagnostic model or AI system is presumed to have been made available on the Community market at the time of the modification (Recital 40 PLD). Therefore, we can conclude, albeit more difficultly, that the end-user itself becomes burdened with the strict liability of the original manufacturer under the PLD, where its substantially modified AI system causes harm.

The answer to the latter question can be derived from this conclusion, since when the retraining constitutes a substantial modification, it triggers obligations along the AIA AI value chain (Article 25(1)(b) AIA), including the obligation to have a post-market monitoring system in place, within the meaning provided in Article 3(25) AIA (Recital 155 AIA). Furthermore, the

AIA stresses the importance of post-market monitoring (Recitals 65 and 114 AIA) and acknowledges AI systems and AI-enabled products' ability to create new risks or alter their functions. This acknowledgement is complemented by the PLD, which also underlines the unique modifiability and learning capacities of AI systems, and attributes liability for software developers and actors modifying AI systems even post-deployment, not just at the design phase but also throughout the lifecycle of the AI system or AI-enabled product (Recitals 17 and 18, Article 7(1)(d) PLD). As a result, one could argue that the AIA and PLD display a thoroughly harmonised and adaptable call for user accountability in cases where an end-user substantially modifies a high-risk AI system through machine learning.

However, it is notable to address the PLD's narrow criterion for attributing liability, namely the materialisation of death and personal injury, damage to property and loss or corruption of personal data (Recital 20, Article 6(1) PLD).

Firstly, although the PLD states that compensation for immaterial harm resulting from the aforementioned is possible (Article 6(2) PLD), unless the respective immaterial harm is recognised in the national legal systems of the Member States concerned—which is often not the case in AI-related disputes due to outdated or national laws—claims for pain and suffering, emotional distress, loss of enjoyment of life or loss of consortium caused by a defective AI system will not prompt intervention by the PLD. Similarly, compensation for pure economic loss, privacy infringements or discrimination are explicitly outside the PLD's substantive scope (Recital 24 PLD), even where the harms in question having been caused by flawed algorithmic decisions ridden with bias or discrimination (Wachter, 2024).

While the AIA refers to bias, requiring for AI systems to be assessed for biases likely to affect health, safety, or fundamental rights, and mitigated (Article 10(2)(f), Article 10(2)(g) AIA), the PLD's scope only extends to such bias if it results in a defect causing material damage. Similarly, inadequacy with respect to embedding fairness, non-discrimination and explainability in AI systems must manifest as tangible harm-causing defects for the PLD to be relevant. From these limitations, one could infer concerns about the PLD's coverage of ethical damage, including reputational harm (Mittelstadt et al., 2023), hallucinations in generative artificial intelligence (GAI) (Bender et al., 2021), or autonomy erosion, which are only augmented by the evidentiary burden that prospective AI-caused damage victims face when proving defectiveness of a product (Article 9 PLD). This blind spot also has particularly disproportionate implications on marginalised groups who are not legislatively protected from discrimination facing AI-enabled discrimination

(Wachter, 2024), potentially leading to wrongful welfare denials, or predictive policing abuses without meaningful redress in the absence of harm to body or property. Even though the AIA tackles the concept of collective harm through the term of 'widespread infringement' (Article 3(61) AIA), the PLD's regime of individualised liability (Article 5(1) PLD) and causality standard (Article 10(1) PLD) diminishes the normative meaning of collective harm.

Secondly, the PLD explicitly excludes damage to professional property, including data used for professional purposes from its scope (Recital 22, Article 6(1)(b)(iii), (c) PLD). Even though the PLD states that its purposes are that of creating a genuinely uniform internal market, and harmonising EU-wide product liability rules, its exclusion of situations where legal persons are subject to AI-caused property damage or data corruption is contradictory would not undermine, nor enhance the protection the PLD grants consumers. While the PLD's status as a Directive does indeed allow for flexibility when transposed by Member States, its explicit inapplicability to damage to professional property is unnecessary.

Taking these limitations into consideration, one could argue that the accountability framework offered by the AIA and PLD is ill-equipped for dealing with liability for intangible damage, collective harms and probabilistic or opaque risks.

Territorial scope

The territorial scopes of the AIA and PLD represent a manifestation of the EU's strategic ambition to regulate AI comprehensively, both within and beyond its borders. This section analyses the geographical reach of both instruments, identifies key jurisdictional principles, and assesses how they apply to liability determination in complex global supply chains involving both EU and third-country parties.

