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ARTIFICIAL INTELLIGENCE AND LAW: HYPOTHESIS OF CIVIL LIABILITY

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Abstract

This paper examines the intersection of artificial intelligence (AI) and law, with a particular focus on the hypothesis of civil liability in the context of AI applications. The study provides a comprehensive taxonomy of AI, detailing its various forms and roles within the legal field, while highlighting both the transformative potential and the legal complexities it introduces. The European perspective on AI is then examined, with a particular emphasis on the regulatory landscape and the ethical implications under EU law, particularly after the entry into force of the "AI Act". A central theme of the paper is, then, the allocation of civil liability in cases where AI systems are involved in legal decision-making processes. Lastly, the paper assesses how liability should be attributed, considering the challenges posed by autonomous decision-making and the absence of traditional human accountability. Through this focused analysis, this contribution seeks to provide a nuanced perspective on the evolving role of civil liability in the context of AI.

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Keywords

Artificial Intelligence – Algocracy – Civil Liability – Legal Framework – EU Law

1. Premise

The swift and exponential advancement of emerging digital technologies, whether fully automated or not, presents novel challenges in the realm of civil liability. These advancements engender a myriad of potential scenarios for harm, diverging significantly from those traditionally addressed in legal precedents[1].

The new realities introduced by the so-called "algocracy" constitute a factor with which private law will increasingly have to contend[2].

The expression "artificial intelligence" (better known by the acronym AI)[3] has firmly established itself within the legal lexicon, challenging conventional notions of legal

[1] A Amidei, 'Robotica intelligente e responsabilità: profili e prospettive evolutive del quadro normativo europeo' (2021) Giur. It, 100 ff. On this topic, *ex multis*, among the most authoritative contribution, G Pascuzzi, *Il diritto dell'era digitale* (Zanichelli 2020); G Alpa (ed.), *Diritto e intelligenza artificiale. Profili generali, soggetti, contratti, responsabilità civile, diritto bancario e finanziario, processo civile* (Pacini Editore 2020); S Faro - TE Frosini - G Peruginelli, *Dati e algoritmi. Diritto e diritti nella società digitale* (Zanichelli 2020); P Perlingieri - S Giova - I Prisco (eds.), *Rapporti civilistici e intelligenze artificiali: attività e responsabilità* (Edizioni Scientifiche Italiane 2020); U Ruffolo (ed.), *Intelligenza artificiale. Il diritto, i diritti, l'etica*, (Giappichelli 2020); A Santosuosso, *Intelligenza e diritto. Perché le nuove tecnologie sono una grande opportunità per il diritto*, (Giuffrè 2020).

[2] The first author to introduce the term "algocracy" was M Ainis, *Il regno dell'uroboro. Benvenuti nell'era della solitudine di massa* (La Nave di Teseo 2018) 19 ff; On the same perspective, previously, S Rodotà, *Il diritto di avere diritti* (Laterza 2015) 33 ff. In this case, however, the author used another concept – with the same meaning – "algorithm dictatorship". Also, about algocracy, see M Barcellona, 'Il diritto neoliberale dell'economia globalizzata e della società liquida' (2020) Eur. Dir. Priv. 763-764.

[3] It is that part of computer science concerning the study and creation of systems designed so as to have those same characteristics we associate with human intelligence: understanding of language, ability to learn, ability to solve problems, etc. See on this point, A Albanese, 'La responsabilità civile

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personhood. This necessitates a substantial interpretative endeavor, adapting this new "entity"[4] to the framework of Civil codes in an evolutionary manner.

The third millennium is undeniably characterized by the widespread utilization of robotic forms, which extend their significance beyond activities within the information society. They are increasingly pivotal in the realm of technological advancements, ranging from semi to fully automated processes involved in the production of goods and provision of services[5].

per l'uso di sistemi di intelligenza artificiale', in F Bocchini (ed.), *Manuale di diritto privato dell'informatica* (Edizioni Scientifiche Italiane 2023) 559-575; F Caroccia, 'Ancora su responsabilità civile e uso delle intelligenze artificiali' (2022) CONTR. IMPR. 408 ff; A Procida Mirabelli di Lauro, *Intelligenze artificiali e responsabilità civile* (Edizioni Scientifiche Italiane 2020); A Procida Mirabelli di Lauro, 'Le intelligenze artificiali fra responsabilità e sicurezza sociale', in P Perlingieri (ed.), *Rapporti civilistici e intelligenze artificiali: attività e responsabilità* (Edizioni Scientifiche Italiane 2020) 297 ff; A Procida Mirabelli di Lauro, 'Le intelligenze artificiali', in AA.VV., *Rapporti civilistici e intelligenze artificiali: attività e responsabilità. Atti del 15° Convegno Nazionale della SISDiC* (Edizioni Scientifiche Italiane 2020) 240 ff; M. Iaselli, 'Informatica e nuove regole per la produzione del diritto', in G Cassano (ed.), *Diritto delle nuove tecnologie informatiche e dell'Internet* (Ipsoa 2002) 1467 ff. See also M Ienca, *Intelligenza2, Per un'unione di intelligenza naturale e artificiale* (Giappichelli 2019) 13 ff; G. Romano, 'Diritto, robotica e teoria dei giochi: riflessioni su una sinergia, in G Alpa (ed.), *Diritto e intelligenza artificiale* (Pacini Editore 2020), 105 ff; G Alpa, *L'intelligenza artificiale. Il contesto giuridico* (Mucchi Editore 2021); E Corapi, 'Robo advice', in G Alpa (ed.), *Diritto e intelligenza artificiale*, op. cit. 401 ff; U Pagallo, *Advanced Introduction to Law and Artificial Intelligence* (Edward Elgar Publishing 2020); U Pagallo, *Apples, oranges, robots: Four misunderstandings in today's debate on the legal status of AI systems*, in *Philosophical transactions of the royal society of london series a: mathematical physical and engineering sciences* (Royal Society 2018); S Aceto di Capriglia, 'Gli illeciti on line e le nuove frontiere della responsabilità civile nell'era digitale' (2018) federalism.it. The definition contained in the European Ethical Charter on the Use of Artificial Intelligence in Justice Systems and Related Fields – adopted on December 3 and 4, 2018 by the European Commission for the Efficiency of Justice (Cepej), established by the Committee of Ministers of the Council of Europe in 2002 – which understands it as the set of scientific methods, theories and techniques aimed at reproducing through machines the cognitive capacities of human beings, could also be shared. Current developments aim to make machines perform complex tasks previously done by human beings. See J Kaplan, *Intelligenza artificiale, guida al futuro prossimo* (Luiss University Press 2017) 15 ff.

[4] On this point, U Ruffolo, 'L'intelligenza artificiale in sanità: dispositivi medici, responsabilità e 'potenziamento" (2021) Giur. It. 502 ff. See also R Pardolesi - A Davola, 'Algorithmic legal decision making: la fine del mondo (del diritto) o il paese delle meraviglie?' (2020) Questione Giustizia 104-111.

[5] Think, for example, to the blockchain technology and, more generally, so-called distributed ledgers, understood as secure data storage systems, which serve as carriers of value, tending to assume increasing relevance within various sectors of society. It is now known that their use, which is likely to vary by virtue of the different types of blockchain, carries a number of advantages in terms of disintermediation, decentralization, security and immutability. In this direction P De Filippi - A Wright, *Blockchain and the Law. The rule of Code* (Harvard University Press 2018) 33. In particular, the authors underline that "[b]lockchain technology constitutes a new infrastructure for the storage of

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Such developments bear profound implications for constitutionally safeguarded rights, notably the sacrosanct entitlements to life and health. Consider, for instance, the utilization of artificial intelligence in the execution of intricate surgical procedures[6]. Similarly, the right to privacy, encompassing the sanctity of private life, stands susceptible to encroachment by the proliferation of so-called "home assistants" or "intelligent" home automation systems[7].

Consequently, a doctrinal discourse emerges concerning the extension of legal personhood to electronic agents capable of autonomously processing algorithmic decisions and, concomitantly, undertaking actions with legal ramifications. A significant quandary arises when such manifestations of artificial intelligence, imbued with autonomy and independent learning capacities, yield outcomes beyond the control of both developers and users[8].

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data and the management of software applications, decreasing the need for centralized middlemen". See also B Gardella Tedeschi, 'Introduzione, in Focusi: Blockchain e Intelligenza Artificiali' (2021) Riv. Dir. Media 11-12; P Hacker, 'Regulating Blockchain: Techno-social and legal challenges – An Introduction', in P Hacker - I Lianos - G Dimitropoulos - S Eich (eds), *Regulating Blockchain. Techno-social and legal challenges* (Oxford University Press 2019) 3 ff. For an overview of the features of blockchain technology A Borroni, 'Blockchain: Uses and Potential Value', in A Borroni (ed.), *Legal Perspective on Blockchain Theory, Outcomes, and Outlooks*, (Edizioni Scientifiche Italiane 2019); M Finck, *Blockchain Regulation and Governance in Europe* (Cambridge University Press 2019) 10-33; D Szostek, *Blockchain and the Law* (Nomos Verlagsgesellschaft Mbh & Co 2019) 40-53; A Wright - P De Filippi, 'Decentralized Blockchain Technology and the Rise of Lex Cryptographia' (2015) Social Science Network.

[6] For a general overview of the relationship between AI and healthcare see F Ferretti, 'Intelligenza artificiale e responsabilità civile nel settore sanitario' (2023) Actualidad Jurídica Iberoamericana 1852-1885; G Votano, 'Intelligenza artificiale in ambito sanitaria: il problema della responsabilità civile' (2022) Danno Resp. 675 ff; M Arisi - P Guarda, 'Blockchain and eHealth: seeking compliance with the General Data Protection Regulation' (2020) Biolaw J. 477-496; P Guarda - L Petrucci, 'Quando l'intelligenza artificiale parla: assistenti vocali e sanità digitale alla luce del nuovo regolamento generale in materia di protezione dei dati' (2020) Biolaw J. 425-446; P Guarda, "'Ok Google, am I sick?": artificial intelligence, e-health, and data protection regulation' (2019) Biolaw J. 359-375.

[7] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (2021) Resp. Civ. Prev. 1011 ff. See also, on this point, G Resta, 'Governare l'innovazione tecnologica: decisioni algoritmiche, diritti digitali e principio di uguaglianza' (2019) Pol. Dir. 199 ff.

[8] The main characteristic of the new digital technology is precisely the ability to make autonomous decisions, consequent to a process of adaptation that is referred to as self-learning: the device is able to confront and interact with reality and evolve as a result, modifying and adapting its behaviors and decisions in coherence with experiential data acquired over time. On this point, more extensively see S Fidotti, 'Nuove forme contrattuali nell'era del blockchain e del machine learning. Profili di responsabilità', in G Alpa (ed.), *Diritto e intelligenza artificiale* (n 3) 335 ff; MB Magro, 'Robot, cyborg e intelligenze artificiale', in A Cadoppi - S Canestrari - A Manna- M Papa (eds.), *Cybercrime* (Wolters Kluwer 2019) 1181 ff.

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In light of these deliberations, the issue of civil liability becomes manifest, notwithstanding the implementation of various regulations, particularly at the European level, which will be explored in subsequent discourse. There exists an increasingly pressing imperative not only to instill a deterrent effect upon potential wrongdoers but also to establish an efficacious framework of safeguards. These measures are indispensable to forestall the utilization of intelligent technologies from compromising safety and accountability vis-à-vis traditional paradigms – a concept known as functional equivalence[9].

In the pursuit of this overarching objective, it becomes imperative to address the critical legal and ethical question of attributing responsibility for the autonomous conduct of intelligent systems. Consequently, liability for resultant damages must be apportioned judiciously, assigning it to the entity best equipped to mitigate such risks[10].

2. Artificial intelligence: taxonomy and role in law

Some scholars have ruled out the recognition of the status of legal entity to automata, considering it sufficient to adapt conventional rules on civil liability[11], either by

[9] G D'Alfonso, 'Intelligenza artificiale e responsabilità civile. Prospettive europee' (2022) Revista de Estudios Jurídicos y Criminológicos 166. See also D Chiappini, 'Intelligenza Artificiale e responsabilità civile: nuovi orizzonti di regolamentazione alla luce dell'Artificial Intelligence Act dell'Unione europea' (2022) Riv. It. Inf. Dir.; A D'Alessio, 'La responsabilità civile dell'intelligenza artificiale antropocentrica' (2022) personaemercato.it 243 ff.

[10] G Comandé, 'Intelligenza artificiale e responsabilità tra liability e accountability. Il carattere trasformativo dell'IA e il problema della responsabilità' (2019) An. Giur. Econ. 182. Also make reference to M Grondona, 'Responsabilità civile e IA: tra paure e mitizzazioni, meglio un "anything goes" in salsa popperiana' (2022) Danno Resp. 277 ff.

