CORVINUS UNIVERSITY of BUDAPEST

Ph.D. Programme
in Management and
Business Administration

Rossen Tkatchenko

Personal City Mobility in the Context of Sustainable Development

Ph.D. Dissertation

Supervisor:

Prof. Sándor Kerekes
Doctor of the Hungarian Academy of Science

Budapest, 2017

Economic Geography, Geo-Economics and Sustainable Development Institute

Supervisor:
Prof. Sándor Kerekes
Doctor of the Hungarian Academy of Science

Corvinus University of Budapest
Ph.D. Programme in Management and Business Administration

Personal City Mobility in the Context of Sustainable Development

Ph.D. Dissertation

by

Rossen Tkatchenko

Budapest, 2017

Table of Contents

List of figures

List of data tables

List of annexes

Dedicated to all those,
whose love, support and inspiration
helped me to become a better man.

"I have never been able to agree with the pessimists and those who bury the idea of sustainability. Sustainability is very simply "just" about that - all living human generations are responsible for their offspring."

Prof. János Szlávik[1]

1. Introduction

As mankind evolves, it conquers every space it can reach. When the distance that needs to be covered by an individual increases, different transportation means are used to reduce the time spent while travelling to the desired destination. After using sails, oars, then animals – horses, donkeys, camels, etc. – for thousands of years, the man invented the engine car. First it was the steam that moved the vehicle, then electric and internal combustion engines (ICE) were introduced. After a period of strong presence the electric vehicles lost their share and were completely outnumbered by cars using petroleum-derived liquid as fuel.

The expansion of the habitual "presence range" of an average contemporary human being is influenced by his/her increased ability to travel, and to do it fast - between his/her living area, schools, shops, working places, administrative centers and the scenes of social and recreational activity. In the modern cities of today the main personal means of transportation are the road vehicles. People in most western countries were addicted to motoring already by the middle of the XXth century. In the remaining part of the world, as soon as the steadily increasing prosperity, the improving standards of living provided even the slightest opportunity for the masses to obtain their own motor vehicle, the population of all the other economies quickly followed suit. In too many countries people have become not only addicted to travel, but also addicted to owing more than one vehicle in the household - in some countries preferably one per each adult family member, and in such a way that it has led to extremely heavy traffic, congestion, pollution, accidents, increased fuel consumption and material waste. We are witnessing excessive depletion of energy resources and - overwhelmingly often - selfish

[1] (Szlávik, 2014)

attitude to personal mobility on all levels, from personal to governmental. Something shall be done to slow down this process of devouring energy resources and nature demolition. Our cities are overburdened with passenger cars, whose huge numbers continue to grow. They overtake our space, pollute our air and limit our walking areas. If we do not change our approach to personal mobility in the cities, the situation will only get worse - meaning that it is not sustainable in its present form.

The main point of my dissertation is - how can we improve the quality of city life and ensure modern mobility for ourselves and for our future generations?

The concept of sustainable development has been constantly scrutinized by the academic and political community for the last decades. Thanks to the foresight and still continuing perseverance of its pioneers the modern origins and complexity of sustainable development became part of the Hungarian university curriculum at the end of the last century - e.g. see (Kerekes, A környezetgazdaságtan alapjai, 1998)

In 2005 Tamás Fleischer pointed out that the most frequently cited definition of sustainable development, originating from the Bruntland report (Report of the World Commission on Environment and Development: Our Common Future, 1987), if taken out of context might cause misinterpretation, because it was generally discussing the time dimension of sustainability (Fleischer, 2005) (p. 2). Same year Christopher Zegras, while trying to derive an operational definition for the measuring of sustainable urban mobility, presented a deep analysis of the origins of sustainability concept itself, which led him to the early eighteenth century, when German Hans von Carlowitz published his book on forestry practice in 1713. (Zegras, 2005) (p. 24).

In this regard we can even go back to the ancient hunting laws, which were wisely limiting hunting and presumably trying to preserve the game for the next season (next year, next generation) as well - see "The Laws of Ancient Crete c.650-400 BCE" (Gagarin & Perlman, 2016) (p. 213).

Some say that there really is no clear definition and that, "Sustainable development is increasingly being presented as a pathway to all that is good and desirable in society" (Holden, Linnerud, & Banister, 2014) (p. 130).

In terms of personal transport as well, the definitions for sustainable mobility are too many and every year we can have another one. For those, who would like to investigate the theoretical side of the concept I can recommend the above mentioned work by Zegras, who himself says that the phrase 'sustainable transport system' has become synonymous with "good transport" (Zegras, 2005) (p. 26) and that the main threats to

sustainability in transportation "are those that impact our immediate existence, such as accidents that kill or maim us, pollution that can make us acutely ill (or make it acutely difficult to sleep or rest), or loss of time..." (Zegras, 2005) (p. 28).

After all, the basic idea is simply formulated in the motto of this paper by professor Szlávik (Szlávik, 2014). We need to shape our city mobility in such a way that the ease and safety of our everyday movements now and in the future will not diminish, but grow and the quality of life will not suffer, but improve for us and for the generations to come.

Personal mobility can be shaped by many possible means, from strategic international agreements on joint vehicle standards, through national legislation on health and safety, sustainable municipality planning and development, up to education and promotion of environmentally friendly life style. The supply has often been shaping the demand for passenger vehicles. People have followed car makers for long years and have become obsessed with cars. The author believes, that psychologically motoring habits shall be compared to eating habits. While modern consumers are becoming more and more sensitive to the issue of healthy eating, in terms of motoring most people drive in excess and do not feel the importance of personal self-restriction, as compared to their attitude to food. This paper follows some of the main trends in the historical development of the everyday car travel demand, and voices the opinion of the author how this demand could be influenced in the context of sustainable development.

Luckily, the understanding and the support of the principles of sustainability is growing, and green thinking can be witnessed in municipality planning, governmental policies, even car manufacturing. As we shall see later, it is another question, whether these green efforts are always leading to the best solution.

The dissertation is investigating the following topics:

What is the current situation with the personal mobility in the cities?

What are the reasons for the current situation?

Can we reach sustainable mobility by replacing the traditional internal combustion engines in modern passenger vehicles with less polluting or even zero emission propulsion technology?

Is it possible to live in cities without private passenger vehicles, only with public transport?

What shall be the desirable future model of sustainable city mobility?

What is the role of the market lobby and that of the policy makers?

Hypotheses:

1. The majority of the passenger car buyers in their choice of personal cars are motivated by convenience, social status, cost efficiency and not by environmentally friendly attitude.
2. Similarly, when choosing the means of travel in the city, citizens are mostly motivated by convenience.
3. However strong the environmental commitment of the citizens is, in itself it will never be enough in terms of personal city mobility, because their desire for safety and comfort is stronger.
4. Consequently, the sustainable mobility modes based on minimal private car use cannot be expected to spread spontaneously without the strong limitation of the current conventional mobility based on private car use.
5. Personal driving can be reduced only if the city simultaneously restricts driving and offers real-life alternative mobility modes that are fast, cheap, comfortable and more appealing - healthy lifestyle and fun.

2. Review of the sustainable mobility literature.

The struggle to improve the vehicles we use. Driving forces for innovation in the car manufacturing sector in the last fifty years. From safety to CO2 emission limits.

2.1. Changing driving forces in the mobility.

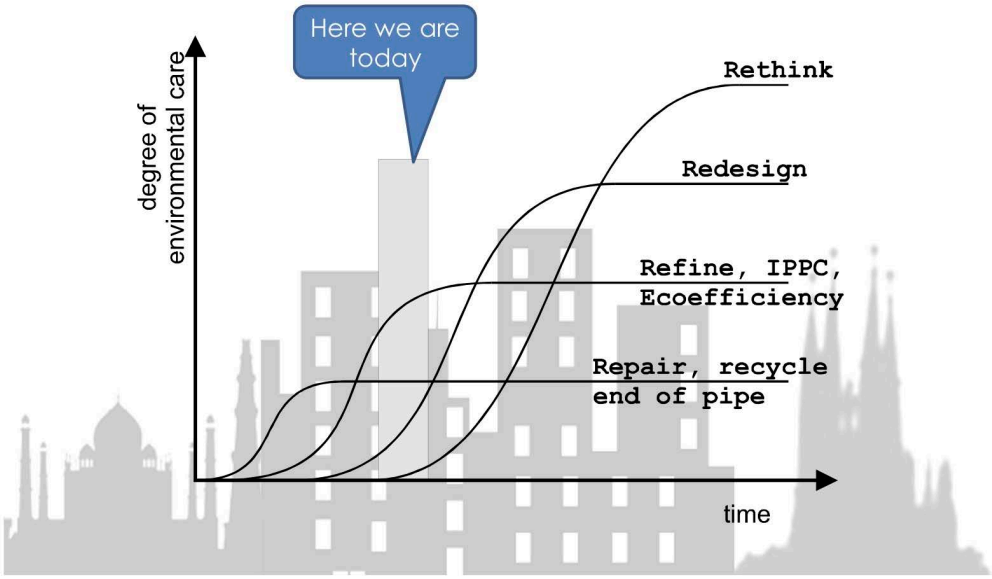
2.1.1. From cleaning the mess to avoiding the damage - in search of better solutions.

The four degrees of environmental care based on Hans Schnitzer (Schnitzer, 2015), show the approach by humans towards decreasing their negative impact.

1. The first stage is, when we try to clean the mess after we have already created it - we **repair, filter, recycle** and do everything else we can **at the "end of pipe" section**.
2. Then we start **refining the things we produce, improving their eco-efficiency** and establishing the so called Integrated Pollution Prevention and Control measures.
3. Next it comes to our mind, that, perhaps, instead of tinkering with the old product we shall **redesign** it completely.
4. In the end we finally **rethink** our behaviour and reduce and even avoid doing things that can harm the environment.

See Figure 1.

Figure 1. Degrees of environmental care. Source: (Schnitzer, 2015)



Back in 1986 the Hungarian professor Pál Michelberger (Michelberger, 1986) (pp. 41-82) described the main trends in the technical development of the automotive industry of that period as follows:

- Safety enhancement (including both active and passive safety)
- Environmental improvement (mainly reducing exhaust and noise through electronic management of the burning process, use of catalysts and unleaded gasoline)
- Energy efficiency (reducing fuel consumption through advanced engine efficiency, improvements in the whole powertrain[2] and its management, decreasing energy loss due to weight, drag and not utilized heat, as well as better traffic management)
- Comfort enhancement (suspension, air-conditioning, ventilation, automatization, soundproofing)
- Reliability enhancement (maneuverability, braking ability, mechanic reliability in terms of failure rate - safe life, fail safe - and diagnostics)

[2] *Powertrain* is an automotive term, used by car manufacturers meaning all the components of the power transmission system of a vehicle, that conduct the vehicle's power from the original source of energy to the surface of the road. In most modern vehicles, the powertrain includes the engine, and this how this term is used here and later.

- Flexibility of production and design (to meet the demand at an acceptable cost)

Three decades later these trends are still valid in the automotive industry! While safety and comfort still sell well everywhere, it was a strategy effectively focused on reliability, affordability and environmental friendliness that helped Toyota to become the world's leading automaker. At the same time the very close connection of the 'environment' and the 'energy efficiency' categories in the above grouping may nowadays become a basis for discussion and/or even argument, whether their separate listing is justified.

In this paper I will handle these two topics as one category aimed at improving environmental efficiency of vehicles by all possible means, including the reduced exhaust and noise through perfection of engines, fuels, the whole of the powertrain, the whole vehicle architecture, and much more, including the perfection of the drivers themselves.

2.1.2. Different fuels - solo and hybrid.

To start with, from technical point of view another important trend has reemerged in the last decades: in search of improvement manufacturers have been investigating the use of different fuels and have been building hybrid vehicles. Beside the most common fuels - gasoline and diesel - alternative fuels like CNG, LNG, bio-ethanol, bio-diesel, hydrogen and electricity are gaining their share, although, as it shall be shown later, most of them are rather revitalized, than invented.

All fuel solutions can have different advantages under different circumstances. For instance, here is the conclusion of a study aimed to identify options of fuels and propulsion technologies, applicable to bus transit in the state of Rio de Janeiro and which present a potential reduction in CO_2 emissions in the short term: "The use of CNG dedicated buses and diesel-gas systems best suits in regions where natural gas is available at a competitive price with diesel. The same thing occurs for the use of ethanol in buses. The use of hybrid-drive buses best suits at congested large city urban transit. The other fuel options (bio-diesel and diesel from sugarcane) can be used across the country without problems if the alternative fuel's price cope diesel price." (D'Agosto, Ribeiro, & de Souza, 2013) (p. 181 - spelling and punctuation as in original).

A bold approach to the solution - a portfolio of fuels! Beside the appealing tailor-made attitude this way of thinking shall give decision makers a chance to avoid erroneous trends on a large scale and to resist the pressure of the lobbies (see later).

2.1.3. Oil lobby in the XXth century - against coal, steam and electricity. The epic struggle around the leaded fuel.

Another promising alternative fuel, though less known to the general public, is Dimethyl ether (DME), which can be produced from coal, natural gas or other organic resources. "The use of DME as a diesel fuel has been expanded as the most promising alternative for gas oil, because it gives little particulate material under any operation conditions." (Adachi, Komoto, Watanabe, Ohno, & Fujimoto, 2000) (p. 234).

"The life-cycle CO_2 emissions from production and use of fuels made by indirect coal liquefaction (ICL) would be lower than with production and use of petroleum-derived transportation fuels." (Larson & Tingjin, 2003) (p. 100). Which means, when liquid fossil fuels become scarce and/or too expensive, coal will come into fashion again. As it is now in China, whose dependency on oil and whose abundant coal supplies make the CTL (coal-to-liquids) technology increasingly popular.

Similarly to the other alternative fuels, the idea to produce liquid fuel from coal is not new. Richard Vietor based on (Krammer, 1978) and (Hughes, 1969) points out that due to its encouraging governmental policy "by 1942 Germany was synthesizing about half of its gasoline, diesel oil, and aviation fuel from coal" (Vietor, Richard H. K., 1980) (p. 6). In his highly educational work: "The synthetic liquid fuels program: energy politics in the Truman era" Vietor shows, how a similar option was seriously discussed in the US in the 1950s', but the oil lobby forced the idea out in order to protect its own interests. As Representative Carl Perkins (D-Kentucky) put it before the closing of the debates: "We have a process that has been proved successful and has reached the point of being commercially competitive with crude oil. Yet, because of that fact, we want to destroy that process in favor of the oil lobby." (Vietor, Richard H. K., 1980) (p. 29 - spelling and punctuation as in original).

It seems that the oil business has always been very successful as a powerful lobby, and as a great survivor too. With the emerging of electric light bulbs as a replacement for kerosene lamps the oil industry desperately needed a new customer base:

"Rockefeller’s company, Standard Oil, transformed its eventual loss of the kerosene market in the illumination business into an even more lucrative commerce, initially with locomotive engines and then with the automobile. In the United States of America (USA), internal combustion engines powered only 22% of the cars sold in 1900: 38% were electric and 40% were powered by steam engines. The situation changed rapidly: by 1905 gasoline-powered automobiles had defeated their competitors. The number of car registrations in the USA grew from 8,000 in 1900 to 902,000 in 1912. Considering that gasoline engines powered the vast majority of these cars, by any standard it represented a remarkable success for ICE technology." (Orsato & Wells, 2007) (p. 996).

And, of course, for the oil industry. The mutual dependency of ICE and oil strengthened over the decades.

"The discovery of lead for the automotive fuels in the 1920’s, by Thomas Midgley (from General Motors) and by Harry Ricardo (sponsored by the Asiatic Petroleum Company) occurred independently of each other... The tetra-ethyl lead was a knock-suppressant, which reinforced even further the optimization of fuel quality and the functioning of the internal combustion engine. This knocking of the engine should be avoided since it meant [loss] of power, overheating and damage to the pistons and [its] associated parts. This discovery illustrates that the two communities (automobile and oil) converged through the finding of a similar solution – the discovery of lead – by two completely different approaches." (Taminiau, 2006) (p. 253).

But with the resolution of the "knocking" problem almost instantaneously a "health" problem appeared. According to Jerome Nriagu the first gallon of leaded gasoline was sold on 2 February 1923 to a motorist in Dayton, Ohio, and the extreme surge in the popularity of this type of fuel very soon brought an outbreak of severe lead poisoning, prompting the United States Public Health Service to halt the production in May 1925 and initiate an investigation.

"An intensive industrial lobby was mounted which effectively forestalled any government regulation on lead in gasoline... Thus, the threat of gasoline lead to public health remained essentially neglected and unappreciated for well over 30 years... As to be expected, the fight to censure a highly profitable product with multinational oil and automobile industries as key players was particularly acrimonious, but ultimately the concern for the risk to public health has outweighed any economic benefits." (Nriagu, 1990) (p. 19).

We shall take into consideration that in addition to endangering humans lead was damaging the catalyst converters as well. "The irony is that it was not the issue of health but the issue of air pollution that forced the ban of lead in fuels. Scientists did find irrefutable evidence that lead had damaging effects on the proper functioning of the catalytic converter, which became mandatory (with the Clean Air Act which was passed in 1970) to improve the air quality in California." (Taminiau, 2006) (p. 255).

Introducing general standards on emissions led to the introduction of catalytic converters, which made leaded fuel unwanted by the car manufacturers, increased pressure on the oil industry and finally phased out leaded fuel. That same leaded fuel, which had been successfully safeguarded from "direct" attacks for long decades since early 1920s. In a way, this is another proof of how important it is to pursue environmental issues on a broad scale.

2.1.4. Vehicle efficiency improvement and the human factor

Likewise, the issue of reducing vehicles emissions shall be approached from several directions. The most prevalent, and, probably, most visibly effective approach so far has been the vehicle efficiency improvement, quite often expressed in reducing fuel consumption of the traditional internal combustion engines (ICE). The statement is based on the observation that, "The potential of conventional ICE vehicles is still substantial as they will continue to offer high cost-effectiveness and driving performance which can be hardly matched by alternative technologies." (Ntziachristos & Dilara, 2012) (p. 3). The high cost of developing the alternative vehicle technology, its often non-existing infrastructure, and conservatively cautious consumer behaviour give the traditional internal combustion technology a substantial advantage indeed, which encourages carmakers to continue investing in the improvement of the powertrain based on the conventional combustion engines. Here efficiency improvement can be achieved by the manufacturers through technological development like variable valve timing (VVT), automatic cylinder deactivation, idle start/stop, smart transmission, low-resistance tire technology, reduced weight through lighter materials, reduced drag coefficient through improved aerodynamics, smaller vehicles, better air-conditioning equipment, application of monitoring systems for assuring optimal technical conditions (e.g. tire pressure monitoring) and of systems influencing driving habits (gear shifting

reminders, economy evaluation gauges, etc.). On closer look the latter strongly relates to the use of technology to deliberately shape individual behaviour, thus trying to shift it towards environmentally responsible conduct. In this regard we can certainly add on-line navigational aids as systems influencing driving habits. Similarly, in his earlier mentioned work professor Michelberger shortly but clearly articulates that the biggest reserve for reducing fuel consumption lies in the better management of vehicle traffic. (Michelberger, 1986) A great observation! In other words, it is not the vehicles, but rather the humans that have to be improved.

Later similar opinion was voiced by Kerekes and Wetzker about the whole consumer world: "The 'spectacular' environmental problems have largely been solved by the market players and the solution has indeed had significant business benefits due to energy savings, reduction in waste management costs, and the indirect benefits of better corporate image. Within the environmental dimensions of sustainability, only the 'greening' of consumption is to be achieved." (Kerekes & Wetzker, Keletre tart a „társadalmilag felelős vállalat" koncepció, 2007) (p. 1).

In the drivers' community there is much to be accomplished too, even if we only consider one parameter - the driving style: "Eco-driving campaigns aim to inform and educate drivers in order to induce them to drive in a fuel-efficient and thus environmentally friendly way. There seems to be some consensus in the literature that eco-driving could lead to reductions in CO_2 emissions of around 10 per cent." (Santos, Behrendt, & Teytelboym, 2010) (p. 47).

2.1.5. The role of consumer's behaviour in the mobility.

In her study of the ecological impacts of general pro-environmental behaviour Mária Csutora also confirms that such behaviour "does have an effect on the ecological footprint of consumers in certain areas (such as travelling or electricity consumption)", although she warns that "these impacts are relatively insignificant compared to the total ecological footprint" (Csutora, One More Awareness Gap? The Behaviour–Impact Gap Problem., 2012) (p. 159). Still another point shall be considered, when discussing the so called "green consumers" - namely, their frequently present wishful thinking. Environmentally sensitive consumers nowadays still use relatively more electricity as this correlates with income and consumers with pro-environmental behaviour on the

average tend to belong to more well-off households (Csutora, One More Awareness Gap? The Behaviour–Impact Gap Problem., 2012).

While sifting through scientific articles and data bases in my pursuit of relevant information on the subject, among all other sources I have come upon the following two, which seem to fit simultaneously well into both the topic of "decreasing energy loss due to weight" and the topic of "shaping individual behaviour of drivers", though in a non-standard way.

As mentioned previously, reducing excessive weight in the vehicle can become another source of fuel saving. The following citation is coming from an owner-educating material aimed at customers, who have recently taken a delivery of a new passenger car: "Every kilo of luggage costs you fuel. To be precise: a weight of 100 kg can increase fuel consumption by up to 0.3 l/100 km. So inspect the contents of your luggage compartment on a regular basis. With today's network of filling stations there is no point in keeping a full fuel canister in the car. And nobody needs more than one road atlas. And the bag with the golf clubs doesn't have to be carted around all year – neither does the picnic basket in winter or the can of antifreeze in summer." (Volkswagen AG, 2010) (p. 14). The car maker can be praised for promoting a genuinely well known, but concurrently a generally neglected issue.

In the same line of thought scientific research in fuel consumption can sometimes ingenuously find hidden reserves for improving vehicle efficiency rates in quite unexpected areas, e.g. the human bodies. Like this article from the American edition of Transportation Research, implying to improve fuel consumption of the vehicles in the USA by reducing the body weight of the passengers themselves: "As many as one billion gallons or more of fuel consumed in the US each year can be attributed to excess weight in the US population." (Jacobson & King, 2009) (p. 11). The authors presume, that higher gasoline prices in the US will lead to less driving, which will subsequently lead to less obesity, and hence to a twofold fuel-decreasing effect. Thus we can reduce both obesity and pollution at the same time. Perhaps, the feasibility of this tactic shall be addressed by another study, though it is easy to be sceptical about the true sustainability of the approach.

Apart from the natural urge to improve and the desire to meet public demand for green machinery, the greatest incentive to invest into new technology development is coming from national governments, when they decide to introduce fuel efficiency

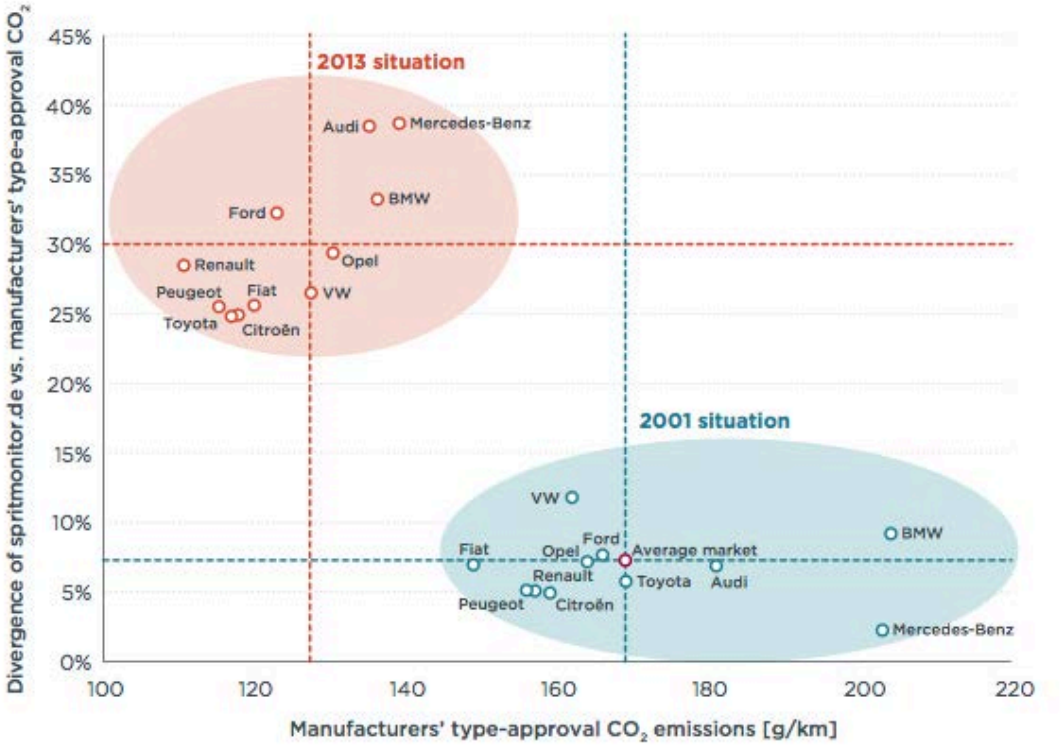
standards: "First, there seems to be sufficient evidence that if there were no FE [fuel economy] standards or targets in force, new-car fuel economy would not have improved at the rates that have been observed in Europe and Japan in recent years, and this would most probably have happened in the US as well; as a result, transportation energy use would have increased more rapidly. Second, in order to attain the desired FE improvements without imposing any further standards or voluntary targets in Europe, fuel taxes would have to increase by 50%. Third, without higher fuel prices and/or tighter FE standards, one should not expect any marked improvements in fuel economy under 'business as usual' conditions. Potential fuel savings due to autonomous technical progress in the past have been counterbalanced by changes in consumer preferences towards more comfortable and powerful cars, and there is no reason to believe why this trend should not continue in the future in the absence of impressive technological breakthroughs or an economic recession." (Zachariadis & Clerides, 2008) (p. 2671).

