September 2021

EU Tech Chamber Mobility Council

White Paper on Sustainable Future Mobility

European Technology Chamber
eutec.org

EXECUTIVE SUMMARY

We consider mobility a fundamental human right because it is essential for people to come together as social beings. However, we have reached a point where we should no longer ignore the negative effects of current mobility. It is therefore recommended that we rethink future mobility from a holistic perspective in order to achieve a basis for understanding both causes and effects and to be able to derive appropriate conclusions for the necessary transformation.

The philosopher Hans Jonas formulated a premise for this new way of thinking more than 40 years ago in his book "The Imperative of Responsibility": "Act so that the effects of your action are compatible with the permanence of genuine human life.“

When we reflect on our global behavior in recent decades, we must ask ourselves if we have given sufficient weight to the reports on the environmental impact of mobility by, for example, the Club of Rome or to the reports of the Intergovernmental Panel on Climate Change (IPCC). Wherever we have reason to suspect that our social, political, and economic decisions and actions contradict this imperative, we should strive as human beings to find better and more acceptable approaches.

The vision of the EU Tech Chamber - "Technology Obliges" - is the logical continuation of the "Imperative of Responsibility" to us. It is hence natural that the EU Tech Chamber brings together people who want to contribute to the preservation of "the permanence of genuine human life".

In the Mobility Council, we focus on the aspect of mobility and explore the many aspects of human-centred mobility from different perspectives within the neutral framework of the EU Tech Chamber.

A first result of the still young work of our Council is this White Paper with "10 Key Recommendations for Sustainable Future Mobility", in which the interrelationships of sustainability and affordability, and of climate neutrality and safety and security play a central role. This White Paper further shows that we will only be able to master the challenges of future mobility in close and trusting collaboration as well as through information exchange between all stakeholders, from education to business, civil society, and politics, while considering our natural environment.

We want to deepen and expand our initial results in the coming period. To this end, we invite all of you, with your ideas and experiences, to join us and our colleagues in the other EUTEC Councils, Chapters, and Commissions in rethinking the topic of mobility in all its dimensions. Together with entrepreneurs and associated companies and organisations, we want to create and implement suitable projects and business models in parallel to validate the results of the discussions and at the same time, to make an immediate contribution to sustainable, human-centred mobility.

We are pleased to contribute to the transformation to future mobility together with you through our work in the EUTEC Mobility Council.

European Technology Chamber

With great technology comes great responsibility.

Technology Obliges!

The European Technology Chamber (EU Tech) is a registered NGO that enables European businesses to use their technologies for the benefit of Europe and mankind. The EUTEC Chamber has three major goals and believes that technology is the key to achieving such goals.

Competitiveness

Strengthen Europe's competitiveness and transformation capabilities in its global positioning

Sustainability

Leverage innovation, key technologies, and business opportunities to achieve the 17 UN SDGs

Growth

Build bridges to international markets and establish partnerships for inclusive growth

About the Mobility Council

Designed to foster innovation and business opportunities for European technology.

The EU Tech Chamber's Mobility Council supports a system change in mobility that harmonises the human need for mobility with the global protection of the climate and nature. We support not only the necessary change in mindsets about mobility, but also the smart use of existing and new technologies to solve mobility challenges holistically.

We connect visionaries and entrepreneurs with cutting-edge mobility solutions and technologies. Together with them, we create the necessary innovations for global markets and thus, generate the necessary growth in Europe as well.

Sustainable and Affordable

Climate-Neutral

Holistic, Safe, and Secure

METHODOLOGY

The EU Tech Chamber White Paper

An EU Tech White Paper serves as an informational document for sharing knowledge, fostering exchange and collaboration, and creating value for our advocates and the larger EU Tech community, from society to businesses, and from industry professionals to technological innovators.

It allows us to share technology-driven solutions and methods to help answer some of our most challenging questions on how we can improve our lives, including from insights of engineers, experts, and researchers.

A White Paper is carefully curated in collaboration with EU Tech advocates, supporters, and contributors who share EU Tech's vision and values, and is published by EU Tech Sections for educational and knowledge-sharing purposes.