[11] See, with reference to civil liability, G Comandé, 'Intelligenza artificiale e responsabilità tra liability e accountability. Il carattere trasformativo dell'IA e il problema della responsabilità' (n 10) 169-188; P Pardolesi, 'La responsabilità civile 3.0 e l'insostenibile leggerezza del suo DNA polifunzionale' (2018) Riv. Dir. Priv. 121 ff; V Zeno Zencovich, 'Liability for Data Loss' (2018) Data Science and Law 39 ff; V Di Gregorio, 'Intelligenza artificiale e responsabilità civile: quale paradigma per le nuove tecnologie?' (2022) Danno Resp. 51 ff. For a general analysis of the concept of civil liability in the major italian doctrine see E Navaretta (ed.), '*Codice della Responsabilità Civile* (Giuffrè 2021); S Aceto di Capriglia - F De Luca, *Percorsi evolutivi della responsabilità civile nel sistema ordinamentale italo-europeo* (Edizioni Scientifiche Italiane 2021); M Barcellona, *Trattato del danno e della responsabilità civile* (Giuffrè 2021); CM Bianca, *La responsabilità*, *Diritto civile* (Giuffrè 2021); C Castronovo, *Responsabilità Civile* (Giuffrè 2018); G Alpa, *La responsabilità civile* (Giappichelli 2018); A Procida Mirabelli di Lauro - M Feola, *La responsabilità civile. Contratto e torto* (Giappichelli 2014); R Caso, 'Il bene

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analogy or through legislative reforms, tying the activity of the machine to that of the producer or user[12] and considering that robots are machines responding integrally and inevitably to the programming predisposed by man and for this reason devoid of any form of will of their own[13].

Many of the scenarios delineated undoubtedly intersect with contractual relationships, spanning realms such as product sales, employment, insurance, banking, financial intermediation, and professional endeavors. Consequently, aggrieved parties are endowed with the legitimacy to invoke contractual remedies to secure redress for the so-called "algorithmic damages"[14].

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della vita e la struttura della responsabilità civile' (2014) Foro It. 769; F Busnelli - S Patti, *Danno e responsabilità civile* (Giappichelli 2013); P Stanzione, *Responsabilità contrattuale* (Cedam 2012); V D'Antonio, 'La responsabilità civile. Profili di diritto comparato, in P Stanzione, *Trattato della Responsabilità Civile* (Wolters Kluwer 2012) 59-112; G Visintini, *Trattato breve della responsabilità civile. Fatti illeciti. Inadempimento. Danno risarcibile* (Cedam 2005) 822 ff; M Franzoni, *Il danno risarcibile* (Giuffrè 2004); PG Monateri, *Illecito e responsabilità civile* (Giappichelli 2000); P Stanzione - V Zambrano, *Attività sanitaria e responsabilità civile* (Giuffrè) 1998; P Gallo, *Pene private e responsabilità civile* (Giuffrè 1996); G Ponzanelli, *La responsabilità civile. Profili di diritto comparato* (Zanichelli 1992); F BUSNELLI, 'voce Illecito civile' (1991) Enc. Giur. 30 ff; E Dell'Aquila, *I principi generali della responsabilità civile nel diritto inglese* (Cedam 1989); P Cendon, *La responsabilità civile. Saggi critici e rassegne di giurisprudenza* (Giuffrè 1988); A De Cupis, *Il danno. Teoria generale della responsabilità civile* (Giuffrè 1979); G Calabresi, *Costo degli incidenti e responsabilità civile* (Giuffrè 1975); S Pugliatti, *Responsabilità civile* (Giuffrè 1968).

[12] For the "weak artificial intelligence" thesis, see A Albanese, 'La responsabilità civile per i danni da circolazione di veicoli ad elevata automazione' (2019) Eur. Dir. Priv. 995 ff; G Capilli, 'La responsabilità per la produzione di robot', in G Alpa (ed.), *La responsabilità del produttore* (Giuffrè 2019) 625 ff; G Finocchiaro, 'Intelligenza artificiale e responsabilità' (2020) Contr. Impr. 713 ff; M Costanza, 'L'intelligenza artificiale e gli stilemi della responsabilità civile' (2019) Giur. It. 1686 ff; M Infantino, 'La responsabilità per danni algoritmici: prospettive europeo continentali' (2019) Resp. Civ. Prev. 1762 ff; NF Frattari, 'Robotica e responsabilità da algoritmo. Il processo di produzione dell'intelligenza artificiale' (2020) Contr. Impr. 458 ff; U Ruffolo, *Intelligenza artificiale. Il diritto, i diritti, l'etica* (Giuffrè 2020).

[13] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1011-1012. See also more recenlty L Arnaudo - R Pardolesi, 'Ecce robot. Sulla responsabilità dei sistemi adulti di intelligenza artificiale' (2023) Danno Resp 409 ff.

[14] M Infantino, 'La responsabilità per i danni algoritmici: prospettive europeo-continentali' (2019) Resp. Civ. Prev., 1765. On contractual liability in connection with the use of artificial intelligence see M Bassini - L Liguori - O Pollicino, 'Sistemi di intelligenza artificiale, responsabilità e accountability. Verso nuovi paradigmi?', in F Pizzetti (ed.), *Intelligenza artificiale, protezione dei dati personali e regolazione* (Giappichelli 2018) 333 ff. In the case, for example, of a malfunction of an intelligent product, such as an autonomously driven vehicle or industrial machinery, the manufacturer of the good will be contractually liable to its purchaser, the employer to the injured employee. In the event of errors caused, in the processing of personal data, by the bank or insurance company that harm the position of their customers, they will be able to sue for damages under the banking and insurance contract. In the same vein, the patient may sue the doctor who errs in diagnosis or medical or pharmacological treatment by relying on the use of artificial intelligence, claiming breach of the obligation to provide

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In the domain of non-contractual liability, two distinct facets warrant consideration[15].

Firstly, the liability of producers becomes salient, as the incorporation of artificial intelligence technologies into goods or services may engender novel hazards to the safety of purchasers or users[16].

Secondly, the duty of the interpreter lies in assessing the applicability of traditional civil law doctrines to emergent liability scenarios.

Within the Italian legal framework, Article 2043 of the Civil Code assumes paramount significance. This provision, characterized by its atypical nature and general

professional services. The person harmed by automated resolutions may then, depending on the specific case, take extra-contractual action against the subjects involved in the "value chain" of intelligent systems, to which he is not bound by a contractual relationship. See also, for an in-depth analysis, U Pagallo, 'Three Roads to Complexity, AI and the Law of Robots: On Crimes, Contracts, and Torts', in M Palmirani - U Pagallo - P Casanovas - G Sartor (eds.), *AI Approaches to the Complexity of Legal Systems. Models and Ethical Challenges for Legal Systems, Legal Language and Legal Ontologies, Argumentation and Software Agents* (Springer Berlin Heidelberg 2012) 48-60. In the foreign doctrine, E Veress, 'A General Overview of Artificial Intelligence and Its Current Implications in Civil Law' (2022) Acta Universitatis Sapientiae, Legal Studies 98-112; G Borges, 'Liability for AI Systems Under Current and Future Law. An overview of the key changes envisioned by the proposal of an EU-directive on liability for AI' (2023) Comp. L. Rev. Int'l; T Rodríguez de las Heras Ballell, 'Legal challenges of artificial intelligence: modelling the disruptive features of emerging technologies and assessing their possible legal impact' (2019) Uniform L. Rev. 302-314.

[15] U Salanitro, 'Intelligenza artificiale e responsabilità: la strategia della Commissione Europea' (2020) Riv. Dir. Civ. 1253. Digital systems qualify as objects, or rather "mechanical artefacts", and the complex legislation, aimed at the design and construction of "products", as well as the protection of human health, public safety and the protection of consumers and users in general, will be applicable to them. E Palmerini, 'Robotica e diritto: suggestioni, intersezioni, sviluppi a margine di una ricerca europea' (2016) Resp. Civ. Prev. 1826 ff. Of paramount importance is Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety, which is complementary to the directive on product liability, in establishing the requirements to be met when placing goods on the market, providing the type of information to be provided to consumers. d. Machinery Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006, which defines the essential health and safety requirements that machinery must meet, during the design, manufacture and operation phase, before being placed on the market; the directive regulates the safety of machinery with the obligation of CE marking. Well, since both directives were adopted at a time when new technological products and related devices were rare and technically not advanced, as at present, both directives are being revised. On 21 April 2021, the text of the Proposal for a Regulation of the European Parliament and of the Council on Machinery Products (COM(2021) 202 final) was published, which will replace the Machinery Directive 2006/42/EC once the approval process is completed.

[16] See for an in-depth analysis G Teubner, *Soggetti giuridici digitali? Sullo stato giuridico degli agenti software autonomi* (Edizioni Scientifiche Italiane 2019); RH van Genderen, 'Do we need to legal personhood in the age of robot and IA?, in M Corrales - M Fenwick - N Forgo (eds), *Robotics, AI and future of law* (Springer 2018) 15 ff.

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applicability, inherently accommodates any form of tortuous conduct and adapts to technological evolution sans necessitating explicit adjustments for its enforcement[17].

However, the structure of this rule proves inadequate in encompassing the expansive spectrum of damages wrought by intelligent artificial entities. This inadequacy stems from the onerous probative burdens faced by injured parties in founding the prerequisites of liability. These prerequisites encompass not only the objective element of establishing a causal nexus between the system's activity and the deleterious outcome but, more crucially, the subjective element concerning the culpability of the offending party[18].

The challenges associated with attributing liability based on the criterion of culpability[19], have spurred doctrinal scrutiny, prompting a shift towards prioritizing the plight of the injured party and devising mechanisms to shield them from the adverse repercussions stemming from the actions of artificial intelligences. In pursuit of this objective, liable parties have been delineated irrespective of the ascertainment

[17] G D'Alfonso, 'Intelligenza artificiale e responsabilità civile. Prospettive europee' (n 9) 169-170.

[18] On this point, amplius P Pardolesi, 'La responsabilità civile 3.0 e l'insostenibile leggerezza del suo DNA polifunzionale' (n 11) 121 ff. The author, in particular, dwells on the presence of increasingly sophisticated techniques, in which different actors collaborate, as a factor that makes the identification of the perpetrator of the damage increasingly complex, which, in a progressive manner, almost acquires a character of anonymity, with the consequence that the danger of so-called "anonymous damage" could arise. See also, for an in-depth analysis U Salanitro, 'Intelligenza artificiale e responsabilità: la strategia della Commissione Europea' (n 15) 1247; A Amidei, 'Intelligenza Artificiale e product liability: sviluppi del diritto dell'Unione Europea' (2019) Giur. It. 96 ff; F Naddeo, 'Intelligenza artificiale: profili di responsabilità' (2020) Comp. Dir. Civ. 1151 ff; D Di Sabato, 'Strumenti riparatori e risarcitori', in P Perlingieri - S Giova - I Prisco (eds.), *Il trattamento algoritmico dei dati tra etica, diritto e economia* (Edizioni Scientifiche Italiane 2020) 341 ff.

[19] With reference to the criterion of culpability see amplius G Cian, *Antigiuridicità e colpevolezza. Saggio per una teoria dell'illecito civile* (Cedam 1966) 391 ff, according to whom it is possible to speak of a duty of care and of a breach thereof, insofar as the concrete capacities of the subject are taken into account, if it is true that the law can only command acts of will. It is sometimes discussed whether so-called civil fault can be equated with so-called criminal fault. But the unity of the mode of functioning of guilt for the purposes of judging the imputation of risk seems obvious. Of course, the distinction makes sense again when it comes to measuring fault, since the criminal sanction must be proportionate to the seriousness of the fault while the measure of compensation is independent of it. On this point M Barcellona, *Trattato del danno e della responsabilità civile* (n 11) 248, footnote 23. See also F Cafaggi, *Profili di relazionalità della colpa. Contributo ad una teoria della responsabilità extracontrattuale* (Cedam 1996) 138 ff; M Bussani, *La colpa soggettiva* (Cedam 1991); C Maiorca, 'Colpa civile (teoria generale)' (1960) Enc. Dir. 534 ff; S Pugliatti, *Alterum non laedere* (Giappichelli 1958) 103 ff.

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of culpable conduct. Instead, the focus lies on assessing their proximity to the risk at hand, thereby determining their capacity to either avert or manage it[20].

In this vein, doctrinal discourse has initially turned to the provisions governing vicarious liability scenarios.

Certain scholars have drawn parallels with the model outlined in Article 2048 of the Civil Code concerning the liability of parents, guardians, tutors, and art instructors. They elucidate the liability of the programmer or any entity instructing the digital system on the desired conduct, likening them to the position of a tutor. Here, the concept of the tutor transcends its concrete manifestation, assuming an abstract notion of an individual entrusted with guiding pupils, thereby equating the intelligent system to a pupil or apprentice[21].

On the contrary, some scholars have advocated for the application of Article 2047 of the Civil Code, which delineates the liability of the supervisor overseeing an incapacitated individual who causes harm, portraying the artificial intelligent entity as a "subject" possessing diminished capacity[22].

However, these propositions are contestable, as the invocation of Articles 2047 and 2048 of the Civil Code must be dismissed. These provisions are tailored to regulate liability stemming from the oversight or nurturing of specific "categories" of human

[20] G D'Alfonso, 'Intelligenza artificiale e responsabilità civile. Prospettive europee' (n 9) 170.

[21] According to this view, the former should be liable for the damage caused by artificial intelligence unless they prove that they could not have prevented the act. Among the authors supporting this thesis, see, M Costanza, 'Robot e impresa, in U Ruffolo (ed.), *Intelligenza artificiale e responsabilità* (Giuffrè 2017) 112 ff; U Pagallo, *The law of robots. Crimes, contracts and torts* (Springer 2013) 128 ff. In particular, this author considers this regime to be preferable to others of non-contractual liability, together with Article 2050 of the Civil Code.

