

Fast and Furious: Is German Regulation on Automated Vehicles Forging Ahead?

Federico Gasparinetti*

Abstract

This article deals with the legal implications of the automation revolution in the transportation sector, with specific regard to the German regulation on driverless vehicles. The invention of vehicles completely changed the possibility to move and the concept of mobility itself and now we are facing a new great industrial revolution: the introduction of autonomous vehicles. Such change will have great effects on the worldwide social, economic and legal scenarios. The German legal framework concerning automated vehicles is one of the most developed among the Western legal systems and this article has the goal to briefly examine its regulation, with particular regard to the reforms of the *Straßenverkehrsgesetz* made through the *Achtes Gesetz zur Änderung des Straßenverkehrsgesetzes* and the *Gesetz zur Änderung des Straßenverkehrsgesetzes und des Pflichtversicherungsgesetzes – Gesetz zum autonomen Fahren*. After that, a comparison will be proposed between German and Italian law provisions in order to better grasp their respective strengths and weaknesses and to try to understand possible next steps that may be taken by national and European legislators.

I. Introduction. The Relation Between Law and Vehicles: A Centuries-Old Relationship

This article deals with the legal implications of the automation revolution in the transportation sector. Since the beginning of car use in the first half of the XX century, it has been clear that the relevant regulation would have been absolutely peculiar.

Vehicles and their use represent a great innovation in human history. Their importance is impressive not only from a social or an economic perspective, but also law development has been strongly influenced by the advent of cars.

The invention of vehicles gave the possibility to substitute an external animal source of power with an internal motor¹ and this completely changed the possibility to move and the concept of mobility itself. Furthermore, car and traffic regulation have probably been the very first legal field where very detailed norms with a highly elevated technical content have been introduced.

* Post-Doctoral Fellow, University of Trento.

¹ M.G. Losano, 'Il progetto di legge tedesco sull'auto a guida automatizzata' *Il diritto dell'informazione e dell'informatica*, 1 (2017).

Nowadays various scientific, technical and technological subjects are ruled by law provisions: not only vehicle production (eg minimum safety standards) and use (eg speed limit), but also pharmaceutical and chemical products, foodstuffs, goods to be sold to consumers, etc.

Modern law provisions and technical and scientific rules are now strongly interconnected and jurists and experts from various fields cooperate in drafting new laws, which today often have a great technical content. Car production and use regulations probably represent the first case of this kind of legal creation, in the different legal orders, of norms with a similar technical nature and content.

Now we are facing a new great scientific revolution: the introduction of autonomous vehicles. Such change cannot be considered, from a juridical point of view, as a physiological development of the existing technology with no effects on the relevant regulation. Indeed, whereas in the past it was possible to clearly distinguish between the vehicle and the driver, with the increasingly sophisticated vehicle functions, the boundary between them is becoming increasingly blurred.²

The entire transportation sector is undergoing a quick development that will also affect the conditions of production and energy supply of the same vehicles, the characteristics of people and goods mobility, the interaction of vehicles with cities and rural areas, the infrastructures and connection systems.³

More in general, the unique amount of innovation related to the increasing use of Artificial Intelligence and the consequent new juridical issues to be solved represent one of the hardest challenges for the actual legal scholarship and for legislators all over the world.

Moreover, such questions and problems need to be solved not at a national level but by the international community as a whole. As a matter of fact, it is clear that Artificial Intelligence and Internet of Things⁴ research and development and the effects of its admission and use cannot be limited to the area of a single country but are naturally transnational and global.⁵ This applies even more with regard to automated vehicles if we consider how road traffic and the circulation of vehicles among different states is and always will be increasing.

Driverless vehicles are the symbol of a multiplicity of technological innovations which, taken together, have initiated a process of transformation of mobility characterised by the driving automation and the connection between vehicles and infrastructures.⁶

² B. Wolfers, 'Autonomes Fahren ist möglich: Deutschland als regulatorischer Tempomacher' *Recht Automobil Wirtschaft*, 24 (2022).

³ D. Cerini, 'Dal decreto Smart Roads in avanti: ridisegnare responsabilità e soluzioni assicurative' *Danno e responsabilità*, 401, 402 (2018).

⁴ For an overview of the Internet of Things main characteristics, see *inter alia* M.C. Gaeta, 'La protezione dei dati personali nell'internet of things: l'esempio dei veicoli autonomi' *Il diritto dell'informazione e dell'informatica*, 147 (2018).

⁵ S. Vöneky, 'Key Elements of Responsible Artificial Intelligence – Disruptive Technologies, Dynamic Law' *Ordnung der Wissenschaft*, 9, 9-10 (2020).

⁶ G. Calabresi and E. Al Mureden, *Driverless cars* (Bologna: il Mulino, 2021), 95.

Experimentation of driverless cars began several years ago⁷ and many scholars have already started to analyse their social and juridical impact, as well as to study the most complicated legal and ethical questions connected with their use.

At the same time, some legislators have already promulgated some norms having as object driverless car production, experimentation and use. Such provisions – in the same way as all norms having as object Artificial Intelligence – represent a significant change, considering the fact that until today ‘the law is – and always has been – made by humans and for humans’.⁸

Automated and autonomous vehicles regulation will in fact have to – similarly to the rest of the future ‘robot law’⁹ – necessarily be different from the existing norms, even from those that already rule the use of vehicles or other products. This is due to technological reasons more than to juridical ones: the role of the technologies will always be more active and they will take actions and make decisions on their own (even if on the basis of previous general human orders) and not only perform tasks that have been ordered by a human being.

With regard to such norms, it should be noted, however, that the existing international and European regulatory framework for the approval of automated and autonomous driving functions has not progressed very far in recent years, in contrast to the current scientific and technological state of the art in this field. Particularly the existing regulatory regimes still show a large regulatory gap for SAE Level 3, 4, and 5 driving functions.¹⁰ On the other hand, non-harmonized regulatory areas could represent an important space to be filled by modern national legislation. So was for the German legislator, who seems to have recognized this non-harmonized legal area as an opportunity for its own innovative legislation. As we will see, for two times, in 2017 and in 2021, Germany has used a gap in the multi-level system to drive forward technical and legal developments in the field of automated and autonomous driving.¹¹

This article has the goal to examine German law on autonomous vehicles, with particular regard to the reforms of the *Straßenverkehrsgesetz* made through

⁷ See also W. J. Kohler and A. Colbert-Taylor, ‘Current Law and Potential Legal Issues Pertaining to Automated, Autonomous and Connected Vehicles’ 31 *Santa Clara High Technology Law Journal*, 99, 100-101 (2014), see particularly n 3. According to M. G. Losano, n 1 above, 1, the first experiments concerning automated vehicles started already in the 1980s.

⁸ H. Eidenmüller, ‘The Rise of Robots and the Law of Humans’ *Zeitschrift für Europäisches Privatrecht*, 765, 766 (2017).

⁹ There are several studies concerning the so called ‘robot law’, but also, more in general the relation between law and technology. Among the latter see the analyses conducted by G. Pascuzzi, *Il diritto dell’era digitale* (Bologna: il Mulino, 5th ed, 2020), 249-250, where he underlines the effects of digital technologies on juridical norms, noting that technology and its development can change the content of law provisions and make it necessary to amend parts of them or to introduce new ones, on the other hand law can use new technologies to better pursue its goals and protect more effectively society’s interests. See also M.G. Losano, ‘Verso l’auto a guida autonoma in Italia’ *Il diritto dell’informazione e dell’informatica*, 423-441 (2019).

¹⁰ See below for their description.

¹¹ B. Wolfers, n 2 above, 24 and 28.

the *AchtesGesetz zur Änderung des Straßenverkehrsgesetzes* and the *Gesetz zur Änderung des Straßenverkehrsgesetzes und des Pflichtversicherungsgesetzes – Gesetz zum autonomen Fahren*. After that, a comparison will be proposed between German and Italian law provisions in order to find out their respective strengths and weaknesses.

The German legal framework concerning automated vehicles is one of the most developed among the Western legal systems and the German legislator has already from 2017 been extremely keen on being at the vanguard in terms of legalising and regulating the use of automated vehicles.¹² Therefore the German regulation in this field can represent a great opportunity of comparison for other legal systems. The analysis of the virtues and flaws of the current German regulation on automated vehicles may help the legislators of those countries who still have to develop a regulation in this field or where, like in Italy, such regulation is at an early stage. Comparative law teaches us that legal transplants are never easy. The question here is what kind of transfers the German legislation could put in motion.

This article is structured as follows. In addition to this short introduction and to the final remarks, there are five chapters.

Subject of the next one is the international and European legal scenario with regard to driverless vehicles. Special attention is paid to the 1968 Vienna Convention on Road Traffic and specifically to the amendments proposed in 2021. After that there is a summary of the most relevant regulations and acts of the European Union. The following three chapters deal with the main theme of this study: the German regulation on driverless vehicles. Particularly in the third chapter there is brief summary of the most relevant sources of law in this field as well as an in-depth analysis of the role that could be played by the German Constitution. Chapter four and five have as an object the two great reforms concerning autonomous and automated vehicles regulation. In the first one the 2017 *AchtesGesetz zur Änderung des Straßenverkehrsgesetzes* and the introduction of the new §§ 1a – 1c of the *Straßenverkehrsgesetz* are treated. In the second one I try to examine the subsequent reform which took place in 2021, the so called *Gesetz zum autonomen Fahren*. Finally in the sixth chapter, there is a comparison with the Italian regulation on automated vehicles as well as a reflection on the possibility to transplant German provisions in Italy. The article is concluded by some final considerations on the analysed law provisions as well as on the possible next steps national and European legislators may take.

II. German Traffic Regulation: The International and European Sources of Law

¹² M.N. Schubert, 'Regulating the Use of Automated Vehicles (SAE Levels 3 to 5) in Germany and the UK' *Recht Automobil Wirtschaft*, 18 (2019).

If we want to try to identify the German law provisions ruling autonomous vehicles it is necessary – in the same way as for other social and economic sectors – to consider not only national laws, but also sources of law at an international and European level.

Because of road traffic's intrinsic characteristics, international treaties and European regulation have always played a relevant role in this particular field. As a matter of fact, already in the second half of the last century it was clear to most of the legislators that different state's road traffic rules need to be harmonised in order to give road users the possibility to drive in and through different nations having to always respect the same (or similar) rules. This will to harmonise is justified not only for economic reasons but also by the intention of increasing road safety.

It is clear that a harmonised international legal framework would support mobility so much more than a fragmented one.

This not only applies also to autonomous vehicles, but it is even more important if we reflect on the constantly increasing importance of cross-border mobility and on the fact that their use will be necessarily based on a constant connection with other vehicles and infrastructures.

In light of the above, it seems appropriate to start this brief analysis of the German autonomous vehicles' legal framework from the international treaties concerning road traffic which finds application in Germany. After that, we turn to European regulations and directives. Finally, we will focus on German national norms.

1. The Vienna Convention on Road Traffic of 1968

The Vienna Convention on Road Traffic of 8 November 1968¹³ is one of the most important law provisions concerning national and international road traffic. As of today, more than eighty states have signed it. Among those nations there are Germany, Italy, France, the United Kingdom, but not the USA.

The same convention came then into force in Germany in 1977¹⁴ and sets the international law framework conditions of national law provisions concerning road traffic. Thanks to the 1968 Convention and to the signatory states' task to adapt their national norms to the Convention content it is therefore possible to have more similar regulations and consequently a higher security on roads.¹⁵

As any international treaty, the 1968 Convention is not directly applicable in the signatory states but nevertheless plays a central role for this analysis

¹³ The Convention is available on the United Nation Treaty Collection website at <https://tinyurl.com/msjwec32> (last visited 31 December 2022).

¹⁴ German Federal Law Gazette (*Bundesgesetzblatt*) 1977, part II, no 39, 809-1111.

¹⁵ See Convention's preamble. J. Ensthaler and M. Gollrad, *Rechtsgrundlagen des automatisierten Fahrens* (Frankfurt am Main: Fachmedien Recht und Wirtschaft, 2019), 57.

considering that German law provisions have to respect it.¹⁶ Indeed the national legislator can enact laws on autonomous vehicles only and within the limits provided by the 1968 Convention.

More in detail, the possibility for national sources of law to admit and to rule upon the use of autonomous vehicles belonging to the third, fourth and fifth level of driving automation is possible only if at the international level the relevant conditions have been previously created.¹⁷

The further development of the Vienna Convention and the drafting of technical regulations is under the responsibility of the UNECE (United Nations Economic Commission for Europe) working groups.¹⁸ These working groups draw up technical regulations (so called ECE regulations) that are based on the current state of the art of science and technological development and contain detailed specifications and requirements for certain components or vehicle functions. The harmonised technical requirements for motor vehicles drafted by the UNECE working groups are referred to as 'Regulations'. The adoption of a new regulation by the World Forum is followed by a procedure within the UNECE and a ratification process within the UNECE Member States, including the European Union. The European Union either adopts the UNECE regulations in their entirety or adopts its own legal acts that are strongly based on the UNECE regulations.¹⁹

The WP.1 (Working Party: Global Forum on Road Traffic Safety) and the WP.29 (World Forum for Harmonisation of Vehicle Regulations) are competent for the development of regulations on automated driving and the sub-working group on automated and connected driving (GRVA - *Groupe Responsive Voiture Automatique* - Working Party on Automated/Autonomous and Connected Vehicles) is responsible particularly for automated and connected driving.²⁰

During the last decades the Vienna Convention has been the subject of several modifications. With specific regard to autonomous vehicles, two specific

¹⁶ As for any international treaty, the States that have signed the Vienna Convention have to respect its content in accordance with the principle '*pacta sunt servanda*' as *per* Art 26 of the Vienna Convention on the Law of Treaties and with what is stated by Art 27 of the same convention: 'A party may not invoke the provisions of its internal law as justification for its failure to perform a treaty'. The Convention on the Law of Treaties of 1969 is available on the United Nation Treaty Collection website at <https://tinyurl.com/5n7r15wr> (last visited 31 December 2022). A. Von Arnould, *Völkerrecht* (Heidelberg: C.F. Müller, 2nd ed, 2014), 83.

¹⁷ M. Wagner, *Das neue Mobilitätsrecht* (Baden-Baden: Nomos, 2021), 34.

¹⁸ More information on the UNECE working groups and their work on autonomous vehicles can be found on the UNECE website at <https://unece.org/automated-driving>. The role played by the UNECE Regulation in this field is absolutely important. This is confirmed by almost all the legal scholarship. See, among others, J. Klink-Straub and T. Keber, 'Aktuelle Gesetzeslage zum automatisierten Fahren – eine Rechtsvergleichung' *Neue Zeitschrift für Verkehrsrecht*, 113-114 (2020) and F. Geber, 'Rechtliche Anforderungen an Software-Updates von vernetzten und automatisierten Pkw' *Neue Zeitschrift für Verkehrsrecht*, 15 (2021).

¹⁹ *ibid* 15.

²⁰ M. Wagner, n 17 above, 35.

amendments to the Vienna Convention have to be taken into account.

The first one took place in 2016²¹ and had as object the modification of Arts 8 and 39 of the Convention. For the purposes of this analysis, the most important change was the introduction into Art 8 of para 5-*bis*, according to which:

‘Vehicle systems which influence the way vehicles are driven shall be deemed to be in conformity with paragraph 5 of this Article and with paragraph 1 of Article 13, when they are in conformity with the conditions of construction, fitting and utilization according to international legal instruments concerning wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles’.

Para 5-*bis* is of great importance, if we consider that before this amendment there was no possibility to use any kind of autonomous vehicles.

As a matter of fact, pursuant to Art 8, para 5 ‘Every driver shall at all times be able to control his vehicle or to guide his animals.’ and to Art 13

‘Every driver of a vehicle shall in all circumstances have his vehicle under control so as to be able to exercise due and proper care and to be at all times in a position to perform all manoeuvres required of him. (...)’.