Indeed, consumer behaviour is not always based on long-term scientific wisdom, and as such shall be guided by proper governmental policies.

In addition to the above-cited conclusion, the same authors address the issue of country specifics: "Our analysis shows that the question "standards or prices?" cannot be answered in a definite way for all world regions. In the US tighter FE standards and higher gasoline taxes need to be carefully examined against their welfare impact, and a combination of both policy options should not be excluded in view of the many uncertainties about the effectiveness and the side-effects of each measure. Conversely, regulations seem to be a more feasible option for Europe and Japan as it is hardly possible to increase fuel taxes because of their already high levels; how these regulatory measures will be designed and implemented, however, is crucial in order to avoid welfare losses for producers or consumers." (Zachariadis & Clerides, 2008) (p. 2671).

A White Paper published in September 2014 by the International Council on Clean Transportation Europe confirms that European passenger-car efficiency regulation has been very effective - "The 2015 target of 130 grams of CO_2 per kilometer (g/km) was met two years ahead of schedule and manufacturers are making good progress towards the 2020/21 target of 95 g/km." (Mock, et al., 2014) (p. 47). At the same time the above report raises concerns that the improvements reported via the type-approval tests are not reliably matched in everyday driving - see Figure 2.

Figure 2. Sales-weighted CO_2 emission levels and spritmonitor.de vs. type-approval discrepancy for selected brands/manufacturers in 2001 and 2013. Source: (Mock, et al., 2014)



We can see on the chart, that in 2001 the CO_2 emission levels measured by the manufacturer Toyota on its vehicles for the issuing of their type approval were just under 170 g/km, and this also coincided with the average of the all examined producers. After comparing manufacturers' laboratory data to the real world measurements provided by spritmonitor.de for the same year the CO_2 emission results showed 6% discrepancy in case of Toyota vehicles and 8% discrepancy in case of the industry average. For the same year Mercedes-Benz showed higher emission level measurements, and also higher precision - the discrepancy there was only 2%. Volkswagen declared lower emission levels, but when compared to the real world results its discrepancy was 12% - the highest in the group. In 2013 the official industry average of CO_2 emissions dropped to 127 g/km, however the average discrepancy grew to 31%. Mercedes-Benz was still showing higher emission levels than industry average, which could be acceptable, as this manufacturer is known for its luxury/performance cars. What is raising eyebrows is the fact that its precision lost credibility - the real life results were showing 39% discrepancy - the highest in the test group. According to the

authors of the research the average discrepancy gap between the laboratory vehicle emissions and the real world data is getting wider, as shown in Figure 3.

Figure 3. Divergence of real-world CO_2 emissions from manufacturers' type-approval CO_2 emissions for various on-road data sources, including an average estimate for private and company cars as well as all data sources. Source: (Mock, et al., 2014)

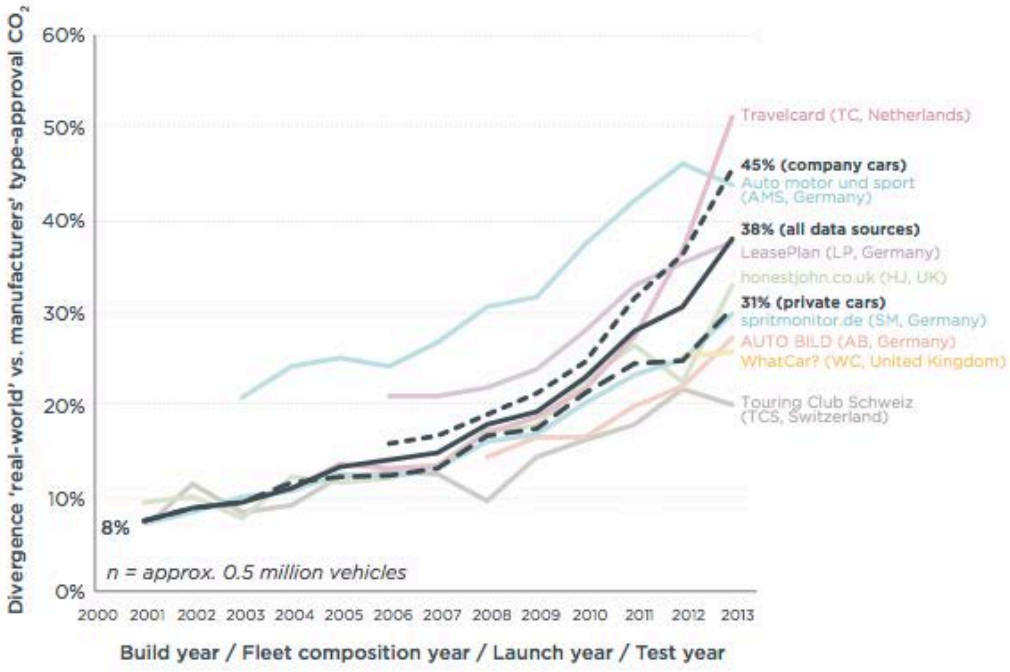


Figure 3 shows that this discrepancy is revealed by different independent sources, and that the average gap they show from 8% in 2001 has become 38% in 2013. While it shall be evident that the adopted standard laboratory tests cannot be expected to coincide with real life usage, the growing data gap may lead to confusing conclusions. As cited above, in theory the manufacturers are making good progress towards the 2020/21 target of 95 g/km: "In 2013, 2 percent of new vehicles in Germany were below the 95 g/km threshold."; but in reality "the proportion of cars that would remain below the 95 g/km threshold in terms of real-world CO2 emissions is deemed negligible. (Mock, et al., 2014) (p. 45).

The above data is for 2000-2013, but the growth of the gap between official and real-world emission values has been confirmed by other recently published studies on the same topic, which clearly indicate that the discrepancy has been increasing. It has been estimated by some sources to be as much as 50% - see (Fontaras, Zacharof, & Ciuffo, 2017).

Tietge, et al. pointed at another phenomenon, namely that "company cars exhibit a higher gap (45% in 2014) than private cars (36% in 2014). The higher divergence of company cars was presumed to be a result of more demanding usage patterns as well as a lower incentive to conserve fuel as employers often cover fuel expenses". (Tietge, Mock, Franco, & Zacharof, 2017)

All of the authors agree that to narrow the gap between type-approval and real-world values a new standard shall be introduced with more realistic test cycle and tightened test procedure.

I may rather summarize it from a different perspective: even if the cars are capable of complying with the emission standards, there will always be drivers, who (involuntary or not) can squeeze the worst out of them. Because, unfortunately, too many drivers enjoy "environmentally unfriendly" driving, and that inadvertently - although also unsurprisingly - influences their car-buying choices. At the same time, if the car with which the prospective buyers would love to "horse around" has high CO_2 emissions in the test results, the manufacturer cannot comply with the regulations, and henceforward has higher costs and less sales. From here comes the challenge for the manufacturers to use modern technology and build cars that satisfy the strictest requirements for minimum CO_2 emissions, but can produce street power as well, when needed. Probably, that was the elementary idea, which mutated at Volkswagen into installing an illegal emissions-cheating “defeat device”. Unable to meet emissions guidelines and simultaneously to produce an inexpensive solution for a driveable diesel engine, the engineers came with a virtual solution - computer sentinel. The software, while monitoring all available data like engine operation, wheel speed, air pressure, position of the steering wheel, etc. could detect a possible testing procedure and initiated a test mode, which reduced actual performance and put the unwelcome power to sleep. When testing ended and the car was back on the road, the beast woke up again.

As described in the Notice of Violation of the Clean Air Act, issued by the United States Environmental Protection Agency on September 18, 2015, "a sophisticated software algorithm on certain Volkswagen vehicles detects when the car is undergoing official emissions testing, and turns full emissions controls on only during the test. The effectiveness of these vehicles’ pollution emissions control devices is greatly reduced during all normal driving situations. This results in cars that meet emissions standards in the laboratory or testing station, but during normal operation, emit nitrogen oxides, or

NOx, at up to 40 times the standard. The software produced by Volkswagen is a “defeat device,” as defined by the Clean Air Act." (United States Environmental Protection Agency, 2015).

Since then the car maker had been forced to pay billions of dollars of settlements and fines, with several executives investigated or even charged.

The investigators naturally turned to other producers as well, e.g. quite recently on 23 May 2017 the Federal Government of the US filed a lawsuit against Fiat Chrysler Automobiles, accusing it of using illegal engine-control software to enable its diesel-powered vehicles to pass emissions tests (The US District Court for the Eastern District of Michigan, 2017).

Exactly on the same day in Europe German prosecutors searched the offices of Daimler in line with their Diesel Emissions Inquiry. As cited by The New York Times, Daimler said the raids were because of “suspicion of fraud and criminal advertising relating to the possible manipulation of exhaust-gas aftertreatment in passenger cars with diesel engines.” (The New York Times, 2017)

Prosecutors are in charge, because obviously the transportation authorities have failed to protect the environment as they were expected to do.

2.1.6. The beginnings of the mass motoring. A ground-breaking vision.

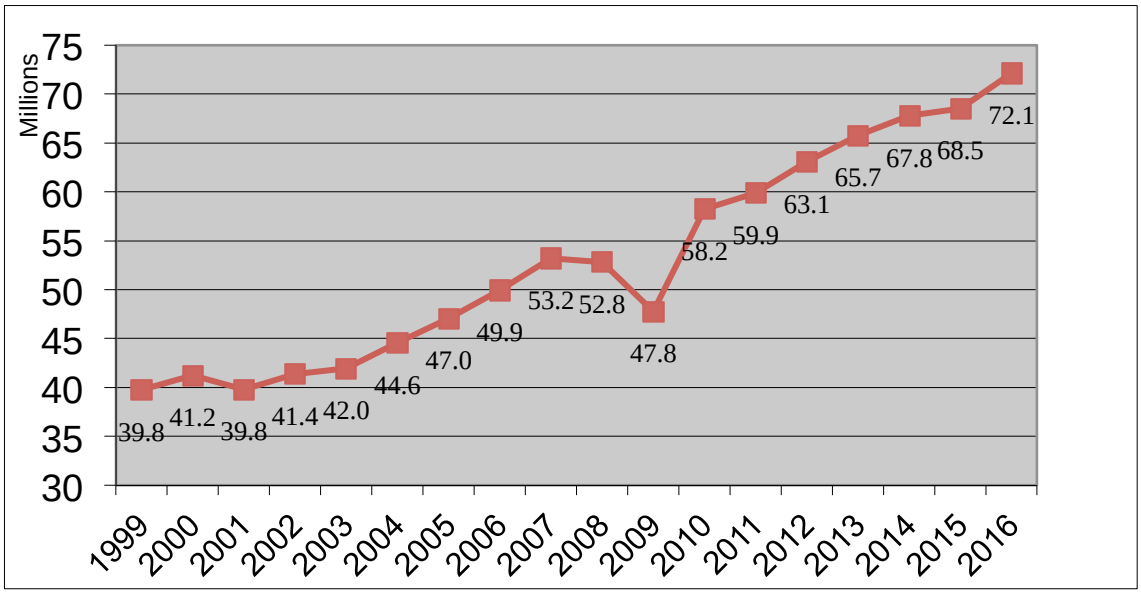
The need for everyday mobility can be divided into working mobility and tourist or leisure mobility, and in both cases this ability to move for the modern human means to use machines.

"I will build a motor car for the great multitude. It will be large enough for the family but small enough for the individual to run and care for. It will be constructed of the best materials, by the best men to be hired, after the simplest designs that modern engineering can devise. But it will be so low in price that no man making a good salary will be unable to own one - and enjoy with his family the blessing of hours of pleasure in God's great open spaces." (Ford, 1922) (p. 37).

Contrary to general belief Henry Ford was not the first mass producer of automobiles. E.g. in his PhD dissertation William Shields shows, that Ransom Olds started mass production of internal combustion vehicles in 1901 (Shields W. M., 2007). But Ford

really succeeded in his plan for great volumes and made history by selling more than 15 million units of his first "mass production" model T between 1908 and 1929. Many other car makers followed suit and here we are now - the total number of vehicles in 2010 was 1.015 billion, including cars, light-, medium- and heavy-duty trucks and buses registered worldwide, but excluding off-road and heavy-duty vehicles (WardsAuto, 2013). Figure 4 shows the production data - and the respective trend - of passenger cars, defined as motor vehicles with at least four wheels, used for the transport of passengers, and comprising no more than eight seats in addition to the driver's seat.

Figure 4. Cars produced in the world in million units. Data source: www.worldometers.info/cars/.



Car production has never stopped increasing in the examined period with the exception of the economically burdened 2001 and 2009.

For 2016 the world production of cars and commercial vehicles was more than 72 million units (International Organization of Motor Vehicle Manufacturers, 2017)

Already at the beginning of the XXth century the mass production of the automobiles brought forward a new type of human mobility. The growth in welfare and the affordability of the means of transportation naturally created an increase in the demand for travel, both in terms of distance covered and of time spent on the road. In Western societies, "the spread of high-speed travel due to increased car availability among the households resulted in a widening of the activity space of individuals" (Vilhelmson, 1999) (p. 187). Certainly, if the individuals can afford cars, they can volunteer for work

farther away from home, they can choose a larger shopping center at a more distant location, or they can buy a bigger home away from the cramped big city.

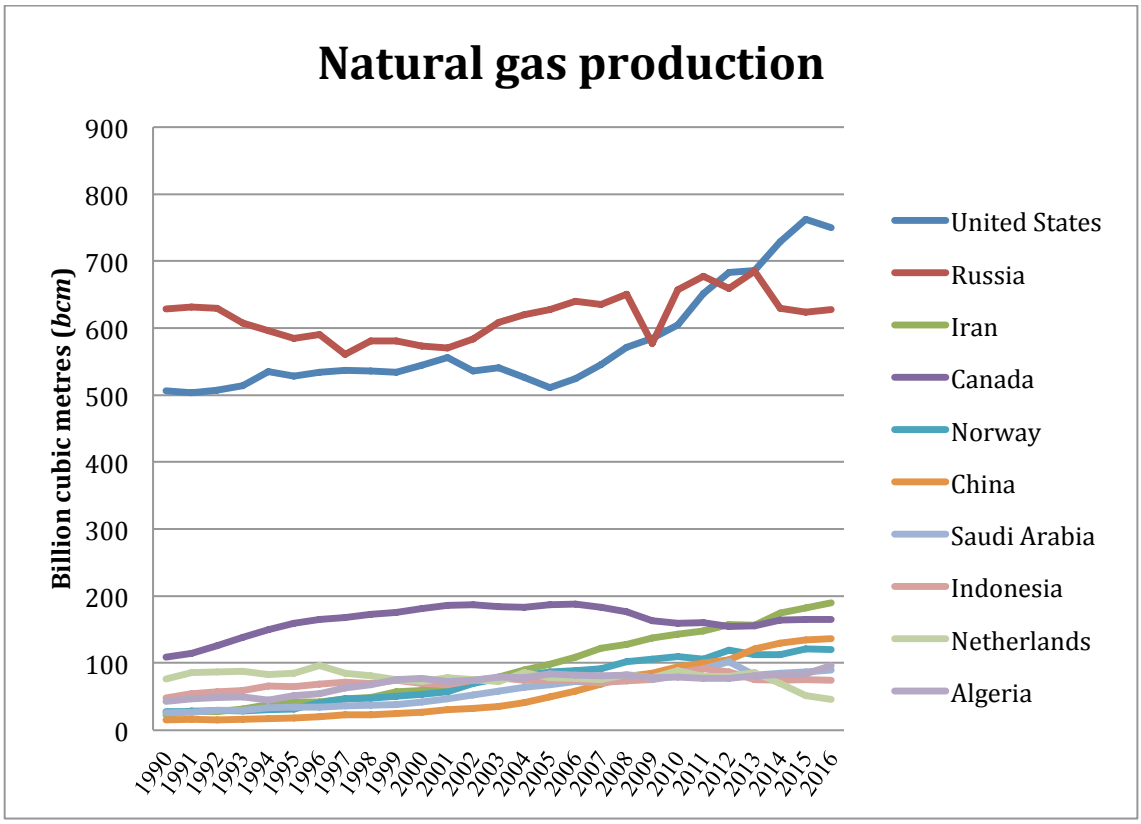
According to (Metz, Saturation of Demand for Daily Travel, 2010), the average distance travelled by an individual, as well as the number of trips made is strongly related to his income. Similar conclusion is drawn by (Orfeuil & Soleyret, 2002): "Household income has a major impact on travel practices for all the markets." (p. 221). While it may be easy to accept the presumption that higher income produces more travel, the approach might not be perfect, because individuals who cannot afford to live closer to their place of work also travel more, but apparently not because they have higher income. Nevertheless, if we consider not all types of travel, but just travel by privately owned cars, the influence of higher income on motoring habits can be clearly shown through fuel usage by households. Here it is worth mentioning the following observation, made by Kim and Brownstone after examining statistical data in the USA: "Higher income translates into: (1) choice of lower density residential location, (2) greater total driving distances, which is independent of the greater distances caused by lower densities, and (3) lower overall fuel economy of the household fleet. All these effects are statistically significant." (Kim & Brownstone, 2010) (p. 26). This confirms the general view that Americans with higher income are likely to reside farther from the big urban centers, and that they prefer bigger than average vehicles with less than environmentally friendly consumption. At the same time point (2) of the above conclusion by Kim & Brownstone shows that the Americans with higher income travel longer distances independently from where they live, i.e. whether in dense areas (cities) or not.

2.1.7. Carmakers reactions to the changing conditions - the main innovations in the last fifty years.

If we wish to summarize the trends in the efforts of volume orientated carmakers, we can state that all of them want to develop vehicles that would have a secure supply of fuel in the foreseeable future. At the beginning of the 21st century the prospectives of the renewable fuels were increasingly very highly evaluated, until the shale gas came into sight. "Shale gas rose from less than 1% of domestic gas production in the United States in 2000 to over 20% by 2010." (Stevens, 2012) (p. 2). The increase in total US

resources due to inclusion of shale gas was estimated to be 38%! (U.S. Department of Energy, 2013). In 2012 shale gas accounted for 39% of all natural gas produced in the United States (The U.S. Energy Information Administration, 2013). This also made USA the largest producer of gas in the world, which title it has kept ever since (Figure 5). The other main traditional producers on the chart are shown in order to illustrate the scale of the production volumes and .

Figure 5. Natural gas production. Source: (Global Energy Statistical Yearbook, 2017)



Furthermore, shale gas "has had a dramatic impact on US carbon emissions. Whereas the Europeans have been increasing the coal burn (and building new coal-fired power stations) the US has been switching from coal to gas in electricity generation. The result is that, contrary to Europe, and despite European's economic crisis, it is the US not Europe which has sharply falling carbon emissions. Without much by way of energy or climate policies, the US is on course to meet its emissions reductions targets. Emissions in the major European countries (Germany in particular) are now rising." (Helm, 2013) (p. 3). In the USA shale gas has brought forward distinct benefits like the above

mentioned emissions reductions, like production boost and additional jobs. What is less conspicuous though, is the environmental threat in its many forms.

First comes the direct risk of the fracking technology itself, using huge quantities of water for pumping it underground, and thus creating waste water, which may contain potentially hazardous chemicals, causing groundwater contamination, and even triggering small earthquakes.

Second is the indirect negative impact generated by the appearance of the suddenly plentiful low cost gas. This reduces demand for carbon-free renewable energy sources, which makes them more expensive and further reduces demand, stalling environmental efforts.

When investigating the environmentally friendly effect of the technological improvement of vehicles I would group the different approaches as follows:

1. Improving fuel efficiency and user-friendliness of the common types of powertrains based on internal combustion engines (ICE) - e.g. gasoline, diesel. Over time this tactics leads to considerable efficiency improvement, but being based on fossil fuels it has never been the right solution. Some environmental experts bluntly call the expectation that the fossil fuel industry could be sustainable “foolish”. (Kiss, 2011)

2. Changing the fuel used in ICE - e.g. ethanol, CNG, LNG.

This scheme can only be considered a better solution, than the previous one, if the fuel is renewable - such as bio-ethanol, bio-gas or bio-diesel. However, there are serious concerns, that an uncontrolled demand for bio-fuel and its ensuing mass production may have grave impact on world ecosystems. (Elbehri, Segerstedt, & Liu, 2013)

3. Introducing hybrid systems - ICE powertrain together with one or more electric engines.

In light of the previous two methods the introduction of such hybrids can only be a transient technology on the route to sustainable mobility. Still, this modelling has shown its indisputable values through raising environmental awareness, accustoming consumers to electric drives, stimulating improvements in battery technology and somewhat decreasing the current carbon footprint.

4. Building Electric Vehicles (EV) - either Battery Electric Vehicles (BEV) or Fuel Cell Electric Vehicles (FCEV) using hydrogen or ethanol to produce their own electricity.

The electric powertrain, when using green sources of energy, can definitely become the most promising sustainable solution of the future mobility. This solution, however, will need considerable additional infrastructural development of the electric grid. Furthermore, the massive growth of world population in the developing countries and their increasing appetite for mobility both need to be closely monitored. What will happen, for example, if the Indian consumers reach the same level of car ownership as in Hungary?

2.2. The cars we use. Orthodox engines, conventional fuels, the alternatives and their sustainability.

The cars we use can be generally classified in three groups depending on their powertrains:

1. Internal Combustion Engines (ICE) Vehicles
2. Electric Vehicles (EV) – having an electric powertrain
3. Hybrid-Electric Vehicles (HEV) – having both

The ICE vehicles represent the overwhelming majority – these are the commonly available cars with gasoline or diesel powertrains well known to the wide public. Less widely spread are the different converted versions of ICE that can run on Liquefied Petroleum Gas (LPG), Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG). We all know that using fossil fuels is not a solution in the long run due to their limited resources. So if we look for opportunities how to replace traditional fuels derived from petroleum with alternative products, then we can have different solutions right here – e.g. we can use ICE with methane, hydrogen or bio-fuel.

2.2.1. CNG as automotive fuel.

The introduction of CNG (Compressed Natural Gas) as automotive fuel began in Italy

as early as in mid 1930s. Natural gas generally consists of methane (CH_4), whose content – depending on the origin – can vary between 80 and 99%. The appeal of this automotive fuel is based on the fact that compared to gasoline, diesel and LPG (Liquefied Petroleum Gas), CNG is cleaner and cheaper; even more so, this fuel is renewable – it can be produced locally from bio-gas. When compressed at 200 bar and used as fuel for internal combustion engines, the more efficient burning process of natural gas results in lower green house gas emissions - significantly lower than with traditional petrol fuels. (Bordelanne, et al., 2011) In particular, according to NGVA Europe, theoretically the CO_2 emissions can be reduced close to 30% compared to gasoline internal combustion engine. (NGVA Europe, 2009) When replacing gasoline with CNG CO emissions can be reduced by 60-80%, and the reduction can be 70-90%, if diesel fuel is replaced. The resulting lower emissions of NOx, of SO_2, furthermore of practically non-existent particular matter and volatile organic compounds ensure improvement of local air quality, apart from reducing the traffic noise. In addition to the above, vehicles operating on CNG produce no cold-start emissions.

Among other advantages of CNG as automotive fuel one can mention the present availability of natural gas resources and the existing supply infrastructure. Methane is the major component of bio-gas (50-75%), which means that after proper treatment bio-gas can be used as a substitute to natural gas, therefore as an alternative clean source of automotive fuel in CNG vehicles. Utilizing organic waste for the production of bio-gas is a good example of what Gunter Pauli describes as “Blue Economy” - turning mankind back to the sensibility of ecosystems, as opposed to the “Red Economy” of borrowing from nature "with no thought of repaying", or the “Green Economy” of making the consumers "to pay more, to achieve the same, or even less, while preserving the environment" (Pauli, 2010).

