



Rivista di **D**iritto dell'**E**conomia, dei **T**rasporti e dell'**A**mbiente

[Home](#) · [La rivista](#) · [Contatti](#) · [Criteri redazionali](#) · [Sistema di referaggio](#)

Giugno 05 2019 10:58:16

[Diritto Pubblico](#) · [Diritto Privato Generale](#) · [Diritto Commerciale e dell'Economia](#) · [Diritto dei Trasporti e della Navigazione ed Internazionale e Comunitario](#) · [Osservatorio sul Diritto dei Trasporti](#)

Navigazione

- ▶ [Volume XVII - 2019](#)
- ▶ [Volume XVI - 2018](#)
- ▶ [Volume XV - 2017](#)
- ▶ [Volume XIV - 2016](#)
- ▶ [Volume XIII - 2015](#)
- ▶ [Volume XII - 2014](#)
- ▶ [Volume XI - 2013](#)
- ▶ [Volume X - 2012](#)
- ▶ [Volume IX - 2011](#)
- ▶ [Volume VIII - 2010](#)
- ▶ [Volume VII - 2009](#)
- ▶ [Volume VI - 2008](#)
- ▶ [Volume V - 2007](#)
- ▶ [Volume IV - 2006](#)
- ▶ [Volume III - 2005](#)
- ▶ [Volume II - 2004](#)
- ▶ [Volume I - 2003](#)
- ▶ [Osservatorio Euromediterraneo](#)
- ▶ [Codice della Navigazione esplicito](#)
- ▶ [Seminari e convegni](#)
- ▶ [Giurisprudenza marittima in Sicilia](#)
- ▶ [Sistema di referaggio](#)

Home page



Rivista di **D**iritto dell'**E**conomia, dei **T**rasporti e dell'**A**mbiente

ISSN 1724-7322

Comitato di Direzione

Salvatore Piraino (Direttore) - Carlo Bavetta, Fabrizio Piraino,
Nicola Romana, Lara Modica (Condirettori)

Comitato Scientifico

Sergio Alagna (già professore ordinario di Diritto commerciale, Università di Messina), Guido Camarda (già professore ordinario di Diritto della navigazione, Università di Palermo), Lorenzo Chieffi (professore ordinario di Istituzioni di diritto pubblico, Università della Campania "Luigi Vanvitelli"), Michele M. Comenale Pinto (professore ordinario di Diritto della navigazione, Università di Sassari), Carlo Emanuele Gallo (professore ordinario di Diritto amministrativo, Università di Torino), Carles Gòrriz López (profesor titular de Derecho mercantil, Universitat Autònoma de Barcelona), Salvatore Mazzamuto (già professore ordinario di Diritto privato, Università di Roma Tre), Armando Plaia (professore ordinario di Diritto privato, Università di Palermo), Tullio Scovazzi (professore ordinario di Diritto internazionale, Università di Milano-Bicocca), Giuseppe Vermiglio (già professore ordinario di Diritto della navigazione, Università di Messina)

Comitato di Redazione

Maria Paola La Spina (capo redattore), Stefania Bevilacqua, Giuseppe Spoto, Aurelio Anselmo, Pierluigi Mazzamuto, Marco Cottone, Enrico Labella, Antonello Iuliani, Daniele Piva, Aurora Anselmo, Donato Di Bona, Giuseppina Rosato

La rivista è pubblicata dalla Sezione di Diritto del
Dipartimento di Scienze Economiche, Aziendali e Statistiche
dell'Università degli Studi di Palermo

viale delle Scienze, ed. 13 - 90128 Palermo
Tel. +39 091 23895219/220 - Fax +39 091 6197933 - e-
mail: giureta@unipa.it

Login

Nome Utente

Password

 Login

Dimenticata la password?
Richiedine una nuova qui.

Shoutbox

Devi loggarti per scrivere
un messaggio

Non sono stati scritti
messaggi

Questa rivista fornisce accesso aperto ai suoi contenuti sin dal momento della loro pubblicazione, ritenendo che rendere le ricerche disponibili liberamente al pubblico migliori lo scambio della conoscenza a livello globale, secondo la [BOAI Definition of Open Access](#). Il lettore potrà pertanto leggere, scaricare, copiare, diffondere, stampare, cercare o linkare al testo completo degli articoli. Non è richiesta alcuna registrazione. Gli articoli sono pubblicati secondo la [Creative Commons Attribuzione - Non commerciale - Non opere derivate 4.0 Internazionale](#).

La rivista è sottoposta al sistema di referaggio ed è documentata nell'Archivio DoGi dell'Istituto di Teoria e Tecniche dell'Informazione Giuridica (ITTIG) del Consiglio Nazionale delle Ricerche.

La rivista risulta inoltre inserita nell'[Archivio Collettivo Nazionale dei Periodici](#), curato dall'Università di Bologna e dal CNR, cod. CNR PT02740674, e in "Directory of Open Access Journals" (DOAJ), www.doaj.org

Registrata presso il Tribunale di Palermo al n. 17 del 4 giugno 2004.

Elvira La Loggia (Responsabile)

Il volume viene considerato chiuso alla fine di ogni anno. A partire dal volume VII/2009, la data di pubblicazione effettiva di ogni singolo contributo è indicata nella pagina da cui è possibile effettuare il download dell'articolo. Per le annate precedenti la data è certificata in calce all'articolo.

Webmaster Gabriella Cangelosi e Lidia Undiemi

© Copyright 2008 Dipartimento D.E.T.A.



Navigazione

- ▶ [Volume XVII - 2019](#)
- ▶ [Volume XVI - 2018](#)
- ▶ [Volume XV - 2017](#)
- ▶ [Volume XIV - 2016](#)
- ▶ [Volume XIII - 2015](#)
- ▶ [Volume XII - 2014](#)
- ▶ [Volume XI - 2013](#)
- ▶ [Volume X - 2012](#)
- ▶ [Volume IX - 2011](#)
- ▶ [Volume VIII - 2010](#)
- ▶ [Volume VII - 2009](#)
- ▶ [Volume VI - 2008](#)
- ▶ [Volume V - 2007](#)
- ▶ [Volume IV - 2006](#)
- ▶ [Volume III - 2005](#)
- ▶ [Volume II - 2004](#)
- ▶ [Volume I - 2003](#)
- ▶ [Osservatorio Euromediterraneo](#)
- ▶ [Codice della Navigazione esplicito](#)
- ▶ [Seminari e convegni](#)
- ▶ [Giurisprudenza marittima in Sicilia](#)
- ▶ [Sistema di referaggio](#)

STEFANO PELLEGGATA - Autonomous Driving and Civil Liability: The Italian Perspective

[Autonomous Driving and Civil Liability: The Italian Perspective](#)

di Stefano Pellegatta

Data di pubblicazione: 31 maggio 2019

Abstract

L'introduzione dei sistemi di guida autonoma è suscettibile di determinare un impatto disruptive sull'assetto attuale e consolidato della responsabilità civile automobilistica. Di pari passo con lo sviluppo tecnologico - e i progressivi livelli di autonomia raggiunti dal veicolo - si rende infatti necessario individuare il ruolo del driver in quanto la responsabilità di questo soggetto è tradizionalmente correlata al suo potere di controllo sul veicolo. L'Autore valuta quindi quali possano essere le soluzioni interpretative percorribili nell'ordinamento italiano al fine di allocare i danni cagionati dal veicolo driverless, individuando le disposizioni generali di legge suscettibili di trovare applicazione con riferimento a tale nuova realtà. Sulla base delle prime indicazioni provenienti dalla disciplina italiana in tema di autorizzazione ai test su strada dei veicoli a guida automatica vengono infine proposte alcune riflessioni circa i prevedibili sviluppi della regolamentazione sul piano della allocazione della responsabilità e delle implicazioni assicurative.

The introduction of autonomous driving systems is likely to have a disruptive impact on the current and consolidated structure of civil liability arising from the circulation of vehicles. Along with the technological development of autonomous driving, as well as the progressive levels of autonomy achieved by the vehicle, it becomes necessary to identify the role of the driver as liability is traditionally tied to the degree of control the driver has over the vehicle. In this piece, the Author identifies the general legal provisions applicable to this new reality in order to evaluate the possible interpretative solutions offered by the Italian legal system as regards the allocation of liability for damage caused by driverless vehicles. Finally, and based on preliminary reflections as concerns Italian legislation on the authorization of road tests of "automatic guided vehicles", the Author offers insight on some foreseeable developments as regards the law in terms of shared liability and insurance implications.

**AUTONOMOUS DRIVING AND CIVIL LIABILITY:
THE ITALIAN PERSPECTIVE**

Stefano Pellegatta *

SUMMARY: 1. Automation in the automotive sector: a “disruptive innovation” – 2. Advanced driver assistance systems (ADAS) and the legal problem of vehicle control – 3. Liability for damage arising from the use of vehicles in the current Italian legal context: the full compatibility of driver assistance systems with applicable laws – 4. The impact of autonomous driving systems on the current law on civil liability in respect of motor vehicles. The role of the driver: possible interpretive solutions – 5. Autonomous driving, ADAS and the new role of product liability – 6. How will the system of liability for the use of motor vehicles evolve? New solutions and expected developments: an attempt to summarize.