The AIA exhibits a strong extraterritorial effect, being applicable not only to providers and users established in the EU, but also to third-country providers placing AI systems on the EU market or putting them into service within the EU (Article 2(1) AIA). Arguably, this Brussels effect of regulatory reach is deliberate, seeking to ensure that all AI systems affecting EU residents meet EU standards, irrespective of the provider's location, thereby creating obligations for actors located outside the EU whose systems enter the EU market, and enforcing de facto global compliance for international AI developers (Hacker, 2023). This replicates the GDPR's global impact and thus the AIA's extraterritorial effect can be interpreted as a paradigm example of the EU's ability to shape global standards for emerging technologies by using market access as leverage (Bradford, 2020).

The PLD's territorial scope is determined indirectly through the national laws of EU Member States, which will transpose the Directive by the end of 2026. The critical territorial link here is the commercial availability or integration of a product in the EU market, which, alike the AIA, implies liability for third-country parties if the product they manufactured, imported, provided or distributed reached EU consumers.

While the AIA and PLD cover liability of third-country parties, the PLD's approach, inherent to its nature as a Directive, could lead one to argue that the PLD leaves room for divergence and fragmentation amongst EU Member States' civil tortious liability regimes, and eventual forum-shopping opportunities.

Temporal scope

The AIA came into force in the EU legal order on August 1, 2024, with different provisions going into effect gradually. So far, prohibitions on prohibited AI practices took effect from February 2, 2025. What follows is for GPAI rules to take effect starting from August 2, 2025, rules for high-risk AI systems from August 2, 2026, and rules for AI systems that are products or safety components of products regulated under specific EU law from August 2, 2027.

The PLD came into force on 8 December 2024 (Article 23 PLD) and will apply to products placed on the market or put into service after 9 December 2026 (Article 2(1) PLD). For products placed on the market before this date, Directive 85/374/EEC continues to apply (Article 21 PLD), which does not cover AI-related liability.

Recommendations

This paper proposes two ways in which the EU could further align the substantive scopes of the AIA and PLD to close gaps in coverage of AI-caused harm:

a. A future amendment or complementary instrument, which could explicitly cover immaterial harms, such as algorithmic discrimination or harm to dignity, and facilitate claims for collective injuries. This would prompt the PLD's individual-centric notion of harm to align with the concept of widespread infringement acknowledged by the AIA, to provide an effective and predictable EU-wide redress mechanism for intangible damage.

b. A future amendment of the provisions excluding professional property from the PLD's substantive scope, which could state that such limitation or exclusion clauses should be accepted subject to conditions that are normally applicable under Member States' law (Borghetti, 2023).

Conflicts-of-law rules in AI litigation: Rome II

Conflicts-of-law rules continue to apply to establish the applicable law in cross-border, tortious product liability disputes. This section will refer to Rome II.

Scope of Application

Substantive Scope

Rome II's substantive scope is clear—It establishes the national law applicable to situations involving both a conflict of laws and non-contractual obligations (defined in CJEU, 1992, 1998) that are likely to arise or have arisen in civil and commercial matters (Article 1(1), Article 2 Rome II), including **product liability** (Article 5 Rome II). Thereby, the relevancy of Rome II depends on the existence of one or more foreign elements connected to the case, which entail the application of several legal systems by the forum (European Commission, 2003). In this context, 'forum' refers to the courts and tribunals, which in their exercise of judicial functions of a Member State, hear the case at issue (Dickinson, 2008).

Unlike the PLD's strict liability regime, Rome II applies regardless of the substantive ground of liability, be it fault, defect or strict, called for by the claimant or designated by the applicable law, as long as it is non-contractual (Whittaker, 2011). The special rule on product liability imposes that the law applicable to a non-contractual obligation arising out of damage caused by a product is that of the country where the claimant habitually resides, provided that the product was marketed there, or failing that, where the product was acquired provided that the product was marketed there, or failing that where the damage occurred provided that the product was marketed there (Article 5(1) Rome II). Nevertheless, if the defendant could not have foreseen the marketing of the product in the respective country, the applicable law will be that of the defendant's country. In the same fashion as the general rule (Article 4 Rome II), the special rule for product liability also provides for an escape clause, according to which the law of a country that is manifestly more closely connected to the facts of the case than the one assessed in the first paragraph, shall be given priority (Article 5(2) Rome II).

