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Employer's Vicarious Liability for Damage Caused by an AI Worker: Comparative Law Perspective

ARTICLE

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ABSTRACT

The article examines whether the proposal to apply vicarious liability is the optimal method of regulating the employer's liability towards third parties for damage caused by AI systems. The research concerns autonomous AI systems used by the employer to achieve the same goals as previously could be achieved only by the human workforce. In this article, the concept of the optimal solution refers to a liability model capable of addressing the challenges posed by the inherent characteristics of AI, such as autonomy, complexity, opacity, the ability to learn, and interaction with the environment, including humans. This model should ensure that injured parties have a genuine opportunity to receive compensation. Scholars have proposed the use of vicarious liability as, in their opinion, the optimal method to regulate employers' liability vis-à-vis third parties for damage caused by autonomous AI systems. Experts predict that applying such systems on a large scale is only a matter of time. This article concentrates on the civil liability of an employer in situations where damage was sustained by a third party who is not in any legal relationship with the employer, and the damage was not caused by a defect of the AI system. The analysis covers the legal perspective of the EU and the US.[1]

1 This article presents the results of research project No. 2021/41/B/HS5/01001, "The use of autonomous AI in the labour process and employer's civil liability towards third parties", financed in whole by the National Science Centre, Poland.

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1. INTRODUCTION

Certain scholars in the European Union and the United States have analyzed the potential scenario in which employers might extensively deploy autonomous AI systems to substitute human employees in specific roles (AI workers). This innovative change in the labour market will not happen overnight and will not relate to all professions.[2] However, the conclusions from the research indicate that such change is workable, and one should be prepared for such a possibility.[3] Employers are interested in applying autonomous AI systems to improve competitiveness, reduce labour costs and increase profits.

One of the assumptions at the core of developing and implementing ever more advanced AI technology is that the operation of AI systems will be safer than human work. Safety is also a goal of the EU legislature, which decided to adopt a legislative framework for AI technology, allowing, amongst other things, the introduction of high safety standards for AI systems. This is to be achieved, in the first place, through the legal solutions included in the Artificial Intelligence Act.[4]

However, despite high safety standards, AI-enabled devices and systems will cause damage now and in the future. In light of the above, civil liability for damage caused by artificial intelligence is becoming one of the most critical regulatory challenges to be faced not only by the EU but also by national legislatures. The problem is complicated because immanent AI characteristics, such as complexity, opaqueness, autonomy, and ability to learn and interact with the environment in which the AI operates, give rise to a so-called 'black box' effect:[5]

> [A]I is a "black box"/opaque (which affects how we can explain its workings) – because an AI system can learn its own rules and uncover hidden relationships in the data beyond what unaided human observation can do, it can be difficult to understand how or why the AI system reached a particular outcome.[6]

Due to the black box effect, the processes occurring within AI-enabled devices and systems are challenging to predict and account for, complicating the identification and proof of fault-based tortious liability. In the Explanatory Memorandum to the AI Liability Directive proposal, the EU legislature emphasized that:

> [C]urrent national liability rules, in particular based on fault, are not suited to handling liability claims for damage caused by AI-enabled products and services. Under such rules, victims need to prove a wrongful action or omission by a person who caused the damage. The specific characteristics of AI, including complexity, autonomy and opacity (the so-called "black box" effect), may make it difficult or prohibitively expensive for victims to (...) prove the requirements for a successful liability claim. In particular, when claiming compensation, victims could incur very high up-front costs and face significantly longer legal proceedings, compared to cases not involving AI. Victims may therefore be deterred from claiming compensation altogether.[7]

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2 M Scherer, 'Of Wild Beasts and Digital Analogues: The Legal Status of Autonomous Systems' (2018) 19 *Nevada Law Journal*, no. 1, 285.

3 A Gentili et al., 'Are machines stealing our jobs?' (2020) 13 *Cambridge Journal of Regions, Economy and Society*, no. 1, DOI:10.1093/cjres/rsz025, 167–168; Stanford Institute for Human-Centered Artificial Intelligence (HAI), 'Artificial Intelligence Index Report 2025' (2025), 160–279 <https://hai.stanford.edu/ai-index/2025-ai-index-report> (accessed 28 May 2025).

4 Regulation ((EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act), OJ L, 2024/1689, 12.7.2024. Hereinafter: the AI Act.

5 P Padovan et al., 'Black is the New Orange: How to Determine AI Liability' (2023) 31 *Artificial Intelligence and Law*, no. 1, DOI:10.1007/s10506-022-09308-9, 133; C Zednik, 'Solving the Black Box Problem: a Normative Framework for Explainable Artificial Intelligence' (2021) 34 *Philosophy & Technology*, no. 2, DOI:10.1007/s13347-019-00382-7, 265; D Castelvecchi, '*Can* We Open the Black Box of AI?' (2016) 538 *Nature*, 7623, DOI:10.1038/538020a, 20.

6 C Seah, 'Liability Arising from the Use of Artificial Intelligence' (2023) *The Law Gazette*, Law Society of Singapore, <https://lawgazette.com.sg/feature/liability-arising-from-the-use-of-artificial-intelligence/> (accessed 28 May 2025).

7 See the Explanatory Memorandum to the AI Liability Directive proposal <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0496> (accessed 28 May 2025).