1. – Automation has always played a central role in the industrialization and evolution of society. In recent years, however, this process has grown exponentially as technological developments – such as the automation of production – have come to embrace every aspect of human life ¹. Industrialization has led to the use of machines, whether as aids or instruments, becoming a consolidated phenomenon. Nonetheless, technological development has determined profound transformations that have greatly impacted the life of individuals. Just in the past few years, for example, we have witnessed the development of smartphones with computing power nearly equal to computers, algorithms have become progressively complex, we now have the option of being “always on”, and sci-

* Assegnista di ricerca, Università degli studi di Milano-Bicocca.

¹ Merely as an example, think of robots used in medicine, in logistics, or industrial production. Consider the development of drones, piloted remotely or by automated systems. Again, we can refer to the evolution of Artificial Intelligence and the role algorithms play in the formation of contracts: see DI SABATO, *Gli “Smart Contracts” che gestiscono il rischio contrattuale*, in *Contratto e impresa*, 2017, 2, 378 ss..



ence is taking the first steps towards artificial intelligence. This line of evolution includes the advent of robots programmed to facilitate – and sometimes substitute – humans in the performance of certain tasks; a condition that has become increasingly central to social and industrial advancements². These are tendencies that impact every sector of our lives, whether industrial, professional or personal, and the automobile industry could not remain estranged to such advancements. On the contrary, especially in the last few years as illustrated by its exponential growth, it has become one of the most rapidly evolving sectors when it comes to the new automated instruments that have been introduced. The primary and fundamental needs that this industry must satisfy significantly influence this process³. Therefore, the shift from manual to self-driven automobiles may be included among the most striking cases of disruptive innovations⁴.

² The robot presents itself as “a machine that autonomously performs a task”. See SANTOSUOSSO, BOSCARATO, CAROLEO, *Robot e diritto: una prima ricognizione*, in *Nuova giur. civ. comm.*, 2012, 494 ss..

³ These aspects were also examined during the European Parliament Resolution of 16 February 2017 with recommendations to the Commission with regards to “The rules of civil law on robotics”. The reference is firstly to the liberty of movement. The implementation of new technologies could, in fact, guarantee access to mobility even to individuals – such as the disabled, elderly or minors – who are currently completely or partially immobile. Many studies indicate that human error is the primary cause for automobile accidents. It is therefore believed that the use of self-driving automobiles (and, in the short term, the implementation of assisted driving systems) may result in a drastic reduction of the number of accidents, and consequently the reduction of pecuniary and non-pecuniary damages. Health and human life are therefore better protected by the development of such technologies. Additionally, robot-guided vehicles perform more efficiently (for example, they are more prudent, exploit the “shades of green” of traffic lights, choose more efficient routes according to the concrete road/access conditions), and may benefit the environment through reduced vehicle emissions. The use of fully autonomous systems can also realistically promote car-sharing systems (even private ones, for instance, within the same nuclear family or amongst colleagues) and therefore reduce the number of vehicles in circulation. On the other hand, the diffusion of such technologies could also increase the demand for individual mobility and actually increase the number of vehicles on the road. It must however be said that the profile of harmful emissions appears to be mitigated by the diffusion of electric vehicles, which are well paired with automated driving systems: indeed, in the future, these may help reduce the problem of automation by efficiently and autonomously managing the recharge phase. On the “environmental ambivalence” of autonomous driving see BUTTI, *Auto a guida autonoma: sviluppo tecnologico, aspetti legali ed etici, impatto ambientale*, in *Riv. giur. ambiente*, 2016, 3-4, 435 ss..

⁴ In general terms “disruptive innovation refers to an innovation that creates a new market and

2. – Technological development has allowed us to equip vehicles with useful instruments that allow drivers to control cars more easily, as well as other driving tasks. Think of the introduction of the anti-lock braking system (ABS) and anti-slip regulations (ASR), which subsequently evolved into electronic stability control (ESC or ESP)⁵, or the system that facilitates up-hill starts of manual transmission automobiles (the so-called “hill holder”), just to name a few. In the last few decades, active safety systems – which help prevent accidents – have been significantly improved to make automobiles considerably safer modes of transportation⁶. Likewise, passive safety systems have also improved to guarantee enhanced protection for passengers and third parties, working harmoniously with active safety systems in those situations where an accident is no longer preventable⁷. Thus, the increasingly popular expression “assisted driving” comes from the augmented role of active safety systems in modern vehicles, and driving technically becomes “assisted” whenever a system that supports the driver is present⁸. As modern vehicles replace old

value network, which eventually disrupts an existing market and value network, typically displacing established market leading firms”. See MC.GRATH, *Autonomous Vehicles, Opportunities, Strategies and Disruptions*, Poland, 2018, 141. The author’s opinion that “*autonomous vehicles will create an extreme degree of disruptions*” because this evolution “*will displace a huge existing industry, transportation, along with all its supporting industries*” is shared. See also CAMERON, *Realising the potential of Driverless Vehicles*, Wellington, 2018, 1 ss. and HERRMANN-BRENNER-STADLER, *Autonomous Driving, How the Driverless Revolution Will Change the World*, Bingley, 2018, 31 ss..

⁵ Effective 1 November 2011, the European Union made the system obligatory for newly approved automobiles.

⁶ Active safety means the group of devices, systems or features that impede the occurrence of accidents, therefore fulfilling a primarily preventative purpose. Take ABS and ESC/ESP systems, for example, which have contributed to the reduction of the overall number of accidents, or automatic emergency braking systems (see *infra*).

⁷ More precisely, the devices and passive safety systems are intended to reduce the negative consequences of an accident. Examples include, airbags, seat belts and reinforced structures. So-called “pre-safe” systems are somewhere between the two “worlds”, but more similar to passive safety systems. These systems intervene when the occurrence of an accident becomes inevitable, but before it actually occurs. Typical examples include automatic emergency braking systems (when they reduce speed without avoiding impact altogether) or systems that lock seat belts (before impact), close windows and/or sunroofs to protect the people in the car, or even reproduce sounds from the audio system to avoid damage caused by the loud bang of the accident.

⁸ There is a multitude of instruments that support drivers, but their presence and operability

ones, driver-support systems are almost always present: even power-assisted braking and power steering are in themselves driver support systems. In some way, and as an initial approach, these systems facilitate the (manual) control of the vehicle without, however, having any intention of substituting the driver. Indeed, these systems do not take control of the vehicle – rather, they simply assist the person driving the car at that particular moment (who we will call “driver”, given that he maintains control over the car)⁹.

Defining the notion of “assisted driving” in this manner appears to make its scope clear. Still, relentless technological development makes us increasingly doubtful of the most elementary certainties. After all, as driver assistance systems progress toward perfection, over time they have taken over more and more tasks and become evermore relevant. It is significant that sometimes not even the driver can disengage these systems¹⁰.

Consider the evolution of cruise control, which in its simplest form allows the driver to take his foot off the accelerator while maintaining a constant speed. In recent years, the introduction of radar and speed sensors has transformed basic cruise control into so-called “adaptive cruise control”, which can autonomously reduce a car’s speed and even bring it to a complete stop (to avoid impact with slower vehicles in front of it), and then accelerate again to reach the previously configured speed without driver intervention. The computer therefore shifts control to the brake, and can also regain speed after braking. The lane change warning system also developed at this time: from the first most basic elements that merely alerted the distracted or clumsy driver with a simple vibration of the steering wheel, the system evolved to automatically correct a vehi-

within the vehicle do not *per sé* qualify them as driver “assistance”. Technically speaking, instruments provide driver assistance when their presence is great enough to reach level 1 on the scale of “autonomous driving”, as discussed *infra*.

⁹ This is an interpretive opinion shared by doctrine: see GAETA, *Automazione e responsabilità civile automobilistica*, in *Resp. civ. e prev.*, 2016, 5, 1725. On the concept of “driver” see *infra* para. 3 B) and article 8, Vienna Convention on Road Traffic of 8 November 1968.

¹⁰ This is frequently the case with ESC/ESP, which can usually be completely disengaged only on sports models. In most cases, not even pushing the “off” button deactivates the system, but instead raises the threshold for intervention. Again, the user cannot usually deactivate automatic emergency brake systems.

cle's course and can even keep it in the middle of the lane¹¹. It is clear that combining this last mechanism with adaptive cruise control may result in autonomous or automatic driving of a vehicle, although under the supervision of the driver¹² (which is also what happens when a vehicle is equipped with so-called "traffic jam assist", an instrument that assists drivers in dense traffic or in traffic jams¹³). Other increasingly common systems relate to automatic emergency braking systems, useful to avoid collisions with other cars, pedestrians or cyclists. Or instruments to monitor blind spots¹⁴, as well as systems that facilitate parking or automatic parking systems that can even be controlled by smartphone¹⁵. The road

¹¹ The system was working when the driver crosses the line separating the lanes, without having set the direction beforehand. The most basic technologies are limited to a "lane departure warning", while more evolved technologies provide actual "lane keeping" and include "lane centering": this last feature is capable of maintaining the vehicle in the middle of the lane, avoiding sudden movements, but literally setting the course.

