Legal Aspects of Automated Driving

Vellinga, N. E.

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7 Conclusion

7.1 Main findings

All of the previous chapters and epilogues have contributed to answering the main research question:

Are legislative measures concerning traffic laws and civil liability needed in order to facilitate the deployment of self-driving cars on public roads within the EU, and if so, which legislative measures concerning traffic laws and civil liability should be taken?

The various chapters have revealed shortcomings in accommodating automated driving in both traffic law and civil liability. In addition, the preferred solutions for these shortcomings and the necessary steps to implement the solution have been proposed.

7.1.1 The Geneva Convention and Vienna Convention Are Not Compatible With Automated Driving

The notion of *driver* within both the 1949 Geneva Convention on Road Traffic and the 1968 Vienna Convention on Road Traffic does not accommodate automated driving (section 3.3.2). *Driver*, within the meaning of the Conventions, is a human who decides on the speed and direction of a vehicle by operating (some of) the controls of the vehicle (section 3.2.4). Therefore, an SAE Level 5 vehicle is driverless within the meaning of the Conventions. The preferred approach to overcome this problem is the *functioneel daderschap* approach (freely translated: *vicarious perpetrator* approach, section 3.8). This approach entails that the automated driving system drives the automated vehicle, and the acts of the automated driving system are regarded as being the acts of the (legal) person who has the power to dispose over the conduct of the automated driving system. The *functioneel daderschap* approach requires only one amendment to be made to each of the Conventions: the definition of driver needs to be deleted (art. 4 paragraph 1 Geneva Convention, art. 1(v) of the Vienna Convention). This can be done via the amendment procedures of both Conventions (art. 31 Geneva Convention, art. 49 Vienna Convention), whereby one of the Contracting Parties can propose an amendment. The traffic rules directed at the driver can remain as they are. If the amendment is accepted and therefore the definition of *driver* is deleted, the *functioneel daderschap* approach further enables a flexible interpretation of the notion of *driver* in both Conventions. Depending on the exact circumstances, a driver can be the automated driving system or a human (in case of a conventional vehicle). The driver can even change, for instance, in an SAE Level 4 vehicle where the driving task is performed by the automated driving system during part of the trip, and by a human during the other part. This also illustrates that

the *functioneel daderschap* approach is suitable for a future where vehicles of different levels of automation share the road. In addition, the *fuctioneel daderschap* approach offers a clear framework on responsibility for the conduct of the vehicle.

7.1.2 Software should be a Product within the Meaning of the EU Product Liability Directive

Another legal instrument that is challenged by the development of automated vehicles is, as discussed in Chapter 5, the Product Liability Directive (Directive 85/374/EEC). An important discussion point in literature is whether software should be regarded to be a product within the meaning of art. 2 of the Directive (section 5.5). If software is being regarded as a product, then the producer of a software update for the automated vehicle can be held liable for damage caused by a defective software update. This is in line with the level of consumer protection offered by the Product Liability Directive.[1] The EU Court of Justice will need to decide on the status of software under the Product Liability Directive. Whether software is a product within the meaning of the Directive is a matter of interpretation, as it does not require any changes to the Directive itself.

7.1.3 Two Defences of the Producer Lead To Undesirable Results

Two of the defences that the Product Liability Directive offers to the producer lead to undesirable results when applied to scenarios related to automated driving. The outcomes are not in line with the level of consumer protection offered by the Directive.

The defence of art. 7(b) of the Product Liability Directive could lead to an undesirable result when applied to a situation such as when an automated vehicle gets a software update from the producer of the automated vehicle (long) after the vehicle has been put into circulation (section 5.7.1). The software update could turn out to be defective, when it causes damage. In this scenario, the producer of the automated vehicle could avoid liability by invoking the defence of art. 7(b) of the Directive: "having regard to the circumstances, it is probable that the defect which caused the damage did not exist at the time when the product was put into circulation by him or that this defect came into being afterwards (…)." Subsequently, the injured party would not be compensated for their damage and – depending on national tort law – and could be left without compensation entirely. This is not acceptable as this outcome is not in line with the Product Liability Directive's aim of ensuring consumer

[1] Recitals Product Liability Directive.

protection. To achieve this aim of consumer protection, the defence of art. 7(b) of the Directive should be interpreted in line with its rationale. This means that as long as a producer can exercise (substantial) influence over his product, as is the case with software updates, the producer should not be able to successfully invoke the defence of art. 7(b) of the Product Liability Directive.

