

ARTICLES

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Product liability for autonomous vehicles¹

Is product liability law of today as harmonised by EC Directive 85/374/EEC suitable for the specific risks posed by autonomous vehicles? Are these risks (better) covered by other liability or compensation mechanisms? A brief snapshot of key arguments highlights the necessity of looking at the bigger picture.

Key words: traffic accidents, product liability, motor insurance, autonomous vehicles

A. Liability for traditional vehicles in general

Before turning to the specific aspects of product liability for autonomous vehicles, I would like to start by briefly looking at the big picture first: Where and how does this fit into the overall distribution of the risks of motorized traffic? The answer thereto necessarily predetermines whether and to what extent product liability as it stands still manages to meet the needs of future traffic risks or requires adjustments.

The primary focus of the law of delict lies on the driver and her conduct when using the car – after all, fault liability is the historic core of all tort law systems. The ultimate decision whether and to what extent she may be held liable, though, also depends upon the degree of impact of other potential causes of the harm, starting with the victim herself, or of third parties. Furthermore, unavoidable external causes (commonly referred to as acts of God) or flawed conduct attributable to the State, for example with respect to road maintenance or traffic control, also come into play

1. This paper is based upon a presentation given at a conference on 'Civil Liability and New Technologies' at the University of Gdańsk (Poland) on 10 October 2019, which in turn built upon prior research: see Bernhard A. Koch, 'Product Liability 2.0 – Mere Update or New Version?' in Sebastian Lohsse, Reiner Schulze and Dirk Staudenmayr (eds), *Liability for Artificial Intelligence and the Internet of Things* (2019) 99. The manuscript of the Gdańsk presentation was complemented with some footnotes but otherwise mostly left unchanged. Internet references in the following were last accessed on 20 December 2019. The author wishes to express his gratitude to Ewa Bagińska for organizing this conference and for inviting him as a speaker.

as alternative or concurring potential causes of an accident, which may lead to liability of another party or at least impact the victim's claim for compensation.

An alternative route to compensation was chosen by many (but not all) jurisdictions already in the wake of the Industrial Revolution by shifting the focus from the driver's behaviour to the control of the object whose inherent risks materialized. Strict keeper's liability was in essence also a response to the challenges of modern technology at the time and seems to have worked more or less fine ever since, particularly in light of a compulsory liability insurance regime often coupled with it.² The latter in particular has to be kept in mind when assessing the distribution of the risks of motorized traffic as a whole: at least within the EU in light of its elaborate system shaped by the Motor Insurance Directive³ and its predecessors, the primary victims of traffic accidents benefit from a fairly well functioning system of (at least partial) indemnification via the liability insurers of the vehicles involved.

B. Product liability for traditional vehicles in particular

1. Product liability in general

The second half of the 20th century in particular brought about a third strand of liability co-existing with both more traditional paths towards compensation, now shifting the focus yet again from those using or controlling the vehicle to its producer, requiring, however, (at least in theory) that it was distributed with some sort of inherent vice. For reasons we shall return to shortly, liability is attached to the manufacturer for putting a defective product into circulation. Sometimes, the defect can be traced back to a component built into the final car, which may justify direct claims against the supplier of that flawed part.

While European jurisdictions had already developed at least some variations of liability (be it in tort or in contract) to indemnify victims of defective products before,⁴ the 1985 Product Liability Directive (PLD)⁵ aimed at harmonizing these national variations, though not necessarily as successfully as hoped for initially.⁶

2. See also the contributions to Wolfgang Ernst (ed), *The Development of Traffic Liability* (2010).

3. Directive 2009/103/EC of the European Parliament and the Council of 16 September 2009 relating to insurance against civil liability in respect of the use of motor vehicles, and the enforcement of the obligation to ensure against such liability [2009] Official Journal (OJ) L 263/11.

4. See, eg, Piotr Machnikowski, 'Conclusions', in: Piotr Machnikowski (ed), *European Product Liability* (2016) 669, 670 f.

5. Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products [1985] OJ L 210/29, as amended by Directive 1999/34/EC of the European Parliament and of the Council of 10 May 1999 [1999] OJ L 141/20.

6. Even the most recent (fifth) Commission report on the PLD voices serious doubts 'that the Directive is perfect': COM(2018) 246 final, 8. See also Machnikowski (fn 3) 679 ff.