¹² Adaptive cruise control and lane centering develop in symbiosis a system that nears, at least in certain conditions, autonomous driving. The ability to change lanes is yet to be developed, but it is noteworthy that the more evolved solutions are capable of autonomously steering the car to safely overtake other cars. Additionally, the combination of the above mentioned systems only work on freeways and main thoroughfares and not in urban contexts. This also requires well-defined signs and road markings.

¹³ This system operates in traffic jams by operating the accelerator and brakes, and even bringing the vehicle to a complete stop. It is capable of following the vehicle ahead in traffic jams, but it usually deactivates after 3 seconds of standstill and additionally only functions at moderate speed. The presence of a driver is still necessary. On the one hand, the device itself demands the presence of a physical driver: the device automatically deactivates if the driver removes his hands completely from the steering wheel. On the other hand, in the systems currently on the market, the driver is nonetheless required, for example, to change lanes and respect traffic signals, as well as take into account other elements of the outside world (for example, an unmarked obstacle or unforeseen situation, or even signals given by traffic officers or other authorized persons). As will be illustrated, it appears that the evolution of this instrument will become one of the first instances of level 3 autonomous driving.

¹⁴ These are integrated in the rearview mirror in order to give coverage also to spots outside the driver's view angle: a colored light indicates when a vehicle is overtaking from the rear and it is therefore advisable not to swerve or overtake the car in front. Regarding mirrors, it must be stated that the first vehicles entered the market devoid of exterior rearview mirrors. Cameras have replaced these mirrors as they guarantee a wider range of vision and less aerodynamic resistance: indeed, cameras may be even thinner than a mirror. The same technology is more common when it comes to internal rearview mirrors, which are increasingly replaced by a screen, to improve the driver's ability to see objects in plain sight, but also provide extra information.

¹⁵ The most modern systems, currently available on flagships, allow a vehicle to be controlled

toward completely autonomous vehicles is therefore mapped out: driver assistants (technically defined as ADAS, or *Advanced Driver-Assistance Systems*) indeed accompany the driver and may even replace him in certain conditions or for brief periods of time, but whether a certain device or system intervenes (and correspondingly whether there is a duty intervene) remains up to the human driver¹⁶.

It is clear, however, that the development of increasingly advanced technologies that are potentially capable of autonomously performing a multitude of tasks (accelerate, brake, turn the steering wheel, maintain safe distance), especially when combined, causes us to question whether the driving of a vehicle can be qualified as simply “assisted”. Indeed, vehicles appear to be progressively autonomous, especially in specific circumstances¹⁷. The degree of control that the electronic system has over the vehicle itself is certainly one factor that distinguishes vehicles that are (merely) “assisted” from those that are “autonomous”. It is evident that if a vehicle does not possess an effective assistance system it cannot ever be

by smartphone: and only at significantly reduced speed and only for concise maneuvers. In these situations, it is true that the driver has control over the vehicle, but he is also located outside the vehicle itself. The instrument is intended to facilitate parking in tight spaces. Parking assist systems are controlled from inside the car and allow the entire maneuver to be performed automatically (without having to turn the steering wheel, or touch the accelerator or brake). For the purpose of preventing the establishment of the producer's strict liability, said ADAS usually require the driver to hold a button for the entire period in which the maneuver is being performed. This method thus ensures the driver maintains control over the vehicle in all phases. For the same reason, driver assistance systems are integrated with sensors that verify the driver keeps both hands on the steering wheel, and, in some cases, by instruments that reveal the level of the driver's attention.

¹⁶ It is noteworthy that the newest driver assistance systems, in presence of prolonged inactivity by the driver or unresponsiveness to prompts (e.g., failure to react to warning to return hands to the steering wheel), or in case the driver becomes ill, the systems are capable of arresting the vehicle in the rightmost lane of the carriageway, insert the hazard, and send a distress signal with GPS tracking.

¹⁷ This is particularly likely to happen when “*traffic jam assist*” is involved. As we have seen, the system is not, however, capable of evaluating all real factors. For example, it cannot change lanes or “read” traffic signals. These functions will be integrated and will probably constitute the first instances of autonomous (and not assisted) driving. Specifically, Audi, on the A8 model, has installed an evolved version of the system that is run by Artificial Intelligence and will allow the vehicle to reach level 3 automation (see below). At the moment, this feature is deactivated for legal reasons. Recently, however, it has been reported that Tesla, with its upcoming Model Y, will include an option that enables the car to recognize (and comply with) traffic lights.

considered “self driving”. Nonetheless, it appears that – from a certain level of assistance onward or in presence of systems that can take control of the vehicle (even if limited to definite situations) – whether driving is “assisted” or “autonomous” depends on whether the driver may immediately regain control of the vehicle (anticipating the next point to be discussed) and therefore remain responsible for its operation¹⁸.

In other words, it is difficult to distinguish between “assisted” and “autonomous” driving systems, as it is difficult to discern a significantly efficient assistance system from a completely autonomous one¹⁹.

Before discussing the law governing the new technological systems for the operation of vehicles, we must first define the terms situations and specific scenarios for its application, as the peculiarities of each of these may, as we will see, impact how the rules are applied to each concrete case²⁰.

In this regard it is useful to refer to the technical classification given by the *Society of Automotive Engineers* (SAE)²¹, which is the most widespread and authoritative and establishes five levels of driver assistance. Level 0 driver assistance, or manual driving, is established when the driver maintains control of all the driving modes irrespective of whether the car is equipped with assistance and alert systems²². The following

¹⁸ If the driver can (and therefore must) regain control of the vehicle when the system requires it, such as in cases of failure or when such intervention is advisable, we are still in a circumstance of “assisted driving”. This is confirmed by the SAE J3016 TABLE on autonomous driving (see below).

¹⁹ Think of the *traffic jam assist* feature used on a one-way street without traffic signals, or on a two-way road with lanes separated by a continuous line. In this context, the assisted driving system is already capable of performing every task in complete autonomy. In practice, in such situations, we already substantially have a case of autonomous driving. Yet, at present these systems require the continuous reactivity and “command” of the driver and are considered mere assistants. Indeed, these are not yet capable of handling all situations.

²⁰ As we approach the reconstruction of the laws that govern the new driver assistance technologies, which are implemented aboard vehicles more and more frequently, it is fundamental for the interpreter to identify some basic notions and definitions in order to categorize and organize the given reality in a way that will allow an improved understanding. For the same reason, jurists must first describe and qualify this reality so as to identify the law to be applied to each specific fact.

²¹ See <https://www.sae.org>. For reasons of clarity and given the scope of this article, our discussion will only refer to this classification, notwithstanding there have been other authoritative proposals for a classification system.

²² Systems such as an automatic emergency braking system, a blind spot warning system or a lane departure warning system could be installed. However, as explained by the SAE, “*these features*

level 1 is characterized by the fact that, in some driving modes and based on the driving environment, the system controls the steering wheel or the vehicle's speed, but the driver is expected to control the rest²³. Level 2 is determined when, in specific situations, the system uses information regarding the driving environment to control all dynamic aspects of the vehicle. In this case, the driving assistant assumes control of both the steering wheel and the speed, while the driver is in control of the other driving aspects and may be required to take action at any time; in practice, this situation corresponds to co-driving. Moreover, it is noteworthy that the system only controls some aspects of driving²⁴.

The transition to level 3 occurs when the assistance tool (again, only in specific situations) is capable of managing all dynamic driving aspects but the driver is expected to respond promptly to requests for intervention. In this scenario and under ordinary functioning conditions, the system has complete control over the driving environment²⁵. With level 4, the driver is

are limited to providing warnings or momentary assistance”.

²³ This level of autonomy occurs when the vehicle is equipped with either lane centering or adaptive cruise control technologies.

²⁴ Compared to the previous level 1, here lane centering and adaptive cruise control work together. Notwithstanding the driver must remain in control of external and environmental factors, it is significant that these technologies are being further developed. For example, Mercedes-Benz has proposed equipping some of its models with a technology making them capable of engaging with the satellite GPS system to, for instance, slow the vehicle as it approaches a roundabout. This technology has not yet reached the level of complete autonomy, but it is still a step ahead compared to the traditional functioning of the previously mentioned combination. In fact, not only does the vehicle follow the cars in front of it and the road markings, but it knows the road that it is destined to travel (which has been programmed into the GPS) and regulates its pace according to the route.

