Article

Regulating driving automation in the European Union – criminal liability on the road ahead?

Sabine Gless
University of Basel, Switzerland

Katalin Ligeti
University of Luxembourg, Luxembourg

Abstract
Technological developments enable modern cars to drive autonomously. The EU has embraced this phenomenon in the hope that such technology can ameliorate mobility and environmental problems and has therefore engaged in tailoring technical solutions to driving automation in Europe. But driving automation, like other uses of AI, raises novel legal issues, including in criminal law – for instance when such vehicles malfunction and cause serious harm. By only pushing for a technological standard for self-driving cars, are EU lawmakers missing necessary regulatory aspects? In this article, we argue that criminal law ought to be reflected in EU strategy and offer a proposal to fill the current gap, suggesting an approach to allocate criminal liability when humans put AI systems in the driver's seat.

Keywords
artificial intelligence, criminal liability, EU harmonisation, EU digital strategy, self-driving cars, autonomous vehicles

Corresponding author:
Katalin Ligeti, University of Luxembourg, Alphonse Weicker, Luxembourg 41511, Luxembourg.
Email: Katalin.Ligeti@uni.lu

Introduction

Over the last few decades, we have witnessed a digital transformation that has brought many benefits accompanied by multiple risks.[1] Driving automation provides a very good example.[2] More and more motor vehicles with driver-assistance systems or self-driving capabilities travel our public roads. In the past, autonomous vehicles were the stuff of science fiction novelists; now, self-driving cars are a reality.[3] Self-driving cars offer new opportunities to facilitate the mobility of disadvantaged persons (e.g., the disabled, the elderly, and persons too young to drive) and could help address the lack of public transportation in rural areas. Furthermore, interest in driving automation is propelled by the hope that assisted- and self-driving cars will make our streets safer in the long run. After all, an AI system's attention span is not as limited as ours, they have no appetite for wine and beer, and they are expected to make fewer mistakes (at least in standard situations).[4] Although cars equipped with driver-assistance systems and self-driving cars can do much good and greatly increase transport safety and societal welfare,[5] one cannot disregard the possibility that those vehicles may cause not only property damage but also serious injury, including loss of human life.[6]

Against this background, the EU has developed a digital strategy to make digital transformation benefit the people living in the EU; it contains a number of actions and initiatives, including some touching upon driving automation, such as new type-approval requirements for advanced

---

1. Against this background, the EU has developed a digital strategy to make digital transformation benefit the people living in the EU. The EU's Digital Strategy, which forms one of the Commission's six priorities for 2019–2024, pursues, *inter alia*, actions intended to encourage and enhance the development and use of AI, which is the backbone of Assisted and Automated Driving Systems. For an overview of the EU's Digital Strategy, see the European Commission's Website: <https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en> accessed 18 October 2023. For the purposes of this essay, the term 'EU Digital Strategy' is used in a broader sense and also includes initiatives which have been put forward under the Mobility Strategy (such as regulation on the new type-approval requirements for advanced driver-assistance systems and automated vehicles) but are related to digital transformation in the field of automated mobility.
2. The term 'driving automation' is used in this discussion to capture both assisted and automated driving systems, as those terms will be further elaborated in Section II.
3. Sabine Gless, Emily Silverman and Thomas Weigend, 'If Robots Cause Harm, Who Is to Blame? Self-Driving Cars and Criminal Liability' (2016) 19(3) New Criminal Law Review 412, 412-15.
4. Commission, 'EU Road Safety Policy Framework 2021–2030. Next steps towards "Vision Zero"', SWD(2019) 283 final, 9.
5. Commission, 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions, 'On the road to automated mobility: An EU strategy for mobility of the future', COM(2018) 283 final, 1.
6. In this regard, see numerous Tesla cases in which Tesla vehicles running driver-assistance systems or other self-driving features have been involved in accidents.

driver-assistance systems and automated vehicles,[7] a proposal to regulate AI systems,[8] and two proposals[9] to adapt civil liability rules to the digital age.[10] Criminal liability, however, does not yet play a role in that line-up of initiatives. To date, EU policy documents suggest that the EU's appetite for creating criminal prohibitions is rather limited.[11]

The EU's cautious approach to imposing criminal liability related to AI systems comes as no surprise. On the one hand, criminal law is seen as a last resort in both the Member States and the EU, and on the other hand, the EU can only use criminal enforcement mechanisms under specific circumstances. Indeed, since the 19th century, European liberal criminal-law thinking has been based on the principle of individual guilt, which necessarily revolved around the actions of humans. The potential criminal liability of non-human actors such as robots, as well as the potential criminal liability of those humans who created and/or used AI that has caused damage or injury or otherwise 'committed' a criminal offence, has only recently become part of the criminal justice debate in Europe.[12] Anchored in the principle of individual guilt, several countries (such as Germany) still reject the idea that corporations can be held criminally liable. Recently, however, we

---

7. For instance, Council Regulation (EU) 2019/2144 of the European Parliament and of the Council of 27 November 2019 on type-approval requirements for motor vehicles and their trailers and systems, components, and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users, amending Regulation (EU) 2018/858 of the European Parliament and of the Council and repealing Council Regulations (EC) No 78/2009, (EC) No 79/2009 and (EC) No 661/2009 of the European Parliament and of the Council and Commission Regulations (EC) No 631/2009, (EU) No 406/2010, (EU) No 672/2010, (EU) No 1003/2010, (EU) No 1005/2010, (EU) No 1008/2010, (EU) No 1009/2010, (EU) No 19/2011, (EU) No 109/2011, (EU) No 458/2011, (EU) No 65/2012, (EU) No 130/2012, (EU) No 347/2012, (EU) No 351/2012, (EU) No 1230/2012 and (EU) 2015/166 (Text with EEA relevance) [2019] *OJ L 325/1* (hereinafter: Regulation 2019/2144); Commission Implementing Regulation (EU) 2022/1426 of 5 August 2022 laying down rules for the application of Regulation (EU) 2019/2144 of the European Parliament and of the Council as regards uniform procedures and technical specifications for the type-approval of the automated driving system (RDS) of fully automated vehicles [2022] OJ L 221/1 (hereinafter: Commission Implementing Regulation 2022/1426) . For more details, see Section II.
8. Commission, 'Proposal for a Regulation Laying down Harmonised Rules on Artificial Intelligence (AI Act)' COM(2021) 206 final (hereinafter: 'Draft AI Act').
9. Proposal for a Directive of the European Parliament and of the Council on adapting non-contractual civil liability to artificial intelligence (AI Liability Directive), COM(2022)496 final; and Proposal for a Directive of the European Parliament and of the Council on liability for defective products, COM(2022)495 final.
10. For an overview of EU initiatives touching upon driving automation, see Section II.
11. While it is true the EU institutions have on various occasions acknowledged that the current liability regime in relation to AI systems appears to have gaps that call for instruments better adapted to AI's unique features, to date the focus has been on civil liability rather than criminal liability. On the topic of civil liability, see, e.g., Commission, 'Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions on Artificial Intelligence for Europe' COM(2018) 237 final, 15 ('The emergence of AI … requires a reflection about the suitability of some established rules on safety and *civil law questions on liability*' (emphasis added)); Commission, 'White Paper On Artificial Intelligence – A European approach to excellence and trust' COM(2020) 65 final, 3 ('Although further arrangements may need to be put in place to prevent and counter misuse of AI for criminal purposes, *this is outside the scope of this white paper*' (emphasis added)); European Parliament resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence (2020/2014(INL)).
12. Dafni Lima, 'Could AI Agents Be Held Criminally Liable: Artificial Intelligence and the Challenges for Criminal Law' (2018) 69(3) 2 South Carolina Law Review 677. See, also, Alice Giannini and Jonathan Kwik, 'Negligence failures and negligence fixes. A comparative analysis of criminal regulation of AI and autonomous vehicles' (2023) 34 Criminal Law Forum 43, who analyse the models that France and the UK propose in order to address criminal liability for AI misbehaviour. See further Evert F. Stamhuis, 'Dutch Report on Traditional Criminal Law Categories and AI' in Lorenzo Picotti and Beatrice Panattoni (eds), *Traditional Criminal Law Categories and AI: Crisis or Palingenesis?*, vol 94(1) (Revue internationale de droit pénal, MAKLU 2023) 146.

have seen inroads into the principle of individual guilt: some jurisdictions now entertain the concept of robot culpability,[13] while others have adopted legislation assigning criminal liability in human-robot interactions.[14]

One of the key reflections in this context is whether the risks related to the increasing deployment of AI-enabled driving systems can be resolved by a technological approach (i.e., 'legality by design') or if they instead require a regulatory approach that would include new criminal laws. If we opt for a regulatory approach, the next step will be to decide if such regulation should be adopted at national or EU level. More and more vehicles operate on European roads with varying degrees of automation; to address that fact, the EU has already embarked on the path toward legality by design via harmonised technical standards for driving automation. In this article, we argue that the EU should complement those technical standards with rules addressing criminal liability. To this end, Sections II and III set the scene for our main analysis; we present the existing EU-level rules, both technical standards and the current liability regime, applicable to driving automation. Section IV points to the current gap in criminal liability and focuses on those cases where traditional criminal law doctrine does not offer adequate answers so that the intervention of the lawmaker is necessary. Section V will then examine the desirability of a harmonised EU approach to criminal liability connected to driving automation and the respective competence of the EU to establish minimum rules in this area. Section VI closes with our outlook on future developments if the EU Member States go down the road suggested in Section V.

Regulating driving automation in the EU: State of the art

Driving automation entails a number of technologies ranging from existing conventional (i.e., human-operated) cars equipped with advanced driver-assistance systems to fully automated driverless vehicles, which remain, for the moment, an aspiration. According to the classification system – generally regarded as the industry standard – developed by the Society of Automotive Engineers (SAE) there are six levels of automation a car may offer.[15]

---

13. For example, in 2017, the Tennessee state legislature amended the state's Motor Vehicle Code to broaden the definition of 'person' to cover 'an engaged [automated-driving system] ADS'. However, the extended definition does not seem to be applicable in the context of civil and criminal liability. See Simon Chesterman, 'Artificial Intelligence and the Problem of Autonomy' (2020) JET 210, 215 <https://ndlsjet.com/wp-content/uploads/2020/04/Artificial-Intelligence-and-the-Problem-of-Autonomy.pdf> accessed 18 October 2023.