As the AI technology becomes more advanced, this problem could get worse. AI-based products and services are designed to delegate decision-making to algorithms, whereas tortious law regimes were developed to assess human behaviour.[8] Researchers emphasise that the effectiveness of fault-based liability is decreasing as the autonomy level of an 'AI-enabled' device is increased.[9] As a result, a fault-based liability regime is inadequate for autonomous AI systems. It is necessary to adapt the currently applicable liability terms to the challenges inherent to AI technology. For a long time, among legal scholars, both in the EU and in the US, there has been a discussion on how to achieve that goal.

The question of civil liability for damage caused by AI systems also relates to employers utilising such systems in the labour process. In a legal sense, an employer using an AI system in the labour process qualifies as that system's professional operator. This article concentrates on the employer's civil liability when damage was suffered by a third party, who was not in any legal relationship with the employer, and the cause of damage was not a defect of the AI system. By way of example, one can point to situations in which: (1) the employer uses an autonomous drone delivering parcels, and the drone drops a package and injures a random pedestrian; (2) an AI enabled robot used to wash glass walls of skyscrapers suddenly drops off the wall and falls from a great height only to damage a random person's car; (3) the employer uses an autonomous robot delivering food that runs over a senior citizen causing that citizen to fall down and break a leg; (4) an AI system controlling a crane at the construction site in place of an employee, the crane's operator, damages the property of a random person.

In the aforementioned cases, fault-based tortious liability will generally apply, as specified by the legal systems of individual EU Member States. This is the case since, at the EU level, tortious liability has not been comprehensively harmonised.[10] However, fault-based liability is subject to different limitations. The professional operator of an AI system (employer) is liable, e.g., for inadequate selection of the system for a particular task, for irregularities in maintaining the system in optimal operational condition, or negligence in updating and supervising the system. However, this is not liability for the outcome but for the lack of due care.[11] The employer is liable for the employer's own acts or omissions in operating the AI system and for the acts and omissions of the employees using AI systems as tools supporting their work. However, the employer does not incur risk relating to the AI's capacity to cause damage irrespective of the exercised level of care required from the operator as a professional. AI's capacity to self-modify in a process of constant self-betterment also implies that the final outcome of the AI system's operation is unpredictable.[12] As a consequence, instead of accomplishing the task delegated by the employer, the AI system's operation can result in damage. Moreover, immanent characteristics of AI (complexity, opacity, autonomy, capacity to learn and interact with the environment, including with humans) mean that in practice it is extremely difficult, and often even impossible, for the claimant (natural person/consumer) to prove the fault of the professional operator of an AI system (employer).

If an employer uses a semi-autonomous AI system operated or supervised by a (human) worker, then in the event of damage caused to a third party, the applicable legal regime will

8 J Knetsch, 'Are Existing Tort Theories Ready for AI? A Continental European Perspective' in L DiMatteo et al. (eds.), *The Cambridge Handbook of Artificial Intelligence: Global Perspectives on Law and Ethics* (Cambridge University Press, 2022), 99.

9 M Buiten et al., 'The Law and Economics of AI Liability' (2023) 48 *Computer Law & Security Review*, DOI:10.1016/j.clsr.2023.105794, 19; Knetsch (n 8), 99.

10 Harmonisation was only achieved in the area of liability for defective products, which was based on risk. Previously, the harmonization was achieved by Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31985L0374> (accessed 28 May 2025). Currently, the harmonization is achieved by Directive (EU) 2024/2853 of the European Parliament and of the Council of 23 October 2024 on liability for defective products and repealing Council Directive 85/374/EEC, OJ L, 2024/2853, 18.11.2024. Hereinafter: Products Liability Directive. However, liability for defective products does not attach to AI system operators since the regime is exclusively addressed to, broadly defined, manufacturers of such systems. In the light of this, product liability will not be analysed in this article.

11 L Bosek, 'Perspectives on Development of Civil Liability for Intelligent Robots' (2019) *Forum Prawnicze* no. 2, 15.

12 G Swanson, 'Non-Autonomous Artificial Intelligence Programs and Products Liability: How New AI Products Challenge Existing Liability Models and Pose New Financial Burdens' (2019) 42 *Seattle University Law Review*, no. 3, 1201–1222.

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be vicarious liability.[13] This type of liability is to be found in all Member States of the EU[14] and in the US,[15] although it has been specified in different terms. In the EU, each Member State has its national legal regulation defining the principle on which vicarious liability is based; this is the principle of an employer's fault or an employer's liability without fault (strict liability). In the US, however, the legal situation is slightly different. Although the common law in individual states is not identical, and the detailed decisions of the courts differ, the doctrine of respondeat superior (vicarious liability) remains common. It is a principal's strict liability and is based on the assumption that since a superior entrusts subordinates with actions involving risk, justice requires that the superior be responsible for the actions of his or her subordinates while performing their duties. In the US, basing the doctrine of respondeat superior on the principle of risk is, among other things, intended to motivate the superior to carefully select their subordinates and invest more time and effort in the selection, training and supervision of subordinates. Another purpose that can be indicated is to guarantee that an injured party obtains the due compensation.[16]

However, a question arises: what should be done when a fully autonomous AI system replaces a (human) worker?[17] What liability model will apply in such cases? One of the proposals put forward in the literature is to apply the institution of vicarious liability to autonomous AI systems operating as AI workers (and, in a broad sense, as AI agents) and replacing (human) employees.

