Shared Automated Mobility: The Legal and Governance Considerations

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Abstract: Automated vehicle technology is a fast-growing phenomenon which has, in recent years, found itself at the forefront of research projects being carried out in jurisdictions all over the world, and is a vital component to the modern revolution of the transport sector in the race against climate change. However, attaining a world with driverless cars and digital infrastructure, which eliminates the role of the driver, requires a detailed study from multiple aspects, including from a legal and governance perspective. A holistic, proportionate, and harmonised approach towards a dedicated body of legislation, which strikes the right balance between safeguarding consumers and a free market, is crucial to reaping the full potential of this technology, as the demand for alternative mobility solutions increases. This paper considers the legal impacts, which automated vehicles are expected to have on mobility, analysing in particular the challenges posed, the adequacy of existing legal systems, and the improvements that need to be made, on the basis of international research, with a particular focus on Malta. Project MISAM (Malta's Introduction of Shared Autonomous Mobility) was launched specifically for the purpose of assessing the viability of enabling the use of automated vehicles in Malta, including from a legal and governance perspective.

1 INTRODUCTION

Automated vehicles ("**AVs**") operate themselves and perform necessary driving functions with little to no human involvement, using data collected through sensors to take 'educated' decisions. The term 'AV' is in itself an umbrella term which encompasses different degrees of automation corresponding to the varying extent of human intervention required for operation. SAE International defines six levels of driving automation ranging from 0 (fully manual) to 5 (fully autonomous) (SAE, 2022).

1.1 The Call for the Use of AVs on a Wide Scale

Road traffic accidents claim approximately 1.35 million lives each year, over half of which are vulnerable road users such as pedestrians, cyclists, and motorcyclists, and are the leading cause of death for children and young adults aged between 5 and 29. Between 20 and 50 million more suffer non-fatal injuries. Major risk factors which contribute to road traffic accidents include over-speeding, driving under the influence, and distracted driving (World Health Organization, 2021).

The overwhelming majority of road accidents are the result of human error (Buck, Toscano & Tereskerz Ltd., 2021). Without a doubt, using automated technologies to decrease or even totally remove the human element from the equation would offset such error, thus reducing traffic incidents and road fatalities. Computers are capable of retaining vast quantities of information, running that information as variable inputs to a hypothesis in order to determine the potential outcomes, weighing those outcomes to determine which inputs produce the best overall result, and taking an informed and arguably the most favourable decision on the basis of that result. Naturally, the same cannot be said for the human driver. In fact, driver assistance systems such as lane-keeping systems and automatic braking systems – already a common feature in various modern car

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models – have been shown to contribute to reducing the incidence of accidents.

Increasing road safety is indeed one of the key drivers for the widespread use of AVs. But that's not all. AVs represent a smart and sustainable transport alternative. Aside from increasing mobility options and facilitating commutes for persons unable to drive or keen not to remain dependent on privately-owned cars, through an increase in shared mobility the use of such vehicles would contribute to a greener, more sustainable way of life (European Parliament, 2019).

1.2 The Modern-day Trolley Problem

The ability of AVs to exist in and interact with the physical world without the need for human intervention poses a set of challenges to existing legal systems. The notorious 'Trolley Problem', previously just a philosophical riddle of the mind, has found itself at the forefront of theoretical, technical and even legal discussions surrounding the introduction of AVs into society. Essentially, the Trolley Problem is an ethical thought experiment which contemplates a bystander's perplexing task of making the choice to save five people from being hit by a runaway trolley by personally intervening to divert it to a different track on which it will hit and kill one person. More loosely, the term is used to refer to an ethically bewildering trade-off between 'ethically acceptable' sacrifices and when these can be made (Foot, 1967). In the context of AVs, how would an artificial-intelligence-("**AI**")-powered vehicle, unable to brake in time and with no sense of morality, make the choice between crashing into the vehicle before it or diverting its trajectory and crashing into a wall?