[22] In particular, see A Santosuosso - M Tomasi, *Diritto, scienza, nuove tecnologie* (Cedam 2021) 338 ff. Such liability may also be characterised, from the point of view of the lack of vigilance, as liability for one's own fault, since the person liable is liable for his own fault, which may be seen in the breach of the duty of diligent supervision and custody of the incapable person (*culpa in vigilando*). For in-depth analysis see For an in-depth analysis see G Alpa, *La responsabilità civile* (n 11) 665; M Comporti, 'Fatti illeciti: le responsabilità presunte, in *Comm. Schlesinger*, *sub artt. 2044-2048* (Giuffrè 2002) 168; A De Cupis, *Il danno. Teoria generale della responsabilità civile* (n 11) 134; M Franzoni, *Il danno risarcibile* (n 11) 328; G Giannini - M Pogliani, *La responsabilità da illecito civile* (Giuffrè 1996) 118; C Salvi, 'La responsabilità civile', in *Tratt. Iudica, Zatti* (Giuffrè 1998) 138; P Morozzo Della Rocca, 'La responsabilità civile del sorvegliante dell'incapace naturale', in P Cendon (ed.), *La responsabilità civile* (Giappichelli 1998) 23 ff. Analogically, one would find oneself in the presence of what Scognamiglio and Busnelli call a legal obligation of guarantee. See F Busnelli - S. Patti, *Danno e responsabilità civile* (Giappichelli 2013); R Scognamiglio, *Responsabilità civile* (Giappichelli 1968) 693.

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beings, thus delineating a highly specialized discipline that proves challenging to extend analogously to this domain[23].

Furthermore, a segment of the doctrinal community[24] has suggested the analogical application of Article 2049 of the Civil Code, which governs the liability of masters and principals. This provision outlines the entrepreneur's liability for damages inflicted by an intelligent system tasked with activities integral to entrepreneurial endeavors, typically executed by human laborers[25].

Nonetheless, it has been rightfully contended that recourse to Article 2049 of the Civil Code, while intriguing, remains incompatible with our legal framework. The inherent specialization of this provision precludes its extrapolation beyond the confines of human conduct[26].

Furthermore, legal scholarship has speculated on the applicability of certain liability provisions, codified in Articles 2050-2054 of the Civil Code, to these "new" forms of damages. These provisions, often termed "special", deviate from the approach mandated by the general clause of Article 2043 of the Civil Code. Under this Article, the emergence of extra-contractual civil liability is intricately linked to an examination of the culpability of the offending party's conduct.

Recent doctrinal trends and jurisprudence have diverged from previous interpretations, which categorized both liability for custodial items, as per Article 2051 of the Civil Code, and liability for hazardous activities, as per Article 2050, as fault-based liability, albeit "aggravated", with a simplification of the burden of proof

[23] In these vein U Ruffolo, 'Intelligenza artificiale, machine learning e responsabilità da algoritmo' (2019) Giur. It. 1698. The same critical stance is also adopted by L Coppini, 'Robotica e intelligenza artificiale: questioni di responsabilità civile' (2018) Pol. Dir. 726 ff; G Finocchiaro, 'Intelligenza artificiale e diritto. Intelligenza artificiale e protezione dei dati personali' (2019) Giur. it. 1657 ff.

[24] M Costanza, 'Robot e impresa' (n 21) 112 ff. On this point see also P. Pardolesi, 'La responsabilità civile 3.0 e l'insostenibile leggerezza del suo DNA polifunzionale' (n 11) 121 ff; G Teubner, *Soggetti giuridici digitali? Sullo status privatistico degli agenti software autonomi* (n 16), whose proposal is formulated on a sociological as well as a legal level.

[25] The constituent elements of the case would be identifiable in a kind of preposition relationship and in the causal link between the performance of the tasks and the damage caused to the third party. G D'Alfonso, 'Intelligenza artificiale e responsabilità civile. Prospettive europee' (n 9) 172.

[26] U Ruffolo, 'Intelligenza artificiale, machine learning e responsabilità da algoritmo' (n 23) 1698. The rationale of the rule is to make the principal liable, for a given hypothesis of error of the (human) intelligence of its perpetrator, and it would be complicated to interpret the rule extensively, with reference to damage caused by the conduct of non-human systems, due to a defect in their artificial intelligence.

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favoring the injured party. Instead, these liabilities have been reconfigured as strict liabilities, particularly highlighting, in the context of Article 2050, that the failure to undertake all appropriate preventive measures does not necessarily signify a breach of a duty of conduct[27].

Some in the legal community have invoked this latter provision, positing that the use of artificial intelligence inherently constitutes a hazardous activity, solely by virtue of employing intelligent systems[28].

However, this argument finds limited consensus within the majority of legal scholarship. Artificial intelligence is not inherently perilous, and such an attribute is ill-suited to it. Rather, being emblematic of technological advancement, artificial intelligence is perceived as more dependable than human agency, serving as a corrective or augmentative tool to human fallibility[29]. It is conceivable that the hazard

[27] Leading doctrine has developed this thesis, in light of a systematic interpretation of the special liability cases set forth in articles 2050-2054 of the Civil Code, closely correlated to the business risk and the repercussions on the insurance market, significant factors that affect the distribution of damages and relative costs of the community. Specifically, P Trimarchi, *Rischio e responsabilità oggettiva* (Giuffrè 1961) 48 ff and 193 ff. The author has pointed out that the function of strict liability is not to punish, but rather to impute to anyone the risk objectively created by their activity, to the extent that it can be expressed in cost and administered from an economic point of view, with the knowledge and means of foresight that a good administrator has at his disposal. The risk theory has been criticised by C Salvi, 'La responsabilità civile' (n 22) 149 and by C Castronovo, *La nuova responsabilità civile* (Giuffrè 1997) 57 ff. For a reconstruction of the debate on the legal qualification of liability for things in custody between aggravated and strict liability, see G D'Alfonso, 'Il regime di responsabilità da cose in custodia tra questioni tradizionali e "responsabilità da algoritmo"' (2022) EJPLT 6 ff. Among the most authoritative authors who have configured the regime under Article 2050 of the Civil Code as liability for "aggravated" fault, see A De Cupis, *Il danno. Teoria generale della responsabilità civtle* (n 11) 88 ff; P Forchielli, 'La colpa lievissima' (1963) Riv. Dir. Civ., 202 ff; E Paraglia, 'Appunti in tema di responsabilità da esercizio di attività pericolose' (1975) Dir. Prat. Ass. 645 ff. Proponents of the reconstruction of strict liability are M Franzoni, 'Responsabilità per l'esercizio di attività pericolose', in G Alpa - M Bessone (dir.), *La responsabilità civile. Una rassegna di dottrina e giurisprudenza* (Giappichelli 1987) 459 ff; PG Monateri, 'La responsabilità civile', in R Sacco (Dir.), *Trattato di diritto civile* (Giappichelli 1998) 674 ff.

[28] In particular, see L Coppini, 'Robotica e intelligenza artificiale: questioni di responsabilità civile' (n 23) 735. See also M Scialdone, 'Il diritto dei robot: la regolamentazione giuridica dei comportamenti non umani', in E Pietrafesa - F Marzano - T Medici (eds.), *La rete e il fattore C: Cultura, Complessità, Collaborazione* (Stati Generali dell'Innovazione 2016) 76; A Santosuosso - M Tomasi, *Diritto, scienza, nuove tecnologie* (n 22) 329 ff. It is held that, if an automaton, endowed with adaptive and learning capacities, is allowed to interact with a human, there is no guarantee that it will not behave in a manner prejudicial to the rights of third parties.

[29] P Pardolesi, 'La responsabilità civile 3.0 e l'insostenibile leggerezza del suo DNA polifunzionale' (n 11) 123 ff. On the same point, also M Costanza, 'L'intelligenza artificiale e gli stilemi della responsabilità civile' (n 12) 1688 ff.

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may not lie in the activities performed by intelligent systems per se, but rather in their interactions with the external environment. Consequently, a previously benign productive activity may acquire hazardous attributes upon the integration of artificial intelligence into the production process or directly into the product[30].

Another perspective within legal discourse posits that liability for artificial intelligence could be imputed to the user, owner, or custodian of the digital device. This assertion draws upon the discretionary application of Article 2052 of the Civil Code, pertaining to liability for damages caused by animals, or Article 2051, concerning liability for custodial items[31].

[30] Just think for example, to the circulation of vehicles, which could take on dangerous connotations, could be attracted to the discipline of Article 2050 of the Civil Code. U Ruffolo, 'Intelligenza artificiale, machine learning e responsabilità da algoritmo' (n 23) 1696. The recourse to Article 2050 of the Civil Code would, on the other hand, have the merit of giving the injured party a possible alternative route, with respect to product liability, in order to obtain compensation for the damage suffered, offering greater protection and making it possible to avoid the obstacle of the exemption of development risk. On the point A Amidei, 'Intelligenza Artificiale e product liability: sviluppi del diritto dell'Unione Europea' (n 18) 1725 ff. Besides, European and Italian laws provide for the cumulation of product liability and liability under other laws, and our jurisprudence continues to grant, as a competitor, the protection offered by the regime under Article 2050 of the Civil Code even in cases of damage caused by a defective product, if its manufacture or distribution can be qualified as a dangerous activity. U Ruffolo, 'Intelligenza artificiale, machine learning e responsabilità da algoritmo' (n 23) 1684-1687.

[31] L Fort - V Ieva, 'Intelligenza artificiale, responsabilità civile e interpretazione analogica' (2020) www.biodiritto.org 2. This, in particular, depending on whether the intelligent device is configured as a dynamic and evolutionary entity such as an animal, or in a naturalistic perspective that highlights that it is neither an animal nor a human being, but falls, on the contrary, within the category of things in the proper sense. As a matter of fact, Article 2051 of the Civil Code must be read in conjunction with Article 2052 of the Civil Code, concerning liability for damages caused by animals, since in both rules the criterion of imputation is custody with the limit of unforeseeable circumstances. See U Ruffolo, 'Intelligenza artificiale, machine learning e responsabilità da algoritmo' (n 23) 1699, who speaks of Article 2052 of the Civil Code as a "photocopy rule" of Article 2051 of the Civil Code. For comments on the applicability of Articles 2051 and 2052 of the Civil Code in this context, see context, see. L Coppini, 'Robotica e intelligenza artificiale: questioni di responsabilità civile' (n 23) 1699; M Scialdone, 'Il diritto dei robot: la regolamentazione giuridica dei comportamenti non umani' (n 28) 78; M Ratti, 'Riflessioni in materia di responsabilità civile e danno cagionato da dispositivo intelligente alla luce dell'attuale scenario normativo' (2020) Cont. Impr., 1174 ff.

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The reference to Article 2052 of the Civil Code must be rejected[32], as the behavior of animals, like that of intelligent devices, is inherently unpredictable[33].

Similarly, the application of the liability regime for custodial items has been met with substantial criticism within legal circles.

It has been contended that Article 2051 of the Civil Code, fundamentally addressing "inanimate" property, diverges significantly from intelligent devices capable of independent behavior and decision-making without human oversight[34].

Nevertheless, proponents argue that Article 2051, in its strict liability essence, finds relevance when the intelligent device itself serves as the direct cause of harm, rather than merely being a tool wielded by the owner, user, or custodian[35].

Under this interpretation, the liability regime for custodial items may also be extended to encompass the "trainer" of the artificial intelligent entity. This approach suggests

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[32] G D'Alfonso, 'Intelligenza artificiale e responsabilità civile. Prospettive europee' (n 9) 174. Otherwise, A Bertolini, 'Robots as Products: the case for a realistic analysis of robotics applications and liability rules' (2013) L. Innov. Technol. 227 underlines the difference between animal and intelligent device.

[33] M Bassini - L Liguori - O Pollicino, 'Sistemi di intelligenza artificiale, responsabilità e accountability. Verso nuovi paradigmi?' (n 14) 333 ff. From another point of view, whereas, in the first case, the owner carries out a control over the animal's ability to react, by means of domestication; differently, the owner/user/custodian of such devices, in addition to not knowing, at a basic level, their operating mechanisms and reaction to the outside world, has a limited possibility of influencing their behaviour.

[34] M Costanza, 'L'intelligenza artificiale e gli stilemi della responsabilità civile (n 12)1687. See also G Sartor, 'Gli agenti software e la disciplina giuridica degli strumenti cognitivi' (2003) Dir. Infor. 55 ff. It was held that the custody parameter might be unsuitable in view of the circumstance that the custody of a smart device, especially a stand-alone one, would be excessively complex and unbalanced for the custodian, who might not be able to control it. Again, should the owner/user/custodian be sued, proof of the fortuitous case exemption, concerning the unforeseeability of the conduct of the intelligent system, could become insurmountable. On this point L Fort - V Ieva, 'Intelligenza artificiale, responsabilità civile e interpretazione analogica' (n 31) 15. In particular, according to the authors the above would affect the economic choices of consumers who, as end-users, would be disincentivised to purchase the above products.