14. For example, in 2021, France adopted an *ordonnance* that modified the French Road Act to regulate criminal liability for traffic offences related to automated driving systems. (Ordonnance n° 2021-443 du 14 avril 2021 relative au régime de responsabilité pénale applicable en cas de circulation d'un véhicule à délégation de conduite et à ses conditions d'utilisation). In 2022, the Law Commission of England and Wales and the Scottish Law Commission released a joint report that included recommendations on how to develop a new regulatory reform for automated vehicles, including recommendations on imposing criminal liability in that context: Law Commission of England and Wales and Scottish Law Commission, *Automated Vehicles: Joint Report* (Law Com No 404, Scot Law Com No 258, 2022). See also Giannini and Kwik (n 12).

15. For a detailed description of the six levels of automated driving, see the SAE's website: SAE International, 'SAE Levels of Driving Automation™ Refined for Clarity and International Audience' (*SAE International*, 3 May 2021) <https://www.sae.org/blog/sae-j3016-update> accessed 18 October 2023. See also United Nations Economic and Social Council, 'Reference document with definitions of Automated Driving under WP.29 and the General Principles for developing a UN Regulation on automated vehicles' (ECE/TRANS/WP.29/1140, United Nations, 23 April 2018) <https://unece.org/fileadmin/DAM/trans/main/wp29/wp29resolutions/ECE-TRANS-WP29-1140e.pdf> accessed 18 October 2023; Rachel Gordon, 'Explained: Levels of autonomy in self-driving cars' (*MIT CSAIL*, 10 December 2020) <https://www.csail.mit.edu/news/explained-levels-autonomy-self-driving-cars> accessed 18 October 2023. On the contrary, the policy on automated vehicle development released by the US Department of Transportation in 2019 included five levels of automation (U.S. Department of Transportation, 'U.S. Department of Transportation Releases Policy on Automated Vehicle Development' (*Transportation.gov*, 1 August 2019) <http://www.transportation.gov/briefing-room/us-department-transportation-releases-policy-automated-vehicle-development> 18 October 2023).

At Level 0, the human driver remains in complete control of the motor vehicle and is in charge of operating all of its driving functions (no driving automation technology at all). Level 1, i.e., the lowest level of automation, offers some driver assistance. The motor vehicle provides *one single* driver-support system that offers steering *or* braking/acceleration support (only one task at a time) such as adaptive cruise control or lane-centering assistance or lane-following assistance. Level 2 provides a more advanced driver-assistance system that can take over both steering *and* acceleration/braking in specific circumstances (partial driving automation). Neither Level 1 nor Level 2 systems replace the human driver; the human driver must remain alert and is obliged to actively supervise the automated support features at all times and intervene immediately if the environment or the system (warnings) demand it. We refer to Level 1 and Level 2 of automation as 'Assisted Driving Systems'.

At Level 3, vehicles are able to drive themselves in certain circumstances (such as traffic jams) in the sense that longitudinal (braking and acceleration) and lateral (steering) dynamic driving tasks are automated; the human driver does not need to supervise the technology.[16] The driver must nevertheless be ready to take control when the vehicle notifies the driver to do so, particularly in the event of an emergency due to system failure (conditional driving automation). Level 4, often referred to as 'high driving automation', does not rely on any human interaction, as the vehicle is able to carry out all driving tasks and is programmed to stop itself in the event of system failure. Level 4 systems only work in limited circumstances (e.g., within certain geographic boundaries, or in certain weather conditions) and cannot operate unless all necessary conditions are met. This advanced technology can apply, for instance, in driverless taxis and public transportation services. Finally, Level 5 entails the highest level of automation: vehicles are able to operate by themselves in all conditions, without any need for human intervention once the vehicle is in operation and has been given its destination. We refer to Level 3, Level 4, and Level 5 as 'Automated Driving Systems'.[17]

EU harmonised rules on technical requirements

Vehicles equipped with Assisted Driving Systems have been sharing European roads for quite a while – as a matter of fact, many driver-support features are now standard on most new cars.[18] Because the car industry continues its rapid advances in vehicle autonomy, some Member States

---

16. The system can be used in a traffic jam scenario: it detects a slow-driving vehicle ahead and then handles the vehicle both longitudinally and laterally. In this regard, see Susanne Pillath, 'Automated Vehicles in the EU' (European Parliamentary Research Service, January 2016) 5.

17. It should be pointed out that there is no officially accepted definition of what 'driving automation' means or official terminology for each level of driving automation. As mentioned above, for the purpose of this contribution, we will refer to Level 1 and Level 2 of automation as 'Assisted Driving Systems', and to Level 3, Level 4 and Level 5 as 'Automated Driving Systems'. As far as the EU framework is concerned, although the EU seems to follow the 6 level-classification inaugurated by the SAE, it does not always use the terminology in a very consistent way. For instance, Regulation 2019/2144 refers to automated driving systems of Level 3 as 'automated vehicles' and to automated driving systems of Level 4 as 'fully automated vehicles'. Regulation 2019/2144 (n 7), art 3(21) reads as follows: "automated vehicle' means a motor vehicle designed and constructed to move autonomously for certain periods of time without continuous driver supervision but in respect of which driver intervention is still expected or required'; and according to art 3(22) "fully automated vehicle' means a motor vehicle that has been designed and constructed to move autonomously without any driver supervision'.

18. Commission, 'Communication on the road to automated mobility: An EU strategy for mobility of the future' COM(2018) 283 final (n 5) 3.

already require testing – based on Member States' national law – for Level 3 and Level 4 Automated Driving Systems. In 2019, in light of this, the EU adopted Regulation 2019/2144,[19] which amended the EU's Vehicle General Safety Regulation[20] to include a legal framework for different types of driving automation.[21] The New Vehicle General Safety Regulation has developed rules for a harmonised type-approval procedure that sets out uniform, obligatory standards for Assisted Driving Systems[22] and Automated Driving Systems of Level 3[23] and Level 4 such as urban shuttles or robotaxis.[24] At the time of writing the EU has not yet put in place a regulatory framework for Automated Driving Systems of Level 5. Although the EU seems to follow the six-level classification inaugurated by the SAE, it employs the term 'autonomous' to refer to Automated Driving Systems. More specifically, Regulation 2019/2144 refers to Automated Driving Systems of Level 3 and Level 4 – as defined above – as 'automated vehicles' and 'fully automated vehicles' respectively.[25] Therefore, for the purpose of this article the term 'automated vehicles' refers to Level 3 Automated Driving Systems, while 'fully automated vehicles' refers to Level 4 Automated Driving Systems.

Interestingly, the EU's legal framework – established through the New Vehicle General Safety Regulation – addresses two distinct elements with respect to driving automation (without formally separating them in the relevant documents): one of the two elements sets out the obligatory technical requirements that driving automation systems must meet, while the other sets out the roles and obligations of the various actors involved in designing, developing, and deploying such systems in the common market (e.g., of the manufacturer,[26] the importer, the distributor).

---

19. Regulation 2019/2144 (n 7).
20. Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC (Text with EEA relevance.) [2018] OJ L 151/1 (hereinafter: Regulation 2018/858 or Vehicle General Safety Regulation). The Vehicle General Safety Regulation, which is the EU instrument that stipulates harmonised rules for the approval and market surveillance of motor vehicles and their trailers as well as systems, components, and separate technical units intended for such vehicles, did not include any rules on driving automation.
21. We will refer to the Vehicle General Safety Regulation as amended by Regulation 2019/2144 and the subsequent delegated and implementing acts as the 'New Vehicle General Safety Regulation'.
22. Such as intelligent speed assistance (for all road vehicles), lane-keeping systems, and automated banking (for cars and vans), technologies for better recognising possible blind spots, warnings to prevent collisions with pedestrians or cyclists, and tyre pressure monitoring systems (for buses and trucks).
23. The new EU rules aligned EU legislation with the new UN-level rules on Level 3 of automation (for the UN rules, see more on: United Nations Economic Commission for Europe, 'UN Regulation extends automated driving up to 130 km/h in certain conditions' (*United Nations Economic Commission for Europe*, 22 June 2022) <https://unece.org/media/press/368227> accessed 18 October 2023.
24. In this regard, see Commission Implementing Regulation 2022/1426 (n 7). The rules cover, among others, testing procedures, cybersecurity requirements, and data recording rules, as well as safety-performance monitoring and incident reporting requirements for manufacturers of fully driverless vehicles. For a comprehensive overview of secondary legislation adopted based on the New Vehicle General Safety Regulation, see more on: European Commission's website: Commission, 'General Safety Regulation – Secondary Legislation' (*European Commission's website*, 28 August 2022) <https://ec.europa.eu/docsroom/documents/51154> accessed 18 October 2023.
25. Regulation 2019/2144 (n 7). Regulation 2019/2144, art 3(21) reads as follows: ''automated vehicle' means a motor vehicle designed and constructed to move autonomously for certain periods of time without continuous driver supervision but in respect of which driver intervention is still expected or required'; and according to art 3(22) ''fully automated vehicle' means a motor vehicle that has been designed and constructed to move autonomously without any driver supervision'.
26. For more details, see Section 2 below.

At the time of writing, the EU still requires some degree of cooperation between the vehicle's human driver and its driving automation systems, with the exact amount of such cooperation depending on the vehicle's specific AI systems. In such circumstances, attributing criminal liability for damage or injury caused while the vehicle is operating has been complex. At Level 3, for example, automated-driving functions can only be activated under specific conditions (i.e., only on motorways on which pedestrians and bicyclists are prohibited, only at speeds up to 130 km/h), the human driver can override the system if he or she deems it necessary, or the system can alert the driver to immediately retake control of the vehicle at any moment.[27] Therefore, the human driver must always remain sufficiently vigilant to respond to a transition demand, the vehicle's warnings, and mechanical failure[28] and take up the fallback position.[29] With respect to Level 4 automation, the current EU framework only permits a limited number of fully automated vehicles (1,500 vehicles per model per year[30]) in certain use situations (e.g., shuttles on designated roads). Although fully automated vehicles are able to cope with any situations within their operating parameters[31] – including taking up the fallback position without human intervention – the system must request human takeover if its operating parameters have reached their outer limits (e.g., if it exits the predefined area in which it is specifically designed to function).

The current EU legal framework directly related to driving-automation systems is, however, likely to change once the Commission's Proposal for a Regulation laying down harmonised rules on artificial intelligence ('Draft AI Act') is adopted.[32] At present the Draft AI Act is still being negotiated; on 6 December 2022, the Council adopted its common position on the draft bringing amendments to the Commission's proposal ('Council's General Approach')[33] and on 14 June 2023, the European Parliament adopted its negotiating position.[34] What is already clear at this stage, however, is that driving-automation systems qualify as high-risk systems[35] for the purposes of the Draft AI Act (i.e., AI systems that pose significant risks to the health and safety or fundamental

---

27. On this topic, see United Nations Economic Commission for Europe, 'UN Regulation extends automated driving up to 130 km/h in certain conditions' (*UNECE*, 22 June 2022) <https://unece.org/media/press/368227> accessed 18 October 2023.