Some dismiss this possibility altogether, arguing that there can be no such thing as the Trolley Problem in the operation of a driverless car, since a properly-functioning AV should be capable of detecting a collision in advance and communicating with surrounding vehicles to effectively orchestrate a manoeuvre to avoid it (Eliot, 2020). Such arguments, which ignore basic risk theory, also make a number of assumptions: that all components of every AV involved are operating properly and without delay, that the mechanics of the car enable it to come to an instant halt with zero stopping time, and that erratic unforeseeable events simply do not happen. Although automation may allow vehicles to take quicker and more informed decisions, this can never totally eliminate the possibility of an accident. A vehicle, any vehicle, moving at a certain speed, even with the most refined software and hardware, will require some amount of time to come to a halt from the moment the brakes are engaged. Furthermore, AVs are not precluded from experiencing unpredictable behaviour on the roads simply by virtue of their automation – the possibility of a child running out into the street from between parked cars, or being cut-off by a human-driven vehicle, cannot be excluded.

Who, then, is to be held responsible when an AV – an inanimate object which is not (at least not as yet) a legal person – causes damage to a victim's person or property? And against whom is that victim expected to seek redress? Here, a responsibility gap arises.

2 THE NEED FOR AN ADEQUATE LEGAL SYSTEM

With a view to addressing the legal issues presented by AVs, legislators are faced with two options: (a) retaining existing legislation and leaving the assigning of responsibility in the hands of the courts; or (b) actively and pre-emptively preparing for the mass release of AVs through the development of ad hoc legislation and re-consideration of existing regulation. The adequacy of existing legal frameworks can be determined from an analysis of: (i) primary areas of law which would be directly relevant to AVs and disputes arising therefrom (such as infrastructure, traffic management, liability, cybersecurity, privacy and data protection); and (ii) secondary areas which, at face value, may not appear relevant for the direct regulation of AVs but which would nonetheless be affected by their use (such as insurance, intellectual property, and the environment).

Generally, existing legislation is considered unfit, if not for the introduction of AVs, for their continued development. Adapting legislation to cater for the world of AVs is almost certainly not a matter of merely altering definitions and widening scopes, but is expected to require a dedicated framework of interoperable ad hoc laws capable of protecting the interests of consumers and stakeholders alike. In addition, due consideration would need to be given to changes to transportation systems particularly with a view to adopting adequate safety standards.

2.1 Existing Frameworks

Fully-autonomous (Level 5) vehicles are not yet being commercially produced, though companies such as Zoox and Google's Waymo are developing Level 5 prototypes for the purpose of testing on public roads. It is argued that the lack of publicly-available high-level AVs is partly attributable to the absence of dedicated regulatory frameworks, with the effect that the operation of AVs today would be regulated by existing legislation on traffic, infrastructure, licensing, type-approval, data protection, privacy, insurance, and liability, to name a few. For as long as laws are not updated or replaced to reflect the unique characteristics of AVs, contention will arise on the applicability and extendibility of existing regimes to AVs.

2.1.1 Existing Traffic Legislation

Traffic laws set out rules and standards for the legal operation of vehicles on public roads, imposing mandatory requirements such as the licensing of the driver and the vehicle, and sanctions for negligent or reckless behaviour while driving, such as driving under the influence of alcohol or drugs and running red lights. There is a tendency, however, for the scope of existing laws to be limited to 'motor vehicles', having been drafted with the traditional vehicle in mind. The complex nature of AVs and the different operational risks and challenges they pose, are likely to render a set of provisions specific to AVs, the people who operate them, and the infrastructure on which they operate, a necessity.

2.1.2 Regulating AI

The general complexity and endless possibilities of automated technologies strengthen the need for ad hoc legislation, so much so that the European Union ("**EU**") has long indicated its intention to develop a Union-wide framework for AI – a core component of any automated technology, including AVs – most recently with its proposal for an Artificial Intelligence Act.