²⁵ The SAE explains “these features can drive the vehicle under limited conditions and will not operate unless all required conditions are met”. The “traffic jam chauffeur” provides one possible example of this level technology. However, note that levels 3, 4 and 5 are characterized by this precision: “you are not driving when these automated driving features are engaged – even if you are seated in the driver's seat”. As such, what qualifies driving as level 3 is precisely the fact that “when the feature requests, you must drive”. Therefore, level 3 is perhaps the most complex to define: it differs from level 2 because here the car functions in complete autonomy and does not control the steering wheel or accelerator. For example, in the city, to integrate the conditions required by level 3, it appears necessary that the vehicle also be capable of recognizing traffic signals and changing lanes. All this, presumably, in synergy with the GPS system, directing the automobile as programmed. At the same time, level 3 differs from the subsequent level 4 because (and as will be im-

required to have even less control over the vehicle, as the system is capable of managing even emergency or dynamic situations without the intervention of the driver. However, even at this level, the system cannot be activated in all driving conditions. Conversely, at level 5, the system completely replaces the driver by taking over all aspects that are typically handled manually: from dynamic to emergency situations, under any condition and on every road. In this case, a vehicle command system is no longer necessary as the system autonomously performs all tasks²⁶.

Besides the preferred technical classification – based on the degree of control that the installed technologies have over the vehicle – and the absence of a (desired) single international standard, it may be observed that assisted and autonomous driving systems coexist. In legal terms, however, the difference between these two systems depends on whether the driver has continuous and effective control over the vehicle.

Where the technological system, notwithstanding its capability of autonomously performing a multitude of tasks, requires the driver to be consistently responsive, active and alert, the driving of the vehicle must be considered “assisted”. However, when the driver no longer has or needs to have control over the vehicle, driving becomes autonomous. The role of the driver winds up being the only element that, in legal terms, discerns the two figures. As useful as this clarification might be, legal problems arise when the vehicle autonomously performs tasks but the driver may nonetheless intervene (a feature that has not yet become standard, but is in the process of being developed)²⁷. Such hypotheses lie

mediately illustrated) in this next level the car also manages emergencies without requiring the physical intervention of a human driver and resolves the situation, where applicable, by putting itself in safety mode.

²⁶ It is possible for level 4 vehicles not to come equipped with a control system, providing that these vehicles are destined to operate only in contexts that may be completely managed by an automatic system. However, should the functioning conditions not be integrated, even temporarily, these vehicles would end up being unusable (e.g., local driverless taxis).

²⁷ Soon to be implemented level 3 appears particularly problematic. Up until level 2 a driver technically has the option of full driver assistance, even if the ADAS (in certain situations) is capable of gaining complete control. Still, the system is still not ready for all circumstances: this is the basis for legal disclaimers and monitoring precautions (e.g., attention detector, sensors on the steering wheel, etc.) that ensure drivers are alert and in the driver’s seat. Thus, even if the car is temporarily performing all of its tasks in autonomous mode, the driver has control over the vehicle and is

somewhere between assisted and autonomous driving: in these circumstances, the specific facts and future technological developments must be evaluated case-by-case. It is clear that as control systems become progressively effective, the reliance of the “driver” on such systems becomes increasingly justified, and so does the driver’s reasonable expectation that these systems will function. Ultimately, the mere existence of a steering wheel and pedals – and therefore the theoretical possibility to (re)gain control of the vehicle – cannot be the only criteria for determining whether driving is autonomous or assisted²⁸.

Finally, it must be noted that the concept of autonomous driving does not exist in a vacuum: it will likely also affect the notion of vehicle, and consequently require more definitions, as well as legislative and regulatory reform. However, these issues will be illustrated at the conclusion section of this article²⁹.

3. – The law on civil liability arising from the use of motor vehicles derives from article 2054 of the Italian civil code, which provides that the driver of any vehicle not driving on railways is obliged to reimburse any

in any case required to monitor the vehicle’s performance. On this point, the conditions of use of the notorious Autopilot by Tesla make it clear that: “*Tesla disables Autopilot by default and requires explicit acknowledgement that the system is new technology and still in a public beta phase before it can be enabled. When drivers activate Autopilot, the acknowledgment box explains, among other things, that Autopilot “is an assist feature that requires you to keep your hands on the steering wheel at all times,” and that “you need to maintain control and responsibility for your vehicle” while using it. Additionally, every time that Autopilot is engaged, the car reminds the driver to “Always keep your hands on the wheel. Be prepared to take over at any time.” The system also makes frequent checks to ensure that the driver’s hands remain on the wheel and provides visual and audible alerts if hands-on is not detected. It then gradually slows down the car until hands-on is detected again.*” See www.tesla.com.

²⁸ The crucial question is in which situations, or at which level, does assisted driving become autonomous driving. In legal terms, the issue requires identifying who has concrete control over the vehicle, and it is neither possible nor appropriate to generalize. Indeed, it is possible for the driver to remain in control of the vehicle (at least potentially) even if the car is in automatic guidance mode: if there are manual command devices, the driver may theoretically always intervene. This makes it necessary to determine under which conditions this potential intervention becomes a duty. Also because, as has been observed, autonomous driving was invented precisely so that constant human operation would no longer be necessary, allowing drivers to spend the time they normally spend at the wheel differently. It would therefore not make sense to impose a duty of constant intervention. See GAETA, *op. cit.*, 1729-1730 and 1743-1744.

²⁹ See generally paragraphs 3 B) and 5 below, and note 46 in particular.

damage caused to people or things related to the circulation of such vehicle, unless he proves to have done all possible to avoid the damage occurred³⁰.

The liability of the driver is accompanied by that of the vehicle's owner or user, or of the buyer under reservation of title, who are jointly and severally liable between themselves with the driver unless they can prove that the vehicle was used against their will³¹.

An important aspect to clarify is that the abovementioned subjects are liable for damages arising from manufacturing defects or the faulty maintenance of the vehicle. Article 2054 of the Italian civil code therefore expressly connects liability for the use of motor vehicles and product liability, but purely to affirm that the driver and the owner are continuously responsible for damages³². Thus, where manufacturing defects are present, the joint and several liability of potentially three distinct subjects (the owner, the driver and the producer, as the conditions for application of liability may dictate) is relevant for product liability.

However, product liability appears to be of secondary importance, at least from a codistic approach. Indeed, according to the third paragraph of Article 2054 of the Italian civil code, the injured third party – knowing full and well that the driver and owner are always liable – is propelled to claim compensation from the liable subjects, even if a maintenance defect exists or the vehicle has been faultily maintained³³. It should also be noted that

³⁰ The second paragraph of this law establishes that, should two vehicles collide, there is a presumption of joint liability unless evidence to the contrary exists. The driver must therefore establish the fault of the other driver to overcome the presumption. See BUFFONE (curated by), *Circolazione stradale – Danni e responsabilità*, vol. I, *Dinamica del sinistro stradale e responsabilità civile*, Padova, 2012, 56 et. seq.. See also TERRANOVA, *Responsabilità da circolazione di veicoli*, in *Digesto civ.*, IV, XVII, Torino, 1998, 89 and GALLONE, *La circolazione dei veicoli*, Milano, 1996.

³¹ These terms are expressed in the third paragraph of the mentioned law.

³² Indeed, the fourth and last paragraph of article 2054 of the Italian civil code establishes that “in any case the people mentioned here above are to be held liable for any damage originating from construction failures or by failure in servicing and maintenance of the vehicle”.

³³ PECCENINI, *La responsabilità civile per la circolazione dei veicoli*, in CENDON (curated by), *La responsabilità civile*, XIII, Torino, 1998, 112; FRANZONI, *Dei fatti illeciti*, in *Commentario del codice civile Scialoja-Branca*, Bologna -Roma, 1993, 708; VISINTINI, *Trattato breve della responsabilità civile*, Padova, 1999, 726-728; DE CUPIS, *Dei fatti illeciti*, in *Commentario del codice civile Scialoja-Branca*, Bologna -Roma, 1971, 103 ss.. See contra also BONA, *Art. 2054 – Circolazione dei veicoli*, in CARNEVALI (curated), *Dei fatti illeciti, Commentario del Codice Civile*, lead by

the system is combined with the existence of a compulsory insurance regime (chargeable to the owner) that will thus, at least abstractly, guarantee the fruitfulness of a potential claim by the injured party³⁴.

The contours of product liability are therefore not typically invoked, at least not by the injured third party. The driver or the owner, if anybody and in order to be released from their own liability, will be the ones to advance issues that could possibly establish the liability of the producer. This additional case of liability demonstrates its relevance for cases where damages are suffered directly by the driver. While the passenger is considered a third party, if an accident occurs without the involvement of another vehicle, the driver cannot call on article 2054. The driver must thus identify a different source of liability in order to obtain compensation for any damages suffered. Product liability is therefore destined to take on a more incisive role in cases where the driver suffers damages³⁵.

In this long-established legal framework, the impact of new ADAS technologies – which will support or replace the human driver in certain situations – remains to be seen.

It has been said that assisted driving is legally recognized in the situations where the driver is supported by technological and automated systems but maintains control of the vehicle, and consequently the full responsibility for its operation.