28. United Nations Economic and Social Council, 'Reference document with definitions of Automated Driving' (ECE/TRANS/WP.29/1140, United Nations 23 April 2018) 5.

29. When errors occur during the automated driving procedure, either the human driver or the automated driving systems – depending on the level of automation – must perform fallback behaviour. For more on this topic, see Wei Xue et al, 'An adaptive model predictive approach for automated vehicle control in fallback procedure based on virtual vehicle scheme' (2019) 2(2) Journal of Intelligent and Connected Vehicles 67. At Level 3, the automated driving system assumes that human drivers are reliable and can take over the dynamic driving task correctly when failures occur.

30. This limit is subject to review in July 2024.

31. In this regard, see the definition of 'operational design domain (ODD)' adopted by Commission Implementing Regulation 2022/1426 (n 7), art 2(16).

32. Draft AI Act (n 8).

33. Council Document No 14954/22, 'Council General Approach on the Proposal for a Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) and amending certain Union legislative acts' (25 November 2022).

34. Amendments adopted by the European Parliament on 14 June 2023 on the proposal for a regulation of the European Parliament and of the Council on laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) and amending certain Union legislative acts (P9_TA(2023)0236).

35. Article 6(1) of the Daft AI Act. The Draft AI Act adopts a risk-based approach, distinguishing between three categories of AI systems: systems posing unacceptable risk, high-risk AI systems, and limited-risk AI systems. Furthermore, there are separate provisions on general-purpose AI systems. Hannah Ruschemeier, 'AI as a challenge for legal regulation – the scope of application of the artificial intelligence act proposal' (2023) 23 ERA Forum 361, 368.

rights of persons[36]). In relation to high-risk systems, the Draft AI Act contemplates, *inter alia,* creating a set of horizontal mandatory requirements that such AI systems must fulfil, as well as clarifying the allocation of responsibilities and roles to the various actors. Although the Draft AI Act is not specifically tailored to driving automation, such mandatory requirements could affect the legal framework on driving automation.

As drafted, Article 6 of the Draft AI Act captures driving automation systems as they qualify as high-risk systems;[37] they should therefore theoretically fall under the scope of the Draft AI Act. However, because the Commission decided to adopt a sectoral approach in its proposal in order to avoid overlaps and duplications, it excludes driving automation systems from its scope of application,[38] but simultaneously requires the EU legislature to take into account requirements set out for high-risk AI systems when establishing the prerequisites for type approval for Assisted and Automated Driving Systems of Levels 3 and 4.[39] That being said, if the Draft AI Act is adopted, further measures are expected[40] in order to align applicable sectoral legislation with the AI Act to the extent such sectoral legislation is inconsistent with such requirements.[41] Among those requirements, an obligation to incorporate 'human oversight' is of particular significance for Automated Driving Systems. Article 14 of the Draft AI Act states that 'High-risk AI systems shall be designed

36. Draft AI Act, Recital 27.
37. ibid, art 6(1) considers *inter alia* as high-risk the AI systems that are covered by the Union legislation listed in Annex II and are required to undergo a third-party conformity assessment with a view to their placing on the market. Driving-automation systems are classified as high-risk systems as they fall within the scope of certain Union harmonisation legislation listed in Annex II (i.e., Regulation 2019/2144 (n 7) and Regulation 2018/858 (n 20)), and pursuant to the applicable legal framework they undergo the conformity assessment procedure with a third-party conformity assessment body (in this regard, see the New Vehicle General Safety Regulation). Although the method of classification of systems as high-risk is debated among the Commission, the Council, and the Parliament, the logic behind Article 6(1) remains intact.
38. Draft AI Act, art 2(2) stipulates that '[f]or high-risk AI systems that are safety components of products or systems, or which are themselves products or systems, falling within the scope of the following acts, onlyArticle 84 of this Regulation ('Evaluation and review') shall apply: … (f) Regulation 2018/858, … (h) Regulation 2019/2144'. Accordingly, except for Article 84, driving-automation systems are not covered by the Draft AI Act, because as explained above, they fall within the scope of Regulation 2018/858 and Regulation 2019/2144. The Council's General Approach upholds exempting driving-automation systems from the scope of the Draft AI Act by restating that '[f]or AI systems classified as high-risk AI systems in accordance with arts 6(1) and 6(2) related to products covered by Union harmonisation legislation listed in Annex II, section B only art 84 of this Regulation shall apply' (art 2(2) of the Council's General Approach).
39. Draft AI, arts 80 and 82 require the amendment of Regulation 2018/858, art 5 and of Regulation 2019/2144, art 11 respectively, which deal with the technical requirements that driving systems based on AI should comply with. See also Recital 29 of the Draft AI Act ('As regards high-risk AI systems that are safety components of products or systems, or which are themselves products or systems falling within the scope of … Regulation 2018/858, … and Regulation (EU) 2019/2144 of the European Parliament and of the Council, it is appropriate to amend those acts to ensure that the Commission takes into account, on the basis of the technical and regulatory specificities of each sector, and without interfering with existing governance, conformity assessment and enforcement mechanisms and authorities established therein, the mandatory requirements for high-risk AI systems laid down in this Regulation when adopting any relevant future delegated or implementing acts on the basis of those acts').
40. David Fernández Llorca and Emilia Gómez, 'Artificial Intelligence in Autonomous Vehicles: towards trustworthy systems' (Joint Research Centre of the European Commission, 2022) 1. See also Draft AI Act which states that 'As regards high-risk AI systems which are safety components of products, this proposal will be integrated into the existing sectoral safety legislation to ensure consistency, avoid duplications and minimise additional burdens' (Draft AI Act, 3).
41. The Draft AI Act introduces requirements on risk management system, data governance, technical documentation, record keeping, transparency and provision of information to users, human oversight, and accuracy, robustness, and cybersecurity.

and developed in such a way, including appropriate human-machine interface tools, that they can be effectively overseen by natural persons during the period in which the AI system is in use', which is apparently intended to prevent harmful AI outcomes by inserting a human operator 'in the loop' to monitor the AI system's operation and intervene if necessary. How that concept of human oversight can be implemented in the field of driving automation and how it can be reconciled with the increased level of autonomy of fully automated vehicles remains to be seen.

Fragmented EU rules on driving-automation-related liability

While the EU has harmonised rules and technical requirements for driving automation based on AI systems with the New Vehicle General Safety Regulation – with further rules expected to come if the Draft AI Act is adopted – rules on liability related to driving automation are rather scarce and fragmented. Indeed, driving-automation-related liability is addressed through various existing instruments at EU level, while the Commission tabled two proposals to adjust the liability regime to AI-systems.

To the extent the EU legal framework addresses who bears ultimate responsibility for the safety of an Assisted or Automated Driving System, it focuses mainly on the system's *manufacturer*.[42] By and large, manufacturer obligations tend to arise either before or after the system is marketed to the public. Before a manufacturer can legitimately put an Assisted or Automated Driving System on the market, it must first obtain type approval, which obliges the manufacturer *inter alia* to demonstrate that its system meets current scientific and technical standards and that the system's safety for road use has been adequately tested.[43] The responsibility of the manufacturer does not cease when the system is put on the market; the manufacturer remains responsible for the ultimate safety of the system *and* its continued compliance with the technical standards over its lifetime. To this end, the manufacturer is obliged, among other things, to collect vehicle data to monitor and analyse safety-relevant incidents/accidents caused by its driving-automation systems and subsequently report them to the competent authorities (a); he is obliged to manage potential safety-related gaps and update affected vehicles if necessary to remedy such gaps (b); if an Assisted or Automated Driving System already on the market does not conform to the EU framework, or was granted its type approval on

---

42. Under the EU legal framework, 'manufacturer' means a natural or legal person who is responsible for all aspects of the type-approval of a vehicle, system, component, or separate technical unit, or the individual vehicle approval, or the authorisation process for parts and equipment, for ensuring conformity of production and for market surveillance matters regarding that vehicle, system, component, separate technical unit, part, and equipment produced, irrespective of whether or not that person is directly involved in all stages of the design and construction of that vehicle, system, component or separate technical unit concerned (Regulation 2018/858 (n 20), art 3(40)). See also, Regulation 2019/2144 (n 7), art 4(1) which states that 'Manufacturers shall demonstrate that all new vehicles that are placed on the market, registered or entered into service, and all new systems, components and separate technical units that are placed on the market or entered into service, are type-approved in accordance with the requirements of this Regulation and of the delegated acts and implementing acts adopted pursuant to it'.

43. With regards to Level 4 Automated Driving Systems, it is stated that 'The manufacturer *shall demonstrate that an acceptable degree of consideration has been given to the functional and operational safety for the ADS during its design and development processes*. The measures put in place by the manufacturer shall ensure that the fully automated vehicle is *free of unreasonable safety risks to vehicle occupants and other road users* during the vehicle lifetime when compared with comparable transport services and situations within the operational domain. The manufacturer shall define the acceptance criteria from which the validation targets of the ADS are derived to evaluate the residual risk for the ODD taking into account, where available, existing accident data, data on performances from competently and carefully driven manual vehicles and *technology state-of-the-art*' (Commission Implementing Regulation 2022/1426 (n 7), Annex II, paras 7.1. and 7.1.1. (emphasis added)).

the basis of incorrect data, or presents a serious risk to the health or safety of persons or to other aspects of the protection of public interests covered by the relevant EU framework, the manufacturer must immediately take necessary corrective measures (e.g., bring the system into conformity with then-current standards, withdraw it from the marketplace, issue warnings, recall defective systems for repair, or take other appropriate action).

When it comes to liability, the New Vehicle General Safety Regulation includes the well-established EU law-enforcement clause which requires Member States to provide *effective, proportionate, and dissuasive penalties* for infringements by economic operators[44] and technical services[45] of the said regulation.[46] The EU therefore currently leaves it to the Member States to decide whether infringement of the rules stipulated in the New Vehicle General Safety Regulation is sanctioned via administrative or criminal law.

While criminal liability rules and common EU provisions on criminal liability for offences connected to driving automation are outside the frame of the New Vehicle General Safety Regulation, EU law entails common provisions on civil liability. Under the Product Liability Directive (PLD), any natural person who suffers damage by a defective product should be entitled to compensation.[47] However, as the Commission itself has admitted, the applicability of the PLD to driving-automation products is questionable and, therefore, it is unlikely that a victim of an accident caused by, for example, an automated vehicle could take legal action against the vehicle's manufacturer under the current regime if there is a defect in, or malfunction of, a driving-automation system.[48] To remove any uncertainty, the Commission tabled a proposal to revise the PLD[49] with a view to confirming that AI systems and AI-enabled goods fall within the PLD's scope.[50] To complete the civil liability aspects of regulating AI-enabled systems, the Commission simultaneously tabled a second proposal for a Directive on adapting non-contractual civil-liability rules to

---

44. According to Regulation 2018/858 (n 20), art 3(44) 'economic operator' means the manufacturer, the manufacturer's representative, the importer, or the distributor.