This article aims to examine if the proposal to apply vicarious liability is the optimal solution to the problem of an employer's liability towards third parties for damage caused by autonomous AI systems used by the employer. By the term 'optimal solution', a liability model should be understood that responds to the challenges posed by artificial intelligence and in practice ensures that injured parties have a real possibility of obtaining due compensation. To achieve the intended goal, in the first place, I will present, in Section 2.1, the institution of vicarious liability as applicable in the existing legislative framework. Next, in Section 2.2, I will make an overview of proposals put forward in legal literature by authors who regard vicarious liability as the best method to solve the problem of liability for damage caused by autonomous AI systems. In Section 3, I will evaluate whether the application of vicarious liability presents a viable solution to the challenges associated with the opacity and autonomy of AI systems. Specifically, I will consider if this legal framework can ensure that injured parties have a genuine opportunity to receive appropriate compensation for damages caused by autonomous AI systems used by employers to achieve objectives that previously required human labour.

This article considers the current legal position and proposals of legal scholars regarding vicarious liability in the EU and the US. Irrespective of the common law system, the institution of vicarious liability also applies in the US and is recommended by some US authors as the solution to the problem of civil liability for artificial intelligence. As a consequence of the above, there is room for carrying out comparative law research and exploring differences and similarities in how the research question is addressed in both jurisdictions.

It is particularly important to examine tortious liability of employers because the labour market is going to be one of the first areas where autonomous AI systems will come into widespread use. Bearing in mind the costs of implementing advanced technologies, commercial applications

13 Vicarious liability means liability for the acts of others. An employer is liable for employees even if the employer himself is not at fault. Fault-based liability, according to general principles, is liability for one's own actions or omissions, while vicarious liability is liability for the actions or omissions of another party.

14 E Tjong Tjin Tai, 'Liability for AI Decision-Making' in L DiMatteo et al. (eds.), *The Cambridge Handbook of Artificial Intelligence: Global Perspectives on Law and Ethics* (Cambridge University Press, 2022), 124.

15 In the US, vicarious liability is a principle of the common law. The development of rules of vicarious liability in the US is dated back to mid-nineteenth century. In 1838, the New York Supreme Court established in the case of *Wright v. Wilcox* (19 Wend. (N.Y.)) the principle of the masters' vicarious liability for the actions of their 'servants' in the course of employment. See J Joad, 'The Limits of Liability: Anglo-American Organisations and Vicarious Liability from the 19th Century to the Present' (2020) 1 *St Andrews Law Journal*, no. 1, 6.

16 A Lior, 'AI Entities as AI Agents: Artificial Intelligence Liability and the AI Respondeat Superior Analogy' (2020) 46 *Mitchell Hamline Law Review*, no. 5, 1096–1097 <https://open.mitchellhamline.edu/mhlr/vol46/iss5/2> (accessed 28 May 2025).

17 For the purposes of this article, an autonomous AI system should be understood as a system that does not make a tool supporting work of a (human) employee, is not supervised by an employee, but implements the objectives defined by the employer by making independent decisions so as to achieve the objective (AI worker).

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of autonomous AI in economic contexts will definitely precede the prevalence of such solutions in consumer households.

2. VICARIOUS LIABILITY: MEMBER STATES OF THE EUROPEAN UNION AND THE UNITED STATES

2.1. CURRENT LEGISLATIVE FRAMEWORK

In the legal systems of the Member States of the EU, vicarious liability is the liability of an employer for torts committed by employees; if the employee commits a tort causing harm to a third party, the employee will be liable on the basis of vicarious liability.[18] Likewise, the US doctrine of 'respondeat superior', which literally means 'let the superior answer', establishes that employers are responsible for the acts of their employees in the course of their employment.[19] Also according to § 7.07(1) of the Restatement[20] (Third) of the Law of Agency (2006),[21] '[a]n employer is subject to vicarious liability for a tort committed by its employee acting within the scope of employment'. Thus, the general core requirement for vicarious liability is that an employee has committed a tort, i.e. has breached a duty of care and, by doing so, has caused damage.[22]

In the US, vicarious liability is independent of the employer's fault. In *Kerl v. Rasmussen*, the Wisconsin Supreme Court emphasised:

> Vicarious liability is a form of strict liability without fault. A master may be held liable for a servant's torts regardless of whether the master's own conduct is tortious. (...) vicarious liability is a separate and distinct theory of liability, and should not be confused with any direct liability that may flow from the master's own fault in bringing about the plaintiff's harm. (...) It is imposed upon an innocent party for the torts of another because the nature of the agency relationship – specifically the element of control or right of control – justifies it. Vicarious liability under respondeat superior typically arises in employer/employee relationships (...). See Restatement (Second) Agency, § 225 (1958). (....) a master will only be liable for torts of the servant committed within the scope of the servant's employment.[23]

At the same time, the employer's liability is limited by the scope of liability of the employee as the only active perpetrator of the tort.[24] A similar form of vicarious liability exists in certain EU Member States. This pertains to jurisdictions where employers are liable for damage caused by workers during the performance of their duties, and in some legal systems, even in the course of performing such duties (e.g., Spanish law). This liability is objective and independent of the employer's fault in selecting and supervising workers.[25] This means that, in the case of damage caused by an employee to a third party, the employer incurs risk-based liability (e.g. Polish law, Spanish law). As a result, the employer will also be liable when the employer is not personally

18 Tjong Tjin Tai (n 14), 124.

19 S Hoffman & A Podgurski, 'E-Health Hazards: Provider Liability and Electronic Health Record Systems' (2009) 24 *Berkeley Technology Law Journal*, no. 4, 1536 <https://ssrn.com/abstract=1463671> (accessed 28 May 2025).

