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From automotive to mobility

What are the expected legal and regulatory trends in a changing industry with new consumer and sustainability demands?

Marco Paolo Francesco Pontani

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Abstract

The automotive system is moving towards radical changes driven by the technological improvements and by new perceptions of the human and natural environment. This phenomenon is far from being entirely comprehended by local and global regulators that are not enough able to be properly answer to manufacturers and customers' expectations. However, the European Union is trying to face the regulation challenge; this article summarizes the main critical aspects of the transition from an automotive system to a mobility one and underlines the European Union's efforts to balance conflicting interests.

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SUMMARY

1. Introduction

The development of automotive (on-road motor vehicles) has been, for long stretches of time, connected to the evolution of the relationship between mechanic and propulsive systems (steam, liquid and gas fuel, electricity).

The arrival of digitalization resulted respectively in the substitution and automation of several mechanical parts and processes of vehicles. The purpose to improve the general vehicle performance, to enhance the safety of passengers and pedestrians and to reduce the pollutant emissions brought, has brought and is going to bring an increase in the demand for the automotive sector to adopt ever newer, better and more complex software (which automatically communicates with itself, with little or no human support, thanks to the adoption of several different sensors inside and outside the vehicle).

Nowadays, we are witnessing a gradually increasing change in the perception of the human and natural environment, which is awakening people to the necessity of a new idea of private transport. This new idea can be summarized as follows: we do not need to own a vehicle (such as a car or a motorbike) to move from A to B, but what we need is the right to move from A to B with the ease and comfort of a car without owning it.

This new point of view is currently spreading around the developed world with the arrival of systems of long-term car leasing and car sharing (also feasible because of the digital evolution of dedicated applications on widely used mobile devices).

The next steps in this field are coming in the vest of automated (self-driving, driverless and autonomous) and "clean" cars[1] (e.g. electric cars).

[1] An increasing number of vehicle manufacturers are aiming to introduce in the market fully autonomous cars, trucks and air drones, and all sort of autonomous machines (e.g. Tesla, Amazon,

marcopontani@hotmail.it
Piazza Castello, 5 - 20121 Milano

Such an evolution is going to reduce urban car overcrowding and reduce under-used vehicles with possible benefits for people's safety and the environment.

The ever-increasing levels of automation and systems of artificial intelligence[2] are going to change our current factual system of reference, which is going to move our attention from the current European Union regulation that focuses on a safe, environment friendly, connected and automated mobility to future and actually non-foreseeable issues that shall be regulated. Moreover, the complexity of the new technologies and the ever-increasing improving of the same, in a world where the co-existence of different legal, ethic[3] and economic frameworks is as hard as ever, will not ease the regulators and legal field operators' work).

2. From automotive to mobility

The evolution of technology, moving towards digitalization and robotization, which includes the IT and AI area, is influenced and includes, in the short and medium period, several different aspects and factors like those highlighted below.

The developed world[4] is entering, more and more, the fourth industrial revolution (Industry 4.0) which would bring inevitable modifications of the required human capital working skills and, as a consequence, some workers shall be re-skilled, but others would probably not be able to ever rejoin the job market.

Indeed, due to the pressing incoming advent of an all-new technological framework driving society to automation entailing less need for unskilled workers, is now increasingly arising and spreading around the world the idea that governments should introduce the so-called universal Basic Income or similar measures. Moreover, the idea that states should provide a means-tested guaranteed minimum income for citizens who are unable to meet their basic needs is widely shared and has been a central component in the evolution of social citizenship rights in existing welfare states[5].

Manufacturers and consumers are moving towards the third stage of mobility[6], which entails a higher level of automation, a different approach to all kinds of transportation and a whole new (or revisited) infrastructure system.

The above was also driven by the awareness of the necessity (and not only the need) to contrast the negative effects of human actions on the environment and on living beings, in a world with an increasing population, and an increasing demand for natural resources, products and services. Therefore, a smart mobility system is part of a larger plan for the benefit of all even if it would entail a reshaping of the conception of transportation.

The expectations of enterprises and consumers (or better, clients – service users rather than vehicle owners -) are a consequence of the currently evolving awareness and technologies and require a new legal framework.

For sake of clarity, the legal framework shall consider new values of a changing society, different societies, different technologies and new risks. We are dealing with systemically and otherwise dynamic regulatory systems that are difficult to harmonize in the presence of civil societies that change at variable speeds and are culturally inhomogeneous.