It was therefore not allowable to ‘delegate’ the driving activity to the vehicle or to another technological system.

Pursuant to such fundamental provisions it was always necessary that driving activities were conducted in accordance with two requirements: the necessary presence of a driver and his capacity to constantly control the vehicle.²² Consequently, all the existing driving technologies – like the cruise control or the lane departure warning system – always carried out only an assistance function and the person driving the car always had to keep an ongoing control on the same.

The new Art 8, para 5-*bis*, of the Vienna Convention represents a fundamental basis for the introduction of automated driving systems. For the first time, it put signatory states in the condition to enact law provisions concerning the use of highly automated vehicles (Level 3 and 4 of the SAE International classification),²³ ie, vehicles where the automated system controls the vehicle if the latter is in a defined driving mode (eg, in highways) and the system is also activated. At both Levels 3 and 4, the driver naturally has to carry out the driving task when the vehicle is operated outside the defined driving mode. At Level 3, the driver hands over control to the system only in predefined scenarios (eg in a traffic

²¹ The proposal was submitted on 23 September 2014 and then relevant amendments entered into force on 23 March 2016.

²² J. Ensthaler and M. Gollrad, n 15 above, 58.

²³ M. Wagner, n 17 above, 36. See also the opinion of C. Artz and S. Ruth-Schumacher, ‘Zulassungsrechtliche Rahmenbedingungen der Fahrzeugautomatisierung’ *Neue Zeitschrift für Verkehrsrecht*, 57, 61-62 (2017).

jam)²⁴ and must be able to resume the driving task (fallback performance), which is not the case at Level 4.²⁵

The amended version of the Convention entered into force in Germany in 2016.²⁶

Even if this opinion is not shared by all scholars, it should be deemed that the above-mentioned provision cannot be referred also to so called autonomous vehicles (Level 5 of the SAE International classification), i.e. a vehicle that, by completely deviating from the current idea of a vehicle, is equipped with an automated driving feature that ‘can drive the vehicle under all conditions’.²⁷ A vehicle where human intervention can be completely excluded and that consequently can be without any of the tools (steering, pedals) through which this typically takes place.²⁸

This is due to the fact that Arts 8 and 13 of the Convention still require that the driver keeps the control of the vehicle and consequently driving systems that cannot be oversteered are not compliant with the same Convention.²⁹

More in detail, automated driving systems can be deemed as compliant with Arts 8, para 5-*bis*, and 13 of the Vienna Convention if they meet the conditions of an international agreement such as the Geneva Convention of 1958³⁰ or the Agreement on UN Global Technical Regulations of 1998³¹ or, if

²⁴ V. Lüdemann et al, ‘Neue Pflichten für Fahrzeugführer beim automatisierten Fahren – eine Analyse aus rechtlicher und verkehrspsychologischer Sicht’ *Neue Zeitschrift für Verkehrsrecht*, 411, 412 (2018).

²⁵ M.N. Schubert, ‘Der Automated and Electric Vehicles Act 2018’ *Straßenverkehrsrecht*, 124, 126 (2019).

²⁶ *Gesetz zur Änderung der Artikel 8 und 39 des Übereinkommens vom 8. November 1968 über den Straßenverkehr* (Law to amend Articles 8 and 39 of the traffic road Convention of 8 November 1968) of 7 December 2016, German Federal Law Gazette (*Bundesgesetzblatt*) 2016, part II, no 34, 1306-1808. J. Ensthaler and M. Gollrad, n 15 above, 59.

²⁷ A description of the SAE Levels of driving automation is available at <https://tinyurl.com/wmh7ffnb> (last visited 31 December 2022). In any case please note that – according to the information currently available – it is quite hard to always distinguish the difference Level 4 technology from Level 5 one. In fact on both levels, the car carries out autonomously the driving activities, but in Level 4 – unlike Level 5 – this is only possible under specific conditions (e.g. in a certain geographic area).

²⁸ G. Calabresi and E. Al Mureden, n 6 above, 98. The description of the SAE Automation Levels of A. Kriebitz et al, in ‘The German Act on Autonomous Driving: Why Ethics Still Matters’ *Philosophy & Technology*, 1, 4 (2022), is particularly effective: ‘the various levels of autonomous driving correspond not so much to the level of technical sophistication but rather to the degree of driver involvement and autonomy’.

²⁹ M. Wagner, n 17 above, 37-38, see specifically fns 77 and 78.

³⁰ Agreement concerning the adoption of uniform conditions of approval and reciprocal recognition of approval for motor vehicle equipment and parts, which is available on the United Nation Treaty Collection website at <https://tinyurl.com/2jt3y7sb> (last visited 31 December 2022).

³¹ Agreement concerning the establish of global technical regulations for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles, which is available on the UNECE website at <https://tinyurl.com/5cb9banc> (last visited 31 December 2022).

this is not the case, the driving system can be overridden or switched off.³²

2. The Latest Amendment to the Vienna Convention: A Real Chance for Autonomous Vehicles?

The abovementioned WP.1 (Working Party: Global Forum on Road Traffic Safety) underlined in the past years the possible problems related to a future use (and admission) of automated vehicles of Level 4 and 5. Consequently some signatory States, and especially the United Kingdom and France, proposed different amendments to the Convention.³³

On 14 January 2021 a proposal of amendment to the Convention transmitted by the Sustainable Transport Division of the United Nations Economic Commission for Europe was officially communicated by the Secretary-General of the United Nations.³⁴

Such amendments have great importance with regard to this article's topic as they affect Art 1 and a new Art 34-*bis*.

More in detail, the subject of the proposed amendment is the introduction at Art 1 ('Definitions') of two new definitions (letters 'ab' and 'ac'). The former has as object specifically the automated driving systems, which have been defined as 'vehicle system that uses both hardware and software to exercise dynamic control of a vehicle on a sustained basis'. The latter states that according to the same Convention the concept of dynamic control

'refers to carrying out all the real-time operational and tactical functions required to move the vehicle. This includes controlling the vehicle's lateral and longitudinal motion, monitoring the road, responding to events in the road traffic, and planning and signalling for manoeuvres'.³⁵

Even more important is the provision contained in the new Art 34-*bis*, which is expressly dedicated to the automated driving and establishes that

'The requirement that every moving vehicle or combination of vehicles shall have a driver is deemed to be satisfied while the vehicle is using an

³² J. Ensthaler and M. Gollrad, n 15 above, 59-60. The same Authors also point out that according to Art 39, para 1, of the 1968 Convention driving systems that comply with the aforementioned agreements now also meet the requirements of Annex 5 of the Vienna Convention, which imposes basic technical requirements on vehicles. Moreover, they underline that pursuant to Art 8, para 5-*bis*, an oversteer or deactivation capability is now only required if the corresponding technical requirements of international agreements are not met. However, the ECE regulations based on the Geneva Convention of 1958 mentioned there continue to require that the systems can be permanently deactivated and overridden.

³³ M. Wagner, n 17 above, 42-43.

³⁴ The proposal of amendment to the Convention transmitted communicated by the Secretary-General of the United Nations on 14 January 2021 is available at <https://tinyurl.com/5dx9w4z2> (last visited 31 December 2022).

³⁵ <https://tinyurl.com/4899hs2n> (last visited 31 December 2022).

automated driving system which complies with: (a) domestic technical regulations, and any applicable international legal instrument, concerning wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles, and (b) domestic legislation governing operation. The effect of this Article is limited to the territory of the Contracting Party where the relevant domestic technical regulations and legislation governing operation apply'.³⁶

On 21 January 2022 the Secretary-General of the United Nations stated that by 14 January 2022, on the expiry of a period of twelve months following the date on which the was by depositary notification, none of the Vienna Convention's contracting parties informed the Secretary-General that it had rejected the proposed amendments. Therefore, in accordance with Art 49 of the Convention, the amendments to Art 1 and the introduction of Art 34-*bis* have to be considered approved and will enter into force for all parties six months after the expiry of the period of twelve months, ie, on 14 July 2022.³⁷

The aim of the proposal is to provide a significant legal certainty for the signatory States without imposing a uniform interpretation of the Convention with regard to possible disputed points. The amendment is intended to allow signatory States to facilitate the responsible use of automated vehicles, even in the absence of a human driver, under conditions that are acceptable to them and consistent with the more general safety principles of the Convention. This solution is intended to be read both as an exception to the driver requirement and as a clarification that automated vehicles satisfy the driver requirement, depending on which reading the contracting State follows.³⁸

3. The European Union Legal Framework

According to Art 4 of the Treaty on the Functioning of the European Union, 'transport' is one of the areas where there is a shared competence between the Union and the Member States (Art 4, para 2, lett g, TFUE). Arts 90 and following of the same Treaty are specifically referred to the regulation of the transport sector. Based on such norms, the European legislator has approved many regulations and directives in this sector, with the aim of creating increasingly harmonised legislation and ensuring as much safety as possible on European Union roads.

To offer some examples, among such provisions the following pieces of legislation are present: (i) the Regulation (EC) No 661/2009 concerning type-

³⁶ <https://tinyurl.com/hz5hwcvn> (last visited 31 December 2022).

³⁷ The official communication concerning the acceptance of the amendment to Art 1 and the new Art 34-*bis* of the Convention is available at <https://tinyurl.com/24r8jpyb> (last visited 31 December 2022).

³⁸ M. Wagner, n 17 above, 42-43.

approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor and (ii) the Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems (ITS) in the field of road transport and for interfaces with other modes of transport.

Simultaneously we are starting to see a regulation on Artificial intelligence. The White Paper on Artificial Intelligence in particular should be remembered,³⁹ as also the Commission report on the safety and liability implications of Artificial Intelligence, the Internet of Things and robotics⁴⁰ and the proposal of 21 April 2021 of the Commission for a Regulation laying out harmonised rules on artificial intelligence (Artificial Intelligence Act).⁴¹

As of today there is no law provision (neither regulation nor directive) enacted by the European Union having as its subject a complete regulation of driverless cars, their possible market entry conditions and their use.⁴² Nevertheless there are some acts that should be considered at this stage.⁴³ In 2018, the European Commission itself adopted an official communication directed to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions concerning ‘the road to automated mobility: An EU strategy for mobility of the future’.⁴⁴

Through such document, the Commission presented a comprehensive EU concept for connected and automated mobility as well as its vision for supporting measures, in particular with regard to the legal and policy framework for the development and adoption of key technologies, services and infrastructures.⁴⁵

Primarily based on such communication of the European Commission, on 15 January 2019 the European Parliament adopted a resolution on ‘Autonomous driving in European transport’.⁴⁶

In this document the European Parliament briefly summarised the ‘state of the art’ with regard to automated driving functions and pointed out the relevant needs to be met as soon as practically possible by the competent public and private bodies. The Parliament, *inter alia*, ‘Affirms the important role of cooperative

³⁹ COM (2020) 65.

⁴⁰ COM (2020) 64.

⁴¹ COM (2021) 206.

⁴² B. Wolfers, n 2 above, 27.

⁴³ Please note that this is not the place for an in-depth analysis of the European regulation on driverless vehicles. Only a brief overview on the current legal scenario with regard to the topic of this article will be carried out.

⁴⁴ COM (2018) 283. The text of the resolution is available at <https://tinyurl.com/2p8djsn9> (last visited 31 December 2022).

⁴⁵ M. Wagner, n 17 above, 47; F.P. Patti, ‘The European Road to Autonomous Vehicles’ 43 *Fordham International Law Journal*, 125, 127 (2019).

⁴⁶ 2018/2089 (INI). The text of the resolution is available at <https://tinyurl.com/3vanhw4m> (last visited 31 December 2022). See also C. Antweiler and P. Liebschwager, ‘Die Entwicklung des öffentlichen Verkehrsrechts in den Jahren 2019/2020’ *Neue Zeitschrift für Verwaltungsrecht*, 849, 859 (2021).

intelligent transport systems (C-ITS) in providing connectivity for Society of Automotive Engineers (SAE) level 2, 3 and possibly 4 automated/autonomous vehicles; encourages the Member States and industry to further implement C-ITS, and calls on the Commission to support the Member States and industry in deploying C-ITS services, notably through the Connecting Europe Facility, the European Structural and Investment Funds and the InvestEU programme' (Point 3),

'Acknowledges the significant potential of automated mobility for many sectors, offering new business opportunities for start-ups, small and medium-sized enterprises (SMEs), and the industry and enterprises as a whole, in particular in terms of the creation of new mobility services and employment possibilities'

and

'Underlines the need for the development of autonomous vehicles that are accessible for persons with disabilities and reduced mobility (PRMS)' (Point 5 and 6).

Consequently it

'Underlines that fully autonomous or highly automated vehicles will be commercially available in the coming years and that appropriate regulatory frameworks, ensuring their safe operation and providing for a clear regime governing liability, need to be in place as soon as possible in order to address the resulting changes, including interaction between autonomous vehicles and infrastructure and other users' (Point 19).⁴⁷

Later, in 2021, the European Commission presented the Sustainable and Smart Mobility Strategy, by means of which the foundations of the future development of European transport have been laid out.⁴⁸ In this Plan special attention has been put on not only on the transport sector's environmental sustainability but also on its digital transformation. Particularly, the Commission points out the social importance of the transport sector's technological progress; it in fact underlines that it has to take place within a proper framework guaranteeing all European citizens enjoy its advantages and, on the contrary, avoiding inequalities or conflicts caused by such development.⁴⁹

⁴⁷ 2018/2089 (INI).

⁴⁸ The Sustainable and Smart Mobility Strategy and the related information and documentation is available on the website of the European Commission at <https://tinyurl.com/k4ub9zdt> (last visited 31 December 2022).

⁴⁹ The first two paragraphs (no 54 and 55) of the third section ('Smart Mobility – Achieving Seamless, Safe And Efficient Connectivity') of the Plan are very clear: 'People should enjoy a seamless multimodal experience throughout their journey, through a set of sustainable

The European Commission seems to be fully aware of automated vehicles' possible social impact, but also of the related risks as well as of the strong relation between driving and cultural and ethical values, which results in the necessity of particular attention on the side of the legislator.

Based on the above stated, the Commission underlines in the Plan that

'(t)he Commission will explore options to further support safe, smart and sustainable road transport operations under an existing agency or another body. This body could support the deployment and management of ITS and sustainable connected and automated mobility across Europe. It could facilitate the preparation of relevant technical rules, including as regards the use of automated vehicles cross-border and on the deployment of recharging and refuelling infrastructure, provided for in Union legislation and to be adopted by the Commission. Such rules would in turn create synergies across Member States. It could for example prepare drafts of roadworthiness inspection methods and carry out other specific road safety tasks, as well as collect relevant data. It could also accomplish specific tasks in the area of road transport in the face of major disruptions like the COVID-19 pandemic, where emergency measures and solutions such as Green Lanes⁴² have been necessary' (para no 58).⁵⁰

Furthermore, it states:

'Proactively shaping our future mobility by developing and validating new technologies and services is key to staying ahead of the curve. The EU will therefore put in place favourable conditions for the development of new technologies and services, and all necessary legislative tools for their validation. We can expect the emergence and wider use of drones (unmanned aircraft) for commercial applications, autonomous vehicles, hyperloop, hydrogen aircraft, electric personal air vehicles, electric waterborne transport and clean urban logistics in the near future. An enabling environment for such game-changing mobility technologies is key, so that the EU can become a prime deployment destination for innovators. Start-ups and technology developers need an agile regulatory framework to pilot and deploy their products. The Commission will work towards facilitating testing and trials, and towards making the regulatory environment fit for innovation, so as to

mobility choices, increasingly driven by digitalization and automation. As innovation will shape the mobility of passengers and freight of the future, the right framework and enablers should be in place to facilitate this transition that can make the transport system much more efficient and sustainable. Public and social acceptance is key for a successful transition, which is why European values, ethical standards, equality, data protection and privacy rules, among others, will be fully respected and at the heart of these efforts, and cybersecurity will be treated with high priority'.