Similarly, parties have the **freedom to choose** another law than the one designated by Article 5, provided that their choice of law is expressed and demonstrated with reasonable certainty through either an agreement entered into after the occurrence of the event giving rise to damage, or a freely negotiated agreement before the occurrence of the event insofar as the parties are pursuing a commercial activity (Article 14(1) Rome II). However,

the law designated by either the general rule or a special rule shall be prioritised where all elements relevant to the case are located in a country other than the one whose law was freely chosen by the parties (Article 14(2) Rome II).

Unlike the PLD, Rome II does not require the product to be defective, but for damage caused by the product to occur. Rome II specifically advances the goals of protecting consumers and maintaining the foreseeability of the internal market in the context of emerging technology (Recital 20 Rome II), which arguably hints at an alignment with contemporary substantive EU law, rather than an autonomous static meaning of 'product', in order to adapt to the needs of the referred high-technology society and prevent fragmentation within the EU legal order.

EU Member States considered it **premature** to amend Rome II (European Commission, 2021) to accommodate AI-caused damage due to the uncertainty of the nature of legal issues that may arise as AI systems continue to develop, which was upheld by the European Commission on January 31, 2025 (European Commission, 2025). The Commission is so cautious about untimely decisions concerning the adaptation of Rome II to AI-related disputes due to the lack of jurisprudence and specificity regarding AI liability, that it questions whether the possibility is to be even considered given Rome II's deliberately technology-neutral nature. This section shall thereby explore the hypothetical extent of a prospective amendment of Rome II's product liability special rule, meant to equip Rome II for facilitating cross-border cases involving damage caused by AI systems and AI-enabled products.

Even upon transposing the PLD's definition of **'product'** in Rome II, uncertainties remain in regard to where and when damage caused by an AI system occurred, where an AI system was acquired, and whether an AI system was foreseeably marketed in a given country. The heavy focus on causation in Rome II's special rule fails to account for the pervasive, unpredictable and elusive nature of AI systems and AI-enabled products, which circulate and cause damage invisibly at paces that do not allow for full reliance on such strict causal factors. Therefore, even if the term 'product' was to be interpreted in conjunction with the definition provided by the PLD, Rome II would still necessitate revision to cater to the distinct demands of AI systems.

Assessing the location of the AI-caused injury's occurrence currently necessitates reliance on jurisprudence of the Court of Justice of the European Union (CJEU), where the CJEU ruled that the *locus damni* designates the country where the initial damage occurred as a result of the

normal use of the product for the purpose for which it was intended (CJEU, 2009). The definition of "**normal use**" in the context of an AI system proves problematic, not only because AI-enabled products are inherently unpredictable due to their self-learning nature, but also because they are subject to substantial modifications.

Does Rome II adopt a similar approach to the PLD, whereby the substantial modification of an AI system attributes new liability and a new definition of "normal use", or does Rome II consider the "normal use" of a product to be the intended use of its initial algorithm? The harmonised meaning of intended use refers to the use for which a product made available on the Union market is intended in accordance with the information provided by the manufacturer or importer (European Commission Notice, 2022). The adoption of this same meaning in Rome II would facilitate a smoother interpretation of what indirect consequences of the primary harm entail. Rome II stipulates that the territories where indirect consequences of the harm manifest are irrelevant for establishing the applicable law (Article 4(1), Recital 17 Rome II), thereby demonstrating unfitness to accommodate the prospect of AI-caused collective and widespread harms, much like the PLD. The temporary factor is similarly difficult to assess, because the time of the damage caused by an AI-enabled product can vary depending on the nature of the damage.

The concept of damage itself within the meaning of Rome II is broader than the one in the PLD, and encompasses, besides death, physical injury or property damage, non-material harms, as long as the latter is an indirect repercussion arising out of tort, unjust enrichment, *negotiorium gestio* or *culpa in contrahendo* (Article 2(1) Rome II). CJEU jurisprudence has already confirmed that Rome II's definition of damage includes **intangible injury** such as emotional suffering (CJEU, 2015) and pure economic loss (CJEU, 2016). In this sense, AI-caused damage may unfold gradually or remain latent. For example, if an AI tool manufactured by a company with its statutory seat in Spain and advertised on the EU market generates manipulated video content that circulates online, damaging the reputation of a natural person with her habitual residence in Poland over time, the damage can be considered to accrue progressively without a single identifiable start date. In addition, the reputational harm in this scenario is tied to a broader product liability claim, such as the negligent deployment of an unfiltered GAI system, and arguably falls outside the defamation exception (Article 1(2)(h) Rome II). Determining the time when the harmful event occurred under Rome II can also prove difficult.