In the European Union (which from an ethical and regulatory point of view is in the lead), the interventions in relation to the transit from the automotive to the mobility are different and seem to provide the first answers (especially general and in terms of principle) to the expectations of both manufacturers and consumers (or clients).

Indeed, the expectation of the manufacturers and consumers/clients could be, partially, considered coincident (environment, safety, etc.), but the first endeavor to contain costs, increase sales and compete with other manufacturers, while the latter focus on their personal safety, family, friendship, hospitality and adequate protection in terms of health and safety.

Volkswagen, Hyundai, Samsung, etc). This would reduce the major element of risk in the transportation equation: humans.

[2] Rule Based Systems, Context Awareness and Retention, Domain Specific Expertise, Reasoning Machines, Self-Aware Systems / Artificial General Intelligence (AGI), Artificial Super Intelligence (ASI), Singularity and Transcendence (Rohit Talwar, Steve Wells, Alexandra Whittington, April Koury and Helen Calle, of the Fast Future, *The 7 stages of the future evolution of Artificial Intelligence*, 25th September 2018 https://www.em360tech.com/tech-news/tech-features/artificial-intelligence/. The automation levels as defined by the Society of Automotive Engineers (SAE) International (Troy, Michigan, Oakland, USA) shared by the U.S. Department of Transportation (NHTSA -Automated Vehicles for Safety) and the United Nations (UN Economic Commission for Europe (UNECE) Global Forum on Road Traffic Safety, October 10, 2018) are: (0) no driving automation; (1) driver assistance; (2) partial driving automation; (3) automated driving – conditional, (4) automated driving – high; (5) Automated driving – full.

[3] European Parliament resolution of 16 February 2017, with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103 (INL) P8_TA (2017)0051).

[4] Sovereign countries with high industrial and Human Development Index (see the United Nation definition) compared to other countries, with a technologically advanced infrastructure, and a highly developed economy.

[5] In Italy a first approach, currently, is the Decree Law, No. 4/2019 implemented with Law No. 26/2019 on March 28, 2019.

[6] The project of the Joint Research Center of the European Union Commission, whose subject is the themes of Smart Electricity Systems and Interoperability, *The 7 stages of the future evolution of Artificial Intelligence*, 25th September 2018, developed between 2012 and December 2015, aimed at the realization of "*an integrated approach of addressing the main bottlenecks of urban FEV (Full-Electric Vehicle) mobility: 'range anxiety' related to the limited FEV range, scarcity of parking spaces with public recharging spots, and the congestion of urban roads*", https://ses.jrc.ec.europa. eu/mobility-20). The foundation of the new conception of urban mobility is found in the study coordinated by ARTHUR D. LITTLE, *The Future of Mobility 3.0 - Reinventing mobility in the era of disruption and creativity*, March 2018, (https://www.adlittle.com/futuremobilitylab/assets/file/ 180330. ArthurD.Little_&_UITP_Future_of_Mobility_3_study.pdf) in particular page Nos. 11 et seq. which underlines the profound change in behavior resulting from technology, the increase in car sharing, the change in the composition by age group of consumers, the increase in the mobility of people (page no. 13).

3. The manufacturers' expectation of regulation

The European Union has not yet organically regulated the subject of connected and automated mobility, but has highlighted the need for the implementation of a system based on cooperation and has addressed the complex issue, starting from September 2012, with the Department of Transportation Intelligent Transportation System (ITS), and with the participation in various working groups (e.g. Safety applications, Standards harmonization, Assessment tools, Driver distraction and Human-Machine interaction).

The basic steps, of the abovementioned working groups, can be identified as follows: (i) the Proposal for a Regulation of the European parliament and Council (COM(2016) 31 final/Brussels, 27.1.2016) on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles; (ii) the Report (amending the proposal) A8-0048/2017; (iii) and the subsequent Legislative resolution of the 19th of April 2018 (P8_TA(2018)0179) (adopting such a proposal).

Besides, different and collateral initiatives that have been implemented need to be mentioned:

a) the Resolution of the European Parliament of 16th February 2017 (P8_TA (2017) 0051) which (i) underlined and acknowledged the possible problems relating to finding a subject to assign responsibility for the operation of systems governed by algorithms (bearing recommendations to the Commission concerning standards of civil law on robotics (2015/2103 (INL)), and (ii) underlined the fact that there are differing ethical points of view of the people involved in the application and use of intelligent robotics;

b) the establishment of technical standards by the ISO[7] that classified the risks related to the functional safety of electrical and/or electronic systems installed in mass production on road vehicles (26262/2, in 2018, - Automotive Safety Integrity Level (ASIL)) and the ISO/TC 299 Robotics having the "*goal to develop high quality standards for the safety of industrial robots and service robots to enable innovative robotic product to be brought onto the market*";

c) the "*Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee Of The Regions 5G For Europe: An Action Plan*" on September 14, 2016 which considers the new generation of network technologies that connect devices and objects to software virtualization and technologies that allow the application of innovative business models in various sectors (such as the automotive, transportation, manufacturing, energy sectors).

