Opinion of the European Economic and Social Committee on 'Implications of the digitalisation and robotisation of transport for EU policy-making'

(own-initiative opinion)

(2017/C 345/08)

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1. **Conclusions and recommendations**

1.1. Digitalisation and robotisation in the field of the mobility of people and the transport of goods provide society with several potential benefits such as better accessibility and convenience for passengers, efficiency and productivity for logistics, improved traffic safety and reduced emissions. At the same time, there are concerns relating to safety, security, privacy, labour and the environment.

1.2. While technology offers endless opportunities, progress must not be solely technology driven but aim at creating added value for society. Political debate — together with the proper involvement of civil society in transport planning processes, particularly in large urban areas — is therefore necessary.

1.3. Realising digital transport requires solutions for existing bottlenecks, as well as integrated investments along the TEN-T network in transport, energy and telecommunication systems, including the deployment of 5G. EU funding instruments such as the Connecting Europe Facility, the EFSI and Horizon 2020 should support these undertakings.

1.4. The digitalisation and robotisation of transport provide new business opportunities for both manufacturing and service industries, including SMEs, and could be an area of competitive advantage for the EU. To this end, the EESC calls for an encouraging and enabling business environment, including openness towards new business models and boosting the development of European digital platforms.

1.5. The digitalisation and robotisation of transport will bring about profound changes in the nature of work and the demand for skills. The EESC highlights the importance of dealing with these structural changes by enhancing a fair and smooth transition and addressing the skills gap, together with the appropriate monitoring of progress. Social dialogue and informing and consulting workers play a key role in the transition process. Member States also have to adapt their education systems to respond to the new demand for skills.

1.6. The digitalisation and robotisation of transport require the adequate availability, accessibility and free flow of data. At the same time, proper data protection has to be ensured. Increasing cybersecurity capabilities and tackling liability issues are also necessary in order to respond to new developments.

1.7. The EESC stresses the intermodal character of digital transport, which touches the very heart of the EU's transport strategy. It also implies close connections with other policy areas such as those relating to the digital single market, energy, industrial development, innovation and skills. As the goals and requirements of climate change mitigation act as one of the drivers of digital transport, there is also a close link with environmental sustainability.

2. **Background and ongoing trends**

2.1. Digitalisation is expanding into all areas of the economy and society — transport being an area often used as an example. The purpose of this own-initiative opinion is to consider the developments and implications of the digitalisation and robotisation of transport from the point of view of society as a whole, including businesses, workers, consumers and citizens in general, and to put forward the EESC's views on how these developments should be taken into account in EU policy-making, in order to seize the opportunities and manage the risks in a proper way.

2.2. Much is already going on in the markets, as well as in different policy areas at national and EU levels. The EESC has also addressed this theme in its opinions, with regard to e.g. the future of the automotive industry ([1]) and the European strategy on Cooperative Intelligent Transport Systems, C-ITS ([2]), as well as Artificial intelligence ([3]).

2.3. The digitalisation of transport takes several forms. At present, vehicles, aircraft and ships already use digital information in many ways, including technology and services supporting car driving, traffic control of trains, aviation and shipping management. The digitalisation of passenger and goods information is another area of everyday application. Thirdly, robots are commonly used in terminal operations in the area of freight logistics.

2.4. Further automation and robotisation open up new opportunities for transporting goods and people, as well as for various kinds of monitoring and surveillance. Virtual robots, i.e. software robots play a central role here by enabling the increased use and connection of different information systems, allowing them to function as one interoperable unit.

2.5. The automation of transport involves developing means of transportation with regard to their interaction with human beings, as well as with infrastructure and other external systems. Driverless and unmanned vehicles, ships and airspace systems that are fully autonomous, i.e. that function independently, are the final step in this development.