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10 RECOMMENDATIONS FOR SUSTAINABLE FUTURE MOBILITY

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1. Future Mobility - Sustainable, Fair, and Non-Discriminatory. The direction of all efforts to develop future mobility has to be aligned with the United Nations Sustainable Development Goals. The associated framework and technical implementation should allow for fair and non-discriminatory access to mobility worldwide.

2. Innovations for Resilient Mobility in Europe and Worldwide. Findings from the COVID-19 pandemic are expected to make new mobility robust in Europe and worldwide, and also make value chains and innovation capabilities more resilient for the future.

3. Climate-Neutral Future Mobility. The future reduction of CO2 emissions is politically fixed and socially accepted. An unbiased and technologically open discussion and design of the transition and the ultimate climate-neutral mobility could accelerate its implementation for the common good.

4. Holistic Design of Mobility Ensuring Functional Safety and Cybersecurity. With the increasing networking of transport modes and the comprehensive exchange of information, protecting the means of transport from people is just as important as protecting people from vehicles.

5. Mobility-as-a-Service - Accessible and Affordable. Mobility-as-a-Service (MaaS) is not new, but it is an important concept for separating mobility from individual transport and ownership and for using transport modes and transport spaces in a more environmentally friendly and sustainable way. Use of digital services and networking of multimodal modes of transport offer numerous opportunities for sustainable and climate-neutral mobility.

10 RECOMMENDATIONS FOR SUSTAINABLE FUTURE MOBILITY

6. Balancing Urban and Rural Mobility. Many new mobility offerings are focused on urban centres. Sustainable mobility for adequate urban connectivity and participation must also be extended to rural areas as well as to an aging population.

7. User-Friendly Mobility. Through multimodal networking of all means of transport and exchange of traffic data in secure data spaces, users can be provided user-friendly and affordable access to mobility via suitable applications.

8. Open Market for Optimised Mobility. Innovations for optimal mobility services require an open market based on a commonly accepted framework of rules. This will reduce traffic burdens as much as possible and optimise the utilisation of transport and infrastructure in the long term.

9. Dependable Data Spaces for Sharing Mobility Data. Data for new mobility services should be shared in secure and trusted data spaces to allow for the integration of multiple modes of transportation and to allow users affordable and customised access.

10. Human-Centred Mobility by Decision and Technological Innovation. Mobility is undergoing a transformation and will have a profound impact on the way we live. We are deciding whether the future combination of technological innovations such as electrification, automation, and connectivity will transform the transportation of people and goods into human-centred mobility.

1. Future Mobility - Sustainable, Fair and Non-Discriminatory

Smart cities, innovations in vehicles and infrastructure, and service integration contribute to the achievement of Sustainable Development Goal (SDG) 11.2: "By 2030, provide a safe, affordable, barrier-free, and sustainable transportation system for all and improve road safety, especially by expanding public transportation, paying special attention to the needs of those in disadvantaged positions, women, children, the disabled, and the elderly" and SDG 9.1: "Develop high-quality, reliable, sustainable, and resilient infrastructure, including regional and cross-border infrastructure to support economic development and human well-being, with a focus on providing affordable and fair opportunities for all."

The reduction of individual mobility and the transformation to a new concept of integrated mobility services support the achievement of other SDGs. Reduced individual transport and optimised integrated transport systems that also support intermodality can reduce emissions and thus, contribute to climate protection (SDG 13).

In addition, integrated mobility services create greater availability and affordability of mobility, which can contribute to reducing inequality (SDG 10). Here, we achieve sustainability, for example, through the holistic electrification of transport, the expansion of public transport, and the comprehensive intersectional integration of mobility services. In cities, this has a decisive impact on air quality, supports climate change mitigation, and ensures fair use by all.

These approaches are generally in line with European Union (EU) transport policies. In addition, the development of cost-effective, ubiquitous, and environmentally sustainable transportation options requires coordinated market regulation across the EU. This includes coordinating and ensuring the interoperability and integration of IT system architecture for overlaid mobility platforms and services. For effective deployment of new digital services, harmonisation of interfaces for data sovereignty, management, exchange, security, integrity, and protection must be promoted through standardisation.

If technologies, solutions, and applications are not included in a comprehensive policy package that considers the diversity of economic, environmental, and social goals as well as the local environment and user needs, there is a risk that urban-rural inequalities and gaps within society will widen in terms of mobility.