In this situation, the traditional framework applied to the use of motor vehicles appears fully confirmed: the driver is always the master of the driving process and thus, in addition to the ordinary liability regime appearing applicable, this law does not pose particular compatibility problems with the new situation that has become characterized by the presence of ADAS. Indeed, it appears that manufacturers develop these products in such a way that the ordinary liability regime will apply to cases

GABRIELLI, Artt. 2044-2059, Torino, 2011, 391 ss.. In reference to aspects of strict liability: ALPA, *La responsabilità civile*, in *Trattato di diritto civile*, diretto da ALPA, IV, Milano, 1999, 713. ENGELHARD-DE BRUIN, *Liability for damage caused by autonomous vehicles*, The Hague, 2019, 31 ss. highlighting the reasons why it is statistically more common to see suits for the liability of the driver/owner than the manufacturer.

³⁴ See ROSSETTI, *L'assicurazione obbligatoria della R.C.A.*, Torino, 2010, 4 ss..

³⁵ See AL MUREDEN, *Sicurezza "ragionevole" degli autoveicoli e responsabilità del produttore nell'ordinamento giuridico italiano e negli Stati Uniti*, in *Contratto e impresa*, 2012, 1506 ss..

where driver assistance technologies are installed on a vehicle. In fact, notwithstanding the current presence of technologies that are potentially capable of autonomous driving, at least in certain circumstances and for brief periods, manufacturers insist that the driver – who is called upon to remain alert – retains full responsibility in every situation. This choice involves, above all, more care and safety: the systems, although reliable in most situations, involve a margin of error and are still preferable (especially in conditions of poor visibility and in when road markings are poorly delimited)³⁶. The reasons for insisting on this continuous need for human control reside, however, in the need to guarantee legal compliance of the vehicle and, in my opinion, in the desire to further limit a hypothetical injured third party's claim for compensation against the manufacturer³⁷.

Even if the regime established under article 2054 of the Italian civil code is applicable, it is unlikely that the presence of articulated and complex driver assistance systems sets the foundation for a broad application of product liability laws in the automotive industry. This heightened importance is capable of impacting, at least in internal relationships, the degree of driver fault, if in no other way than in relation to the driver's reasonable reliance in a properly functioning system³⁸.

³⁶ Even the most evolved level 2 systems currently on the market are considered to fully constitute driver assistance systems. Moreover, the functioning of these systems is not guaranteed in a number of situations, primarily due to the adverse road and weather conditions. In particular, the presence of snow and cold temperatures proves, in the current state of development, to be particularly problematic, so much that ad hoc technologies are being studied for these situations.

³⁷ Within the framework of currently marketed simple "assisted driving" systems, we might consider, for example, the disclaimer reported on the Lexus website: "the Lexus Safety System+ is designed to protect drivers, passengers, people in other vehicles on the road and pedestrians from harm, but the system does not cover all the variables that might affect driving. Moreover, circumstances may arise that affect or influence the operability of the system and/or its functioning (for example, rain on the windshield, sun rays, etc.) and consequently prevent the system from activating even in contemplated instances. Please read the Instruction Manual carefully. The Safety System+ is not capable of substituting the driver, so drivers need to pay continuous attention at all times, without distractions. Do not commit the mistake of entrusting the system to avoid accidents by acting responsibly and exercising care when you drive; Safety System+ may help you, but you are solely responsible for your safety and the safety of those around you". See www.lexus.it.

³⁸ In these situations, whether the user has been adequately informed must be ascertained before anything else. Then, based on the concrete circumstances of the specific case, the liability for

A particularly thorough analysis is required, however, in the situations where the assisted driving system takes effective control over the vehicle, even if under the supervision and responsibility of the driver. When an instrument malfunctions in those specific circumstances, one must conduct a more careful analysis and distinguish between each single case. Indeed, if harm is caused precisely because of the intervention by the system (and therefore the issue at hand is not whether the same system was able to simply avoid harm), it is easier to establish the liability of the manufacturer. The possibility of a driver reacting and correcting a system malfunction has yet to be examined, but the liability of the manufacturer appears indisputable in such hypotheses. What must be stressed is that these situations not only involve the reliance of the driver, but rather a contribution by the system for the causation of harm. Nevertheless, for all the reasons already mentioned, even in these more serious hypothesis, the liability of the driver and the owner toward third parties is not excluded as a result of article 2054 of the Italian civil code ³⁹.

4. – After having outlined the current legal framework and ascertained its compatibility with the introduction of modern driving assistance tools, it must be determined whether that set of rules is coherent with the new autonomous driving scene, defined as – according to the above proposed

negligence of a “distracted” driver may be established. On concepts of “distracted” and “attentive” driver see GURNEY, *Sue My Car Not Me. Products Liability and Accidents Involving Autonomous Vehicles*, in www.private-law-teory.org, 2013, 255 ss..

³⁹ It does not seem less important to distinguish the hypotheses in which the driving assistance system cannot avoid an accident from those in which the car itself causes the harm, whether due to a problem with its hardware or software. Consider, for example, if the emergency brake malfunctions near another vehicle, or while parking (the new systems do not include just alert the driver, but they avoid the impact all together). Here the driver undoubtedly relies on the system, but his negligence and failure to monitor the car's operation is what is ultimately important. Should, however, the harm occur because the assistance system unexpectedly takes control over the vehicle and performs an unforeseen action (e.g., turns the steering wheel without command, changes lanes or accelerates without warning), it is clear that the driver's degree of liability tends to be less. In fact, the driver cannot be considered negligent for not having monitored or supervised the car's behavior. Instead, his fault may be established only to the extent it is possible to establish an uninterrupted possibility to react, combined with an ADAS error. In these cases, it is necessary to assess whether the human driver could have behaved differently and avoided an accident and/or causing harm.

“legal” notion – a system that allows a vehicle to be operated independently and without driver supervision.

It such situations, there is little doubt about the need to establish who the “driver” is, meaning the subject that has control over the vehicle⁴⁰. Now, if on the one hand it seems clear that autonomous driving systems are capable of depriving the subject that activated such system of the management and control of the vehicle (while allowing him/her to regain manual control in potentially any moment), on the other hand, the automated system is not immediately attributed “subjectivity” despite it being equipped with artificial intelligence⁴¹ and being the one to concretely operate the vehicle. In such hypotheses we question whether the person who activated the system is the driver or the passenger. The latter is preferable because the former has always been grounded in the possibility to control the vehicle⁴².

However, if the driver activates an autonomous driving system that is capable of performing all driving functions, it appears that the “driver”

⁴⁰ See, among the others, GAETA, *op. cit.*, 1725; DE STEFANO, *Altri danni derivanti da cose: la rovina degli edifici e la circolazione dei veicoli*, in INZITARI (curated by), *Valutazione del danno e strumenti risarcitori*, Torino, 2016, 446. Insights also in SCOGNAMIGLIO, *Responsabilità civile e danno*, Bologna, 2010, 72 ss. It is therefore a question of the person responsible for driving a vehicle: see TERRANOVA, (entry) *Responsabilità da circolazione di veicoli*, in *Dig. disc. priv., sez. civ.*, XVII, Torino, 1998, 95; PECCENINI, *op. cit.*, 28; FRANZONI, *op. cit.*, 649.

⁴¹ On the subject of legal subjectivity and the potential liability of robots, see RUSSO, *Io, persona “robot”*. *Il nuovo diritto pubblico della robotica*, in *Amministrativ@mente*, 2018, fasc. 3-4, 10; ROMANO-TADDEI ELMI, *Il robot tra “ius condendum” e “ius conditum”*, in *Inf. e dir.*, 1, 117 ss. For additional insight, see BUSTO, *La personalità elettronica dei robot: logiche di gestione del rischio tra trasparenza e fiducia*, in *Cyberspazio e dir.*, 3, 2017, 499 ss.. The problem’s complexity is compounded by the fact that the machine is programmed to learn, and therefore make autonomous decisions when confronted with new situations, even if this was not originally envisioned.

⁴² Although a merely formal and likely unacceptable view, abstractly one might be able to establish uninterrupted liability of the subject who activated the system, to the extent that, in any moment, he may deactivate the system and regain manual control – or at least stop – over the vehicle, therefore avoiding harm. This, however, evidently implies performing a legal fiction, which clashes with the foundation of civil liability. A solution of this type appears rather to echo other functions that were noted in the past with regard to compensation and which, nonetheless, seem to be in the course of being overcome: this claim is made based on the widely accepted interpretation of article 2049 of the Italian civil code, which aims to establish a continuous liability of the owner for fault for bad judgement (*culpa in eligendo*), if not for failing to monitor (*culpa in vigilando*). See GIORGI, *Teoria delle obbligazioni nel diritto moderno italiano*, V, Firenze, 1926, 524; L. CORSARO, (entry) *Responsabilità per fatto altrui*, in *Dig. disc. priv., sez. civ.*, XVII, Torino, 1998, 386.

has effectively been transformed into the passenger. After all, this is the precise purpose (or at least the aim) of autonomous driving systems, which intend to give “drivers” the option of not having to worry about operating the vehicle, thus ensuring improved mobility also to subjects that are potentially immobile (for instance, minors or people without a driver’s license) or anyhow facilitating the use of a personal or shared vehicle to get from one place to another⁴³.