20 In the US, the Restatements of the Law are a series of treatises that articulate the principles for a specific area of law, e.g. torts. They are written and published by the American Law Institute (ALI) to clarify the law and help courts understand and interpret the current common law. The American Law Institute was founded in 1923 following a study conducted by a group of American judges, lawyers, and teachers known as "The Committee on the Establishment of a Permanent Organization for the Improvement of the Law." The American Law Institute is the leading independent organization in the United States producing scholarly work to clarify, modernize, and improve the law. ALI drafts, discusses, revises, and publishes Restatements of the Law, Model Codes, and Principles of Law that are enormously influential in the courts and legislatures, as well as in legal scholarship and education. See <https://www.ali.org/about>; <https://www.law.cornell.edu/wex/restatement_of_the_law> (accessed 28 May 2025).

21 Hereinafter: the Restatement (Third).

22 A Beckers & G Teubner, Three Liability Regimes for Artificial Intelligence: Algorithmic Actants, Hybrids, Crowds (Hart Publishing, 2021), 80.

23 Kerl vs. Rasmussen, 267 Wis. 2d 827, 672 N.W.2d 71 (2004). For more about the principles of vicarious liability, see also: Heims v. Hanke, 5 Wis. 2d 465, 468, 93 N.W.2d 455 (1958) (citing Restatement (Second) of Agency § 220); Butzow v. Wausau Mem'l Hosp., 51 Wis. 2d 281, 290, 187 N.W.2d 349 (1971); Arsand v. City of Franklin, 83 Wis. 2d 40, 45, 264 N.W.2d 579 (1978); Giese v. Montgomery Ward, Inc., 111 Wis. 2d 392, 414–15, 331 N.W.2d 585 (1983); Pamperin v. Trinity Mem'l Hosp., 144 Wis. 2d 188, 198, 423 N.W.2d 848 (1988).

24 Lior (n 16), 1097.

25 Ł Pisarczyk, *Ryzyko pracodawcy* (Wolters Kluwer Business, 2008) 328.

at fault. At the same time, attention should be drawn to the fact that, under vicarious liability, a prerequisite of the employer's liability is damage caused by an employee's fault.[26] However, the lack of an employee's fault is an exonerating condition that relieves the employer from liability.[27] A fundamental difference between vicarious liability and strict liability is precisely the fact that strict liability does not presuppose the violation of a duty of care, whereas vicarious liability necessarily requires that an employee breaches a duty of acting with reasonable care.[28]

Both in EU Member States jurisdictions and in the US common law, an important element of vicarious liability is the operation of a worker under the employer's control. It can even be pointed out that a justification for vicarious liability is the employer's possibility to organise, manage and control the work performed by an employee.[29] According to § 7.07 point 3a of the Restatement (Third), 'an employee is an agent whose principal controls or has the right to control the manner and means of the agent's performance of work (...)'. In US common law, the relationship between the employer and the employee is a subcategory of the relationship between the agent and the principal.[30] Vicarious liability '[i]s imposed only where the principal has control or the right to control the physical conduct of the agent such that a master/servant relationship can be said to exist'.[31]

An employer's liability for torts committed by the employer's workers is not unlimited. As mentioned above, the employer is only liable for damage caused by workers in the performance of their employee duties and only exceptionally (e.g. under Spanish law) also for damage caused by the way of performing such duties.[32] The employer incurs liability when the damage occurred as a result of employee activities undertaken within the framework of employment, that is, in the interest of the employer, and not that undertaken in the interest of the employee.[33] Under § 7.07(2) of the Restatement (Third):

> [A]n employee acts within the scope of employment when performing work assigned by the employer or engaging in a course of conduct subject to the employer's control. An employee's act is not within the scope of employment when it occurs within an independent course of conduct not intended by the employee to serve any purpose of the employer.

2.2. PROPOSALS PUT FORWARD BY LEGAL SCHOLARS

Certain scholars put forward the idea of using the previously known institution of vicarious liability for the legal regime of liability for damage caused by AI systems. In the EU, some proponents of this conception argue that vicarious liability can be a basis for liability in a broad subjective scope, covering employers taking advantage of autonomous AI systems and, broadly understood, users of such systems.[34] On the other hand, US legal scholar Anat Lior suggests a more flexible approach according to which the principal would not be predetermined in advance but would be identified only on the basis of the circumstances of a particular case, having regard to such factors as the level of involvement, supervision, monitoring and capacity to manage operations of an AI agent.[35] In the opinion of Anat Lior:

> [t]reating AI entities as AI agents, which are under the control and guidance of human principals, is the most accurate analogy we can use to represent their relationship with our society. This is so given their mono-purpose feature, the instrumental value they serve in accomplishing tasks humans assign to them, and

26 Tjong Tjin Tai (n 14), 124.

27 W Dubis, 'Komentarz do artykułu 430' in E Gniewek (ed.), *Kodeks cywilny. Komentarz* (C.H. Beck, 2006), 720.

28 Beckers & Teubner (n 22), 80.

29 Tjong Tjin Tai (n 14), 124.

30 Lior (n 16), 1092.

31 ibid, 1097.