[35] The reference of the rule to the case under consideration would indeed be reasonable, because the intelligent device has an evolutionary and autonomous nature, a characteristic that distinguishes it from inanimate beings, and the damage would in fact be inherent in the intrinsic dynamism of the "intelligent thing". M Ratti, 'Riflessioni in materia di responsabilità civile e danno cagionato da dispositivo intelligente alla luce dell'attuale scenario normativo' (n 31) 1174 ff. In addition, Article 2051 of the Civil Code would be complementary to Article 2050 of the Civil Code, although it must be reiterated that the regime dictated by the first rule has the advantage that it does not require proof of the dangerousness or defectiveness of the property in custody. A Santosuosso - M Tomasi, *Diritto, scienza, nuove tecnologie* (n 22) 329 ff.

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a potential parallel liability shared with the producer of the digital device and/or the designer of the algorithm, if distinct from the former[36].

By way of conclusion, it is noteworthy that Article 2051 of the Civil Code has also been mentioned in legal literature for damages caused by autonomous vehicles[37]; For instance, consider a scenario where a defect in object recognition technology leads an autonomous vehicle to misidentify an object on the road, resulting in an accident-causing injury and property damage. In such cases, a distinction must be drawn between situations where the vehicle operates under the direct control of a human driver and instances where the device assumes partial or full control, thereby potentially excluding or limiting the liability of the human operator[38].

In conjunction with the liability attributed to the owner and driver, the accountability of the manufacturer or the designer of the algorithm, if distinct from the former, can be delineated through both the frameworks of product liability and liability for hazardous activities. This is especially pertinent if it is determined that the

[36] The occurrence of liability, pursuant to Article 2051 of the Civil Code, would derive from the circumstance that the "trainer" uses or manages the "thing" equipped with self-learning artificial intelligence, directing it towards a mentality, capable of trespassing into malevolent or deviant behaviour, without, however, having inhibiting mechanisms in place. For an overview of the best doctrine on the case see, *ex multis*, MC Gaeta, *Liability rules and self-driving cars. The evolution of tort law in the light of new technologies* (Editoriale Scientifica 2019); FP Patti, 'The European Road to Autonomous Vehicles', (2019) Fordham Int'l L. J. 125 ff; L Gatt - I Caggiano - MC Gaeta, 'Italian Tort Law and Self-Driving Cars: State of art and Open Issues', in BH Oppermann - J Stender-Vorwachs (eds), *Autonomes Fahren. Technische Grundlagen, Rechtsprobleme, Rechstsfolgen* (C. H. Beck 2020) 239 ff. According to this doctrine the "trainer" would be liable for the damage caused by the intelligent "thing", since its conduct, even if not directed by that person, would certainly be the result and consequence of his teaching or of the device's openness to experience. According to this approach, the "trainer" would also be liable for damages resulting from an unforeseeable change in the attitude of the intelligent device, since it was "guarded" by the latter. Article 2050 of the Civil Code could also apply to the "trainer" if the conditions are met.

[37] L Coppini, 'Robotica e intelligenza artificiale: questioni di responsabilità civile' (n 23) 734 ff.

[38] In the first case, should damage occur, the driver's liability may be configured, pursuant to Article 2054 of the Civil Code. In the second case, if one decides not to apply this rule to intelligent automation, one could invoke Article 2051 of the Civil Code, from which the imputation of liability to the owner-driver or to the owner and driver could derive, due to the factual relationship of custody of the vehicle. L Coppini, 'Robotica e intelligenza artificiale: questioni di responsabilità civile' (n 23) 735. Similarly, A Bertolini, 'Robots as Products: the case for a realistic analysis of robotics applications and liability rules' (n 32) 227 ff. On the potential dangerousness of the activity in this area, U Ruffolo - E Al Mureden, 'Authonomous vehicles e responsabilità nel nostro sistema e in quello statunitense' (2019) Giur. It. 1704 ff.

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manufacturing process of highly automated machines has assumed a hazardous nature due to the emergence of new risks associated with product fallibility[39].

3. European perspective in using AI

If the first steps taken by the European Union were clearly aimed at promoting new legal frameworks, with the promulgation of specific sectoral regulations, the landing place reached by the most recent EU documents seems to have partially revised the original approach, also by virtue of a general principle of technological neutrality[40].

The inaugural document to scrutinize this issue, concerning the realm of product liability, was the European Parliament Resolution addressing civil law regulations pertaining to robotics[41]. This resolution advocated for the integration of automatons into legal frameworks by endowing them with full legal subjectivity[42]. Simultaneously,

[39] R Pardolesi - A Davola, 'Algorithmic legal decision making: la fine del mondo (del diritto) o il paese delle meraviglie?' (n 4) 104-111. In terms of defective products, amplius G Comandè, 'La responsabilità civile per danno da prodotto difettoso... assunta con "precauzione"' (2013) Danno Resp. 107 ff. In particular, the author, in terms of product defectiveness, analyses two specific needs: the need to guarantee a high degree of consumer protection on the one hand, and the need to stimulate the competitiveness and innovativeness of European companies in the global market on the other. In order to strike a balance between the two requirements, the pro-injury evidentiary regime is balanced by a number of exemptions in favour of the manufacturer, such as the development risk exemption based on knowledge that is certain at the time of marketing. However, this exemption could turn out to be "a Pyrrhic victory" if circumvented by a precautionary reading of the general rules of imputation of civil liability, and of liability for dangerous activities in particular.

[40] L Buonanno, 'La responsabilità civile nell'era delle nuove tecnologie: l'influenza della blockchain (2020) Resp. Civ. Prev. 1620 ff. For a general overview of the doctrine treating the European scenario see, G Resta, 'Cosa c'è di 'europeo' nella Proposta di Regolamento UE sull'intelligenza artificiale?' (2022) Dir. Infor.; U Pagallo, 'The Politics of Data in EU Law: Will It Succeed' (2022) Digital Soc'y; A Fusaro, 'Quale modello di responsabilità per la robotica avanzata? Riflessioni a margine del percorso europeo' (2020) Nuov. Giur. Civ. Comm. 1353 ff; C Casonato - B Marchetti, 'Prime osservazioni sulla proposta di regolamento dell'Unione Europea in materia di intelligenza articiale' (2021) Biolaw - Riv. Biodiritto 436 ff; A Walch, 'The Path on the Blockchain Lexicon (and the Law)' (2016) Rev. Bank. Fin. L. 713 ff.

[41] European Parliament resolution of February 16, 2017, with recommendations to the Commission regarding civil law rules on robotics [2015/2013 (INL)].

[42] In a wide-ranging dissertation on developments in artificial intelligence and the possible critical issues involved in such progress, the Commission is urged to explore the establishment of a specific legal status for robots in the long term, so that at least the most sophisticated autonomous robots can be held as electronic persons liable to compensate for any damage caused by them, as well as possibly the recognition of the electronic personality of robots making autonomous decisions or interacting independently with third parties. Particularly illustrative is the recent elaboration, in the European Union, on the subject of artificial intelligence and product liability; a subject, the latter,

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it underscored the imperative for comprehensive regulation of artificial intelligence to mitigate the escalating autonomy of these systems. In pursuit of this objective, the resolution advocated for the establishment of mandatory insurance policies to mitigate associated risks, alongside the creation of a contingency fund for cases where such insurance is not procured[43].

More recently, the European Parliament itself has issued a new Resolution[44] on the management (at several levels) of artificial intelligence and has again urged the Commission[45] to review the existing legislation to ensure that it is fit for purpose, and indeed "regretting" that the process of updating and adapting the current rules on liability (consumer protection, but not only) has not yet been completed and that a uniform view of the problem has not been reached in the Union[46].

And again, the issue was addressed by a report prepared by a team of experts[47] dealing with the implications of artificial intelligence, the Internet of Things and robotics on safety and liability, annexed to the White Paper "On Artificial Intelligence - A

which the legislature has made the subject of harmonization with Directive 85/374/EEC of July 25, 1985, (on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products), now transposed, albeit with some significant delay, by the national legal systems of all the Member States. In this direction, the Commission's assessment of the choice between the strict liability or risk management approach was solicited, bearing in mind that risk management does not focus on the person who acted negligently but on identifying the person who, under the given circumstances, is able to minimize the risks and deal with the negative impact. On this point see *amplius* F Carroccia, 'Soggettività giuridica dei robot?' in G Alpa (ed.), *Diritto e intelligenza artificiale* (n 8) 214 ff; G Sartor, 'Gli agenti software: nuovi soggetti del ciberdiritto?' (2002) Contr. Impr. 465 ff; G Taddei Elmi, 'I diritti dell'intelligenza artificiale tra soggettività e valore: fantadiritto o jus condendum', in L Lombardi Vallauri (ed.), *Il meritevole di tutela*, (Giuffrè 1990) 685-711.

[43] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1013-1014.

[44] On this point, A Amidei, 'Intelligenza Artificiale e product liability: sviluppi del diritto dell'Unione Europea' (n 18) 1716 ff.

[45] See generally U Salanitro, 'Intelligenza artificiale e responsabilità: la strategia della Commissione Europea' (n 15) 1247. Over the past few years, the European Commission has launched a series of wide-ranging initiatives aimed at ushering in what is called a "European approach to artificial intelligence". Among the most illustrative of the "all-encompassing" approach taken by the European Commission in addressing artificial intelligence are the following Communications: Artificial Intelligence for Europe, April 25, 2018.

[46] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1014.

[47] European Commission, *Liability for Artificial Intelligence and other emerging digital technologies, Report from the Expert Group on Liability and New technologies – New Technologies Formation* (European Union 2019).

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European Approach to Excellence and Trust"[48], the results of which, echoed in the Commission's own Report[49], emphasized the need to adapt safety and liability legislation to the issues that artificial intelligence poses. It was enunciated, *expressis verbis*, the unavoidable obligation to ensure a level of protection of the injured by artificial intelligence systems corresponding to that of the injured by traditional product, while ensuring a balance with the requirements of technological innovation[50].

Indeed, a significant juncture in this discourse can be attributed to the recent proposal for a Regulation drafted within the Juri Commission[51]. This proposal delineates a dual legal status for artificial intelligence, contingent upon the degree of automation exhibited by the system. It envisions the establishment of a stringent liability regime for damages arising from high-risk artificial intelligence systems. Examples of such systems include unmanned aircraft, highly automated vehicles, autonomous traffic management systems, and self-operating devices for public space maintenance[52].

[48] European Commission, COM (2020) 65 final, February 16, 2020, White Paper on Artificial Intelligence – A European Approach to Excellence and Trust. The Report is aimed to give a definition of AI, underlining the potential benefits and technological advances in different areas, including medicine, safety, farming, as well as identifying the potential risks, such as opaque decision making, gender inequality, discrimination, lack of privacy. On the point G Proietti, 'The White Paper on Artificial Intelligence. The European approach between law and ethics' (2020) Giust. Civ.

[49] European Commission, COM (2020) 64 final, Feb. 16, 2020, Report on the safety and liability implications of artificial intelligence, the Internet of Things and robotics.

[50] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1013-1014.

[51] Draft report with recommendations to the Commission on a civil liability regime for artificial intelligence [2020/2014 (INL)]. The draft is the basis for the European Parliament's October 20, 2020, Resolution making recommendations to the Commission on a liability regime for artificial intelligence [2020/2014]. The EU Parliament played ahead and passed three Resolutions last October 20 with specific demands regarding future standardization plus other less specific but equally assertive texts including one on the use of A.I. in the criminal justice system. It adopted three proposals specifying how the EU can regulate artificial intelligence more effectively to give a positive boost to innovation, ethical standards, and trust in technology. The first resolution (A9-0186/2020) addresses the "constitutional" issue of the ethical safeguards that artificial intelligence applications will need to ensure safety, transparency, and accountability, and avoid the creation of bias and discrimination, stimulate social and environmental responsibility, and how to ensure respect for fundamental rights. The second A9-0178/2020) deals with the sensitive issue of the civil liability regime for damages and injuries caused by A.I. systems. The third resolution (A9-0176/2020) concerns intellectual property rights, in which Parliament reiterated the importance of having an effective system for further development of artificial intelligence, including licensing and new creative processes.

[52] That is, the systems indicated in levels four and five of the SAE J3016 standards, a document published in 2014 by SAE International, an independent association of engineers and technicians, which describes a sequence of levels of vehicle automation starting with the lowest level, zero,

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Conversely, for other artificial intelligence systems where automation levels are not as pronounced, the proposal advocates for a liability framework based on presumed fault, with provisions allowing for contrary evidence to be presented in such cases.

Liability is attributed to the operator (so-called deployer, defined as the one who benefits from the operation of the automaton and exercises control over the risk associated with it, who would be obliged to take out an appropriate insurance policy)[53] providing, as well, in its favor an action of recourse against the manufacturer (under Directive 85/374/EEC).

The European institutions have recently taken another step towards building a regulatory framework on the topic of innovation and, in particular, artificial intelligence.

The European institutions have recently taken a significant stride towards establishing a regulatory framework concerning innovation, particularly focusing on artificial intelligence (AI). In September 2022, the proposal for a directive on liability stemming from AI systems (AI Liability Directive) was unveiled, alongside a crucial proposal to amend the product liability directive[54].

indicating the absence of automation systems, progressively moving to vehicles that have certain levels of automation (driver assistance, partial automation), in which, however, control of the vehicle remains with the driver, and finally to systems with high or full automation (levels four and five). For a careful analysis R Lobianco, 'Veicoli a guida autonoma e responsabilità civile: regime attuale e prospettive di riforma' (2020) Resp. Civ. Prev.

