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Unanswered Questions on the Registration of Electric Scooters from the Perspective of the Automotive Industry and the Law

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Abstract

The rise of micromobility has brought increased use of low-speed transport devices such as electric scooters, Segways, and e-bikes. Despite their global popularity, the legal status of electric scooters remains unclear. A key regulatory question is whether e-scooters should be classified as vehicles. While some European countries consider them vehicles, others place them under existing categories like mopeds or bicycles, or even classify them as pedestrian devices. This classification affects all subsequent regulatory considerations. This study focuses on the registration of electric scooters, a topic with limited information despite its potential to address legal issues like theft and liability. The analysis examines regulatory frameworks in select European countries, compares them with practices in certain U.S. states, and highlights successful approaches in Asia, notably Singapore. The findings emphasize the role of vehicle databases in legal problem-solving and evaluate the effectiveness of existing systems. It may also be an incentive for the legislator to consider whether appropriate solutions can be found for the registration of other means of transport (e.g., bicycles, mopeds) and whether the adoption of these options could be appropriate for electric scooters.

Keywords

micromobility, e-scooters, sustainable transportation, registration of e-scooters, legislation

1 Introduction

In recent years, metropolitan transport has undergone a major transformation, partly due to changes in transport objectives: people want to reach their destinations in the shortest possible time. In this changed environment, there is a growing trend towards the use of micromobility, which is increasingly replacing public transport, and people are increasingly choosing this form of private transport within cities. This paper will focus on one of the most exciting and versatile of the micromobility means of transport, the electric scooter. Statistics show that the number of people using e-scooters is increasing year on year, but despite their popularity, it is important to note that they are a rather questionable phenomenon. From a technological point of view, there are many ideas and solutions as to the characteristics of this vehicle, but the versatility of the vehicle is not clearly reflected in the law. Among the subsystems of society, the world of transport is characterized by the fact that other social norms are overshadowed by legislation. This is important because the various means of transport can endanger people's lives, physical safety, health and property, so it is sure that clear legislative standards are needed to ensure predictability and safety in transport for all. Electric scooters are therefore trying to fit into this complex system, but they are being dealt with very different degrees in legislation around the world. The aim of this study is to highlight this context and to draw attention to the need for all societies to have a precise legal definition of electric scooters, including a clear definition of their technological characteristics. The response to the vehicle problem also shades the responses to all the other contexts, of which this analysis focuses on the problem of registration of e-scooters. By reviewing the literature and some relevant regulatory solutions from Europe, the United States and Asia, this paper aims to make a proposal to the

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legislator that focuses on the specific legal-vehicle characteristics of e-scooters.

2 The role of electric scooters in sustainable transportation

The concept of sustainable transport emerged in the early 2000s and has been evolving and building ever since (Zhou, 2012). Many researchers have adopted a holistic approach to its analysis and interpretation, focusing on three dimensions: environmental, economic and social (McQueen et al., 2020). Tumlin made a very important connection when he wrote that the task of sustainability is to balance the triad of 'people, planet, profit' and the triad of 'equity, ecology, economy'; it is a task that is known to be extremely complex and the right position is to see it not as an outcome but as a process (Tumlin, 2012) – which, it should be added, is still ongoing and often indeed fraught with problems.

The phenomenon of micromobility is closely intertwined with the requirement for sustainable transport (McQueen et al., 2020). Transport has always been a subject of broad consensus, as it was when the first bicycle or the first car appeared on the road (Héder, 2020). Yet many people forget that transport cannot be thought of as a system of actors that is only composed of motorists and cyclists, between whom many conflicts are generated. In cities in particular, the last two decades or so have seen major changes, with the emergence of micromobility, which finally calls into question the claim that roads were created specifically for motorists (Reid, 2015). The term 'micromobility' refers precisely to relatively low-speed transport devices (e.g., electric scooters, electric bicycles, Segways, electric bicycles, hoverboards, airwheels, electric skateboards) that make urban transport much easier and are increasingly becoming part of the urban landscape. E-scooters are therefore one of these new services, made possible by the development of information and communication technologies (Shibayama and Emberger, 2020).

SAE International plays an active role as a professional leader in creating cross-border automotive cooperation. Their taxonomy of the micromobility terrain provides a starting point for public authorities to serve the goals of sustainable transport with their policy objectives and the infrastructure at their disposal. In 2019, the SAE released J3194™ (SAE International, 2019), defining powered micromobility as: a wheeled vehicle that is fully or partially propelled; has an unladen weight of 500 lb (227 kg) or less; and has a maximum speed of 30 mph (48 km/h). It is important to note that only vehicles designed primarily for human transport and used on paved roads are covered by this standard, and it does not include vehicles propelled solely by human power. Standard J3194 (trademark pending) distinguishes between six types of powered microvehicles, including powered standing scooter and powered seated scooter (SAE International, 2019). These new terms were developed because the term "scooter" has been applied to a variety of different human-powered and motorized devices/vehicles. By way of contrast, EU regulation No 168/2013 (Council of the European Union, 2013) has defined L-category vehicles as the reference for Member States, which can be two-, three- or four-wheeled vehicles. The category uses performance, power, speed, length, width and height as classification criteria. However, the regulation does not apply to vehicles that are so-called self-balancing vehicles, nor to vehicles that do not have at least one seating place – electric scooters can or would be included in all these categories.