2.6. At present, driverless cars are being developed by several car manufacturers and tested in practice. Driverless metros have already been introduced in many cities while driverless buses and platoons of trucks are being tested. The use of unmanned aircraft systems or drones is rapidly increasing and even remote-controlled and autonomous ships are being developed. In addition to vehicles, aircraft and ships, new kinds of infrastructure solutions and traffic control systems are being explored.

2.7. Although steps towards autonomous and unmanned transport are being taken, the basic structures are still based on people as the main actors. The most remarkable implications are to be seen when fully autonomous and unmanned transport is a reality. Prognoses on when this will happen vary significantly. However, it is important to prepare for the future and make the necessary decisions in good time.

([1]) Information Report of EESC's Consultative Commission on Industrial Change (CCMI) on 'The automotive industry', CCMI/148, adopted by CCMI on 30 January 2017.

([2]) EESC Opinion on 'Cooperative Intelligent Transport Systems', TEN/621 (not yet published in the Official Journal).

([3]) EESC Opinion on 'Artificial intelligence', INT/806 (not yet published in the Official Journal).

2.8. Digitalisation also enables passengers and other transport users to benefit from a new kind of Mobility as a Service (MaaS) concept through digital platforms.

2.9. The ongoing development of MaaS seeks to respond better to market demand by combining the reservation, purchase and payment systems of transport chains and providing real-time information on time-tables, weather and traffic conditions, as well as available transport capacity and solutions. MaaS is thus the user's digitised transport interface. At the same time, it aims at optimising the use of transport capacity.

2.10. The rapid development of technology such as big data, cloud computing, 5G mobile networks, sensors, robotics and artificial intelligence — especially with its learning capacities such as machine learning and deep learning — is the key enabler behind the developments in digital and automated transport.

2.11. It is, however, obvious that one cannot proceed successfully if the progress is solely technology driven. Ideally, the development should be based on societal demand. On the other hand, it is often difficult for citizens to see the opportunities that the new developments provide.

3. **Implications for the transport system**

3.1. Digital development creates conditions for intermodality and thus contributes to the system approach in transport. It also means that the transport system has several new elements in addition to the traditional infrastructure.

3.2. The foundation of the system, however, still remains: roads, railways, harbours and airports. Besides these basic elements, an advanced digital infrastructure is needed, covering mapping and positioning systems, different kinds of sensors for data generation, hardware and software for data processing, and mobile and broadband connections for data distribution. Automated traffic management and control systems are also included under digital infrastructure.

3.3. As both the digital and digitised infrastructure require electricity, and given the interaction between smart electric grids and electric vehicles, electricity infrastructure is also a key element of the transport system. Finally, new services and infrastructure are needed to allow access to traffic information as well as the booking and payment of mobility services. The system, from physical infrastructure to physical transport services, is therefore linked by different kinds of digital elements.

3.4. Despite rapid developments, there are still several bottlenecks hindering progress towards digital transport systems which must therefore be overcome. These include, for example, shortages in the availability and accessibility of data, the lack of fast internet connections, and technical limitations relating to sensors and real-time positioning.

3.5. The EESC calls for investment in technology and infrastructure on which digital transport can be built, in particular traffic management and control systems: SESAR (Single European Sky ATM Research) and ERTMS (European Railway Traffic Management System) are projects that are already at a mature stage but which lack substantial financial resources. VTMIS (Vessel Traffic Management and Information System) and C-ITS still need to be developed. Furthermore, 5G connections have to be made available along the TEN-T core network. EU funding instruments such as the Connecting Europe Facility, the European Fund for Strategic Investments and Horizon 2020 should prioritise these undertakings.

3.6. The interoperability of digital systems is also necessary in order to enable cross-border connectivity both domestically and internationally. The EU should strive to be the forerunner and standard-setter in this field.

3.7. The EESC stresses that digitalisation does not remove the need for investments in basic transport infrastructure, although it optimises the use of the existing capacity. Furthermore, during the transition period, partly automated and fully autonomous vehicles and vessels move together, which has to be taken into account in road and maritime infrastructure. New challenges have also emerged in aviation due to the deployment of drones.