[53] The definition that is used of operator also allows those who in practice do not exercise real control over the system (see, for example, the driver of the fully autonomous vehicle or the doctor using a deep learning system) to qualify as such, who, on the contrary, would be liable under strict liability. See L. Comporti, 'Fatti illeciti: le responsabilità oggettive' (n 22) 172 ff.

[54] On this point see G Resta, 'Cosa c'è di 'europeo' nella Proposta di Regolamento UE sull'intelligenza artificiale?' (n 40) 323 ff; G Finocchiaro, 'La proposta di regolamento sull'intelligenza artificiale: il modello europeo basato sulla gestione del rischio' (2022) Dir. Infor. 303 ff; G Alpa, Quale modello normativo europeo per l'intelligenza artificiale?' (2021) Cont. Impr., 1003 ff; G Di Rosa, 'Quali regole per i sistemi automatizzati intelligenti?' (2021) Riv. Dir. Civ., 850 ff; R Lener, 'Vigilanza prudenziale e intelligenza artificiale' (2022) Riv. Trim. Dir. Econ. 207 ff; GR Marseglia, 'AI Act: impatti e proposte' (2022) i-lex 37 ff; G Proietti, 'Intelligenza artificiale: una prima analisi della proposta di regolamento europeo' (2021) dirittobancario.it 198 ff. In the foreign doctrine see M Ebers, Standandizing AI - The Case of the European Commission's Proposal for an Artificial Intelligence Act', in LA Di Matteo - M Cannarsa - C Poncibò (eds.), *Handbook of Artificial Intelligence: Global Perspectives on Law and Ethics* (Cambridge University Press 2022); L Floridi, 'The European Legislation on AI: a Brief Analysis of its Philosophical Approach' (2021) Philos. Technol. 215-222; M MacCarthy - K Propp, 'Machines learn that Brussels writes the rules: The EU's new AI regulation. Editor's Note' (2021) *Brookings*.edu; M McFadden - K Jones - E Taylorosborn, 'Harmonising Artificial

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The proposed directive, comprising thirty-three recitals and nine articles, sets forth a distinct scope and objective. It primarily addresses non-contractual liability, with a specific emphasis on torts involving the involvement of AI systems in actions or omissions leading to damages, as articulated in Recital No. 3. Of particular concern are AI systems characterized by opacity, autonomy, and inherent complexity, which pose challenges in burden of proof, often making it onerous, if not impossible, for the injured party to discharge[55].

Consequently, to optimize the realization of economic and social benefits derived from AI utilization, harmonization of laws across member states is deemed essential in this domain. However, as highlighted in Recital 10, such harmonization endeavors are not extended to general aspects of civil liability, which exhibit variations across EU member states. These aspects encompass fault definition, causation determination, types of damages, liability imputability, and criteria for quantifying damages[56].

The core elements of the proposed legal framework are delineated partly in Article 3 and partly in Article 4.

Article 3 mandates that Member States establish a procedural mechanism enabling judicial authorities to compel individuals, which could include providers, those subject to similar obligations under the Artificial Intelligence Act, or users, to disclose relevant evidence regarding a specific high-risk AI system. This includes granting access to

Intelligence; The role of standards in the EU AI Regulation Harmonising Artificial Intelligence' (2021) Oxford Commission on AI & Good, Oxford Information Labs. The framework would not be complete if overlooking other legislative proposals that, although concerning personal data, have a direct bearing on issues related to technological innovations. These are initiatives aimed at realising the project of a single European data market. Some legislative projects have already been passed – the reference is to the Digital Service Act and the Digital Market Act – while others are still in a gestation phase. The reference is to the Data Governance Act and the Data Act.

[55] G Resta, 'Cosa c'è di 'europeo' nella Proposta di Regolamento UE sull'intelligenza artificiale?' (n 40) 323 ff.

[56] Moreover, the directive does not intersect with the Digital Services Act but is complementary to the proposal outlined in the Artificial Intelligence Act, referenced consistently within the directive's provisions. See amplius L Floridi, 'The European Legislation on AI: a Brief Analysis of its Philosophical Approach' (n 54) 215-222. The legislative proposal expressly states that the directive does not affect, and is therefore without prejudice to, legislation concerning liability in the transport sector, as well as Directive 85/374/EC on product liability, the Digital Services Act and national rules determining the person who bears the burden of proof or the definition of fault. This is without prejudice to the possibility for Member States to adopt or maintain internal rules that are more favourable to the injured party for damages caused by an AI system.

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such evidence when voluntary disclosure is declined, especially in cases where suspicions of harm caused by said system arise[57].

In contrast, Article 4 addresses the presumption of causality in cases of damage caused by an AI system[58].

Specifically, it outlines a scenario where legal action is taken against an individual who has employed the AI system for personal and non-professional activities. In such cases, the presumption of causality applies only if the defendant materially interfered with the functioning conditions of the AI system or if they were capable of and obligated to determine the system's functioning conditions but failed to do so.

The most recent European-level legislation concerning artificial intelligence is the AI Act, which garnered approval from the European Parliament in March 2024. This legislation mirrors a similar approach to previous initiatives such as the GDPR and subsequent digital legislations[59].

The Artificial Intelligence Act imposes significant obligations directly impacting suppliers, deployers, importers, and distributors of high-risk AI systems. Suppliers and importers must ensure conformity with specific technical requirements, furnish essential system information, implement quality management systems, draft EU

[57] G Finocchiaro, 'La proposta di regolamento sull'intelligenza artificiale: il modello europeo basato sulla gestione del rischio' (n 54) 303 ff. See also BA Koch, 'Liability for Emerging Digital Technologies: An Overview' (2020) J. Eur. Tort L. 115-136.

[58] L Floridi, 'The European Legislation on AI: a Brief Analysis of its Philosophical Approach' (n 54) 215-222. Such a presumption would arise where all three of the conditions listed in subparagraphs (a) to (c) of paragraph 1 below are met. Those conditions include a showing by the plaintiff of the defendant's culpable failure to comply with obligations of care established by European or national law to prevent the harm from occurring. There must also be a reasonable probability, inferred from the concrete circumstances, that such conduct influenced the result produced by the IA system or the failure of the IA system to produce a result.

[59] The regulation extends its applicability not only to artificial intelligence system suppliers that market or utilize such systems within the European Union but also to entities outside the EU if the outcomes produced by artificial intelligence systems are utilized in Europe. Moreover, the regulation encompasses users of artificial intelligence systems, including both public and private entities, as well as importers, distributors, and individuals involved in the utilization of such systems. Exclusions from the regulation encompass artificial intelligence technologies employed solely for military, defense, or national security purposes (which fall under the jurisdiction of Member States), those required for scientific research and development activities related to artificial intelligence systems, or those utilized by individuals for non-professional purposes.

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declarations of conformity, initiate corrective actions if necessary, and provide requested information to competent authorities.

Deployers of high-risk AI systems are obliged to adopt appropriate technical and organizational measures for compliant utilization, delegate human oversight responsibilities, monitor system operations, collaborate with supervisory authorities, and conduct impact assessments on fundamental rights in specified circumstances.

Additionally, providers of general-purpose AI models, including large generative AI models like ChatGPT, must maintain updated technical documentation detailing training and testing procedures, evaluation outcomes, and establish policies for compliance with EU copyright law[60].

Another pivotal responsibility involves compiling and making accessible to the public a summary of the data utilized for training the AI model, thereby enabling interested parties to opt out if desired. It's noteworthy that providers of models distributed under free or open-source licenses are exempt from these obligations, unless such models pose a systemic risk[61].

While suppliers bear the most significant set of obligations, the European legislator has instituted a mechanism whereby importers, distributors, deployers, or any third party could be designated as the supplier of a high-risk AI system. Consequently, such parties are subject to all the obligations outlined, albeit under specific circumstances: if they affix their name or trademark to the system after it has been placed on the market or put into service, make substantial changes to the system after its market introduction (provided it remains high-risk), or alter the intended purpose of the AI system, rendering it high-risk.

Furthermore, the Regulation places particular emphasis on safeguarding the fundamental rights of natural persons. Public institutions and private organizations

[60] On this point already N Helberger - N Diakopoulos, 'ChatGPT and the AI Act' (2023) Internet. Pol'y Rev.

[61] The systemic risk monitoring approach in art. 34 of the Digital Services Act (DSA) has been an inspiration. Under the DSA, "Very Large Online Platforms and Very Large Search Engines are already obligated to monitor their algorithmic systems regularly for any actual and foreseeable negative effects on fundamental rights and societal processes, including such that arise from the implementation of generative AI models. It is conceivable that a comparable obligation to monitor for and mitigate systemic risks on a regular basis should also apply to the providers of very large generative AI models". N Helberger - N Diakopoulos, 'ChatGPT and the AI Act' (n 60) 4.

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offering community services, such as education, healthcare, accommodation facilities, social services, and entities in the life and health insurance sector, are mandated to conduct a Fundamental Rights Impact Assessment (FRIA) prior to deploying a high-risk AI system. This assessment entails identifying risks, oversight measures, risk mitigation strategies, affected categories of individuals, expected frequency of use, and the deployment processes across various entities utilizing the system[62].

From what has just been outlined, the concern of the Community institutions[63] clearly emerges: to avoid the entry into the system of wrongful acts without a liable party[64].

The solution is the use of the precautionary principle in the choices on the liability status of automatons[65], with the primary purpose of managing the risk arising from the ineradicable uncertainty of science[66].

To navigate the complexities of determining causality in highly intricate scenarios, there have been suggestions within the community to introduce registration mechanisms for devices posing a high degree of risk. These mechanisms would be assessed based on intrinsic characteristics, such as self-learning capabilities and the

[62] The FRIA aims to mitigate possible harms of high-risk AI systems in relation to individuals' fundamental rights, beyond the rather technical compliance requirements of the EU AI Act, such as the conformity assessments. See for a general overview on the FRIA, H Janssen - M Seng Ah Lee - J Singh, 'Practical fundamental rights impact assessments' (2022) Int'l J. L. Inform. Tech. 200–232; S Bertaina et al., *Fundamental Rights and Artificial Intelligence Impact Assessment: A New Quantitative Methodology in the Upcoming Era of Ai Act* (Giuffrè 2024).

[63] Court of Justice, EU, Sept. 11, 2014, Case C-525/12; Justicial Court, EU, May 15, 2014, case C-521/12; Justicial Court, EU, April 10, 2014, case C-269/13. See also Trib. EC, Nov. 16, 2002, Joined Cases T-74/00, T-83/00 and T-85/00, T-132/00, T-137/00 and T-141/00; Trib.EC, 11/9/2002, Case T-70/99.

[64] E Palmerini, 'Robotica e diritto: suggestioni, intersezioni, sviluppi a margine di una ricerca europea' (2016) Resp. Civ. Prev. 1816-1850.

[65] For an in-depth analysis on this topic, see U Izzo, 'La precauzione nella responsabilità civile' (Cedam 2004). The work analyses the impact of the precautionary approach in the operational rules of civil liability. The doctrine does not unanimously accept this use of the principle, since the "normative theory" is not always supported, which is based, moreover, on the numerous pronouncements of the Court of Justice, where the principle is an evaluative criterion in the judgement of liability, see G Tomarchio, 'Il principio di precauzione come norma generale', in L. Marini - L Palazzani (eds.), *Il principio di precauzione tra filosofia, biodiritto e biopolitica* (Studium 2008). For others, the principle remains a criterion of conduct in the face of risk; MG Stanzione, 'Principio di precauzione e diritto alla salute. Profili di diritto comparato' (2016) Comp. Dir. Civ. Authoritative doctrine states that the principle is an inspiring criterion for legislation and administrative measures to protect health. See G Francescato - A Pecoraro Scanio, *Il principio di precauzione* (Giuffrè 2002).

[66] See P Perlingieri, 'Applicazione e controllo nell'interpretazione giuridica' (2010) Riv. Dir. Civ. 332 ff; C Toscano, *Il teatro dei robot* (Zanichelli 2019).

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level of autonomous action, as well as the potential impact on third-party interests requiring safeguarding[67].

The trajectory the European Union appears to be following contrasts with assertions made by some scholars[68], suggesting a departure from stringent application of the precautionary principle, which aims to curtail potentially harmful technological advancements. Instead, the focus appears to be on striking a balance between the imperatives of protection and fostering innovation and development[69].

It is important to note that, currently, the autonomous learning process is typically constrained to a period following the circulation of the product. Consequently, according to the Commission, risks could be effectively managed by mandating manufacturers to reassess the product upon completion of the learning process[70].

The implementation of these nascent proposals undoubtedly carries significant and far-reaching implications for the liability framework concerning damage caused by automatons.

It imposes continual monitoring and control obligations on manufacturers, with liability being limited to instances where such duties are breached. This approach, aimed at accepting and distributing risk between users and other involved parties[71], does not stifle technological progress but rather regulates or constrains the

[67] SM Solaiman, 'Legal personality of robots, corporations, idols and chimpanzees: a quest for legitimacy' (2017) Artif. Intell. L. 155 ff. The issue becomes even more complicated for self-learning devices, with respect to which the risks increase because of the unpredictability of the decisions they can make. See also U Ruffolo, 'Per i fondamenti di un diritto della robotica self-learning; dalla machinery produttiva all'auto driverless: verso una "responsabilità da algoritmo"?', in U Ruffolo (ed.), *Intelligenza Artificiale e Responsabilità* (Giuffrè 2017).