In this context it is questionable whether an article – such as article 2054 of the Italian civil code – that establishes liability of the driver in case of harm still makes sense⁴⁴. If a car is completely self-driving, and that system has been activated, who is the actual driver of the vehicle? The car – or, more precisely, the autonomous driving system – is operating itself.

On a factual level, this argument is difficult to dispute. It is possible, then, to conclude that the driver becomes the same autonomous driving system. However, with regard to the current legal framework, being able to apply such a notion becomes considerably complex. And as concerns applicable law, deeming a machine legally responsible for the operation of a vehicle could result in the *automatic* liability of the manufacturer, with some – obvious – clarifications (which will be discussed in the coming paragraphs). The choice could be quite innovative, but its compatibility with the system is still unknown.

At first sight, such a regime would require us to consider the vehicle itself – or at least the autonomous driving system – as a legal “subject,” as the law intends for the driver to be a physical person. However, doing this would pave the way for discussion of the possible subjectivity of robots, in so much as an autonomous vehicle possesses such characteristics. Said “personification” of the machine cannot at present be realized⁴⁵.

⁴³ See BERTOLINI-PALMERINI, *Regulating robotics: A challenge for Europe*, in *EU Parliament, Workshop on Upcoming issues of EU law for the IURI Committee, Publications Office of the EU Parliament*, Bruxelles, 2014, 110.

⁴⁴ The diffusion of driverless cars will wind up rendering obsolete the traditional approach to civil liability for the circulation of automobiles, which revolves around the role of the driver, with help from the “deep pocket” of the driver’s owner. In these terms, see DAVOLA-PARDOLESI, *In viaggio col robot: verso nuovi orizzonti della r.c. auto (“driverless”)*, in *Danno e resp.*, 2017, 5, 616 ss.

⁴⁵ In this regard, see also BERTOLINI, *Robots as Products: The Case for a Realistic Analysis of*

Thus, without a more profound interpretation (both doctrinal and legislative), we are led to exclude autonomous driving systems from being qualified as drivers under article 2054 of the Italian civil code.

Still, it is interesting to observe that, should the legislator wish to equate “autonomous driving system” to “driver” without changing the applicable law on the circulation of motor vehicles, the result would be the assignment of automatic liability of the manufacturer of the system that, taking control of the vehicle, assumes the role of “driver.”

Although evocative, the implications of such a choice on general legal categories must nonetheless be carefully contemplated, and a thorough cost-benefit analysis must be performed before putting autonomous driving systems on the same legal playing field as human drivers. As reasonable as it may seem, transferring the risk for harm to the manufacturer (in order to impute costs on the subject that is best capable of managing such risk) could cause significant drawbacks in the short term. In fact, the immediate and integral transfer of risk could undermine the development and adoption of this new technology, a consequence that must be avoided⁴⁶. Rather, more consideration should be given to a so-called “hybrid” application of law so that new autonomous driving instruments may coexist with manual driving, and therefore with the “culpable” liability of human drivers.

If, therefore, article 2054 of the Italian civil code does not recognize the possibility for the driver of the vehicle to also be an autonomous driving system, then drivers must continue to be those physical persons who find themselves in the driver’s seat⁴⁷. Otherwise there might not be any

Robotic Application and Liability Rules, in *Law, Innovation and Technology*, 2013, V, II, 225 and 235 for which robots are objects and not subjects of law. See also PERLINGIERI, *L'incidenza dell'utilizzazione della tecnologia robotica nei rapporti civilistici*, in *Rass. dir. civ.*, 2015, 1241 ss..

⁴⁶ According to this view, the autonomous system would end up embodying the driver. Aside from the legal problems connected to subjectivity, it has been critically emphasized that it would not be very efficient to hold the manufacturer of the robot fully liable no matter what. See BERTOLINI-PALMERINI, *op. cit.*, 112.

⁴⁷ According to the traditional approach, the driver is the one who has effective control over the mechanical contrivances used to move the vehicle, regardless of whether somebody else has helped him perform the maneuver: see SICA, *Circolazione stradale e responsabilità: l'esperienza francese e italiana*, Napoli, 1990, 144. In giurisprudenza see also Cass. 5 May 1956, n. 1446, in *Resp. civ.*, 1957, 122.

legal remedy in those cases where the law requires the “driver” to be a physical person. And this condition is made worse if we imagine that a vehicle not operated by anyone (aka “driverless”) cannot even belong to the genus in question, at least not under present law.

Even if the person behind the wheel does not perform any driving tasks, his/her liability could be established according to the laws for liability for things in custody laid down in article 2051 of the Italian civil code⁴⁸. It is known that this liability exists due to the particular relationship between the subject and the *res* (object), which attributes the custodian the right to prevent third parties from administering or operating the object in custody. However, this right is not always automatically attributed to whoever simply uses the good, but rather to the owner or to a subject that has de facto control of the object (including the illegitimate possessor). In this respect, even though some of the first commentators might fear the establishment of liability under the aforementioned law, the point does not seem crucial. After all, one could always make a claim against the vehicle’s owner under article 2054 of the Italian civil code. The case would obviously be different if this law was deemed inapplicable to self-driving vehicles. And this argument stops being merely theoretical or peregrine from the moment that the impossibility of establishing a driver also excludes this category of (self-driving) vehicles from being governed by the Rules of the Road.

Article 2050 of the Italian civil code may also become important. Deeming autonomous driving a “dangerous activity” could expose manufacturers to a more burdensome liability regime. However, it remains uncertain whether this type of solution is in line with general interests, or if it is concretely practicable⁴⁹.

The previous framework reveals that article 2054 of the Italian civil code will continue to be applied to the extent that the presence of a *human*

⁴⁸ On the relationship between the two laws, for the purpose of this article it is enough to recall DE STEFANO, *op. cit.*, 443, which makes further references. See also BERTOLINI, *op. cit.*, 227 ss..

⁴⁹ Even in this case the “*technology-chilling effect*” would be possible. See BERTOLINI-PALMERINI, *op. loc. cit.*. The legal risks would discourage such solution. For an assessment of the costs and benefits of this solution, see ENGELHARD-DE BRUIN, *op. cit.*, 84 ss.. Moreover, it is worth exploring the possibility of effectively qualifying as “dangerous” an activity that, by its nature, reduces the number of car accidents.

driver is established, even where a computer has control over the vehicle⁵⁰. This law will also be applied to establish the liability of the car's owner, but cannot be applied directly to automatic systems, as they are not actually subjects within the meaning of the law. Again, due to the difficulty in qualifying a driverless machine as a "vehicle", it might be found that article 2054 of the Italian civil code is no longer applicable (not even partially) where an active autonomous driving system is in place⁵¹. Moreover, it becomes apparent that this scenario might be the most disruptive since such vehicles could not be used on the road, be registered or even insured. Regulatory intervention thus appears inevitable to avoid such risk.

5. – In light of the above considerations, when it comes to the automobile sector, we can already expect that product liability will assume a preponderant role in Italy without special provisions⁵². Little by little, as

⁵⁰ This appears to be the choice made by the recent Smart Roads Decree, as regards the authorization to experiment with autonomous driving systems where significant responsibility is attributed to the "supervisor" of the system: see section 6 below. For a comparison on the favorable versus unfavorable aspects of a similar solution aimed at maintaining the liability of the owner or operator, see ENGELHARD-DE BRUIN, *op. cit.*, 84 ss..

⁵¹ Ultimately, article 2054 c.c. could become inapplicable whether due to the absence of a driver or because there is no "vehicle". In this regard, article 46 of the Rules of the Road (Legislative Decree No. 285 of 30 April 1992) becomes significant as it establishes vehicles as being all machines "driven by a human". In this respect, see also article 8 of the Vienna Convention on Road Traffic of 8 November 1968, which states "every moving vehicle [...] shall have a driver" and that "every driver shall at all times be able to control his vehicle". Article 8.5-bis as amended in 2016 now provides for ADAS. It is noteworthy that the incompatibility of article 2054 c.c. of the Italian civil code with a situation of completely autonomous driving can also be drawn from so-called "redeeming evidence". Indeed, it is incomprehensible how requiring a physical person to prove they have done "everything possible to avoid damage" could make sense when there is no concrete possibility to affect the operation of the vehicle. The mere presence of a "panic stop" function does not seem adequate to change the framework and allow us to consider the "driver" he who is actually just a passenger. Thus, this function or button could sometimes not even be adequate to avoid an accident. The importance of the "supervisor" pursuant to the Smart Roads Decree is important even for the sole purpose of being able to test that new technology: see section 6 below.