In many countries this option is already a reality. Bio-methane has been injected into the natural gas grid of the Netherlands and the USA since the 1980s. According to a study by (Bordelanne, et al., 2011) in 2010 there were 110 installations in 18 countries injecting more than 40,000 Nm^3/h of bio-methane into the grid.[3] According to the German Energy Agency by January 2012 only in Europe there were more than 155 operating bio-gas plants, 120 of which were feeding upgraded bio-gas into the public natural gas grids (77 of them in Germany). In Germany the first two plants for the

[3] Nm^3/h = Normal Cubic Meters Per Hour

upgrade and feed-in of bio-gas into the natural gas grid were put into operation at the end of 2006, and presently, although in Europe the Netherlands, Sweden and Switzerland have the longest experience in the upgrade and feed-in of bio-methane, Germany is strongly leading in feed-in capacity. By the end of 2012, around 133 German plants were expected to be connected to the network with an hourly feed-in capacity of 86,000 cubic meters of bio-methane. With almost 4,000 installed bio-gas plants and more than 500 manufacturers with 10,000 employees in the bio-gas branch, Germany is one of the most sophisticated countries in bio-gas technology in the EU. We shall also mention that the supply of CNG to the automotive consumers is organized to the extent that with proper route planning it is possible to drive through the whole country on CNG. Germany's 900th compressed natural gas filling station was officially opened on December 21st, 2011.

Despite its obvious benefits, CNG is barely present in Hungary mainly due to the less encouraging national excise tax policy.

2.2.2. Hydrogen as automotive fuel.

Though not yet commercially available to the wide public, hydrogen has been in the center of renewed public attention. Few know that, ironically, the very first operational Internal Combustion Engine in history, which was built in Switzerland by François Isaac de Rivaz between 1805 and 1807, was running on hydrogen. Now, two centuries later, hydrogen (still) has great chances to become the fuel of the future. Its main advantages as ICE fuel are:

- ICE technology is already present and relatively easy to adapt for using hydrogen
- the direct emissions are almost zero
- hydrogen is renewable.

In a technical review of the modern development of the Hydrogen-fuelled Internal Combustion Engine (H_2ICE) the authors conclude that "Undoubtedly aided by the technological advancements of the ICE, simple H_2ICE options are convenient and economically viable in the near-term"; nevertheless, they cautiously add, that "the long-

term future of the H_2ICE is less certain and hard to predict" (White, Steeper, & Lutz, 2006) (p. 1303).

(Das, 2009), (Meier, 2014) and (Thengane, Hoadley, Bhattacharya, Mitra, & Bandyopadhyay, 2014) confirm, that most of today's hydrogen is still produced from fossil resources such as natural gas, oil and coal. Moreover, when performing cost-benefit analysis to compare eight different hydrogen production technologies, namely, steam methane reforming, coal gasification, partial oxidation of hydrocarbons, bio-mass gasification, photovoltaic-based electrolysis, wind-based electrolysis, hydro-based electrolysis and water splitting by chemical looping, Thengane, et al. conclude that "the fossil fuel based processes appear to have less beneficial qualities including greater environmental impacts, but are more cost-effective" (Thengane, Hoadley, Bhattacharya, Mitra, & Bandyopadhyay, 2014) (p. 15293). Consequently, if we would decide to replace transportation fuel with hydrogen by taking it from fossil fuels, then according to Shinnar that, "would require more fossil fuel than currently used for the same purpose and would significantly increase our energy imports and global warming. If the hydrogen were to be released by electrolysis using solar- or nuclear-derived electricity, the cost would be higher. The direct use of the electricity would cost half as much as via the hydrogen route" (Shinnar, 2003) (p. 456).

In "The business of sustainable mobility: from vision to reality" Vergragt cites a 2002 study, which concludes that for the next 30 years there will not be enough renewable energy to produce hydrogen sustainably in any country, except for Iceland, with its abundance of geothermal and hydroelectric power (Nieuwenhuis, Vergragt, & Wells, 2006). This evaluation is still valid - a recent article states that Hydrogen could be important only in the future, because, "It has the potential to improve air quality and energy security. But these require the development of low-emission versions of existing plants or of novel technologies, in order to be sustainable." (Velazquez Abad & Dodds, 2017)

Which shall not be interpreted as a dismissal of the idea for hydrogen fuel, but rather as a call for further research. The above reference also carries a warning on using hydrogen as fuel in Fuel Cell Electric Vehicles (FCEV), which shall be described later. In other words, for the time being we shall be better off by using EVs.

2.2.3. Bio-fuel in vehicles.

The renewable liquid fuels such as bio-ethanol, bio-diesel, green diesel (the other name for renewable diesel), and green gasoline are generally considered to contribute to sustainability, reduction of greenhouse gas emissions, as well as regional development and security of supply.

The most widely used transportation bio-fuel at the moment is bio-ethanol. Using ethanol as a fuel additive to unleaded gasoline causes an improvement in engine performance and exhaust emissions (Agarwal, 2007). “Bio-ethanol from sugar cane, produced under the proper conditions, is essentially a clean fuel and has several clear advantages over petroleum-derived gasoline in reducing greenhouse gas emissions and improving air quality in metropolitan areas.” (Balat & Balat, 2009) (p. 2273). According to the latter study it is difficult to achieve the desired effect in countries other than Brazil, having different climate, size and agriculture. Other scholars have voiced a similar opinion: “On an energy basis, ethanol is currently more expensive to produce than gasoline in all regions considered. Only ethanol produced in Brazil comes close to competing with gasoline. Ethanol produced from corn in the US is considerably more expensive than from sugar cane in Brazil, and ethanol from grain and sugar beet in Europe is even more expensive.” (Demirbas, 2009) (p. S111). Other disadvantages include “lower energy density than gasoline (bio-ethanol has 66% of the energy that gasoline has), corrosiveness, low flame luminosity, lower vapor pressure (making cold starts difficult), miscibility with water, toxicity to ecosystems, increase in exhaust emissions of acetaldehyde, and increase in vapor pressure (and evaporative emissions) when blending with gasoline”. (Balat & Balat, 2009) (p. 2276). The EU bio-fuel policy has its outspoken critics too: “Knowing the current situation of the prices for raw materials, forcing European countries to produce and consume bio-fuel is not profitable either for the European countries or for individual users”. (Sobrino & Monro, 2009) (p. 2681). Instead the authors would encourage the use of existing technologies in the market to reduce fuel consumption, including the HEV, and would reduce the maximum speed on highways and increase fuel prices. (Sobrino & Monro, 2009).

It is worth mentioning that bio-ethanol is another example of a revived initiative. Ford Model T back in 1908 was the first commercially available vehicle already built to run

on bio-fuel. Henry Ford was not the only one who promoted ethanol. Still it was gasoline that grew to be the fuel of choice on the market, and the automotive industry became dependent on petroleum. Luckily for Ford his Model T was also the first Flex-Fuel Vehicle (FFV), capable of using gasoline as well, hence the mass adoption of gasoline fuel did not affect the business strategy of Ford Motor Company. Which cannot be said about many carmakers that betted exclusively on electric powertrains.

2.2.4. Electricity as automotive propulsion energy.

Those carmakers, who invested exclusively in electric powertrains at the beginning of the twentieth century, soon went out of business, despite the fact that from 1895 to 1910, electric automobiles were more common in most areas of the United States and Europe than gasoline internal combustion vehicles. (Sovacool, Early modes of transport in the United States: Lessons for modern energy policymakers, 2009). Among the numerous reasons blamed for the decline of the EVs we shall mention their much shorter range compared to ICE, the lack of acceptable infrastructure (for example, “By 1917, just seven million American homes – roughly one-third – were connected to an electrical grid, most of these were in large cities”), poor management and faint marketing on behalf of the electric car manufacturers, as well as the successful lobbying and the aggressive campaign for the establishment of gasoline filling stations on behalf of the oil and petroleum companies. (Sovacool, Early modes of transport in the United States: Lessons for modern energy policymakers, 2009) (p. 420).

Nonetheless, environmental and economic worries of modern time have revived the interest towards the EVs. Despite their need for time-consuming recharging and high battery costs, the Battery Electric Vehicles (BEV) have stayed with us in more or less inconspicuous forms even after the indisputable triumph of the “ICE age”. They are noiseless, have no direct emissions, at the same time their disadvantages have remained generally the same, not to mention the relatively new concerns about the polluting dangers of end-of-life batteries. On the other hand, just being noiseless has given them a tremendous potential, if we consider the huge amounts that municipalities have to spend in order to decrease the health consequences of regular exposure to consistent elevated

sound levels.[4]

The still high production cost makes electric vehicles a luxury product, which led Tesla Motors, Inc to the idea of offering luxury top level electric vehicles with the long term plan to be able to build a wide range of models, including affordably priced family cars. (Musk, 2006).

Apart from Battery Electric Vehicles (BEV), another type of EVs has emerged – the high-tech Fuel Cell Electric Vehicles (FCEV), using hydrogen or ethanol to produce its own electricity. Their commercial application is still under development.

The third type of road vehicles is the Hybrid-Electric Vehicle (HEV) - a combination of ICE and an electric motor in an attempt to bring together their benefits. The hybrids use the worldwide infrastructure created for ICE over the last one and a half century, and at the same time partly enjoy the advantages of the BEV. As a result we achieve improved fuel economy and reduced emissions.

The idea of the hybrid is not new either – the luxury sports car producer Porsche proudly states that the first HEV was built in 1900 by their founder at the age of 25 (Official Porsche Website, 2009), although nobody claims that Ferdinand Porsche might have been inspired by environmental concerns. After many attempts over the decades by different inventors and carmakers the modern HEV equipped with a gasoline engine and an electric motor finally came back on a commercial scale in 1997, when Toyota successfully launched its Prius model in Japan. Honda followed in 1999 with the "Insight". Ford launched "Escape Hybrid" in 2004 as the first American HEV. Non-surprisingly, it was also the world's first Hybrid Electric SUV (Sport Utility Vehicle), reflecting the American taste for bigger vehicles, and confirming several of the following issues supporting anti-hybrid opinions.

First of all the consumption of a modern passenger vehicle with diesel or petrol internal combustion engine is comparable to that of a gasoline-electric Hybrid Electric SUV, but without the additional weight and potential burden of the batteries disposal.

So if someone would like to reduce its fuel consumption, why doesn't he reduce the size of the driven vehicle?

Indeed, when we buy a vehicle for personal purposes, we go through different phases of the decision making process. We summarize our personal accumulated knowledge, and then start actively to search for latest information on the subject. We collect data on

[4] See "How much is worth the reduction in noise pollution?" by (Harangozó & Marjainé Szerényi, 2014)

brands we know and/or trust, surf the net for cars of the year, examine the best-selling models, collect references and sometimes (he-he) check for discounts and best deals. We evaluate design, look at performance figures like top speed, acceleration and torque, luggage capacity, sift through active and passive safety equipment, comfort levels, standard accessories, optional equipment, warranty period, and inevitably arrive to the cost of ownership. This usually includes the price of the car, all fees and taxes, maintenance cost and a must-ask question – the fuel consumption. Those absentminded car buyers, who never inquire about fuel consumption of the vehicle that they are considering to buy (and use), are most probably extinct by now. If any of them are still around, they carry the social stigma of being not only filthily rich, but also politically incorrect. Even in the US market, where huge cars with thirsty engines have always been part of the landscape, things have changed to the point that carmakers are busy launching new small(er) models, while customers are less ashamed to drive them. Nowadays it is not only progressive to drive vehicles guzzling less gas, but it is also a matter of patriotism – a way to reduce the country's dependency on oil imports. And the fuel costs of the household. The latter, perchance, may often happen to be the stronger urge. Knowing very well that better efficiency comes at a certain development cost, nobody is shocked to see higher prices on the "greener" products. Instead the buyer-to-be simply starts to calculate how later savings may reward the higher price. Ah, there's the rub; for in that mathematical model the common formula starts with the question: what is your average mileage NOW? In other words, if I drive like I do now, how much fuel can I save if I choose the more expensive, but less fuel consuming engine for the same size of the vehicle I am now used to? Instead of changing their way of living most customers are trying to keep their habits as constants. They start calculating based on a wrong model, and as soon as the extra purchase cost seems to be too high in comparison to the future returns on this investment, most of the customers abandon the idea of purchasing efficient, but costly technology. Or they start driving more in order to justify the more expensive purchase, which brings us to a classical form of the rebound effect. An analysis of the driving habits of about 360,000 vehicle owners by an American insurance services company has shown that owners of hybrid vehicles drive as much as 25% more miles than owners of non-hybrids (Quality Planning, 2009).

In this regard it shall be no surprise, that the highly praised introduction of the Hybrid-Electric Vehicles – and especially its support by incentives in many countries from Japan, through the US, to Hungary – is raising concerns, whether that really is a

good solution from environmental point of view. In Sweden a recent paper clearly showed the users of pure electric vehicles (EV) make significantly more trips than their non-EV using counterparts; but more worrisome is their finding, that EV is generally perceived by respondents to be more environmentally friendly than public transport modes, which explains why "the EV users choose the car for a significantly larger percentage of their total travel distance than conventional vehicle users" (Langbroek, Franklin, & Susilo, 2017), p. 98. The authors warn that a rebound effect will occur "if a transition towards EVs would imply an increased use of the personal car at the expense of active modes and public transport" (Langbroek, Franklin, & Susilo, 2017), p. 111.

When governments, enterprises, NGO's and private individuals embark on an environmentally friendly initiative they do not always arrive to an environmentally friendly outcome. When we finally overcome the resistance, after a period of slight improvement (if any) we can have an even worse ecological impact, and even more severe negative economic effects in the long run. Ecologically speaking, we need to support only those recommendations, that not only sound 'green' and 'politically correct', but which also have a high probability of long-term validity. One of the main obstacles to faster progress in environmental protection is the transitional cost, as the expected short-term negative economic implications scare away the common public. Far from many among the consumers are ready to pay a price premium for an already expensive product just because it is 'greener', unless they can have reasonably quick returns on their 'investment'. The financial advantage is often non-existent for the individual users and henceforth is either substituted by emotion and other non-material benefits, or is created by governmental incentives. Therefore governments may have a rather strong role in promoting a particular technology, but governments are lead by politicians, and, as we have earlier seen, there is no insurance against promoting the wrong technology.

A study in Switzerland investigated two different possible direct rebound effects of Toyota Prius: above trend increase in size of the purchased car and the increase in average car ownership per household. No rebound effect was revealed in either case. “On the contrary: vehicle size slightly decreased, and the low numbers of first-time buyers and non-replacement vehicles would, if they were representative for a whole population, even lead to a decrease in average vehicle ownership.” (de Haan, Mueller, & Peters, 2006) (p. 604). This result was confirmed by a later study on the same subject, where the authors also claimed that, “hybrid cars indeed are suited to play a role, during

the next 5 years, in energy policy schemes aiming at reducing CO_2 emissions from individual road transport." (de Haan, Peters, & Scholz, 2007) (p. 1084). Furthermore, according to the same study, the introduction by some of the Swiss cantons of tax rebates for hybrid vehicles appears to be effective in achieving reduced CO_2 emissions (significantly higher sales in Swiss cantons having tax rebates).

But this is only Prius and only in Switzerland.

An American study in 2002 found that the Prius was not cost-effective in improving fuel economy or lowering emissions: "For the Prius to be attractive to US consumers, the price of gasoline would have to be more than three times greater than at present. To be attractive to regulators, the social value of abating tailpipe emissions would have to be 14 times greater than conventional values. Alternatively, the value of abating greenhouse gas emissions would have to be at least $217/t. There are many opportunities for abating pollutant and greenhouse gas emissions at lower cost. We conclude that hybrids will not have significant sales unless fuel prices rise several-fold or unless regulators mandate them." (Lave & MacLean, 2002) (p. 155). The authors calculated that price of $5.10 / gal ($1.35/l) would be required to offset the $3,495 initial price difference... Since then the prices of gasoline have soared in the US, though still not enough.

Following the line of thought drawn by the Swiss study, it would be interesting to investigate the change in size of the purchased car in the case of Hybrid Electric SUV like Ford Escape Hybrid, Toyota Highlander Hybrid or Lexus RX 400h. We may then consider the following possible Hybrid Electric SUV cases:

A. If the customer would have bought a smaller and/or more efficient car, but buys an SUV only because it is available as a hybrid, then we have a negative effect.

B. If the customer would have bought a regular SUV anyway, and chooses a similar size Hybrid Electric SUV instead, then we have a clear reduction in the direct emissions per km as well as in the noise level. In both cases incentives for the buyers are questionable, because

In case 'A' they will provoke a negative effect.

In case 'B' the state will be financially supporting those buyers, who have higher than average income and are spending it on the more expensive SUVs. Similar conclusions can be found in a study by Diamond, who investigated the impact of monetary incentives and gasoline prices on the monthly U.S. market share of three top selling HEV: Honda Civic Hybrid, Toyota Prius and Ford Escape. The author describes a

positive relationship between income and hybrid adoption for the Escape and Prius and suggests that, “financial incentives may disproportionately benefit higher income consumers who are more likely to purchase hybrids in the first place. Lower income consumers are less able to afford the higher up-front premium for a hybrid and more likely to discount future fuel cost savings from a hybrid purchase. Given the apparent weak or negligible effect of monetary incentives, this could result in incentive payments effectively creating a subsidy for the highest income consumers without significantly affecting their purchase decisions. In other words - current monetary incentives for hybrids may be rewarding those who need the incentive the least for a purchase they were likely to have made anyway.” (Diamond, 2009) (p. 982). Consequently, instead of tax rebates on hybrid versions it may be beneficial and fair to add a punitive tax to vehicles with worse environmental performance.

Whatever the average European opinion is on the American taste for SUVs with big gasoline engines, if we agree that the hybridization process shall start with the most popular models on the market, then the presence of Hybrid Electric SUVs there shall be fully justified. Obviously, it shall be a totally different issue in other countries, where SUVs are considered luxury goods and are taxed accordingly.

Closely related to the above subject is the following statement describing the efforts to lower the average new vehicle’s CO_2 emissions in Europe: “significant progress will come from the large vehicle segments through their hybridization...There is a paradox of seeing hybrid SUVs or hybrid luxury cars as part of the solution...“ (Cuenot, 2009) (p. 10).

Finally, the strongest point in favour of Hybrid-Electric Vehicles is the role they play in bridging the gap between different technologies. Despite the sober understanding that their dependence on fossil fuel makes HEVs another dead-end street in the quest for sustainable transportation, their commercial success has certainly been contributing to the development of better batteries, paving the way for the BEVs of the future or for the Hybrid-Electric Vehicles running on bio-fuel. The greater part of the consumers is distrustful of the new technology and sceptical of BEVs due to their limited range and heavy expensive batteries. It takes time to develop batteries with the necessary parameters, but most of the customers are so used to the free mobility they have grown up with, that they cannot even accept the thought of a possible flat battery in their BEV. At the same time a possible empty tank in a conventional ICE vehicle would not be a mental threat for anybody. In contrast, HEV can operate on batteries and on gasoline.

Compared to BEV and Fuel Cell Electric Vehicles (FCEV) the moderate price premium of the HEVs makes them look affordable, while the constantly rising fuel prices make the purchase look more and more practical. HEV seems a totally acceptable solution to many, providing crucial selling volumes for the carmakers and a great testing ground for improving batteries. This has been noticed and in some way or another welcomed by scholars from different fields. "Triggered among others by the development of hybrid vehicles, there is renewed interest in electric vehicles as a means to reduce emissions and a lot of research is being done on the development of new battery types." (Ball & Wietschel, 2009) (p. 618)

If the HEV trend shall continue, then the progress in improving the batteries will subsequently influence the development of the Plug-in Hybrid Electric Vehicles (PHEV), which will naturally create a demand for charging facilities. A new network of charging points will gradually appear to meet the new requirements, encouraging more and more customers to join the electric club.

Similar thoughts are expressed by (Barkenbus, 2009) and (Bitsche & Gutmann, 2004). Suppes goes further to claim that "petroleum-free automobiles can spontaneously evolve from hybrid electric vehicles (HEVs) based solely on the economic viability of replacing batteries with Regenerative Fuel Cells (RFCs) as fuel cell prices decrease. The evolution can be projected first to plug-in HEVs (PHEVs) and finally to a substantially hydrogen-based transportation system." (Suppes, 2006) (p. 353).[5]

Toyota Motor Company simply says that hybridization allows the ICE vehicles to stay competitive in the future by enabling total energy efficiency that is comparable to future fuel cell systems (Yaegashi, 2003). In other words, before we reach the hydrogen society we shall improve efficiency and try to save fossil fuel.

Similar conclusion was voiced by Seidel, et al.: "All current evidence strongly suggests that will have a minuscule market penetration as primary propulsion source in passenger vehicles by 2030... Moreover, engine and powertrain improvements of existing engines (for example hybrid electric/combustion engines) may potentially reach the same cleanliness and fuel efficiency as hydrogen based vehicles once the efficiency of hydrogen production is included in the calculation, without requiring a new costly gas station infrastructure." (Seidel, Loch, & Chahil, 2005) (p. 443).

[5] RFCs is supposed to be used as an alternative to batteries. In closed-system RFCs water is converted to oxygen and hydrogen through electrolysis, and the hydrogen and oxygen provide electrical power similar to a battery. (Suppes, 2006)

Notwithstanding the latter opinion, petrol and diesel cars are doomed to be ousted. The tightening emission standards are increasing the costs of production development - both in investment terms as well as in political pressure, which has prompted Swedish carmaker Volvo's Chief Executive Hakan Samuelsson to declare, that their latest generation of diesel engines could be their last as the cost of reducing emissions of nitrogen oxide is becoming too much. (Reuters, 2017a)

Another strong message was recently sent by Nicolas Hulot, Minister for the Ecological and Inclusive Transition of France, who said the French government was envisaging an end to the sales of diesel and petrol cars by 2040. (Reuters, 2017b)

The Environmental group DUH made an even more aggressive step, when it went to court two months after the VW scandal, seeking to force the city of Stuttgart to drastically improve its air quality by banning diesel cars. On 28 July 2017 the German court backed the effort to ban diesel cars from the city, and Stuttgart's home state of Baden-Wuerttemberg said it would study the court ruling before deciding if and when it would impose a ban that DUH wants by January 2018. Although the state could also appeal the verdict at the Federal Administrative Court, analysts have said they expected other German cities would follow suit swiftly if Stuttgart put a diesel ban in place. (Reuters, 2017c)

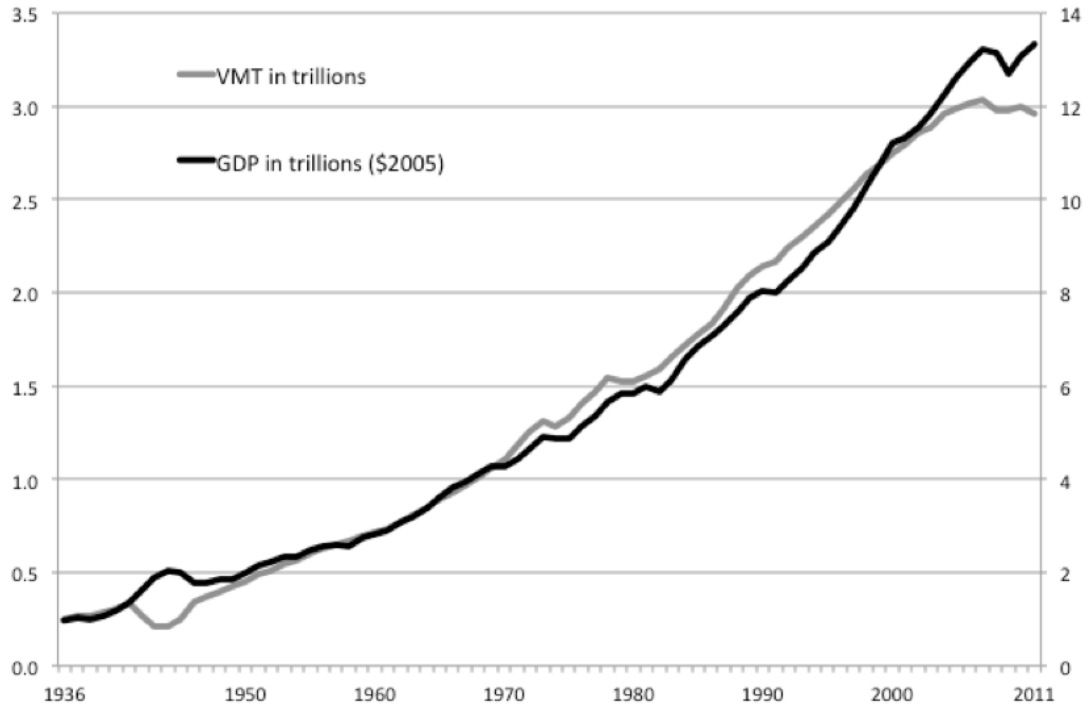
3. Growing mobility with less passenger cars. Dream or reality?