The dynamics of interaction between intelligent robotic systems, which learn independently from the external environment by modifying their software, imply an automatic exchange of information. This leads to possible repercussions on people's privacy (EU Regulation No. 2016/679), for which additional protection standards are required, as examined in EU Resolution P8_TA (2017) 0051.

As we have seen, the European Union is active and very careful regarding the problem: the harmonious interaction between progress in the field of artificial intelligence on the one hand and respect for human rights on the other, and proceeds with caution and firmness in its regulation.

Mobility becomes Mobility-as-a-Service (MaaS) with obvious repercussions on security systems, traffic volumes, the extent of vehicle sales, urban logistics and payment system treatment methods, etc[8] .

What are the manufacturers' expectations in the Mobility-as-a-Service transition?

The most urgent are to ease access to financing in order to support technological improvements and access to public grants for the retraining of employees to be "converted" to new tasks, favoring the transition with a limited effect on the size of the workforce employed. Manufacturers will thus have the availability of human capital resources with professional profiles (including knowledge of shared and verified ethical standards) suitable to intervene competently in the new production processes[9].

Simultaneously regulators shall:

a) set up a system of civil and criminal liability in case of malfunction of autonomous cars (also driverless ones with autopilot) due to possible interference or blackouts in network communication systems or automatic management of artificial intelligence that cannot be countered by human intervention, even with remote access to car management systems[10] ;

b) define uniform and legally recognized technical standards (such as vehicle registration systems

[7] The International Organization for Standardization.

[8] Urban Mobility System Upgrade: How shared self-driving cars could change city traffic, https://www.itf-oecd.org/sites/default/files/docs/15cpb_self-drivingcars.pdf, (OECD) INTERNATIONAL TRANSPORT FORUM'S CORPORATE PARTNERSHIP BOARD, 2015).

[9] There is an increasing need for specialized workers in line with the aim to produce Zero Emission Vehicles (ZEV), ZEV Alliance, International Council on Clean Transportation (ICCT). Please also note that cases of software intentionally modifying CO2 gas emissions emerged dramatically (one above all: Volkswagen) as witnessed also by White Paper, *Real-world exhaust emissions from modern diesel cars* (October 2014), INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION. Reference is made to the recent paper (October 14, 2018), on behalf of the Zev Alliance, Accelerating the transition to ZEs *in shared and autonomous fleets* (http://www.zevalliance.org/wp-content/uploads/2018/12/IZEVA-sharedFleet-vF.pdf).

[10] The National Transportation Safety Board (NTSB), an independent U.S. government investigative agency responsible for civil transportation accident investigation, reported, among others, of a fatal accident occurred, in March 2018, of a Tesla motor vehicle driving with an "autopilot", a type of autonomous driving which presupposes the presence of a human pilot to counteract any operating defects of the control software. More noteworthy, but not related to a private vehicle, is the case of the Ethiopian Airlines "Boeing 737 Max 8" that crashed on March 10, 2019. It was an autopilot of a plane with certain processes left to the control of an autopilot, which the human pilots were unable to counter. This shows that an autopilot driving system with prevalence over the human intervention can fail entailing the arise of who can be considered responsible.

with transparent and unchangeable sharing, "black boxes" and blockchain systems with technology compliant with ISO standards, still under study);

c) to provide a training system for judges and specialized technical consultants in the event of litigation

Finally, it will be necessary to set up an insurance system with limited costs to face both the risks inherent in production processes, which will increasingly take advantage of robotic systems with artificial intelligence, and those of circulation on the road in the presence of defects in communication systems of computer networks and mixed circulation of driverless vehicles, with autopilot not effectively replaceable by the human driver, and of human-driven vehicles.

4. The regulation expectation of consumers

The current legal framework is linked to traditional on-the-road human-driven vehicles and is mainly focused on various indemnification provisions that vary from country to country, for damage to people (passengers, drivers and third parties) and to things.