Specifically, the undeniable advantages of e-scooters include the following features for sustainable transport: competitive journey times; solving transport difficulties (e.g., avoiding congestion, avoiding overcrowded public transport); reducing emissions from passenger transport and local freight transport; shared systems offer a practical alternative to private vehicle ownership; providing more practical access to places that are difficult to reach from a transport perspective; offer travel alternatives that enable a car-free lifestyle; increase the energy efficiency of transport; contribute to the 'safety in numbers' effect; in the longer term, increase demand for safe cycling and walking infrastructure; reduce noise pollution (ITDP, 2019). However, in order for e-transport devices, in particular e-scooters, to effectively deliver these benefits, some essential technological and legal conditions need to be in place. Among the various micromobility services, bicycles and e-bikes have already been subject to relatively thorough analyses (focusing on their usage patterns, social and environmental impacts, regulatory good practices), while e-scooters still represent a challenge for urban mobility practices and policies, as they are less well known and a relatively new element in the mobility palette (Bozzi and Aguilera, 2021).

Above all, it must be stressed that guaranteeing transport safety is a public responsibility; while ensuring that the technological conditions are in place, the State must pay particular attention to the regulation of the various means of transport and show flexibility in adapting to any new circumstances. When new means of transport emerge, as has been the case in recent years, there is an urgent need to rethink the regulatory environment.

3 Electric scooters as vehicles

The primary question in finding the right regulatory solutions is whether the e-scooter is a vehicle, and if so, under which vehicle category exactly can it be subsumed? The question can be put in parallel with the famous example of the legal theorist Herbert Hart, who in his theory drew attention to the open texture of law (we can say the possibility of a "legal gap"): "Hence the law must predominantly (…) refer to classes of person, and to classes of acts, things, and circumstances; and its successful operation over vast areas of social life depends on a widely diffused capacity to recognize particular acts, things, and circumstances as instances of the general classifications which the law makes" (Hart, 1994:p.124). The general linguistic patterns given by the legislator are embedded in a standard linguistic form, are clear and predictable. There are, however, uncertainties where it is not clear to the legal practitioner whether a particular case falls within the general pattern, i.e., the rule. This is because there is a limit to the guidance that can be given in general terms in all areas of empirical knowledge, and this limit is to be found in the nature of language. For all these reasons, Hart argues that language is an inextricably open-ended web, and that the uncertainty of boundaries is the price we have to pay for using general classificatory terms. This must be accepted, for "we are human, not gods", he writes. Legislators are human too, and therefore cannot know all possible combinations of circumstances (Hart, 1994).

Hart illustrates this with a real-life example from the world of transport. (The example was probably inspired by an actual case Hart heard about at Harvard; in McBoyle v. United States, the question of whether an aircraft was a vehicle was raised. McBoyle was accused of violating the federal vehicle theft statute, but he argued that the statute in question did not mention aircraft at all in its definition of a vehicle, and therefore the theft of aircraft was not prohibited; see as "McBoyle v. United States, 283 U.S. 25 (1931)" (Justia, online)). Suppose, Hart writes, that a general rule says: "No vehicles allowed in the park". The clear cases are those that fall within the core of meaning of the rule's expression, and the so-called hard cases fall within the penumbra of the rule. Thus, if, as in the example above, someone wants to drive a car into the park, it is clear beyond any doubt that the car falls within the core of the rule, i.e., it is forbidden to drive into the park with that vehicle. However, if you arrive at the park on a skateboard, in a stolen car, or in an electric toy car – what do you do (Hart, 1958)?

The example of the cited legal theorist is even more relevant today, since we can transform the premise of his question as follows: can we enter the park mentioned in the example with an electric scooter, i.e., is an electric scooter a vehicle according to law? This question is a live practical problem all over the world, and there are many different answers to it in the legal systems of the present day. What these different approaches have in common is that they treat it as a vehicle, but its specific characteristics further complicate its place in the transport system – and the diversity is even more intense in relation to these characteristics. For example, there is no international consensus on essential questions such as: where an e-scooter can be driven; whether it is powered by a motor or by foot; whether the driver can be considered a pedestrian; whether there is a speed limit; what the performance of the device should be; whether insurance is required; whether a driving license is needed; whether a helmet should be worn, etc.