2. Innovations for Resilient Mobility in Europe and Worldwide

The COVID-19 pandemic has very different impacts on innovation and affordability in the mobility sector itself. First, local lockdowns and social distancing, as well as global travel restrictions, have dramatically reduced the demand for global mobility. At the same time, demand for e-commerce and home delivery has exploded, driving up the need to transport consumer goods. Both effects have had the effect of making the transportation of people and goods more expensive. In the case of passenger transport, this is mainly due to the extremely reduced capacity utilisation, whereas in the case of goods transport, it is due to the high demand at constant or reduced transport capacities.

Other interesting findings have emerged in the area of shared mobility and public transportation. There has been an increased shift back to individual transport in the EU due to social distancing and stricter hygiene requirements, although experts believe that this trend will be reversed once the pandemic is over. Nevertheless, these measures have increased operational complexity and the amount of information required in public transport. First, there is passenger counting and routing, which have triggered innovations and investments in sensor technology and data collection in many places. At the same time, there has been an increase in the amount and type of information that many public transport providers have sent to their users via apps, e.g., information on occupancy and on distance and hygiene rules, as well as on hygiene measures implemented to increase acceptance of the use of shared mobility services.

The further course of the pandemic and social life afterwards cannot yet be predicted globally. However, many analysts agree that at least some of the behavioural changes we observed during the crisis will endure in the medium to long term. A possible economic recession with collapses in the supply of raw materials and interruptions in many supply chains will also probably have an impact on the innovations to be achieved and in the local, regional, and global transformation processes for mobility. Hence, it is even more important for stakeholders in the field of future mobility to join forces and work together to find viable and sustainable solutions for local, regional, and global mobility. To do this, some key questions need to be answered:

What insights from mobility behaviour need to be incorporated into the design of future mobility concepts? How can innovation capacity be maintained and increased when economic performance is degraded? How can we shape a more sustainable, resilient, and human-centred mobility from the mobility that changed during the COVID-19 pandemic? How can we establish viable business models for sustainable mobility to make it affordable even with the financial burdens of the COVID-19 pandemic?

3. Climate-Neutral Future Mobility

Climate-neutral mobility is one of the essential elements of sustainable future mobility. The EUTech Mobility Council aims to discuss ways to achieve this goal, together with experts from technology, business, and society. The focus is on short-term effects as well as medium-term transfer solutions, in order to ultimately create valid mobility concepts for the respective regions and the associated applications that balance social goals with environmental protection and economic design for sustainable implementation.

Although traffic brings many undoubted benefits to users, the costs to society and the environment are obvious. These costs include greenhouse gas (GHG) emissions; air, noise, and water pollution; accidents and road collisions; and congestion and loss of biodiversity. In addition to the direct costs, there is a negative effect on our health and well-being. Past efforts and policy measures have not been able to eliminate these problems or achieve a stable balance between society, the environment, and the economy. GHG emissions from the transport sector have increased over time and now account for a quarter of total emissions in the EU.

With the announced ban on internal combustion engine (ICE) vehicles in many industrialised countries, OEMs have no choice but to adjust their offerings accordingly.

Almost every major car manufacturer has announced and made major investments in electric mobility and battery or hydrogen technology in recent years. Policymakers in Europe are supporting the transformation of automobility with extensive subventions. In Norway, for example, nearly 40% of new car sales in 2017 were battery electric vehicles (BEVs) or plug-in hybrids (PHEVs). The United States and China also offer strong government incentives, and both combined now account for more than half of the current global market for electric vehicles ("Global Electric Vehicle Outlook 2018", International Energy Agency, May 30, 2018). The United Kingdom has also made steady progress and will accelerate its growth in this market. By 2030, electric vehicles will account for 69% of passenger car sales and 57% of light commercial vehicle (LCV) sales (KPMG Mobility 2030 analysis). The UK government reiterated the proposed 2040 ban on conventional cars in its strategic document "The Road to Zero", setting a clear direction in line with similar commitments in countries such as France, China, Norway, and India.