[68] In this sense U Ruffolo, *Intelligenza artificiale e responsabilità* (Giuffrè 2018) 98 ff.

[69] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1014-1015.

[70] European Commission, COM (2020) 64 final, Feb. 16, 2020, Report, cit., 8, footnote 38, where it is specified that the expression 'capable of self-learning' has been used in the context of artificial intelligence mostly to indicate that machines are capable of learning during training; it is not yet a requirement that machines equipped with artificial intelligence continue to learn even after they are put into operation. P Moro - C Sarra, *Tecnodiritto. Temi e problemi di informatica e robotica giuridica* (Franco Angeli 2018).

[71] See U Salanitro, 'Intelligenza artificiale e responsabilità: la strategia della Commissione Europea' (n 15) 1247 ff; D Heaven - V Gili, *Macchine che pensano. La nuova era dell'intelligenza artificiale* (Hoepli 2018) 31 ff.

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development of self-learning techniques by exercising control over their advancement.

In light of the aforementioned observations, it becomes apparent that the complexity, autonomy, and opacity of artificial intelligence systems, coupled with the uncertainty surrounding their operational rules, render traditional paradigms of civil liability inadequate in ensuring effective protection of fundamental rights and freedoms. Consequently, civil liability cannot assume a primary role in this context[72]. Instead, it falls upon the legislator to address two categories of legal issues: those concerning liability – purely civil law matters – and those concerning permission – pertaining to the regulatory needs of the sector[73].

In essence, there exists a pressing need to develop administrative regulations alongside the framework of "algorithmic" civil liability. These regulations would establish parameters for programming, production, and marketing of digital systems, as well as introduce new procedures for their verification and validation. This approach aims to assess and control the safety, transparency, comprehensibility, accountability, and ethical responsibility of such systems[74].

Only in this way can a reliable and anthropocentric artificial intelligence[75] be realised and an architecture of intelligent artificial entities be built that can guarantee their compliance with ethical principles and current European Union regulations[76].

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[72] D Di Sabato, 'Strumenti riparatori e risarcitori' (n 18) 343.

[73] A Amidei, 'Intelligenza Artificiale e product liability: sviluppi del diritto dell'Unione Europea' (n 18) 1718 ff.

[74] See on this point the Opinion of the European Economic and Social Committee on "Artificial Intelligence. The impact of artificial intelligence on the (digital) single market, production, consumption, employment and society", Document 52016IE5369 (point 3.16).

[75] On this topic, European Commission, Directorate-General for Communication Networks, Content and Technology, Ethical Guidelines for Reliable AI, Publications Office, 2019, points 87 ff.

[76] M Gambini, 'Responsabilità civile e controlli del trattamento algoritmico', in P Perlingieri - S Giova - I Prisco (eds.), *Il trattamento algoritmico dei dati tra etica, diritto e economia* (n 18) 326. In relation to the ethical profiles of Artificial Intelligence, the European Parliament Resolution of 20 October 2020, containing recommendations to the Commission concerning the framework for the ethical aspects of artificial intelligence, robotics and related technologies (2020/2012(INL)) is very important, where, in line with the logic of based risk, the need for rules establishing a predefined ethical approach, right from the design of intelligent systems, is foreseen; the possibility of human intervention, in order to compensate for the asymmetry between those who employ digital technologies and those who are subject to them. Attached to the Resolution is the proposal for a Regulation of the European Parliament and of the Council on ethical principles for the development, deployment and use of artificial intelligence, robotics and related technologies which aims to establish

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The most suitable legislative model for addressing legal issues arising from technological innovation must be imbued with principles of prevention and precaution, akin to those enshrined in the GDPR. This necessitates the development of a multilayered system of responsibility anchored in the principle of accountability, similar to the approach GDPR[77]. The objective is to maximize the liability of all stakeholders involved in the entire lifecycle of intelligent systems, ranging from conception and programming to the utilization of algorithmic applications, holding them answerable to those impacted by their decisions[78].

Such a comprehensive framework would not only regulate civil liability concerning damages stemming from smart devices but also entail the elaboration of extensive administrative regulations. These regulations would delineate criteria for planning, manufacturing, and commercializing intelligent systems, while also instituting novel procedures for their verification and validation. These measures are indispensable for evaluating and managing critical aspects such as safety, transparency, comprehensibility, accountability, and ethical responsibility[79].

Only through such meticulous oversight can we achieve a trustworthy and human-centric artificial intelligence framework[80] fostering the construction of a resilient

a Union framework of ethical principles and legal obligations for the development, deployment and use of artificial intelligence, robotics and related technologies in the Union. It lays down multiple and specific obligations for "high-risk" technologies.

[77] G Comandé, 'Multilayered (Accountable) Liability for Artificial Intelligence', in S Lohss - R Schulze - D Staudenmayer (eds.), *Liability for Artificial Intelligence and the Internet of Things* (Nomos Verlagsgesellschaft Mbh & Co 2019) 178 ff. In particular, the GDPR entrusts the data controller with the choice of the most suitable solutions for achieving the objective of risk management, arising from the processing of personal data, and stipulates that he or she will be held accountable if problems arise. Be permitted a reference to F Zambardino, 'La blockchain e la protezione dei dati personali: una tecnologia privacy compliant by design?' (2022) EJPLT 136-152. See also R Carleo, 'Il principio di accountability nel GDPR: dalla regola alla auto-regolazione' (2021) Nuovo Dir. Civ. 366 ff; G Comandè, 'Responsabilità e accountability nell'era dell'Intelligenza Artificiale', in F. Di Ciommo - O. Troiano (eds.), *Giurisprudenza e Autorità indipendenti nell'epoca del diritto liquido, Studi in onore di Roberto Pardolesi* (La Tribuna 2018) 1010 ff; M Trapani, 'GDPR e Intelligenza Artificiale: i primi passi tra governance, privacy, trasparenza e accountability', in A Mantelero - D Poletti (eds.), *Regolare la tecnologia: il Regolamento UE 2016/679 e la protezione dei dati personali* (Pisa University Press 2018).

[78] G D'Alfonso, 'Danni algoritmici e sviluppi normativi europei tra "liability" e "permittance" rules' (2022) EJPLT 37.

[79] See on this point the opinion of the European Economic and Social Committee on "Artificial Intelligence. The impact of artificial intelligence on the (digital) single market, production, consumption, employment and society", (point 3.16).

[80] G D'Alfonso, 'Intelligenza artificiale e responsabilità civile. Prospettive europee' (n 9) 178.

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architecture for intelligent systems that ensures adherence to ethical principles and regulatory standards[81].

Moreover, from a broader perspective, the rules of civil liability, irrespective of the chosen applicable standard, must be integrated within the wider framework of accountability encompassing all actors involved in the lifecycle of digital systems. This entails a conception of civil liability with a broader connotation, intricately linked to the principle of accountability. In this regard, civil liability serves as merely one component within the broader landscape, necessitating complementation and augmentation by other public instruments of preventive protection[82].

4. The risk allocation

The predisposing party's (*i.e.*, the operator's) interest in protection shows that exploitation of the AI imports a number of potential risks to users. Well, it is logical that such risks[83] are allocated to the operator, who has an obligation to ensure the maximum safety of the technological service made available to users, to prevent, in a cost-effective manner, the service from becoming detrimental[84]. Thus, if the malfunction creates harm to users, they will have to be compensated[85].

Clearly, it is impossible to eliminate risk in its entirety, however, one must necessarily determine what levels of risk are acceptable in order to maximise utility and minimise

[81] M Gambini, 'Responsabilità civile e controlli del trattamento algoritmico' (n 76) 325 ff.

[82] G Comandé, 'Intelligenza artificiale e responsabilità tra liability e accountability. Il carattere trasformativo dell'IA e il problema della responsabilità' (n 10) 180-184.

[83] J Moury, 'Le droit confronté à l'omniprésence du risque' (2016) Recueil Dalloz 1020 ff.

[84] This view, therefore, conflicts with the idea of those who, in contrast, argue in the sense of the impossibility of identifying the entity responsible for the service provided by the blockchain platform. A Walch, 'The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk', (2015) NYU L. Legisl. & Publ. Pol'y 837 ff.

[85] For an in-depth analysis of the case of malfunctions, see P Pardolesi, 'Riflessioni sulla responsabilità da prodotto difettoso in chiave di analisi economica del diritto' (2017) Riv. Dirt. Priv. 87 ff; G Guerra, 'Il concetto di difettosità nella realtà che cambia. Un esercizio di microcomparazione', in G Autorino - S Sica - P Stanzione, *Comparazione e diritto civile* (Edizioni Scientifiche Italiane 2019) 249-280; V D'Antonio, 'La responsabilità per danno da prodotti difettosi', in P Stanzione - A Musio, *La tutela del consumatore*, (Giappichelli 2009) 595-670.

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liability. Inherently, the more restrictions one places on the system, the more limited will be its ability to generate solutions[86].

It is precisely the cases of malfunctioning of artificial machines that are evidence of how only their operators could manage the risk[87], prevent the damage and eventually compensate for it[88].

The use of the concept of remedy[89], which has the function of repairing the damage suffered, generally presupposes the recognition of liability. The complexities thus

[86] G Comandé, 'Intelligenza artificiale e responsabilità tra liability e accountability. Il carattere trasformativo dell'IA e il problema della responsabilità' (n 10) 171. As the author points out, however, every product development process necessarily has a tipping point, where spending additional resources in search of the perfect balance is inefficient. Alternatively, programmers who take little care, or more trivially develop the programme inefficiently, could impose general, non-targeted restrictions, but, again, this comes at the cost of limiting the possible solutions found by artificial intelligence by diminishing their intrinsic value. See also, of the same author, G Comandè, 'Multilayered (Accountable) Liability for Artificial Intelligence' (n 77) 169 ff.

[87] *Ibid*. See also M Gorgoni, 'Responsabilità per prodotto difettoso: alla ricerca della (prova della) causa del danno' (2007) Resp. Civ. Prev. 1592 ff.

[88] The principle is already established by the Supreme Court of California, *Escola v Cola-Cola Bottling Co of Fresno*, 150 SPCC P.2d, 1944, p. 440 ff.

[89] Despite the fact that the term "remedy" is widely used in legal language and has been the subject of a very extensive literature, its exact meaning is still rather uncertain, so much so that it is not infrequently defined in such broad terms as to encompass any legal action and any instrument of protection provided by the legal system. However, if it is understood in a vague or overly broad sense, the concept of remedy loses its dogmatic rationale, identifying itself with any instrument by which the legal system protects the rights it recognises and attributes to subjects. Ultimately, it can be said that for any legal system the saying applies that when there is a right, there is also a remedy, and that only if there is a remedy, then a right exists (*ubi ius ibi remedium, ubi remedium ibi ius*). Y Adar - P Sirena, 'La prospettiva dei rimedi nel diritto privato europeo' (2012) Riv. Dir. Civ. 367-368. In such a broad sense, however, remedies constitute nothing more than the practical and perceptible manifestation of rights, to which they attribute force and, ultimately, meaning. A right that is not protected and safeguarded by the legal system would therefore not be a right, but only its simulacrum, because it would be exhausted in a subjective interest or an ideal aspiration devoid of any legal force. In a specific sense, however, remedies can be defined as the claims that the holder of a legally protected interest can exercise against those who have injured it or are about to injure it, so that this injury is prevented ex ante or repaired ex post (in a specific form or, if this is not possible, by monetary equivalent). *Ibid*. According to the terms of that definition, for there to be a remedy it is essential that a claim presupposes the injury of a legally protected interest of the person exercising it, being precisely aimed at protecting that interest. The person entitled to exercise the remedy may therefore be appropriately qualified as the subject protected. A classic distinction in rights into primary (primary) and secondary (sanctioning) is made in J Austin, *Lectures on Jurisprudence. Or the Philosophy of Positive Law* (Kessinger Publishing 1885) 760 ff. Although necessary, this requirement is not sufficient. A person who has suffered unjust damage within the meaning of Art. 2043 of the Civil Code, for example, may claim to be indemnified by the insurance company of the person causing the damage, or possibly by a public fund established for that purpose, but this does not mean that such claims can be qualified

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generated by the arduous identification of the liable party appear, in such a case, to be surmountable with the help of a theory rooted in risk management. Indeed, it is still someone who, by putting the algorithmic service into circulation[90], assumes the risk that, despite the precautions (in terms of protection and inalterability) that may have been taken, his or her activity will cause harm[91].

The inability to trace liability would, moreover, weaken the incentive to take those precautions, imposing a net cost on society, which would ultimately burden the victims of the harm[92].

The conceptual approach invoked thus assumes that the harm, once it has occurred, can no longer be eliminated. Through compensation, therefore, the harm is not undone, but the relative economic burden is transferred from the one who suffered it to the one who must compensate for it[93].

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as remedies. Whoever is entitled to suffer the exercise of the remedy may therefore be appropriately qualified as the liable party. Y Adar - P Sirena, 'La prospettiva dei rimedi nel diritto privato europeo' (n 89) 368. See also L Di Donna, *Intelligenza artificiale e rimedi risarcitori* (Cedam 2022).