While the PLD channelled liability primarily onto the manufacturer of the finished product,⁷ it also took care of the other players already mentioned by providing for a co-existence of the liability theories already addressed.⁸

2. Product liability for digital products or components in particular

As time went on and technology progressed, one key question became more and more challenging, though, ie how producers of digital components fit into this overall picture.⁹ It is still today not entirely clear how these contributors to the final product have to be dealt with since their output is not tangible, but digital.¹⁰ This applies not only for software developers, but increasingly for those contributing other digital content such as pre-installed maps for navigation etc.

However, as mentioned before, the PLD made clear that the prime addressee in case a product is defective is the one who put it into its final state before distributing it, and for that claim it does not matter whether the component that rendered it defective was digital or tangible. As long as the manufacturer who puts its star or other insignia on the vehicle is still solvent, the victim herself will typically not pursue claims against the supplier of car parts anyway. The viability of direct claims against developers of digital components will therefore not be tested before the car manufacturer who indemnified the victims of an accident seeks recourse, and this will typically be governed by contractual relationships in the supply chain.

C. Product liability for autonomous vehicles

1. Setting the scene

Now how is all that still suitable today and – more importantly – tomorrow? Sooner or later we will see truly autonomous vehicles on our roads.¹¹ Is tort law of today in general and product liability in particular suitable for such new technology?

Here, the scenario clearly gets more complex, as more players will necessarily have to be considered.

7. See, eg, the Explanatory memorandum on the proposal for a Council Directive relating to the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products, Bulletin of the European Communities, Supplement 11/76, 14.

8. For example, art 8 PLD deals with the concurrence of a product defect and some third-party influence (para 1) as well as contributory conduct of the victim (para 2), and art 13 PLD underlines that the PLD 'shall not affect any rights which an injured person may have according to the rules of the law of contractual or non-contractual liability ...'.

9. See also the Fifth Commission Report (fn 5) 1: '2018 is not 1985. The EU and its rules on product safety have evolved, as have the economy and technologies. Many products available today have characteristics that were considered science fiction in the 1980s. The challenges we are facing now and even more acutely in the future — to name but a few — relate to digitisation, the Internet of Things, artificial intelligence and cybersecurity.'

10. Bernhard A Koch, 'Produkthaftung für Daten' in Francesco Schurr and Manfred Umlauf (eds), *Festschrift für Bernhard Eccher* (2017) 551.

11. On the various levels of automation, see, eg, <<https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety>>.

Apart from the ones already mentioned, other vehicles in traffic will either directly or indirectly communicate with the autonomous car that caused the harm, as will traffic systems going beyond GPS data, providing further input to the functioning of the car. The keeper may have to sign up for some backend services, either provided by the manufacturer herself or by some third party, which will not only transmit further input, but also receive data from the car in return. A significant portion of all that interaction will be done online, and the providers of these means of communication themselves will play a significant role in the overall functioning of future traffic.

In addition, updates and further input from those who originally contributed to the final product may be installed through such backend services provided by the car manufacturer or go directly to the car, thereby bypassing the producer, but either way added after the car was originally put into circulation, which is the PLD's magic moment.

But also the State may play a more important role in the overall assessment as it will probably contribute more substantially to the actual functioning of an autonomous traffic system, for example by providing infrastructure that will directly or indirectly communicate with the vehicles such as traffic lights that send out data to the cars in the vicinity of a crossing.¹²

Does this increase in complexity (which in part is already the reality, though not necessarily in motorized traffic) require a new look at the role or even the details of product liability as harmonized in 1985?¹³

2. Key elements of product liability

In order to find an answer to that question, we must first reduce our focus again to the manufacturing process.

a) Compensable loss

If we go through the catalogue of requirements for product liability, the first question is of course whether the victim has suffered some harm that is deemed recoverable under the PLD regime. Whether a reform of the directive will finally get rid of the 500 Euro threshold,¹⁴ or whether certain property losses remain excluded from the directive's scope,¹⁵ are questions whose answers do not necessarily depend upon the technology we are looking at here.

We should at least keep in mind, though, the peculiar problems with what in German is referred to as 'Weiterfresserschäden', ie damage caused to the product itself by one of its components.¹⁶ While art 9 lit b PLD makes it clear that the owner of an autonomous car will not be able to sue its

12. See <<https://www.eng.ufl.edu/newengineer/research-innovation/a-smart-city-where-self-driving-cars-traffic-lights-pedestrians-and-cyclists-all-talk-to-one-another/>>, but see also <<http://senseable.mit.edu/light-traffic/>>.

13. For the Commission at least, this is a rhetorical question to be answered in the affirmative: see the Fifth Commission Report (fn 5) 8 ff. This is not necessarily true for the Product Liability Formation of the Expert Group on Liability for New Technologies which was inter alia installed by the Commission to assess the need for updating the PLD; see <<https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail&groupID=3592>>.