Furthermore, if Article 5(1)(a) Rome II does not allow for application because the product was not marketed in the country where the person sustaining the damage had his or her habitual residence when the damage occurred, Article 5(1)(b) Rome II presupposes determining the country in which the product was **acquired**. If the product was not marketed in the respective country, the law of the country where the damage occurred will be designated.

As seen, even if one accurately determines where the AI-caused damage occurred, or where the AI system was acquired, and attempts applying Article 5(1)(a), (b) or (c) Rome II, an additional assessment of whether the AI system or AI-enabled product was marketed in the respective country is warranted. The meaning of **'marketed'** was hinted at with reference to a manufacturer's controlled sales network in the Commission Proposal (European Commission, 2003) but has no established definition in the current Rome II. Nevertheless, in conjunction with Rome II's self-assumed mission of aligning itself with the high-technology society in which it operates, the harmonised EU interpretation of market placement in regard to products is relevant. In this sense, a product falling under the scope of Rome II's product liability rule ought to be deemed to have been marketed upon having been made available for the first time on the EU market (European Commission Notice, 2022), in order to align with the PLD's approach to the distribution chain (Article 4(7), Article 4(8) PLD).

Moreover, since the **foreseeability** clause allows the defendant to rebut application of the injured party's law if the marketing of the product in that country was not reasonably foreseer (Article 5(2) Rome II), an assessment of the extent of a manufacturer's ability to foresee the marketing of his product in a specific country is required. This clause—traditionally intended to protect producers from unexpected liability—becomes problematic in the AI context where products often circulate outside traditional distribution chains, especially in the case of large language models (LLMs), GPAI systems, and open-source model libraries. These products may be deployed by downstream users far removed from the original developer's sales network, making the foreseeability of marketing become an unstable criterion which opens the door to diverging national interpretations.

Territorial and temporal scopes

Rome II's territorial scope is universal (Article 3 Rome II), meaning its conflict-of-laws rules apply even where the law designated is that of a third country, which mirrors the PLD's extraterritorial effects where a third-

country party makes the defective product available on the EU market. Rome II is given priority over the Hague Convention on the Law Applicable to Product Liability (HCLAPL) unless the States concerned had been parties to HCLAPL at the time Rome II was adopted (Article 28 Rome II) or where Rome II is inapplicable to them, as is the case for Norway, North Macedonia, Montenegro and Serbia.

As stated, in cross-border, tortious cases, the PLD's civil remedies can only take effect in the country whose law was designated upon applying Rome II's special conflicts-of-law rule. Thereby, given the connecting factors listed in Rome II, one can assume that the special rule will refer to the designated national legal system's transition of the PLD in product liability cases for damage caused by AI systems within the AIA's territorial scope (Poesen, 2025). We will consider a tortious case involving a third-country provider of autonomous vehicles (AVs) intended for food and grocery deliveries, who put its products in circulation in Croatia on January 1, 2027. A natural person with her habitual residence in Slovakia travels to Croatia on spring break that year and suffers bodily injury after one of the self-driving vehicles loses control as a result of a malfunction while delivering an order. Even if the only EU Member State where the third-country provider has marketed its product is Croatia, the product will fall within the AIA's territorial scope (Article 2(1)(a) AIA) and the application of Rome II (Article 5(1)(c)) Rome II) will lead to the application of Croatia's transposition of the PLD in its national legal system.

Rome II's temporal scope covers events giving rise to damage that occur after January 11, 2009 (Article 31, Article 32 Rome II). Therefore, upon the transposition of the PLD in EU Member States by December 9, 2026, Article 5 Rome II will further ensure on the one hand, that EU citizens subjected to tortious damage caused by an AI system or AI-enabled product put into circulation by a third-country party can access an effective redress mechanism, and on the other hand, that the territorial scopes of the AIA and PLD remain harmonised.

Recommendations

To effectively accommodate this harmonisation, this paper regards future amendments to Rome II to be crucial, particularly with respect to Article 5 Rome II's connecting factors, that fail to reflect the realities of AI-enabled products, which are often intangible, continuously updated, and integrated across multiple jurisdictions.

