

Meeting the Green Deal objectives by alignment of technology and behaviour

Options for sustainable behaviour in food consumption and mobility

Creating a climate-neutral and resource-efficient European economy requires a deep transformation of energy, mobility and food systems, as well as a change in production and consumption. Such profound change will have a significant impact both at the level of the individuals as well as at the level of society. At the same time, the transition to sustainability will not succeed if people do not support it by adapting their behavioural and consumption patterns. This would imply change towards 'sustainable behaviour'.

The 'Meeting the Green Deal objectives by alignment of technology and behaviour: Options for sustainable behaviour in food consumption and mobility' study, published by STOA in July 2021, explores options for such sustainable behaviour with a focus on mobility and food consumption. It identifies key challenges and possibilities in each domain and explores how technological solutions can help people adapt to sustainable behaviour in alignment with the objectives of the European Green Deal.

Technology, specifically digital technologies, features as one of the main drivers of the European Green Deal policies proposed by the European Commission in 2020. In its recently adopted [sustainable and smart mobility strategy](#), the European Commission recognises that digitalisation will become an indispensable driver for the modernisation of the entire transport system, making mobility seamless and more efficient, while further reducing emissions. Likewise, the 2020 [Farm to Fork strategy](#) recognises the importance of digitalisation for sustainable food consumption, particularly in waste prevention. The Commission aims to halve per capita food waste at the retail and consumer levels by 2030. An important step in this direction is the proposed plan to step up the efforts to measure food waste; improving data collection on food waste is the basis for monitoring progress.

1. Changing mobility use and food consumption trends

Demand for transportation and mobility services is expected to grow considerably. The European Commission expects an increase of 42 % for passenger transport and of 60 % for freight transport by 2050, as compared to 2010. This rapid growth in demand will have a negative impact on environmental sustainability. However, the patterns of demand and use of mobility will probably change due to longer-term trends such as urbanisation and the ageing society in Europe. These trends, along with that of the significant increase in single-person households without children, have the potential to impact the European mobility system profoundly.

Many people have developed habits that derive from owning combustion-engine vehicles. This enables them to live in certain places and organise their activities on the basis of the possibilities made available by their car. According to a recent Eurobarometer [survey](#), 55 % of those who use a car for daily transport are nevertheless ready to switch a significant part of their daily mobility to environmentally friendly modes of transport, as long as it does not cost them more. Interestingly, the less urbanised the area, the more likely it is that people will refuse to use alternatives to cars: in the same survey, 46 % of respondents who live in rural areas, compared to 25 % of those who live in large towns, maintained that there is no replacement for cars for daily transport.

Turning to food waste, about 50 % of such waste in the EU is created in households. There are several reasons for this, including poor planning, not valuing food, impulsive shopping, purchasing more than one needs, preparing too much food, and food spoilage. Moreover, people often disvalue food, as they are disconnected from how food is produced.

Recent surveys show that more Europeans are taking an interest in changing their food consumption patterns. In a recent survey by the European Consumer Organisation (BEUC), slightly more than 40 % of consumers say they have stopped eating red meat or have cut down due to environmental concerns. Moreover, two-thirds of consumers indicated their openness to changing their eating habits for environmental reasons, with many willing to waste less food at home, to buy more seasonal fruit and vegetables, and to eat more plant-based foods. A large majority of European consumers are also aware of the impact of food waste, and 77 % of the respondents to the Euroconsumers' survey said they were taking measures and wished to do more to prevent food waste.

Impact of the pandemic on food consumption and mobility use:

Covid-19 has led to unprecedented changes in consumption patterns in the food and in the mobility sectors. The confinement and physical distancing measures may possibly have lasting impacts on food consumption due to people cooking more at home and ordering in. The number of people avoiding food waste grew during confinement, and was aided by better planning of meals and grocery shopping, increase in home cooking, and more frequent reusing of leftovers from previous meals (Euroconsumers, 2020). However, it would not be surprising if consumers stockpiling food has also, at times, led to wasting food.

Mobility needs have dropped drastically. This has resulted in some short-term environmental benefits, with large decreases in air pollutant concentrations, greenhouse gas emissions, and a significant reduction in noise levels – especially in cities. However, most of these gains are likely to be undone as the economy recovers. Public transportation systems are struggling with the effects of the Covid-19 crisis. Fear of contamination, combined with distancing rules, have led to reduced use of public transport in many cities. Conversely, the use of personal transport solutions, such as private cars, bicycles and scooters, has been increasing rapidly.

However, the long-term effects on the mobility system, in particular, on car use and ownership are not clear. Questions on whether Covid-19 will accelerate or reverse the trend towards a more urbanised society remains open. Some of the trends may lead to a better quality of life in cities, but technologies also allow people to live and function remotely. As a matter of fact, the lockdown experience has shifted demand – at least temporarily – towards apartments with large terraces and housing outside city centres, with more space and gardens). This, in turn, may increase car dependency for many more people in the future.