The defence of art. 7(e) of the Product Liability Directive, the development risk defence, also leads to undesirable results in the context of automated driving (section 5.7.2). If the producer successfully invokes the development risk defence, then the development risk of the automated vehicle is put onto the shoulders of the random road users injured by the automated vehicle. As the development of automated vehicles should benefit society as a whole, it is not acceptable that a random victim carries the burden of the development risk. Therefore, Members States should derogate from the development risk defence of art. 7(e) of the Product Liability Directive. Article 15(1)(b) of the Directive offers Members States this possibility. This requires legislative measures by the individual Member States.[2]

7.1.4 The Influence Of The (Type-)approval Of A Vehicle On Liability Risks Will Increase

In this day and age of conventional vehicles, the (type-)approval of a (type of) vehicle has very limited, if any, influence on the liability risks of the stakeholders involved. This will change with the development of automated vehicles. Where the liability of stakeholders is affected by the justified expectations of users, the (type-)approval will have an increased influence on the liability risks of those stakeholders. This is because the (type-)approval shapes the justified expectations of the users, as shown in section 5.6 for the producer and section 6.3.3 for the road authority. The (type-)approval sets expectations for the functioning of the vehicle itself, when it has been approved for use on certain roads and under certain conditions. For instance, if the automated vehicle is approved for use during rain, this raises the justified expectation of the user that the vehicle is capable of driving fully automated during rain without a problem. If the automated vehicle then causes damage, it does not meet the justified expectations, which can contribute towards establishing whether the automated vehicle is a defective product within the meaning of art. 6 of the Product Liability Directive (section 5.6). Thereby, the (type-)approval influences the liability risks of the producer of the automated vehicle. The (type-)approval has not this great an

[2] After the completion of this thesis, the European Commission published the report 'Liability for Artificial Intelligence and other emerging digital technologies', written by the Expert Group on Liability and New Technologies - New Technologies Formation. This report underlines the findings of this thesis.

influence when it comes to conventional vehicles, as this would not entail the conditions (weather, roads, etc) under which the conventional vehicle can function. Besides, a conventional vehicle has a human driver that should act in unsafe conditions. Consequently, the (type-)approval of a conventional vehicle does not shape the expectations of the users to the extent the (type-)approval of an automated vehicle does. The increased influence of the (type-)approval of automated vehicles on the liability risks of the producer are illustrated by Table 1 and Table 2, where Table 1 shows the situation for the producer of a conventional vehicle and Table 2 the situation for the producer of an automated vehicle.