⁵⁰ Sustainable and Smart Mobility Strategy, 12.

support the deployment of solutions on the market' (para no 64).⁵¹

One of the milestones indicated in the Plan is the development of large-scale automated mobility by 2030.⁵²

Concluding this paragraph the following should be kept in mind, that there are also other sources of law of the European Union that should be taken into account, even if they do not expressly rule automated driving technologies.

Among those there is the EU Regulation 2018/858 and particularly Art 39 ('Exemptions for new technologies or new concepts'), according to which the 'manufacturer may apply for an EU type-approval in respect of a type of vehicle, system, component or separate technical unit that incorporates new technologies or new concepts that are incompatible with one or more regulatory acts listed in Annex II'⁵³ (where the requirements for the purpose of EU type-approval of vehicles, systems, components or separate technical units are indicated).

On 6 June 2022 the EU Regulation 2019/2144 will enter into force on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, in relation to their general safety and the protection of vehicle occupants and vulnerable road users.⁵⁴ This law provision is (further) proof of the constantly increasing importance of driverless vehicles also for the European legislator: at Art 3 ('Definitions') there is also the definition of 'automated vehicle' and 'fully automated vehicle'. The former is defined as a

'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';

the latter as 'a motor vehicle that has been designed and constructed to move autonomously without any driver supervision'.⁵⁵

The same Regulation states at the following Art 11 the 'Specific requirements

⁵¹ *ibid* 13.

⁵² *ibid* 14.

⁵³ Art 39, para 1, EU Regulation 2018/858.

⁵⁴ 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 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, Official Journal of the European Union, 16.12.2019, L 325/1.

⁵⁵ As we will see below, such definitions do not completely match with those provided by the German regulation.

relating to automated vehicles and fully automated vehicles'. Such provision is particularly important because it seems to continue to require the presence of a physical driver, who is able to take control of the vehicle if necessary.⁵⁶

III. German Road Traffic Norms: The Current National Juridical Scenario

Law provisions concerning driverless cars (as well as those having as object 'classic' vehicles) have to face various kinds of problems and rule different aspects of their assembly and construction, sale and use. In general, the legal framework concerning road traffic can be divided into legal issues concerning the registration of vehicles in order to be used on public roads, the use and the behaviour in the public road space, the requirements for the transportation of passengers and goods.⁵⁷

Such regulation has to be particularly detailed because of the complexity which naturally characterises road traffic and this complexity will probably even increase with the introduction of driverless cars and the relevant infrastructures.

Moreover, road traffic regulation has the particular task of having to rule an activity which is today considered ineliminable and irreplaceable, but also a source of equally significant risks (so called 'negative externalities') that must be contained as much as possible.⁵⁸ Furthermore, vehicle use is inevitably connected with rights protected by constitutional law. In particular, §§ 2 (Personal freedom) and 3 (Equality before the law), but also 14 (Property – Inheritance – Expropriation) of the *Grundgesetz* (German constitution) come into play.

1. The Driverless Cars from the Perspective of the German *Grundgesetz*

The German legal scholarship has already started to analyse the possibility of using automated vehicles taking into consideration the principles and the provisions of the German constitution, the *Grundgesetz* (hereinafter also the 'GG').

In particular, such scholarship has noted that the constitutional framework should be examined and its importance should not be undermined in the case of automated and autonomous driving systems. Also, whilst drafting the law provisions and the technical regulations concerning such technologies should the constitutional framework be kept in due consideration. The focus should be specifically on fundamental rights, which have a very central meaning in the

⁵⁶ B. Wolfers, n 2 above, 30-31.

⁵⁷ M. Wagner, n 17 above, 52.

⁵⁸ F. Jourdan and H. Matschi, 'Automatisiertes Fahren – Wie weit kann die Technik den Fahrer ersetzen? Entwickler oder Gesetzgeber, wer gibt die Richtung vor?' *Neue Zeitschrift für Verkehrsrecht*, 26-29 (2015), make an interesting analysis on the relations between safe driving and technology.

field of autonomous driving.⁵⁹

Because of their complexity and variety, all the constitutional issues that may arise with regard to driverless technologies cannot be analysed properly here. Nevertheless, I will present a preliminary analysis on these themes of great importance.

A first point to be discussed is the care itself that the German legislator should put in drafting the necessary law provisions in time with respect to the quick development of the automated driving systems. Why? Because according to almost all the studies conducted on such technologies the number of car crashes will drastically decrease thanks to them and one of the most important duties of the State is to protect citizens' lives and health also through concrete acts (*staatliche Schutzpflichten*). This is obviously based on the assumption that the more vehicles equipped with the appropriate technology can participate in road traffic, the more the number of accidents could be reduced. The prerequisite for this, of course, would be that the technology used in the vehicles actually works flawlessly and that accidents with autonomously driving cars on the roads will be virtually impossible. The final result could be that when the technological systems will be sufficiently developed, the State will be committed to admit and support the use of automated vehicles.⁶⁰

This idea represents *mutatis mutandis* a development of the so-called crashworthiness doctrine which has been developed in the United States in the second part of the last century and according to which there is a duty to grant the vehicles that guarantee the highest protection level entrance into the market.⁶¹ From another point of view, driving automatization should represent a tool aimed to compensate for human flaws.⁶²

Moreover, the necessity to reduce the negative external impacts of road traffic has been felt by the national and European legislators for many decades and has inspired almost all the road traffic regulation amendments of the last few years. Automated and autonomous vehicles now seem to represent the instrument through which achieving a real qualitative leap in policies that aim to balance

⁵⁹ M. Brenner, 'Verfassungsrechtliche Vorgaben für die rechtliche Ausgestaltung des autonomenFahrens', in M. Hermann and M. Knauff eds, *Autonomes Fahren* (Baden-Baden: Nomos, 2021), 46-47.

⁶⁰ *ibid.*, 47-48. The Author - see n 10 - also points out that according to the *Staatliches Bundesamt* the eighty eight per cent of accidents in 2017 were caused by a human error and only the 1% by a technical defect of the vehicle. See also P. Ringlage, *Haftungskonzepte für autonomes Fahren – „ePerson“ und „RmbH“?* (Baden-Baden: Nomos, 2021) 53-54; F. Jourdan and H. Matschi, n 58 above, pp. 26-27; H. Eidenmüller, n 8 above, 770. Such circumstance is also confirmed in the Bill for amendment of the Road Traffic Act and the Compulsory Insurance Act – Act on Autonomous Driving, available at <https://tinyurl.com/2cw6are6> (last visited 31 December 2022), 18. On this topic see also the analysis of A. Hevelke and J. Nida-Rümelin, 'Responsibility for Crashes of Autonomous Vehicles: An Ethical Analysis' *Science and Engineering Ethics*, 619-630 (2015).

⁶¹ G. Calabresi and E. Al Mureden, n 6 above, 42.

⁶² F. Jourdan and H. Matschi, n 58 above, 27.

efficiency and safety in the field of vehicular circulation could be possible.

Another topic that has been analysed in the German literature is if the right to use not-automated cars will always exist when this technology will be completely developed and will be accessible to all citizens. This now seems to be a very theoretical and not current problem, but it is in any case necessary to start dealing with it, especially in a country like Germany where the car and driving culture is strongly rooted in the population. The question is if it will still be possible to forbid driving a 'classic' not-automated vehicle or if the loss of the possibility to drive a vehicle by the state would cause a disproportionate interference with the general freedom of action.⁶³ To answer this question – the Author thinks this will be effectively possible only when the automated technologies will be concretely available – it will be necessary to balance the protection of life and physical integrity with other rights also protected by the *Grundgesetz*.⁶⁴

But the most discussed and problematic issue with regard to automated vehicles use and its regulation is represented by the so-called dilemma situations (*Dilemmasituationen*). Many scholars have started to deal with this issue, not only from a juridical and constitutional point of view, but also from an ethical one. Also the German Government took the importance of the ethical issues related to the use of driverless cars into account and the Federal Minister of Transport and Digital Infrastructure appointed an *Ethik-Kommission Automatisiertes und Vernetztes Fahren* (Ethic Commission on automated and connected driving), which presented a code of ethics published in 2017 consisting in twenty ethical guidelines indicating how the use of automated vehicles should take place.⁶⁵

The problem arises with reference to the fact that (clearly) automated and even more autonomous vehicles will be equipped with collision avoidance systems that are ideally capable of independently preventing an accident or at least mitigating its consequences. Nevertheless, there will be situations in which an accident cannot completely be prevented and in those cases the vehicle shall make a decision (on behalf of the driver) with potential consequences for the life and health of the driver, of the other vehicle's occupants or of third parties. The

⁶³ See the analysis of M. Brenner, n 59 above, 49-50.

⁶⁴ See particularly §§ 1, 12, and 14.

⁶⁵ The guidelines are available at <https://tinyurl.com/yey4twcu> (last visited 31 December 2022). See the comments regarding them made by C. Lütge, 'The German Ethics Code for Automated and Connected Driving' *Philosophy & Technology*, 547-558 (2017).

Among the scholars who have started to deal with the ethical problems related to automated driving activities, see, eg N. Knoepffler, 'Ethische Fragen autonomer Mobilität', M. Hermann and M. Knauff eds, *Autonomes Fahren* (Baden-Baden: Nomos, 2021), 9-26; F. Kröger, 'Automated Driving in Its Social, Historical and Cultural Contexts', in M. Maurer et al eds, *Autonomous Driving* (Berlin-Heidelberg: Springer, 2015), 41-68; P. Lin, 'Why Ethics Matters for Autonomous Cars', in M. Maurer et al eds, *Autonomous Driving* (Berlin-Heidelberg: Springer, 2015), 69-85; J.C. Gerdes and S.M. Thornton, *Implementable Ethics for Autonomous Vehicles*, in M. Maurer et al eds, *Autonomous Driving* (Berlin-Heidelberg: Springer, 2015), 87-102.

vehicle will not make this decision spontaneously, but in the way it was programmed in advance by the manufacturer, who has therefore programmed in advance using specific algorithms⁶⁶ how the vehicle should behave in a specific situation. It has been underlined how this kind of problem exactly proves the unique importance of constitutional law in the context of autonomous driving as the programming of vehicles shall be carried out respecting the conditions of constitutional law and the constitutionally protected legal interests.⁶⁷

It is clear that this could lead to profound differences in the regulation and systems programming rules among the various countries in light of the fact that the 'hierarchy' of constitutionally protected interests can also vary considerably across legal systems.

Concluding this quick recap, it should be observed that in the *Grundgesetz* there is no explicit reference to technology and technological development among the fundamental rights. On the other hand, it has been pointed out that the same Constitution is deemed open for progress in technology, considering that science and research fall within the scope of application of Art 5, para 3, GG.⁶⁸

In Germany also § 14 GG which guarantees property⁶⁹ and § 2 GG concerning the protection of life and physical integrity come into play.⁷⁰ The challenge for the programming of autonomous vehicles will be to anticipate possible conflicts of fundamental rights and to resolve them as carefully as possible by means of practical concordance in a constitutionally compliant balance.⁷¹ It is hard to predict how this will practically take place, in any case the future regulation, the legal scholarship and the constitutional case law will play a central role.

2. German Law Provisions Concerning Road Traffic

German road traffic regulation ('*Straßenverkehrsrecht*') is particularly detailed and consists of various law provisions. The most relevant ones are the following:

- Road traffic law ('*Straßenverkehrsgesetz*' – StVG);
- Road traffic regulation ('*Straßenverkehrs-Ordnung*' – StVO);
- Road traffic admission regulation ('*Straßenverkehrs-Zulassungs-Ordnung*' – StVZO);

⁶⁶ With regard to the functioning of such algorithms see, *inter alia*, G. Pascuzzi, n 9 above, 291.

⁶⁷ M. Brenner, n 59 above, 50-51.

⁶⁸ E. Böning and H. Canny, 'Easing the Brakes on Autonomous Driving - International Law, European Law and German Law in Perspective' *Freiburger Informationspapiere zum Völkerrecht und Öffentlichen Recht*, 15 (2021).

⁶⁹ The first sentence of § 14, para 1, GG states clearly that property shall be guaranteed ('*Das Eigentum und das Erbrecht werden gewährleistet*').

⁷⁰ § 2, para 2, GG foresees that every person shall have the right to life and physical integrity ('*Jeder hat das Recht auf Leben und körperliche Unversehrtheit. Die Freiheit der Person ist unverletzlich. In diese Rechte darf nur auf Grund eines Gesetzes eingegriffen werden*').

⁷¹ M. Brenner, n 59 above, 51.

- Vehicle approval regulation (*EG-Fahrzeuggenehmigungsverordnung* – EG-FGV), which converted into national law the European directive no 2007/46/EC;
- Vehicle admission regulation (*Fahrzeug-Zulassungsverordnung* – FZV);
- Regulation on the admission of people to road traffic (*Verordnung über die Zulassung von Personen zum Straßenverkehr* – FeV).

With specific regard to automated vehicles, as of today, the most important law provision is the *Straßenverkehrsgesetz* and particularly §§ 1a – 1l.

The *Straßenverkehrsgesetz* rules, more in general, the behaviour of drivers in the context of road traffic and the use of traffic signs. In 2017 and then in 2021 it was modified in order to provide a regulation also to the most recent (and even not yet completed) technological developments in the field of autonomous driving.

IV. The Reform of the *Straßenverkehrsgesetz* of 2017 and the New §§ 1a – 1c

In 2017 automated vehicles made their debut in the German legal scenario.⁷² By means of the *Achtes Gesetz zur Änderung des Straßenverkehrsgesetzes* of 16 June 2017⁷³ the *Bundestag* introduced the new §§ 1a, 1b and 1c. The changes made to the *Straßenverkehrsgesetz* concerned three main areas: (i) the characteristics and the registration of driverless vehicles, (ii) the driver's liability by using them and (iii) data storage.⁷⁴ More specifically with this reform the use of highly and fully automated vehicles that fulfil certain requirements has been explicitly legalised.⁷⁵

On this occasion the German legislator proved to be aware of the new challenges that driverless cars oblige it to address or at least to take into due consideration.⁷⁶ In particular, it was clear that in the near future technical developments in automotive engineering will lead to scenarios in which it is technically possible for the technological system to take over vehicle control in certain situations. At the same time, it was not possible (in 2017) to consider those systems as perfectly and constantly working. It was therefore necessary to keep in mind their limits and leave to the driver the possibility to retake over

⁷² M.G. Losano, n 1 above, 3-4, points out that already in 2015 the German Government decided to digitise a stretch of highway intended for testing automated vehicles, so that it has experimental data on which to base legal rules to be applied to this developing field. It was only a closed-to-the-public road area, albeit simulating a public highway.

⁷³ German Federal Law Gazette (*Bundesgesetzblatt*) 2017, Part I, no 38, 1648-1650.

⁷⁴ E. Böning and H. Canny, n 68 above, 18; M.G. Losano, n 1 above, 4-7. The regulation concerning automated driving systems data and their use will not be a subject of this article. Because of their complexity and extent such topics require indeed to be analysed specifically.

⁷⁵ K.A.P.C. van Wees, 'Technology in the Driver's Seat: Legal Obstacles and Regulatory Gaps in Road Traffic Law', in S. Van Uytsel S. and D. Vasconcellos Vargas eds, *Autonomous Vehicles* (Singapore: Springer, 2021) 21, 30.

