

## MOBILITY AND CONTEMPORARY CHALLENGES OF CIVILIZATION

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**Abstract:** *The increased mobility of European citizens caused the cars are currently the most responsible for the energy needs of road transport. This happened in spite of improving energy efficiency of these cars and freight transport growth. The above regularities define a key challenge which the transport system is facing - to meet the constantly growing demand for energy. These challenges are particularly relevant in the countries of Central Europe. The increase in prosperity these countries' citizens is conducive to high growth of automotive development, which is the result of a number of processes taking place in parallel. These processes lead to an increased number of cars per capita, the rapid growth of the average course of an average car and the growth of weight of used cars. An important issue in achieving the objectives of sustainable transport is not only the development of technology, but also human consciousness proper shaping consumer preferences. The structure of future transportation will depend mostly on carriers and customers. Large reserves of energy intensity improvements in road transport can be achieved at a relatively low investment cost through behavioral changes. Promoting and developing sustainable transport passenger promotes also the greening of transport. The potential of improving the efficiency of transport, especially local so should be seen in increasing the share of public transport, walking and cycling in the daily move around the city. Measurable results can also be obtained as a result of the speed limit. Promoted ecodriving is becoming more and more popular.*

**Keywords:** *transport, sustainable transport, automotive personal, behavioral changes, ecodriving*

**JEL Classification:** *L99*

### 1. INTRODUCTION

The purpose of this article is to analyze changes in driver behavior and identify courses of action to encourage users to select greener forms of movement as a individual transport. In particular, this applies to urban areas. In order to achieve the main objective two main areas of behavioral change were brought into focus. In the first case it is about promoting and developing sustainable transport passengers. The goal of the second part of the potential behavioral changes is to improve transport efficiency.

Mobility is the foundation of a modern economy. Private and public transport provide citizens with greater flexibility in everyday life. A well-functioning transport sector enables companies to create sophisticated supply chains and to organize quick and on time movement of goods and transportation of people, to improve the functioning of markets for goods and labor. Its importance for the modern economy synthetically reflects the contribution to GDP. On average this sector is responsible for 7% of the product in the European Union (EU). This is more than electronics, energy and agriculture. Spendings on transport are also an important part of household budgets. In 2012, in the EU amounted to 15,2 %. In the EU-13 rate was lower (12,3 %), which can be explained by the fact that the movement is still called a good of higher order [4]. This means a good that is consumed the more likely, the higher income you have. Among the EU countries Romania (7,5%), Slovakia (8,7%) and Poland (10,2 %) spend at least on transport in 2012. However, compared to 2005, these expenses increased [5]. This is inter alia due to the progressive along with economic development trends of suburbanization, which increase the demand for individual transport. Not without significance is the technical progress, enabling quick and cheap movement of the increasing distances.

### 2. SCIENTIFIC AIM, METHODOLOGY/METHODS

The implementation of the approved work method was used to study the documents (desk research). Analysis of literature and secondary data were the basis for the scientific objective - to carry out the thought experiment using the method of analysis and logical construction. With quantitative and qualitative data, and knowing at a glance goal attempt examine the relationship and the relationship between behavioral change behavioral drivers and the development of sustainable mobility.

### 3. FINDINGS

The analysis revealed that a richer society travel more, spending a relatively larger part of their income on travel. The increase in wealth is not only the intensification of passenger services, but also freight transport [8]. A shortcoming of modern transport sector is its strong dependence on oil, which results in a number of economic and geopolitical problems.

Since the first big oil crisis 40 years ago, despite the considerable technical progress and the potential for cost-effective in terms of cost and energy solutions, the transport system has hardly changed [9]. Transport is admittedly more energy efficient, but 95% of the EU's energy needs in this sector is still dependent on oil and petroleum products [3]. It is true that the sector is more environmentally friendly, but its growth means that it remains a significant source of noise and air pollution on a local scale. In addition, due to the increase in CO<sub>2</sub> emissions, this sector is second only to the energy one, contributing to climate change.

Aware that the world's oil resources are limited, and the demand for it is rapidly growing with the increase of wealth in emerging markets, opportunities to reduce demand for

energy from the developed countries are still valid. New technologies for vehicles and traffic management are the key to reduce the demand for raw materials of petroleum and reduce emissions from transport in the EU and worldwide. In addition to technological changes exceptionally high potential for improving the efficiency lies in behavioral changes.

An important type of intervention, used in Europe and other developed countries, has regulations to support behavioral change and encourage transport users to select individual environment greener forms of movement. The costs of car use in towns and cities do not take into account the external effects of quality of life, resulting from congestion, noise and environmental pollution. The municipal authorities shall take into account these effects by implementing sustainable transport policy based, inter alia, to increase the supply of public transport and forwarding the demand on its behalf, eg by debiting private transport charges for parking or entrance to the center. Recent editions of the Urban Audit study, carried out in the cities of Western Europe, show that it succeeded there to effectively reduce the percentage of the population that traveled to work by car (Fig. 1).