14. See, eg, the Fourth Commission Report on the PLD, COM(2011) 547 final, 9 f.

15. Art 9 lit b PLD.

16. Cf Koch (fn *) 104.

(final) manufacturer if some of the vehicle's hardware is ruined because of flawed pre-installed software, this does not preclude a direct claim against the latter's developer (but – again – subject to the recognition of digital products as falling within the directive's scope).

More importantly, damage to data will become more relevant in the future, particularly if two vehicles driven by data collide, but it is at least not self-explanatory that data are 'items of property' as required by art 9 lit b PLD.

b) Product

When it comes to the notion of a product, it can easily be applied to autonomous vehicles as well, of course, as these are undoubtedly tangible movables. As mentioned before, however, doubts remain with respect to individual (purely) digital components thereof that may lead to a direct liability of their producer if flawed. These doubts should be resolved once and for all – in a Digital Single Market, it is unbearable to be left in the dark whether the PLD extends to digital products or not. Even if the clarification thereof should be in the negative, 'damage caused by defective digital content should trigger the producer's liability because digital content fulfils many of the functions tangible movable items used to fulfil when the PLD was drafted and passed'.¹⁷

c) Liable persons

The key person in the product liability game is obviously the manufacturer of the finished product. In our scenario here, this would clearly be whoever markets the car as such, so presumably most car manufacturers currently on the market with traditional vehicles, plus some more (such as Waymo), perhaps some less.

Those providing (hardware) components to autonomous vehicles can easily be dealt with by the existing approach – already now, companies providing the steering wheel or other integral parts of the final car are deemed secondary producers.

As already indicated, it gets more tricky when it comes to those contributing digital input into the final product, ie software developers or those producing other digital content. I personally think that these already now fall within the scope of Art 3 para 1 PLD.¹⁸ However, this is open to debate¹⁹ and therefore yet another reason why the PLD should be amended to provide answers to such pressing questions of modern-day economy, which undoubtedly changed over the past 35 years.

17. Final report of the New Technologies Formation of the aforementioned (fn 12) EU Expert Group on Liability for New Technologies, *Liability for Artificial Intelligence and Other Emerging Digital Technologies* (2019, <<https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeetingDoc&docid=36608>>) 43.

18. Koch (fn 9) 560 ff.

19. Also in favour of extending the notion of a product to software: Andreas Günther, *Produkthaftung für Informationsgüter* (2001) 668–677; Gerald Spindler, 'Haftung im IT-Bereich' in Egon Lorenz (ed), *Karlsruher Forum 2010: Haftung und Versicherung im IT-Bereich* (2011) 41–43; Jürgen Taeger, *Außervertragliche Haftung für fehlerhafte Computerprogramme* (1995) 108–169; Gerhard Wagner, 'Produkthaftung für autonome Systeme', (2017) 217 AcP 707, 717–718. See also the final report of the New Technologies Formation (fn 16) 42 ff.

d) Defect

Let us turn to the next question, the notion of a defect under the PLD. The key question is of course what kind of and what degree of safety we are entitled to expect.²⁰ After all, those using modern technology already today presumably do not even expect their new gadgets to operate flawlessly any more – when buying a computer or a mobile phone, we are aware of patch days and continuous updating of the embedded or pre-installed software. Whether and – if so – to what extent this impacts upon the notion of ‘safety which a person is entitled to expect’ within the meaning of art 5 PLD yet has to be determined, ultimately by the CJEU. However, the formulas used by courts today could presumably still be suitable to tackle that problem tomorrow, were it not for the tricky question whether new products which are meant to develop their own decision-making process and to adapt to future problems independently have to be treated differently. The problem is that upcoming technology such as autonomous driving will increasingly rely upon artificial intelligence which is meant to have a mind of its own (hopefully only figuratively speaking), therefore it is predictable that it will be unpredictable.²¹ Is the safety to be expected of a self-driving car that it will always make the right decision, even if the answer to the question what is right will be determined ex post by a judge, whereas the actual decision will be determined ex ante by a machine which we programmed to choose its conduct according to algorithms and previously accumulated data? Still, I would assume we can agree that the minimum safety to be expected of an autonomous vehicle is that we as participants in traffic, whether inside the car as passengers or on the street as pedestrians or in other vehicles, expect it to behave in a manner that will prevent accidents to the extent technically feasible.

e) Burden of proof

One of the biggest challenges, however, with product liability in the digital age lies in proving the defect as a cause of harm. The operation of the product is no longer predominantly determined by its inherent features given to it by its manufacturer, but depends heavily on the interaction with others. The cars of the future will rely upon data constantly fed into its system, data coming from road infrastructure, GPS services, and probably also from other cars.