⁷⁶ J. Klink-Straub and T. Keber, n 18 above, 114.

driving control. In any case such technical developments required regulations by the legislator on the interaction between the vehicle driver and the motor vehicle with automated driving functions.⁷⁷

Thanks to this reform, for the first time Germany saw a regulation aiming to rule the coexistence of ‘classic’ vehicles with cars of Level 3 and 4 of the SAE Classification.⁷⁸

To be more precise, it is necessary to note that the terminology used by the German legislator is a bit misleading. Particularly § 1a ff. StVG uses the expression ‘*Kraftfahrzeuge mit hoch- oder vollautomatisierter Fahrfunktion*’ (Vehicles with high or complete automated driving function) but in a different sense from the one used in the SAE Classification. In this latter rating system highly and fully automated driving technologies correspond to those of Level 4 and 5. Probably it would have been more appropriate to use the terminology ‘conditional’ (Level 3) and ‘high’ (Level 4) automation,⁷⁹ or, even better, to make an explicit reference to the SAE Classification or in any case to support the use of a unique international rating system.

However, it has been pointed out that despite the fact that the StVG does not expressly refer to the SAE Classification, the reference to it is in any case clear from the parliamentary documentation.⁸⁰ In the same way it is clear from the parliamentary proceedings that Level 5 was not a subject of the *AchtesGesetz*.⁸¹

The exclusion of autonomous vehicles (Level 5, ie, cars with a driverless technology that is completely autonomous in every possible situation and where the ‘tools’ that allow the ‘physical’ driver to control the vehicle are not even necessarily present) is also expressly stated by § 1b StVG, according to which the driver has to be able to take back vehicle the control. Therefore, the modification made through the *AchtesGesetz* did not change the need to have a physical driver always present in the car and able to drive.⁸²

Starting to analyse the provisions instructed by the abovementioned reform, § 1a StVG (expressly entitled ‘*Vehicles with high or complete automated driving function*’) states the admissibility of automated vehicles if they are handled for their intended purpose (*‘bestimmungsgemäß’*).⁸³ Furthermore, § 1b StVG (*‘Rights*

⁷⁷ Deutscher Bundestag, Drucksache 18/11300, 20 February 2017, 1. The most relevant documentation concerning the *AchtesGesetz zur Änderung des Straßenverkehrsgesetzes* is available at <https://tinyurl.com/45sf2fff> (last visited 31 December 2022).

⁷⁸ M. Brenner, n 59 above, 45. This is confirmed by other several scholars, among which see K.A.P.C. van Wees, n 75 above, 30, fn 36, according to which: ‘Although these new rules do not refer to the automation levels as defined by the SAE, in essence, the term “high automation” in the German law is akin to SAE Level 3 (“conditional automation”), while the term “full automation” equals SAE Level 4 (“high automation”)’.

⁷⁹ Among others, M.N. Schubert, n 25 above, 126, also points out that the German ‘*hochautomatisiert*’ driving system corresponds to the ‘conditional automation’ (Level 3).

⁸⁰ Deutscher Bundestag, Drucksache 69/17, 27 January 2017, 6.

⁸¹ M.N. Schubert, n 12 above, 20-21.

⁸² J. Klink-Straub and T. Keber, n 18 above, 114. V. Lüdemann et al, n 24 above, 412.

⁸³ M.N. Schubert, n 12 above, 20, translates the first paragraph of § 1a StVG (*Der Betrieb*

and obligations of the vehicle driver when using highly or fully automated driving functions') states that driving functions are permissible only to the extent that drivers may temporarily turn away from traffic and driving and are always capable of overriding the automated system.

In the second paragraph, § 1a StVG defines *Kraftfahrzeuge mit hoch- oder vollautomatisierter Fahrfunktion*, as those with a technical equipment that:

1. can control the motor vehicle after activation in order to perform the driving task, including longitudinal and lateral guidance;
2. during highly or fully automated vehicle control is capable of complying with the traffic regulations directed at the vehicle control;
3. can be manually overridden or deactivated by the vehicle driver at any time;
4. is capable of recognizing the need for the driver to control the vehicle manually;
5. can indicate visually, acoustically, tactilely or otherwise perceptibly to the driver the need for manual control of the vehicle with a sufficient time buffer before the driver is given control of it, and
6. indicates if the use is contrary to the system description.

The manufacturer of such a motor vehicle shall make a binding declaration in the system description that the vehicle complies with the requirements described above and clarify prerequisites and limits of the automated system. Drivers are required to inform themselves of these limits and keep them in mind when driving.⁸⁴

This provision – set by § 1a, para 2, StVG – has been criticised by some scholars, as there is the risk that too many tasks are placed on the manufacturer. Tasks that as of today have always been performed by the State, especially if we consider that the responsibilities in this sector are particularly high and sensible because there are constitutional and human rights of the individuals (including health and life of the driver, of passengers and of the other users of the road) that may be involved.⁸⁵

Going back to § 1a StVG, it should be noted that according to the following para 3, the vehicles must comply with international regulations (UNECE-Regulations)⁸⁶ or have type approval under EU law. In this regard it should be noted that since European Union law provisions (Directive 2007/46/EC and Regulation 2018/858/EU) also refers to the ECE regulations in many cases,

eines Kraftfahrzeugs mittels hoch- oder vollautomatisierter Fahrfunktion ist zulässig, wenn die Funktion bestimmungsgemäß verwendet wird.) as follows: 'The operation of motor vehicles by means of a highly or fully automated driving function shall be permissible if this function is used for its intended purpose'. In my view, 'bestimmungsgemäß' could also be translated into 'according to the regulations'.

⁸⁴ E. Böning and H. Canny, n 68 above, 19.

⁸⁵ *ibid* 19-20.

⁸⁶ J. Klink-Straub and T. Keber, n 18 above, 114.

these will be decisive for automated vehicle eligibility.⁸⁷

Such requirements have a central importance: in order for a driver to be allowed to turn his or her attention away from driving (§ 1b StVG), the same requisites set forth by the § 1a StVG have to be met.⁸⁸

Even if he or she can carry out other actions while the car is moving, based on the definition of § 1a StVG, the importance that the driver's role continues to have has been made absolutely clear. This is furthermore stressed by the subsequent para 4, according to which the driver of the vehicle⁸⁹ is also the person who activates a highly or fully automated driving function within the meaning of the above summarised definition and uses it to control the vehicle, even if he or she does not directly control the vehicle during the use of this function.

As a matter of fact, the 'physical' driver has to always be able to override the automated system which is therefore still considered as an assistance technology, not as a driver-replacement one. For this reason, Level 5 driving systems cannot be considered as admitted according to §§ 1a-1c StVG.

The 'revolutionary' aspect of this law provision is given by the fact that § 1a StVG states clearly the admissibility of high and fully automated vehicles on public roads.

Such admission is granted upon application if the vehicle corresponds to an approved type (*Typengenehmigung*) or an individual approval has been granted and a motor vehicle liability insurance policy complying with the compulsory insurance law has been subscribed to. In the case of type approval (*Betriebserlaubnis*), a distinction is made between type approval for series-produced vehicles of the same type on the basis of a sample vehicle and individual approval for individual vehicles.⁹⁰

Some scholars have questioned the exact meaning of the term '*bestimmungsgemäß*' (for its intended purpose), which is indicated as a requirement in order to handle automated vehicles by the abovementioned § 1a, para 1, StVG. More in general, this term represents a central parameter for driverless vehicles' use admissibility as well as for the driver's liability.⁹¹

According to the official documentation related to the *Achtes Gesetz zur Änderung des Straßenverkehrsgesetzes*, such a requirement is addressed first of all to the cars' producers. More in detail, the manufacturer has to clearly explain to the user of the vehicle that it is a vehicle with highly or fully automated driving functions as described in this law and which are the limits of such use.⁹²

⁸⁷ M. Wagner, n 17 above, 54.

⁸⁸ E. Böning and H. Canny, n 68 above, 19.

⁸⁹ ie the person who has all the related rights, duties and obligations.

⁹⁰ M. Wagner, n 17 above, 53-54, see specifically fn 149; C. Artz and S. Ruth-Schumacher, n 23 above, 58.

⁹¹ § 1a, para 1, and § 1b, para 1, no 2, StVG.

⁹² Deutscher Bundestag, Drucksache 18/11776, 29.03.2017, 10: 'Beim Tatbestandsmerkmal „bestimmungsgemäß“ kommt der Systembeschreibung durch den Hersteller Bedeutung zu.

Similar to other fields, the use of a certain product or object for its intended purpose represents a parameter, which is necessary to limit the manufacturer's responsibility.⁹³ Here it is particular that § 1a, para 1, StVG links the *bestimmungsgemäß* use of the automated vehicles with their admissibility. The authorised handling of the vehicle by means of automated driving functions is to be restricted: not every technically possible use of the functions has to necessarily be deemed as admissible for the user.⁹⁴

Consequently, it has to be pointed out the great importance of the role played by the manufacturer. According to the abovementioned *AchtesGesetz*, the manufacturer defines the requirements for the *bestimmungsgemäß* use of the vehicle in its functional description.⁹⁵ *Eg* the use of an automated driving function would only be *bestimmungsgemäß* on highways or traffic routes similar to freeways if the automated system is only intended for this use according to the vehicle manufacturer.⁹⁶

In this way § 1a, para 1, StVG seems to make a dynamic reference to the private standard-setting by a corporation. Such reference could be source of uncertainty and in contrast with the rule of law and the principle of '*Rechtsklarheit*'.⁹⁷

On the other hand, it should also be noted that the margin left to the manufacturer is strongly limited by the fact that the requirements foreseen by § 1a, paras 2-3, StVG, including the technical standards referred to therein, shall be understood as a determination of the content of the permissibility of automated driving functions. The *bestimmungsgemäß* use will be therefore first of all specified by the technical requirements (such as the ECE regulations) for individual driving functions within the meaning of § 1a Para 3 StVG. These technical requirements shall already contain specific information about the intended use of the driving function and its prerequisites and the manufacturer's system description must be assessed in accordance with these technical

Mit dieser Regelung wird der Hersteller verpflichtet, dem Nutzer des Fahrzeugs eindeutig zu erklären, dass es sich hier um ein Fahrzeug mit hoch- oder vollautomatisierten Fahrfunktionen gemäß der Beschreibung in diesem Gesetz handelt'. (The description of the system by the manufacturer is important with regard to the criterion of 'its intended purpose'. This regulation obliges the manufacturer to clearly explain to the user of the vehicle that this is a vehicle with highly or fully automated driving functions according to the description in this law.)

⁹³ For a first analysis of the characteristics of the producer's liability according to German law, see O. Palandt, *Bürgerliches Gesetzbuch, Kurz Kommentar* (Munich, C.H. Beck, 79th ed, 2020), § 823, para 169-185.

⁹⁴ J. Ensthaler and M. Gollrad, n 15 above, 68.

⁹⁵ In the documentation related to the *AchtesGesetz* (particularly Deutscher Bundestag, Drucksache 18/11300, 20.02.2017, 20) it is stated that the system description of the vehicle has to provide unambiguous information about the type of automated driving function equipment as well as about the degree of automation in order to inform the driver about the framework of the intended use ('*Rahmen der bestimmungsgemäßen Verwendung*'). V. Lüdemann et al, n 24 above, 412.

⁹⁶ J. Klink-Straub and T. Keber, n 18 above, 114. J. Ensthaler and M. Gollrad, n 15 above, 68.

⁹⁷ S. Vöneky, n 5 above, 14. See also V. Lüdemann et al, n 24 above, 412.

requirements.⁹⁸

To conclude, what does ‘use for its intended purpose’ mean in practice? It is not possible to give a unique answer, considering that the possible use of the vehicles will depend first of all on the degree of automation of the driving function (Level 3 or 4), the operating domains in which an automated function or system is designed to properly operate (operational design domain - ‘ODD’), the requirements of the vehicle, the interaction with the vehicle by using the driving function (human-machine interaction), and specific instructions for using the driving function in the vehicle.⁹⁹

1. The Sharing of Liabilities in Case of an Accident Caused by a Driverless Vehicle

One of the most discussed issues with regard to automated vehicles use is the sharing of liabilities and of the consequent damages’ compensation obligations. The basic question is if the physical person in the car or its owner¹⁰⁰ shall or not bear the cost¹⁰¹ of an accident caused by the vehicle – as it is for cars without an automated driving system or with a SAE Level 1 or 2 technology – if in that moment the car is driven by the driving system.

The questions that arise in relation to the applicability of the actual liability regime to automated vehicles represent a challenge for all legislators. Particularly it is necessary to state if the current liability provisions remain effective also with regard to such new technologies or if they need to be amended or substituted.¹⁰²

⁹⁸ J. Ensthaler and M. Gollrad, n 15 above, 69.

⁹⁹ *ibid* 69.

¹⁰⁰ According to § 7, para 1, StVG: ‘If, during the operation of a motor vehicle, a person suffers death, the body or health of a person is injured or an item of property is damaged, the vehicle holder is liable to make compensation to the injured person for the resulting damage’.

¹⁰¹ § 12 StVG foresees a monetary cap. Such provision states the following: ‘(1) The party liable to pay damages shall be liable: 1. only up to a maximum total amount of five million euro in the case of the death or injury of one or several persons as a result of the same event; only up to a maximum total amount of ten million euro in the case of the damage being caused on account of the use of a highly or fully automated driving function in accordance with section 1a or during operation of an autonomous driving function in accordance with section 1e; in the case of the commercial transportation of passengers for payment, the liability of the holder of the transporting motor vehicle to pay damages shall increase when more than eight passengers were killed or injured by six hundred thousand euro for each additional passenger who was killed or injured; 2. only up to a maximum total amount of one million euro in the case of damage to property, even when several items of property were damaged by the same event; in the case of the damage being caused on account of the use of a highly or fully automated driving function in accordance with section 1a, or during operation of an autonomous driving function in accordance with section 1e, only up to a maximum total amount of two million euro. The maximum amounts specified in sentence 1 no 1 shall also apply to the capital value of an annuity to be paid as damages. (2) Should the combined indemnification to be paid to several injured parties on account of the same event exceed the maximum amounts specified in subsection (1), then the individual compensation shall be reduced pro-rata to the maximum total given’.

¹⁰² See also B.A. Koch, ‘Produkthaftung für autonome Fahrzeuge’, in S. Laimer and C. Perathoner eds, *Mobilitäts- und Transportrecht in Europa* (Berlin: Springer, 2022), 113-128.

The German liability regime has always been characterised by a strict liability imposed on the owner (ie, the person or legal entity in whose name the vehicle is registered).¹⁰³ Particularly § 7 StVG states that if, during the operation of a motor vehicle, a person suffers death, the body or health of a person is injured or an item of property is damaged, the vehicle holder is liable to make compensation to the injured person for the resulting damage. Moreover § 18 StVG regulates the vehicle driver's liability to pay damages compensation if he or she caused it. But does such liability regime change if the vehicle is driven by an automated technological system?

The *Achtes Gesetz zur Änderung des Straßenverkehrsgesetzes* of 2017 started to deal with this problem. As a matter of fact, by means of such law provision the German legislator not only made automated driving available for the first time, but also defined the areas of responsibility for the use of automated driving functions.¹⁰⁴

The subjects here involved are the manufacturer, the competent approval authority, the vehicle's owner and the driver.