Malta took its first steps towards the regulation of AI with the establishment of the **Malta.AI Taskforce**, bringing entrepreneurs, academics and experts in the field together to work towards, amongst others, the publication of an AI strategy and ethical framework, introducing the guiding principles needed to establish a firm legal foundation for AI (and hence for the AI component of AVs) in Malta. Malta's strategy provides for a national AI certification programme, overseen by the Malta Digital Innovation Authority, which provides applicants with certification recognising ethically aligned, transparent and socially responsible AI. Any future legislative framework addressing AVs would need to consider whether such a certification system should be made mandatory.

2.1.3 The International Arena

UN Regulation No 157, which came into force internationally in January 2021, is the first binding international regulation that includes Level 3 function, allowing signatory states to approve and deploy vehicles equipped with automated lane-keeping systems provided that their use is restricted to roads where pedestrians and cyclists are not allowed and to a maximum speed of 60km/h (Wise-Act, 2021). Recent amendments to the Vienna Convention on Road Traffic now explicitly provide for automated driving. At a European level, the EU's abovementioned publication of a draft Artificial Intelligence Act in early 2021 marks a major step in the regulation of AI, in a standardised and harmonised manner, across all Member States – a step which will undoubtedly impact the regulation of AVs (European Parliament, 2021).

2.2 Pertinent Legal Issues Expected to Arise from the Operation of AVs

The uniqueness and novelty of AV technology necessitates a thorough assessment of existing legal frameworks with a view to addressing and mitigating the legal issues surrounding it, particularly those relating to data protection and liability.

2.2.1 Data Protection, Privacy and Cybersecurity

Since AVs continuously collect and process data in vast quantities, including personal data, it is vital that adequate data protection principles are laid down and observed by such systems. The EU General Data Protection Regulation, which binds all Member States and third-party jurisdictions providing services from or to such states, lays down six exemplary principles for the protection of personal data, requiring the collection, processing, and storage of data to be conducted in a manner that is lawful, fair and transparent, respecting integrity, confidentiality, and data minimisation, among other things. The access and use of the data collected by the system must be restricted to its original intended purpose and the processing of such data must comply with the principles for the processing of personal data set out therein. Additionally, any AV making use of personal data is required to implement the necessary safeguards to ensure its proper use, and reliable processes for the protection of personal data must be integrated into the AV systems by design and by default (EU General Data Protection Regulation, 2016).

Like all IT systems, the AI component of AVs is vulnerable to cyberattacks that can compromise the safe operation and use of the vehicle and its data. A 2021 report published by the European Union Agency for Cybersecurity and the Joint Research Centre provides insights on the cybersecurity challenges specifically connected to the uptake of AI in AVs, and establishes a set of recommendations to improve cybersecurity in AVs and mitigate potential threats and risks (Dede et al., 2021).

2.2.2 Civil Liability

The copious amounts of data gathered and processed by automated systems, which 'teach themselves' to take appropriate decisions on the basis of data gathered, give rise to a number of legal and moral questions. One of the most pertinent relates to liability: who is responsible for a decision taken by an AV which results in damage to a third party? Without any ad hoc regulation in place, these questions may only be answered through an extended interpretation of existing legislation, by widening the application of established legal doctrines on liability. This is problematic, since rules on liability do not contemplate the prospect of holding liable an inanimate object such as a computer. By way of example, the Maltese Civil Code attributes liability to "persons". Therefore, if damage is caused by a robot, and a robot is not considered to be a person at law, then who should be held accountable for damage caused by the robot?