During the transformation to electromobility, it is likely that vehicles with an internal combustion engine will still be on roads up to 2050 and beyond for various reasons. Sufficient renewable energy for generation and innovations for the development of renewable and low carbon fuels are essential to be able to ensure mobility on the path to climate neutrality even with the existing vehicle fleet and the still achieve contributions to climate protection.

The Green Deal, a set of policy initiatives by the European Commission with the overarching aim of making Europe climate-neutral by 2050, is an opportunity to align climate policies and to integrate the now strictly isolated sectoral regulations. UN Environment's Electro Mobility Programme supports countries, with a special focus on emerging economies, in introducing electric mobility.

4. Holistic Design of Mobility Ensuring Functional Safety and Cybersecurity

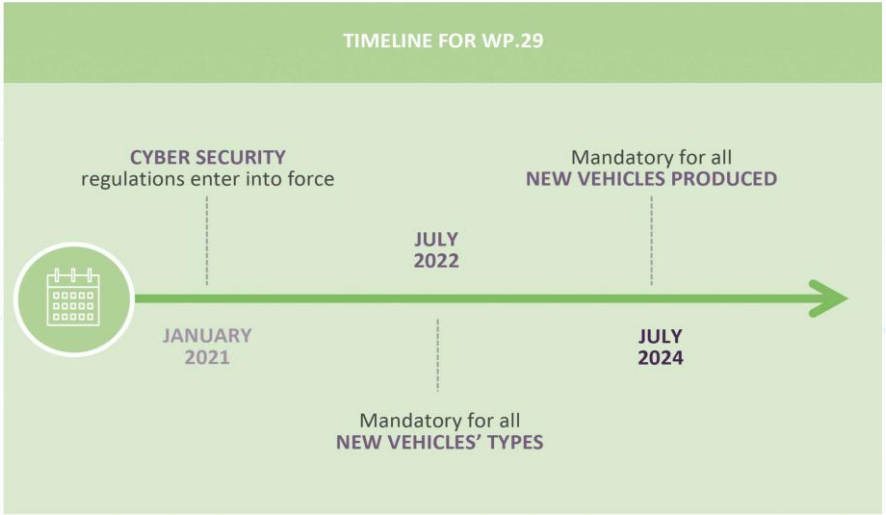
The users of means of transport have a legitimate interest in the low-risk transportation of people and goods. Two central aspects play a crucial role in this risk mitigation – functional safety and cybersecurity.

The requirements for functional safety protect people from vehicles, while the regulations on cybersecurity are intended to protect vehicles from people.

Due to the worldwide use of transportation, these requirements are of global interest and are therefore regulated at the UN level. The World Forum for Harmonization of Vehicle Regulations (WP.29) within the United Nations Economic Commission for Europe (UNECE) is responsible for incorporating vehicle technological innovations into its regulatory framework to make vehicles safer and more environmentally friendly. This also generates a contribution to the fulfilment of SDGs 3, 7, 9, 11, and 13.

It is the responsibility of the European Commission to implement the harmonisation of the rules of the EU and those of the member states with the UN regulations and thus, to ensure the meeting of expectations of safety standards according to European values. This will become more relevant in the future as the complexity of vehicles and their integration into higher-level mobility systems continue to advance.

The UN regulation places cybersecurity at the center of the connected vehicle ecosystem for the first time, encompassing information systems (IS), infrastructure, and the entire value chain, in addition to the on-board vehicle components.



Approaches such as Safety by Design cannot be applied to cybersecurity, because a vehicle that is secure today may no longer be so tomorrow in a changed environment. This means that cybersecurity can no longer be added to a vehicle during production as an integral property. As a result, cybersecurity must be viewed as a holistic activity that treats the vehicle as a device to be protected over its entire life cycle. In addition to technical solutions, this implies that cybersecurity is an additional vehicle requirement that must be addressed through mandatory processes at all levels of the companies involved in the development, production, and operation of the vehicles. This poses significant challenges for on-board and backend software development, communication providers, and even certifiers when vehicles suddenly need to be supported continuously throughout their entire lifecycle. And this is where the requirements for a functionally safe and cybersecure vehicle significantly differ from those for a mobile device.