The manufacturer bears a comprehensive safety-related product responsibility (*sicherheitsbezogene Produktverantwortung*). Before the launch of an automated driving system on the market, the manufacturer must comply with the regulatory requirements, implement them in the automated driving system and prove that they have been met in the approval procedure. Particularly, the manufacturer has the responsibility to ensure that the automated driving function complies with the requirements foreseen by the law.¹⁰⁵ This is checked by the approval authority (or the technical service commissioned by it). The approval authority has a guarantee responsibility (*Gewährleistungsverantwortung*), as it certifies with the approval of the automated driving function that its intended use does not impair road safety. The task of the public authority itself is therefore very important, as the latter decides whether or not a highly or fully automated vehicle can be purchased and then used on public roads. Therefore, the competent authority has to test and then, eventually, approve the vehicle.¹⁰⁶ Such activities play a central role and are a source of responsibility on the authority, considering that the testing and approval of the highly or fully automated driving function is part of the authorization process. Only by performing such activities correctly can the approval authority fulfil its responsibility to

¹⁰³ M.N. Schubert, n 12 above, 18; M. Channon et al, *The Law of Autonomous Vehicles* (Abingdon-New York: Informa Law from Routledge, 2019), 68.

¹⁰⁴ B. Wolfers, 'Regulierung und Haftung bei automatisiertem Fahren: zwei Seiten einer Medaille?' *Recht Automobil Wirtschaft*, 94 (2018).

¹⁰⁵ B. Wolfers, n 104 above, 95. See also the analysis on the provisions of the European Union on the product responsibility (also in relation to the automated vehicles) made by B.A. Koch, n 102 above, 118-128.

¹⁰⁶ With regard to the approval procedure, see B. Wolfers, n 104 above, 94 and 97.

guarantee the approval of safe vehicles with automated driving functions.¹⁰⁷

Furthermore – as already mentioned above – pursuant to § 1a, para 1, sentence 2, StVG the manufacturer has to make a binding declaration in the system description that the vehicle complies with the requirements by the aforementioned sentence of the same norm. Such declaration duties have effects *vis-à-vis* both the driver and the approval authority.¹⁰⁸ At the same time, the manufacturer's liability has to follow the law provisions concerning the liability for products' defects¹⁰⁹ as well as the regime of the producer's liability.

The owner liability is stated by § 7 StVG and it does not change if the vehicle is equipped with a highly or fully automated driving technology (Level 3 and Level 4).

With regard to § 7 StVG, it should be remembered that the liability regulated by the same provision is a '*verschuldensunabhängige Gefährdungshaftung*' (no-fault liability). This also applies if a vehicle with an automated driving function is used. Therefore, such liability covers all potential damage, regardless of whether it is caused by a use for the intended purpose or not or by an error of the automated driving function. Malfunctions of driving systems are not an event of force majeure (*höhere Gewalt*), as they are not something 'external' from the vehicle, and therefore the exception pursuant to § 7, para 2, StVG does not apply.¹¹⁰ In this case, the owner of the vehicle will therefore still be considered liable, but she or he may be then able to take recourse against the manufacturer.¹¹¹

Finally, the driver is liable pursuant to § 18 StVG and has a responsibility to gather information, monitor and take over the driving system ('*Informations-, Überwachungs- und Übernahmeverantwortung*'): He or she must inform him- or herself about the requirements and limits of the automated driving function, monitor compliance with them and, if necessary, take over the driving task again.¹¹² In other words, his or her duty to be informed has to be respected in order to enable the driver to respect the obligations foreseen by § 1b StVG. At the same time, he or she always has to use the driverless technology *bestimmungsgemäß*, otherwise the same use is inadmissible, and the driver will be liable in case of damage to third parties.¹¹³ In fact the circumstance that

¹⁰⁷ C. Artz and S. Ruth-Schumacher, n 23 above, 57-62.

¹⁰⁸ B. Wolfers, n 104 above, 96.

¹⁰⁹ And particularly the provisions of the *Gesetz über die Haftung für fehlerhafte Produkte* (Act on Liability for Defective Products – ProdHaftG).

¹¹⁰ P. Ringlage, n 60 above, 43; B. Wolfers, n 104 above, 99. See also V.M. Jänich et al, 'Rechtsprobleme des autonomen Fahrens' *Neue Zeitschrift für Verkehrsrecht* (2015), 313-318, cited by the latter Author at fn 31.

¹¹¹ M. Channon et al, n 103 above, 69-70.

¹¹² P. Buck-Heeb and A. Dieckmann, 'Die Fahrerhaftung nach § 18 I StVG bei (teil-)automatisiertem Fahren' *Neue Zeitschrift für Verkehrsrecht*, 113, 115 (2019).

¹¹³ B. Wolfers, n 104 above, 94 and 96. The Author correctly points out the strict connection between the duties of the manufacturer and the driver: As a matter of fact, the manufacturer's information and transparency responsibility corresponds to the driver's responsibility to be informed.

the ‘*bestimmungsgemäße Verwendung*’ is determined by the manufacturer’s system description implicates the driver’s duty to know this before activating the driving function and using it to control the vehicle. If he or she does not do this, he or she is acting in breach of his or her duty of care and it will not be possible for him or her to exonerate himself or herself from the presumption of fault pursuant to § 18, para 1, StVG.¹¹⁴

Moreover, even if the automated driving systems are considered as a safer alternative to traditional cars, the damage compensation monetary cap foreseen by § 12 StVG has been increased from a liability coverage of five million to ten million (§ 12, para 1, no 1 StVG) in case of damage (death or injury of one or several persons) caused on account of the use of a highly or fully automated driving function in accordance with § 1a StVG or during the operation of an autonomous driving function in accordance with § 1e StVG.¹¹⁵

Such increase of the monetary cap has been foreseen also in case of damage to a property: the cap of one million euro has been doubled to two million euro if the damage has been caused on account of the use of a highly or fully automated driving function in accordance with § 1a StVG or during operation of an autonomous driving function in accordance with § 1e StVG.

It has been pointed out that the above-described monetary cap increases pursuant to § 12 StVG seem to reflect a degree of uncertainty in relation to whether these cars that are allowed to be used according §§ 1a ff StVG will actually increase road safety. At the same time, it should be considered that there is no empirical data related to the use of automated driving systems, only estimations are available so far.¹¹⁶

With regard to the sharing of liabilities, what the German Government explicitly pointed out in the official motivation of the law proposal sent to the German Parliament is interesting. In particular it stated that at this stage of the technological development it should be clear that highly and fully automated systems should be programmed and structured so that they are able to recognize their limits and request the vehicle driver to take over vehicle control. The vehicle’s driver is obliged to comply with this request without delay. In addition, the vehicle driver must take over vehicle control if the prerequisites for using a highly or fully automated driving function no longer apply. Consequently, even in the case of vehicle control by means of an automated driving function, the driver of the motor vehicle in question remains the ‘physical’ driver, *i.e.*, during the automated driving phase the vehicle driver is not replaced by the highly or fully automated system. This would only be the case with autonomous driving, in which there is no driver, only passengers.¹¹⁷

¹¹⁴ P. Buck-Heeb and A. Dieckmann, n 112 above, 116.

¹¹⁵ Moreover, see the section dedicated to autonomous driving function in accordance with §§ 1e and following StVG.

¹¹⁶ E. Böning and H. Canny, n 68 above, 20.

¹¹⁷ Deutscher Bundestag, Drucksache 18/11300, 20 February 2017, 14.

According to §§ 1a ff StVG when a highly or fully automated driving system is used, the ‘physical’ driver remains legally in control of the vehicle, even if he or she is not manually controlling the vehicle in this mode.¹¹⁸ This is clearly stated by § 1a, para 4, StVG according to which the driver is the person who activates a highly or fully automated driving function and uses it to control the vehicle, and this does not change if he or she does not directly control the vehicle while using the driverless technology.

Therefore, this is no great change in the liability regime, especially with regard to the rights and duties of the vehicle’s owner pursuant to § 7 StVG. Even apart from the reasons described above, this is due to the fact that the regulation (which is prior to these driving technologies) according to which the vehicle owner shall be considered liable, regardless of whether or not he or she was driving the vehicle, is not affected and does not depend on whether a human or machine driver is controlling the car at the moment of the accident. Therefore, the opinion according to which after the *Achtes Gesetz* the liability regulation, especially with regard to the vehicle’s owner, is not substantially changed could be shared.¹¹⁹

The only aspect that could be considered new, however, is the subject of the owner’s liability: The owner no longer has to be liable only for the behaviour of human drivers who use the vehicle under his or her authority, but also for the automated driving software.¹²⁰

In other words, §§ 1a and 1b StVG did not create an independent liability regime: the previous liability regimes, in particular those of the StVG, the *Bürgerliches Gesetzbuch* (German Civil Code – BGB) and the *Gesetz über die Haftung für fehlerhafte Produkte* (Act on Liability for Defective Products – ProdHaftG) have remained essentially unchanged. At the same time, it cannot go unmentioned that according to part of the scholarship the new regulations have an – at least indirect – impact on the existing liability regimes. Particularly, they affected the concept of fault and the determination of a product defect. As a result, it has been stated that the liability regimes have not been changed, but they have been readjusted in line with the new allocation of responsibility for automated driving functions.¹²¹

This applies especially for the driver’s liability pursuant to § 18 StVG, which – differently from § 7 StVG – is based on negligence, which the law initially presumes, but that can also be refuted (§ 18, para 1, StVG).¹²² This is typically the case if the accident is due to a technical fault (*eg* burst tire, failing brakes). In this case the driver must prove that his or her loss of control was due to this

¹¹⁸ M.N. Schubert, n 12 above, 21.

¹¹⁹ *ibid* 19; P. Buck-Heeb and A. Dieckmann, n 112 above, 113; M. Channon et al, n 103 above, 69.

¹²⁰ P. Ringlage, n 60 above, 48.

¹²¹ B. Wolfers, n 104 above, 98.

¹²² P. Ringlage, n 60 above, 52; M. Channon et al, n 103 above, 68.

technical fault and that she or he acted without fault.¹²³

Which is the relation between this general liability norm and the provisions of §§ 1a and 1b StVG? How should § 18 StVG be interpreted if an automated driving system is used and the driver is not technically driving?

The abovementioned scholarship supports the opinion according to which the standard of negligence has been shifted by provisions introduced by the *AchtesGesetz* and that the result of the combined application §§ 1a, 1b and 18 StVG is that the driver can reduce the standard of care while driving within the limits of the intended use of the automated driving technology, but within this framework the assumption and monitoring responsibility remain with the driver. Consequently, the liability exception pursuant to § 18, para 1, StVG is applicable if the accident is caused by an error of the driverless technology (which was used for its intended purpose) that could not be recognized in time, but not if the same accident is caused by the circumstance that the driver did not use the technology for its intended purpose or did not take back the control of the vehicle when he or she should have done so.¹²⁴

Considering the continuous and quick development of driverless technology it has been pointed out that probably the higher the degree of automation of the vehicles, the less the fault liability according to § 18 StVG will play a role in the future.¹²⁵

At the end of this section, it should be noted that the owner and the driver are also subject to general tort liability pursuant to § 823 BGB. Particularly the owner has a duty to instruct the driver as part of the general duty to ensure road safety, consequently he or she has to inform the driver about the automated driving functions, their purpose, requirements and limits. On the other hand, the driver has to fulfil the information responsibility by properly informing himself or herself.¹²⁶ In this case, differently from the provisions of road traffic law, neither a presumption of fault on the part of the driver nor a cap in favour of the driver apply.¹²⁷

2. Non-Driving Activities

The main consequence of the use of driverless technologies is the possibility for the driver – even if he or she has to be always able to take back the control of the vehicle – to do other activities (also called ‘side activities’) while the car is proceeding.

This right of the driver to ‘be distracted’, to turn away from the driving activities (*Abwendungsrecht*) represents a great innovation as it is an exception

¹²³ B. Wolfers, n 104 above, 99; P. Buck-Heeb and A. Dieckmann, n 112 above, 114.

¹²⁴ V. Lüdemann et al, n 24 above, 412; B. Wolfers, n 104 above, 99-100.

¹²⁵ J. Klink-Straub and T. Keber, n 18 above, 114-115.

¹²⁶ V. Lüdemann et al, n 24 above, 412.

¹²⁷ B. Wolfers, n 104 above, 100.

expressly provided by law from the obligation foreseen by § 1, para 1, StVO, according to which being involved in road traffic requires constant caution and mutual consideration (*ständige Vorsicht und gegenseitige Rücksicht*).¹²⁸

Such possibility is not only a logical consequence of the admission of the driverless systems (and one of their main advantages) but also is openly stated by the law. Pursuant to § 1b, para 1, StVG the driver is allowed to turn away from the traffic environment and vehicle control, but must remain sufficiently perceptive so that he or she can resume control in every moment if necessary.¹²⁹ In the second paragraph the same law provision indicates when the driver has the duty to immediately take back the control: When the automated system prompts him or her to do so (no 1), or when she or he realises, or, because of clear circumstances, must realise that the conditions for using the automated driving functions are no longer being met (no 2).¹³⁰ This means that the driver cannot rely entirely on the automated driving technology.¹³¹

But what this concept of *Wahrnehmungsbereitschaft* (perception readiness) means could represent a problem. In fact, it is not clear which level of attention is required from the driver. The legislator has refrained from rendering the above-mentioned term more concrete.¹³² In any case, considering that § 1b, para 1, StVG allows the driver to turn away from the traffic situation and the control of the vehicle, it can be deduced that a permanent monitoring is not required, instead it is necessary to have only a minimum level of attention in order to be able to take control again.¹³³

Part of the legal scholarship has also pointed out that as of today it is not clear which are in practice those circumstances from which the driver has to

¹²⁸ B. Wolfers, n 104 above, 95; M. N. Schubert, n 25 above, 126. See also M. Wagner, n 17 above, 66-69, who points out with regard to the *Straßenverkehrs-Ordnung* (StVO) that its provisions are mainly directed at the vehicle driver and that consequently there could be some difficulties related to the interpretation and application of those norms when a highly or fully automated driving system is used. She also reflects on the fact that in the absence of a clarification of the StVO with regard to the use of driverless cars, questions arise in relation of the extent to which the principle of constant vehicle control remains in effect even with highly and fully automated driving, or to what extent the driver may turn away from the traffic situation when automated driving functions are activated.

¹²⁹ *Der Fahrzeugführer darf sich während der Fahrzeugführung mittels hoch- oder vollautomatisierter Fahrfunktionen gemäß § 1a vom Verkehrsgeschehen und der Fahrzeugsteuerung abwenden; dabei muss er derart wahrnehmungsbereit bleiben, dass er seiner Pflicht nach Absatz 2 jederzeit nachkommen kann.* (During vehicle manoeuvres using the highly or fully automated driving functions pursuant to § 1a, the driver may turn away from the traffic situation and vehicle manoeuvring; in doing so, he must remain perceptive in such a way that he can fulfil his duty in accordance with paragraph 2 at any time.).

¹³⁰ A. Albanese, 'La responsabilità civile per i danni da circolazione di veicoli ad elevata automazione' *Europa e diritto privato*, 995, 997-998 (2019). With regard to the concept of *'offensichtliche Umstände'* (evident circumstances) see P. Buck-Heeb and A. Dieckmann, n 112 above, 118-119.

¹³¹ M. Channon et al, n 103 above, 69.

¹³² P. Buck-Heeb and A. Dieckmann, n 112 above, 114.

¹³³ V. Lüdemann et al, n 24 above, 414.

infer that he has to take back control of the vehicle.¹³⁴ This problem will probably be solved by case law, but at this stage this gap could cause uncertainty and hinder the spread of driverless technologies.