[90] On this perspetcive, see Y Adar - P Sirena, 'La prospettiva dei rimedi nel diritto privato europeo' (n 89) 359 ff.

[91] T Simonite, 'The Man Who Really Built Bitcoin, in MIT Technology Review' (2014) available at www.technologyreview.com/s/527051/the-man-who-really-built-bitcoin/. Last visited October 28, 2022. The author notes that, at least until the early days of the Bitcoin phenomenon, only the major developers had the power to "change the code behind Bitcoin and merge in proposals from other volunteers". *Ibid.*

[92] V Mataja, *Das Recht des Schadenersatzes vom Standpunkte der Nationalökonomie* (Duncker & Humblot 1888) 19 ff. This theory evokes that subsequently developed by G Calabresi, 'Optimal Deterrence and Accidents' (1975) Yale L. J. 666 ff, in which the author introduces some modifications to his original theory set forth in G Calabresi, *The Costs of Accidents* (Yale University Press 1970).

[93] L. Buonanno, 'La responsabilità civile nell'era delle nuove tecnologie: l'influenza della blockchain' (n 40) 1625-1626. In this regard, it is worthwhile to make a comparative reflection between the concept of civil liability and that of torts. The entire original common law liability, as Comandè carefully explains, is characterised by the intentionality of the conduct; and its main action, the trespass, is characterised by the voluntariness and physicality (*vi et armis*) of the conduct and the injury attributable to it. (see G Comandè, 'Le linee di confine tra danno patrimoniale e non patrimoniale nella evoluzione del modello di common law', in L Vacca (ed.), *Il danno risarcibile. Congresso internazionale ARISTEC, Baia delle Zagare 14-16 giugno 2007* (Edizioni Scientifiche Italiane 2011) 271. In a nutshell unlike continental legal systems in which, whether through typical forms or an atypical structure, the main point is the configuration of the protected situation – and therefore the central position is that of the injured party – in British common law the hinge always remains the existence of a duty of care. F Di Ciommo, *Evoluzione tecnologica e regole di responsabilità civile* (Edizioni Scientifiche Italiane 2003) 125. An obligation that, together with its possible breach, is not identified through recourse to general principles, but is rather derived from a broad casuistry that allows the judge to delineate the standard of the case on a case-by-case basis: while rejecting, in fact, any

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A portion of the literature also discusses the potential intersection, under specific conditions, between liability rules for dangerous activities outlined in Article 2050 of the Civil Code[94]. Pursuant to this provision, individuals causing harm to others in the course of engaging in an inherently dangerous activity, either due to its nature or the means employed, are liable for compensation unless they can demonstrate having taken all necessary measures to prevent such harm. Therefore, the risk inherent in development, acting as an external constraint on product liability, could potentially indicate, if not outright prove, the hazardous nature of the activity characterized by that risk[95].

In such instances, the practitioner may only be absolved of liability by proving adherence to the requisite professional diligence. This entails demonstrating the adoption of all normally appropriate precautions in terms of skill and prudence[96].

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hypothesis of statutory negligence, the search for the standard must nevertheless be based on objective elements that refer to the imago of the reasonable man, a very faithful transposition of the *bonus pater familias* of the Roman tradition. On the point V Zeno Zencovich, 'Il problema della pena privata nell'ordinamento italiano: un approccio comparatistico ai "punitive damages" di "common law"' (1985) Giur. It. 348-349. As Castronovo well explains, in common law the question of the qualification of damage "is originally absent because the typicality of torts that characterises these systems makes a question about the characteristics of damage in general meaningless" (see C. Castronovo, 'Responsabilità civile europea', in V Scalisi (ed.), *Il ruolo della civilistica italiana nel processo di costruzione della nuova Europa* (Giuffrè 2007) 337). Therefore, it can be concluded that in the matter of damages, we pass from the pure and simple patrimonial loss that can be said to be characteristic of common law but also of French law, to systems such as the German and Italian legal systems, in which the damage becomes relevant through a process of legalisation that brings it ever closer to a normative conception in its primitive meaning. On this point also see G Comandè, 'Le linee di confine tra danno patrimoniale e non patrimoniale nella evoluzione del modello di common law' (n 93) 273; A Procida Mirabelli di Lauro - M Feola, *La responsabilità civile. Contratto e torto* (n 11); E Dell'Aquila, *I principi generali della responsabilità civile nel diritto inglese* (n 11).

[94] On the regulation of dangerous activity liability in general see E Al Mureden, 'La responsabilità per esercizio di attività pericolose a quarant'anni dal caso Seveso' (2016) Contr. Impr. 647 ff; M Comporti, 'Responsabilità per l'esercizio di attività pericolose, in F Busnelli, *Comm. cod. civ.* (Giuffrè 2009); M Franzoni, 'Responsabilità per l'esercizio di attività pericolose', in G Alpa – M Bessone, *La responsabilità civile. Una rassegna di dottrina e giurisprudenza* (Utet 1987). The doctrine, in analysing liability arising from the use of artificial intelligence in the medical field, has expressly referred to this rule.

[95] The legislator has not typified all dangerous activities. Consequently, the assessment is left to the judge of merit. Jurisprudence defines dangerous activities as those activities that by their very nature or the characteristics of the means used entail the relevant possibility of damage occurring due to their marked potential for injury. For a broad casuistry, see M Franzoni, 'Responsabilità per l'esercizio di attività pericolose' (n 94) 482.

[96] A purely literal reading of the rule would never allow for liberating proof if one considers that the adoption of really all the measures abstractly possible would certainly avoid the damage. Thus, the majority jurisprudence interpolates the rule by virtue of its function, which is to set a limit of

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The precision of the objectives set forth in the algorithmic procedure, the integrity of the data inputs, and the consideration of an ethical approach to the development of AI systems by programmers will play pivotal roles in determining the extent of liability involved[97].

There is indeed a lingering uncertainty regarding the appropriateness of equating the use of an AI, even an autonomous one, with activities inherently prone to harm due to their nature or characteristics. After all, an AI fundamentally operates as a logical-mathematical function, processing variable data, which makes it challenging to perceive it as inherently dangerous[98].

However, the mechanism for freeing oneself from liability through demonstrating the adoption of all necessary precautions appears to be somewhat inadequate in terms of practical applicability. Considering the inherent unpredictability of AI output, it becomes exceedingly difficult to ascertain what measures would be deemed appropriate to prevent unforeseeable harm[99].

According to other legal scholars[100] an alternative avenue for liability could potentially be found in the concept of liability for things in custody, as outlined in Article 2051

liability for those who perform a dangerous activity. This limit is marked by professional diligence. See CM Bianca, *La responsabilità, Diritto civile* (n 11) 682.

[97] Thus states M Ferrari, *Il vantaggio della responsabilità concorsuale da uso "organizzato" di algoritmi* (Il Mulino 2021) 424 who takes up G. Fasano, 'L'intelligenza artificiale nella cura dell'interesse generale' (2020) Giornale Dir. Amm, 724 who emphasises the importance of the relationship between the neutrality of the algorithm and the impartiality of its results. The neutrality of the algorithm (represented by the fact that the functioning mechanism does not take sides for any of the possible output choices) cannot be translated into an impartial choice if its design phase is not governed by criteria marked by maximum impartiality, therefore impartiality would be nested in the human choices of the programmer.

[98] Opposing the view that the application of artificial intelligence is dangerous is M Costanza, 'L'intelligenza Artificiale e gli stilemi della responsabilità civile' (n 12) 1688, who states that to intelligence artificial intelligence as an emblem of technology and therefore as an entity deemed more reliable than man does not then fit the attribute of dangerous. Artificial intelligence as a corrective or supplementary means to human deficiencies would not tolerate any attribute that would qualify it as risky; on the contrary, artificial intelligence would be a non-dangerous entity because it would be able to avoid the inconveniences that without its intervention could be generated by the performance of certain activities.

[99] MM Mollicone, 'Il rischio dell'intelligenza artificiale applicata. modelli di allocazione a confronto' (2023) Actualidad Juridica Iberoamericana 2122 ff.

[100] U Ruffolo, 'Responsabilità da produzione e gestione di ai self Learning', in Aa.Vv. *Rapporti civilistici e intelligenze artificiali: attività e responsabilità. Atti del 15° Convegno Nazionale della SISDiC*, (Edizioni Scientifiche Italiane 2020) 233 ff; M Ratti, 'Riflessioni in materia di responsabilità civile e danno cagionato da dispositivo intelligente alla luce dell'attuale scenario normativo' (n 31) 1174-1191; A

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of the Civil Code[101]. This liability could extend not only to the user or operator of the AI but also to the trainer – the individual responsible for inputting data. The rationale behind this perspective lies in the notion that the trainer continuously exposes the AI to new "experiences" by feeding the algorithm, thereby exerting ongoing influence over its behavior. Thus, machines and systems relying on AI could conceivably be classified as "things" under this framework[102].

The essence of AI, whether symbolic-semantic or sub-symbolic-biological-empirical, can be viewed as falling within the domain of "things", currently existing in a state of "unawareness". In simpler terms, the AI operates without the awareness of its own functioning, rendering it akin to an "intelligent good". This characterization further reinforces its alignment with the scope of Article 2051 of the Civil Code.

Article 2051, symmetrically juxtaposed with Article 2052 concerning liability for the actions of animals, could be interpreted as liability for the actions stemming from the natural intelligence of the animal – equivalent to liability for the actions resulting from the intelligence of AI, capable as it is of self-learning[103].

Thus, framing liability for the actions of intelligent things, including artificial intelligence, within the framework of Article 2051 of the Civil Code does not appear overly challenging. However, this paradigm may seem rigid, particularly when

Santosuosso - C Boscarato - F Caroleo, 'Robot e diritto. Una prima ricognizione' (2012) Nuova Giur. Civ. Comm. 494-516., who emphasise that in the hypothesis that robots are mere objects, Art. 2051 of the Civil Code would be the only rule that would certainly be applicable to the case of damages produced by them. Contrary to this potential application of Article 2051 of the Civil Code is M Costanza, 'L'intelligenza Artificiale e gli stilemi della responsabilità civile' (n 12) 1687, who considers that the rule only refers to inanimate things. Hence, the underlying codictic logic would be exaggeratedly simple to refer to IA.

[101] In general on liability for property damage in custody see among many L Corsaro, 'Responsabilità da cose' (1998) *Dig. disc. priv., Sez. civ.*, 103 ff; M Franzoni, *La responsabilità oggettiva. Il danno da cose e da animali* (Cedam 1988).

[102] A Bertolini, 'Artificial intelligence does not exist! Defying the technology-neutrality narrative in the regulation of civil liability for advanced technologies' (2022) Europa Dir. Priv. 370. The author argues that not only is it pointless to sanction something that is objectively incapable of fearing the sanction itself – because it would fail to induce compliance anyway – but it is also pointless, because in the end the legal consequences will be borne by the human being behind it, who is called upon to provide the necessary means.

[103] MM Mollicone, 'Il rischio dell'intelligenza artificiale applicata. modelli di allocazione a confronto' (n 99) 2122 ff.

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considering the stringent burden of proof required to establish the occurrence of a fortuitous event, potentially acting as a disincentive for innovation.

5. Conclusive remarks. Liability profiles and possible legal scenarios

The regulatory landscape surrounding artificial intelligence systems is evolving towards a focus on risk prevention, particularly concerning "high-risk" systems, by intertwining safety regulations with civil liability provisions.

Failure to implement the technical and organizational safety measures outlined in the proposed AI legislation will result in the imposition of administrative sanctions. Moreover, the violation of obligations pertaining to compliance with these safety standards will trigger a presumption of defectiveness of the digital device. This breach may also lead to heightened liability for the presumed fault of the "supplier" or "user", thereby necessitating compensation for damages incurred[104].

However, the violation of pre-established safety standards will not automatically entail the "defectiveness" of the intelligent system[105]; likewise, adherence to them will not necessarily imply exemption from liability in the event of damage, because the compliant system may be "defective"[106].

[104] Similarly to what is provided for by the GDPR (Articles 83 and 84 GDPR), according to which the failure of the data controller to adopt the measures imposed on him/her results in substantial administrative sanctions and the breach of the obligations determines the aggravated liability for presumed fault of the data controller (and of the data processor) and, consequently, the obligation to pay damages, pursuant to Article 82. On this point, see M Gambini, 'Responsabilità civile e controlli del trattamento algoritmico' (n 76) 322. See also A Fusaro, 'Quale modello di responsabilità per la robotica avanzata? Riflessioni a margine del percorso europeo' (n 40) 1344 ff.

[105] U Ruffolo, La responsabilità da artificial intelligence, algoritmo e smart product: per i fondamenti di un diritto dell'intelligenza artificiale self-learning, in U Ruffolo (ed.) *Intelligenza artificiale. Il diritto, i diritti, l'etica* (n 1) 144 ff.