3.1.The restraint on travel demand.

3.1.1. The evidence of the matured markets - the examples of the US and the UK.

It is reasonable to expect, that the increase in personal travel demand must also stop at some point. If not for other reasons, then certainly due to the individual's time restraint. Unsurprisingly, this has already been independently confirmed for the developed markets. Figure 6 shows the relation between GDP and Vehicle Miles Traveled (VMT) in the USA for the period between 1936 and 2011.

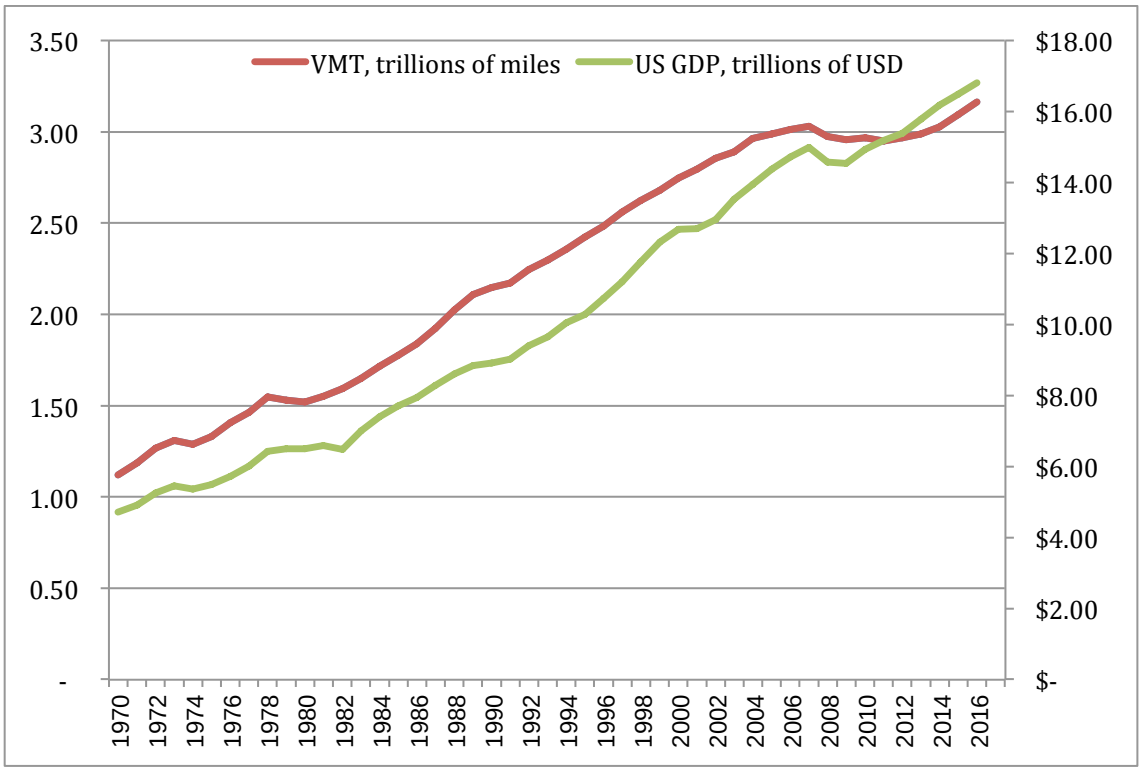
Figure 6. Total Auto and Truck VMT (trillions) and GDP (trillions of $ 2005), 1936 - 2011. VMT (vehicle miles traveled) axis on left; GDP on right. Source: (Ecola & Wachs, 2012).



Except for the war period, GDP and VMT have grown together until 2003. Based on Figure 6 I was ready to presume that the growth in VMT in the USA by that time might have reached a point of saturation and could not cope with the growth of wealth. However, after examining the exact Federal Reserve Economic Data since 1970 up to the end of 2016 (see Figure 7), I decided it might have been a hasty assumption. Even if

there has been any saturation, the infrastructural developments must have created a new growth potential for the VMT. A press release by the Federal Highway Administration stated that the data was "highlighting the growing demands facing the nation's roads and reaffirming the value of the recently enacted 'Fixing America's Surface Transportation' (FAST) Act, which is investing $305 billion in America's surface transportation infrastructure – including $226 billion for roads and bridges. (Federal Highway Administration, 2016)

Figure 7. Total Auto and Truck VMT (trillions) and GDP in trillions of chained 2009 dollars (inflation-adjusted), 1970-2016. VMT (vehicle miles traveled) axis on left; GDP on right.



In the United Kingdom Metz, based on the 'The National Travel Survey of Great Britain', states that "the average trip rate has held steady at about a thousand journeys per person per year over the nearly four decades of the Survey, while the average travel time has been about an hour per person per day throughout. The average distance travelled increased from 4500 miles per year to reach 7000 miles in 1995, since when there has been little further change" (Metz, Demographic determinants of daily travel demand, 2012) (p. 20).

Using the National Travel Survey statistics of the UK (Department for Transport, 2013) we can even see a clear decline in the distance travelled, (Figure 8) as well as in total trips made (Figure 9).

Figure 8. Average distance travelled per person per year in the UK (miles). Data source: National Travel Survey statistics of the UK (Department for Transport, 2013).

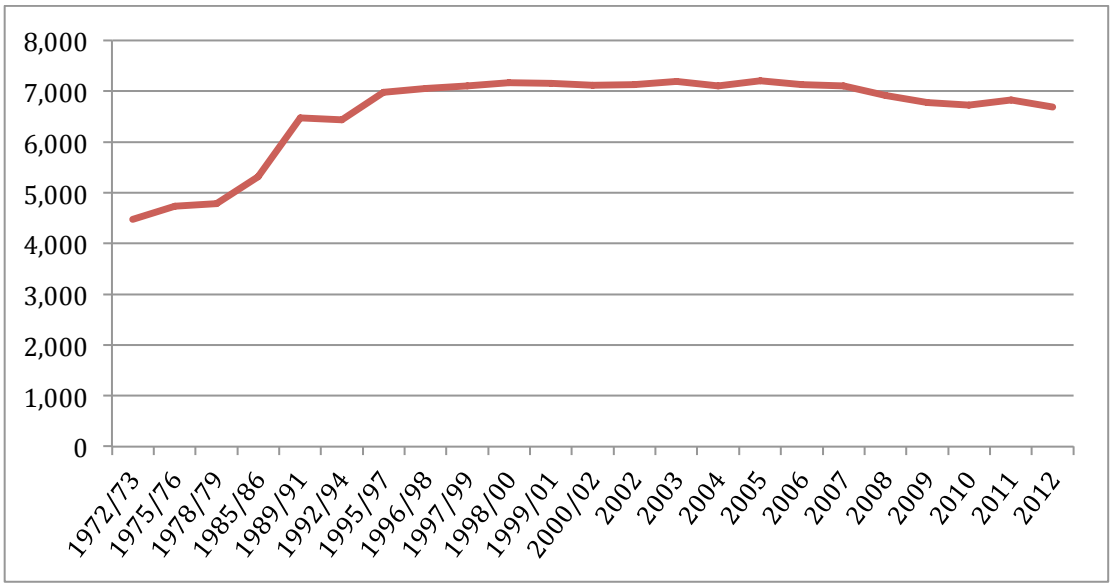
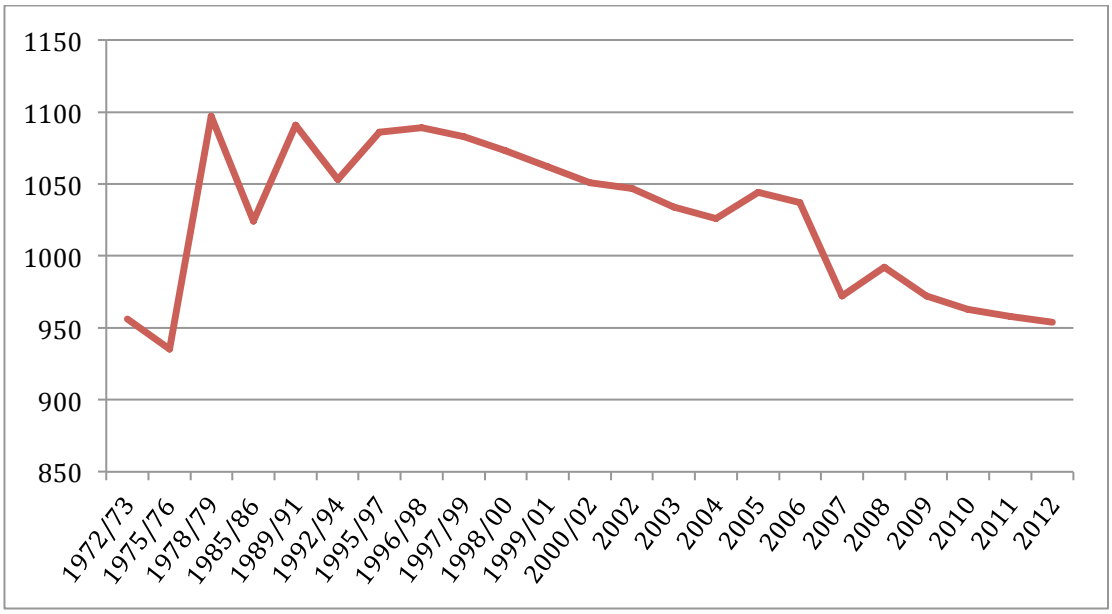


Figure 9. Average trips per person per year made in the UK. Data source: National Travel Survey statistics of the UK (Department for Transport, 2013).

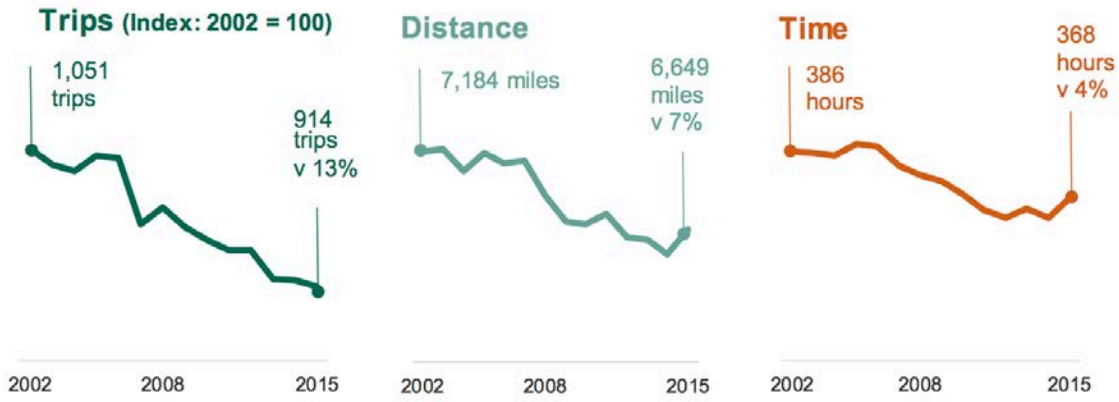


Some may say, that this has happened because of the increasing share of air traffic in

personal mobility, but in my opinion, if we speak about daily mobility and presume that part of it may be achieved by air, then the time to drive to and from the airport may be comparable with the time we need to drive to and from our office. At the same time, in the case of Great Britain, domestic air travel was included in the survey, and the data was still showing saturation. In the other cases, as shown below, it was excluded, but showed similar results.

The British National Travel Survey for the period 2002-2015 (Department for Transport, 2016) shows a clear fall in the average number of trips and the distance travelled per person per year, as well as the average time spent on travel per person per year - Figure 10.

Figure 10. Average data per person per year in the UK - trips, distance and travelling time. Data source: (Department for Transport, 2016).[6]



3.1.2. Saturation of the daily travel demand and behavioural changes

The saturation of the demand for daily travel as described by Metz is similar to "the saturation of ownership and use" as described by Lee Schipper based on the stagnating vehicle use not only in the UK, but in Australia, Germany, France, Italy and Japan (Schipper, 2009) (p. 3712). A similar phenomenon - stagnating and decreasing "vehicle miles traveled per capita" in the US - even leads Puentes and Tomer to the bold suggestion that "there may be a ceiling on the amount of driving that Americans are capable of" (Puentes & Tomer, 2008) (p. 32).

[6] From January 2013, the survey has covered England residents only. After an open competition in 2012, the National Centre for Social Research (NatCen) was confirmed as the contractor to conduct the NTS from 2013 to 2017. They were the incumbent contractor having ran the NTS since 2002. (Department for Transport, 2016)

In Sweden "time saved by using faster modes of transport is now being spent on stationary activities to a greater extent than during the 1970s and 1980s" (Vilhelmson, 1999) (p. 178). Without mentioning it explicitly, Vilhelmson involuntary confirms that in terms of travelling the increased travelling speed seems to have always had a rebound effect in Sweden - reducing travel time through higher speed gave the opportunity to cover longer distances within the same time, and it is only recently that spending this additional time on stationary activities has become more popular.

Although, concerning motoring, the rebound effect is more often related to cost saving, rather than time saving, the above example is raising important thoughts. The topic of the rebound effect deserves more attention, as it may provide one of the keys to understanding motoring behaviour and achieving sustainable mobility. Ironically, only one person (Schipper, 2009) among the above cited authors mentions this type of rebound effect by name, stating that, "there is no evidence of any important rebound of driving because of greater fuel economy in Europe, although as Schipper and Fulton (2009) and Schipper (2009) point out, diesel cars in Europe are driven significantly more (50–100%) than gasoline cars." (Schipper, 2009) (p. 3712).

But it is quite difficult to agree with the first half of his citation regarding the non-existence of important rebound of driving, because the second half of the same sentence essentially confirms that same denied rebound.

The reality is that general rebound effect is a fact, although in the U.S. Kenneth Small and Kurt Van Dender reveal "evidence that the rebound effect diminishes with income, and possibly increases with the fuel cost of driving. Since incomes have risen and real fuel costs have fallen, the rebound effect has declined considerably over time." (Small & Van Dender, 2007) (p. 31).

I strongly disagree with this conclusion. If we presume that the rebound effect shall cause people to drive more due to cost saving, that shall definitely involve a clear perception by the consumer of what his fuel costs are. Obviously, this may not be appropriate to expect in this case, because another paper examining "the reality of how US consumers are thinking and behaving with respect to automotive fuel economy" plainly says, "We found no household that analysed their fuel costs in a systematic way in their automobile or gasoline purchases. Almost none of these households track gasoline costs over time or consider them explicitly in household budgets. These households may know the cost of their last tank of gasoline and the unit price of gasoline on that day, but this accurate information is rapidly forgotten and replaced by

typical information." (Turrentine & Kurani, 2007) (p. 1213).

It may be much more probable, that the explanation for the "considerable decline" of the rebound effect lies in my earlier suggestion - namely, an individual shall sooner or later run out of additional time he or she may spend on motoring, and that this breakthrough has been naturally achieved by the North American nation.

Back in 1994 Cesare Marchetti approached the topic of travel from a different point of view. While citing observations by Yacov Zahavi (Zahavi, 1979), (Zahavi, 1981) about the time people spent travelling, Marchetti emphasized several findings, which he then took to far reaching assumptions.

Zahavi initially investigated the correlation between income and travelling, finding (among other things),

a) that people were willing to allocate a certain proportion of their income to travel, and that on the average the proportion was relatively stable - about one eighth of household income;[7]

b) that increasing income led to increasing demand for speed.

Subsequently, Zahavi thoroughly examined both "travel budgets" - time and money, which led to his conclusion, that households were striving to reach equilibrium conditions between their travel demand and system supply by adjusting their amount and spatial patterns of travel - changing their residence location, choice of travel mode, etc. As a result, they were trying to use the fastest travel mode that they could afford. Still, the time they saved was used by the travellers for additional travel. From here, he found car owners to have better opportunities for equalizing their travel demand within their money and time budgets. (Zahavi, 1976).

But while Zahavi was looking at his research from the point of view of modelling and planning urban transportation, Marchetti took another stand: "The field work of Zahavi [...] is in my opinion most remarkable because it shows the *quintessential unity of traveling instincts around the world*, above culture, race, and religion, so to speak, which gives unity to the considerations relative to the history and future of traveling, and provides a robust basis for forecasts in time and geography" (Marchetti,

[7] Similar proportion is shown by Eurostat in its Household Budgetary Survey Dataset for 2013, where the EU average expenditure on transport is 12.8%. Cited by (Attard, Von Brockdorff, & Bezzina, 2015).

Anthropological invariants in travel behaviour, 1994) (p. 75 - spelling, punctuation and italic fonts as in original). Using Zahavi's data, Marchetti voiced his belief, that all over the world the mean travelling exposure time for man is around one hour per day over the year and over a population (Marchetti, Anthropological invariants in travel behaviour, 1994).

This, en passant, precisely corresponds to the findings of David Metz, provided by this paper earlier (Metz, Demographic determinants of daily travel demand, 2012). But Marchetti went much further in his line of thought. Drawing a parallel between the instincts of the cave dweller and the behaviour of the modern man, he declared that, "Even people in prison for a life sentence, having nothing to do and nowhere to go, walk around for one hour a day, in the open. Walking about 5 km/hr, and coming back to the cave for the night, gives a territory radius of about 2.5 km and an area of about 20 km^2. This is the definition of the territory of a village, and… this is *precisely* the mean area associated with Greek villages today, sedimented through centuries of history." (Marchetti, Anthropological invariants in travel behaviour, 1994) (p. 76 - spelling, punctuation and italic fonts as in original). According to Marchetti, the same principle applied, when cities expanded: "There are no city walls of large, ancient cities (up to 1800), be it Rome or Persepolis, which have a diameter greater than 5 km or a 2.5 km radius. Even Venice today, still a pedestrian city, has exactly 5 km as the maximum dimension of the *connected core*." (Marchetti, Anthropological invariants in travel behaviour, 1994) (p. 77). "The Berlin of 1800 was very compact with a radius of 2.5 km, pointing to a speed of 5km/hr, the speed of a man walking. With the introduction of faster and faster means of transportation the radius of the city grew in *proportion* to their speed, and is now about 20 km, pointing to a mean speed for cars of about 40 km/hr. The center of the city can be defined, then, as the point that the largest number of people can reach in less than 30 minutes." Expanding his own reasoning Marchetti muses about a city of 1 billion people, which would require an efficient transportation system with a mean speed of only 150 km/hr. For those, who are familiar with Marchetti's other publications, his striking ideas look less and less extraordinary. Just to mention his finding that in car accidents "deaths grow with the car population, but to a saturation point of about 25 per 10^5 people/year. From then on they become independent of the number of cars."; or that, "for the United States, mileage per car is basically independent of the number of cars on the road and is about 15,000 km/ year" (Marchetti, The automobile in a system context. The past 80 years and the next 20

years., 1983) (p. 16). Most of his findings are supported by comprehensive mathematical analysis of real "time series" (statistical data), and though often they have no explanation, can be very thought stimulating. Similarly challenging is Cesare Marchetti's opinion, that environmental problems are direct consequence of Christianism brought into Western societies:

"By destroying pagan animism, Christianity made possible exploitation of nature in a mood of indifference to the feelings of natural objects. For nearly two millennia Christian missionaries have been chopping down sacred groves that are idolatrous because they assume spirit in nature. The only counter voice was St. Francis of Assisi. He talked to brother wolf and persuaded him of the error of his ways. The wolf repented, died in odor of sanctity, and was buried in consecrated ground.

The real miracle is that St. Francis did not end at the stake, but his message was certainly buried away. The Christian arrogance toward nature is now more vital than ever, although in the last twenty years a thin vein of doubt seems to be creeping in, curiously, in both science and technology.

My point is that the ecological problem is before all cultural, and because it lies deep, religious. It feeds on our basic attitudes toward the world. These are very slow to change, and that is why the problem will be difficult to solve." (Marchetti, Environmental Problems and Technological Opportunities, 1986) (p. 16).

The citation is not intended to start a theological chapter in this dissertation (for those who may be interested in the topic it will be worth to see the series of articles by Gergely Tóth on the economic teachings of great religions[8]), but rather to stress the psychological base line in the environmentally friendly (or non-friendly, and even environmentally "hostile") human behaviour. In fact, I have reached a similar conclusion regarding the cultural causes for excessive motoring.

I strongly believe, that psychologically motoring habits shall be compared to eating habits. Personal wealth and/or cheaper food, combined with cultural inclinations can often lead to higher - and frequently unjustified - food consumption. That has been proved to cause obesity and deterioration both in physical and in mental health. Due to these unwanted effects modern consumers are becoming more and more sensitive to the issue of healthy eating, which is not about the eating being cheap and big, but about

[8] (Tóth, Az új paradigma építőkövei – 1. rész: Nagy vallások gazdasági tanításai, 2016), (Tóth, Az új paradigma építőkövei – 2. rész: A keresztény társadalmi tanítás, 2016), (Tóth, Az új paradigma építőkövei – 3. rész, 2017)

choosing better quality and avoiding excess. In terms of motoring most people do not feel the importance of personal self-restriction, as compared to the above described attitude to food. To put it in other words, very few motorists can be ready to say that they only drive healthy (i.e. made of recyclable materials and having minimum harmful emissions) vehicles and that they avoid unnecessary motoring, because it is not good for the health of their society. The comparison with food holds, if we look at the developing countries - if someone is starving, then any food is good, not just the healthy one; if we need to be mobile in a less wealthy country, then any vehicle is acceptable, therefore sustainability may become of low priority.

Back to the idea of "quintessential unity of traveling instincts around the world" as offered by Marchetti, I would rather suggest to consider another explanation for the historical urge or instinct to move daily: to stay healthy. This is supported by the following citation from (Hanna, 1996), as cited by (Litman, 2002): "Regular walking and cycling are the only realistic way that the population as a whole can get the daily half hour of moderate exercise which is the minimum level needed to keep reasonably fit." (Physical Activity Task Force, 1995).

I am inclined to accept the latter phrase as the better reasoning - people living in cities shall walk and exercise for an hour every day instead of driving from door to door. Similar conclusion is offered by (Rissel, Curac, Greenaway, & Bauman, 2012), who investigated the potential effect on the population level of physical activity of inactive adults, who increased their walking through improved use of public transport. The study was covering population from the USA, the UK and Australia, and concluded that for some people walking related to public transport "is sufficient to achieve the recommended levels of physical activity" (Rissel, Curac, Greenaway, & Bauman, 2012) (p. 2465).

At global level, according to the International Energy Agency, the demand for transport appears unlikely to decrease in the foreseeable future - the World Energy Outlook 2012 projects that transport fuel demand will grow by nearly 40% by 2035 (International Energy Agency, 2012).