Theoretically the driver may therefore carry out any non-driving activity, provided that in the specific driving situation he or she is still able to resume control of the vehicle *'unverzüglich'* (without delay) as soon as the system prompts him to do so.¹³⁵

In order to respect such an obligation, the driver has to be able to interrupt the non-driving behaviour from time to time in order to monitor the driving system and observe the traffic situation. The period of time during which he has to comply with this reduced monitoring duty depends on the respective traffic, visibility, road and weather conditions characterising the concrete driving situation. As long as the non-driving activity does not cause the driver to lose his or her capacity to perceive external circumstances, he or she can do theoretically anything, provided he or she does not leave the driver's seat to do so and that he or she is – as said above – always able to stop the non-driving activity immediately.¹³⁶

In any case, according to § 1b StVG there are three requirements to be met in order to let the driver do non-driving activities: (i) a *'hoch- oder vollautomatisierte Fahrfunktion'* pursuant § 1a, para 2, StVG has to be used to drive the vehicle, (ii) said driving system has to be used for its intended purpose pursuant § 1a, para 1, StVG and (iii) the driver must remain *'wahrnehmungsbereit'* during the automated driving functions use in accordance with § 1b, para 2, StVG.¹³⁷

The legislator did not also provide a list of allowed non-driving activities¹³⁸ or examples of them and this contributes to a certain degree of uncertainty that – as said *supra* – can only be overcome by case law.

V. The Reform of 2021: The *Gesetz zum autonomen Fahren*

Until 2021, the use of autonomous vehicles on public roads has so far only been legally permitted in parts of the USA.¹³⁹ Such a scenario could now change in Germany.

More specifically, thanks to the *Gesetz zur Änderung des Straßenverkehrsgesetzes und des Pflichtversicherungsgesetzes - Gesetz zum autonomen Fahren vom 12.07.2021*¹⁴⁰ the German legislator opened the door

¹³⁴ M.N. Schubert, n 12 above, 21; J. Klink-Straub and T. Keber, n 18 above, 114; V. Lüdemann et al, n 24 above, 413.

¹³⁵ P. Buck-Heeb and A. Dieckmann, n 112 above, 117.

¹³⁶ *ibid* 119.

¹³⁷ B. Wolfers, n 104 above, 95.

¹³⁸ V. Lüdemann et al, n 24 above, 414.

¹³⁹ J. Klink-Straub and T. Keber, n 18 above, 118.

¹⁴⁰ German Federal Law Gazette (*Bundesgesetzblatt*) 2021, part I, no 48, 3108-3115.

also to the ‘*Kraftfahrzeuge mit autonomer Fahrfunktion*’, ie pursuant to the new § 1d StVG, motor vehicles that can perform the driving task independently, within a defined operating area and without a person driving them and that have the technical equipment required by the law.¹⁴¹ Such innovative law was adopted as a transitional regulation currently applicable in the national legal framework in preparation for later expected international legal harmonisation.¹⁴²

Thanks to this reform, in Germany autonomous driving (in defined operating ranges) is already a regulatory reality and the technical application can now travel the path paved by regulation.¹⁴³

Before dealing with a short analysis of the *Gesetz zum autonomen Fahren*, it is necessary to observe what the German legislator means when it uses the expression ‘*Kraftfahrzeuge mit autonomer Fahrfunktion*’. Such wording is indeed partially misleading, as it does not refer to the Level 5 vehicles of the SAE Classification, but to Level 4.

This is not explained in the law provisions themselves, but in the relevant documentation, as well as in the relevant German Federal Ministry for Digital and Transport communication of 27 July 2021.¹⁴⁴ More in detail it is possible to read in the ‘Bill for amendment of the Road Traffic Act and the Compulsory Insurance Act – Act on Autonomous Driving’ that these vehicles are not those ‘fully automated’ of Level 5 according to the international classification (SAE), because

‘Level 5 SAE means fully autonomous driving, in which the dynamic driving task is performed without a human driver under any road and environmental condition that is conventionally also controlled by a human

¹⁴¹ The German text of § 1d, para 1, StVG is the following ‘Ein Kraftfahrzeug mit autonomer Fahrfunktion im Sinne dieses Gesetzes ist ein Kraftfahrzeug, das 1. die Fahraufgabe ohne eine fahrzeugführende Person selbstständig in einem festgelegten Betriebsbereich erfüllen kann und 2. über eine technische Ausrüstung gemäß § 1e Absatz 2 verfügt.’ (A motor vehicle with an autonomous driving function within the meaning of this law is a motor vehicle that 1. Can perform the driving task independently within a specific operating area without a person driving the vehicle and 2. features technical equipment pursuant to § 1e paragraph 2.).

The *Gesetz zur Änderung des Straßenverkehrsgesetzes und des Pflichtversicherungsgesetzes – Gesetz zum autonomen Fahren* vom 12.07.2021 entered into force last July and therefore there is not lot of literature on it yet. Consequently this part of the article cannot be particularly exhaustive and will consist only in a short summary of the most evident amendments made by the same law provision.

¹⁴² S. Gstöttner et al, ‘Dürfen automatisierte Fahrzeuge Recht brechen?’ *Neue Zeitschrift für Verkehrsrecht*, 593, 595 (2021).

¹⁴³ B. Wolfers, n 2 above, 28. As A. Kriebitz et al, n 28 above, 2, point out: ‘The act, which was finally passed in July 2021, marks an important step in autonomous driving legislation, as it depicts the first comprehensive national law on autonomous driving’.

¹⁴⁴ On the website of the Ministry, on the page ‘Germany will be the world leader in autonomous driving’, available at <https://tinyurl.com/5ycp58wx> (last visited 31 December 2022), it is stated that ‘With the new Act on Autonomous Driving, we have established the regulatory framework for autonomous motor vehicles (level 4) to be allowed to operate in regular public road transport in determined operational areas – all across Germany’.

driver. Regulations concerning autonomous driving in suitable operating areas correspond to SAE Level 4'.¹⁴⁵

Using the words 'autonomous driving vehicles' to refer to SAE Level 4 may be – in the opinion of the writer – source of confusion, also because it is now not clear to which level the '*Kraftfahrzeuge mit hoch- oder vollautomatisierter Fahrfunktion*' of § 1a StVG should be referred to. This confusion can be even more significant if we consider that according to the SAE Classification (that now is mentioned expressly also by the German official documentation) fully automated driving technology is considered referred to Level 5.¹⁴⁶

This is confirmed by the circumstance pointed out by the scholarship that in terms of handling the driving task, the driving technology must be equally capable of handling the entire driving task, so the key difference between the German *Kraftfahrzeuge mit autonomer Fahrfunktion* and the SAE Level 5 is only the restriction of operation to a specific operating area (the *festgelegter Betriebsbereich*).¹⁴⁷

More in general we can see that the spread of law provisions concerning automated vehicles makes it urgent or in any case increases the need of a worldwide uniform classification and use of the same nomenclature.

On the other hand, it should be noted that the German legislation provides the indications for a vehicle to be considered autonomous and going back to the analysis of the *Gesetz zum autonomen Fahren*, it can be stated on a first approximation that by means of this amendment to the *Straßenverkehrsgesetz* autonomous motor vehicles – as defined below – can now be used in public traffic, provided that these vehicles and their respective operating areas have been approved by the relevant authorities and that the driving systems can be deactivated at any time by the *technische Aufsicht* (technical supervisor).¹⁴⁸

In particular, through the above-mentioned *Gesetz zum autonomen Fahren* the legislator introduced eight new law provisions (from § 1d to § 1k) and changed § 1 of the *Pflichtversicherungsgesetz* (ie, the statutory insurance for motor vehicle owners) by adding one sentence to the first article. Starting

¹⁴⁵ In the Entwurf eines Gesetzes zur Änderung des Straßenverkehrsgesetzes und des Pflichtversicherungsgesetzes – Gesetz zum autonomen Fahren of 8th February 2021, available at <https://tinyurl.com/2cw6are6> (last visited 31 December 2022), 19-20, it is written that 'Es handelt es sich hier nicht um vollautonome Kraftfahrzeuge der Stufe 5 gemäß den internationalen Einstufungen' (...) 'Stufe 5 SAE bedeutet vollständig autonomes Fahren, bei dem die dynamische Fahraufgabe unter jeder Fahrbahn- und Umgebungsbedingung, welche herkömmlich auch von einem menschlichen Fahrzeugführer beherrscht wird, ohne einen solchen durchgeführt wird. Regelungen, welche das autonome Fahren in geeigneten Betriebsbereichen betreffen, entsprechen der SAE Stufe 4'.

¹⁴⁶ See, eg, among the German literature, M. Wagner, n 17 above, 17 and 21.

¹⁴⁷ B. Wolfers, n 2 above, 28, see particularly fn 34.

¹⁴⁸ M. Brenner, n 59 above, 46. As confirmed also by A. Kriebitz et al, n 28 above, 6, with the reform of 2021 the reform of 2021 introduced the category of 'technical oversight' (or supervision).

from this last amendment the addition consists in a provision specifically referred to the autonomous vehicles pursuant § 1d StVG that foresees an obligation for the relevant owner to have liability insurance also for a person part of the technical supervision.

Notably, the above-mentioned law provision regulates, *inter alia*, the technical requirements for the construction, properties and equipment of a *Kraftfahrzeuge mit autonomer Fahrfunktion* as well as the obligations of the persons involved in the operation of the vehicle, but also the requirements for data processing (§ 1g StVG).¹⁴⁹

Moreover, if we read the new articles of the *Straßenverkehrsgesetz*, it is immediately clear how their regulation is deeply different from the one foreseen by §§ 1a-1c. While the latter provisions regulate the use of highly and fully automated vehicles in a quite general way, §§ 1d ff. StVG regulate the use of autonomous vehicles with very specific norms and state in a very detailed way various aspects connected with such driving technology.

As mentioned above, § 1d StVG provides a first definition of autonomous vehicles. After that it states what a *festgelegter Betriebsbereich* (defined operating area),¹⁵⁰ the *technische Aufsicht* (technical supervisor)¹⁵¹ and the *risikominimaler Zustand* (risk-minimised state) are.¹⁵²

The technical supervisor is a natural person (§ 1d, para 3, StVG), who, even if he or she does not have to constantly monitor the operations, has to be ready to intervene at any time in legally defined situations. In particular, the supervisor must be able to disable the vehicle at any time in dangerous situations or to perform certain driving manoeuvres. The necessary presence of the technical supervision results also from international provisions and is aimed at fulfilling the requirements contained in Art 8, para 5-*bis*, of the Vienna Convention. Moreover, it has to be noted that in this way the legislator creates confidence in the safety of new autonomous driving functions, which increases the acceptance of novel technologies on the market.¹⁵³

After having provided the definition of the most important new concepts, the StVG regulates the use of autonomous vehicles through § 1e. Said norm is

¹⁴⁹ S. Gstöttner et al, n 142 above, 595.

¹⁵⁰ The locally and spatially determined public road space in which a motor vehicle with an autonomous driving function may be used if the requirements pursuant to § 1e, para 1, StVG are met (§ 1d, para 2, StVG).

¹⁵¹ The natural person who can deactivate the motor vehicle during operation in accordance with § 1e, para 2, no 8 StVG and who can perform driving manoeuvres for this motor vehicle in accordance with § 1e, para 2, no 4 and para 3 StVG (§ 1d, para 3, StVG).

¹⁵² A state in which the motor vehicle with autonomous driving function, at its own instigation or at the instigation of the technical supervisor, comes to a standstill in the safest possible place and activates the hazard warning lights in order to ensure the greatest possible safety for the vehicle occupants, other road users and third parties, taking due account of the traffic situation (§ 1d, para 4, StVG).

¹⁵³ B. Wolfers, n 2 above, 28.

quite complex and in the following paragraphs I will try to summarise it and provide a brief explanation in relation to it.

The first two paragraphs of § 1e StVG are strongly connected to each other. More specifically the first one states when the use of an autonomous vehicle is allowed and as a first requirement it is requested that vehicles respect the technical characteristics described in the second paragraph.

After that § 1e, para 1, StVG requires that an operating approval has been issued for the motor vehicle in accordance with the subsequent paragraph 4, that the same vehicle is used in a *festgelegter Betriebsbereich* approved by the competent authority and that it is licensed to participate in public road traffic pursuant to § 1, para 1, StVG. According to this, the use of the autonomous vehicle within Germany is not spatially unlimited. Rather, the *festgelegter Betriebsbereich* defines the area – approved by the competent authority – in which the operation of the autonomous driving function is permitted (§ 1e, para 1, no 3, StVG).¹⁵⁴

Particularly interesting is the above-mentioned second paragraph where the requirements of the autonomous vehicles' technical equipment are listed. Such norm has very technical content and represent a great example of the increasingly frequent coexistence of juridical and technological provisions.

This 'cooperation' between different fields of social and technical sciences has to be appreciated as it should help create clear norms and avoid interpretative uncertainty.

But how should the equipment of an autonomous vehicle be structured pursuant to § 1e, para 2, StVG? The norm lists ten 'major' requirements.

First of all, such a driving system should be capable of performing the driving task independently in the *festgelegter Betriebsbereich* without a person driving the vehicle intervening in the control system or the driving of the motor vehicle being permanently monitored by the technical supervisor.

This first requirement is absolutely important as it states clearly the independence of the driving system and the fact that the supervisor has to stay only in the 'background'.

Such a statement is confirmed by § 1e, para 2, no 2, StVG according to which the same driving system has to independently comply with the traffic regulations and to have a system of accident prevention that (a) is designed to prevent and reduce damage; (b) in the event of unavoidable alternative harm to different legal interests, takes into account the importance of the legal interests, with the protection of human life having the highest priority; (c) in the case of unavoidable harm to human life, does not provide for further weighing based on personal characteristics.

How such a driving system will work in the practice – and specifically the respect of the last two requirements – is as of now not predictable.

According to the author, this latter point could cause particular difficulties,

¹⁵⁴ *ibid*

also from a social point of view, as the result of its application could be that the driving system decides in a different way than a human driver would. In other words: Pursuant to such provision in case of an unavoidable accident the driving system could theoretically 'decide' to sacrifice its passenger instead of third parties (*eg* a group of pedestrians), while, in the same situation, the human driver would maybe have decided to save his or her own life. Consequently, my question is: Will citizens accept to use a vehicle that could decide to harm them (or their relatives) without the possibility to intervene and stop this decision?

The subsequent § 1e, para 2, nos 3 and 4, StVG require that the driving system is able to put the vehicle in a minimal risk condition independently, if the continuation of the journey were possible only by violating road traffic regulations, and that in this case it has to independently suggest to the technical supervision possible driving manoeuvres to continue the journey, and provide data to assess the situation so that the technical supervisor can decide whether to approve the proposed manoeuvre. Moreover, the system has to check the driving manoeuvres ordered by the technical supervisor and not execute them, but rather put the motor vehicle independently in a minimal risk condition, if the driving manoeuvre were to endanger people participating in the traffic or uninvolved people, as well as immediately report any impairment of its functionality to the technical supervisor (§ 1e, para 2, no 5 and 6, StVG).

The relation between the driving system and the technical supervisor is particularly interesting as the law expressly states that a non-human technological system has to ignore a human order if it recognizes that it could cause risks to the traffic on the road or to other people. Such regulated 'superiority' of the machine may never not have particular effects in the practice, but, at least from a theoretical point of view, looks quite revolutionary.

The seventh requirement of the technical equipment consists in the capacity of recognizing its own limits and, when a limit is reached or when a technical malfunction occurs that impairs the exercise of the autonomous driving function, independently placing the motor vehicle in a risk-minimised state.

§ 1e, para 2, no 8, StVG counterbalances the power of the driving system described above and clearly states the permanent possibility for the technical supervisor and for the vehicle occupants to deactivate at any time the driving system, which in that case has to set the motor vehicle independently to the minimum-risk state.

Finally, the last two requirements consist in the capacity to indicate visually, acoustically or otherwise perceptibly to the technical supervisor its functional status and the need for activation of an alternative driving manoeuvre or deactivation of the system (§ 1e, para 2, no 9, StVG) and to ensure sufficiently stable radio connections protected against unauthorised interference, in particular to the technical supervisor, and to set the motor vehicle independently to a minimised risk state if this radio connection is interrupted or accessed without authorization.

The *fil rouge* of the ten technical characteristics requested by § 1e, para 2, StVG is represented by the necessity of ensuring safety to all the possible parties who could be present when an autonomous vehicle is used.