[106] U Ruffolo - E Al Mureden, 'Authonomous vehicles e responsabilità nel nostro sistema e in quello statunitense' (n 38) 1709 ff; A Fusaro, 'Quale modello di responsabilità per la robotica avanzata? Riflessioni a margine del percorso europeo' (n 40) 1348-1353. In other words, compliance with certain standards will only denote conformity to an abstract regulatory model, set on the basis of static and not dynamic criteria, but this will not exclude the digital system causing damage to third parties, when used by the end user. In any case, there is no doubt that the provision, alongside the civil liability legislation, of public regulation has the merit of designing a regulatory landscape in which the instruments of subsequent protection converge with those of preventive protection, based on risk assessment and their limitation, through the use of a series of technical measures that are predetermined and subject to constant monitoring and updating, in accordance with the

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In the event of damage (to the user and to third parties) caused by such defects, the European regulations governing product liability for defective products should, therefore, find application, accepting the principle of strict producer liability[107] in the event of damage. If, therefore, a person suffers damage resulting from a defective "intelligent" system, the producer of that system will be liable (regardless of the existence of profiles of malice or fault)[108].

In scenarios where an automaton possesses a degree of autonomy that enables it to make independent decisions beyond its original programming, traditional product liability frameworks may become inadequate. In such cases, the automaton cannot be simply regarded as a product, and holding the manufacturer liable for damages caused by its autonomous actions may not be appropriate.

Instead, the focus may shift towards recognizing the legal personality of the automaton itself. This would allow for the direct imputation of liability to the robot for its actions. By acknowledging the legal personhood of the machine, the

precautionary principle. Criticism must, however, be levelled at the European institutions for the change of course in the regulation of non-contractual civil liability, outside the product liability regime. G D'Alfonso, 'Danni algoritmici e sviluppi normativi europei tra "liability" e "permittance" rules' (n 78) 64-65.

[107] For an analysis of the liability of the producer see, generally G Guerra, 'Il concetto di difettosità nella realtà che cambia. Un esercizio di microcomparazione' (n 85) 249-280; A Fusaro, 'Responsabilità del produttore: la difficile prova del difetto' (2017) Nuova Giur. Civ. Comm. 896 ff; R Pardolesi - G Ponzanelli, 'Speciale 2012, "I 25 anni di products liability"' (2012) Danno Resp.; L Cabella Pisu, 'Ombre e luci nella responsabilità del produttore' (2008) Contr. Impr. 617 ff; G Ponzanelli, 'Causa probabile del danno e responsabilità del produttore' (2004) Danno Resp. 532 ff; U Carnevali, 'voce Responsabilità del produttore' (1998) Enc. Dir., Agg. 942 ff; G Ponzanelli, 'Responsabilità del produttore' (1995) Riv. Dir. Civ. 215 ff; F Cafaggi, 'La responsabilità dell'impresa per prodotti difettosi', in N Lipari (ed.), *Trattato di diritto privato europeo* (Cedam 1997) 1013 ff; D Cerini, 'Responsabilità del produttore e rischio da sviluppo: oltre la lettera della dir. 85/374/CE' (1996) Dir. Econ. Ass. 33 ff; G Ponzanelli, 'Responsabilità del produttore', Riv. Dir. Civ. 220 ff; G Alpa - M Bin - P Cendon, 'La responsabilità del produttore', in F Galgano (ed.), *Trattato di diritto commerciale e di diritto pubblico dell'economia* (Ceadm 1989); C Castronovo, 'Danno da prodotti (dir. it. e straniero)' (1995) *Enc. Giur.*

[108] According to Directive 85/374/EEC, Article 7, "[t]he producer shall not be liable under this Directive if he proves […] (b) that, having regard to the circumstances, it is reasonable to believe that the defect which caused the damage did not exist when he put it into circulation or arose subsequently; […] (e) that the state of scientific and technical knowledge at the time he put the product into circulation did not permit the existence of the defect to be discovered".

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responsibility for its actions can be appropriately attributed, thereby reconciling the imperative of ensuring system safety with the ongoing progression of technology[109].

The acting machine cannot be a thing, it must transform itself into a subject[110], so as to prevent the rigid application of the precautionary principle from bending the liability system under the aegis of a *fictio iuris* that qualifies the manufacturer as responsible, always and in any case[111].

In ascertaining liability, whether contractual or extra-contractual[112], it would complicate the imputation system, as human conduct would be added to that of the digital agent[113].

A possible solution could be that found in the not inconsiderable role to be attributed to the so-called "development risk"[114], which finds its origin in an intrinsic defect of the product which should have already been considered dangerous at the time it was put into circulation, although such dangerousness could not have been detected on the basis of the technical and scientific notions of the time; but precisely because it is

[109] C Perlingieri, 'L'incidenza dell'utilizzazione della tecnologia robotica nei rapporti civilistici' (2015) Rass. Dir. Civ. 1235 ff. According to the author, the perception that some regulatory gaps may turn into a so-called responsibility gap undermines to some extent economic development, trade and technological progress itself, thus deterring not only entrepreneurs from producing but also possibly users from purchasing such products. See also, on the matter of legal personality of AI G Taddei Elmi - S Marchiafava - A Unfer, 'Responsabilità civile e Personalità giuridica della Intelligenza Artificiale' (2021) *i-lex* 100 ff.

[110] G Tamburrini, *Etica delle macchine. Dilemmi morali per robotica e intelligenza artificiale* (Carocci Editore 2020) 58 ff.

[111] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1016.

[112] *Ibid.* Both forms of liability can, of course, arise in connection with the use of intelligent systems, sometimes even being able to overlap with reference to the same damaging event (a classic example concerning the self-driving car, if something in the system malfunctions and the user reports damage, the liability that can be asserted against the car manufacturer will be contractual in nature; if, however, as a result of the defect found, the car impacts another vehicle, causing property damage to a third party, the owner of the former will be liable to the latter for non-contractual damage).

[113] M Ratti, 'Riflessioni in materia di responsabilità civile e danno cagionato da dispositivo intelligente alla luce dell'attuale scenario normativo' (n 31) 1174 ff.

[114] Development risk was the subject of a lengthy debate in the European Commission, in which those who considered such liberating evidence as a necessary element in order to foster competitiveness among companies and the introduction of new products to the market were divided, and those who believed that it should be excluded in order to offer greater protection to the harmed consumer. On this point, see *amplius* D Caruso - R Pardolesi, 'Per una storia della Direttiva 1985/374/CEE' (2012) Danno Resp. 9 ff.

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intrinsically dangerous, the producer, in the light of the precautionary principle, is obliged to put in place the precautions required from time to time[115].

This risk, if on the one hand, constitutes an external limitation to product liability[116], could represent, on the other hand, a specific situation of dangerousness, suitable to make the discipline of liability for dangerous activity (Art. 2050 Italian Civil code[117]) applicable to artificial intelligence, giving the injured party a possible alternative route to product liability, in order to obtain compensation for the damages suffered[118].

Authoritative scholars have advocated the explicit extension of the regulatory provision to damage caused by artificial intelligence systems[119], since this provision is particularly advantageous for the injured party, postulating strict liability or presumed fault and providing for a very arduous liberating proof, consisting of having adopted every suitable measure to avoid the damage[120].

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[115] *Report from the Commission to the European Parliament*, COM (2020) 64 final, February 16, 2020, cit. The Commission does not seem to take a position on this point, except to point out that in the field of artificial intelligence there could be an "abuse" under which the producer is not liable if the defect did not exist at the time the product was put into circulation or if the state of scientific and technical knowledge did not allow the defect to be foreseen.

[116] See U Carnevali, 'Responsabilità del produttore', in G Alpa - U Carnevali - F Di Giovanni - G Ghidini - U Ruffolo (eds.), *La responsabilita per danno da prodotti difettosi* (Giuffrè 1990) 4 ff; G Alpa - M Bessone, 'La dottrina sulla responsabilità del produttore. Il rischio d'impresa alle soglie del 1992' (1991) Cont. Impr. 250 ff; G Alpa - M Bessone, 'La responsabilità del produttore' (Giuffrè 1999); R D'Arrigo, *La responsabilità del produttore. Profili dottrinali e giurisprudenziali dell'esperienza italiana* (Giuffrè 2006) 12 ff.

[117] Article 2050 of the Civil Code provides for the assumption of liability for individuals who engage in activities that are particularly dangerous and potentially offensive to third parties. The activity taken into consideration is that which, by its nature, or the nature of the means employed, is defined as "dangerous". Doctrine, in analyzing liability arising from the use of artificial intelligence in the medical field, has made express reference to this standard. For a careful examination of the issue of liability in the field of medical robotics see C Perlingieri, 'Responsabilità civile e robotica medica' (2020) Tecn. Dir. 165 ff.

[118] A Amidei, 'Intelligenza Artificiale e product liability: sviluppi del diritto dell'Unione Europea' (n 18) 1725.

[119] M Durante - U Pagallo, *Manuale di informatica giuridica e diritto delle nuove tecnologie* (Giappichelli 2013). The authors, in particular, advocate the application of this rule in the field of self-driving cars (so-called self-driving). See also A Davola - R Pardolesi, 'In viaggio con il robot: verso nuovi orizzonti della r.c. auto ("driveless")?' (2017) Danno Resp., 625 ff.

[120] According to Article 2050 of the Italian Civil code, whoever causes damage to others in the performance of a dangerous activity, either by its nature or by the nature of the means employed, shall be liable for compensation unless he proves that he has taken all appropriate measures to avoid the damage. For an in-depth analysis of the strict liability see RD Cooter - T Ulen, 'Law and Economics, Berkeley Law, 1988; R. D. COOTER, Economic Theories of Legal Liability' (1991) J.

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This thesis appears convincing since where an automaton endowed with adaptive and learning capabilities is allowed to interact with a human, there is no certainty whatsoever that the same cannot engage in behaviors detrimental to the rights of third parties[121].

At present, therefore, there is no reason to exclude the use of robots in relational activities with human beings from the list of "dangerous activities" – as defined by Article 2050 of the Italian Civil code[122].

Recourse to this form of liability even if not specifically modulated on the figure of robots, in addition to being responsive to the ratio of the norm, would constitute a valid incentive to elide as much as possible that dangerousness intrinsic in forms of artificial intelligence, inducing the manufacturer to allocate resources to measures suitable for minimizing it, and thus to face the related preventive burdens, in order to escape the subsequent compensation costs that aggravated liability for the exercise of dangerous activities would otherwise impose if they were not prepared[123].

Econ. Persp. 11-30; RD Cooter, 'Liability Rules and Risk Sharing in Environmental and Resource Policy: Discussion' (1986) Am. J. Agric. Econ. 1276-1278.

[121] In fact, the judgment on dangerousness must be made in a prognostic key and not on the basis of the harmful event that actually occurred, but precisely through a posthumous prognosis, on the basis of the factual circumstances that presented themselves at the very time of the exercise of the activity and were knowable by the average man, or at any rate should have been known by the agent in view of the type of activity exercised. C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1016-1017.

[122] A Amidei, 'Intelligenza Artificiale e product liability: sviluppi del diritto dell'Unione Europea' (n 18) 1725. It is worth recalling the above-mentioned doctrine who have configured the regime under Article 2050 of the Civil Code as liability for "aggravated" fault: A De Cupis, *Il danno. Teoria generale della responsabilità civile* (n 11) 88 ff; P Forchielli, 'La colpa lievissima' (1963) Riv. Dir. Civ. 202 ff; E Paraglia, 'Appunti in tema di responsabilità da esercizio di attività pericolose' (1975) Dir. Prat. Ass. 645 ff. Proponents of the reconstruction of strict liability are M Franzoni, 'Responsabilità per l'esercizio di attività pericolose', in G Alpa - M Bessone (eds.), *La responsabilità civile. Una rassegna di dottrina e giurisprudenza* (Giappichelli 1987) 459 ff; PG Monateri, 'La responsabilità civile', in R Sacco (Dir.), *Trattato di diritto civile* (Giappichelli 1998) 674 ff.

[123] The responsibilities of both the producer of a good that incorporates it and (where not coincident) the author of the algorithm that gives the machine the ability to learn, seem to be adjustable by invoking the discipline on both product damage and dangerous activity. While the responsibilities of those who "train" an artificial intelligent entity, or in any case expose it to "experiences" that change its "mentalité", seem to be able to be adjustable by recourse to art. 2051 c.c. and, when there are the prerequisites, art. 2050 c.c. Therefore, the following will be applicable, with regard to any case of use or management of things endowed with AI self-learning, directed toward "mentalité" capable of trespassing into malware or, in any case, into malicious or deviant conduct: (i) the rules on product liability; (ii) art. 2050 c.c., where the specific situation is characterized by high dangerousness; (iii) in any case, art. 2051 c.c, recourse to which seems justified as a provision

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In other words, misinterpretations of the system could be avoided, responding to the precautionary need to allocate compensatory costs according to certain rules, without, however, disincentivizing production and technological development, by releasing the producer or user from liability in all those cases in which he or she has adapted to safety measures, taking into account the current state of science and technology, and has complied with obligations pertaining to the construction, information and control of the product[124].

symmetrical to Art. 2052 c.c., and homologously formulated, and, consequently, suitable to regulate the "fact" of "things" endowed with artificial intelligence, just as Art. 2052 c.c. dictates a discipline identical to liability for the fact of the animal, i.e. of the attitude of its natural intelligence (also self-learning), even if it were "lost or escaped".

[124] C Leanza, 'Intelligenza artificiale e diritto: ipotesi di responsabilità civile nel terzo millennio' (n 7) 1017.

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