Changes in the countries of Central and Eastern Europe are not so clear. In these countries still is the increase in wealth an important factor that makes a growing group of people can afford to choose between access by public transport and by car [Fig. 2]. The authorities of the countries in the region (including Polish) have to consider a situation in which more and more people no longer must - for income

reasons - use only public transport and still want to rely on personal transport more than ever.

Therefore maintaining a historically significant role of public transport in Central Europe requires a systematic improvement of the quality of offered services and intensive promotion of this form of mobility society, which is getting richer. Energy efficiency of passenger transport can also be improved through soft measures such as limiting the number of trips made or making car journeys more efficient by utilising the maximising the capacity of passengers by car journey, i.e. car sharing. Belgium is trying to incentivise car sharing through measures such as reserving a lane of traffic to make car sharing more attractive (commuters travelling by car represent 20 to 30% of road traffic). The Highway Code was modified in 2003 to allow the road system manager to reserve a lane of traffic not only to public transport vehicles, but also to private vehicles occupied by more than one passenger. France introduced the "car club", which is defined as making a fleet of motorised land transport vehicles available to subscribing users on a shared basis. Each subscriber may have access to a vehicle, without a driver, for the journey of his or her choice and for a limited period. A 'car club' label is currently being defined at national level and will be the subject of a decree stating the terms of its award and use. Town hall authorities may reserve parking spaces for vehicles with this label. A CERTU study concerns mechanisms for encouraging the use of alternatives to private cars in European countries, including car clubs. Similar measures are in place in the United Kingdom.

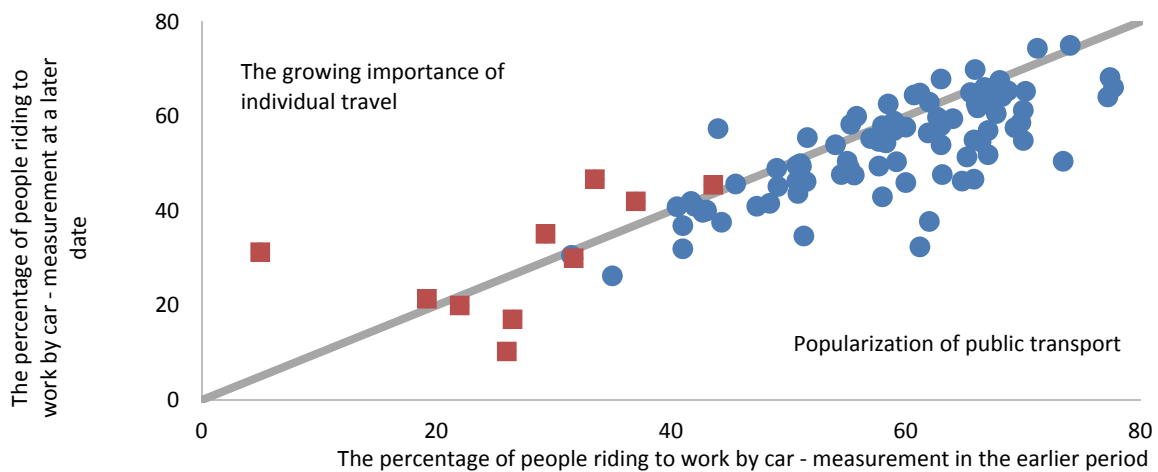


Figure 1 Change in the percentage of commuters drive in European cities

Source: [1]

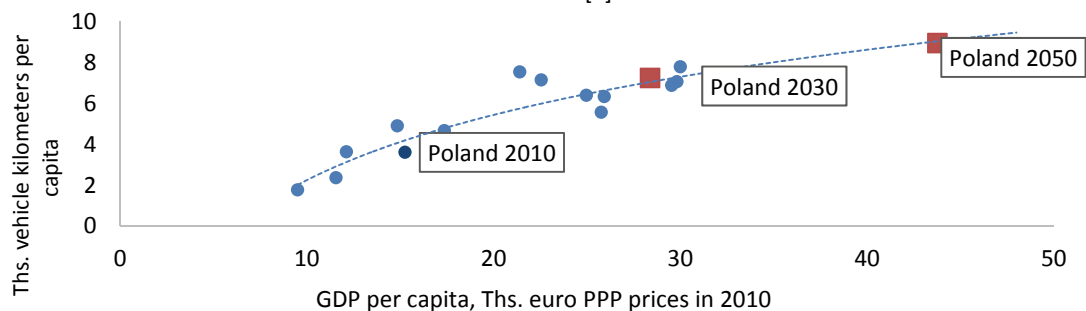


Figure 2 The use of cars and the level of economic development

Source: [1]