The concept of road safety therefore has a great importance for the German legislator which has considered it as the ‘pillar’ around which to build the whole autonomous vehicles regulation.

Furthermore, in accordance with § 1e StVG it can be deemed that under German law, an autonomous vehicle will not break any traffic rules independently in the future. Rather, a human decision-maker (the ‘technical supervisor’) will approve a proposed manoeuvre or, if necessary, order an alternative one.¹⁵⁵

The same provision states at its para 4 that upon application by the manufacturer, the *Kraftfahrt-Bundesamt* issues an operating permit if the driverless vehicle meets the above summarised requirements (§ 1e, para 4, sentence 1, StVG). The approval, which is valid throughout Germany, ‘makes sense’ because the technical equipment should basically be usable everywhere in Germany.¹⁵⁶

The other provision that will be quickly analysed here is § 1f StVG, which has as object the obligations of the parties involved in the use of motor vehicles equipped with an autonomous driving function.

The provision is divided in three paragraphs, one per each ‘main character’ involved in the use of the *Kraftfahrzeuge mit autonomer Fahrfunktion*.

Starting with the owner (*Halter*), the norm states that he or she has to maintain the road safety and environmental compatibility of the motor vehicle and must take the necessary precautions for this purpose. Moreover, he or she has to (a) ensure the regular maintenance of the systems required for the autonomous driving function, (b) take precautions to ensure compliance with other traffic regulations not directed at the driving of the vehicle and (c) ensure that the tasks of technical supervision are fulfilled.

Here it is evident that no particular driving tasks are required to the owner who therefore does not have to be necessarily able to take back control of the vehicle in case of emergency.

The latter is in fact a task of the technical supervisor. Pursuant § 1f, para 2, StVG the technical supervisor has to evaluate alternative driving manoeuvres in accordance with the abovementioned § 1e, para 3, no 4 and with para 3 StVG and enable the motor vehicle in relation to this purpose as soon as (i) he or she is visually, acoustically or otherwise perceptibly notified of such a manoeuvre by the vehicle system, (ii) the data provided by the vehicle system enables him or her to assess the situation and (iii) the execution of the alternative driving manoeuvre does not endanger road safety. Furthermore the technical supervisor has the duty to deactivate the autonomous driving function immediately as

¹⁵⁵ Gstöttner et al, n 142 above, 596.

¹⁵⁶ B. Wolfers, n 2 above, 28.

soon as this is indicated visually, acoustically or otherwise perceptibly by the vehicle system, evaluate signals from the technical equipment regarding its own functional status and, if necessary, initiate required measures for road safety, and immediately establish contact with the occupants of the motor vehicle and initiate the measures necessary for road safety when the motor vehicle is placed in the minimum risk state.

By summarising such a provision, we can say that it always foresees someone who can and has to control the technological driving system, but such a person does not have to be in the vehicle, on the contrary it seems that he has to be outside it. Moreover, it looks like there is no obligation to have a proportion of one technical supervisor for one autonomous vehicle and therefore it could be deemed that one technical supervisor can control a multitude of vehicles, within the limit that such control remains effective.

Based on what is stated above, it can be deduced that the autonomous vehicles regulated by the amended *Straßenverkehrsgesetz* does not necessarily have to be equipped with an internal tool that allow its occupant (we cannot call him or her ‘driver’) to take back control of the vehicle. Moreover, the person in the vehicle can no longer be considered liable in case of an accident and it is not necessary that he or she has driving skills.

Allowing such technology – that at the moment is only in an experimental phase – could represent a juridical revolution. At the same time, this represents the greatest difference with the highly and fully automated driving technologies pursuant to §§ 1a-1c StVG, as in this last case according to § 1a, para 4, StVG, users of highly and fully automated driving functions remain ‘*Fahrzeugführer*’ (vehicle drivers) during the entire driving time and consequently they are basically subject to the same obligations of ‘classic’ vehicle drivers.¹⁵⁷

Finally, the § 1f StVG regulates the duties of the autonomous vehicle manufacturer. Such obligations are divided into six subparagraphs.

More in detail the manufacturer shall prove to the competent authorities that the vehicle is compliant with the relevant provisions and that its equipment, including a radio link, respects the requested technological requirements as well as to provide the same authority with an adequate risk assessment. The manufacturer has furthermore to draft a system description for each motor vehicle, to prepare an operating manual and to make a binding declaration to the *Kraftfahrt-Bundesamt* (Federal Motor Transport Authority) and in the operating manual that the motor vehicle meets the requirements of §1e, para 2, also combined with para 3, StVG. Finally, the manufacturer has to offer specific training for the persons involved in the operation of the motor vehicle and if it detects any manipulation in the vehicle or its equipment it has to promptly notify the *Kraftfahrt-Bundesamt* and the other competent authorities and initiate any necessary measures.

¹⁵⁷ V. Lüdemann et al, n 24 above, 412.

The previous summary and explanation of part of the norms introduced by the *Gesetz zum autonomen Fahren* cannot be in any case complete but the author hopes that it can help to have a first overview on this innovative law provision.

VI. Germany v Italy: A Comparison of the German Regulation with the Italian ‘Smart Roads’ Decree

The Italian legislator’s approach to automated vehicles is significantly different from the German one summarised in the previous pages. As of today, the only law provision concerning such technology is the decree of 28 February 2018 (complete name ‘*Modalità attuative e strumenti operativi della sperimentazione su strada delle soluzioni di Smart Road e di guida connessa e automatica*’,¹⁵⁸ also called ‘*decreto Smart Roads*’) of the Ministry of Infrastructures and Transport (‘*Ministero delle Infrastrutture e dei Trasporti*’)¹⁵⁹ and published in the Italian Official Journal no 90 on 18 April 2018.

Such decree is the result of a decision taken by the Italian Government in the previous budget law (‘*legge di bilancio*’, law no 205 of 27 December 2017) whereby pursuant Art 1, para 73 (only!) two million euro (one for 2018 and one for the subsequent year) were allocated to the research and experimentation of smart roads and automated vehicles. Particularly, in the same budget law, the legislator underlined the importance of supporting the process of digital transformation of the national road network and the development of the connected technologies and consequently expressly authorised the road testing of the smart roads and of connected and automated driving technologies.

Even if the allocated budget is not very significant, the above stated provision is nevertheless important, considering that it led the way to the subsequent Smart Roads decree.¹⁶⁰

As we will see in the next paragraphs, the Italian regulation pursuant the ministerial decree of 28 February 2018 has huge differences if compared to the German one.

More in details, the Smart Roads decree is structured as follows. The first two articles provide the definition of the most important concepts, such as ‘*veicolo a guida automatica*’ (Art 1, letter f), ‘*tecnologie di guida automatica*’ (Art 1, letter g), ‘*operatività in modo automatico*’ (Art 1, letter h), ‘*operatività in modo manuale*’ (Art 1, letter i), ‘*supervisore*’ (Art 1, letter j), ‘*smart road*’ (Art 2, para 1).

¹⁵⁸ Such title could be translated into ‘Implementation methods and operational tools of road testing of smart road and connected and automated driving solutions’.

¹⁵⁹ Pursuant to Art 5 of the Law-Decree no 22 of 1 March 2021 the Ministry changed its name, which is now ‘Ministry of sustainable infrastructure and mobility’ (‘*Ministero delle infrastrutture e della mobilità sostenibile*’).

¹⁶⁰ M.G. Losano, n 9 above, 430; S. Scagliarini, ‘La sperimentazione su strada pubblica dei veicoli autonomi: il “decreto smart road”’, in Id ed, *Smart roads e driverless cars: tra diritto, tecnologie, etica pubblica* (Torino: Giappichelli, 2019), 15, 16.

The definition of self-driving vehicle is quite detailed and it states that such vehicle should be equipped with technologies capable of adopting and implementing driving behaviours without the active intervention of the driver, in predetermined types of roads and external conditions. After that the same provision states clearly that the current cars equipped with some driver assistance systems cannot be considered as automated vehicles. Three other definitions are also very important here, because thanks to them we are able to understand the characteristics that according to the Italian legislator an automated vehicle should have. More specifically letters h), i) and j) of article 1 state respectively that the automated driving functioning requires that the driving system has the full control of the vehicle, that there should be the possibility to switch off the driving systems and for the driver to take the control of the vehicle and that the 'supervisor' is the occupant of the vehicle, who should always be able to assume control of the vehicle regardless of its degree of automation, at any time the need arises, acting on the controls of the vehicle in absolute precedence over the automated systems. This person is also considered liable for possible damage caused during the use of the vehicle.

The person in the vehicle therefore plays a role 'oscillating' between a driver and a mere supervisor.¹⁶¹

Based on the definitions offered above, it is clear that the Italian *veicolo a guida automatica* can be compared to the German *Kraftfahrzeuge mit hoch- oder vollautomatisierter Fahrfunktion*, but not to the *Kraftfahrzeuge mit autonomer Fahrfunktion*.

In other words, as of today, in Italy it is not possible to use or even to test on a public road a vehicle equipped with a driving technology that does not allow a person inside it to take back control and disconnect the driving system.

Moreover, it should be pointed out that according to the Smart Roads decree it is in any case not possible to use or commercialise an automated vehicle, but only to test it after receiving a specific authorization by the same Ministry pursuant to Art 9.

Therefore, while in Germany it is – theoretically – possible to use automated vehicles, in Italy it is only allowed to test them in accordance with the provisions of the above-mentioned decree.

The regulation of the same testing and of the relevant procedures is very detailed and is regulated by Arts 9 to 18. The subsequent Art 19 foresees and regulates the content of a specific insurance coverage with the goal to guarantee the risks resulting from this special segment of road traffic. With regard to such norm, it should be noted that – similarly to the German regulation – the ceiling is particularly high (at least four times the amount provided for the vehicle used for the trial in its model without the self-driving technologies according to the current regulation) and the insurance contract has to identify exactly the risk

¹⁶¹ D. Cerini, n 3 above, 405.

associated with the experimental circulation. The presence of this kind of norm has been approved by the literature, which has pointed out that the new mobility and the relevant insurance coverage cannot be separated considering that the entire transport sector is densely regulated by compulsory insurance obligations at national and international level in order to guarantee people safety, economic protection and freedom of movement.¹⁶²

It is not the intention of the author to determine whether the Italian legislator has been safer considering that the automated driving technology still has to be developed, nor that the German one has been more capable of understanding social and economic needs in advance, but, as said at the beginning of this section, it should be clear that the two legislators have followed, as of today, two completely different tracks with regard to the regulation of automated vehicles.

1. May German Regulations Be ‘Transplanted’ into the Italian Legal System?

Considering the completely different current ‘state of the art’ of the German and Italian regulations on autonomous and automated vehicles, the transplant of the above summarized German law provisions in Italy could – theoretically – take place.

Legal transplants are *‘the moving of a rule or a system of law from one country to another, or from one people to another’*¹⁶³ or, in other words, *‘a situation where the legislator of one country enacts a new rule that largely follows the rule of another country’*¹⁶⁴ and they have always represented an important tool for the juridical development.¹⁶⁵ By means of a legal transplant, a country borrows or takes inspiration from a foreign law provision that seems efficient in order to introduce a similar one in its legal order or to change existing regulations improving it.

¹⁶² D. Cerini, n 3 above, 402-405.

¹⁶³ A. Watson, *Legal Transplants* (Athens-London: The University of Georgia Press, 2nd ed, 1993), 21.

¹⁶⁴ M. Siems, *Comparative Law* (Cambridge: Cambridge University Press, 2nd ed, 2018), 232. Another definition – *ex multiis* – is the one created by J.M. Miller, in ‘A Typology of Legal Transplants: Using Sociology, Legal History and Argentine Examples to Explain the Transplant Process’ 51 *The American Journal of Comparative Law* (2003), 839: ‘the movement of laws and legal institutions between states’. Instead, according to U. Kischel, *Comparative Law* (Oxford: Oxford University Press, 2019), 59: ‘A legal transplant occurs when the use of comparative preparatory materials leads legislatures to adopt specific legal norms or institutions from foreign law into their own’.

¹⁶⁵ According to A. Watson, n 163 above, 95: ‘transplanting is, in fact, the most fertile source of development’. See also J. Husa, ‘Developing Legal System, Legal Transplants, and Path Dependence: Reflections on the Rule of Law’ 6 *The Chinese Journal of Comparative Law* (2018), 129-130 and V.P. Hans, ‘Trial by Jury: Story of a Legal Transplant’ 51 *Law & Society Review* (2017), 471-472. A very detailed analysis on the history and development of legal transplants research is done by J.W. Cairns, ‘Watson, Walton, and the History of Legal Transplants’ 41 *Georgia Journal of International and Comparative Law* (2013), 637, 638-696.

Scholarship has found cases of transplants already in the ancient Near East¹⁶⁶ as well as in the following centuries, particularly with regard to Roman law. Today such a phenomenon is absolutely remarkable and evident considering that ‘*economic development, democratization and globalization have today so sharply increased the number of legal transplants that at least in developing countries, most major legislation now has a foreign component*’.¹⁶⁷

Moreover, technological progress can be one of the most frequent causes of a legal transplant¹⁶⁸ as it urges the necessity of efficient provisions for new kinds of rights and duties to be regulated.

With specific regard to the subject of this article, it can be noted that there are not many examples of an advanced and detailed regulation like the German one. At the same time, we have just seen that the Italian regulation is at an early stage.

Consequently, we could consider it possible for the Italian legislator to ‘copy’ German law provisions concerning autonomous and automated vehicles, instead of creating completely new legal provisions. *Prima facie*, such an approach would have some benefits for the Italian legal system: copying (or borrowing) German regulations would save time and costly experimentation (so called ‘Cost-Saving Transplant’).¹⁶⁹ This way Italy would have the possibility to introduce law provisions which are the result of a great study by German competent authorities and which are – albeit improvable – one of the most complete legal structure on autonomous driving in Western countries.

Also (and especially) for Germany the legal transplant of its rules in a foreign country would bring several advantages. The possibility for Germany to export its regulation in Italy or other countries would be convenient for it. In fact, it has been observed that also the origin country of a legal transplant may benefit from the latter: *eg* the country of origin gains in international prestige in this sector and in this way increases its chances to influence future developments of such regulation. Moreover its companies and firms will more easily have opportunities to create business relationships with commercial partners from the receiving country.¹⁷⁰

¹⁶⁶ A. Watson, n 163 above, 22-24 and 95.

¹⁶⁷ J.M. Miller, n 164 above, 839-840. See also U. Mattei, ‘Efficiency in Legal Transplant: An Essay in Comparative Law and Economics’ 14 *International Review of Law and Economics* (1994) 3-4. M. Siems, n 164 above, 242-243, points out that: ‘The general picture that emerges is that legal transplants between continental European countries have been fairly common. They did not only concern the positive law, but also the deeper structural levels of the ‘legal ocean’, such as the relevant legal methods and the use of law in society, often mixing various models. It also helped that European countries share a common history and culture’.

¹⁶⁸ M. Graziadei, ‘Comparative Law, Transplants, and Receptions’, in M. Reimann and R. Zimmermann eds, *The Oxford Handbook of Comparative Law* (Oxford: Oxford University Press, 2nd ed, 2019), 442, 457-458.

¹⁶⁹ J.M. Miller, n 164 above, 845-846 and 867-868.

¹⁷⁰ M. Siems, n 164 above, 235; J.M. Miller, n 164 above, 875, underlines the risk that the ‘active foreign involvement may limit the recipient’s autonomy in future interpretation of the

Furthermore, it should be considered that such transplant may take place not only from Germany to Italy, but also to other countries. In this way Germany would become the European leader in the field of automated driving regulation.

Considering the importance of the automotive industry in Germany, this could have a very significant economic and social impact.