32 Pisarczyk (n 25), 328.

33 Dubis (n 27), 721.

34 Beckers & Teubner (n 22), 87.

35 Lior (n 16), 1092.

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> the fact all other non-agency legal analogies can be reduced to a three-way agency relationship (because AI entities are in essence AI judgment-proof agents).[36]

Other authors arguing in support of applying vicarious liability in the context of the legal regime of liability for AI systems are, for example, Chopra and White[37] and Scherer.[38] Beckers and Teubner are of the opinion that the use of vicarious liability is the optimal solution for several reasons. First, because '[v]icarious liability requires intention or negligence of the agent's actions (...)' while strict liability, as a pure causation liability, would go much too far.[39] Second, because '[v]icarious liability extends to more than just personal injury and property damage and may include, among other things, violation of privacy rights, libel or sexual harassment'.[40] Third and finally, because:

> [v]icarious liability would, depending on the tort committed by the algorithm, be open for a wider array of sanctions; especially in the case of the violation of privacy rights, it would allow for injunction, right to reply, or rectification (...) while the sanctions of strict liability are limited to financial compensation (...).[41]

Yet other EU-based scholars – Daniela Glavaničová and Matteo Pascucci – emphasise that, due to the application of vicarious liability, a gap can be filled in the regime of civil liability for AI systems. However, they propose that the responsible parties should not be employers but manufacturers of AI systems. The proposal put forward by Glavaničová and Pascucci has two variants. According to the first one, persons involved in the development of AI systems (designers, programmers) would be treated as employees of the systems' manufacturer and, in this way, the vicarious liability doctrine would involve a relation between the employer and employee.[42] The other variant relates to autonomous AI systems. It assumes that:

> [r]ather than the programmer, an AI machine enters the relation as the agent that contributed to the wrong. However (...), we argue that the other party involved in this relation should not be the owner or the user but (again) the manufacturer. When it comes to the manufacturer as the intended bearer of responsibility, justifications of the doctrine of vicarious liability in the context of the relationship between an employer (a manufacturer) and an employee (a programmer) carry over to the context of the manufacturer–AI machine relation.[43]

The opinions quoted above demonstrate that vicarious liability has many advantages. However, not all researchers favour applying this institution to the legal regime of civil liability for damage caused by artificial intelligence. For example, in US legal scholarship, one can come across critical opinions drawing attention to the fact that damage caused by AI systems can be a consequence of acts and/or omissions of many parties, including those parties that do not have any direct, or even indirect, control over such systems. As argued by Benny Chan '[l]iability that operates exclusively on a principal's (or principals') supposed control or supervision of its agents and subagents, is too limited of a legal theory to account for complex layers of interactions and relationships'.[44]

It is worth adding that the EU does not regard the institution of vicarious liability as the best method to resolve the problem of civil liability for damages caused by artificial intelligence. The EU legislature intended to base a consistent system of civil liability for artificial intelligence on two pillars: (1) liability of manufacturers for defective products, adapted to the era of modern

36 ibid, 1101.

37 S Chopra & L White, *A Legal Theory for Autonomous Artificial Agents* (University of Michigan Press, 2011), 119–152.

38 Scherer (n 2), 287.

39 Beckers & Teubner (n 22), 159.

40 ibid, 80.

41 ibid.

42 D Glavaničová & M Pascucci, 'Vicarious liability: a solution to a problem of AI responsibility?' (2022) 24 *Ethics and Information Technology*, no. 3, DOI:10.1007/s10676-022-09657-8, 6.

43 ibid, 10.

44 B Chan, 'Applying a Common Enterprise Theory of Liability to Clinical AI Systems' (2022) 47 *American Journal of Law & Medicine*, no. 4, DOI:10.1017/amj.2022.1, 367–368.

technologies; and (2) non-contractual liability of AI system users. The introduction at the EU level of the legislative framework of AI liability has already been partly achieved, which can be demonstrated by Products Liability Directive. In addition, the terms of civil law liability of AI systems users were laid down in the Proposal for an AI Liability Directive.[45] This Directive also covered employers as professional operators of AI systems because they fitted into the concept of 'user'.[46] The European Commission has recently withdrawn its legislative proposal for an AI Liability Directive.[47] The European Commission will probably need more time to consider the principles of non-contractual civil liability for damage caused by AI systems and whether the rules of that liability should be harmonised at the EU level.

3. CAN VICARIOUS LIABILITY LIVE UP TO THE CHALLENGES OF AI TECHNOLOGY?

It is essential to consider three challenges when dealing with liability for damage caused by autonomous AI systems. All of them follow from the inherent characteristics of AI technology and, in the first place, from the opaqueness and autonomy of artificial intelligence and its capacity to learn.[48] These features preclude full traceability of the algorithmic process that has led the AI system to produce a specific output in a specific factual situation. In other words, one cannot foresee in advance the consequences of the operation of an autonomous AI system, even when the input data are known, and the output to be obtained by the system has been precisely defined.[49]

Bearing this in mind, in the context of vicarious liability, the first serious challenge is specifying the standard of care which an autonomous AI system (AI worker) is supposed to follow. The second challenge relates to the applicability of different liability regimes for damage caused by AI systems. The basis for liability depends on the cause of damage in the circumstances of a particular case. According to both European and American legal framework, where the cause of the damage is a defect of the AI system, the responsible party may be the system's manufacturer, along the terms of the products liability regime. However, where the AI system is not defective but the damage was caused by the system's professional operator (e.g., employer) who used the system incorrectly, then vicarious liability may come to the fore. If this division were maintained,[50] the person injured by the AI system, as is the case today, would first have to establish the addressee of the claim for damages. For that purpose, the injured party has to learn what the cause of the damage was. However, in practice, the injured party will face serious difficulties in establishing the actual cause of damage; namely, whether it was a defect of the AI system or non-compliance with the required standard of care by a non-defective AI system. The third challenge involves the claimant's obligation to show the specific error in the AI system that caused the damage. Since, under the institution of vicarious liability, a prerequisite of the employer's liability is a commission of a tort by an employee, in a situation

45 The Proposal for a Directive of the European Parliament and of the Council on Adapting Non-contractual Civil Liability Rules to Artificial Intelligence (AI Liability Directive) COM(2022) 496 final <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0496> (accessed 28 May 2025). Hereinafter: the AI Liability Directive proposal.