In addition, the afore-mentioned problems of continuous updating, often by those contributing to the original product, but subsequently bypassing the manufacturer by delivering updates directly to the user, make it very hard to determine what actually caused the harm. Even if it can be allocated somewhere within the operation of the vehicle, it often remains unclear whether it was really a problem inherent within the product already since it was put into circulation.

A reflex response by some is to call for a reversal of the burden of proving the defect in product liability, but this would effectively be nothing less than reallocating the overall risk in disguise. One should also bear in mind that with automated vehicles in particular, it is highly likely that these

20. Cf, eg, CJEU 5.3.2015 Joined Cases C-503/13 and C-504/13, *Boston Scientific Medizintechnik GmbH v AOK Sachsen-Anhalt and Betriebskrankenkasse RWE*, ECLI:EU:C:2015:148: ‘The safety which the public at large is entitled to expect, in accordance with that provision, must therefore be assessed by taking into account, inter alia, the intended purpose, the objective characteristics and properties of the product in question and the specific requirements of the group of users for whom the product is intended.’ [para 38].

21. Cf Google, *Perspectives on Issues in AI Governance*, <<https://ai.google/static/documents/perspectives-on-issues-in-ai-governance.pdf>>, 16, admitting that ‘it is hard to predict all possible AI system behaviors and downstream effects ahead of time’.

will be equipped with event logging or recording systems (so-called black boxes) which may put better data about the actual cause of a collision into the hands of the keeper than before.²²

3. Reasons for allocating the loss

We therefore have to look at the reasons for allocating the loss in search for a solution, first by focusing just on the two main players at first sight, the manufacturer of the autonomous vehicle as the potential target of product liability and its keeper as the person typically liable under classic strict liability for (in this case:) cars.

As often argued in support of product liability, the manufacturer is the one who is (or should be) in control of the defect. It is her who should prevent it or at least properly inform the users of the risks coming with the product. However, a key feature of product liability (at least as envisaged by the PLD) is that the producer gives up control of her output when putting it into circulation, which is why according to traditional understanding she should be shielded from claims based on changes thereafter. At least at the time of the accident, it is instead the keeper who is (or should be) in control of the vehicle itself. Still, if one potential cause of the accident may have been a product defect, it is again the producer who at least should have better access to the facts helping to prove (or disprove) such defect. While the afore-mentioned log files and black boxes seem to improve the position of the keeper in this respect, it is ultimately the producer who remains best suited to interpret the logs. On the other hand, it is the keeper who is the one who benefits from the use of the vehicle at the time of the accident, which is a key argument often raised in support of holding the keeper strictly liable for the risks coming with such benefits.

Another topos frequently raised in allocating risks is loss spreading, and at least with conventional products, it is the producer who can insure against the risks of product defects and pass on the premia onto the buyers via the price mechanism. However, when it comes to motor vehicles, this otherwise valid argument is weaker in light of the motor insurance regime.

Whatever the outcome of this analysis may be, the overall balance may be shifted if the traditional notion of car ownership is more and more being replaced by some collective car sharing system. This may be even more true if it is the manufacturer herself that operates a fleet of her vehicles and thereby no longer distributes her products per se, but Mobility as a Service instead.

There are other factors such as how we can foresee incentives for manufacturers for producing flawless products or the like, but I only wanted to point out at this stage that the answer to identifying the best defendant for the victim of an autonomous car is not self-evident at first sight.

4. Potential alternative addressees of liability

As mentioned before, the focus on just the manufacturer and the keeper alone will necessarily be too narrow, as there are other players we need to keep an eye on, starting with those producers of digital information that continue to provide the vehicle with new data after it was put into circulation.²³

22. Cf the final report of the New Technologies Formation (fn 16) 47 f, 49 ff.

23. Compensation for harm caused by flawed data that was pre-installed in the vehicle before it was put into circulation will typically be sought from the producer of the vehicle; see supra B.2. However, once the car enters

Similarly, those connecting the vehicle with further data, if only in support of its continuous operation, also come into play as additional ‘producers’, even though the borderline to the provision of services may be tricky to draw.

If we group potential players in this overview, we may identify some of them as belonging to the manufacturer’s sphere, at least originally. Only those within that group may be defendants under a regime of product liability at all, and at least initially the manufacturer of the final product may still be the one onto whom that variant of liability may be channelled best, notwithstanding the restrictions of the PLD as it stands.