45. According to ibid, art 3(38) 'technical service' means an organisation or body designated by the approval authority as a testing laboratory to carry out tests or as a conformity-assessment body to carry out the initial assessment and other tests or inspections.

46. Regulation 2019/2144 (n 7), Recital 2 reads as follows: 'The administrative provisions of Regulation 2018/858, including the *provisions on corrective measures and penalties*, are fully applicable to this Regulation' (emphasis added). Regulation 2018/858 (n 20), art 84(1) reads as follows: 'Member States shall lay down *the rules on penalties applicable to infringements* by economic operators and technical services of this Regulation and shall take all measures necessary to ensure that they are implemented. *The penalties provided for shall be effective, proportionate and dissuasive.* In particular, those penalties shall be proportionate to the seriousness of the non-compliance and to the number of non-compliant vehicles, systems, components or separate technical units made available on the market of the Member State concerned' (emphasis added).

47. Council Directive 85/374/EEC on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products [1985] OJ L 210/29.

48. Commission, 'Communication on the road to automated mobility: an EU strategy for mobility of the future' COM(2018) 283 final (n 5) 10-11; see, also, Commission, 'White Paper on Artificial Intelligence' COM(2020) 65 final (n 11) 12-13 ('in the case of an AI-based system such as *autonomous cars*, it may be difficult to prove that there is a defect in the product, the damage that has occurred and the causal link between the two. In addition, there is some uncertainty about how and to what extent the Product Liability Directive applies in the case of certain types of defects, for example, if these result from weaknesses in the cybersecurity of the product' (emphasis added)).

49. Commission, 'Proposal for a Directive of the European Parliament and the Council on liability for defective products' COM(2022) 495 final.

50. ibid 1 ('The Directive also had several shortcomings: it was legally unclear how to apply the PLD's decades-old definitions and concepts to products in the modern digital economy and circular economy (e.g. software and products that need software or digital services to function, such as smart devices and *autonomous vehicles*)' (emphasis added)).

artificial intelligence.[51] Unlike the PLD, which only covers a producer's no-fault liability for defective products, the second proposed Directive is intended to harmonise certain rules for cases in which damage claims arise out of wrongful behaviour. Nevertheless, it is uncertain whether said proposed directive, if adopted, would apply to driving-automation systems, as Article 1(3) of the Commission's Proposal provides that 'This Directive shall not affect rules of Union law regulating conditions of liability in the field of *transport*' (emphasis added).

In sum, EU policy in the area of driving automation is built on laying down technical standards that Assisted and Automated Driving Systems should comply with as well as establishing rules of civil liability, while the area of criminal liability remains – almost – untouched. The Draft AI Act, if adopted, will not change this situation as it does not contain rules on liability.

The silence of the EU legislature on criminal liability is somewhat surprising, given that Assisted and Automated Driving Systems, like all AI systems, are neither error- nor fool-proof, nor are the individuals who develop and deploy them in the marketplace, nor are the human drivers interacting with them. Accidents resulting in property damage, injuries, or even the loss of human life have happened, and will continue to happen. To address this lacuna, we must first ask whether criminal liability should form any part of the regulatory framework addressing the use of driving-automation systems and, if so, how that might be shaped. Once we consider those questions, we can discuss whether the resolution to those questions requires a harmonised EU approach.

Criminal liability gap in the context of driving automation

Criminal law is geared to humans, not to AI systems nor to human-AI interactions. In the logic of traditional criminal law, AI systems cannot be subject to criminal prosecution or punishment. The reasons are manifold: While a driving assistant may be able to learn, to read a traffic sign, and to make decisions about how to react when it encounters one, it is unlikely that it can meaningfully decide to comply with or violate the law[52] since AI systems cannot grasp the concept of having rights and obligations as a participant in public traffic.[53] We cannot hold them 'personally' responsible for any harm they may cause and we have no means to inflict pain on them. Thus, when further developments in driving automation allow human drivers to hand over more and more driving responsibilities to vehicles, chances are that victims of traffic accidents will less often have a criminal case to bring. Phrased differently: A responsibility gap naturally opens when driving assistants operate vehicles – with the risk of them causing harm to humans.[54] Leaving criminal

51. Commission, '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. See more in detail in Christiane Wendehorst, 'AI liability in Europe: anticipating the EU AI Liability Directive' (Ada Lovelace Institute, September 2022) <https://www.adalovelaceinstitute.org/wp-content/uploads/2022/09/Ada-Lovelace-Institute-Expert-Explainer-AI-liability-in-Europe.pdf> accessed 18 October 2023, Sebastian Lohsse, Reiner Schulze and Dirk Staudenmayer (eds), *Münster Colloquia on EU Law and the Digital Economy*, vol 7 (Bloomsbury 2023).

52. On this topic see, Gless, Silverman and Weigend (n 3) 415-17.

53. See Lawrence B. Solum, 'Legal Personhood for Artificial Intelligences' (1992) 70(4) North Carolina Law Review 1231; Andreas Matthias, *Automaten als Träger von Rechten* (2nd edn, Logos Berlin 2010).

54. On this question, see Susanne Beck, 'Die Diffusion strafrechtlicher Verantwortlichkeit durch Digitalisierung und Lernende Systeme' (2020) 2 Zeitschrift für Internationale Strafrechtsdogmatik 41, 4350; Bert-Jaap Koops, Mireille Hildebrandt, and David-Olivier Jaquet-Chiffelle, 'Bridging the Accountability Gap: Rights for New Entities in the Information Society?' (2010) 11 Minnesota Journal of Law, Science & Technology 497, 522-3; Mireille Hildebrandt, 'Autonomic and Autonomous "Thinking": Preconditions for Criminal Accountability' in Mireille Hildebrandt and Antoinette Rouvroy (eds), *Law, Human Agency and Autonomic Computing* (Routledge 2011) 141-60.

liability unregulated in the context of the creation and operation of AI systems means that the new situation (shift of liability from human to AI; grey area of human-AI interaction) is left basically to the courts, which must solve these new challenges in criminal law.

Before moving forward, the question arises about the ambit of a future initiative for regulating criminal liability related to driving automation and what automation levels it should cover. To put it differently: in which cases does a liability gap arise that would, in turn, make intervention by lawmakers necessary? In this context, human-AI interaction and the ability, or rather necessity, of a human driver to retake control of the vehicle are key features.[55] The greater the control assumed by the driving system, the more difficult the attribution of criminal liability to the human driver will be. However, as described earlier, the boundaries in allocating the tasks between the driving systems and the human driver as well as the moment when control is handed back to the human driver might not always be that clear. When it comes to Assisted Driving Systems, the situation seems to be quite clear: the human sitting in the driver's seat in the vehicle should supervise the driving tasks executed by the system, monitor the environment, and intervene immediately when necessary – if the environment or the system through warnings so require – and thus remain in constant active control of the vehicle.

On the other end of the spectrum, at Level 4 it seems that the automated system has full control of the vehicle as it takes all decisions, including to shut itself down in the event of system failure. By contrast, at Level 3 the coexistence of human driver and automaton is not that straightforward.[56] Although the driver may need to retake control of the vehicle, this would happen only if the system demands it (transition demand). That said, one can easily anticipate that cases will occur where the attribution of guilt will be far from clear. If the system – due to a system malfunction – failed to alert the driver to take control of the vehicle thus causing an accident, who is to be blamed for such an incident? On another note, who is responsible for an accident if the system does notify the driver of the need to take on control of the car manually but the driver does not manage to respond in time? It follows that the attribution of liability can be complicated in the context of Automated Driving Systems, and it will become all the more complex in light of the imminent adoption of the Draft AI Act, which will require human oversight, thus reinforcing the role of human drivers even in cases of Level 3 and Level 4 Automated Driving Systems. In these cases, it seems lawmakers will need to intervene to fill a gap that will not easily be bridged using traditional criminal-law doctrine.

In principle, there are two opposing positions on addressing the emerging gap in criminal liability that mark a wide spectrum of options: On the one hand, one can adopt the view that a certain amount of risk-taking is socially acceptable, for instance when – as in the case of driving automation – it is accompanied by the hope of a long-term benefit of greater traffic safety when AI and not humans drive a car. On the other hand, one could aim to fill the emerging liability gap with criminal provisions targeting those humans or corporations that create, use, or oversee AI systems. While the first approach cuts back criminal law as a regulatory scheme for public traffic, the second path, of increasing accountability, seems to fit better in the overall EU strategy of managing risk by a clear attribution of liability.

When regulating driving-automation-related criminal liability, the lawmaker must balance, on the one hand, the interest of citizens who could become victims of an automated-driving system's malfunction in receiving redress for the harm they have suffered and, on the other hand, the reasonable claim of society at large for technological progress including the benefits that AI

---

55. Chesterman (n 13) 212-13.
56. ibid 217.

systems, and in particular driving automation, can provide. From a criminal justice viewpoint, the key question for the lawmaker is to decide who is to be held criminally liable for a harmful result where many actors have been involved and undertook measures to prevent the risks emerging from Automated Driving Systems.

The wide array of problems regulating criminal liability include aspects related to the demarcation of responsibility, a possible attribution of guilt (based on causality) and its proof, as well as a clear definition of duties of care for humans handing over the steering wheel to vehicles.

Criminal liability for intentional wrongdoing

Criminal liability for intentional wrongdoing when employing or designing Automated Driving Systems seems to be a rather clear case for criminal prosecution: If anyone designs or uses a self-driving car as a weapon or to commit crimes, that person must be held liable. If a human intentionally or knowingly programmes a robot so that it causes harm to a person, the programmer's criminal liability can easily be established on the basis of traditional concepts of attribution and *mens rea*: The programmer commits the criminal act by using the robot – irrespective of its artificial intelligence – as a tool for carrying out the programmer's intention, and does so with the requisite intent or knowledge.[57]

Criminal liability for negligence

A liability gap emerges notably in the area of negligence, as criminal liability for crimes connected to Automated Driving Systems committed with negligence, even recklessness, is difficult to capture based on traditional criminal law doctrine. Indeed, domestic approaches differ considerably when it comes to excluding an attribution of guilt in a situation where, for a particular reason, a chain of events leading to a harm no longer appears to be the 'work' of the original actor, be it because a third actor intervenes ('*novus actus interveniens*') or because the harm at issue is the result of a 'normal' risk of daily life; or when it comes to limiting criminal liability by reducing the duty of care.