The concept of indirect liability is particularly important in the field of AVs: in the same way that the legal person in charge of an animal or a child may be held responsible for any damage caused by such, so too could a legal person in charge of an AV be held responsible for any damage caused by that system? Were that to be the case, an injured party would be eligible for the same legal remedies normally available to him in matters of indirect liability under the law of that state. This reasoning becomes problematic, however, in the context of driverless taxis, which transport passengers on a pay-per-ride basis in the same way as traditional taxis – in an accident involving a traditional taxi, liability is easily attributable to the human taxi driver where fault can be proven; however, in the case of a fully-autonomous vehicle with no human driver, the attribution of liability becomes questionable, particularly since the accident would involve no human intervention and the vehicle's only passenger is a consumer making use of the autonomous taxi service. A possible solution would be to apply the same notion of indirect liability by holding the legal person who 'employed' the AV liable for any damages caused by it while under his employment, in the same way that an employer may be held indirectly liable for the harmful actions of his employee. However, such proposed solutions would need to be interpreted in accordance with each respective state's jurisprudence.

Product liability laws may also be applied to any person found to be responsible for damages caused by an AV where it is proven to be a defective product. The EU's Product Safety Directive (2001) holds that a product is only safe if it meets all statutory safety requirements under EU or national law, while the Product Liability Directive (1985) regulates the right of recourse available to consumers for defective products. Under both directives, liability is mainly pegged to the manufacturer or producer of a product, but can be extended to any distributor or supplier that knowingly supplies unfit, defective or unsafe products.

Determining the Adequacy of Existing Legal Systems in Addressing Liability

With automated technologies already hitting local markets, yet with no tangible prospect of AV-specific legislation in the near future, how adequately equipped are current legal frameworks to deal with the proliferated use of automated cars and the legal conundrums that it is bound to bring, such as when a robot causes an accident? Under some liability regimes, a party may be held liable in contract and/or in tort and, where the victim is a consumer and the accident involves a product, potentially also in terms of product liability law. Generally, with a view to instituting a claim for damages, an injured party must contemplate: (A) who should be held responsible and therefore who should be sued, and (B) what correlation there is between that responsible party and the damage caused, and what evidence exists to support this nexus.

A) Who to sue

Assigning responsibility is not a straightforward task; assigning responsibility for damage caused by an AIpowered machine, such as an AV, becomes all the more arduous due to the minimised, or even totally absent, human element, and the AV's ability to take decisions in a human-like manner without the personal capacity or assets needed to compensate a victim in the event of a successful claim for damages. While suing under contract relies on an interpretation of the agreement between the parties, suing under tort follows a fault-based system which assigns liability in varying degrees according to the extent that the accused party strayed from the standard of care expected from it. Who, then, is the party at fault, and therefore the party against whom a claim in tort must be taken when an accident resulting in damages is caused by an AV?

The robot? Having generally been drafted with the natural person in mind, and since no product has ever qualified as a 'person' to date, existing liability frameworks are largely inadequate to contemplate liability of AVs. Whether a robot can, or should, be granted legal personality is another matter altogether.

The Owner of the AV? Should national laws provide for the notion of indirect liability, the owner of an AV may, by extension of his duty of care, be held responsible for an accident involving that AV. This is concerning in the context of the widespread adoption of AVs, primarily owing to the numerous entities involved in the creation and ongoing 'education' of an AV. The chances of a prospective AV owner being held responsible for a decision taken by the AV, through no intervention of his own, may deter him from following through with investing in the AV e. Additionally, it is presumably easier to train and control an animal than it is to 'educate' and control an AV, not only because of its size, but also because it is embedded with software developed by an external party and potentially laden with biases upon which it takes decisions out of the owner's control.

The Vendor? The vendor-consumer relationship is generally governed by the law of contract, imposing on the seller an obligation to deliver to the consumer a fit-for-use product, free from defects. Being a self-teaching, self-deciding technology, the learning process of AI-embedded systems lasts their lifetime, and while this makes it easier for them to adapt to changing scenarios, it raises a question as to whether a vendor can be held liable for damages caused as a result of a defect, which the AV developed after the time that the sale was concluded with its new owner.