46 Art. 2(4) of the AI Liability Directive proposal.

47 Scholars have pointed out the weak points of the AI Liability Directive proposal. For more about the AI Liability Directive proposal, see P Hacker, 'The European AI Liability Directives – Critique of a Half-Hearted Approach and Lessons for the Future' (2023) 51 *Computer Law & Security Review*, no. 7; G Wagner, 'Liability Rules for the Digital Age – Aiming for the Brussels Effect' (2023) 13 *Journal of European Tort Law*, 220–243; MN Duffourc & S Gerke, 'The proposed EU Directives for AI liability leave worrying gaps likely to impact medical AI' (2023) 6 *npj Digital Medicine*, no. 77, 1–7.

48 Cheryl Seah (n 6) points out that '[A]I is self-learning/autonomous – with machine learning, the AI model has the ability to automatically learn and improve from experience without being explicitly programmed, which means that its behaviour may not be fully foreseeable in all situations even if you know what is the algorithm that directs the learning. This is further compounded in cases of AI systems that have continuous learning capabilities, which means they continue to learn outside of the training environment when deployed in the real-world, and can change their behaviour in response to real-world data input into them'.

49 Swanson (n 12), 1201–1222; M Gerstner, 'Liability Issues with Artificial Intelligence Software' (1993) 33 *Santa Clara Law Review*, no. 1, 239–269 <http://digitalcommons.law.scu.edu/lawreview/vol33/iss1/7> (accessed 28 May 2025).

50 It does not seem that, in the near future, the EU legislature will be willing to abandon the division into the liability of AI system manufacturers and the liability of AI system users. This can be shown by the latest Products Liability Directive and the AI Liability Directive proposal.

when an employee (human) is replaced by an autonomous AI system (AI worker), the claimant will have to demonstrate what standard was to be followed by the AI worker and what the violation of that standard was in the particular case. It will be challenging for the claimant to demonstrate this because traceability of the decision process carried out by an autonomous AI system is not fully possible. The claimant does not have the knowledge to perform such a complex evidence operation. Even with the assistance of specialist forensic experts, it may often prove impossible to establish what the AI system's error consisted of in practice.

All three challenges are well known and have been analysed in depth by researchers dealing with the problems of regulating civil liability for AI, both in the EU and the US.[51] These are the same challenges related to fault-based tortious liability for damage caused by AI systems. Therefore, applying vicarious liability to the legal regime of employers'[52] liability for damage caused directly by autonomous AI systems does not solve the problems existing under the currently applicable model of fault-based liability incurred by AI system operators. Although vicarious liability may be defined as a risk-based type of liability (without the employer's fault in the choice or supervision of workers), it is still based on a tort committed by an employee (human). Such configuration of vicarious liability applies both in Member States of the EU and in the US. In the context analysed in this article, this will be a tort caused by an autonomous AI worker. Therefore, the barriers faced by the claimant in the form of: (1) the need to establish the standard of care that was to be followed by a particular AI system causing the damage; (2) the need to examine the actual cause of damage; whether it was a defect of the AI system or non-compliance by a non-defective AI system with the required standard of care; and (3) the need to prove in court proceedings that an AI worker breached a specific standard of care, will still remain in place.

Therefore, even if vicarious liability appears as a liability model with many advantages, which follows from the arguments deployed by researchers advocating this legal solution, the difficulties outlined above can undermine those advantages.

Moreover, attention should be drawn to residual risk, that is, risk that cannot be avoided even when the required standard of care is exercised.[53] In applying vicarious liability to autonomous AI systems (AI workers), the employer will not incur such risk, and residual risk will shift to potentially injured parties (consumers).

An additional problem that can be identified is the lack of the employer's possibility to exercise real control over an autonomous AI system. Supervision of an employee is an inherent element of vicarious liability. Semi-autonomous AI systems can be supervised but are still not fully independent AI workers. Instead, they retain the status of tools supporting employees' work (humans). This means that, in such cases, vicarious liability applies, but the employer incurs liability for a tort committed by an employee (human), being the direct 'operator' of the AI system, and not for a tort committed directly by the AI worker (without human involvement).

Suppose a semi-autonomous AI system were to be replaced by an autonomous AI system making decisions without human intervention. In that case, it is doubtful that the employer can maintain actual oversight over the decision-making process conducted by such a system.