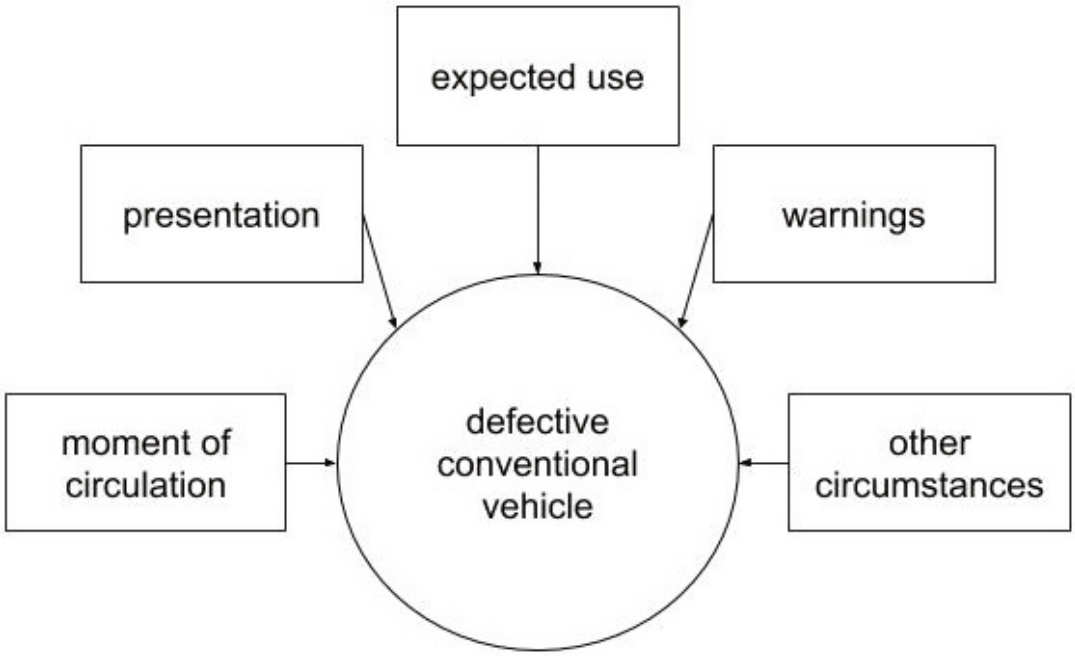

Table 1. Circumstances that can be taken into account when establishing whether a conventional vehicle is defective within the meaning of art. 6 of the Product Liability Directive.

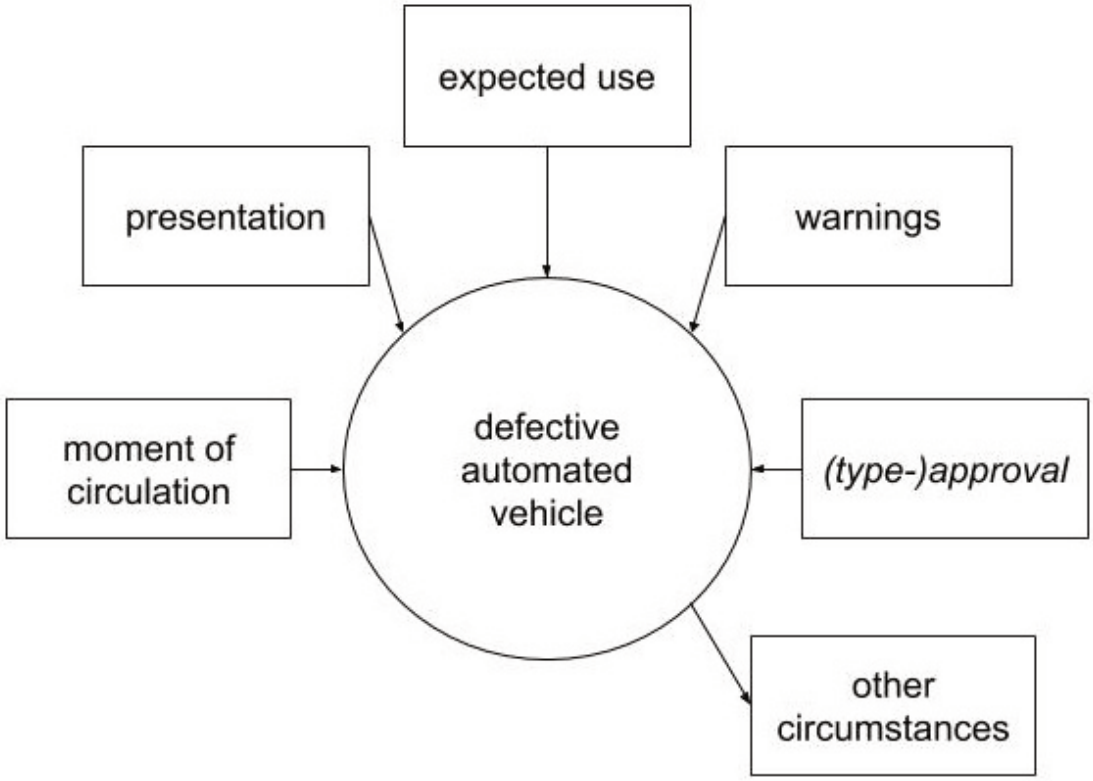

Table 2. *Circumstances that can be taken into account when establishing whether an automated vehicle is defective within the meaning of art. 6 of the Product Liability Directive.*

The influence of the (type-)approval is also relevant for the liability risks of the road authority, as the (type-)approval can also set expectations for the conditions of the infrastructure for which the vehicle has been approved, for instance, the state of maintenance of the road. If the vehicle is approved for use on a specific kind of road, this gives rise to the expectation that the road fulfils the requirements for the approved automated vehicle to function. If the road does not meet these expectations, and consequently the vehicle causes damage, then the road authority can be held liable if the justified expectations of the user of the vehicle play a part in establishing liability (as it does in the Netherlands, see section 6.3).