The explanation for the seemingly contradictive reports on saturation and growth at the same time is twofold. The personal travel demand in many less developed countries is still far from its saturation level; and population in some of these countries is growing with steady rates. In regard to those nations, which still have plenty of time to spend on travel, their progress shall be monitored with special care: "Energy use in the transport

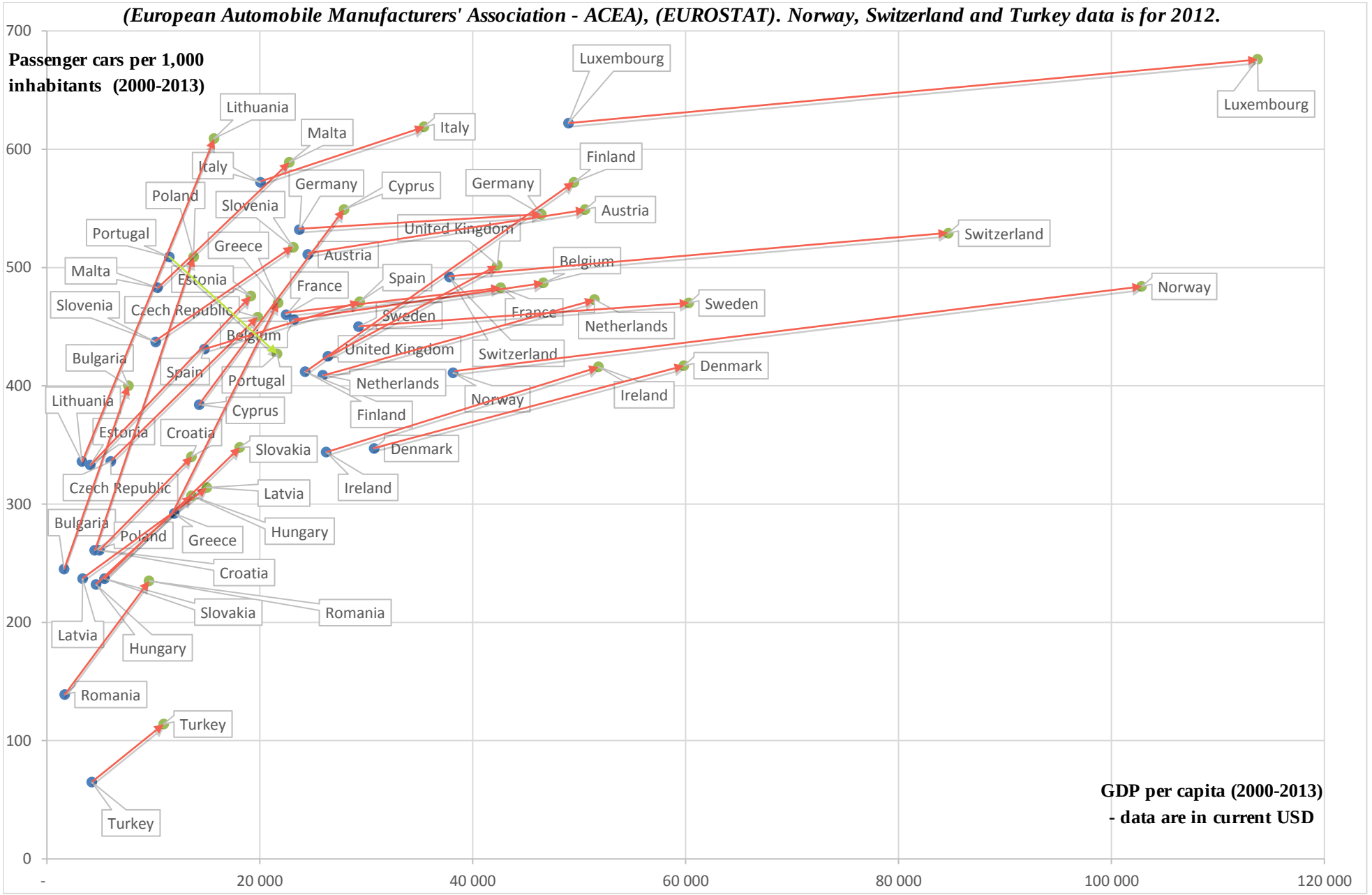
sector grows faster than in any other sector of the global economy. Of that growth, an increasing proportion originates in emerging countries. This is a reflection of the low levels of car ownership in these countries and the near saturation levels achieved in nations like the United States. It is therefore important to understand better how increases in wealth affect car ownership and use, and how these in turn will affect energy consumption and (until hydrogen becomes commonplace fuel) emissions and greenhouse gases." (Ortúzar & Willumsen, 2011) (p. 507).

3.1.3. Growing economy = growing car density!?

If we measure the wealth of a state as GDP per capita, then presumably the increase in its value over time shall lead to the increase of the number of passenger cars owned by the population of this country.

To inspect this I have examined the data of 30 countries in Europe over a 14-year period, and the result can be seen on Figure 11.

Figure 11. Change in the GDP per capita and in the related motorization rate in the period 2000-2013 by country in Europe. Data source: (Worldbank), (European Automobile Manufacturers' Association - ACEA), (EUROSTAT). Norway, Switzerland and Turkey data is for 2012.

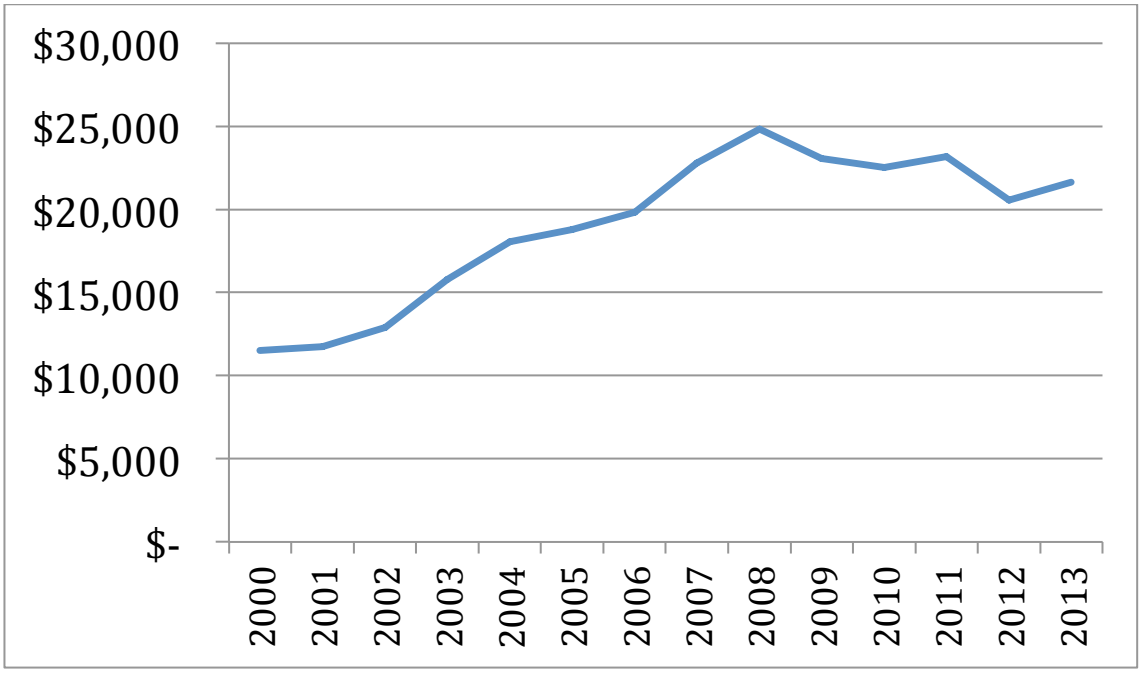


In all of these countries the increase in wealth definitely leads to the increase in the number of cars. The only noticeable exception is the case of Portugal (see green arrow), where the number of passenger cars per 1,000 inhabitants during this period decreased significantly by 16% (from 509 in 2000 to 427 in 2013), although the GDP per capita grew with 88% for the same period (from 11,502 to 21,619 USD per capita). It would have been really great news, if we could be able to attribute this phenomenon to the positive influence of Portuguese urban planning, development of public transport and/or other deliberate efforts to improve sustainable mobility modes and reduce the number of private passenger cars on the roads in Portugal. But when I investigated the two data series in more detail, I found the Portuguese exception to be a literally "hidden" confirmation of the general trend, namely that wealth leads to the increase in the number of cars owned by the population, but from the opposite side - losing wealth shrinks car ownership.

In the case of Portugal the economic difficulties of the past decade led to a steady decrease in Portuguese GDP per capita, which resulted in a decline in the number of cars. Although the period between 2000-2013 shows a relative increase in GDP per capita for the whole period, in the meanwhile there was a big fall in wealth (see Figure 12), whose effect on the number of passenger cars is still clearly visible.

In Portugal itself additional studies may be worth to be done regarding the specific topic of year by year impact of the decreasing GDP per capita on the number of cars per 1,000 inhabitants, and the possible impact of negative (cost related) incentives on the same index, paired with positive incentives for the use of public transport. Extremely scarce data available on Portugal - including empty data series even in the official Eurostat statistical data base - prevented the current topic to be probed further.

Figure 12. Portugal GDP per capita, 2000-2013. Data source: World Development Indicators (Worldbank).



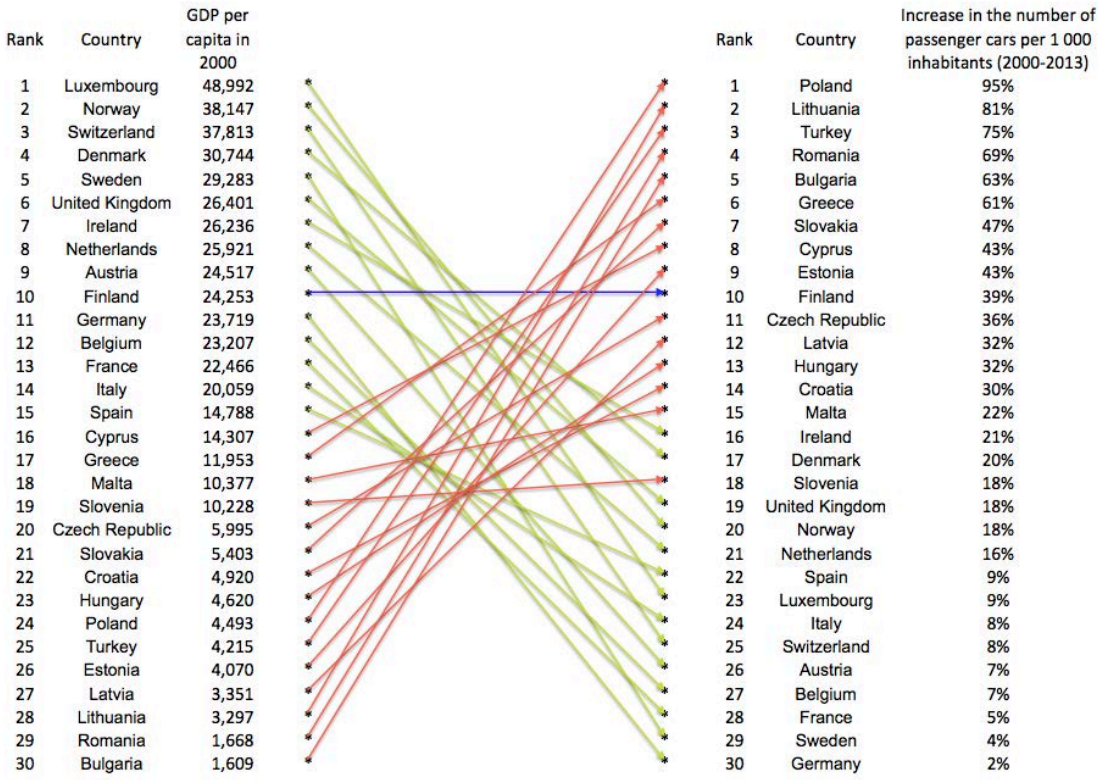
Regarding the other countries on Figure 11 we can observe two distinctive groups among them.

The first group (with "the highly aimed arrows") is composed of countries which had relatively lower income back in 2000 (generally below USD 15,000 per capita), and which by 2013 achieved a strong increase in the number of passenger cars per 1,000 inhabitants.

In the second group, that of the wealthier countries, the number of passenger cars grew at a much lower rate, which is understandable, as we shall keep in mind that these wealthier countries in the year 2000 already had a high motorisation rate - all of them had over 400 passenger cars per 1,000 inhabitants, with the exception of Ireland and Denmark which had 344 and 347, respectively. The less wealthier countries had not only low GDP per capita to start with, but also a population with a strong unsatisfied desire for owing personal passenger vehicles. As a result the growth in GDP and the related real income transformed into steadily increasing number of new passenger car registrations. Second-hand passenger car market grew considerably as well, with a steady flow of older car imports coming from the wealthier countries.

The above revealed existence of the two distinctive groups is clearly illustrated by the next chart "GDP and passenger cars increase" (Figure 13).

Figure 13. GDP and passenger cars increase. Data source: (Worldbank), (European Automobile Manufacturers' Association - ACEA), (EUROSTAT).
Norway, Switzerland and Turkey data is for 2000-2012.



On the left side of the chart we can see the countries ranked by their GDP per capita in 2000, while on the right side the same countries are ranked by the increase in the number of passenger cars per 1,000 inhabitants during the period from 2000 to 2013. In all countries with GDP above USD 14,500 per capita car ownership increased in a moderate way - from the absolute low 2% in Germany to 21% in Ireland (see green arrows).

In countries with GDP below USD 10,000 per capita car ownership increased at a significantly higher rate - from 30% in Croatia, and 32% in Hungary to 81% in Lithuania and 95% in Poland.

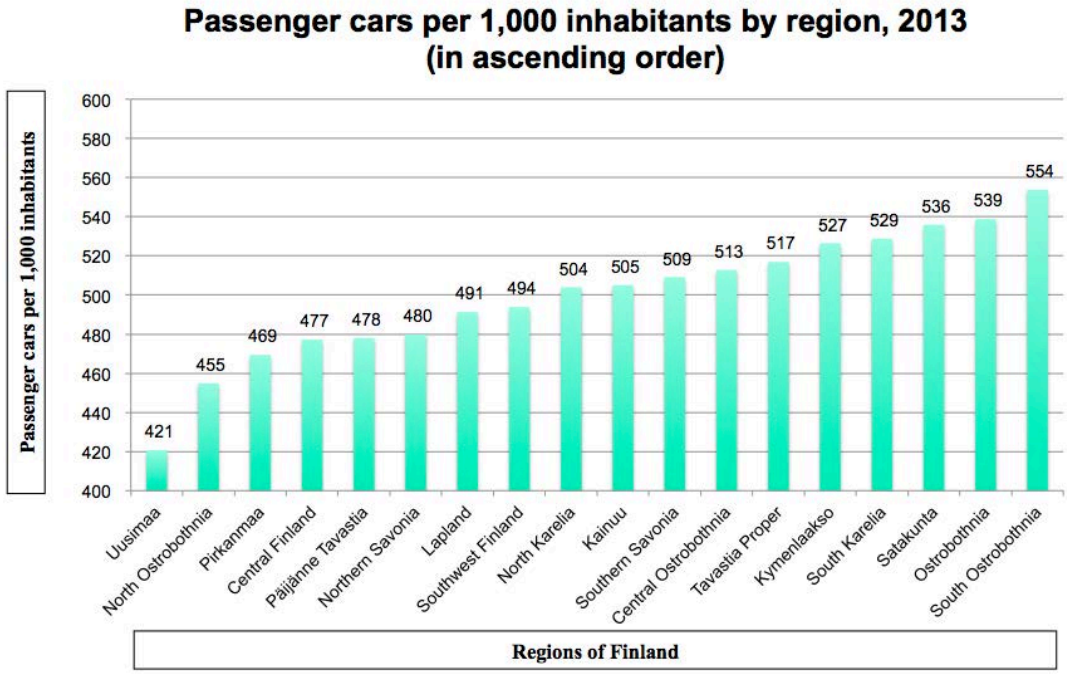
This confirms the presumption that, as a general phenomenon, ***the population in the less wealthier societies spends their growing wealth on personal cars in a more***

profound way than their counterparts from richer economic areas, who are much closer to their car saturation levels. As we will see later, this car-shopping frenzy can lead to a higher motorisation rate in the less developed countries, than in the wealthy countries, which are close to saturation levels.

On this chart Finland is a strikingly strange exception with 39% increase (see blue arrow in Figure 13). Here again, similar to the Portuguese case earlier, the sight of the Finnish indicator pointing totally out of the trend immediately prompted me to investigate the case, and to find out what had made car ownership grow there.

The data of the (Statistics Finland, 2016) showed that car ownership in Finland varied depending on the region, therefore I arranged the data for all the regions in ascending order - from the least motorised to the most motorised, as presented in Figure 14.

Figure 14. Passenger cars per 1,000 inhabitants in Finland by region, 2013. Data source: Statistics Finland.



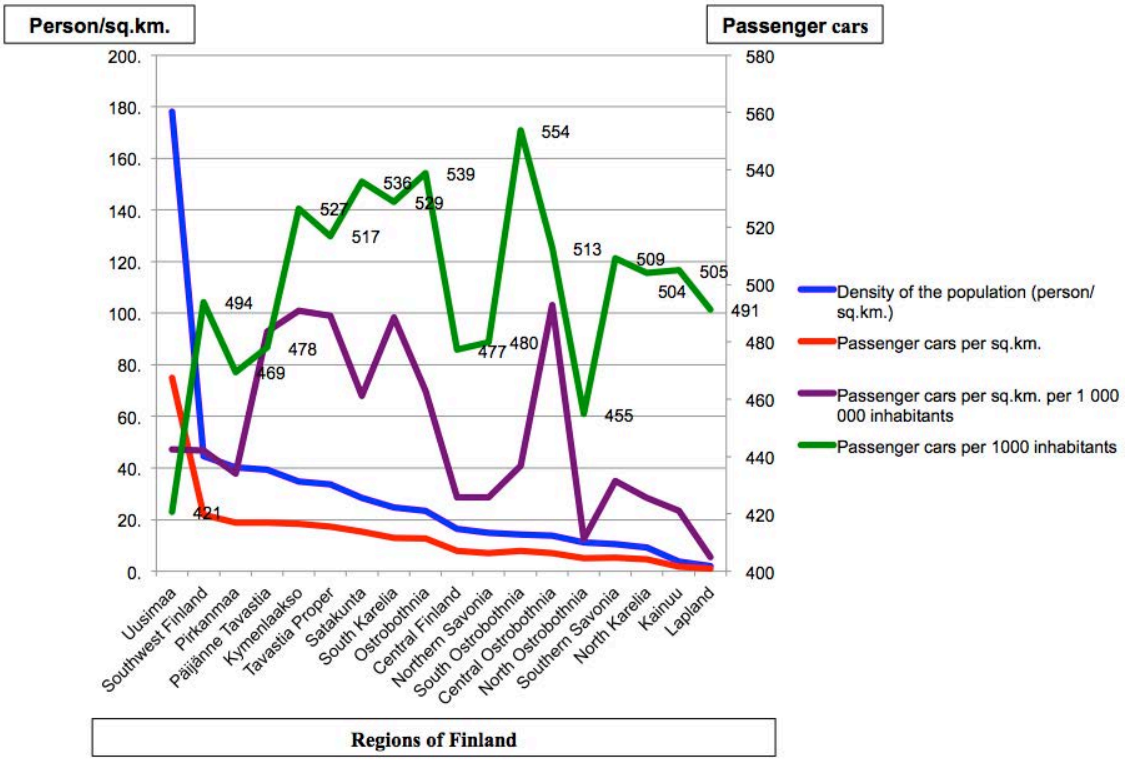
In the examined period the most motorised Finnish region was Etelä-Pohjanmaa (also called South Ostrobothnia in English), and the least motorised was Uusimaa.

Finland's average population density in 2012-2015 has been 17.8-18 persons per square meter, which is the lowest in the EU and second lowest in Europe after that of Norway (European Union, 2013). Finland’s capital Helsinki (also its largest city) and

the second largest city Espoo are both located centrally in the region of Uusimaa, making it by far the most populous territory with well developed public transport, and also with the least cars per 1,000 inhabitants in the country.

When I studied the relation between the Finnish population density (person per sq. km) and car ownership by region, the result of the correlation coefficient was (-0.56) showing a moderate negative relationship between the two arrays of data (see Figure 15).

Figure 15. Population and Passenger Cars Density in Finland. Data source: Statistics Finland. Population density as of 2015, car density as of 2013.

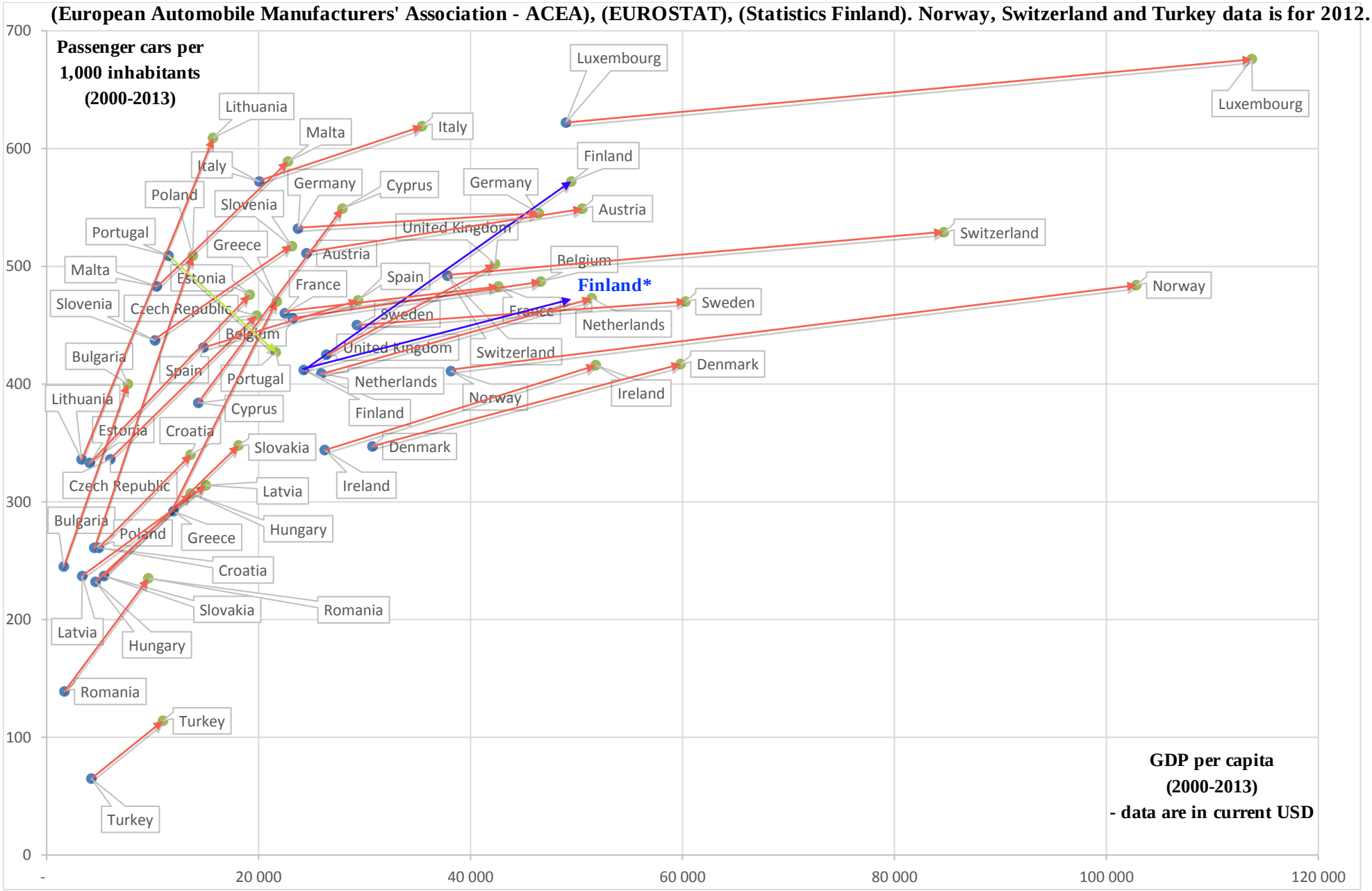


On the above chart the regions are sorted from the most densely populated Uusimaa on the left to the least populated Lapland (population density is shown by the blue line). Not surprisingly, the less populated areas show higher motorisation rate (see green line), as public transport in urban understanding is practically not feasible in some regions like North Karelia, Kainuu and Lapland, where on the average you have 9.3, 3.7 and 2 persons, respectively, per one square km.

Nevertheless, on chart "Passenger cars per 1,000 inhabitants in Finland by region, 2013" (Figure 15), discussed above, even the number of cars in Etelä-Pohjanmaa (South Ostrobothnia), whose indicator is 554 passenger cars per 1,000 inhabitants - the highest in the country, is far from the average number for Finland cited by Eurostat for the same year.

After thorough checking and rechecking I included both data - the one from Eurostat and the authentic one from the national source (both shown in blue) into the chart "Change in the GDP per capita and the related motorisation rate in the period 2000-2013 by country in Europe" on Figure 16.

Figure 16. Change in the GDP per capita and the related motorization rate in the period 2000-2013 by country in Europe. Data source: (Worldbank), (European Automobile Manufacturers' Association - ACEA), (EUROSTAT), (Statistics Finland). Norway, Switzerland and Turkey data is for 2012.

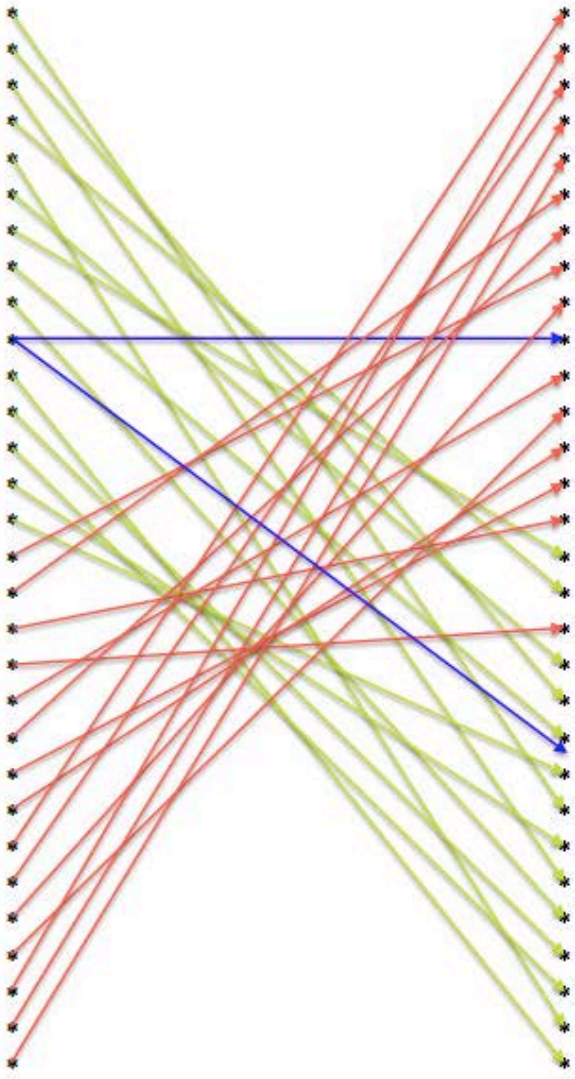


The second blue line on Figure 16, pointing at "Finland*" is based on data from Statistics Finland (the only Finnish public authority specifically established for statistics - www.stat.fi/org/index_en.html).