3.8. The EESC encourages the development of traffic management systems and common rules for drones at the EU level and internationally at the ICAO. Furthermore, the development of rules is needed at the IMO in order to enable the development and introduction of remote-controlled and autonomous shipping, including in ports.

4. **Implications for business and innovation**

4.1. Digitalisation and robotisation bring about increased efficiency, productivity and safety for freight transport and logistics. New business opportunities also emerge for manufacturing and service industries with regard to automation and robotics, services for citizens' mobility, solutions for more efficient logistics, or the digitalisation of the whole transport system. This holds true both for big companies and small and medium-sized enterprises, including start-ups.

4.2. Taking into account that EU companies are leaders in many fields related to digital transport, it could well be an area where a competitive advantage could be developed. As a lot is happening outside the EU with regard to the development of digital and autonomous transport, the EU also has to strengthen its efforts in the fields of innovation, infrastructure and the completion of the single market, including adaptation of the legal framework to new operating conditions.

4.3. There is also a need for openness towards the development and introduction of new kinds of business models, based on digital platforms. In order to enhance the creation of European platforms it has to be ensured that enabling and supporting conditions are in place and that the regulatory framework provides businesses with a level playing-field.

4.4. The digitalisation and robotisation of transport is primarily based on data management as in any other sector. From a business point of view, data can be considered as a production factor or raw-material to be processed and refined to create added value. To this end, the free flow of data is essential. The EESC therefore calls for effective solutions that eliminate the problems associated with the accessibility, interoperability and transfer of data, while securing adequate data protection and privacy.

4.5. The EESC considers it important to open up and facilitate access to transport and infrastructure related mass data, generated by the public sector, for all users. In addition, clarifications and rules are needed for the management of non-personal data, notably data generated by sensors and intelligent devices. In assessing the questions of data accessibility and reuse, it is useful to note that in general, it is not the data itself that brings a competitive advantage but rather the tools, innovation resources and market position for refining it.

4.6. To develop and gain experience in digital and autonomous transport, the experimentation with and piloting of new technologies and concepts must be facilitated. This requires functioning innovation and business ecosystems, adequate test-beds and an enabling regulatory framework. The EESC calls on the authorities to adopt an approach that stimulates innovation instead of applying detailed rules and requirements that hamper development.

5. **Implications for employment, work and skills**

5.1. The implications of the digitalisation and robotisation of transport for labour are obviously the same as they are in other fields. New concepts and processes may result in jobs losses, while new jobs can be generated by new products and services.

5.2. The most significant changes may take place in the transport and logistics sector itself but implications for employment may also be seen in the related manufacturing sectors, as well as in supply chains and regional clusters.

5.3. With the deployment of unmanned transport, the demand for transport personnel will decrease. The same holds true for the implications of the increasing use of robotics for physical labour in terminal operations. Some of the jobs may be replaced by control and monitoring tasks but over time these tasks may also diminish. At the same time, new jobs may be created in other sectors, particularly in sectors related to information and communication technologies, digital services, electronics and robotics. Furthermore, while physical work and routine tasks diminish, the role of problem-solving and creative tasks grows.

5.4. The change in tasks also implies a considerable change in the market demand for skills. There is an increasing demand for high-skilled cyber-professionals such as software developers. On the other hand, there is an increasing need for the practical skills associated with using robotics and acting in human-robot cooperation systems. In addition, the significance of professionals with broad-based competences will grow.

5.5. The EESC highlights the importance of dealing with these structural changes in a proper way, by preparing strategies on how to ensure a fair and smooth transition, decrease negative social impacts and respond to the skills gap, combined with the appropriate monitoring of progress. Social dialogue and informing and consulting workers at all levels play a key role in the transition process.