Novus actus interveniens. Criminal law theory typically does not consider an actor who causes a harmful result responsible if the careless conduct and the resulting harm are not linked in a way that sustains an attribution of responsibility. One reason for excluding liability in this situation could be the primary attribution of the harmful result to the autonomous act of another – be it a person (such as the car manufacturer, an individual engineer, or even the victim), an AI system as a novel actor, or 'chance' (which is another word for the normal risks inherent in living in our dangerous world).

This is a central issue when different actors cooperate or when a third person autonomously interferes with a causal chain of events and affects the causal link in such a way that a harmful result no longer appears to be the 'work' of one (original) actor. The idea applies in a situation where an assigned driver hands over the steering wheel to another or where the injured victim of a traffic accident – while in the ambulance on the way to the hospital – is ultimately killed by someone else who does not give way to the ambulance. Can that death still be attributed to the driver causing the first accident? In the context of driving automation, one could argue that no causal link can be

---

57. Another case that falls into this category is the so-called Google bomb, which manipulates search results for individual websites.

established for fault in designing or training driving-automation systems if the human driver subsequently also is at fault when harm is inflicted, for instance if upon a request from the system the driver did not take control of the vehicle but instead was engaged in secondary activities (e.g., talking on the phone, watching videos) despite an obligation to be vigilant to system alerts. What matters here is the actual driver's role when using AI systems designed for Level 3 and Level 4 Automated Driving Systems.[58] Countries that have adopted relevant laws appear to retain the default of driver responsability.[59] This is the reason experts see the risk of human drivers becoming a 'legal crumple zone'[60] for cars driving automatedly, i.e., the assignment of overall responsibility for risks materialized and thus misattributing a harm to a human actor who had limited control over the behavior of such vehicle. Also, the limits of attribution in cases where a third person intervenes are far from clear.[61] According to German doctrine, for instance, there is no absolute protection of a merely negligent first actor[62] from attribution of guilt, even if the injury was actually brought about by a third person.[63]

For a lawmaker laying out a strategy for driving automation a clear understanding of who is responsible for what is important. If citizens observe the sudden swerving of a car onto a sidewalk where an elderly person stands, when no human is in the driver's seat they will see this as the action of the car. The question thus might subsequently arise whether there is a need to have specific legislation in place for those who created or used such a vehicle, and whether these persons ought to be included in the chain of attribution or not. As long as vehicles cannot be held criminally responsible, the victim (and society) may face a responsibility gap. Such a responsibility vacuum might cause a precipitous

---

58. For the definition of the levels, see the explanations *supra* in Section II; for explanations on the duties arising from a specific role in driving automation see *infra* IV.2.c.

59. For the debate in Germany see Dominik Schmidt and Christian Schäfer, 'Es ist schuld?!- Strafrechtliche Verantwortlichkeit beim Einsatz autonomer Systeme im Rahmen unternehmerischer Tätigkeiten' [2021] NZWiSt 413, 416; Urban Sandherr, 'Strafrechtliche Fragen des automatisierten Fahrens' (2019) 32(1) Neue Zeitschrift für Verkehrsrecht 1, 2; Frank Jourdan and Helmut Matschi, 'Automatisiertes Fahren, Wie weit kann die Technik den Fahrer ersetzen? Entwickler oder Gesetzgeber, wer gibt die Richtung vor?' (2015) 23(1) Neue Zeitschrift für Verkehrsrecht 26, 28-29. For the debate in France see Marion Lacaze and Julien Walther, 'French Report on Traditional Criminal Law Categories and AI' in Lorenzo Picotti and Beatrice Panattoni (eds), *Traditional Criminal Law Categories and AI: Crisis or Palingenesis?*, vol 94(1) (Revue internationale de droit pénal, MAKLU 2023) 162-65.

60. Madeleine Clare Elish, 'Moral Crumple Zones: Cautionary Tales in Human-Robot Interaction' (2019) 5 Science, Technology and Society 40; *Sabine Gless, '*Strafrechtliche Aspekte der Fahrautomatisierung (Beispiel Parkassistenz) - Wird der Mensch zur Knautschzone für das Auto?' in Hardy Landolt and Manfred Dähler (eds), *Jahrbuch zum Strassenverkehrsrecht* (Dike Verlag AG 2022) 337-58.

61. José Antonio Caro John, *Das erlaubte Kausieren verbotener Taten – Regressverbot* (Nomos 2007); Ingeborg Puppe, 'vor § 13 marginal notes 167-68' in Urs Kindhauser, Ulfrid Neumann, and Hans-Ullrich Paeffgen (eds), *Kommentar Strafgesetzbuch* (4th edn, Nomos 2013); Joshua Dressler, *Understanding Criminal Law* (7th edn, CAP 2015) 190 ('There are no hard and fast rules for rendering the commonsense "community justice" determination of when an intervening cause supersedes the defendant's conduct').

62. As in the case where A negligently leaves a loaded gun in a public place and B grabs the gun and shoots V. On the argument that an intentional act by B should always preclude A's liability for negligence (so-called *Regressverbot*), see Wolfgang Naucke, 'Über das Regressverbot im Strafrecht' (1964) 76 Zeitschrift für die gesamte Strafrechtswissenschaft 409; Wolfgang Frisch, *Tatbestandsmäßiges Verhalten und Zurechnung des Erfolges* (C.F. Müller 2012) 62-63; Claus Roxin, *Strafrecht allgemeiner tell 1: grundlagen. der aufbau der verbrechenslehre* (4th edn, C.H.Beck 2006) 236-37; Caro John (n 61) 55-56; Puppe 'vor § 13 marginal notes 167-68, 236-37' (n 61); Jorg Eisele, 'vor § 13 marginal notes 77, 100-102b' in Adolf Schonke and Horst Schroder (eds), *Strafgesetzbuch. kommentar* (29th edn, C.H. Beck 2014).

63. If A runs over V with his car intending to kill him, but V is only injured and instead dies in the hospital fire set by B, V's death may still not be attributed to A, but the case is much closer than if A was only negligent.

drop in support for robotic inventions. These considerations counsel against generally absolving persons creating or employing AI systems of responsibility for harm caused by the robot.

Socially accepted risk. Another idea feeding into the theory of attribution which could impact criminal liability in the context of driving automation is 'socially accepted risk'.[64] According to the idea of a socially accepted risk, a person is not criminally responsible if the harm at issue is the result of a 'normal' risk of daily life; in such situations the victim is expected to bear the harm without redress. This idea has been developed for various situations in our risk-taking society.[65]

When Automated Driving Systems become part of everyday travel and thus the 'normal' risks of life, as other AI systems have already (e.g., internet search engines), the creators who comply with state-of-the-art[66] and the users who comply with relevant rules will not be criminally liable for generally foreseeable malfunctioning but only for harm incurred due to preventable construction, programming, or operating errors.[67]

Establishing duties of care. Even before this time arrives, however, one might choose to limit criminal liability of operators by defining their duty of care, as is already the case in criminal law in the area of product liability.[68]

But now many new issues arise:[69] Do we need to depart from the conventional tools of product liability, because a new concept of foreseeability and preventability is required? Could we argue that manufacturers take a substantial and unjustifiable risk of causing an injury when they decide to put on public roads a car that makes its own decisions?[70]

---

64. Tatjana Hornle, 'Social Expectation in the Criminal Law: The Reasonable Person in a Comparative Perspective' 11 (2008) New Criminal Law Review 1, 9-10.

65. Cornelius Prittwitz, *Strafrecht und Risiko: Untersuchungen zur Krise von Strafrecht und Kriminalpolitik in der Risikogesellschaft* (Vittorio Klostermann 1993). See also Maria Kaiafa Gbandi, Athina Sachoulidou and Dafni Lima, 'Greek Report on Traditional Criminal Law Categories and AI' in Lorenzo Picotti and Beatrice Panattoni (eds), *Traditional Criminal Law Categories and AI: Crisis or Palingenesis?* vol 94(1) (Revue internationale de droit pénal, MAKLU 2023) 240-41.

66. In relation to Automated Driving Systems of Level 4, it is stated that 'The manufacturer shall define the acceptance criteria from which the validation targets of the ADS are derived to evaluate the residual risk for the ODD taking into account, where available, existing accident data, data on performances from competently and carefully driven manual vehicles and technology state-of-the-art' (Commission Implementing Regulation 2022/1426 (n 7), Annex II, para 7.1.1). Furthermore, Article 8 of the Draft AI Act reads as follows 'High-risk AI systems shall comply with the requirements established in this Chapter, taking into account the generally acknowledged state of the art'.

67. For an application of the idea on driving automation see e.g. Peng Liu, Run Yang and Zhigang Xu, 'How safe

68. Joachim Vogel, 'vor § 15 marginal notes 214 et seq.' in Wilhelm Heinrich Laufhitte, Ruth Rissing-van Saan and Klaus Tiedemann (eds), Leipziger Kommentar Strafgesetzbuch I (12th edn, C.H. Beck 2007); Puppe 'vor § 13 marginal note 157 ' (n 62); Eisele 'vor §§ 13 et seq. marginal note 91' (n 62). An alternative and functionally equivalent solution might be to recognise responsible risk-taking (*erlaubtes Risiko*) as a ground of justification; see the discussion in Roxin (n 63) 382-83; Theodor Lenckner and Detlev Sternberg-Lieben, 'Vor §§ 32 et seq. marginal note 107b' in Adolf Schonke and Horst Schroder (eds), *Strafgesetzbuch. kommentar* (29th edn, C.H. Beck 2014). But it might be difficult to explain to the victim of an out-of-control self-driving car that the harm done to him was justified and that the victim must therefore suffer it without redress.

69. Peter Brautigam and Thomas Klindt, 'Industrie 4.0, das Internet der Dinge und das Recht' (2015) 68(16) Neue Juristische Wochenschrift 1137, 1140; Bryant Walker Smith, 'Proximity-Driven Liability' (2014) 102 Georgetown Law Journal 1777; Stephen S. Wu, 'Product Liability Issues in the U.S. and Associated Risk Management' in Markus Maurer, Christian Gerdes, Barbara Lenz and Hermann Winner (eds), *Autonomes Fahren. Technische, rechtliche und gesellschaftliche Aspekte* (Springer 2015) 572-75.

70. Gless, Silverman and Weigend (n 3) 426-27.

In many civil law jurisdictions, such as German law, an actor is liable for criminal negligence if causation of a relevant harm (e.g., someone's death or injury) can be attributed to the actor, if the actor could have foreseen the harm, and if the actor failed to exercise the due care necessary to avert the foreseeable harm.[71] The general idea behind responsibility for negligence is the actor's failure to pay sufficient attention to the harm he or she may cause to others. Liability is imposed if the actor could reasonably have prevented the harm in question. Where even a diligent person could not anticipate harm is imminent, there is no wrongdoing and hence no punishability.