In European countries, the definition of electric scooters from a technological-legal point of view has been on the agenda for some years, but there is no uniform approach to regulatory solutions in these countries (Kazemzadeh and Sprei, 2022). A common solution is to equate state regulations with an existing vehicle category. In Finland, e-scooters are considered pedestrians, while in Italy, Denmark, Norway, Poland and Sweden they are classified as bicycles. It is mentioned as a light moped under Portuguese and Swiss rules, and in some countries there is a separate category for e-scooters; see for example the solutions in Germany, France, Finland (Buongiorno et al., 2022). It is worth mentioning that in Hungary, for example, the classification of electric scooters is not at all clear (Szemere et al., 2024). The latest and most detailed rules are in Ireland, where the "Road Traffic (Electric Scooters) Regulations 2024" (ISB, 2024) specifically apply to e-scooters. Under the Regulations, an electric scooter is a type of electric passenger transport vehicle without a seat, designed to carry one person in a standing position, with a body, two axles and at least one electric motor, powered mainly by electricity. The legislature prescribe, with effect from 20 May 2024, the requirements for the construction, installation and use of electric scooters in public areas and the obligations of drivers. In addition, from 20 May 2024, a maximum normal speed limit of 20 km/h will be imposed for use on public roads, unless a lower road speed limit applies.

In the United States, vehicles that fall under the definition of micromobility, including e-scooters, are regulated primarily at the state level, not the federal level. In some states, these devices are referred to as unconventional low-power vehicles and personal transportation devices. Looking at the US states, it can be observed that

the regulation is developed to different degrees, and therefore electric scooters are sometimes definitely classified under an existing vehicle category. In the state of Utah they are referred to as motor assisted scooters, while in Colorado they are treated under the same rules as electric bicycles. They are included in the same category as bicycles in states such as Kansas and Florida. In Louisiana, they are not considered motor vehicles; while the opposite is true in Texas, Tennessee, and Ohio, where the e-scooter is considered a motor vehicle (Levy, online).

4 Techno-legal aspects of the registration of e-scooters

It was mentioned that promoting road safety through legislation is a public obligation. However, in the context of micromobility, it is important to point out, as practice and research show, that the regulation of transport in the micromobility domain is mainly a matter for local jurisdictions, such as cities and regional councils (Zhang et al., 2024). Among the regulatory issues on the agenda for electric scooters, the issue of vehicle registration is of great importance, and it is therefore important that the relevant legislation is established at central level.

The registration of vehicles of different categories has long been an established solution in the automotive industry, with the following key requirements: proof of ownership, proof of compulsory third party insurance, proof of registration, proof of technical fitness of the vehicle, clarification of ownership in the case of stolen vehicles, and a declaration of conformity for new vehicles (Okeke and Ezenwegbu, 2018). With regard to e-scooters, it would be worth considering making registration compulsory in order to clarify these circumstances; in addition to the above, registration would also help to clarify the circumstances of the large number of accidents involving these means of transport.

As it is known, vehicles are identified by a Vehicle Identification Number (VIN), which is affixed to the vehicle's chassis. It makes the identification of a vehicle absolutely clear, as it is a numerical symbol placed during the manufacturing process and is unique for each vehicle. It is also included in the vehicle registration documents. The creation of a system similar to the VIN could help to clarify the ownership and liability of e-scooters. If, however, e-scooters already produced are subsequently registered under this solution, the fate of these vehicles is in question, a dilemma which the legislator is called upon to resolve (Maróti, 2023).

The zero step in the creation of a complex registration system could be the identification of the vehicle by means of a number plate (which is not the same as a VIN). One of the common features of the widely divergent regulations currently available is that the requirement for a number plate is considered to be rather rare; Germany was a pioneer in this respect, being the first to require a number plate (Kamphuis and van Schagen, 2020), but this practice is also being followed in Italy's evolving legislative amendment. A trend has emerged in several places where states have sought to make private e-scooter purchases more popular in larger cities (supporting the objectives of micromobility), but authorities have not taken sufficient steps to make registration or number plates, for example, mandatory (della Mura et al., 2022).

What follows is a brief presentation of good practices that already represent progress towards consistent registration of e-scooters, but these existing solutions are not identical to the innovative approach outlined above.

The aforementioned legislation of Ireland, which entered into force in May last year, is an important development towards facilitating identification. According to point 26 of the regulation, a manufacturer's plate must be affixed to the e-scooter in a clearly visible place, unique to each vehicle and in a permanent form; it must not be altered, made illegible or removed and must contain the following information: manufacturer's name, vehicle model designation; maximum design speed; maximum continuous rated power; unladen weight and maximum permissible weight; serial number or identification number. A provision on liability has also been included (see point 28 of the regulation): if a person uses an electric scooter in a public place which does not comply with the requirements of this Code, the owner of the vehicle commits an offence under the Road Traffic Act.