5. Mobility-as-a-Service - Accessible and Affordable

In many regions, there is a clear shift in consumer attitudes to mobility, not least in terms of vehicle ownership. This trend is particularly noticeable in urban areas, where people have a greater choice of public or shared transport services. In KPMG's 2019 Global Automotive Executive Survey, 39% of consumer respondents share the view that vehicle ownership is declining, meaning that half of car owners today already know they will not want to own a vehicle by 2025.

Although this trend has been muted by the COVID-19 pandemic, there is nothing to suggest a fundamental reversal. Consumer demand for "mobility as a service" as an alternative to ownership can be primarily traced to the arrival of on-demand private car rentals, which are rapidly becoming mainstream and convenient in cities around the world.

Mobility-as-a-Service (MaaS) is an important concept for decoupling mobility from individual transport and ownership, and for using means of transport and traffic spaces in a more environmentally friendly and sustainable way. The concept is not new, as existing public transport, cabs, and railroads ultimately offer nothing else. MaaS becomes interesting in terms of sustainable people-centred mobility when we integrate multimodal transport modes using additional digital services, and users get easy access to the mobility they want between two places, for example, via apps, without having to think about the means of transport or the respective providers.

A major responsibility lies with cities, municipalities, and states, which must create an appropriate framework for MaaS. In addition to technical and infrastructural measures, such MaaS framework also includes rules that must ensure meaningful integration of public and private MaaS offerings and the highest level of accessibility and affordability for these offerings. Once again, open collaboration between all local, regional, and national stakeholders is essential.

6. Balancing Urban and Rural Mobility

According to the latest research, the concept of shared mobility seems to work best when a larger local group (e.g., a city quarter) shares a common pool of vehicles. This at least increases the utilisation of individual modes of transportation and reduces space consumption for parking unused vehicles.

The acceptance of shared mobility is increasing from generation to generation, as owning a vehicle and its function as a status symbol seems to be becoming less and less important, especially in cities and metropolitan areas. The trend is intensified by the fact that owning a vehicle ties up an increasing share of people's disposable income. With rising rental prices and stagnating incomes, this effect can also be offset via shared mobility.

One challenge with shared mobility is the appropriate coverage of rural areas in order to realize the connection of less densely populated regions to the integrated interregional or inner-city transport systems. Here, a further spread of shared mobility could be achieved via municipal and state incentives and cooperative models, possibly combined with other business models such as regenerative energy generation. In rural areas, too, the smart use of data services could supplement public transportation, especially after numerous bus companies and travel services had to discontinue their services as a result of the COVID-19 pandemic in Europe. An additional potential for shared mobility lies in the delivery of goods and commodities. During the COVID-19 pandemic, online purchases of everyday goods and commodities increased by leaps and bounds. It is not uncommon for different parcel services to deliver to the same address in quick succession. A different distribution system and jointly organized delivery of goods could also generate a reduction in traffic congestion here.

We are convinced that shared mobile services can be further developed and that multimodal options will be offered for different user scenarios.

In the area of shared services, it is once again up to those responsible in the municipalities, cities, and states to create the necessary framework conditions and to work with all relevant stakeholders to drive forward the development of suitable mobility solutions for urban and rural regions. Another aspect to be considered in the context of municipal services of general interest is the fact that the European population is aging - by 2025, more than 20% of Europeans will be 65 or older, and the number of people over 80 will grow particularly rapidly. How can we ensure that older people can continue to drive and have access to mobility in the future?

Shared mobility offers a variety of advantages:

- Provides different mobility options;
- Provides last-mile and first-mile solutions;
- Reduces traffic congestion;
- Reduces various forms of pollution;
- Reduces transportation costs;
- Creates fair access to work and other resources;
- Improves the efficiency of use of a mode of transportation;
- Determines the options for those who cannot afford to own a vehicle; and
- Creates accessible travel options for people with limited physical abilities.

7. User-Friendly Mobility

A holistic mobility and transport policy committed to the UN SDGs and responsive to changing consumer habits and needs will lead to more efficient passenger transport and distribution of goods, appropriately integrating all modes of transport - from ships to trucks, cars, planes, drones, bicycles, and autonomous transport vehicles.

People are basically willing to switch to more sustainable modes of transport, especially for daily travel. The most important criteria for switching are cost, availability, convenient access, and speed.