This illustrates how the liability risks of stakeholders, like the producer and the road authority, are influenced by the (type-)approval. This is a new development evoked by the development of automated vehicles. In addition, like with the (type-)approval of conventional vehicles, the vehicle authority could, depending on national tort law,

be held liable for wrongly approving a vehicle. The influence of the (type-)approval on the liability risks of different stakeholders is illustrated by Table 3.

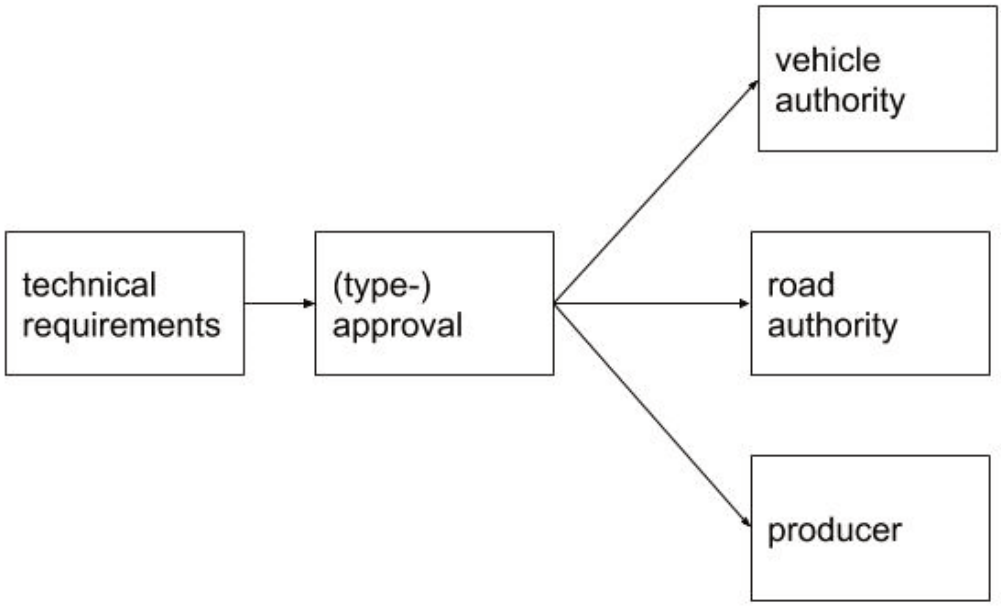

Table 3. *The relationship between the technical regulations, the (type-)approval and the liability risks of the stakeholders discussed in this thesis.*

7.2 Additional Findings

This research has also resulted in several additional findings. It brought to light the increased impact of the (type-)approval of automated vehicles on the liability risks of the stakeholders involved in automated driving, notably the producer (Chapter 5) and the road authority by means of a Dutch example (Chapter 6). In addition, the (type-)approval can also be seen as a tool to provide clarity on the roles of the stakeholders involved in automated driving. A sort of 'liability by design' could be achieved by laying down technical requirements that need to be met in order to be awarded the (type-)approval, that take away any discussions on the roles of stakeholders in liability questions (Epilogue to Chapter 6). For instance, by requiring an SAE Level 5 not to have a steering wheel, the user of the vehicle cannot interfere with the driving, thereby avoiding questions on who did what with regards to the steering of the vehicle in the moments before an accident.

In addition, a 'liability impact assessment' is advisable (Epilogue to Chapter 6). This 'liability impact assessment' should be done by governments in order to provide clarity on the liability risks of all of the stakeholders involved in automated driving, including governmental bodies. This approach is based on the data protection impact

assessment from the GDPR, which entails an assessment of the impact of the envisaged processing operations on the protection of personal data. A liability impact assessment should provide clarity on the liability risks of the stakeholders and thereby on the risks that should be insured.