Similarly, the chart on Figure 17 also includes data on Finland from both sources in blue colour.

Figure 17. Change in the GDP per capita and the related motorization rate in the period 2000-2013 by country in Europe. Data source: (Worldbank), (European Automobile Manufacturers' Association - ACEA), (EUROSTAT). For Finland*: (Statistics Finland). Norway, Switzerland and Turkey data is for 2012.

Rank	Country	GDP per capita in 2000
1	Luxembourg	48,992
2	Norway	38,147
3	Switzerland	37,813
4	Denmark	30,744
5	Sweden	29,283
6	United Kingdom	26,401
7	Ireland	26,236
8	Netherlands	25,921
9	Austria	24,517
10	Finland	24,253
11	Germany	23,719
12	Belgium	23,207
13	France	22,466
14	Italy	20,059
15	Spain	14,788
16	Cyprus	14,307
17	Greece	11,953
18	Malta	10,377
19	Slovenia	10,228
20	Czech Republic	5,995
21	Slovakia	5,403
22	Croatia	4,920
23	Hungary	4,620
24	Poland	4,493
25	Turkey	4,215
26	Estonia	4,070
27	Latvia	3,351
28	Lithuania	3,297
29	Romania	1,668
30	Bulgaria	1,609



Rank	Country	Increase in the number of passenger cars per 1 000 inhabitants (2000-2013)
1	Poland	95%
2	Lithuania	81%
3	Turkey	75%
4	Romania	69%
5	Bulgaria	63%
6	Greece	61%
7	Slovakia	47%
8	Cyprus	43%
9	Estonia	43%
10	Finland	39%
11	Czech Republic	36%
12	Latvia	32%
13	Hungary	32%
14	Croatia	30%
15	Malta	22%
16	Ireland	21%
17	Denmark	20%
18	Slovenia	18%
19	United Kingdom	18%
20	Norway	18%
21	Netherlands	16%
22	Spain	9%
23	Luxembourg	9%
24	Italy	8%
25	Switzerland	8%
26	Austria	7%
27	Belgium	7%
28	France	5%
29	Sweden	4%
30	Germany	2%

Finland* (15%)
Source: Statistics Finland

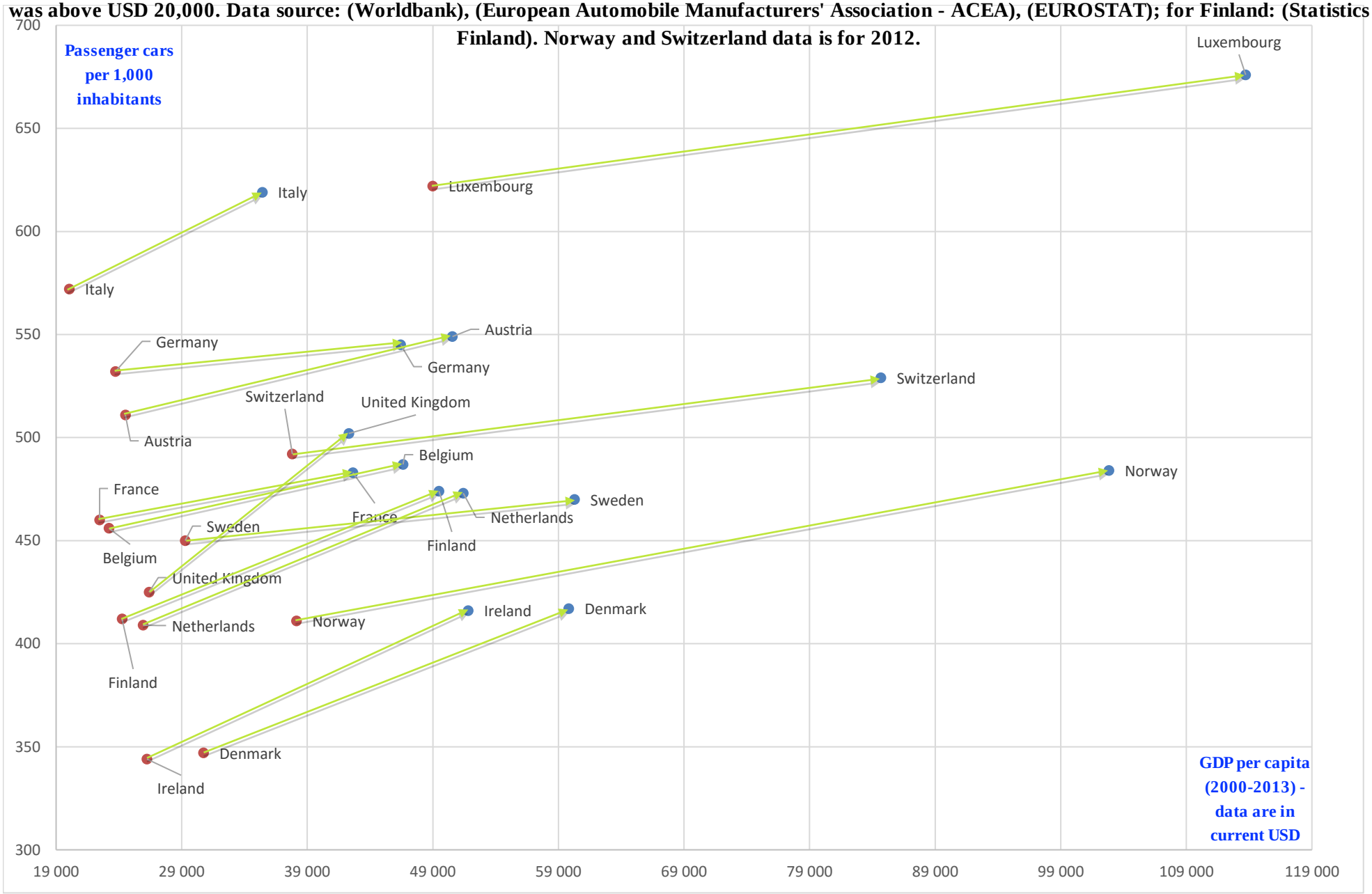
The Eurostat's data about Finland is most probably erroneous, and from here on I shall use the internal national statistical records.

The "Finland*" arrow drawn on data by Statistics Finland on both charts (Figures 16 and 17) fits perfectly with the trend of the other countries, whose GDP per capita is similarly higher than 15,000 USD per capita.

The great differences in GDP between the examined European countries resulted in a heavy and complicated pattern in the chart of Figure 16, and that made it sensible to split the data base used as the source for the preparation of the chart into two series - countries which in 2000 had GDP per capita above USD 20,000 and countries with GDP per capita below 20,000 USD.

The resulting two charts are shown in Figure 18 and Figure 19, where we can observe the less wealthier countries and the more wealthier countries within their own group.

Figure 18. Change in the GDP per capita and the related motorization rate in the period 2000-2013 by country in Europe, where GDP per capita in 2000 was above USD 20,000. Data source: (Worldbank), (European Automobile Manufacturers' Association - ACEA), (EUROSTAT); for Finland: (Statistics Finland). Norway and Switzerland data is for 2012.



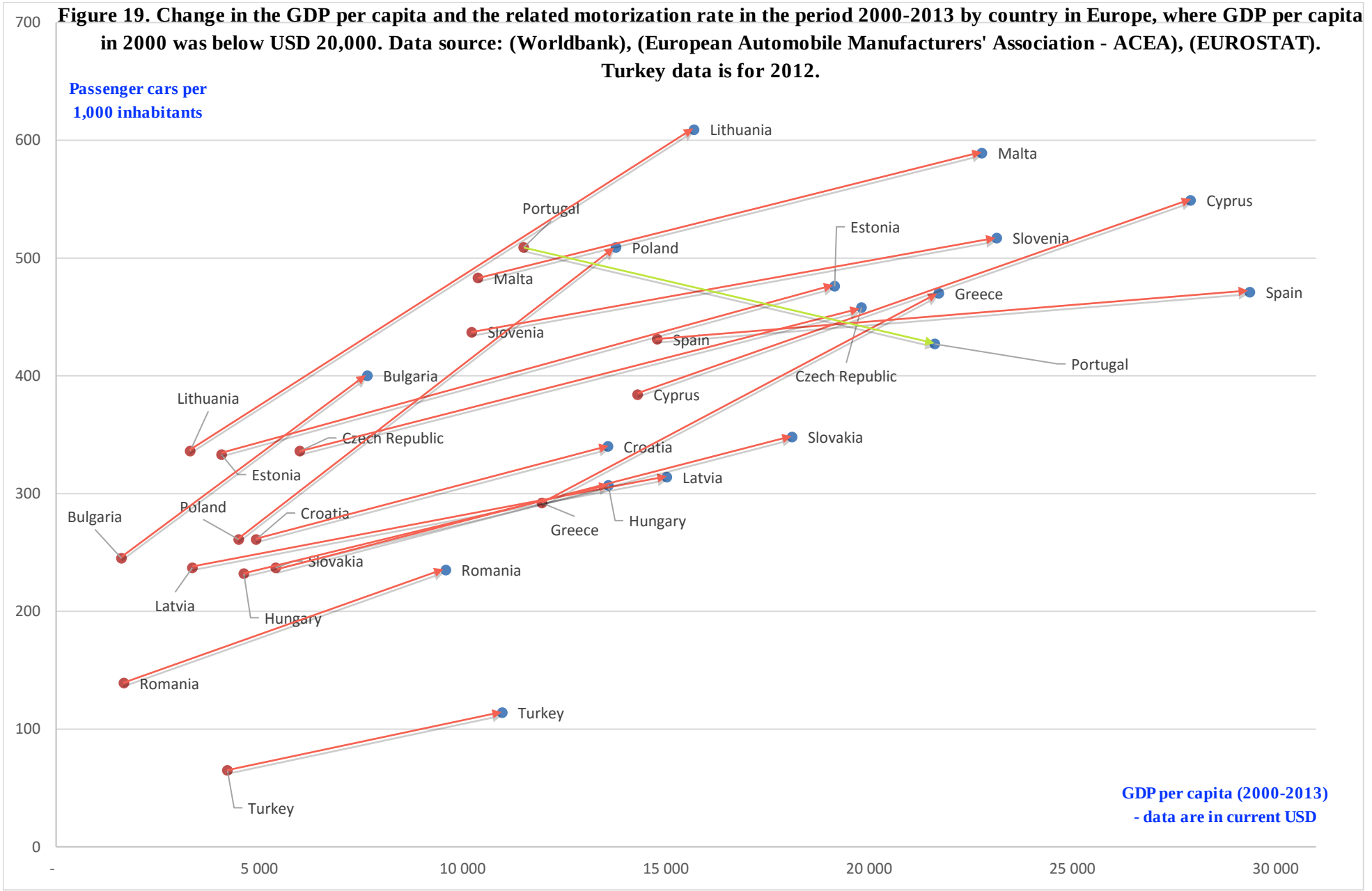
On Figure 18 Luxembourg, Norway and Switzerland - the three countries with particularly high GDP per capita - all show an analogous "long shot" trend: huge gains in GDP on the X axis and moderate growth in the motorisation rates on the Y axis.

All the others display a steady, comparably moderate growth in GDP per capita (X axis) and correspondingly modest growth in the number of cars per 1,000 inhabitants (Y axis).

Peculiar “alliances” can be seen, where pairs of countries demonstrate striking similarities in their development trends over the same 14-year period: Ireland and Denmark, Netherlands and Finland, Belgium and France, and, to a slightly less obvious extent, Austria and Germany. Sweden's trend shows resemblance to the "long shot" trends of Luxembourg, Norway and Switzerland, though with a less profound GDP increase; while Italy stands alone with its really modest GDP growth, as compared to the others, and with high, but still growing motorisation rate.

The chart in Figure 19 is showing the change in the GDP per capita and the related increase in the motorisation rate in the period between 2000 and 2013 in those countries in Europe, where GDP per capita in 2000 was below USD 20,000. Compared to Figure 11, from which Figure 19 was derived by omitting the countries with higher GDP, the data is spread on the chart for better visual arrangement. Figure 11 was depicting all the countries together, which automatically resized the scale to accommodate all data. The X axis is now scaled from 0 to 30,000 (USD), as opposed to the initial scale from 0 to 120,000 (USD). The Y axis in Figure 19 is the same as in Figure 11 - from 0 to 700 passenger car units.

Figure 19. Change in the GDP per capita and the related motorization rate in the period 2000-2013 by country in Europe, where GDP per capita in 2000 was below USD 20,000. Data source: (Worldbank), (European Automobile Manufacturers' Association - ACEA), (EUROSTAT). Turkey data is for 2012.



3.1.4. Lithuania, Malta, Cyprus: outliers or trend champions?

On the chart in Figure 19 Malta and Slovenia are almost parallel in terms of GDP growth and passenger car ownership. In 2000 Slovenia was slightly behind Malta in income. In the following 14 years Slovenians reached the Maltese people in terms of GDP per capita and even overtook them. At the same time the motorisation gap between the two countries increased further - at the beginning of the period Malta had 483 passenger cars per 1,000 inhabitants and in 2013 reached the mark of 589 (22% increase), while Slovenians had 437 passenger cars per 1,000 inhabitants and increased the number by 18% to 517.

Lithuania and Poland lay close to each other on the same chart. The Lithuanian GDP per capita grew from 3,297 to 15,629 USD (476%)[9], while the Polish index changed from 4,493 to 13,776 USD (307%). At the beginning of the investigated period the Polish motorisation rate was much lower (261 vs. 336 in Lithuania), and although its index increased faster than at its neighbour (195% vs. 181%), the Lithuanians still have more cars on the average, being the 3rd most motorised country in Europe. A possible distortion is often mentioned in case of Lithuania, which is a well known transit hub for second hand cars both from the US and Western Europe.

Estonia and Czech Republic also show parallel growth with a slight twist. The Estonian 471% increase in GDP per capita has closed the gap between them almost entirely - the Czech GDP per capita grew "only" 331% to reach 19,814 USD in 2013 against 19,155 USD for Estonia. The motorisation rate of the Estonians, though, increased at a faster rate, and from being slightly behind the Czech Republic, they eventually have reached and have surpassed the Czechs in the number of used passenger cars per 1,000 inhabitants.

Croatia, Latvia, Hungary and Slovakia also stick together on this chart - similar starting motorisation rates, similar starting GDP per capita. In this subgroup Slovakia had some initial wealth advantage, and managed to increase it further. Within the group it also achieved the fastest growing motorisation rate, increasing the gap between itself

[9] Regarding the Lithuanian statistics I rechecked the unbelievably high growth rates using different sources. The data is in current USD. Furthermore, the Lithuanian GDP per capita has been strongly influenced not only by the rapidly growing post-Soviet Lithuanian economy, but also by an unbelievably strong decrease in Lithuanian population. According to the Worldbank it fell from 3,499,536 in 2000 to 2,957,689 in 2013 (http://data.worldbank.org/country/lithuania).

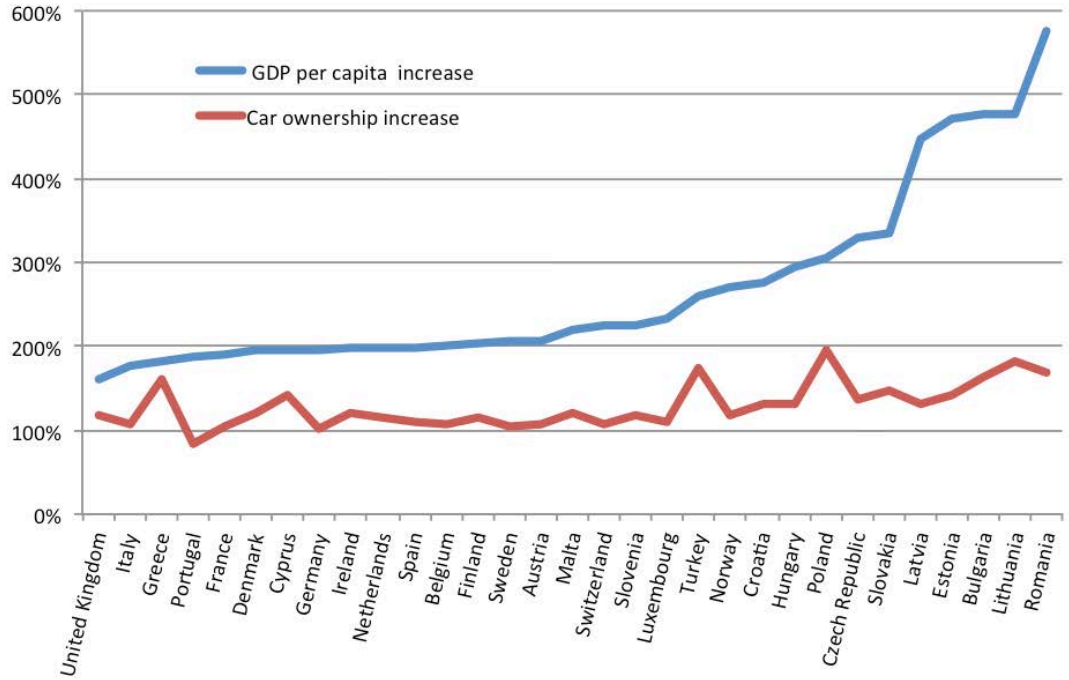
and Hungary, and overtaking the other two countries - Croatia and Latvia. When we compare the motorisation rate in Hungary and Slovakia, it is worth mentioning that during the investigated period the situation was strongly influenced by the advantageously low cost of car ownership in Slovakia. The high car registration tax in Hungary, its 27% VAT, non-refundable to business buyers, and the less entrepreneur-friendly local accounting rules prompted many Hungarian private and business buyers of passenger vehicles to register them abroad. Based on the above there is a strong probability, that Slovakian motorisation rate is in reality somewhat lower, as some of its vehicles are basically running outside of the country. At the same time the real motorisation rate of Hungary might be probably higher, as there is a certain number of foreign cars used locally on an everyday basis. For the purposes of the present paper I presume the distortion of the index due to the above to have been negligible, although the Hungarian government took the issue very seriously and in 2011 and 2013 even adopted several amendments to the 1988 Road Traffic Act (1988. évi I. törvény a közúti közlekedésről) in order to sanction those of its residents, who would try to drive cars with foreign registration plates. Another distortion of the official index of "passenger cars per 1,000 inhabitants" could be the fact, that owners of business companies in Hungary may purchase pick-up trucks for personal use instead of passenger cars, as the pick-up is considered by the accounting rules to be a commercial tool, and its VAT is officially reclaimable. The effect of the accounting rules upon the population's choice of vehicles and, consequently, upon the environment may be a good topic for another paper. Again, for the purposes of the present paper I presume the distortion of the motorisation index due to the above to have been negligible.

Bulgaria, Romania and Turkey in Figure 19 are in group of their own. Bulgaria in 2000 had a much higher motorisation rate, and by 2013 managed to increase it further. One of the factors was the widespread use of methane as automotive fuel, making personal passenger car travel very affordable. In 2011 – according to (NGVA Europe, 2012) – 61,623 vehicles in Bulgaria were driving on natural gas, making it the EU-member state with the third biggest fleet of natural gas vehicles after Italy (761,340) and Germany (94,890). In Figure 19 Bulgaria and Romania are most similar in two of their indices - the lowest GDP per capita among all European countries in 2000 (1,609 and 1,668 USD, respectively), and the percentage of the increase in car ownership by the end of the period (163% and 169%). Turkey is close to Bulgaria and Romania only in

its 175% increase of passenger cars per 1,000 inhabitants, although the motorisation rate itself is still extremely low for Turkey as compared to all the others - only 65 in 2000 and a modest 114 in 2013. But Turkey's GDP per capita (4,215 USD) was considerably higher at the beginning of the period - 2.62 times higher than that of Bulgaria and 2.53 times higher than that of Romania. The collapse of the communist system in these two countries and the strong pulling influence of the European Union brought new horizons, and by the year 2013 the wealth difference with Turkey was only 1.43 times in case of Bulgaria and 1.14 times in case of Romania.

As a whole between 2000 and 2013 there was a positive correlation of 0.635344 between the change of the GDP per capita of the investigated countries and the change of their motorisation rate (Pearson's correlation coefficient), which is illustrated by the following chart (Figure 20).

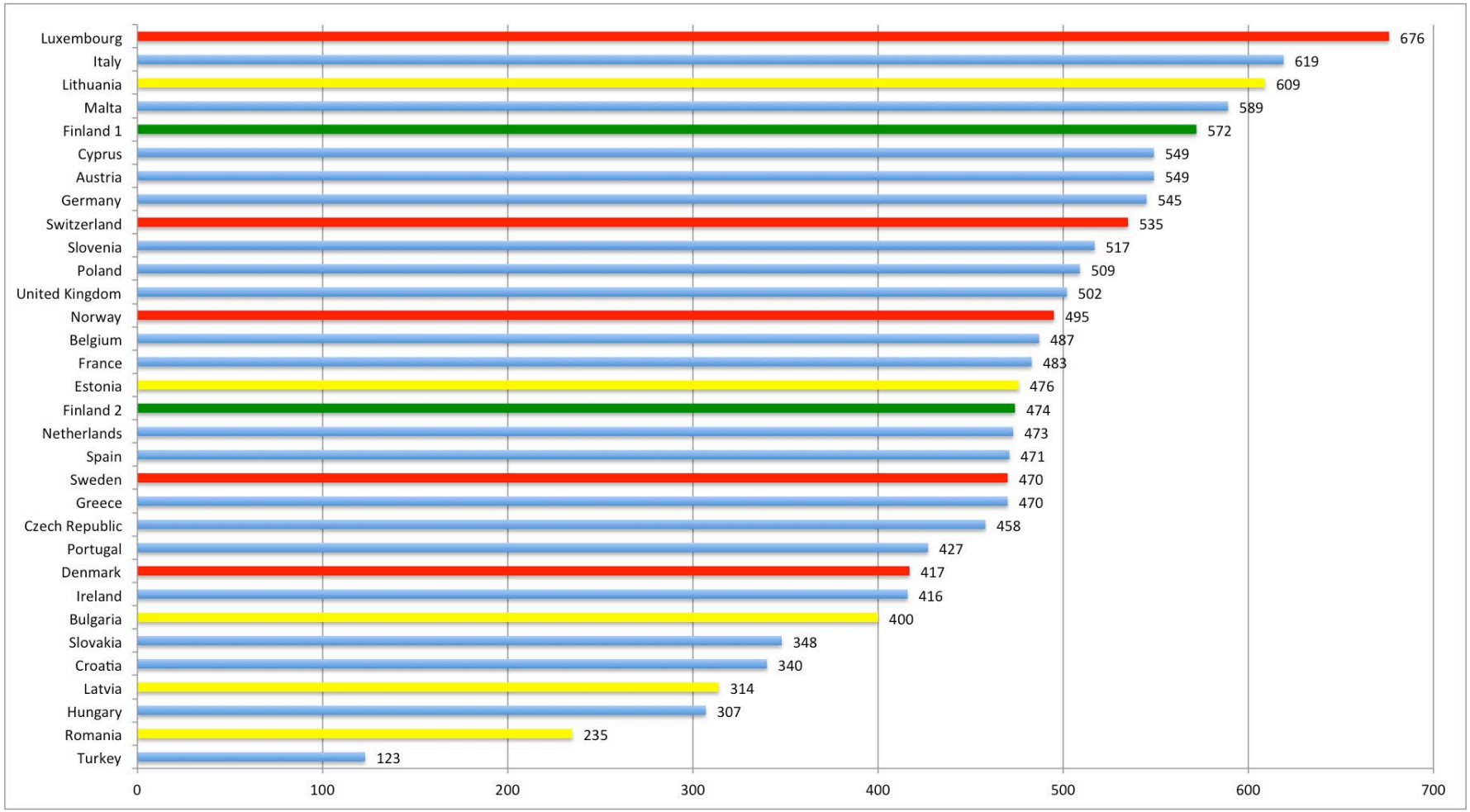
Figure 20. Change in the GDP per capita in % and the related change in the motorisation rate in % by country in Europe (2000-2013). Data source: (Worldbank), (European Automobile Manufacturers' Association - ACEA), (EUROSTAT), (Statistics Finland). Norway, Switzerland and Turkey data is for 2012.