The Producer/manufacturer? A producer may be found liable for breach of contract where he fails to deliver the product as described or where the product is found to be laden with defects. However, the consumer might not have a right of recourse against the producer, since there exists no direct contractual relationship between the consumer and the producer. In such cases, the consumer would only be able to sue the vendor under contract law, with whom there is an established contractual relationship; while the vendor may in turn take action against the producer on the same basis. This does not mean, however, that the consumer has no right of action against the producer of the defective product. Indeed, despite there being no contractual relationship between the producer and the consumer, the consumer may be able to sue the producer in terms of a product liability law, which holds a producer liable for any damage caused by a defect in his product.

The Service Operator? Service operators offering shared mobility services to consumers through the use of AVs may also be found liable depending on a number of factors, such as the nature of its role, the classification of the AVs being used, the sector in which they operate, and whether passenger intervention is required.

Essentially, the responsibility problem which arises with the use of AVs operating with little to no human oversight is that an accident caused as a result of such technology can hardly be attributed to an owner or driver, who was not in full control of the vehicle and whose role has been reduced to that of a passenger or bystander. For this reason, the most suitable route under existing law for an injured party to seek redress for damage caused by an AV may only be determined once the source of the error which gave rise to the damage is identified, though this may not be so straightforward. What is helpful, if not necessary, however, is that the injured party shows that a sub-standard level of care was exercised, below that expected of the reasonable man.

B) How to Prove It

Product liability law at EU level imposes strict obligations on manufacturers – a product cannot be placed on the market unless it is safe and conforms to its description. In the same way that a consumer would not expect his mobile phone to randomly explode, neither would one expect an AV to spontaneously crash into a wall or drive itself off a cliff.

Under EU law, a successful claim for damages caused by a defective product requires the injured party to prove (i) the damage, (ii) the defect, and (iii) a causal relationship between the damage and the defect (Product Liability Directive, 1985). It may be argued that an accident caused by an AV is in itself first-hand evidence of a defect, particularly in the case of fully-autonomous vehicles, which are designed to operate without any human intervention. If this were to be the case, then the only element that a victim of an accident involving an AV would be required to prove is the causal relationship, and this may be done by attesting that the manufacturer failed to properly inform its customer of any possible dangers of the vehicle, or by providing evidence that the AV's safety systems did not meet suitable standards. An interesting parallel may be found in the aviation sector, where responsibility for recent fatal accidents were attributed to the aircrafts' manufacturers, despite the very high level of automation.

The extent of liability of AV manufacturers may also be impacted by the different degrees of automation: the driver of a Level 3 AV is likely to be attributed greater responsibility than the driver of a Level 5 AV which requires no human intervention. In other words, the higher the automation level, the less likely it is that liability would be attributed to the driver, whose role is more akin to that of a passenger, with a greater chance of liability being placed upon the manufacturer.

3 CONNECTIVITY

Traditional transportation systems are heavily reliant on the ability of all road users to remain alert and to efficiently communicate with, and respond to, traffic signs and signals, light and weather conditions, other vehicles and their drivers, pedestrians, and the infrastructure as a whole. Much like humans in the traditional transportation system, AVs operating amongst traffic on public roads will undoubtedly find themselves in situations where they are forced to take split-second decisions, particularly in mixed-traffic scenarios, where driverless vehicles and traditional vehicles operate alongside one another on shared roads. AVs must be capable of precisely understanding the circumstances in which they find themselves at any point in time, through the processing of large amounts of data collected from various sensors embedded into the vehicle's exterior and the continuous exchange of information with other vehicles. A vital prerequisite for AVs to become operable on public roads, therefore, is that they are embedded with advanced communication capabilities and a fast and reliable telecommunications network on which to operate.

Connectivity has presented itself as one of the biggest challenges to autonomy. 4G network capabilities are insufficient to meet the urgent demands required by automated devices. 5G provides a level of connectivity ten times faster than existing cellular networks and its use is expected to improve efficiency and lead to a wider array of services for the consumer, connecting not only humans, but also infrastructure, machinery, and devices. 5G has the capability to transform entire economies as it permeates all sectors of society, bringing humanity one step closer to a 'hyper-connected' world – its principal limitation appears to be the cost of its roll-out (Malta Communications Authority, u.d.). However investment in this area is crucial to the success of automated technology as a whole.