The improvement in fuel efficiency by means of transport can also be achieved by using the speed limit. The specific fuel consumption of cars (l/100 km) is generally at a minimum at speeds of around 90 km [6] per hour, and decreases as speeds rise above this. The idea of using more stringent speed limits to reduce travelling speeds on motorways and thereby cut fuel consumption and transport emissions has received much attention recently, as it could have an immediate effect on fuel consumption and emissions. Current motorway speed limits differ across EU Member States, varying from 110 to 130 km/h; with some countries also apply variable speed limits related to traffic and weather conditions. Modelling of a reduction in motorway speed limits from 120 km/h to 110 km/h suggest that in practice this might reduce the fuel consumption of cars by 2% for diesel cars and 3% for petrol cars [7]. In 2011, as part of an effort to reduce the national energy bill in the face of the large spike in global oil prices, Spain reduced speed limits on its motorways from 120 to 110 km/h. Several other countries have legislative measures in place to reduce and/or regulate speed limits for various different vehicle classes (i.e. Bulgaria, Estonia, Finland, France, Hungary, Ireland, Luxembourg, Malta, Netherlands, Norway, Poland, Romania, Sweden, and United Kingdom).

Reducing speed limits on motorways or ensuring more stringent enforcement of existing limits, will mainly deliver fuel savings from cars, as the speed of HGVs and buses (with more than 8 passenger seats) is set by a European Directive (2002/85/EC) which requires that speed limiters are fitted to restrict the speed of HGVs to 90 km per hour and buses to 100 km/h, which is close to the optimum speed for fuel efficiency. In some countries such as France, more stringent enforcement of existing limits has been found to be very effective in reducing the average speed of cars and delivering fuel savings.

Another important direction of improving the efficiency of transport is ecodriving. Ecodriving often Refers to driving techniques (training courses, awareness raising campaigns) That enable drivers that optimize Their car fuel economy.

An Ecodriving initiative was introduced in Austria in 2004 by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, in cooperation with the Austrian Energy Agency and the Federal Branch Association of Driving Schools. The programme was initially focussed on car drivers, and about 20000 drivers have participated, receiving a one day training session containing both theory and practical elements. Since 2008 Ecodriving training has become a mandatory requirement for obtaining a driving licence, resulting in 90000 novice drivers per year being educated in Ecodriving skills, and average reductions in fuel consumption of 14%. From 2012, the programme has been extended to include shorter, 1 hour, practical training sessions as well. In 2007, the initiative was broadened to include truck and bus drivers, and in 2009, to include tractor drivers [2].

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## 4. DISCUSSIONS

In accordance with the flagship initiative "Europe Resource Efficient 'laid down in the framework of the Europe 2020 Strategy, the overriding goal of European transport policy is to help to create a system that offers high-quality mobility services with less use of resources. The problem is how to meet these challenges, while striking a balance between the issues of economic, social and environmental. Restricting mobility is not an option. Personal mobility and, in particular road transport, are issues of global importance. Can behavioral factors significantly help to solve these contradictions, to improve the quality of life and the environment while maintaining the competitiveness of the European economy and the people's right to movement. Patterns for the countries of Central Europe and in this area should be sought in the experience and activities of the economies of Western Europe, where the foundation of transformation are skillfully designed and enforced by environmental standards, appropriately shaping the direction of development of the sector.

## 5. CONCLUSION

In the modern economy, the transportation is, next to banking power, one of the three key sectors. Thanks to it people can move in accordance with their needs, and companies create flexible and reliable chains . The more developed and richer a country is, the more mobile are its citizens, and the greater their transport expenses are.

The main problem faced by the sector in Europe, is its high dependence on oil. Rising global oil demand puts pressure on the increase of its prices, this translates to the trade balance of countries, threatening the stability of their economic growth. The result of the intensification of external transport by road is pollution, lowering significantly quality of life and health status of persons permanently residing in the centers of increased traffic, as well as contributing to global warming.

Modernization of transport sector is conducted through two basic channels. The first one are the technological changes in the automotive industry. The second, no less important channel, are behavioral change, and thus more efficient use of cars supported by promotion of more sustainable ways of movement.

Changing driver behaviour to encourage more fuel efficient driving is widely recognised as potentially offering significant savings. Several countries have introduced training courses and awareness raising campaigns on the benefits of ecodriving, both for car drivers and for freight, and bus and coach and drivers of off-road vehicles. Increasing the utilisation of vehicles, e.g. through car sharing, can also contribute to improving the overall efficiency of passenger transport, and is typically encouraged though a range of "soft" measures to change driver and passenger behaviour.

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