But are the standards of due attention and due care applicable to humans who interact with AI systems which make decisions their creators and operators cannot foresee in detail? A self-driving car, for example, must interact with an unpredictable and only partly 'smart' environment. Depending on its built-in learning-mode, the AI system will use all stored and incoming information to establish working predictions regarding its dynamic environment. Operators know that AI systems will independently analyse the information they acquire and that they will act autonomously in response to the results of their analyses.

This means that the operator cannot reduce to zero the possibility that AI systems may cause harm to others. This fact suggests two mutually exclusive conclusions as to the operator's liability for negligence. It could be argued the operator cannot be held responsible because the machine is acting 'on its own'; alternatively, it could be claimed that any and all harm that AI systems might cause is foreseeable and the operator therefore should face *de facto* strict liability for the results of the acts of AI systems.

The first line of argument is unconvincing. The fact that AI-systems are generally unpredictable cannot relieve their operators of liability because it is their very unpredictability that gives rise to duties of care. Likewise, if the manager of a zoo releases a tiger from its cage and the tiger kills people on the street, the zoo manager could not successfully argue that tigers are wild animals and therefore cannot be controlled. Since we have seen that robots cannot be held criminally liable, generally exempting their operators from liability would mean, in effect, that no one would be held criminally responsible for the death of a random victim of an errant driverless car.[72] Therefore, people who can foresee that their actions might harm interests protected by criminal law (such as the life and health of other persons) are obliged to refrain from those actions.[73] If the zoo manager can foresee that the tiger, if set free, will harm human beings, he must therefore refrain from releasing the tiger from its cage. The same applies to potentially dangerous products: If the producer of a car could, with appropriate diligence, know that the vehicle's brakes are unreliable in bad weather, the producer violates the duty of care by marketing the car nevertheless.

71. Gunnar Duttge, '§ 15 marginal note 107 et seq.' in Wolfgang Joecks and Klaus Miebach (eds), *Münchener Kommentar zum Strafgesetzbuch* (2nd edn, Mohr Siebeck 2011). For considerations on liability for negligence concerning Intelligent Agents, see Eric Hilgendorf, 'Grundfragen strafrechtlicher Compliance am Beispiel der strafrechtlichen Produkthaftung für teilautonome technische Systeme' in Thomas Rotsch (ed), *Criminal Compliance vor den Aufgaben der Zukunft* (Nomos 2013).
72. For the problems of civil liability, see e.g., John William Terwilleger, 'Navigating the Road Ahead: Florida's Autonomous Vehicle Statute and Its Effect on Liability' (2015) 89(7) Florida Bar Journal 26, 27.
73. Gunnar Duttge '§ 15 marginal note 121 et seq.' (n 71).

New linchpins for potential criminal liability of the various actors involved in the chain of driving automation

In the area of driving automation, the EU has already provided a body of law that sufficiently outlines the obligations of actors involved in designing, developing, and deploying Automated Driving Systems in the common market. On the one hand, the EU has recognised a number of ex-ante and ex-post responsibilities of the manufacturer of an Automated Driving System for maintaining its safety during the lifetime of the system as outlined in Section II above. On the other hand, the role of the human operator in monitoring and overseeing the operation of automated vehicles is expected to be amplified once the Draft AI Act is adopted. New standards of due attention and due care connected to the creation or use of Automated Driving Systems could be built upon these obligations and could feed into standards eatablishing future criminal liability.

Obligations of car manufacturers. According to the EU framework elaborated in Section II, manufacturers must test their Automated Driving Systems extensively before putting them on the market. This obligation can be relevant for criminal liability: If manufacturers fail to adhere to the necessary standards, they may be criminally liable for any harm caused by the product and may be convicted of intentional (if aware of the risk) or negligent bodily injury or homicide.

After putting the automated vehicle on the market, manufacturers bear a number of obligations. Among them is the essential rule that they must closely observe and monitor Automated Driving Systems and react immediately to reports of harmful conduct. If, for example, a newly introduced automated vehicle for unknown reasons has incidents of malfunctioning, the manufacturer will have to examine possible causes. If these incidents cannot be explained by improper handling or interference by third parties, and if the problem cannot be resolved by re-programming the car, the manufacturer will have to take the car off the market. These duties can lead to criminal prosecution if a product causes harm: If the manufacturer fails to comply with the obligation to monitor its vehicles and these harm humans, it can be prosecuted for negligent or even intentional bodily injury or homicide committed by omission.[74]

The reason for criminal product liability is not the unlawful creation of a risk but the mere fact that the manufacturer, in pursuing economic interests, lawfully creates a risk for the general public by releasing an AI-system whose reactions cannot be safely predicted and controlled. The unique feature of this criminal liability concept is the fact that a perfectly legal act – the marketing of an automated or fully automated vehicle in accordance with the current state of knowledge and technology – may trigger criminal liability for omissions. It may be difficult for the car industry to accept this broad ambit of liability. But victims of accidents caused by malfunctioning Automated Driving Systems would find it equally difficult to accept a situation in which, in the absence of a driver, no one is held responsible for the damage caused.

One should indeed beware of giving profit-seeking operators carte blanche for taking inappropriate risks to the life and health of other persons. Yet there may be good reasons for limiting the manufacturer's liability with regard to Level 3 and Level 4 Automated Driving Systems. To the extent that their introduction and promotion is beneficial to society, the risk inherent in marketing a car that cannot be completely controlled needs to be set off against its benefits to society. Whereas it is true that manufacturers of Automated Driving Systems of Level 3 and Level 4 create risks to the

---

74. Sabine Gless, 'Strafrechtliche Produkthaftung' (2013) 2 Recht 54, 60 has called this a 'dormant duty to act', which comes alive whenever reports of harmful incidents appear.

life and health of others, one should not forget that the same is true for the manufacturing and sale of traditional, person-driven cars.

On the contrary, manufacturers who comply with the strict standards envisioned under the EU framework could be deemed to have fulfilled their duty of care, even though they (along with everyone else) know that certain risks remain. The EU legislature knows it, even as it welcomes driving automation, trusting that the use of Level 3 and Level 4 Automated Driving Systems will lead to an overall reduction of accidents and provide the elderly and disabled with equal access to the advantages of personal mobility. It would seem unfair not to limit creators' and the users' of such vehicles (criminal) responsibility for causing harm.

As is well known, criminal product liability raises a multitude of evidentiary issues and these will grow rather than diminish in the area of driving automation, when vehicles rely on various AI-systems and possibly function in a network of various vehicles in a model of connected driving. The European Commission has addressed some of these issues in its Draft AI Act, for instance by establishing a duty to record certain data when using AI systems.[75]

Obligations of users (Human Drivers). European law also sets out obligations for human drivers: In relation to Level 3 Automated Driving Systems, human drivers shall remain sufficiently vigilant to acknowledge transition demands and vehicle warnings, mechanical failure, or emergency vehicles. When it comes to Level 3 and Level 4 Automated Driving Systems, the Draft AI Act requires the natural persons to whom human oversight is assigned: to be enabled to understand the capacities and limitations of the high-risk AI system and be able to duly monitor its operation; to correctly interpret the high-risk AI system's output, taking into account, for example, the interpretation tools and methods available; to decide, in any particular situation, not to use the high-risk AI system or otherwise disregard, override, or reverse the output of the high-risk AI system; to intervene on the operation of the high-risk AI system or interrupt the system through a "stop" button or similar procedure.

If a human driver fails to comply with the duties that arise from using AI systems according to their design and their limits, and for instance does not respond to a takeover request when necessary and the vehicle causes harm to humans, the driver can be prosecuted for negligent or even in-tentional bodily injury or homicide.

Can the EU adopt harmonised rules for criminal liability connected to driving automation?

The desirability of a harmonised EU approach to criminal liability for crimes connected to Automated Driving Systems seems obvious. First, such systems have been developed and used on a cross-border basis: driving automation relies on data from different Member States; companies from various Member States provide technology and services in connection with designing, developing, and deploying such systems in the common market (as product manufacturer, provider, distributor, authorised representative,[76] etc.); the human users of these systems may reside in different Member States; cars constantly cross borders in Europe. Indeed, the cross-border nature of

---

75. Draft AI Act, art 12.
76. In this regard, see Draft AI Act, art 3.

these systems, among other things, led the EU to adopt uniform EU rules on technical standards for Automated Driving Systems – otherwise, these systems could hardly function.[77] This necessarily implies that crimes related to Automated Driving Systems must also manifest a cross-border dimension which would make it difficult for the Member States, acting alone, to tackle them. Therefore, a common stand on criminal liability in situations when a human chooses to turn over operational control to the car is expected to add much value.

Furthermore, as discussed in greater detail in Section II, cars, including automated and fully automated vehicles, are type-approved for the EU market. The requirements that Automated Driving Systems must meet before entering the internal market, the obligations of manufacturers before and after they put them on the market, and the human-AI interaction necessary for automated driving are all detailed by common market rules with, *inter alia*, a view to ensuring the proper functioning of the internal market in the field of driving automation.[78] Disparities in sanction regimes with regard to violation of the relevant EU instruments and a lack of uniform implementation across Member States could undermine the internal market's level playing field by putting operators who strictly comply with EU requirements at a disadvantage, which could, in turn, risk distorting the internal market.

Even more importantly, through the above-mentioned legal instruments the EU has allowed the placing on the market of high-risk AI systems, which may pose significant risks to the health and safety of people in the EU, without addressing who will be responsible when such systems cause damage. It would be, therefore, very welcome – if not necessary – if the legal framework for driving automation were fleshed out with rules on criminal liability. Among other things, regulating criminal liability would contribute to safeguarding legal certainty for both the actors involved in the automated-vehicle industry, on the one hand, and the victims of accidents involving Automated Driving Systems, on the other.

Even if EU-level harmonisation of rules for driving-automation-related criminal liability is desirable, such harmonisation can only occur if specific conditions are met. First, the EU can resort to criminal measures if, and only to the extent that, the Member States have conferred competence on it .[79] Secondly, it can only exercise such competence if EU action is comparatively more efficient to national regulation.[80] In the following sections, we will examine briefly whether these conditions are fulfilled with respect to crimes associated withdriving automation.

---

77. On this topic see Commission, 'Communication on the road to automated mobility: An EU strategy for mobility of the future' COM(2018) 283 final (n 5).