51 See S de Conca, 'Bridging the Liability Gaps: Why AI Challenges the Existing Rules on Liability and How to Design Human-empowering Solutions' in B Custers & E Fosch-Villaronga (eds.), *Law and Artificial Intelligence: Regulating AI and Applying AI in Legal Practice*, Information Technology and Law Series 35 (Springer, 2022), 245; Buiten et al. (n 9), 1–20; H Sullivan & S Schweikart, 'Are Current Tort Liability Doctrines Adequate for Addressing Injury Caused by AI?' (2019) 21 *AMA Journal of Ethics*, no. 2, 160–166; W Barfield, 'Liability for autonomous and artificially intelligent robots' (2018) 9 Paladyn, *Journal of Behavioral Robotics*, no. 1, DOI:10.1515/pjbr-2018-0018, 193–203; A Selbst, 'Negligence and AI's Human Users' (2020) 100 *Boston University Law Review*, no. 4, 1315–1376 <https://ssrn.com/abstract=3350508> (accessed 28 May 2025); J Gurney, *Automated Vehicle Law: Legal Liability, Regulation, and Data Security* (American Bar Association, 2020), 119–233; H Harvey & V Gowda, 'Clinical applications of AI in MSK imaging: a liability perspective' (2022) 51 *Skeletal Radiology*, DOI:10.1007/s00256-021-03782-z, 235–237; D Vladeck, 'Machines without Principals: Liability Rules and Artificial Intelligence' (2014) 89 *Washington Law Review*, no. 1, 117–150 <https://digitalcommons.law.uw.edu/wlr/vol89/iss1/6> (accessed 28 May 2025); S Bayern, 'The Implications of Modern Business-Entity Law for the Regulation of Autonomous Systems' (2016) 7 *European Journal of Risk Regulation*, no. 2, 94–112 <https://ssrn.com/abstract=2758222> (accessed 28 May 2025).

52 In the broad approach, as proposed by certain researchers, this will not only be liability of employers but also of all users of autonomous AI systems qualifying as actual principals. See Lior (n 16), 1092; Beckers & Teubner (n 22), 87.

53 E Büyüksagis & W van Boom, 'Strict Liability in Contemporary European Codification: Torn between Objects, Activities, and Their Risks' (2013) 44 *Georgetown Journal of International Law*, no. 2, 612 <https://ssrn.com/abstract=2257859> (accessed 28 May 2025).

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Obviously, the employer will still determine the goals that the AI is to achieve and will choose an adequate system for a specific set of tasks. However, the employer will not have full insight into the algorithmic process that led the AI system to implement the goals which the employer predetermined.

In considering the issue of control over an autonomous AI system, attention should be drawn to its unpredictability. To be sure, it can be argued that a human acting as employee can also be unpredictable and commit torts. However, there is a difference between the act of a human (employee) and the operation of an autonomous AI system. Namely, an employee (natural person) acts on behalf of the employer, under the employer's direction and, in principle, is aware of the fact that his or her duty is to follow the employer's instructions given as a part of the labour process. On the other hand, an autonomous AI system designed to make autonomous decisions will be focused on maximum efficiency in the implementation of the objectives specified by the system's user (employer). At present, one form of AI is machine learning:

> [w]here statistical techniques are applied to identify patterns in large amounts of data. Unlike rule-based decisions, where a human must conceive the rules so there are predetermined responses to a set of conditions, with machine learning, the machine learning system is set up to "learn" its own responses to conditions under a training regime (...).[54]

The ability of AI systems to learn is even more important in the context of deep learning, which:

> [i]s a subset of machine learning that uses multilayered neural networks, called deep neural networks, to simulate the complex decision-making power of the human brain. (...) traditional machine learning models use simple neural networks with one or two computational layers. Deep learning models use hundreds or thousands of layers (...) to train the models. While supervised learning models require structured, labeled input data to make accurate outputs, deep learning models can use unsupervised learning. With unsupervised learning, deep learning models can extract the characteristics, features and relationships they need to make accurate outputs from raw, unstructured data. Additionally, these models can even evaluate and refine their outputs for increased precision.[55]

What is more, traditional machine learning models need structured, labeled input data to produce adequate outputs, while deep learning models may use unsupervised learning.[56]

Contemporary machine learning and deep learning techniques operate under the premise that an AI system does not require predefined operational patterns. Instead, it can exercise discretion in selecting methods and determining the course of its decision-making process to achieve a specified objective. The discretion gives rise to such an efficiency of artificial neural networks in analysing data that reaches beyond human capacities. In the light of this, it should be remembered that autonomy of an AI system is the opposite of schematic operation, because fully autonomous systems (AI workers) will not be determined by a model of operation imposed in advance by a human (employer). An operation pattern imposed from above can be compared to the instructions of an employer given to employees as they carry out their work. Such operation pattern will be missing in the context of fully autonomous AI systems. Due to their construction, these systems will be focused on independence in their decision making process intended to accomplish the goal designated by the system's user (employer). Therefore, it will be legitimate to say that the employer's control over an AI system will concentrate on the selection of an appropriate AI system for a given task and on the specification of goals the system is to achieve. However, the employer will not have a real impact on the (algorithmic) decision making process undertaken by the AI system for the purpose of accomplishing the designated goal.

54 Seah (n 6).

55 J Holdsworth & M Scapicchio, 'What is deep learning?' <https://www.ibm.com/topics/deep-learning> (accessed 28 May 2025).

56 ibid.

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4. CONCLUSION

The research leads to the conclusion that vicarious liability is not the optimal solution to an employer's liability problem towards third parties for damage caused by autonomous AI systems used by the employer. In fact, this liability model does not remove the barriers faced by the claimant in the form of: 1) the need to establish the standard of care which a particular AI system causing damage was supposed to follow; 2) the need to examine the actual cause of damage; whether it was a defect of the AI system or non-compliance by a non-defective AI system with the required standard of care; and 3) the need to prove in court proceedings that an AI worker breached a specific standard of care, which, in turn, gave rise to the damage.