⁵² See GAETA, *op. cit.*, 1730 ss.; BERTOLINI, *op. cit.*, 227 ss.; AL MUREDEN, *op. cit.*, 1506 ss.; VAN WEES-BROOKHUIS, *Product Liability for ADAS: legal and human factors perspectives*, in *EJTIR*, 2005, 357; ENGELHARD-DE BRUIN, *Liability for damage caused by autonomous vehicles*, The Hague, 2019, 11 ss. For a more detailed discussion, see ALPA-BESSONE, *La responsabilità del produttore*, Milano, 1999, 267; BIANCA, *Diritto civile*, V, *La responsabilità*, Milano, 2012, 753; CARNEVALI, (entry) *Responsabilità del produttore*, in *Enc. dir.*, *Agg. II*, Milano, 1998; CERINI-

autonomous systems start effectively driving vehicles, the occurrence of accidents will seem increasingly connected to a system failure. At the same time, the increasingly insignificant role of the driver will – potentially – cause him to be considered less accountable, at least on an internal level, for the cause of damage.

Aside from the above discussion about the possibility of making claims under article 2054 of the Italian civil code (which we have seen appears to be problematic just as far as autonomous driving is concerned but does not pose particular difficulties for assisted driving technologies), manufacturer liability may be frequently claimed where harm is caused by the circulation of a vehicle equipped with an autonomous driving system.

Considering the advancements – both qualitative and quantitative – in driver assistance technologies and autonomous driving systems, shifting liability for accidents from the driver/owner of the vehicle to the manufacturer of the technological system will certainly be gradual. This transition will inevitably raise many issues that, at least in part, already seem predictable in their main features.

Thus, for what concerns the phenomenon of reliance, or the reliance on the product itself, it is necessary to assess whether the driver (or, perhaps more accurately, the passenger in the case of complete autonomous driving) was using the product correctly at the time of the accident. Specifically, it must be ascertained that the autonomous driving system actually permits the “driver” to become distracted. If this is not the case, the active participation of a physical person will continue to be necessary, including his control over the car despite it being in self-driving mode. This point is open to debate: indeed, it is clear that the ultimate goal of automation is to make it so the driver does not have to tend to any of the tasks delegated to the robot, so that he can focus simultaneously on other activities⁵³. Yet, even the manufacturer instructions indicate the need for constant supervision of the car’s performance by a physical person, at least in order to reduce one’s liability for harm.

To this effect, whether the mere non-compliance with any of the indications of the manufacturer is capable of relieving said manufacturer of

GORLA, *Il danno da prodotto. Regole, responsabilità, assicurazione*, Torino, 2011, 52.

⁵³ See GAETA, *op. cit.*, 1729 and 1743.

liability, in consideration of the so-called “non-conforming use”, must be assessed. It could be argued that the need to be able to carry out other activities while being at the wheel is precisely the scope and essential aspect (or the nature, so to speak) of the new, soon to be released technology. Manufacturer instructions that are completely incompatible with how the product is used would effectively produce a limitation of liability that would additionally frustrate the commercial and economic sense of autonomous driving⁵⁴.

The importance of a clear disclaimer by the manufacturer is undeniable. Despite having to avoid the above excessive costs, it is expected that the topic of incomplete information by the manufacturer is destined to become more central, also with regard to liability for the use of motor vehicles⁵⁵.

Another issue raised by product liability concerns the plurality of manufacturers and the sharing of liability between them. The question is bound to come up in the automobile sector as, usually, assisted and autonomous driving systems (and their relative components, including sensors) are produced by specialized manufacturers and are often used by a multitude of automakers, which sometimes require joint ventures between various manufacturers for the design and production of similar technologies. Even here we can expect to see liability based on the manufacturer’s warranty on the entire vehicle, but the effective sharing of liability will evidently raise issues with regard to the extent of liability of each individual subject involved⁵⁶.

Finally, the introduction of these systems will require a very careful examination of all the circumstances that led to the accident and production of harm, on a case-by-case basis. It will become crucial to ascertain whether the assisted or autonomous driving system was indeed activated,

⁵⁴ As regards possible limits to established contractual liability, it is necessary to take into account the prohibition set out in article 124 of Legislative Decree No. 206 of 6 September 2005, hereinafter “Consumer Code”. On the other hand, the anticipated contributory negligence of the user could lead to a reduction of compensation.

⁵⁵ See article 104 of the Consumer Code.

⁵⁶ See article 121 of the Consumer Code. See contra CASTRONOVO, *La nuova responsabilità civile*, Milano, 2006, 657 ss.. It may also frequently occur that one subject produces the hardware of the technological system, while another provides the software.

to understand if safety conditions were met for the system's use and proper functioning, to evaluate the dynamics of the accident and the behavior of the human driver if alerted by the computer. Realistically, cars will likely need to be equipped with a black box or some sort of system for recording data in order to establish the possible cause(s) of system failure⁵⁷.

6. – To conclude this *excursus* on the legal issues that the introduction of new assisted and autonomous driving technologies gradually presents with regard to the Italian legal system, it is possible to set out some initial key points.

First of all, the current context is dominated by (perhaps more reassuring) assisted driving features that support manual driving, while complete automation still appears to be in the background. The presence of increasingly incisive ADAS, often level 2 on the autonomous driving scale, requires all the circumstances of the concrete case to be assessed in order to determine which factor(s) caused the accident that produced injury. Thus, such advanced driver assistance systems realistically pave the way for shared liability between the driver and the manufacturer to become usual practice, no longer constituting an exception to the law of liability.

In this perspective, with the complete switchover to autonomous driving, the application of laws on product liability is destined to increase. However, this is undoubtedly a future scenario as the systems are currently still in the test phase and must be perfected. Still, in light of the near future transition, the law must also be updated in order to avoid similar systems becoming considered vehicles and thus part of the system⁵⁸.

⁵⁷ In this regard, refer to the decision of the German legislator with the recent "8th Amendment of the German Road Traffic Act", entered into force on 21 June 2017 (available under www.bgbl.de/xaver/bgbl/start.xav#__bgbl__%2F%2F*%5B%40attr_id%3D%27bgbl117s1648.pdf%27%5D__1517589427052). The implementation of these devices will inevitably create additional problems when it comes to privacy and control, also with regard to third parties.

⁵⁸ In this sense it is significant that the Smart Roads Decree, at article 1, letter F, introduces a true definition of "automated guided vehicles", which are "vehicles equipped with technologies capable of adopting and executing driving tasks without driver intervention". There is a clear distinction between "automated" and "assisted" driving. The law specifies, in fact, that "vehicles that are authorized to circulate on Italian public roads under current law and equipped with at least one as-

The so-called Smart Roads Decree (Ministerial Decree of 28 February 2018 implementing the 2018 Budget Law) moves along these lines and has to this end regulated the possibility of conducting road tests in Italy, and affected, among other things, norms regarding insurance aspects and provided for a drastic raise in ordinary ceilings (well over four times the current ceilings for traditional vehicles)⁵⁹. Moreover, in this experimental and test phase, the new rules introduce the “supervisor” (since “driver” is no longer an appropriate term) as the person occupying the vehicle and who must be able to assume control of the vehicle at any moment, regardless of the vehicle’s level of automation⁶⁰. In fact, the Decree expressly establishes that “the supervisor must be able to switch immediately from autonomous to manual driving mode, and vice versa. The supervisor is responsible for the vehicle in both operating modes”⁶¹.

What now seems clear is that – with the co-existence of man and machine, and the gradual tipping of the scales in favor of the latter – a profound evolution of case law on civil liability for the use of motor vehicles and an expansion of manufacturer liability awaits us. In this scenario, the role of fault will be reduced from the moment that, to the extent the machine itself causes injury, the negligence of the physical person cannot be established. This subjective element might reemerge where the driver has not behaved in a way that he should have, or where he has unreasonably trusted the performance of the car in light of the specific situation.

sisted driving system which the driver himself may decide to activate for the sole purpose of performing driving tasks and that, in any case, require the driver to be constantly alert and involved in driving activities are not considered automated guided vehicles”.

⁵⁹ On the topic, see CERINI, *Dal Decreto Smart Roads in avanti ridisegnare responsabilità e soluzioni assicurative*, in *Danno e resp.*, 2018, 4, 401 ss.; SCAGLIARINI, “*Smart Roads*” e “*Driverless Cars*” nella legge di bilancio, in *Quad. cost.*, 2018, 2, 497 ss.. At the European level, please note the recent European Parliament resolution of 15 January 2019, on the “autonomous driving of European transport”. This is, moreover, a relevant topic within the EU from the moment it impacts road safety and laws on product liability, as well as freedom of circulation itself.

⁶⁰ Article 1, letter J adds that this regaining of control is realized by “acting on vehicle commands in absolute precedence over automated systems” and that, for this reason, the supervisor “is responsible for the circulation of the vehicle”. Instead “when effectively controls the vehicle, in manual mode, he becomes the driver”.

⁶¹ See article 10, second paragraph, Smart Roads Decree.