Considering the substantive reforms introduced by the AIA and PLD which will take effect in the following years, Rome II's conflict-of-laws

rules will require revision once AI systems' behaviours will garner sufficient judicial appraisal and specificity, to avoid fragmentation, enhance legal certainty, and support a coherent liability regime across the EU. Thus, this paper proposes four prospective amendments to Rome II:

a. The introduction of a legally binding definition of 'product', mirroring the PLD's recognition of software and AI systems as products, regardless of form—standalone, embedded, or provided as a service (Recital 13 PLD).

b. The clarification of the term 'marketed' under Article 5 Rome II which includes digital and decentralised forms of availability, such as open-source repositories, remote APIs (application programming interfaces), and SaaS (Software-as-a-Service) platforms, consistent with the PLD (Recitals 13, 14 PLD) and the harmonised EU interpretation of market placement.

c. The codification of a foreseeability test which complements the PLD's rebuttable presumption framework (Article 10(2) PLD), in such way that foreseeability of marketing can be inferred from factors such as contractual networks, technical interoperability, cross-border access, and the developer's knowledge of downstream uses to reinforce predictability and limit forum shopping.

d. The clarification of the temporal ambiguity of AI-related damage, given that AI-caused harm may be cumulative, latent, or triggered by third-party inputs, for example using a normative clarification of how to assess the timing of damage—possibly through a presumption that damage occurs upon first manifestation of negative effects attributable to the AI system's function, even if that function is modified post-deployment.

The AILD

Scope of application

The AILD is a 2022 proposal from the European Commission, which was withdrawn in early 2025, aimed at adapting civil liability rules for AI across the EU by tackling compensation gaps in existing national tort laws which are seen as ill-equipped for AI-related harms (Duffourc & Gerke, 2023). Its substantive scope concerns solely **damage caused by AI systems** and intends to minimally harmonise the procedural dimension of non-contractual fault-based liability under EU Member States' national laws (Recital 9, Article 1(2) AILD) by easing the burden of proof in AI-related cases without overhauling Member States' fundamental liability concepts.

The proposal explicitly states its purposes, namely those of supporting the functioning of the internal market, completing the EU AI

liability framework to facilitate the rollout of AI systems across the EU for economic and societal benefits, and ensuring substantive and territorial consistency with the AIA (Recital 5, Recital 7, Recital 15, Article 2(1), (2), (3), (4) AILD). The AILD does not introduce new strict liability regimes for AI, as those remain governed by the PLD, and does not redefine the meanings of fault or damage, which remain governed by Member State law (Recital 24).

Substantive scope

The AILD and PLD are meant to operate in conjunction to govern AI-caused harm, and their complementary design would ensure that most AI-related tortious scenarios have some relevant EU-level rules (Explanatory Memorandum, AILD). In the absence of the AILD, only the PLD's domain remains harmonised EU-wide, and any AI harm falling outside a product defect scenario relies purely on disparate national tort laws which lead to fragmented domestic AI-specific adaptations across Member States. Nevertheless, the AILD's enforcement would not alter the available **types of compensable harm**, which would still depend on national law, meaning that the **liability gap** left by the PLD with respect to purely immaterial and societal harm—which are rarely actionable at the domestic level—remains. This proves problematic because AI systems unequivocally presuppose intangible, collective harms that ultimately become burdens on both the individual and societal level (Wachter, 2024), meaning that the AILD would also fail to enact a EU-wide compensatory standard for for pure economic loss, bias or discrimination.

Notwithstanding this shortcoming, although the AILD would not substantively unify AI liability at the EU level, it would **harmonise minimum procedural guarantees** which facilitate claimants' access to more favourable national laws in cases of damage caused by AI systems, where the damage is caused by an output or the failure to produce an output through the fault of an AI provider or user (Recital 15). In this context, the AILD targets the information asymmetry, high costs and lengthy proceedings in AI litigation (Explanatory Memorandum, AILD) through measures concerning the disclosure of evidence (Article 1(1)(a) AILD) and a rebuttable presumption of causality (Article 1(1)(b) AILD).

Firstly, the AILD would empower national courts to order the **disclosure of relevant evidence** about high-risk AI systems, which are defined according to Article 6 AIA, that are suspected of having caused damage (Recital 19, Article 3(1) AILD), and such disclosure could be requested by the victim before formally filing a liability claim insofar as the victim shows sufficient plausibility with respect to his or her claim. This

measure is arguably balanced because it would mitigate the black box issue while ensuring the limitation of disclosure to what is necessary and proportionate by providing safeguards for trade secrets and confidentiality in line with AIA requirements (Recital 18, Recital 20 Article 3(4) AILD, Article 26(10) AIA). To boot, it would create pressure on parties with obligations under the AIA, such as distributors, importers or deployers to cooperate with AIA's transparency requirements (Article 50 AIA), since their failure to comply with a disclosure or evidence-preservation order would enable the court to invoke a presumption that they breached their duty of care.