The EU must be instrumental in creating the right framework conditions to encourage the use of safe, competitive, and affordable sustainable mobility alternatives. In doing so, it must be considered that public and private mobility services can be integrated in such a way that the goals of building human-centred mobility are achieved.

The rise of remote work, videoconferencing, e-commerce, sharing, and collaborative mobile services as effects of the COVID-19 pandemic have shown how quickly digital solutions have been used as alternatives to previous approaches. At the same time, it was possible to observe how quickly digital solutions were supplemented or new ones emerged that were better adapted to users' needs. Again, the key drivers of usage were cost, availability, convenient access and use, and integration of relevant applications. If these findings can be appropriately applied to digital mobility platforms and user applications, it should be possible to achieve a further shift toward climate-neutral and sustainable mobility through user-tailored access to mobility.

For this to happen, however, it is crucial for mobility service providers to engage in user application integration and data end-to-end. The responsible policymakers, regulatory authorities, and standardisation organisations can be expected to lay the foundations for the necessary transport, energy, and communications infrastructure and the protected and cybersecure data spaces that will enable companies to integrate the necessary mobility services and make them available in a user-friendly manner.

8. Open Market for Optimised Mobility

Historically, the transportation industry has been operating along a linear value chain. All this is changing. All areas of life are converging, eager to seize the revenue-generating opportunities in the new mobile ecosystem. The result is a complex network of interconnected value chains.

We expect many new entrants to have a place in this new market and to seek unprecedented levels of partnership and collaboration in seeking new solutions.

The COVID-19 pandemic clearly shows that maintaining a well-functioning single market is vital to the EU. This crisis shows that when the free movement of people, goods, and services is severely restricted or even reduced completely, transportation plays an important role.

To maintain the supply chain and Europe's coordinated approach to connectivity and transportation activities, it is essential to overcome any crisis and strengthen the EU's strategic autonomy and resilience also in all aspects related to mobility.

Therefore, to ensure that our transport system is truly capable of resisting future crises, this must also be reflected in the EU's future transport policy. This includes the completion of the Single European Transport Area envisaged in the 2011 White Paper 2, which remains a key objective of the European transport strategy.

The cornerstone of policy must remain the promotion of cohesion, the reduction of regional differences, and the improvement of connectivity and access to internal markets in all regions that are of strategic relevance to the EU. The COVID-19 pandemic has had a major impact on mobility. In the context of recovering from this severe crisis, public support should help to "better restore liquidity" and make a leap to a more open, sustainable, and smart future mobility.

9. Dependable Data Spaces for Sharing Mobility Data

Digitisation is necessary to integrate the different modes of transport into a multimodal mobility system. The digital transformation of the transportation and mobility sector requires further efforts from all stakeholders in the provision, acquisition, and exchange of data.

At present, due to the unclear regulatory framework and the lack of a market for data provision in the EU, there is no obligation to collect and share data. Incompatible tools and systems for data collection and sharing, different standards, or changes in data sovereignty often constrain such efforts. The provision of data and statistics is also crucial, especially real-time data, as it can provide citizens with better services or alternatives to mobility or transport.

Therefore, further actions are needed to establish the framework for a common European mobility data space. Considering the principles of horizontal governance and technology neutrality, the goal is to create a space for mobility data collection, interconnection, and provision. It should be coordinated with other key systems, including energy, satellite navigation, and telecommunications, while ensuring cybersecurity and compatibility with the EU General Data Protection Regulation. At the same time, a level playing field must be preserved for data in the value chain so that innovation can flourish and new business models can emerge. EU's international obligations provide a secure and trusted space for operators to share their data within and between departments and companies.

10. Human-Centred Mobility by Decision and Technological Innovation

Cars, transportation, and the travel market in general are undergoing social, economic, and technological changes that are fundamentally changing the way people travel and the way products are transported. In the context of continued population growth, urbanisation, and increasing environmental pollution, new transportation concepts are essential to support tomorrow's social and economic activities.

Today's travel system suffers from congestion, inefficiency, accidents, and high costs. However, the future will lie in purpose-optimised and user-oriented mobility. The transformation of mobility is being driven by the following trends, some of which are disruptive in nature and build on numerous new technologies: connectivity and autonomous driving, electrification of vehicles (EV), and mobility as a service (MaaS).