With regard specifically to product liability, we have seen that important issues might arise in presence of multiple manufacturers, in relation to the manufacturer information duties and in consideration of the non-conforming use of the product by the consumer. The generally affirmed liability of manufacturers is also bound to significantly affect applicable insurance models, as it could be prospectively convenient to adopt a system that assigns manufacturers the responsibility of protecting injured third parties. The cost of such insurance coverage (which could also be hypothetically managed in house by the same automobile manufacturers) would be built into the cost of the product, likely resulting in prices so great that the development of this new market would be severely limited. On the other hand, this option could be a good way to put additional pressure on manufacturers to establish a higher safety standard: moreover, this could improve the collective trust in the quality of the product, and encourage, in a sort of virtuous circle, the growth of a new market. It seems likely that the adoption of these new advanced driver assistance systems will push us toward a regime of more strict liability and, consequently, a reduction in the role of human fault.

It is significant that, in allowing autonomous vehicle road testing and in order to provide increased protection to third parties, the Smart Roads Decree currently provides a substantial increase in insurance coverage ceilings. Reducing the number of accidents through the use of completely self-driving cars will inevitably cause insurance companies to rethink their risk and business models ⁶².

⁶² It is noteworthy that the first steps have already been taken to implement “driverless” police cars: in Italy, these cars are essentially tailor-made products to manage experiments; conversely, in the United Kingdom, they are already commercialized and offer a range of additional coverage (for example, against the risk of hacker attacks or software upgrade failures). In prospect, these driverless cars will be able to accord relevant discounts. Insurance companies will likely be compelled to rethink products and prices as a result of the drastic decrease in the number of accidents. Two complications appear identifiable at the moment: on the one hand, more information must be gathered (related to accidents and therefore risks) about autonomously driven vehicles in order to correctly quantify insurance policy costs. To measure risk, it is necessary to obtain information that, at present, has yet to be collected: millions of kilometers will have to be travelled by driverless vehicles. On the other hand, once again, the hybrid scenario, which will be the first that we will encounter in the near future, will be even more complex from the moment that we will find ourselves managing a context in which machine drivers and human drivers find themselves coexisting, with all the

The development of these new systems appears worthy of encouraging. Indeed, they allow us to better protect fundamental human rights (as well as inviolable individual and collective rights), contribute to the reduction of the number of accidents, and some studies suggest they benefit the environment⁶³. At the same time, we cannot ignore the risks associated with such technology: driver assistance systems must be perfected, adequate disclaimers and manufacturer's instructions must be provided, clear laws that govern these systems must be established, and protection against risks of system failure must be put in place (i.e., provision of manual control of the car in case of system malfunction). Additional aspects that must be considered include the protection against cyber attacks or hackers, as well as protection of personal data that an autonomous vehicle inevitably collects, just to name a few⁶⁴.

The main question is whether the current legal system is ready for such a radical innovation. The answer is, at least somewhat, affirmative, provided that the general rules on civil liability stay flexible and the laws of product liability adequately respond to the needs that gradually emerge as a result of technical advancements. Conversely, it is already clear that legislative reform is opportune (if not necessary) in order to facilitate the commercialization and use of completely autonomous vehicles, and also to clearly establish limits of user liability (qualifying him, depending on the circumstances, as a driver or a passenger). First steps have already

effects on fault and shared liability that are well imaginable. Not even in a regime of coexistence is it clear if autonomously driven vehicles will be effectively safer. As noted by Cerini, op. cit., 405 we can expect to see change, especially with regard to two aspects: "(i) evolution of product liability and increase in coverage in that sector; (ii) increase in spatial and informational risks. These sectors are currently characterized by lack of binding rules and by a state of underinsurance, especially in the Italian market".

⁶³ See MCKINSEY GLOBAL INSTITUTE, *Disruptive technologies: Advances that will transform life, business and the global economy*, in www.mckinsey.com, 2013; DEKRA, Road Safety Report, 2018, p. 52 ss., available at: www.dekra.it; PEGGY, Autonomous Vehicle Liability Insurance and Regulation, in *Dir. mercato ass. e fin.*, 2, 2017, 441-443. For a detailed analysis of the various effects of introducing this technology, see AA.VV., *Autonomous Vehicle Technology, A guide for Policymakers*, Santa Monica, 2014, 9 ss.

⁶⁴ With particular reference to risks of hacker attacks, see COSTANTINI, *Il problema della sicurezza tra informatica e diritto: una prospettiva emergente dalle "smart cars"*, in *Inf. e dir.*, 2016, 1, 95 ss. and . GAETA, op. cit., 1744.

been taken, even at a European level, and efforts are being made to take us in that direction. A legislative intervention that provides clear solutions to all the issues that remain open is nonetheless expected⁶⁵. The topic also involves infrastructure from the moment that vehicles – in order to improve the capacity to control the surrounding environment, necessary to ensure greater security and improve user comfort – can potentially rely on additional external information⁶⁶.

Although technical difficulties and issues involving interaction with manual systems, as well as all the other implications of self-driving cars, mean that completely autonomous vehicles will not become a reality in the immediate future, it is still important not to find ourselves unprepared⁶⁷. Clear rules may, in fact, encourage the development of these systems while at the same time maintain adequate safety standards, attract investments, create opportunities and eliminate more serious uncertainties (such as the fundamental problem with qualifying a completely self-driving car as a “vehicle”, for instance). Meanwhile, the traditional rules that govern the use of motor vehicles are destined to be applied to new challenges, and as such will continue to evolve and perform the task they were intended for. In this respect, the framework appears particularly complex, especially when it comes to the inevitable coexistence of manual (or human) and autonomous (managed directly by the car) systems, with all the possible effects on the establishment

⁶⁵ See PERLINGIERI, *L'incidenza dell'utilizzazione della tecnologia robotica nei rapporti civilistici*, in *Rass. dir. civ.*, 2015, 1241 ss., which illustrates this need in relation to the development of robotics. On change of context, see GLASSBROOK, *The law of driverless cars*, Minehead, 2017, 11 ss.. On a normative level, see the Resolution of European Parliament of 16 February 2017 laying down recommendations to the Commission concerning “existing rules of civil law on robotics”. Autonomous driving cars are, after all, similar to a robot: moreover, these perceive the outside world through a sensory system.

⁶⁶ The development of smart roads is called to accompany the development of smart cars. See DEKRA, *op. loc. cit.*; CERINI, *op. cit.*, 401 ss.. Connected infrastructures (such as streets, traffic lights, traffic signals) capable of communicating with intelligent vehicles will therefore be implemented. In this respect, additional normative needs concern the phenomenon of the exchange of “vehicle to vehicle” and “vehicle to infrastructure” information. Some system implementations are already available: for example, in select areas of the USA, Audi has made a service available that allows the car to communicate with traffic signals and automatically adopt a speed that allows them to catch as many lights as possible (so-called “green light optimized speed advisory”).

⁶⁷ See FERRAZZANO, *Dai veicoli a guida umana alle autonomous car. Aspetti tecnici e giuridici, questioni etiche e prospettive per l'informatica forense*, Torino, 2018, 97 ss..

and division of liability between these two “worlds”. In the face of this new challenge, the jurist is called upon once again to set principles and clarify the law (based on coherent rules and a logical reconstruction of the currently applicable regime) without failing to indicate possible new solutions. In this way jurists will contribute to the organization of applicable law by continuously comparing it to the new factual situations brought about by technological developments that have, until recently, been unthinkable.

Abstract

L'introduzione dei sistemi di guida autonoma è suscettibile di determinare un impatto *disruptive* sull'assetto attuale e consolidato della responsabilità civile automobilistica. Di pari passo con lo sviluppo tecnologico - e i progressivi livelli di autonomia raggiunti dal veicolo - si rende infatti necessario individuare il ruolo del driver in quanto la responsabilità di questo soggetto è tradizionalmente correlata al suo potere di controllo sul veicolo. L'Autore valuta quindi quali possano essere le soluzioni interpretative percorribili nell'ordinamento italiano al fine di allocare i danni cagionati dal veicolo *driverless*, individuando le disposizioni generali di legge suscettibili di trovare applicazione con riferimento a tale nuova realtà. Sulla base delle prime indicazioni provenienti dalla disciplina italiana in tema di autorizzazione ai test su strada dei veicoli a guida automatica vengono infine proposte alcune riflessioni circa i prevedibili sviluppi della regolamentazione sul piano della allocazione della responsabilità e delle implicazioni assicurative.

The introduction of autonomous driving systems is likely to have a disruptive impact on the current and consolidated structure of civil liability arising from the circulation of vehicles. Along with the technological development of autonomous driving, as well as the progressive levels of autonomy achieved by the vehicle, it becomes necessary to identify the role of the driver as liability is traditionally tied to the degree of control the driver has over the vehicle. In this piece, the Author identifies the general legal provisions applicable to this new reality in order to evaluate the possible interpretative solutions offered by the Italian legal system as regards the allocation of liability for damage caused by driverless vehicles. Finally, and based on preliminary reflections as concerns Italian legislation on the authorization of road tests of "automatic guided vehicles", the Author offers insight on some foreseeable developments as regards the law in terms of shared liability and insurance implications.