However, there are other groups of players discernible, for example the one with the keeper of the car in its centre and possibly some other person making current use of the vehicle as granted by the keeper, even though the latter will probably be the prime addressee of claims in times when the influence of the person in the car on the operation of the vehicle declines.

But the third group of remaining players is also impressively big, although presumably more diverse: unlike the manufacturer’s or the keeper’s sphere, there is no obvious single prime target. The connecting element in this third group is perhaps the mere fact that these are all third parties with respect to the production or the use of the car, even though the latter may be doubtful in light of the necessary interaction of the vehicle with such third parties in order to function properly.

Some argue that there should be yet another group, namely the car itself, which should be awarded some sort of legal personality of its own and therefore be sued directly.²⁴ Apart from the fact that this would require that the car itself is equipped with funds in order to be able to compensate losses (if only by way of insurance), I think this idea is artificial and not intelligent.²⁵

5. Fair apportionment of the risks of autonomous driving?

If we recall that one of the prime goals of the PLD is to find ‘a fair apportionment of the risks inherent in modern technological production’,²⁶ and if this is still what we strive for, then it is not necessarily just the manufacturer onto whom liability should be channelled, as this may not (or at least not always) be ‘a fair apportionment of the risks inherent’ in the digital age.

Bear in mind that the PLD only addresses the risks of production, whereas strict liability e.g. for motor vehicles instead focuses on the risks of motorized traffic, which is of course a significantly different problem. If we then also look at those who participate in this risky traffic scenario, it seems obviously preferable to maintain a liability system linked to the latter coupled with a risk pool such as compulsory liability insurance. After all, and as said before, we have a well-established insurance system within Europe also handling cross-border cases (rather) well under the MID regime. To the extent the risks attributed through this system overlap with the production risk assigned to the manufacturer, we might continue to use solidary liability with recourse options as already in force. The question of whether the manufacturer of an autonomous vehicle is liable for a defect

the chain of distribution, the car manufacturer will no longer be liable for subsequent alterations provided by such third-party suppliers according to art 7 lit b PLD.

24. Just see the resolution of the European Parliament of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics, 2015/ 2103 (INL), para 59(f).

25. See Koch (fn *) 115 with further references.

26. Recital 2 of the PLD’s preamble.

inherent therein therefore shifts to the recourse level, and the players on that level will be the MTPL insurer who already compensated the victims of the accident against the insurer of the producer.²⁷ Very often, I presume their interaction in the future will be based on bulk recovery regimes handling more than just a single accident case.

D. Conclusions

To sum up, I can only repeat that the PLD is in urgent need of revision, particularly when it comes to clarifying if and to what extent digital products fall within its scope. The significant dependency of autonomous traffic on data and the digital infrastructure underline this specifically. Even if the lawmakers should decide to exclude digital products from the scope of the PLD and its implementations, an alternative liability regime complementing the directive would have to be devised.

Existing strict liability regimes can exist alongside product liability for the simple reason that they are based on different theories, and even the CJEU has acknowledged that more than 15 years ago.²⁸ The best examples are again cars – strict motor vehicle liability already co-exists with product liability for cars because each is based on peculiar grounds, and the relationship between these liabilities is equally clarified.

The motor insurance regime currently in place in Europe shows that even diversities of liability regimes such as fault-based and strict liability can be overcome on the level of compensating victims. Those harmed in traffic accidents of the future should therefore be able to take advantage of a similar regime, thereby relieving them of the challenge to identify the true cause of their loss. This question will be shifted to the recourse level, and when it comes to alleged product defects, it is on that level that an adequate solution should be found.

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27. This is also the solution envisaged by the final report of the New Technologies Formation (fn 16) 22, 40.

28. See, eg, ECJ 25.4.2002 C-183/00, *González Sánchez v Medicina Asturiana SA*, ECLI:EU:C:2002:255, para 31.

Odpowiedzialność za produkt w przypadku pojazdów autonomicznych

Czy zharmonizowane na podstawie Dyrektywy Rady 85/374/EWG normy prawne dotyczące odpowiedzialności za produkt, w sposób odpowiedni obejmują szczególne ryzyko, stwarzane przez pojazdy autonomiczne? Czy inne podstawy odpowiedzialności lub mechanizmy odszkodowawcze są bardziej adekwatne dla takiego ryzyka? Krótkie przedstawienie argumentów, wskazujących na potrzebę spojrzenia na problem z szerszej perspektywy.

Słowa kluczowe: wypadek komunikacyjny, odpowiedzialność za produkt, ubezpieczenie pojazdów, pojazdy autonomiczne

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