In the context of insurance, the notion of *driver* needs clarification (Epilogue to Chapter 3). Given art. 12 (1) of the EU Motor Insurance Directive, the mandatory motor vehicle insurance should cover liability for personal injuries to all passengers, but not the *driver*, arising out of the use of a vehicle. So, the notion of *driver* is not only of importance for the Geneva Convention and Vienna Convention, but also for the Motor Insurance Directive. If the user is the driver of the automated vehicle within the meaning of this Directive, then the user will not get their damage compensated.

7.3 Further Research: The Road Ahead

This research has shown the legislative steps concerning the 1949 Geneva Convention on Road Traffic, the 1968 Vienna Convention on Road Traffic, and the Product Liability Directive that need to be taken in order to accommodate automated driving and to provide desirable outcomes in the context of automated driving. Furthermore, the influence of the (type-)approval[3] on the liability risks should not be underestimated. Using approaches based on the General Data Protection Regulation's data protection impact assessment and privacy by design, the liability risks of the different stakeholders should be investigated and these risks should also be influenced through privacy by design, via the technical requirements automated vehicles need to meet in order to be (type-)approved. By implementing the discussed actions and approaches, the Geneva Convention, Vienna Convention and the Product Liability Directive will provide for a future with automated driving. There is, however, the need for further research.

In this thesis, the notion of *driver* in the context of the 1949 Geneva Convention on Road Traffic and the 1968 Vienna Convention on Road Traffic was studied. There is, in addition, a need to study the notion of *driver* in the context of insurance, more specifically the definition of *driver* in the EU Motor Insurance Directive. Moreover, whether a different system of insurance would lead to a more desirable result in regards to automated driving needs further research. First-party insurance, instead of third-party insurance, could avoid confronting the injured party with the question of

[3] Directive 2007/46/EC.

who is liable for the damage caused by an automated vehicle. The UK Automated and Electric Vehicles Act of 2018 underlines this need to explore first-party insurance and other systems of insurance for automated vehicles. [4]

Likewise, more research in the field of tort law is necessary. This thesis has focused on SAE Level 5 vehicles, whereas SAE Level 3 and 4 also pose challenges for liability regimes. Specifically, the situation in which the automated vehicle warns the (then) user to take over the driving tasks as an event which is unmanageable for the automated driving system nears, poses a challenge. When does the liability shift from the producer to the user/driver of the vehicle? Is this the moment the take-over request is issued, when the user puts their hands on the wheel and becomes the driver, or was the use of the automated system from the start at the user's risk? Furthermore, if it turns out that automated vehicles will depend on communication with the infrastructure, so-called V2I communication, or with other vehicles, so-called V2V communication, questions arise on the liability for damage caused by the latency of the communication network or the information that is provided.

In addition, the research on the (type-)approval should continue. This research brought to light the importance of the (type-)approval in tort law. Further research is needed to explore the feasibility and desirability of the (type-)approval as a tool to achieve 'liability by design'. Also, the outcome in the discussion on moral dilemmas – who to save in case of an unavoidable accident – could lead to new requirements being set in order for vehicles to be awarded a (type-)approval.[5] For instance, approval of a vehicle could be denied if the vehicle is programmed to always save its passengers if it is determined, following the results of the ongoing ethical discussions or given a determination from the government, that it is undesirable for it to do so. These new requirements based on the outcomes of the discussions on moral dilemmas could very well differ per country, as research has shown variations in ethics for programming automated vehicles.[6]

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[4] See more extensively Chapter 2.

[5] See for instance Independent High-Level Expert group on Artificial Intelligence set up by the European Commission, 'Ethics Guidelines for Trustworthy AI' (8 April 2019); Ethik-Kommission, 'Automatisiertes und Vernetztes Fahren' (Bericht eingesetzt durch den Bundesminister für Verkehr und digitale Infrastruktur, Juni 2017); 'MIT Moral Machine' <http://moralmachine.mit.edu/> accessed 14 August 2019; Edmond Awad and others, 'The Moral Machine experiment' (2018) 563 Nature volume 59.

[6] Edmond Awad and others, 'The Moral Machine experiment' (2018) 563 Nature volume 59.