5.6. There are both immediate and long-term needs for training and education. Member States have a decisive role in responding to the new skills demand by adapting their education systems, and good practices should be shared at the European level. A strong focus on science, technology, engineering and mathematics is required, while taking into account that the demand for creating new solutions also requires wide competences with education in arts and social sciences.

6. **Implications for safety, security and privacy**

6.1. It seems that citizens are not largely aware of the kinds of opportunities that digitalisation and robotisation provide e.g. for the accessibility and convenience of mobility, while the perception of safety, security and privacy turn out to be the main concerns. More knowledge and communication on the pros and cons is necessary, together with the proper involvement of civil society in transport planning processes at local level, particularly in large urban areas.

6.2. Advanced automation obviously increases the safety of transport due to the decrease in human error. On the other hand, new safety risks may emerge due to limitations in the shape recognition ability of sensors, potential malfunction of devices, internet disruptions and new kinds of human error such as software bugs. However, the net effect is assessed as being clearly positive.

6.3. As increasing concerns are emerging with regard to cybersecurity, this will be one of the core elements of transport security. Cybersecurity involves vehicles, aircraft and ships but also the infrastructure that supports, manages and controls them.

6.4. The introduction and deployment of unmanned and autonomous transport also raises the issue of traffic rules, especially those relating to ethical aspects. As transport is a cross-border function, traffic rules should be harmonised in the internal market, with the aim of further harmonisation at the international level.

6.5. With fully autonomous transport, new questions regarding liabilities also arise. This is also reflected in the development of insurance systems. The main challenge may be the factual establishment of liability in the event of an accident, given the role of digital systems and the involvement of several actors such as the manufacturers and owners of vehicles, and the managers of the infrastructure. This may require increased data storage in order to establish the circumstances of the accident. The EESC therefore calls on the Commission to investigate possible data collection frameworks and requirements for liability purposes, while bearing in mind the need for privacy.

6.6. As for privacy and increasing data needs, people are concerned about whether they are constantly being monitored. The use of shape recognition also raises privacy concerns. With regard to the protection of personal data, the General Data Protection Regulation (GDPR) will be applied as of 2018 with the aim of providing a single set of rules for the entire EU. The EESC has drawn attention to the importance of privacy and data protection in its previous opinions and stresses that data should only be used for purposes relating to the operation of the system and should not be kept for other ends.

7. **Implications for the climate and the environment**

7.1. The climate-related and environmental impacts of transport are dependent on many factors. Improving the energy efficiency of vehicles, aircraft and ships is one of the key measures to decrease emissions. Energy efficiency generally goes hand in hand with the automation of functioning and control systems.

7.2. The replacement of fossil fuels with low-carbon fuels, electricity or hydrogen is another key means of reducing emissions. Although a separate process, the deployment of electric vehicles and the roll-out of smart electric grids are closely connected to the automation of transport.

7.3. Measures that increase traffic flow also have a significant role to play in reducing emissions. Digitalisation and automatisation enable smooth transport and efficient multi-modal transport chains. This means greater transport efficiency, greater energy efficiency, lower fuel consumption and fewer emissions. To this end, high quality infrastructure and smooth border crossings are also of the utmost importance. Furthermore, land use and urban planning have an effect on the need and flow of traffic.

7.4. The environmental impacts are not only related to transport itself but also to the life-cycle of vehicles, aircraft and ships from manufacturing to end-of-life. The reshoring of manufacturing and the deployment of the circular economy approach are phenomena that contribute to decreasing life-cycle impacts.

7.5. Autonomous transport may lead to greater use of private cars due to the increased convenience for passengers. On the other hand, car-sharing — together with the use of public transport — is supposed to decrease the amount of private cars. Consumer preferences thus play a decisive role in the future of mobility. They may be influenced by providing readily available journey-planning facilities that encourage people to make environmentally-friendly choices. Appropriate pricing incentives may also have a role in influencing consumer behaviour.

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The President
of the European Economic and Social Committee
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