The reinforcement of **multi-actor liability** also recognises that in AI supply chains, the relevant information ranging from training data to algorithms to event logs, lies with different entities, which enhances the trustworthiness in the EU-wide accountability framework (Recital 17 AILD).

Secondly, the **rebuttable presumption of causality** introduces a targeted presumption of a causal link between the allegedly liable AI operator and the AI output that caused the harm (Article 4(1) AILD). Generally, in cases involving AI-caused harm, even if the claimant shows that the AI was flawed or its operator was negligent, it is often exceedingly complex, timely and costly to prove that this fault caused the specific harm, for example that a lapse in the AI's training data led to the erroneous output that injured the victim.

Under the AILD, if the claimant proves the allegedly liable operator's fault, such as non-compliance with a **duty of care** within the obligations set by the AILD and AIA (Article 2(9) AILD), and it is reasonably likely that this fault influenced the AI system's output, then causation between the fault and the damage is presumed (Recital 21 AILD). The defendant can rebut this (Article 4(7) AILD) by submitting evidence showing, for instance, that the harm would have occurred regardless of the fault, nonetheless in the absence of such rebuttal, the claimant is not required to explain the AI's intricate internal failures.

This also appears to be a balanced measure, because the presumption applies only when the circumstances make it probable that the fault affected the harmful outcome (Recital 25, Article 4(b), (c) AILD) and the defendant cannot prove that the claimant has reasonable access to the evidence and expertise required to establish a causal link (Article 4(4) AILD). Such circumstances are described in the context of AIA requirements (Article 4(2) AILD) and encompass the training of AI models with data that does not meet the quality criteria set by Article 10(2) to (4) AIA, the development of AI system without respect to the transparency, oversight or accuracy, robustness and cybersecurity requirements set by Articles 13, 14,

15, 16(a) AIA, or the inaction in conforming or withdrawing the AI system pursuant to the obligations set in Title III, Chapter 2 AIA. In other words, it is both a fair interference, reminiscent of the PLD's own rebuttable presumption clause (Article 10(2) PLD) based on the facts of the case, not an automatic jump to attributing liability, and a burden of proof-mitigating measure which unburdens the claimant with respect to further dissecting the AI's algorithmic decision-making to connect all the dots.

Thirdly, the AILD allows Member States to adopt stricter, more claimant-friendly national **rules beyond its minimum harmonisation floor** (Recital 14, Article 1(4) AILD), unlike the PLD which, as a fully harmonising Directive, does not allow for Member States to depart from the rules on matters it covers. Thereby, even though the AILD sets common requirements, Member States can go further, for example by introducing special liability rules for certain AI applications or by expanding the categories of compensable AI harms, provided that they are compatible with EU law and do not provide a lower level of rules than what the AILD imposes (Li et al., 2025). This flexibility would improve the liability framework by allowing innovative national solutions which could potentially include awards of damages for pure economic loss or discrimination. Nevertheless, this also risks divergence and forum shopping.

Territorial scope

Furthermore, the AILD would require all Member States to implement its provisions to create an EU baseline for AI liability procedure, and its territorial scope would thereby cover any claim brought under the law of a Member State for AI-caused damage. While it does not purport to govern claims outside the EU, the AILD's harmonising effect is important in the cross-border context. Since AI systems and their harms often transcend national boundaries and may involve both EU and third-country actors, and several jurisdictions in which the harm occurred, conflicts-of-law rules may be applied, leading to the designation of the law of one Member State.

Once each Member State is left to devise its own AI-specific liability tweaks, the outcome of a tortious cross-border AI dispute could drastically change depending on the country whose law is designated applicable and thus incentivise forum shopping. The AILD aims at preventing this by ensuring the existence of certain, **common key rules** across the EU, such as the authority of a national court to order the disclosure of evidence from an AI provider or user and presume causation when appropriate. This would further harmonisation efforts, level the liability playing field so AI providers and users can operate across the Union under similar liability expectations

due to the existence of a common procedural toolkit ensured upon the AILD's transposition and help achieve consistent judicial outcomes.

Temporal scope

The timing of the AILD was orchestrated to dovetail with the new AI regulatory framework. The AIA was adopted in June 2024 and entered into force on August 1, 2024, with some of its provisions set to apply after a transition, between 2025 and 2027, and the PLD was enacted in October 2024, giving Member States until December 9, 2026, to transpose it. The AILD would presumably have a similar transposition deadline, as inferred from the Commission's Proposal suggesting 2 years post-adoption, meaning that the AIA, PLD and AILD were meant to become operational around the same period, namely 2026-27 (European Commission, 2022), ensuring a synchronised rollout of the EU's AI governance and liability regime.