It is worth taking a look at the rules in the US; generally speaking, the issue of registration is not yet clear. For example, the state of South Dakota, which has detailed regulations on e-scooters, takes the position that e-scooters officially classified as mopeds are exempt from registration and ownership requirements. For these reasons, it is unlikely that an e-scooter will be registered under the moped regulations (see in: South Dakota Codified Laws, Title 32, Motor Vehicles (South Dakota Legislature, online)). In Pennsylvania, in order to legally operate an e-scooter on public roads, it must be registered in the Commonwealth and be insured; registration requires PA equipment and testing (see in: Pennsylvania Vehicle Code, Chapter 1, title 75 (Commonwealth of Pennsylvania, online)). In South

Carolina, e-scooters are considered to be subject to the rules for motorcycles, and consequently registration is a mapping of the rules established for these vehicles.

The leader in e-scooter registrations is undoubtedly Singapore, where green transport goals such as the development of micromobility are very much in focus. The Land Transport Authority (LTA) is responsible for the regulation of motorized micromobility vehicles; it plans, builds and maintains transport infrastructure and systems (LTA, 2023). The LTA classifies as active mobility devices: bicycles, three-wheeled pedal cycles (cargo tricycles and rider-only tricycles), recumbents (two- and three-wheeled recumbents); power-assisted bicycles – PAB, motorized and non-motorized personal mobility devices – PMDs (kick-scooters, electric scooters, hoverboards, unicycles, motorized luggage, etc.), and other mobility devices (personal mobility aids – PMAs, such as wheelchairs, motorized wheelchairs or mobility scooters – which are designed to carry an individual who is unable to walk or has walking difficulties). The registration, which is limited to e-scooters among PMDs, was originally intended to ensure ownership of the devices and availability of user information in case of accidents; the first wave of registrations started in 2019 (Pande and Taeihagh, 2021; Singapore Active Mobility Regulations, 2018). At the heart of the process is that new devices intended for sale or rental by retailers or businesses must undergo a so-called registration procedure with the LTA. The procedure involves the vertical placement of a registration mark (issued by the LTA) and a unique registration number on the surface of the e-scooter (front or side stem), which must be placed with special care to ensure that it is intact on the device (LTA, 2021). Devices on the register are subject to a periodic check every 2 years to verify that the e-scooter continues to meet the criteria set out in the legislation; if there is a deficiency in the criteria, the LTA will remove the device from the register. The LTA recommends that citizens should always check that the e-scooter is registered and that the transfer of ownership has taken place when purchasing an e-scooter (LTA, online).

5 Conclusion

It has been seen that different countries have different regulatory approaches when it comes to integrating e-scooters into their existing transport systems. The diversity of national solutions is also reflected in the level of regulation, the extent of which is reflected in the specific transport challenges and safety statistics. In fact, the lack of clarity of the vehicle category also creates uncertainty for other transport stakeholders, as it is not clear what rules apply to e-scooter users. An optimal solution would be to consider electric scooters as a sui generis means of transport, thus highlighting their different characteristics from other means of transport. For the time being, the general solution is to classify them under a different existing category (there are various interpretations, from pedestrian to motorcycle) – but this is only a temporary solution, with the final answer still to be given by the legal systems and supranational jurisdictions.

In addition to this primary task, another urgent task for the legislator is to clarify the registration of e-scooters. As has been seen, this issue is rather vague, but a clear answer to it could resolve a lot of situations quickly and efficiently. Currently, the physical identification of scooters is not official but only commercial, so there is a great heterogeneity of practice as to whether an e-scooter has an identification mark/production number, where it is placed, whether it has a number plate, etc. The bottom line is that the registration of e-scooters is not regulated by provisions similar to those for motor vehicle registration. Obviously, a database is available for rental scooters operated as a shared system, but this does not serve the objectives mentioned above and not all States have the possibility to use this type of e-scooter. Furthermore, it could be argued that for electric scooters only the document of ownership or rental can currently be available, which in turn does not support the transport entitlement structure but the ownership/use entitlement. In order to ensure that the micromobility transport equipment used in transport is also eligible for inclusion in a register, harmonized by national and legal systems, and that the information recorded there is supported by a document, a registration document is also required, which is also a legislative competence.

As a result, it can be stated that after the vehicle status of electric scooters has been addressed, the next urgent task facing the legislator would be to develop a uniform, clear and reliable registration and registration system. This could be a realistic expectation for all states, as resolving this issue would speed up the clarification of a number of other sensitive issues, both legal and technological (e.g., ownership, liability, etc.). EU-level legislation would also be a step in the right direction and foreshadows the desired vision of a vision that would aim to secure the place of electric scooters in sustainable transport through rules based on interdisciplinary considerations.

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