78. See Regulation 2019/2144 (n 7), Recital 1.

79. According to Consolidated Version of the Treaty on European Union [2008] OJ C115/13 (hereinafter: TEU), art 5(2) 'Under the principle of conferral, the Union shall act only within the limits of the competences conferred upon it by the Member States in the Treaties to attain the objectives set out therein. Competences not conferred upon the Union in the Treaties remain with the Member States'.

80. Pursuant to art 5(3) TEU 'Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level'. On this topic, see Irene Wieczorek, *The Legitimacy of EU Criminal Law* (Hart Publishing 2020) 69.

Legal Basis

According to the principle of conferral enshrined in Article 5(2) TEU, the EU may only adopt criminal law measures in relation to specific serious crimes with a cross-border dimension listed in Article 83(1) of the Treaty on the Functioning of the European Union (TFEU) and crimes affecting the implementation of EU policies pursuant to Article 83(2) TFEU.[81]

Starting with Article 83(2) TFEU, the EU may establish minimum rules with regard to the definition of criminal offences and sanctions 'if the approximation proves *essential* to ensure the effective *implementation of a Union policy* in an area which has been *subject to harmonisation measures*' (emphasis added). Under Article 90 TFEU, the EU has competence to establish a common transport policy which consists, *inter alia*, in taking measures to improve transport safety with the objective of reducing fatalities, injuries, and material damage.[82] There can be little or no doubt that establishing minimum rules on offences connected to automated and fully automated vehicles (which belong to the broader category of road-traffic offences) can be perceived as a means to implement Union transport policy;[83] the question therefore rather boils down to (i) whether driving automation is *an area which has been subject to harmonisation measures* and (ii) whether criminal law measures are *essential* to achieve the effective implementation of Union transport policy.[84]

As discussed in Section II, the EU has already established a regulatory framework for driving automation that sets out the minimum technical requirements for automated and fully automatd vehicles (such as testing procedures, cybersecurity requirements, and data-recording rules, as well as safety-performance monitoring and incident reporting for manufacturers). Further harmonisation is expected if the Draft AI Act is adopted. Although one might argue that the area of 'driving automation' is not sufficiently harmonised for the purpose of Article 83(2) TFEU in view of the imminent adoption of the Draft AI Act, most EU criminal law scholars agree that the 'harmonisation requirement' laid down in Article 83(2) TFEU cannot be interpreted to require full harmonisation as a precondition for adopting criminal law measures and that the focus should be on its second requirement: that is, whether EU action is essential to ensure the effectiveness of an EU policy – in this case, that of transport safety.[85]

---

81. Petter Asp, *The Substantive Criminal Law Competence of the EU* (Jure 2013) 134-35; Steve Peers, *EU Justice and Home Affairs Law* (3rd edn, Oxford University Press 2011) 70.

82. Directive (EU) 2015/413 of the European Parliament and of the Council facilitating cross-border exchange of information on road-safety-related traffic offences [2015] OJ L 68/9, Recital 1. According to the EU Road Safety Framework 2021-2030, the Commission decided to focus its road safety policy on preventing deaths and serious injuries (Commission, 'EU Road Safety Policy Framework 2021-2030: Next steps towards 'Vision Zero' (n 4) 11).

83. One could argue that the implementation of Union policy on the internal market should be the underlying EU policy, considering that the sectoral legislation set out in Regulation 2019/2144 and in the Draft AI Act are based on Consolidated version of the Treaty on the Functioning of the European Union [2007] 2008/C 115/01, art 114 to ensure the proper functioning of the internal market. Nevertheless, the link between sectoral legislation in this field and transport policy is evident and has been reaffirmed by Regulation 2019/2144 and the Commission in its staff working document on the 'EU road safety policy framework 2021-2030 – Next steps towards 'Vision Zero' (n 4) 1. To support this argument, Article 2(1) of the Proposal on the protection of the environment through criminal law points out that 'unlawful' means conduct infringing one of the following: (a) Union legislation, which *irrespective of its legal basis* contributes to the pursuit of the objectives of Union policy of protecting the environment as set out in the Treaty on the Functioning of the European Union. This approach could apply *mutatis mutandis* in a potential EU directive harmonising offences and sanctions related to automated vehicles (Proposal for a Directive of the European Parliament and of the Council on the protection of the environment through criminal law and replacing Directive 2008/99/EC, COM/2021/851 final).

84. Valsamis Mitsilegas, *European Criminal Law* (Bloomsbury Publishing 2022) 118.

85. For a narrow interpretation, see Jacob Öberg, *Limits to EU powers* (Hart Publishing 2017) 314-6; for a broader interpretation, see Asp (n 81) 134-35; Peers (n 81) 775-76; Mitsilegas (n 84) 118-19.

According to the Commission's Communication 'Towards an EU Criminal Policy: Ensuring the effective implementation of EU policies through criminal law',[86] when assessing the essentiality of criminalisation, factors that should be considered include, *inter alia*: (a) the seriousness and character of the breach of law; (b) the need to stress strong disapproval in order to ensure deterrence; and the efficiency of the sanction system being enforced as well as the extent to which, and (c) the reasons why, existing sanctions do not achieve the desired level of enforcement. It is true that several instruments have been adopted in the field of transport safety, many of which provide for administrative sanctions.[87] Nevertheless, one cannot ignore that the EU just embarked upon establishing rules for driving automation as well as creating a dedicated regime addressing AI-systems liability.[88] On the one hand, the Vehicle General Safety Regulation as revised by Regulation 2019/2144 requires the Member States to have effective, proportionate, and dissuasive penalties for infringements by economic operators and technical services of obligations set out therein with respect to Automated Driving Systems.[89] On the other hand, with regard to civil liability, the Commission recently proposed revisions to the PLD to make sure it applies to driving automation. In contrast, the proposal on non-contractual civil liability rules on artificial intelligence seems to leave transport out of its scope. One could infer the Commission's reluctance to address comprehensively the liability regime related to road-traffic offences. One could, therefore, argue that the EU should first implement administrative and/or civil liability measures in the context of Automated Driving Systems and if these prove to be inefficient, then consider establishing rules on criminal liability.

The fallacy of that argument, however, ignores the gravity of the harm that can arise out of certain unlawful acts, for which an administrative sanction or the imposition of a civil liability regime cannot be a sufficiently strong response.[90] For such acts, the effective implementation of a union policy would be jeopardised if the EU were to establish criminal liability only after administrative sanctions and/or civil liability were found to be an insufficient deterrent. For such cases, criminal law measures should be considered essential without the need to first prove that such 'other measures' are ineffective. The use of vehicles that do not comply with mandatory road safety rules poses a significant threat to public safety. According to the 2018 global status report on road safety of the World Health Organization, road-traffic injuries were the leading cause of death for children and young adults aged 5–29 years, and the eighth leading cause of death for all age groups.[91] Therefore the dangerousness of cars – some already qualify cars as dangerous instruments, as

---

86. Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Towards an EU Criminal Policy: Ensuring the effective implementation of EU policies through criminal law, COM(2011) 573 final.

87. On this topic, see more on the European Commission's website: <https://road-safety.transport.ec.europa.eu/eu-road-safety-policy/what-we-do/eu-road-safety-legislation_en> accessed 18 October 2023.

88. On the liability regime relating to driving automation, see Section II.

89. Regulation 2019/2144 (n 7), Recital 2 'The administrative provisions of Regulation 2018/858, including the *provisions on corrective measures and penalties*, are fully applicable to this Regulation' (emphasis added). Regulation 2018/858 (n 20), art 84(1) reads as follows: 'Member States shall lay down *the rules on penalties applicable to infringements* by economic operators and technical services of this Regulation and shall take all measures necessary to ensure that they are implemented. *The penalties provided for shall be effective, proportionate and dissuasive.* In particular, those penalties shall be proportionate to the seriousness of the non-compliance and to the number of non-compliant vehicles, systems, components or separate technical units made available on the market of the Member State concerned' (emphasis added).

90. Commission, 'Communication Towards an EU Criminal Policy: Ensuring the effective implementation of EU policies through criminal law' (n 86) 11.

91. World Health Organization, 'Global status report on road safety' (World Health Organization 2018).

weapons to commit crimes, or even weapons of terror[92] – and the increased number of road-traffic incidents could militate in favour of establishing criminal law measures even before testing the effectiveness of administrative sanctions.[93]

Subsidiarity of EU Action

Assuming that there is EU-level competence to establish criminal liability for acts or omissions related to driving automation, the second question that must be addressed is whether regulating such criminal liability is compatible with the principle of subsidiarity. The principle maintains that EU action is only justified when the proposed action cannot be sufficiently achieved by Member States but would rather by reason of scale or effects be better achieved at Union level.[94] The subsidiarity principle safeguards the optimal division of competences between the EU and its Member States by preventing the adoption of criminal measures at EU level that excessively interfere with state sovereignty.[95]

In the area of transport safety, the principle of subsidiarity has been of particular importance, as illustrated in Recommendation 2000/115/EC on the maximum level of alcohol consumption.[96]

92. Andrei Poama, 'Dangerous instruments? Constructing Risk and Culpable Drivers through the Criminalization of Negligence' (2012) 52(5) British Journal of Criminology 932; Sarah S. Lochlann Jain, 'Dangerous Instrumentality: The Bystander as Subject in Automobility' (2004) 19(1) Cultural Anthropology 61.

93. Even if the conditions laid down in TFEU, art 83(2) are not met, this does not exclude that the EU has the needed competence to regulate criminal liability related to driving automation. Art 83(1) TFEU enables the EU to establish minimum rules concerning the definition of criminal offences and sanctions by way of directives in relation to specific serious crimes with cross-border dimension listed in Article 83(1) TFEU. Crimes connected to Automated Driving Systems are not – yet – listed in art 83(1), so a Council decision would be necessary to extend the 'Euro crimes' to these crimes, provided that the two cumulative criteria that trigger the EU's legal harmonisation competence are met: (i) the crimes must be particularly serious; and (ii) there must be a cross-border dimension, resulting from the nature or impact of such offences, or from a special need to combat them on a common basis. Offences related to driving automation could fulfil those two criteria, but the ultimate decision to expand the scope of Euro crimes is a policy choice made by the Member States. Whereas since the adoption of the Lisbon Treaty such expansion was not discussed at EU level, more recently the case of violation of EU restrictive measures lead to the use of art 83(1) as a legal basis. In December 2022, the Council adopted a decision to add the violation of restrictive measures to the list of 'euro-crimes', thus showing its appetite to expand the list of Euro crimes – even in cases where theoretically the legal basis of art 83(2) TFEU could be employed since the approximation of criminal laws in relation to the violation of Union restrictive measures could contribute to ensuring the effective implementation of the Union's policy thereon (Council Decision (EU) 2022/2332 of 28 November 2022 on identifying the violation of Union restrictive measures as an area of crime that meets the criteria specified in Article 83(1) of the Treaty on the Functioning of the European Union [2022] OJ L 308/18 states that 'The violation of Union restrictive measures should be identified as an area of crime in order to ensure the *effective implementation of the Union's policy on restrictive measures*' (emphasis added)).