If these trends are implemented independently of each other or for pure economic profit maximisation, they will probably not be able to support the transformation toward climate-neutral and sustainable mobility and may even hinder it. However, when brought together in a holistic approach to mobility, they are likely to produce unprecedented changes, safety and economic stability, and reduce the negative health and environmental impacts of mobility.

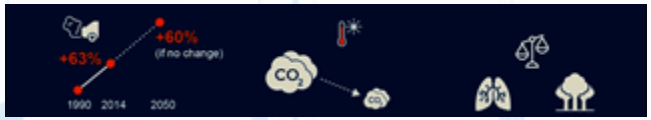
The basis of this transformation is the will to convert the current vehicle-centric mobility system into a user-centric mobility system focused on optimised transportation from one place to another. Users will be able to seamlessly switch between public and private and on-demand and scheduled modes of transportation. Travel information can be changed on the fly, and mobility occurs with extensive cost transparency.

Apart from the automotive and transportation industries, numerous markets are already affected by the changes. New market players and start-ups are challenging the established mobility companies, which, in turn, are using their experience and resources to secure or expand a sustainable market position. Today, innovation is driven by the market and supported by political decisions.

Therefore, the mobility industry needs the necessary flexibility to create innovations. To safeguard innovations, political support is also needed, for example, for special automotive programs and research to further improve the connectivity, environmental compatibility, and safety of vehicles. Again, it is important to achieve a balance between economic interests and the needs of society and the environment.

CONCLUSION

Mobility is a right of human beings. Nevertheless, we must acknowledge that the current mobility systems we have established to connect people and overcome distances, as well as to transport goods, have contributed more to increasing greenhouse gases and environmental pollution than have other sectors in recent decades. It is therefore recommended that we redesign our existing systems in such a way that we can provide affordable access to sustainable mobility for all.



Not to lose any more time, this transformation should be pushed immediately with technologies and solutions that are market-available; and for the future, by providing capability for the integration of local and regional solutions into holistic national and international approaches. We will need to rethink existing paradigms, such as preconditional private ownership, and prioritise sustainable modes of transportation. However, these require that we engage in open dialogue with stakeholders from education, business, civil society, and politics at all levels - local, regional, national, and global - to raise the necessary awareness and change in mindsets, and to begin a global transformation.

In parallel, we should generate short-term contributions to climate and environmental protection with technologies and solutions that are already available, and thus, gain experience that can be used again in the dialogue. For human-centred mobility for the future, we should design technological innovations and services and integrate them holistically into a transport system that integrates public and private providers and combines the different modes of transport in a meaningful way to make it affordable for users.

To do this, we need to open up our data spaces and markets in ways that will allow companies of all sizes to have fair, reasonable, and non-discriminatory access, in order to contribute and innovate.

In this context, a high degree of responsibility lies with political leaders and regulatory authorities, who must, for example, establish the necessary framework for data spaces and the availability of energy and infrastructure in good time. These are crucial foundations so that companies can offer mobility tailored to the customer within these reliable frameworks. An important role is assigned to representatives of cities, municipalities, and rural areas, who should moderate the balance of interests between urban and rural mobility with the various mobility providers.

The global significance of functional safety and cybersecurity for future mobility can already be seen from the fact that these are regulated at the international level at the UN. To implement the international rules, suitable associations and standardisation efforts are appropriate for developing globally or at least regionally accepted solutions. These should rapidly implement innovative approaches in a trustworthy and compatible manner and make technological innovations available throughout Europe and globally.

The implementation of climate-neutral mobility will also probably have to be negotiated at the national and global levels, for example, for international maritime shipping, in order to provide the global supply of renewable energy and, at least for the period of transition or selected use cases, renewable and low-carbon fuels.

Finally, all of us will also have to consider what contribution we can make to creating sustainable mobility. This may include not owning or effectively using available means of transportation. Sustainable future mobility concerns each of us – so let's work together to make it happen sooner.

Infographics: Delivering accessible and sustainable mobility

Ref:OECDiLibrary publications-
Accelerating Climate Action : Refocusing Policies through a Well-being Lens-Ch.5.1

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