By aligning the effective dates, as the AI systems begin to comply with the AIA, those same systems would be subject to the new liability rules concurrently in the event that they cause harm. Relevantly, the AILD contains an explicit non-retroactivity clause, meaning it would only apply to damage occurring after its national transposition date (Article 7, Article 8 AILD), avoiding settled expectations and enhancing legal certainty. In terms of duration, the AILD does not include a sunset clause because it was intended as a permanent part of the EU acquis, adaptable in the future if needed. The Explanatory Memorandum and impact assessment hinted that while the AILD is a first step focusing on procedural aspects, a more harmonised substantive AI-liability regime may be considered down the line (Li et al, 2025). In this sense, one could argue that policymakers essentially saw the 2020s package encompassing the AIA, PLD and AILD as laying the groundwork, with the possibility to expand harmonisation later once the effects of these measures are observed, through new instruments and amendments to outdated ones.

Thereby, the AILD was temporally coordinated not just in enforcement timeline, but also in legislative sequencing—it was introduced after the AIA proposal, complementing it, and alongside the PLD revision, ensuring consistency from the outset. The withdrawal of the AILD disrupted this plan, leaving a temporal gap, and now the AIA and PLD will come into force without the fault-based AI liability harmonisation, meaning the EU might not see a Community-level solution for those gaps until a future initiative is launched.

Who would have benefitted from the AILD?

Firstly, the **healthcare sector** is increasingly using AI systems, from diagnostic decision support to robotic surgery and personalised treatment recommendations. These systems, often based on opaque machine-learning models, pose a challenge for liability, since patients injured by a faulty AI diagnosis could face difficulty suing: a court might struggle to find the AI product 'defective' under the PLD if it performed as trained (just with an unknown error), and a doctor or hospital might escape fault if they reasonably relied on the AI.

One could argue that the AILD would have provided patients and healthcare providers with clearer routes to compensation. For instance, many medical AI systems, such devices for diagnosis, will be classified as high-risk AI under the AIA, so on the one hand, the AILD's disclosure mechanism could force manufacturers to reveal algorithmic logs or risk management files for court-appointed experts to investigate what went wrong. On the other hand, if a provider of a medical AI system failed to meet safety-related obligations, such as not updating the AI when known issues were identified, or not providing transparency as required under the AIA, the patient could successfully invoke a presumption of causality that the failure caused the injury under the AILD. The AILD would lower the bar for injured patients to succeed in claims that an AI was negligently designed or monitored, while not interfering with standard medical malpractice cases (Recital 15 AILD), but instead only coming into play for the genuinely novel scenario of harm directly from an AI's autonomous decision.

It is noted in literature that neither strict product liability, nor traditional fault might readily assign liability for black-box medical AI (Duffourc & Gerke, 2023). The AILD was intended to close this gap by ensuring more accessible legal redress and implicitly enhancing trust in medical AI technology and incentivising the clarification of liability risks to hospitals and AI developers.

Secondly, the advent of accidents caused by **autonomous vehicles** (AVs) raise relevant questions—Was the crash due to a defect in the AV's AI, which ought to have been reasonably foreseeable to the manufacturer in and thereby trigger product liability, or was it caused by negligence in how the AV's AI was updated or monitored by its operator due to insufficient disclosure from the provider? Within the EU, victims of car accidents are protected by the Motor Insurance Directive (MID), which ensures that regardless of fault, motor accident victims receive compensation by insurance, meaning that insurers will seek to recover from the responsible entity. If an AV's manufacturer produced a defective self-driving system, the

PLD would cover strict liability, nonetheless not every failure will neatly qualify as a defect, as is the case where the AV's AI encounters an unforeseeable edge-case scenario.

The AILD could assist by enabling a fault-based claim against the vehicle's operator or manufacturer if either of them fell short of a duty of care set forth in the AIA, for instance failing to install a software update—an omission which under the AILD would lead the court to presume the existence of a causal link. In this context the AILD's enforcement of evidence disclosure could allow an AV accident victim to obtain the AV's driving logs or its AI algorithm's decision records to trigger the presumption or determine liability between the AI's developer, manufacturer, and possibly users. One could argue that the AILD would have slotted into the motor insurance and liability framework by covering any fault not already addressed by product liability or traffic rules, thereby harmonising AV liability across the EU and bolstering consumer confidence in the technology.