Road vehicles already use electronic components and artificial intelligence systems (such as assisted parking, acoustic alarms, automatic braking in the presence of obstacles, management of the routes to follow to reach fixed and/or modifiable destinations, etc.). Moreover, more and more vehicles have electric or hybrid engines with undoubted advantage for the health of individuals and urban communities.

Road infrastructures will need specific adaptations and integration of telecommunications network systems (modest in relation to current and incoming needs) and interconnection systems necessary to allow the use of autonomous vehicles.

To permit the transition from automotive to mobility, the needs of a specific regulatory discipline are not yet adequately perceived by the common person for cultural reasons and are often linked to socio-economic-political choices of a public nature as well related to the industrial development of the sector. To raise public awareness, interventions of a formative and informative nature are needed at a general level and must be such as to enable them to understand what to do, how and when, as well as with whom to speak in case of any need.

In addition, the interconnected communication systems permit the identification both of the people present in the vehicle such as the driver and the passengers and the routes and destinations (thanks to integrated GPS and anthropometric identifying systems). For example, imagine an automated AI system could note frequent visits to a certain hospital and share this information with third parties.

Furthermore, the fact that in an autonomous and interconnected vehicle little or no driving time will be necessary, the consumers will have more time to spend for several activities inside a vehicle. Such activities are those which to date we usually consider linked to our home (e.g. various kind of entertainment, from watching your favorite series on television to reading a book) or our workplace (conference calls, work meetings, etc.).

This *de facto* situation could lead us to think and behave as if we were, for instance, at home, without being effectively there. Because of this, we would risk not to adopt those precautions that we are used to put in place when outside our home/workplace, in a vehicle which is constantly monitored. Therefore, there will be major risks to compromise the safety of our personal data relevant to the abovementioned activities. This information can be sensitive and must be protected.

Therefore, this privacy issue must be integrated and better correlated with other regulatory disciplines relevant to the application of EU Directive No. 680/2016[11] , which is relevant to the protection of individuals with regard to the processing of personal data by the competent authorities for the purposes of prevention, investigation, detection and prosecution of criminal offenses or execution of criminal sanctions, as well as the free circulation of such data.

Among the initiatives of the European Union, aimed at meeting, in part, the needs, both of manufacturers and consumers, and which have been taken with the formulation of some directive proposals, the following legislative proposals are particularly relevant to the relationship between safety and preservation of the environment and health (sustainability): the road infrastructure safety management aiming at eliminating, by 2050, fatal accidents ("zero victims") "COM (2018) 274 final"; May 17, 2018;for a Low-Emission Mobility Strategy following the Paris Declaration on Electro-Mobility and Climate Change and Call to Action, of 29 November 2015 "COM (2018) 286 final".

In the end, in the field of safe and sustainable vehicular mobility, we cannot ignore the emphasis on the close relationship between zero-emission energy and the role of artificial intelligence, which was discussed during the World Economic Forum, in January 2018, on the theme "Electric Vehicles for Smarter Cities: The Future of Energy and Mobility and in the work of the Digital4Med Conference" of April 2019.

5. Conclusions

The European Union has promoted a regulatory, technical and legal framework, which is still limited, with initiatives that can be considered more as soft law than an effective enforceable regulation, trying to balance the needs of producers, workers, consumers and sustainable development.

The present moment of transition from automotive to vehicular mobility is part of a constantly evolving landscape. The arrival point of increasingly complex and autonomous technologies still appears to be undefined and for this reason it is difficult, if not impossible, to achieve a complete and systematic regulation.

[11] Transposed in Italy with Legislative Decree No. 51/2018.

To date, even for cultural reasons, the time to meet consumer expectations regarding safety and health protection appears long. Moreover, the transition requires collaboration and connectivity, in a competitive entrepreneurial context and with great differences in the social composition of the communities concerned.

In the end, a “green”, autonomous and interconnected mobility is a challenging opportunity to reduce pollution in our cities, to improve our safety on the roads and to give us more time for ourselves, but it will have to deal with the risks and dangers of a loss of privacy and the freedom connected to the same.

Pontani e Associati S.A.S. di Franco Pontani e C.
Cap. Soc. € 120.000 (centoventimila) - REA Milano 1047300 - R.I./C.F./P.I. 04847510155
Sede Legale, Direzione e Amministrazione: 20121 Milano - Piazza Castello n. 5 - Tel. 02-36682148
Fax 02-36687506 * Direttore Responsabile: Dott. Franco Pontani
Registered by the Cancelleria del Tribunale di Milano n. 5 del 9 gennaio 2015
E-mail: info@pontanieassociati.com