94. TEU, art 5(3). On this topic, see Wieczorek (n 80) 69.

95. Jannemieke W. Ouwerkerk, 'Old wine in a new bottle: Shaping the foundations of EU criminal law through the concept of legal interests (Rechtsgüter)' (2022) 27(4-6) European Law Journal 1, 5.

96. 'In 1988, the Commission brought forward a proposal for a Directive on harmonised BAC levels, the aim of which was to set a maximum BAC limit of 0,5 mg/ml throughout the Community. *This proposal was not adopted because of the objections of some Member States on the grounds of subsidiarity*…The Commission considers that both national and European action to reduce inappropriate drinking and driving within the EU is best served by a more harmonised regime of legal maximum BAC limits. This will provide a clearer and more consistent driving is a dangerous activity wherever they are driving in the EU. *However it accepts that there are long standing national political objections on the grounds of subsidiarity to such a measure*, and therefore does not intend to renew the original proposal for a Directive in line with the commitment made in the Communication on road safety priorities' (Commission Decision of 24 November 1999 relating to the definitions of the characteristics, the list of agricultural products, the exceptions to the definitions and the regions and districts regarding the surveys on the structure of agricultural holdings (notified under document number C(1999) 3875) [1999] OJ L 038 (no longer in force) (emphasis added)).

Although the Commission originally proposed a directive to establish EU-wide rules on maximum blood alcohol content (BAC) levels,[97] it abandoned that effort due to subsidiarity concerns expressed by some Member States, and instead made Recommendation 2000/115/EC. A further example that demonstrates the sensitivity in this area is the concept of road-traffic offences. Although the Commission expressed its desire to explore the need for criminal law measures in the field of transport safety in its 2011 Communication 'Towards an EU Criminal Policy', the EU has continued to shy away from harmonising liability rules for road-traffic offences attributed to a driver's behaviour (e.g., speeding and drunk-driving). Admittedly, traffic rules (such as speed limits, other traffic restrictions, and acceptable BAC levels) reflect certain societal efforts to balance public safety and mobility interests, which may explain why the EU is reluctant to proceed with their harmonisation, much less the harmonisation of criminal sanctions in the event of their infringement. One could also argue that the lack of harmonisation in the field of transport safety may be due to the inextricable link between road-traffic offences – irrespective of the use of AI – and classic crimes against life and physical integrity, such as homicide and other forms of bodily injury, the regulation of which generally falls within the competence of Member States.[98]

Nevertheless, particularly in relation to crimes connected to driving automation, there are convincing reasons militating in favour of the EU being better placed to step in to adopt criminal measures, such as the strong cross-border dimension of crimes involving automated and fully automated vehicles and the risk of distortion to the internal market in the absence of harmonised criminal law rules.[99] Compared to cars involving no driving automation, the potential distorting effect on the internal market is much stronger in the case of Automated Driving Systems for the reasons already elaborated in Section IV.1. Moreover, unlike the driver's behaviour (such as respecting speed limits, other traffic restrictions, and acceptable BAC levels) – which is regulated at Member States level only – driving automation is already subject to EU harmonisation,[100] and

---

97. Commission Regulation (EC) No 707/98 of 30 March 1998 amending Regulation (EEC) No 3846/87 establishing an agricultural product nomenclature for export refunds [1998] OJ L 98/11 (no longer in force). See, also, Manuel Kellerbauer, Marcus Klamert and Jonathan Tomkin (eds), *The EU Treaties and the Charter of Fundamental Rights: A Commentary* (OUP 2019) 945.

98. On this topic, see Ouwerkerk (n 95) 9, who comments that 'The acceptance of life and physical integrity as legal interests that are worthy of protection through EU criminal law would, after all, raise the challenging question whether classical crimes against life and physical integrity (such as murder, manslaughter and rape) could also be held as types of crime in which the EU potentially could be given competences'.

99. In accordance with the Edinburgh guidelines (European Council, 'Conclusions adopted at Edinburgh European Council, Annex 1 to Part A: Overall Approach to the Application by the Council of the Subsidiarity Principle and Article 3b of the Treaty on European Union' (11-12 December, European Council 1992) – which offer some insight into the aspects that should be looked at in relation to subsidiarity – the cross-border dimension of crimes comprises one of the three criteria that the EU should consider to decide whether there is a need for EU action. In addition to the cross-border criterion (a), the EU should take into account, whether actions by Member States alone or lack of EU action conflict with the requirements of the Treaty (b), and the clear benefits criterion (c). To assess whether EU action has clear benefits over national action the following aspects should be considered: the effect or scale of the operation, the frontier problems, the cost of inaction, the lack of capacity at national level and the protection of the internal market. On this topic see Sanne Buisman, 'The Future of EU Substantive Criminal Law. Towards a Uniform Set of Criminalisation Principles at the EU level' (2022) 30 European Journal of Crime, Criminal Law and Criminal Justice 181; Öberg (n 85) 135. Suffice it to remind that the Commission relied the subsidiarity of the Environmental Crime Proposal *inter alia* on the cross-border dimension and effects of criminal activities related to the environment, and the distortion of internal market due to the disparities in sanction regimes (Proposal on the protection of the environment through criminal law (n 83) 3.

100. Indeed, unlike offences involving traditional vehicles, the EU has already harmonised – or it is in the process of harmonising – the underlying field of driving automation establishing rules on the development of automated and fully automated vehicles and their placing into the market.

thereby raises far fewer subsidiarity concerns. Finally, establishing criminal law rules on crimes connected to driving automation which can affect the fundamental interests of life and physical integrity is in line with the normative agenda the EU seems to have pursued in recent years in order to endorse EU values it deems of high importance (e.g., hate crime and hate speech,[101] gender-based violence[102]).[103]

What lies on the road ahead?

The legal challenges resulting from cars steering themselves must be considered by lawmakers when embracing driving automation, including the option of tailoring criminal liability to the new situation.

Whether common European minimum standards or independent domestic rules will govern criminal liability is not an easy question to answer, as this raises various legal concerns ranging from whether the EU has the competence to establish such rules to their compatibility with the national legal traditions of Member States and their criminal justice and mobility needs. The political decisions to be taken are nevertheless similar everywhere. Especially with regard to a socially acceptable risk and a definition of duties of care, it seems that society must answer the question whether technological development promising benefits should be rewarded with an exemption from criminal liability for some of the risks involved – and what duty of care is imposed on those who want to employ the new technology. It seems with regard to driving automation and the use of AI overall that the EU is on its way to sharing not only the regulation on type approval[104] but also values that underpin the employment of AI in their area of freedom, security, and justice.[105]

As is often the case, however, the devil might be in the detail: A one-size-fits-all approach, even when it is loosely knitted, might look too tight for some who want domestic lawmakers to provide concepts tailored to local traditions and needs. One should keep in mind not only that in the EU cars cross borders on a daily basis in huge numbers, but also that domestic legislators might find it difficult to solve all legal issues in a timely manner whenever new technology creates an accountability gap. Therefore, in particular for jurisdictional issues, definitions of duties of care and possible exceptions from criminal liability cannot be dealt with by domestic rules only.

If no adequate regulatory framework is established, users of driving automation in the EU risk a human moral crumple zone as depicted above,[106] the danger that responsibility for an action may be misattributed to a human actor who had limited control over the behavior of such a vehicle. Madeleine Elish pointed out some years ago that, just as the crumple zone in a car is designed to

---

101 European Commission, 'Communication from the Commission to the European Parliament and the Council, 'A more inclusive and protective Europe: extending the list of EU crimes to hate speech and hate crime' [2021] COM(2021) 777 final.

102. Proposal for a Directive of the European Parliament and of the Council on combating violence against women and domestic violence COM/2022/105 final.

103. Irene Wieczorek, 'The emerging role of the EU as a primary normative actor in the EU Area of Criminal Justice' (2021) 27 European Law Journal 378, 391. In a similar vein, Guild and Mitsilegas advocate in favour of introducing criminal offences for failure to rescue at sea, as such criminalisation is essential for the effective implementation of the Union's transport policy (Elspeth Guild and Valsamis Mitsilegas, 'Taking the normative foundations of EU criminal law seriously: The legal duty of the EU to criminalise failure to rescue at sea' (2021) 27 European Law Journal 502, 503-4.

104. Regulation 2019/2144 (n 7).

105. Independent High-Level Expert Group on AI set up by the European Commission, 'Ethics Guidelines for Trustworthy Artificial Intelligence' (European Commission, Brussels, 8 April 2019).

106. See Section III.2.a.

absorb the force of impact in a crash, the human in a highly complex and automated system may become simply a component – accidentally or intentionally – that bears the brunt of the moral and legal responsibilities when the overall system malfunctions.[107]

The challenge is to strike a fair balance between the interest in promoting innovation and the dangers associated with the use of AI systems. One factor to be considered in the balancing process is the social benefit in relation to a potential for harm.[108] Establishing such rules will not be an easy exercise for the EU, as so far 'negligence' is considered a grey area at the European level. The path is nevertheless set, with the EU regulating the technology used for driving automation.

The EU is well advised to be cautious when regulating liability arising out of negligent conduct or omission, as one might question the compatibility of such legislation with Article 67(1) TFEU which demands 'respect for the legal systems and traditions of the Member States'.[109] In the long run, Europe needs not only technological innovation and vision, but corresponding legal innovation and vision if it wants to master the digital age. Up to now its regulation of the field has served it well.

Declaration of conflicting interests

Funding

is safe enough for self-driving vehicles?' (2019) 39(2) Risk Analysis 315.

107. Elish (n 60).
108. Cornelius Prittwitz, *Strafrecht und Risiko*: *Untersuchungen zur Krise von Strafrecht und Kriminalpolitik in der Risikogesellschaft* (Klostermann 1993) 297-98; Christian von Bar, 'Die Grenzen der Haftung des Produzenten' in Manfred Lieb (ed), *Produktverantwortung und Risikoakzeptanz* (1998) 40-41.
109. TEU, art 4(2) states that 'The Union shall respect the equality of Member States before the Treaties as well as their *national identities*, inherent in their fundamental structures, political and constitutional, inclusive of regional and local self-government', while TFEU, art 67(1) provides that 'The Union shall constitute an area of freedom, security and justice with respect for fundamental rights and the *different legal systems and traditions* of the Member States' (emphasis added).