On the other hand, considering now the Italian – or, more in general, the receiving country's – point of view, the legal transplant of the German automated driving regulation may have side effects that have to be taken into account.

In fact, the introduction of a new regulation from another country has to be carried out considering the social and legal environment of the recipient country, in the same way as an organ transplant into a new body has to be performed taking into account the characteristics of the latter.

Simultaneously, we have to reflect on the causes of the current differences between the German and the Italian regulation on automated cars and to consider that they are probably due not only to a greater or lesser sensibility of each legislator for this field, but rather to a different approach to this very peculiar area of human activities and to the will, or the lack thereof, to admit and legitimate certain risks.¹⁷¹

Therefore, if we consider the strong historical, social and cultural relation between a certain legal regime and its own country, a 'pure' transplant may also involve some disadvantages for the receiving country. It has to be remembered that

'reformers are never writing on a *tabula rasa* but, rather, operate within a complex set of context-dependent particularities – economic, political, social – that have shaped the historical evolution of existing institutions. These particularities affect the nature and scope of feasible institutional reforms'.¹⁷²

Each legal transplant depends much on the relevant legal history¹⁷³ and has its own characteristics that can make each one very different from any other.¹⁷⁴ In the same way, the efficiency of a certain legal institution or reform depends on local characteristics.¹⁷⁵ Consequently, legal transplants have not always been successful: While in some cases ('receptive transplants') the foreign laws are

model and even shift interpretation in unforeseen ways'.

¹⁷¹ As A. Watson points out in 'From Legal Transplants to Legal Formants' 43 *The American Journal of Comparative Law* (1995), 469, 474, it is important to remember 'the importance of comparative law for an understanding of law and society'.

¹⁷² M. Prado and M. Trebilcock, 'Path Dependence, Development, and the Dynamics of Institutional Reform' 59 *University of Toronto Law Journal* (2009), 341, 349-350; J. Husa, n 165 above, 130.

¹⁷³ *ibid* 149.

¹⁷⁴ A. Watson, n 163 above, 17; U. Mattei, n 167 above, 7.

¹⁷⁵ J.M. Miller, n 164 above, 855.

adapted to local conditions and the transplants enable a progress of the receiving legal system, in others ('unreceptive transplants') the provisions have not been able to adapt to the conditions of the receiving country and the transplant attempt failed. This has often been due to a wrong transplant process (like in cases of colonization or other forms foreign norm impositions), which is therefore absolutely important and has to be performed with great care.¹⁷⁶

A legal transplant or any other reform of existing regulations that ignores the importance of the legal, cultural and social background, the historical development and the institutional interdependencies will probably fail or anyway have a less efficient result.¹⁷⁷

Moreover, it will not be possible to immediately see the transplant's positive or negative effects, but only when it will be effective in the legal reality, *ie* when the provisions will be applied in practise, together with the pre-existent norms, and interpreted by the competent judges.¹⁷⁸

In every case the social outcome of a legal transplant is hard to predict,¹⁷⁹ but this is particularly true in the case of an absolutely innovative reform in the field of driving technology which is – as seen at the beginning of this study – particularly bound to the social environment and has a unique interdependency with the culture and the values of a country.

This is absolutely clear if we think about the very complex questions raised by themes like negative externalities mitigation and dilemma situations. That means that the regulation of driving activities is necessarily linked to the ethical and social principles and morals of the relevant country.

Dilemma situations probably represent the most evident example: the setting up of the algorithm that will decide who will suffer the biggest damage may be structured differently from a country to another depending on the different values of each. In fact, no ethical theory or decision is based on an undisputable argument and, above all, ethical value systems change from era to era or from one area to another.¹⁸⁰ As an example, in one country the algorithm

¹⁷⁶ T. Ma, 'Legal Transplant, Legal Origin, and Antitrust Effectiveness' 9 *Journal of Competition Law & Economics* (2013), 65, 67. See also K. Tran et al, 'Negotiating Legal Reform through Reception of Law: The Missing Role of Mixed Legal Transplants' 14 *Asian Journal of Comparative Law* (2019), 175, 208, who point out that 'the first and most important thing that needs to be done is to develop an appropriate legal doctrine in accordance with the legal transplant process'.

¹⁷⁷ The importance of the so called 'legal culture' is extremely relevant, as underlined by J. Husa, in *A New Introduction to Comparative Law* (Oxford-Portland: Hart, 2015), 4: 'Legal culture refers to the special system-specific way in which values and practices and legal concepts are integrated in the actual operation of the legal system. Law is no longer considered autonomous but intimately connected to its human environment'.

¹⁷⁸ U. Kischel, n 164 above, 61.

¹⁷⁹ J. Husa, n 165 above, 139.

¹⁸⁰ V. Colomba, 'Driverless cars e intelligenza artificiale. Una questione di ordine pubblico: la liceità del brevetto', in S. Scagliarini eds, *Smart roads e driverless cars: tra diritto, tecnologia, etica pubblica* (Torino: Giappichelli, 2019), 87, 89.

could be set with the goal of always saving the youngest possible victims, in others the oldest, in others always the occupants of the vehicle.¹⁸¹

That means that – in any case – the introduction of a regulation on driverless cars will represent a legal and social revolution in Italy and therefore it should be carefully carried out.¹⁸²

Moreover in Italy – like in Germany – the driving world has a great importance for its citizens: vehicles are not only used as a tools, but they are also a hobby, a passion and a status symbol.¹⁸³ In the same way driving activities are performed by many citizens not only when it is necessary to go from a place to another, but also as a form of a social activity. Buying, having and using cars are characterized by non-negligible psychological and social aspects that cannot be undervalued by introducing a new regulation that will change driving activities as never before.

In light of the above, a ‘copy-and-paste’ cost-saving transplant of the German regulation on driverless vehicles in Italy may not be the best solution for the Italian legal system and community.

In addition to what is observed above, also the importance of the automotive industry in both Germany and Italy should not be forgotten. It follows that the transplant would probably have effects also on the political and economic scenario, aspects which seem to be absolutely relevant. Also because, as the scholarship has pointed out, once ‘a transplant is adopted, political dialogue and legal debate about the transplant will also be influenced by the transplant’s origins’.

It is therefore necessary to deepen the questions related to the effective convenience of the transplant of such German regulation in Italy and to find out if it can be considered as more efficient and consequently able to improve the economic performance of the receiving legal system.¹⁸⁴

Concluding this brief reflection, it is thus my opinion that considering that the German provisions on driverless vehicles have reached a great degree of progress and are the result of an indisputable detailed analysis and research, their transplant would have for sure a positive impact on the Italian regulation, taking into account its embryonic stage. At the same time, there is the risk that such advantages would be limited to a short-term period of time, because it is necessary to consider also the ethical, moral and social values and elements related to the driving activities as well as the possible economic and political

¹⁸¹ See the very interesting study exploring the moral dilemmas that could be faced by autonomous vehicles conducted by E. Awad et al ‘The Moral Machine experiment’ 563 *Nature* (2018), 59–75. With regard to the importance of the ethical issues in Germany, see the twenty guidelines proposed by the *Ethik-Kommission Automatisiertes und Vernetztes Fahren*, n 65 above, as well as the literature indicated in the same note.

¹⁸² M. Prado and M. Trebilcock, n 172 above, 366.

¹⁸³ G. Calabresi and E. Al Mureden, n 6 above, 21-23.

¹⁸⁴ M. Graziadei, n 168 above, 461.

consequences.

In my view, a better solution would be the creation of a complete regulation at the European Union level, which would probably start taking inspiration from the German provisions but which would also then develop into having as primary consideration the legal, ethical and social issues of all the Member States.

This way, the legal process would be for sure much longer and complicated but at the end it would be possible to have a regulation which would be more complete and competitive than the transplant from one country to another. This is due to the fact that this possible European regulation would consider the difficulties and needs related to each legal system in advance.

Moreover, this kind of regulation could be better coordinated with other EU provisions that necessarily would come into play in connection with the production and use of automated cars, like the ones concerning data protection or product liability. To this it should be added that a single European regulation would ease cross-border legal transactions¹⁸⁵ and simultaneously cause less problems related to the definition of the content and to the description of technical concepts as well as to interpretation of legal issues and especially to their translation, which could represent an important obstacle in a legal transplant.¹⁸⁶

Furthermore, the chance to have a single regulation on driverless vehicles in the entire European Union would probably have very important effects on the position of the European market and of its companies in the automated driving field in comparison with the other two big players that seem to want to be the relevant future leaders: the United States of America and China. It looks like EU countries have a great opportunity at the moment, especially if we consider the current lack of a single regulation in the United States of America. Consequently, the introduction of EU provisions regulating in a unified manner driverless vehicles and all related issues in the 27 Member States could have a large importance under legal, economic and social points of view.

VII. Conclusions

The above-described reforms carried out by the German legislator intervened in an area that is innovative and rapidly evolving. As a result, the German 'regulatory predictions' cannot be based on the analysis of concrete experience (since automated self-driving cars do not yet circulate on public roads) nor on established technology, because innovation in this sector is quick and constant. Despite these difficulties, the German Government decided to set an initial regulation of the sector to prevent the risk that the technology will find an

¹⁸⁵ U. Kischel, n 164 above, 64.

¹⁸⁶ M. Graziadei, n 168 above, 456-457. With regard to the difficulties related to legal translations see also U. Kischel, n 164 above, 10-12.

obstacle to market deployment in the law.¹⁸⁷ This way, Germany has started to rule higher levels of autonomous driving while international initiatives have as of today proceeded slowly.¹⁸⁸

The German legislation is far from complete, with regard not only to autonomous vehicles but also to highly and fully automated vehicles and above-summarised law provisions have received several critics.¹⁸⁹ At the same time, automated driving technologies have been recognised for five years in Germany as a legitimate form of automation and non-driving activities during their use are expressly authorised.¹⁹⁰ The aim is to create the conditions for the legally compliant use of highly and fully automated driving systems in road traffic and to help make Germany the world's leading market for this technology.¹⁹¹

Such a goal has been furthermore pursued through last year's *Gesetz zum autonomen Fahren*.¹⁹²

It should be clear that the path chosen by the German legislator is as of now limited to Germany. However, it offers greater legal certainty and planning reliability than in other European States and it should create a much more cost-efficient and innovation-friendly legal framework from the manufacturers' point of view. The German scholarship seems to particularly appreciate this innovative approach of the legislator and underlines how Germany with the reform of 2021 has created the world's first comprehensive legal framework regulating SAE Level 4. This legal framework in Germany will continue to exist for the time being and we hope that it will also have an accelerating and stimulating effect on the development of a regulatory framework for autonomous driving functions under EU law.¹⁹³

Indeed, it has been pointed out that the German law provisions – especially because there are still no regulations on autonomous driving at European Union level – could one day serve as a model for a European set of norms regulating driverless vehicles,¹⁹⁴ also taking into account its weaknesses.¹⁹⁵

At the moment, neither international nor European law currently provides

¹⁸⁷ M.G. Losano, n 1 above, 5.

¹⁸⁸ A. Kriebitz et al, n 28 above, p. 11.

¹⁸⁹ *eg* with regard to the *Gesetz zum autonomen Fahren*, S. Gstöttner et al, n 142 above, 595, see especially fn 24.

¹⁹⁰ M.N. Schubert, n 12 above, 18 and 22.

¹⁹¹ V. Lüdemann et al, n 24 above, p. 411.

¹⁹² This is clearly stated also in the official website of the Federal Ministry for Digital and Transport at <https://tinyurl.com/5ycp58wx> (last visited 31 December 2022), where there is a page titled 'Germany will be the world leader in autonomous driving' and where it is written that 'Germany is to play a leading role in autonomous driving. To make optimum use of the great potential inherent in autonomous and connected driving, the Federal Government intends to advance research and development, thereby making the mobility of the future more diverse, safer, more environmentally friendly and more user-focused'.

¹⁹³ B. Wolfers, n 2 above, 27 and 31.

¹⁹⁴ M. Brenner, n 59 above, 46.

¹⁹⁵ See *eg* the critical analysis made by V. Lüdemann et al, n 24 above, 411-417.

requirements for the admission and use of driving functions of SAE Levels 4 or 5. The regulation of autonomous driving functions is thus subject to a non-harmonized legal framework that is open to national legislation.¹⁹⁶

On the other hand, there are gaps and applicative difficulties in the same German regulation. Furthermore, the wording used by the German legislator seems to be partially confused and not perfectly in line with the internationally widespread rating systems.

In other words, it should be noted on one side that German legislator has been and still is the pioneer of the automated vehicles regulation in Europe, on the other one that although the regulations introduced in the StVG with the reforms of 2017 and 2021 can be considered very progressive from a technical perspective, they could be improved and particularly the obligations imposed on the different subjects foreseen by the new law provisions are not always satisfactorily regulated.¹⁹⁷

From this European perspective, it can be agreed that the German legislative project should not be deemed as an obstacle to European or international harmonisation. On the contrary, it could represent a technical and legal accelerator for a harmonisation at the European and international levels, because probably without the German law on autonomous driving, the absolutely necessary legal harmonisation would have dragged on longer.¹⁹⁸

A great challenge for the future will in any case be the harmonisation of the automated driving norms of different States and it is still not clear which role will be played by the European Union. This harmonisation task has to be performed already at this initial phase, in order to avoid legal uncertainty and the anti-economical circumstance that a driver has to inform himself or herself first about the regulation of the driverless systems in the destination country and change his or her usage behaviour of the automated vehicle before each border crossing.¹⁹⁹

Moreover, it should be taken into account that with the deployment of automated and autonomous vehicles also the entire model of liability allocation and insurance coverages will change radically with an increase in product damage coverages and an internal reshaping of risks related to the operation of the automobile. That means that the above-mentioned need of harmonisation will be particularly significant also with regard to insurance regulation. Indeed, as of today the liability insurance regulation is probably the most harmonised one at the European level among insurance norms and the results achieved represent a model for other contexts of supranational integration. Therefore, the European legislator's goal should be to maintain an equally efficient and

¹⁹⁶ B. Wolfers, n 2 above, 27-28.

¹⁹⁷ J. Klink-Straub and T. Keber, n 18 above, 118-119.

¹⁹⁸ B. Wolfers, n 2 above, 32.

¹⁹⁹ J. Klink-Straub and T. Keber, n 18 above, 119.

integrated system with regard also to automated vehicles in order to allow their effective spread and a growing circulation in Europe with a consequent better protection of people's right to move.²⁰⁰

Another important issue to be considered is that the use and deployment of automated vehicles will most probably require to change or to adapt the current tort regulation considering that the roles of the owner, user and manufacturer of the vehicle will be significantly different from the ones they have played as of today with 'classic' cars.²⁰¹ If this tort law evolution happens at a harmonised European level and not at national ones, the possibility of effective success of automated vehicles will drastically increase.

The spread of automated and autonomous vehicles can represent an innovation having a unique social impact. Thanks to them it is likely to have an absolutely significant decrease in road deaths and injuries. Moreover, their commercialisation and use could facilitate mobility of old people and persons with disabilities, reduce pollution and driving costs.²⁰² In addition to this, also the possibility to carry out the above-mentioned non-driving activities while the automated system is driving and the consequent positive impact on working and social life must be added.

All these great advantages will not be practically 'useful' in the absence of an appropriate international, or at least European, legal framework. The German regulation is probably not perfect, but it is a good place to start.

²⁰⁰ D. Cerini, n 3 above, 405 and 409.

²⁰¹ F.P. Patti, n 45 above, 149-150.

²⁰² H. Eidenmüller, n 8 above, 770. This is also the intention of the German legislator, see the Bill for amendment of the Road Traffic Act and the Compulsory Insurance Act – Act on Autonomous Driving, available at <https://tinyurl.com/2cw6are6> (last visited 31 December 2022), 18.