Apart from the relative increase in the passenger car density I also examined the absolute number of passenger cars per 1,000 inhabitants. Keeping in mind that the developed countries are considered to be close to their saturation rate in terms of

motorisation, we should expect the ranking to be evident. But if we closely inspect the top five countries in terms of GDP per capita - Luxembourg, Norway, Switzerland, Denmark and Sweden, as well as the five countries with the lowest GDP per capita - Estonia, Latvia, Lithuania, Romania and Bulgaria, we can find continuous deviations from the general rule. On chart "Passenger cars per 1,000 people by country in Europe, 2013" (Figure 21) I marked the above described top wealthy countries in red, while the least wealthy ones were marked in yellow to visualize the peculiar pattern they create. The two green rows show Finland. I used the statistical data of Eurostat for "Finland 1", and supplemented it with that of Statistics Finland, which is used for the "Finland 2" data.

Figure 21. Passenger cars per 1,000 people by country in Europe, 2013.
Data source: EUROSTAT. Source for for Finland 2: Statistics Finland.



The chart shows that Luxembourg has the highest motorisation rate in Europe - 676 (as per 2013 data). Although this number is most probably influenced by the cross-border workers, who use company cars registered in Luxembourg, but actually live outside of the country, this high rate is, logically, perfectly in line with the highest GDP per capita that this country has been achieving among its European peers. But the next front runner in the European motorisation rate is Italy (619 passenger cars per 1,000 inhabitants), whose GDP per capita is less than half of that of Luxembourg.

The other four countries with the highest GDP per capita are found much lower in the "motorisation" list. In terms of its motorisation rate Switzerland is surpassed, apart from Luxembourg and Italy, by countries like Lithuania, Malta and Cyprus (ranked here from more to less motorised).

Therefore the third most "motorised" country in the list is Lithuania, which happens to be one of the poorest in terms of GDP per capita.

Estonia is another strange "champion" among the five East Europeans with the lowest GDP per capita, because in terms of cars per 1,000 people it has "outperformed" even the rich Sweden and Denmark.

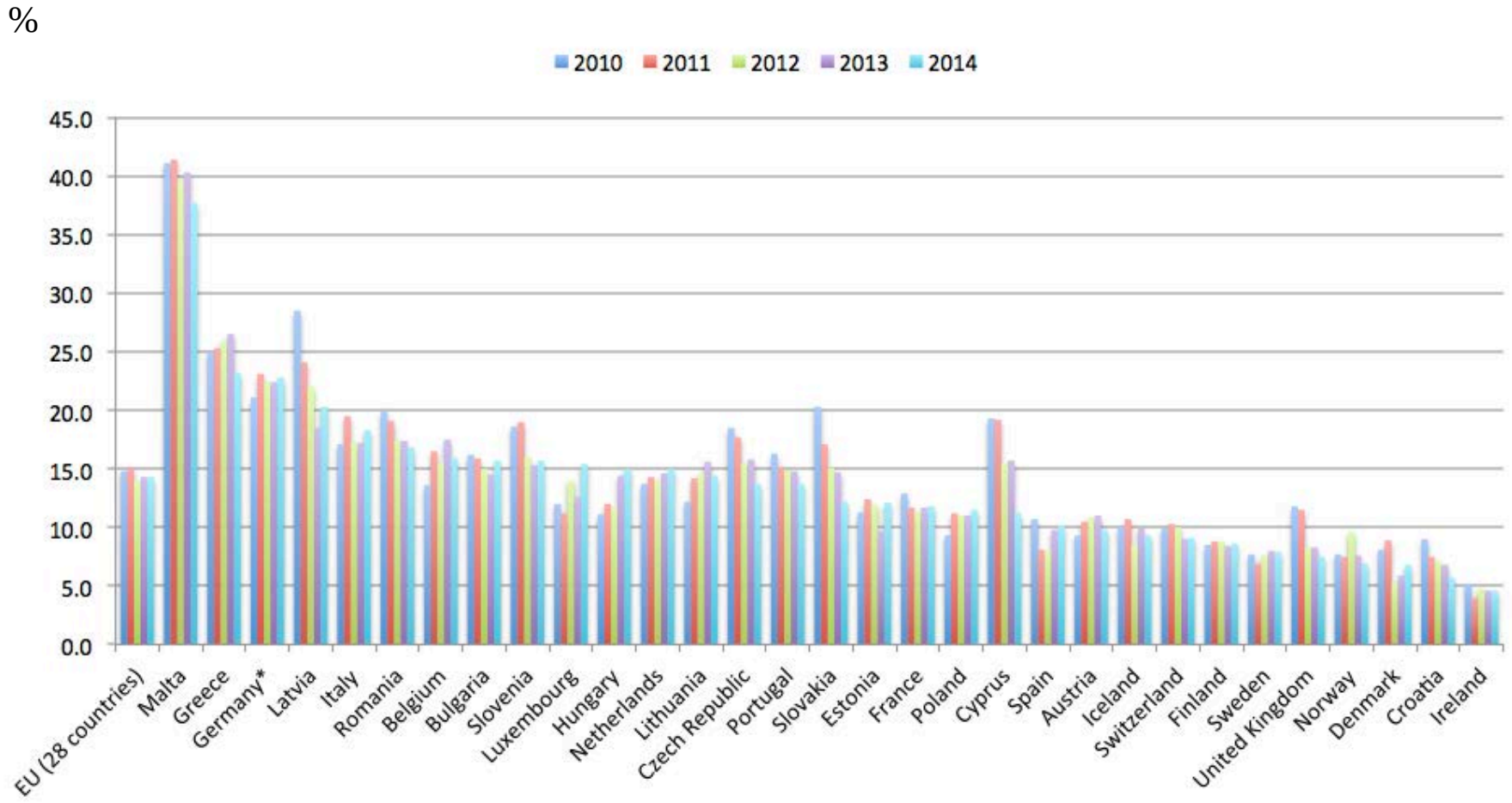
We shall keep in mind, though, that countries with lower income often import older vehicles from the more wealthier states. According to EUROSTAT the Member States with the highest shares of ‘old’ passenger cars (10 years or older) in 2013 were Lithuania (85%), Poland (75%), Latvia (72%) and Estonia (64%). For the same period in Portugal, Malta, the Czech Republic, Romania, Finland, Croatia and Hungary more than 50% of the passenger cars were older than 10 years, while the shares of the ‘youngest’ passenger cars (less than 2 years old) were highest in Belgium (23%), Austria (20%), Ireland (18%) and Sweden (17%) (EUROSTAT, 2015). The older fleet generally aggravates the environmental situation in the less wealthy countries, although the second hand vehicles imported to the East-European countries have often improved the local average...

The densely populated Malta - with 1,323 inhabitants per square km in 2013, making it over 10 times the EU country average - has extremely high passenger car density at the same time, which is difficult to justify from practical point of view. Why shall

Maltese population have so many cars? Based on public data and personal interviews with automotive experts born, raised and working in Malta, I reached the conclusion, that this, again, is a psychological phenomenon based on modern local culture. "It is custom that when you get 18 years old your first aim of independence is owning a car." (Borg, 2016) Another factor that makes this number high is the old mistrust of the Maltese public transport. The National Household Travel Survey conducted in 2010 concluded that 74% of all trips by members of a household were being undertaken using private passenger cars, either as a driver or a passenger. This represented a modal share increase of private cars of more than 5% when compared with the findings of the 1998 National Household Travel Survey. This change in the modal share is mainly attributed to a modal transfer of trips from public transport and walking. (Transport Malta, 2013)

At the same time European Commission data for the respective period shows that around 40% of the population in Malta perceived the area in which they lived as being affected by pollution, grime or other environmental problems, which is extremely high as compared to the EU average (under 15%) or to the proportion of residents suffering from similar problems in Ireland (under 5.0 %) (European Union, 2013) - see Figure 22. This is paired with the fact that forests and other wooded areas are really scarce in Malta - only 5.1% of its area, as compared to the United Kingdom (19.8 %), Denmark (18.3 %), Ireland (13.2 %), the Netherlands (12.6 %). Therefore the desire of the Maltese people for improved quality of life shall be used in promoting sustainable mobility and the use of public transport.

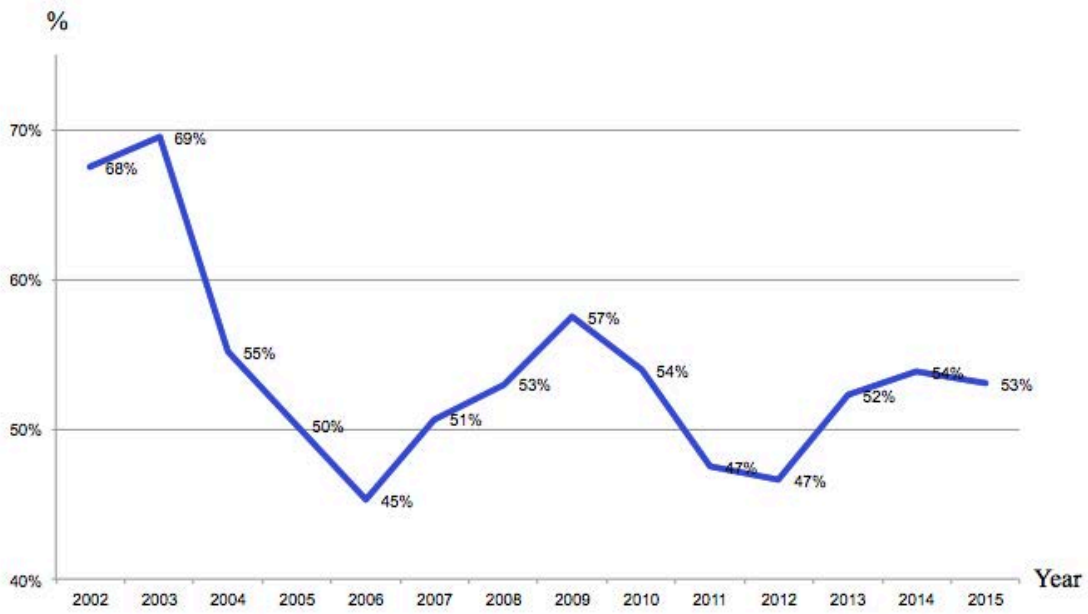
Figure 22. Pollution, grime or other environmental problems as perceived by the total population in %. Countries ranked by the highest percentage in 2014. Data source: (European Union, 2013).



*(until 1990 former territory of the FRG)

Malta and Cyprus have much in common - price sensitive car buyers, unpopular public transport. Cyprus steadily imports used passenger cars, as shown in Figure 23, "Share of used vehicles in the registration of passenger cars in Cyprus, 2002-2016". Malta seems to do quite the same - exact data on Malta's used passenger cars imports was not available, but according to the (JapaneseCarTrade.com, 2016) - a popular Japanese Used Cars Portal, the 65-35 new-old ratio of passenger car registrations in 2008 switched to a 35-65 ratio in favour of second-hand cars in 2009 and 2010. This information is supported by Vanessa Macdonald (Macdonald, 2014). Both sources attribute the Maltese phenomenon to the change of legislation in 2009, when importing used cars was made much easier.

Figure 23. Share of used vehicles in the registration of passenger cars in Cyprus, 2002-2016. Data source: Republic of Cyprus, Statistical Service.



3.2. Do we really need all these cars?

3.2.1. Space required for transport due to the population density

Using your own personal car has its clear benefits - independence (freedom of movement), convenience, feeling of security within your own vehicle, non-intrusion on your personal space. At the same time, using your own personal car for transportation is apparently far from efficient, and has numerous negative side effects. Probably, the main flaw of this mobility model is that most of the time (sometimes up to 23 hours per day) a privately owned car is being parked, and when it is finally used, in the majority of cases it is used by one single person.

In 2009 in the United Kingdom there were 460 passenger cars per 1,000 people, as compared to 439 in the USA, 301 in Hungary, 35 in China and only 12(!) in India. (The World Bank, 2014). Here, too, passenger cars refer to road motor vehicles, other than two-wheelers, intended for the carriage of passengers and designed to seat no more than nine people, including the driver (for those who would be surprised to see the American numbers "behind" the British, please note that those include no freight vehicles like pick-up trucks, vans, etc.). For the year 2010 the source had no available data for India, but for the UK, the USA and Hungary the records were 457 cars per 1,000 people (-0.76% compared to 2009 data), 423 (-3.64%), and 298 (-0.76%), respectively, while in China the indicator grew by 27.06% to reach 44 passenger cars per 1,000 people.

The growth was duly noticed by the automotive industry, causing Indian carmaker Tata's General Manager to openly state, "There exists a huge potential and India is viewed as a lucrative market by many" (Slym, 2013) (p. 4). The business case is really obvious, but let us look at this potential from another perspective.

The population of India from 1,171 million in 2009 - and 1,252 million in 2013 - is expected to grow further and by 2025 to reach 1,459 million people (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2011). If the number of passenger cars per 1,000 Indian people stays the same, there will be additional 3.46 million passenger cars in India. If we would imagine that country to achieve the level of 44 passenger cars per 1,000 people as in China in 2010, then the number of additional cars would be over 50.14 million. Should India

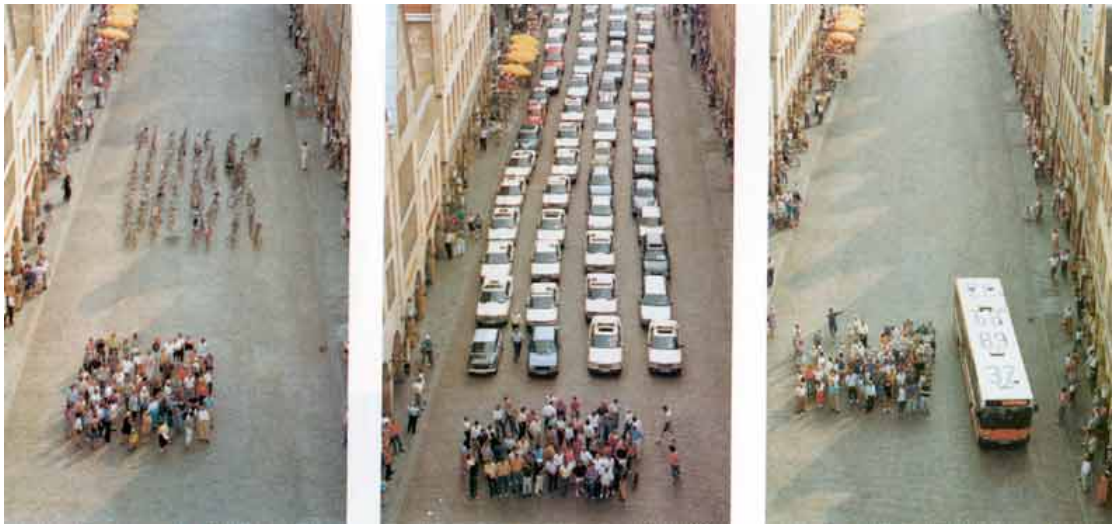
achieve the level of 298 passenger cars per 1,000 people as in Hungary in 2010, than the vehicle surplus would be 420.7 million. Just to park all these vehicles we would need 10,939 square km of open parking area, equal to 20.83 times the area of the city of Budapest.

(Calculations made by the author are based on the parking standards set in "Parking Structures: Planning, Design, Construction, Maintenance and Repair" by (Chrest, Smith, Bhuyan, Monahan, & Iqbal, 2001))

Perhaps this area would be used for better purposes than parking, if the mobility of the population could be ensured by public transport, and private cars remain unnecessary. Not to speak about the fact that the above cars would take that much space only while being neatly parked - imagine the space they would cover when in motion, and how many roads would be virtually packed with them.

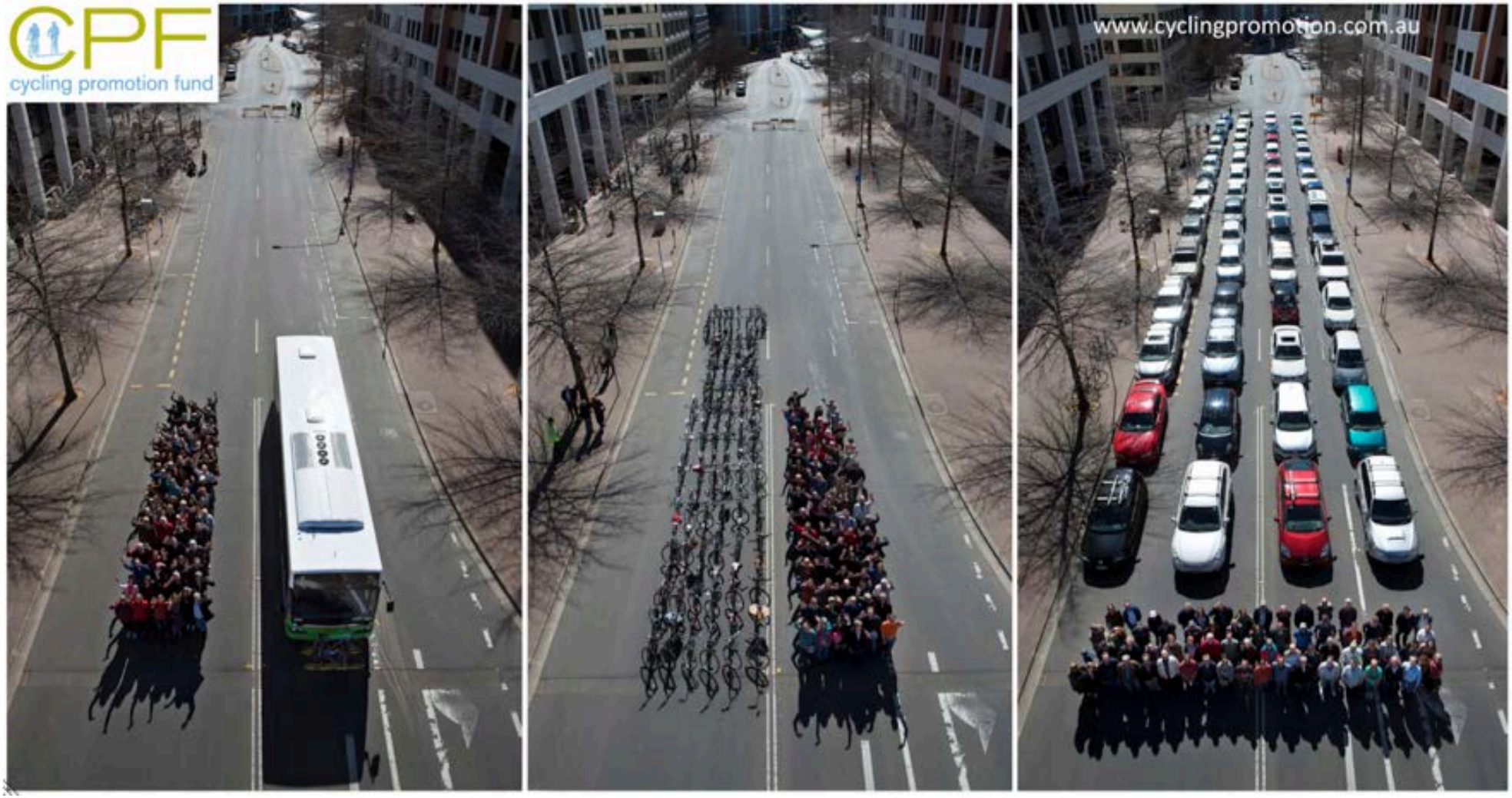
Visually this issue has been illustrated in 1991 by the City of Münster’s planning department with the help of a three-panelled poster showing the space required to transport the same number of people by either car, bus or bicycle. Taken on Prinzipalmarkt, Münster’s High Street, the photo has become an iconic representation of how single-occupancy cars take up a disproportionate amount of road space. The image has been used ever since all over the world to promote awareness, and has been successfully recreated as well. You can see the original on Figure 24, and an Australian remake from 2012 on Figure 25.

Figure 24. Space required to transport 72 people by car, bus or bicycle. Pictures commissioned by the City of Münster's planning department, taken on Prinzipalmarkt, Münster, Germany, 1991. Source: http://www.bikehub.co.uk/news/sustainability/iconic-waste-of-space-photo-keeps-on-giving/



(Next page)

Figure 25. Promoting cycling in Australia by Cycling Promotion Fund. Source: http://www.bikehub.co.uk/news/sustainability/iconic-waste-of-space-photo-keeps-on-giving/


CPF
cycling promotion fund
www.cyclingpromotion.com.au

3.2.2. Income and car density distribution by countries

According to (Dargay & Hanley, 2002) and (Bresson, Dargay, Madre, & Pirotte, 2004), there is a negative relationship between the number of bus trips and income level, and a positive relationship between income and car use (cited by (Souche, 2010)). While investigating the structural determinants of urban travel demand, I would rather concentrate on the positive relationship between income and car use, showing that higher income - in countries with public transport - shifts the preferences of the individual towards car travel, as opposed to using the less expensive and presumably more environmentally friendly public buses.

An international study of sustainable passenger transport conducted by the Technical University of Denmark together with the Institute of Transportation Studies at the University of California and the Transportation Research and Injury Prevention Programme at the Indian Institute of Technology in Delhi concluded that in order to reach CO_2 and other sustainability targets "shifts in travel patterns and reduction in growth will be needed in both the OECD and non-OECD, in parallel that social and economic conditions, particularly in non-OECD, are progressively improved... In non-OECD countries it will require major investments in public transit systems, better maintenance of roads with retrofits to increase access and safety for non-motorised modes, and better land-use planning. **It will require that informal transport services, which service urban poor in inaccessible areas at affordable prices, are recast and maintained as mobility resources linked to accountable incentives for social entrepreneurship in transport.** Cost effective, high capacity, energy efficient, rapid, affordable and integrated bus systems, and other PT [public transport] services that accommodate the surging passenger demand. It will require that subsidies for fuels and new private motor vehicles are reduced, **with financial incentives toward the most sustainable vehicles and modes of transport**." (Figueroa, Fulton, & Tiwari, 2013) (p. 188) (bold letters by Rossen Tkatchenko).

Which leads to the issue of modern vehicles and their level of sustainability - what is the criteria for a sustainable vehicle?

In regard to this an important notion is presented by Orsato and Wells, depicting the average car used by most of the consumers: "Basically, these cars can carry one to five

passengers, reach speeds of more than 160 km/h (although the legal limit is 110 km/h and the average traffic speed is approximately 70 km/h), and have sufficient fuel capacity for approximately 400 km. Cars therefore, embody a high degree of redundancy in design, a feature that carries efficiency and environmental costs. Most trips do not demand such performance but the vast majority of cars currently available in the market present these characteristics. The average drive in cities - the place where most cars spend the largest part of their time - requires less than 20% of such performance capacity, and the average occupancy (1.2 people per car) is also much lower than the capacity of these cars to comfortably accommodate five people. For the vehicle manufacturers, high volumes of sales (and therefore production) are more likely to be assured by general-purpose designs that approximate to several user needs; in other words, market offerings of this type are a form of risk reduction. One could question the reasons for consumers to keep buying over-dimensioned and over-specified cars." (Orsato & Wells, 2007) (p. 997).

Although the maximum allowed speed limits may be higher in Europe than in the USA - from 140 km/h in Bulgaria and Poland, through 150 km/h in Italy, 160km/h in Austria, up to the no-limit highways of Germany, the authors have a very strong point. The cars we use are oversized and overpowered, but most people prefer to have "more", than "less" - just in case the need may arise! An exaggerated example is when a car is maintained by the private individual for the same "just in case" reason, although it is rarely used at all, or out of prestige considerations only, e.g. when the person in reality has another - company - car as well for everyday use (with presumed zero cost for the user, as it is absorbed by the employer). This could be accepted as a habit, but could also be changed by introducing proper commitment. The idea, that in the future car manufacturers might have to compromise on some characteristics of their vehicles in order to reduce emissions, has also been investigated by (The Gallup Organisation, 2011) upon the request of Directorate General on Mobility and Transport. When citizens in 27 EU Member States were interviewed in October 2010 about their car purchase plans, the results showed, that 68% of all respondents would be willing to compromise on speed in order to be able to buy a “cleaner” car, and 62% would be willing to compromise on the size of the car (see Table 1).

Table 1. Willingness to compromise on speed and size in order to be able to buy a “cleaner” car (EU 27). Source of data: (The Gallup Organisation, 2011).