The European Commission's '5G Action Plan' takes a harmonised and coordinated approach towards the deployment of 5G infrastructure across Europe, promotes global standards, and sets out a clear roadmap for investment. Advanced and improved connectivity is a key target of the 2030 Digital Decade proposed by the Commission, with commercial 5G services available in all Member States as of Q1 2022 (European Commission, 2022).

4 DIFFERENT APPROACHES AND REGULATORY OPTIONS

The swift pace of technological development renders legal instruments in a state of constant revision, as cumbersome legislative processes struggle to keep up. Alternative regulatory options which support the simultaneous development of technology and regulation may be the remedy needed to strike the correct balance, at least in the short term.

4.1 Regulatory Sandboxes

Regulatory sandboxes allow for the continuous development of technology through testing and practical experimentation, while keeping activity within a physical and legal 'safe zone' which will give regulatory bodies the time they need to understand the sector and formulate laws accordingly. In regulatory sandbox testing, the legislator uses law as an experimental tool to provide a dedicated yet restricted testing field, while retaining the power to adjust it depending on feedback received. It would be prudent to set up a sandbox for AV testing where industry participants are able to operate prototypes within a safe environment which reflects real-life conditions experienced on public roads, such as flooding, poor visibility of signage, and jaywalking, so that service operators, manufacturers and competent authorities can determine the extent to which physical elements such as local infrastructure and roads, and regulatory elements such as legislation and authoritative bodies, need to be introduced or adjusted for the widespread operation of AVs.

4.2 Living Labs

Living labs are founded with the intention of creating operational, user-centred ecosystems open to the testing of innovative products and concepts, generally across a defined territory (such as a city, region or campus), which differs from the traditional testbed. While testbeds assess the capability of a product to operate safely and as expected, using individuals merely as subjects for observation, living labs turn to their users for valued input within an experiential environment which immerses them in a realistic social simulation. Living labs are useful tools for policymakers who require a concrete basis for the development of new regulations and the refinement of existing ones and who, through the use of such labs, are able to trial the potential impacts of proposed regulations prior to their implementation and take evidence-based decisions. A number of AV living lab projects have been launched in various parts of the globe, such as the Catalonia Living Lab in Spain, the Smart Mobility Living Lab London in the UK, and the BTC City Living Lab in Slovenia.

4.3 Policy Labs

Policy labs are platforms which bring together policymakers, stakeholders, companies, and citizens in the formulating of policies related to a particular subject in an innovative and multi-disciplinary fashion. Policy lab participants can range from engineers and computer scientists to lawyers and economists, working jointly on different test cases. This concept actively involves all interested parties at various stages of the policy development process, and generally facilitates research evidence uptake into policy and practice. One such example is the *RISE Research Institutes of Sweden* – an independent, Swedish state-owned research institute which offers unique expertise, testbeds and demonstration environments for future-proof technologies, products and services, performs industry research and innovation as well as testing and certification in collaboration with the relevant institutions.

4.4 Advertising and Marketing as a Tool for Public Acceptance

Advertising and marketing provide methods of communicating the existence and availability of a product, service or idea to consumers from the people who create them. The lasting impact that an advertisement can create is not only important to consider, but vital to get right. In the context of AVs, this is particularly necessary to minimise the significant sense of scepticism and uncertainty which surrounds this still-nascent technology, and accustom its future users with its benefits.