Shortcomings and recommendations

Despite the listed intended benefits of the AILD, the proposal faced significant criticism and political resistance throughout its legislative process, leading to its withdrawal in early 2025.

Firstly, one line of critique was that the AILD, in conjunction with the revised PLD, did not go far enough to solve the AI liability puzzle, offering merely ***narrow procedural fixes*** in the form of disclosures and presumptions, and otherwise largely deferred to existing laws (Hacker, 2023). Indeed, the dichotomy between the fault-based AILD and the strict liability PLD both have loopholes, such as failing to address scenarios where an AI system causes harm without any clear fault attributable to the operator. Similarly, neither instrument extends liability to immaterial harm or provides clear rules on AI explainability in liability contexts, thus dismissing the intangible, monetary and societal harms AI can cause in favour of traditional harm. Under the PLD-AILD framework, biased AI decisions that entrench inequality, AI-generated misinformation that erodes trust, or loss of employment opportunities or participation due to algorithmic rankings do not constitute compensable damage, unless national tort law somehow covers them. Furthermore, if an AI system discriminates against individuals, breaching a fundamental right, the harm is only actionable through anti-discrimination laws, since the AILD does not create a standalone claim for them and only applies if the harm can be fit within a tort claim recognised by the relevant national law.

One could deem a missed opportunity, since the EU could have used the AILD to explicitly recognise certain AI-caused intangible harms as warranting compensation (Wachter, 2024), and introduce precise measures intended to facilitate the joint application of the AILD and PLD. In the absence of guidelines clarifying the AILD and PLD's most advantageous liability approaches to claimants—either focusing on the provider's breached duty of care, or its strict liability—the AILD and PLD's substantive scopes are incompletely harmonised.

Secondly, many policymakers and industry stakeholders contended that an AI-specific liability Directive was not yet needed, explicitly calling the adoption of the AILD ***premature and unnecessary*** (European Commission, 2025). Indeed, the AIA and PLD had just been enacted, meaning that the AIA's rules on transparency, risk management and human oversight, which will be phased in by 2026-27, and the PLD's newly extended substantive scope could not yet offer sufficient data for an impact assessment.

One could agree that the enactment of an AI liability instrument would benefit from first analysing the data provided by an impact assessment of the AIA and PLD.

Similarly, the voices in the European Union warned of ***unsubstantiated*** harmonisation, arguing on the one hand that the Commission had not demonstrated an actual market failure or legal gap that the AILD was intended to fix, and on the other hand that the existing framework sufficiently addresses AI-related liability issues (European Commission, 2025). One could counter this view by recalling the lack of harmonisation between the PLD and the outdated Rome II, and the forum-shopping opportunities entailed by the fragmented categories of compensable harms across the Member States.

Thirdly, it was argued that excessive liability burdens could ***stifle AI innovation***, especially for SMEs, as reflected at EU's lagging AI adoption rates (only 8% of enterprises used AI in 2023, far off the 75% target for 2030). One could agree with this view, given that the narrative that the EU is falling behind in the global AI race, together with the prospect of new liability risks can indeed prompt wariness of predatory litigation or raised insurance costs and thus discourage investment and experimentation.

Conclusion

As AI systems become increasingly autonomous and embedded in essential sectors, the European Union has responded with a layered regulatory approach. The AIA and PLD represent major advances toward harmonised *ex-ante* regulation and *ex-post* strict liability. However, the withdrawal of the AILD has left a notable gap in the EU's framework for fault-based, non-contractual liability. In this sense, without a unified mechanism to ease evidentiary burdens and clarify liability in cases involving opaque or evolving AI systems, claimants remain exposed to fragmented national laws and inconsistent standards.

At the same time, private international law instruments like Rome II remain ill-suited to address the cross-border nature of AI-related harm due to lack of harmonisation with the PLD. Terms such as 'acquire', 'marketed', and 'foreseeability' do not adequately capture the complexity of digital and self-learning systems, leading to legal uncertainty and potential forum shopping. Amending Rome II to align with the definitions and standards introduced by the PLD—particularly in terms of product scope, marketing criteria, and causation—would strengthen consistency across the EU and reinforce the internal market.

Overall, the EU's current liability framework, while improved, is not yet fit for the age of ubiquitous AI. Future reform must aim for substantive and procedural coherence, combining regulatory obligations under the AIA with clear, enforceable liability mechanisms for all types of harm, including immaterial and societal ones. Only through systemic alignment of substantive law, private international law, and judicial cooperation can the EU deliver on its promise of trustworthy, accountable, and legally predictable AI governance.

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