A similar problem relates to the liability for damage caused by AI systems based on the fault of the system's operator. Unfortunately, in this area, vicarious liability is no more adequate for the challenges deriving from the AI technology. In the case of vicarious liability, a prerequisite of the employer's liability is, in principle, a tort committed by an employee. When this is translated to the context of autonomous AI systems (AI workers), a prerequisite of the employer's liability would be a violation of the standard of care by such a system. However, it remains an unresolved question as to how to establish that standard.[57] This is a problem to which attention was drawn in the Report from the Expert Group on Liability and New Technologies – New Technologies Formation 'Liability for Artificial Intelligence and other emerging digital technologies'.[58] In this Report, experts, on the one hand, recommended the use of vicarious liability; however, on the other hand, they emphasized that:

> [t]he policy argument is quite convincing that using the assistance of a self-learning and autonomous machine should not be treated differently from employing a human auxiliary, if such assistance leads to harm of a third party ('principle of functional equivalence'). However, at least in those jurisdictions which consider vicarious liability a variant of fault liability, holding the principal liable for the wrongdoing of another, it may be challenging to identify the benchmark against which the operations of non-human helpers will be assessed in order to mirror the misconduct element of human auxiliaries. (...) In many jurisdictions, the notion of vicarious liability at present requires the auxiliary to have misbehaved (though as assessed according to the standards applicable to the principal). In the case of a machine or technology, this triggers the question according to which benchmarks such "conduct" should be assessed.[59]

As a consequence, the use of the institution of vicarious liability, in its currently known form, will not ensure to injured parties any real possibility to obtain, in practice, due compensation. This conclusion is valid both for the Member States of the EU and for the US. In the light of this, I join the opinion of those researchers who argue that liability for damage caused by autonomous AI systems should be based on risk.[60] This implies strict liability in the sense described by Christiane Wendehorst. This author pointed out that the term strict liability should be '[r]eserved for such forms of liability that do not require any kind of non-compliance or defect or malperformance but are more or less based exclusively on causation'.[61] In my opinion, risk-based liability should also be incurred by an employer using autonomous AI systems. In fact, strict liability will allow the injured party to be relieved of:

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57 In literature, proposals have been put forward as to how to establish the standard of care. See Beckers & Teubner (n 22), 84–86.

58 Liability for Artificial Intelligence and other emerging digital technologies <https://op.europa.eu/en/publication-detail/-/publication/1c5e30be-1197-11ea-8c1f-01aa75ed71a1/language-en> (accessed 28 May 2025).

59 ibid, 25, 45–46.

60 Chan (n 44), 379, 380–382; R Kelley et al., 'Liability in Robotics: An International Perspective on Robotics as Animals' (2010) 24 *Advanced Robotics*, no. 13, DOI:10.1163/016918610X527194, 1–11; C Wendehorst, 'Strict Liability for AI and Other Emerging Technologies' (2020) 11 *Journal of European Tort Law*, no. 2, DOI:10.1515/jetl-2020-0140, 150–180. Christiane Wendehorst argues that '[s]trict liability is an appropriate response to situations where significant and/or frequent harm may occur despite the absence of any fault, defect, mal-performance or non-compliance. It may also be an appropriate response where such elements would be so difficult for the victim to prove that requiring such proof would lead to under-compensation or inefficiency. The further extension of strict liability may therefore be justified for AI applications because the "autonomy" and "opacity" of AI may give rise to exactly the kind of difficulties strict liability is designed to overcome.' See Wendehorst, 159–160.

61 Wendehorst (n 60), 159.

1) the burden of establishing the standard of care which the autonomous AI system causing damage was supposed to follow;
2) the burden of examining the actual cause of damage; whether this was a defect of the AI system or non-compliance by a non-defective AI system with the required standard of care;
3) the requirement to prove in court proceedings that the AI worker has breached a specific standard of care, which, in turn, gave rise to the damage;
4) the need to incur residual risk which, in fault-based liability models, is borne by the injured person.[62]

The employer, understood as a party using autonomous AI systems to achieve his or her economic or professional purposes and profiting thereby, should, as such, bear residual risk. This means that the employer, as a professional operator of autonomous AI systems, should take advantage of such systems only at the employer's own risk. The legislature should not remove residual risk from the employer (professional operator of an AI system) and shift the risk to a random natural person (consumer) who is not in any legal relationship with the employer. Transfer of residual risk to a random natural person, who by definition is the weaker party in a court dispute, would be unfair and socially harmful. Such a legal situation would definitely not contribute to building citizens' trust in autonomous AI systems.

By contrast, a strict liability model would be fair to a third party who: (1) was not a beneficiary of the employer's activities; (2) was not in any legal relationship with the employer; and (3) did not make any conscious and voluntary decision to assume residual risk in exchange for benefits (material goods or services) obtained by customers/service recipients of the AI system operator (employer) who are in a legal relationship with him. The only prerequisite of liability should be active involvement of the AI system in the event that gave rise to the damage. Adopting this liability model will ensure that individuals injured by autonomous AI systems have a real chance to receive due compensation.

However, as exonerating conditions, one should take into consideration: fault of the injured party or a person for whom the injured party was responsible and *force majeure*. In the absence of any grounds for exoneration, the employer should be held liable to the injured person regardless of what the actual cause of the damage was (whether a defect of the AI system or the system's error independent of any defect).

An important question is also the injured person's possibility to seek compensation directly from the employer and the simultaneous possibility afforded to the latter to assert a recourse claim against the manufacturer of an AI system if the employer has fully compensated the third party for the damage suffered. The success of such a claim will obviously depend on whether the employer is able to prove that the cause of the inflicted damage was a defect of the autonomous AI system for which the manufacturer is responsible.

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62 Vicarious liability, in which the basis for liability is a tort committed by an employee and the general status of fault-based tortious liability.

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