2. Sustainable behaviour: The enabling role of technology

Driven by digitalisation and automation, the impact of technology on our daily lives is expected to further accelerate in the near future. If managed well, this can make the mobility system much more sustainable.

Raising awareness and persuasion enabled by technology. Nudging techniques include behaviour feedback to make people aware of their mobility habits, social comparison, goal-setting, gamification, and personalised suggestions or challenges. For all these techniques, technology has increased the possibilities exponentially.

Smartphone applications enable many more interactive, collaborative and participatory approaches. They can, for instance, provide real-time, user-specific and location-based feedback, provide change interventions, and offer an overview of the available route options. Messages can be instructional, motivational and/or supportive, and with or without interaction with others. The effectiveness of these will depend not only on people's motivations and but also on the situational context. Ideally, therefore, these interventions need to be tailored to a person's individual context.

The emergence of new technology-driven business models. Digitalisation offers possibilities for a whole range of new market solutions such as sharing schemes for very diverse transport modes, including bikes and steps, and shared journeys.

Ever more integrated mobility solutions. Having a wider choice of options could have a positive impact on consumers but choosing the right option can also be rather challenging. In order to reduce this complexity, availability of data, interoperability, and design of new forms of cooperation between public and private mobility providers would need to be improved. This would also require nudging cooperation among transport companies that compete on the market and are not always willing to collaborate, share information and expose their business models. The same applies to longer-distance travel, where operators are not always eager to offer integrated or intermodal ticketing options.

Cleaner, automated, connected and cooperative vehicles. Technological developments in the automotive sector are evolving rapidly. Due to a steep decline in the cost of batteries and economies of scale, the tipping point at which the purchase of electric cars becomes cheaper than that of internal combustion engine cars, is expected to happen very soon. Combined with lower maintenance costs and cheaper electricity prices compared to fossil fuels, electric cars become an attractive proposition for an increasing number of users.

3. Policy options

Options related to regulation and institutions

- Establish a framework that encourages, guides, and enables sustainable behaviour. For example, consumers' difficulty to differentiate between 'use by' and 'best before' markings, or legal barriers to food donation, are basic issues to be addressed.
- Overcome a range of institutional barriers prior to deployment of smart mobility solutions, such as fully integrated mobility-as-a-service (MaaS) models for tailored multi-transport use. This requires new modes of collaboration and multi-stakeholder activity between different types of actors from the public sector, the industry and civil society.
- Enhance trust through introduction of a labelling scheme for mobility (or integrated sustainability) applications. Such a scheme could help raise awareness and support the credibility and effectiveness of sustainable smartphone applications.
- Establish incentives, ranging from taxation to fees and charges, which can be tailored to individual objectives, for example smart road pricing that adapts the fee to the type of vehicle or the time of the day the road is used.
- Use nudging techniques in policies and programmes to incentivise people to adapt their mobility behaviour. In Singapore, for example, a pilot programme using app-based gamification is used to reward commuters with credits depending on travel time to manage overloads on the public transit system. It contributed to a shift of over 7% from peak hours. Commuters were able to earn one credit if they made a trip during peak hours and three credits when they travelled off-peak. The credits could be redeemed at a fixed exchange rate or for other rewards.

Options for data management

- Ensure access to relevant data and interoperability between relevant data spaces in the EU.
- Employ big data mining, which could help identify additional factors that explain travel decisions and uncover the underlying decision mechanisms.

- Include environmental data to raise awareness among users of the benefits of using sustainable applications. To begin with, this requires a robust calculation and reporting framework for CO₂ emissions in the transport sector.
- Improve cooperation between local, national and European environmental agencies and the scientific community to provide easy access to relevant environmental data, to stimulate their inclusion in applications. Public authorities at different levels could help make this happen, but they could also benefit from using and interpreting the data to improve their own mobility policies.

Options for developing and deploying digital solutions for sustainable behaviour

- Invest in digital solutions that can help people improve their mobility and/or food consumption patterns. Citizens and consumers should have access to basic infrastructure such as the internet. Moreover, the EU's long-term budget, the multiannual financial framework (MFF), and especially the [Digital Europe](#) and [Horizon Europe](#) programmes, [InvestEU](#) and [Connecting Europe Facility](#) could be used to develop and deploy digital solutions (e.g. AI and blockchain). This can help accelerate sustainable consumption patterns.
- Recognise the climate and environmental footprint of digitalisation. Data and digital solutions can only become real enablers for a transition towards sustainability if they also become more sustainable. This requires addressing energy consumption and sources of energy for data centres, as well as the sourcing of materials for information and communication technology products, their durability and recyclability, as well as management at the end of their life-cycle.
- Invest in people's capacities to benefit from digitalisation. They should provide the skills and the know-how to use relevant digital solutions. While apps can help connect, inform, educate and empower citizens and consumers, the apps market can be complex and overwhelming for them to navigate.

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stoa@ep.europa.eu (contact)

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