5 A POTENTIAL STRATEGY?

In the absence of an AV-specific legal framework, a robust and holistic strategy, which addresses the impacts of AVs across all sectors on the basis of tried-and-tested strategies for similar technologies, such as drones, is vital. Any AV strategy should thus make the following key considerations:

Maintaining Safety and Security – Safety is the foundation of public acceptance and the overall success of any AV project. A dedicated regulatory body for AVs should be established with the task of enforcing legislation, implementing standards and recommendations, advising governments, and ongoing monitoring;

Optimise the Economic Impact of AVs, by introducing legislation and sector initiatives which foster economic sustainability;

Enhance Connectivity and Facilitate Synergy between Stakeholders – The safe and smooth operation of AVs is dependent on an interconnected network of flawless connectivity between AVs with one another and with the infrastructure on which they operate. But in a free market with numerous stakeholders, a particular AV manufactured by a producer will almost certainly differ from another made by a different producer, rendering ongoing communication between stakeholders a necessity;

Enact Effective National Law and Update existing Legislation – In the absence of an AV-specific framework at a supranational level, it is crucial that local governments kickstart the process towards the introduction of ad hoc legislation, tying in with existing legal principles;

Balance Efficiency and Sustainability – Putting in place a system for the setting and constant review of standards geared towards the reduction of our carbon footprint;

Regulatory Framework for Infrastructure – Adequate infrastructure is a prerequisite for the widespread and normalised use of AVs. Digital and physical infrastructures must complement each other and become aligned in order to create a safe and robust ecosystem for intelligent transport. Meaningful performance-based norms, standards, and specifications need to be introduced, including standards for the design, implementation, detection and ongoing maintenance of traffic signs, road markings and other infrastructural elements, at both national and supranational levels, in order to avoid the likelihood of AV accidents due to sensory and detection issues attributable to the different physical characteristics of the same traffic signs in different jurisdictions. The ongoing maintenance will be key to maintain the safety, security, and efficiency of the system. Although a harmonised approach is preferred, standards are likely to differ in practice, in response to the needs of the particular jurisdiction. It is recommended, however, that traffic management centres are set up in all cases tasked with the monitoring of AVs and their infrastructure, addressing incidents and shortcomings as they occur;

Mobility as a Service – Autonomous shared mobility services are expected to be a leading use case of AVs. With this in mind, operative frameworks for AVs should be strategized in a manner which allows for AVs of different makes, shapes and sizes, to drive on public roads in a collaborative and seamless manner, able to communicate with each other and take coordinated decisions. The co-existence of multiple AV services and service operators requires a number of considerations to be made, relating, among other things, to communication, infrastructure, licensing, type-approval, insurance and competition;

Citizens' Dialogues – These public debates, held between governmental representatives and members of the public to discuss pertinent topics and matters of interest, are frequently organised at EU level typically in the form of question-and-answer sessions which give EU citizens the opportunity to voice their concerns and give feedback to decision-makers. Holding citizens' dialogues on AV policy-making initiatives and projects will contribute to fostering public acceptance and developing legal frameworks that are both technically robust and ethically-aligned.

6 CONCLUSION

Although sections of current legislation may, at face value, appear to be applicable to AVs, there are far too many practical uncertainties for such products to be introduced to local markets without further legislative action. In the absence of dedicated legal frameworks for AVs, it is clear that a roadmap is needed at EU level in anticipation of their prospective widespread deployment. Legislators and regulatory experts will be faced with the conundrum of having to determine whether to take the lead and assume active control in determining the rules regulating the creation and eventual deployment of AVs (*ex ante*, or pre-emptive, approach), or rather allow sufficient leeway for manufacturers to push technological boundaries and proceed to mould an appropriate set of rules around the resulting product, just ahead of their widespread deployment (*ex post*, or reactionary, approach). No consensus, locally or internationally, has yet emerged on whether legislative initiatives should take the form of individual amendments across the entire spectrum, or a single dedicated legal regime consisting of exemptions from the 'traditional' structure as well as the introduction of novel provisions where necessary. A combination of the two might be regarded as ideal, with an initial ad hoc approach being gradually integrated into the *corpus iuris* as automated vehicular technology becomes increasingly normalised.

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