Willingness to compromise on speed and size in order to be able to buy a “cleaner” car (**EU 27**)	Speed	Size
Very likely	29%	24%
Likely	39%	38%
Not likely	11%	16%
Not likely at all	8%	8%
Do not know / NA	13%	14%

The highest percentage of respondents, who said they were "likely" or "very likely" to compromise on speed was found in Cyprus (87%), Luxembourg (84%) and Greece (82%), while the lowest percent of supporters was shown in Estonia (51%), Latvia and Romania (both 48%). Interestingly, the latter two countries also showed the highest percentage of respondents in the EU, who could not decide or would not answer (26% and 35%, respectively), which implies, that proper promotion and education programmes may change their attitude (The Gallup Organisation, 2011) (p.14).

In the above report Hungarian respondents gave the following answers to the question, whether they would compromise on speed and size in order to reduce emissions, when purchasing a car (Table 2):

Table 2. Willingness to compromise on speed and size in order to be able to buy a “cleaner” car (Hungary). Source of data: (The Gallup Organisation, 2011).

Willingness to compromise on speed and size in order to be able to buy a “cleaner” car (**Hungary**)	Speed	Size
Very likely	26%	25%
Likely	35%	37%
Not likely	12%	10%
Not likely at all	5%	5%
Do not know / NA	22%	23%

This implies, that Hungarian citizens are quite ready to accept the change.

Furthermore, the use of vehicles in some cases can be made redundant by the natural growth of the big city itself, even if the national attitude to sustainability is far from progressive.

As an example, I can bring forward my personal experience in Moscow. I started to deliver management training courses in the Russian capital in mid 1990's. When the hosts were eager to show their respect, a car was always sent to the Sheremetyevo International airport to pick up guests personally. Otherwise, for travellers it was common practice to order a transfer from the hotel or to take a taxi from and to the airport. Very soon the traffic jams made it mandatory for the hosts to organize the airport pick-up remotely by local taxi, because their own drivers lost half a day to go to the airport - the driving time was unpredictable. To get to the airport on time for your flight was also a big challenge. In 2005 a special electric train was introduced from the center of Moscow to Lobnya station (within 8-9 km from the main international airport) in order to offer an alternative to the car travel. The passengers were provided with bus service between the Lobnya station and the Sheremetyevo airport. The direct railway connection with Sheremetyevo airport was established in 2008. Presently even travellers with unrestricted budgets use the express trains between the city center and the airport terminals. For those, who still require prestigious means of travel to/from the Moscow airports, the alternative is not the car, but the Business Class of the train. Saving time has become more important, than the prestige of using personal means of transportation, and on top of it, it is safer (no possible car accidents on the way), more convenient and

carries no risks of missing your flight, unlike the conventional trip by car. Obviously, here environmental concerns would hardly explain the growth in the demand for electric trains. Moreover, in the above situation, when traffic jams push the travellers from cars to trains, it is distinctly evident, that replacing traditional automobiles with environmentally friendly Electric Vehicles will never reduce the number of traffic jams, although the harmful emissions in the city would be undeniably reduced.

In other parts of the world the attitude to car traffic appears to be very similar. In a paper based on the National Household Transportation Survey (NHTS) conducted by the U.S. Department of Transportation, the authors conclude that, the average household annual mileage (defined as total mileage per year of household vehicles), as well as the number of vehicles per household decreases as residential density increases. (Kim & Brownstone, 2010)

3.3. Strategies for sustainable mobility

3.3.1. From vehicle efficiency improvement to non-motorised mobility and public transport

The environmentally friendly development of our means of transportation has always been closely connected to the fuel the vehicles used. The exhaust emissions of the engines are easily related to their fuel consumption, which logically leads to the desire to reduce both by improving the efficiency of the engines. When an existing system is being improved by engineers, the concrete specific target can often impair the vision of the engineering team and prevent them from seeing the whole big picture. In this particular case the big picture is not the fuel consumption, and most probably not the fuel itself. Still, for all the car makers willing to outsell their competitors, as well as for the cost sensitive final user, the fuel consumption is a very critical issue, strongly influencing the ultimate buying decision. The engineering "small target" attitude influences the general public, who may wrongly consider a less fuel consuming vehicle to be a good step to sustainable economy. From environmental point of view all these efforts are definitely serving only short term goals.

In our present world more and more people live in megacities - in 2010 the urban population passed over 50% of total (Sadorsky, 2014), therefore the quality of living in these areas strongly depends on the quality of their air. The task of reducing harmful

emissions in the living areas is key, but that is only one side of the issue. The long term solutions shall aim far beyond the reduction of fuel consumption or replacement of the propellant in the vehicles.

"Strategies for ‘sustainable mobility’ adopted by planners now often include – in addition to the promotion of non-motorised and public transportation and efficiency improvements – measures to reduce the sheer need to move." (Frändberg & Vilhelmson, 2011) (p. 1236).

"Many quite small European cities such as Graz (Austria) and Freiburg (Germany) have very high rates of green mode usage because they are dense and planned around these non-auto modes. Conversely, virtually all US cities of similar population size are mostly totally automobile dependent because they have almost no public transport systems and are too low density and spread out for walking and cycling to be viable modes." (Klinger, Kenworthy, & Lanzendorf, 2013) (p. 19).

Here we see a clear message, that municipalities have a major influence on human mobility trends. If the city is planned to be "non-auto", then green-thinking citizens will be happy not to use their cars, and even notorious die-hard drivers may rethink their habits. Less green-thinking administration will give us no choice and will actually force upon consumers a strong reason to use their own cars.

At the same time the municipal bodies and persons responsible for the infrastructural development shall keep in mind that in some cases their well intended green efforts can cause negative effect: "A noteworthy piece of Australian evidence is that the new parking lots at Sydney suburban stations are tending to attract individuals who already use the rail system, but who now drive and park rather than use the local bus service to and from the station." (Hensher, 2007) (p. 487).

Another less positive example is provided by (Batty, Palacin, & González-Gil, 2015) who cites (De Witte, Macharis, Lannoy, Polain, Steenberghen, & Van de Walle, 2006) about a case when "‘almost free’ PT [Public Transport] passes were provided to the students of Flemish-speaking universities and colleges in Brussels, who had to pay €10 for a €200 annual PT ticket. Almost half of the eligible students applied for a ticket, which resulted in 26% of participants using PT for journeys previously made by foot or bike".

As Elizabeth Shove puts it, "policies designed to promote sustainable consumption are generally founded upon an extraordinarily narrow understanding of human behaviour" (Shove, 2003) (p. 1).

Interestingly, apart from smaller cities like Graz and Freiburg, big cities also have their examples of "non-auto" life style.

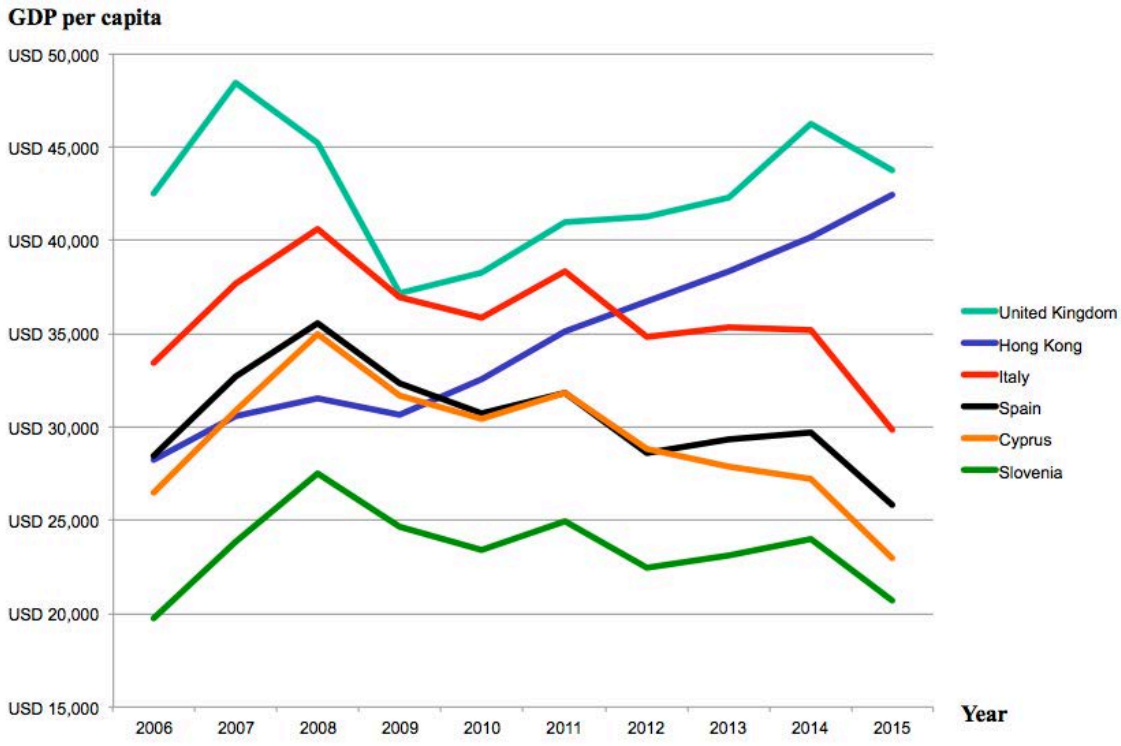
At mid-2014, the population of Hong Kong was 7.24 million, including 0.22 million Mobile Residents. (Hong Kong Census and Statistics Department, 2015), while the total number of registered private cars as at the end of 2014 was 541,751 (Hong Kong Transport and Housing Bureau, 2015). The average of 74.8 private cars per 1,000 people is 4 to 5 times lower than that of the city of Budapest. According to (Lam & Bell, 2003), as cited by (Wikipedia, 2015), over 90% of the daily journeys in Hong Kong are on public transport, which makes it the highest rate in the world. The basis - the "backbone" - of the highly sophisticated public transport network of Hong Kong is the Mass Transit Railway (MTR). Due to its speed, efficiency and affordability, the MTR system is a common mode of public transport in Hong Kong, with an average weekday patronage of over 5.4 million passengers (MTR Corporation Limited, 2015). The other public transport includes double decker trams, funicular railways, buses, taxi and the so called Automated pedestrian transport - escalators and moving pavements (travelators) (see Figure 26 and 27).

Figure 26. Automated pedestrian transport in Hong Kong - photo by the author.

Figure 27. "When using the travelator..." - photo by the author.

Nevertheless, the Hong Kong authorities - not without reason - are quite concerned with the growth of traffic, because the number of total licensed vehicles grew from about 524 000 in 2003 to about 681 000 in 2013, with an annual growth rate of 3.4% (Transport Advisory Committee, 2014). In terms of GDP per capita Hong Kong is now comparable to the United Kingdom - for Hong Kong this indicator is higher than for Italy, Spain, Cyprus and Slovenia (The World Bank, 2016) - see Figure 28, but the population density has a much stronger influence, creating lack of parking space and escalating the cost of car ownership to the level of unaffordability.

Figure 28. GDP per capita for Hong Kong, UK, Italy, Spain, Cyprus and Slovenia Data source: (The World Bank, 2016).



Altogether the cost of car ownership in Hong Kong - purchase price, licence fees, insurance, depreciation, fuel, maintenance, tunnel fees and parking costs - is definitely discouraging for the great majority of the population, but that would not be enough in itself to achieve the low car ownership and the high percentage of the public transport use. "Probably the closest comparison with Hong Kong is Singapore, where despite far higher car prices, electronic road pricing and a strictly enforced vehicle quota system, car ownership is still considerably higher than in Hong Kong." (Cullinane, 2003) Combined with the efficiency and the affordability of the public transport in Hong Kong, this is a solid base for the creation of sustainable mobility patterns, provided that the government is committed to discourage car ownership and promote public transport.

In 2008 David Banister suggested that, "Broad coalitions should be formed to include specialists, researchers, academics, practitioners, policy makers and activists in the related areas of transport, land use, urban affairs, environment, public health, ecology,

engineering, green modes and public transport. It is only when such coalitions form that a real debate about sustainable mobility can take place." (Banister, The sustainable mobility paradigm, 2008) (p. 79). Three years later he admitted that, "At present the scale and nature of the changes necessary in the transport sector to address climate change have not been seriously debated. Pricing for the external costs of transport would help, as would regulations on emissions and heavy investment in clean technology. But even here, the price rises necessary to create real change are not politically acceptable, as both industry and the electorate are powerful pro car lobbies." (Banister, Cities, mobility and climate change, 2011) (p. 1545). Despite this somewhat pessimistic note of the author, his earlier cited suggestion for a broad coalition is very much in line with my idea of how important it is to pursue environmental issues on a broad scale.

Due to the rebound effect efficiency gains often lead to higher demand for travel and higher consumption. "Can we afford cost-saving energy efficiency? The answer is 'yes' only if efficiency gains are taxed away or otherwise removed from further economic circulation. Preferably they should be captured for reinvestment in natural capital rehabilitation." (Wackemagel & Rees, 1997) (p. 20).

The idea is worth investigating. The gains in efficiency often make consumers say to themselves, "Now we can afford to drive more with the same budget". Will it be inappropriate to say, that these efficiency gains produce a "Permanent Happy Hour" effect, stimulating higher consumption? If we look again at the earlier comparison with eating and drinking habits, this is similar to having two drinks (or meals) for the price of one. Unless, of course, the consumers decide not to drive any more than they do already, even if they can afford it. The reason "not to drive more" could be either physiological - if the consumer has reached the saturation level of his demand for daily travel, or psychological - he can substitute this daily travel with something better, without reducing his productivity or quality of life. At the same time, taxing away efficiency gains will stall the investments into efficiency improvement. A possible combined solution could be the constant vehicle standards tightening, making efficiency improvement mandatory, with simultaneous higher taxation neutralizing the rebound effect.

"If one accepts that social and cultural forces play an important role in transportation decisions, then the public needs better information about the consequences of their driving. This information can take two forms: improved vehicle instrumentation and increased public awareness. Rather than merely listing current fuel economy for vehicles in miles or kilometers per gallon, for example, instruments in vehicles could display how fuel economy is affected by driving patterns and suggest ways of improvement. Such real-time feedback could enhance driving performance, especially if it also includes retrospective information after a trip is completed" (Sovacool, Early modes of transport in the United States: Lessons for modern energy policymakers, 2009) (p. 424).

This is already a reality. Even more so, modern telematics allow us to collect and store real-time data about almost everything in the vehicle, so if we take our travel needs as constant, and decide to reduce fuel consumption, we can start doing so by eliminating engine idling, speeding and harsh driving - the latter including not only braking and acceleration, but cornering as well. Those companies, who have big fleets and, consequently, high fuel costs, can significantly benefit from a monitoring system and a properly introduced management approach. For example, according to Masternaut, a UK-based provider of telematics solutions which operates in 32 countries, as a result of greater "vehicle utilisation visibility" and the subsequent rectification of their drivers' driving styles, their clients achieve up to 70% daily reduction in vehicle idling and considerable savings in fuel cost (Masternaut, 2013).

Insurance companies have also discovered the wisdom of telematics from their own point of view: "Telematics insurance uses data that describes how, when and where a vehicle is actually driven to calculate the risk presented by the driver. The data is collected by an electronic device fitted to the vehicle and is transmitted to the insurer via a telecommunications network." (Asquith, Mills, & Forder, 2012) (p. 2). On the same page the authors cite data, according to which in the UK "Norwich Union reported a 30 percent accident frequency reduction in its pilot in the consumer market and Pepsi reduced its fleet crash rates by 80 percent". Another advantage of the telematics insurance is that it helps to reduce fraud, and as such has the full support of the UK government. Evidently, environmental concerns may not be on the top of the insurers' priorities list, but this approach leads to responsible driving, and it has been called to life by simple business prudence. Particularly when, "Recent market research suggests that there is also a consumer appetite for telematics insurance. According to research

conducted in 2012 by Gocompare.com, 57 percent of all UK drivers expect to switch to a telematics-based car insurance policy by 2017." (Asquith, Mills, & Forder, 2012) (p. 2).

In broader terms, "The opportunity is now ripe to capitalize on society's naturally elevated motivation to change (given recent and predicted energy price increases)." (Dowd & Hobman, 2013) (p. 194).

Consumers are becoming increasingly aware of the environmental necessity to stop energy waste, and all policies shall take that into consideration. At the same time we shall keep in mind that consumers may simply "feel 'green' because they recycle, but oppose changing their diet or reducing their car use, although the latter are more influential determinants of total footprint. Environmental actions may serve as green means for relieving our guilty ecological consciences without actually or genuinely reducing impacts." (Csutora, One More Awareness Gap? The Behaviour–Impact Gap Problem., 2012) (p. 149)

"Information has to be taken to the customer, rather than assuming that they will find it themselves. Individualised marketing is a good example of this dialogue-based technique for promoting the use of public transport, cycling and walking as alternatives to the car. It has been developed and applied in several European and Australian cities with positive outcomes (reductions in car use of around 10%), and more importantly, it seems that changes in travel behaviour are maintained over time." (Banister, The sustainable mobility paradigm, 2008) (p. 78).

What will happen, if the government decides to replace the existing car purchase tax and the annual road taxes by kilometer-based charging differentiated by location, time of day and environmental performance of the vehicle? The results of a study conducted in the Netherlands show that even if the new charging scheme will be cost neutral for the average car driver, "abolishing the Dutch car purchase tax while at the same time introducing a kilometer charge will lead to 2.2% rise in car ownership". (de Jong, Kouwenhoven, Geurs, Bucci, & Tuinenga, 2009) (p. 173). If the purchase tax is high, then customers decide to buy a vehicle only if their expected mileage justifies this investment, but if the "entry cost" to the vehicle ownership drops, many citizens may ignore the longer term costs and choose the "joy of possession". Although in the longer run customer attitude may change, this is a warning to policy makers. After the consumers are provoked to become car-owners, even a reversed policy will have

difficulties to remedy the situation. This threat shall be taken seriously: "The acquisition of a car is seen as a luxury, but once acquired the car becomes a necessity, so that disposing of a car is much more difficult. Car ownership is clearly associated with habit and resistance to change. Once the habit of motoring is acquired, it is not so easy to abandon, even if the economic consequences - in terms of alternative consumption foregone - are greater than previously." (Dargay, The effect of income on car ownership: evidence of asymmetry, 2001) (p. 819).

This is a clear warning, that the policies aimed to reduce **personal car ownership** shall not be expected to work overnight. At the same time, we shall distinguish the above from **personal car use**, which can be influenced much faster. For example, those, who use public transport, ride bicycles and walk, they can still own cars. At least, until they are willing to bear the maintenance costs.

According to the Hungarian insurance specialists, the average number of registered claims due to car accidents increases right after reductions in fuel prices. Their explanation is that those car owners, who are sensitive to the price increase, tend to reduce the use of their cars to save money; but if the prices go down, these individuals abandon public transport and go back to private motoring, thus increasing the overall risk and, eventually, the occurrence of road accidents. (Piac és Profit, 2014)

A further peculiarity of Budapest city driving is its weather dependency. My personal observation, regularly confirmed by fellow Budapest city residents and news reports, is that a rainy day (day 1) entirely slows down the city transport, causes bigger than average traffic jams, and... reduces the number of vehicles on the next day, even if the rain stops and the sun is shining. Presumably, a number of drivers, after suffering in the slow traffic on the first day, decides to avoid driving on the next day (day 2). As a result we have a full day of dry weather and incredibly emptied avenues and crossroads, after which drivers' confidence is seemingly restored, and on the following day (day 3) the number of cars in the city comes back to its (ab)normal high level, reestablishing the traffic jams in their familiar numbers and shapes.

This "tidal Budapest" phenomenon shall mean, that drivers are able to adjust their driving habits on a very short notice. Those drivers, who are absent from the traffic on the second day, must have witnessed the disadvantages of city driving one day earlier. Similarly, those who drive on the third day, must have learnt about the improved traffic conditions (either while using public transport or indirectly via news and reports), and

decided to drive again. Therefore, the decision to drive or not to drive can be influenced. The question is, whether this can be influenced permanently.

If we could persuade half of all the motorists in Budapest to voluntarily abandon their cars for an imaginary period of 2-3 months, and during this period replace their car trips with walking, cycling and public transport, then during this period all those motorists, who refused to change their habits, and continued to use their cars, would remarkably benefit from the reduced number of vehicles in the city. The congestion would certainly be reduced, average traffic speed would increase, travelling times would be shortened. As a consequence, the relieved "die hard" motorists would gladly start driving even more, enjoying the lack of "competition" in the street. In addition to that, those individuals, who preferred not to use personal vehicles prior to our experiment due to heavy traffic and the slow average speed of city motoring, would very soon be tempted to get back into their cars and drive them in the city again. Similarly to the "weather dependency" example above, the improved driving conditions would be able in minimum time to generate extra traffic to such a point, where the self-sacrifice of our "stowed away" drivers will not be seen anywhere.

The earlier mentioned experience of the Hungarian insurance specialists was pointing at a price elasticity demonstrated by car users. Researchers have investigated the price sensitivity of fuel demand before. For example, European Federation for Transport and Environment states that in the long run, 10% higher fuel prices reduce the overall fuel consumption of cars by 6 to 8%, and of lorries by 2 to 6%. In Europe the relatively high fuel taxes are considered beneficial, because taxing fuel brings down consumption (Dings, 2011). Based on reviews by (Dahl & Sterner, 1991), (Espey, 1998), (Graham & Glaister, 2002) and (Brons, Nijkamp, Pels, & Rietveld, 2008) the report states that there are "large differences between the long and short run price elasticities, which is logical because only in the long run can people change their choice of car, or place to work and live. Long run price elasticities typically fall between -0.6 and - 0.8 while short run elasticities range between -0.2 and -0.3. This means that a 10% rise in fuel prices typically reduces fuel demand and CO_2 emissions by 6 to 8% in the long run. Most of these studies deal with passenger cars..." (Dings, 2011). So how can we create a reduced traffic condition and keep it constant?

3.3.2. The inefficient transport vs. efficient transport.

While examining the urban transport in Latin America, Hidalgo and Huizenga provide an interesting observation, that "with the notable exception of Brazilian cities and Santiago, public transport is dominated by small private operators, using medium size vans (combis) or minibuses under dispersed ownership (one vehicle - one owner). These operators compete for passengers in the street (competition in the market), under informal economic rules. This causes severe negative externalities: congestion, pollution, and accidents." (Hidalgo & Huizenga, 2013) (p. 70). The phenomenon is not exclusive to Latin America. The 'one vehicle - one owner' model is also quite common for taxi drivers in the city of Budapest. One of the reasons to stick to this model is that a privately owned taxi car gives the taxi driver the flexibility of choosing his own working hours, including the opportunity to work extremely extended shifts - up to 12 or more hours a day. When their income depends on daily revenues, they are easily tempted to prolong the working hours. At the same time, during big holidays (Christmas, New Year) it is often impossible to order a taxi - the drivers of the privately owned taxi cars are not obliged to work, and most of them are free to take a holiday.

This is somehow an exaggerated model of multi-player inefficiency, the opposite of a centrally organized public transport company with employed drivers. The advantages of the latter model are quite obvious. Let us investigate the two models from the owners' point of view, as well as from the public point of view:

A. "One taxi - one driver", where the driver owns or rents the vehicle.

B. "One taxi - many drivers", where the vehicle is driven in shifts by different employees.

In the first case the vehicle is under-utilized, even if the driver is tempted to work overtime; the average maintenance and other costs per distance travelled are also much higher. This model leads to general oversupply of registered taxi vehicles, high average maintenance costs and operational inefficiency, paired with insufficient supply of taxi cars at peak times. Perhaps, taxis shall be integrated into the public transport system? Back in 1996 Richard Arnott gave his article the following straightforward title: "Taxi Travel Should Be Subsidized". Following a thorough mathematical analysis his conclusion makes a serious point: "Taxi service provides many of the advantages of the automobile - flexibility, privacy, and convenience - without significant capital costs. Providing taxi travel at its shadow price might therefore contribute significantly to

solving the urban transportation problem." (Arnott, 1996) (p. 330). To make private car owners use the taxi, instead of driving their own cars you really need to make taxi cost comparable to car ownership cost.

If we shall design the most efficient Budapest taxi company ever, perhaps the guidelines shall be as follows:

- Optimal choice of vehicle models (to reduce pollution, decrease redundancies and improve cost efficiency)
  - The taxi cars shall have the most efficient engines made especially for the city. E.g. electric engines with enough driving range for one working shift and/or replaceable batteries to ensure continuous operation of the vehicles.
  - The taxi cars shall not need to reach speeds of more than 75km/h, as the maximum legal speed within the city limits is 70km/h anyway. (How much would it cost to maintain the public transport in our cities, if vehicles like trams and buses would not be optimized for the job, but could reach speeds in excess of 160 km/hour?)
- Optimized operation management (to reduce overspending and improve the return on investment)
  - The financing, purchasing and servicing/maintenance processes shall be subject to public tenders and made transparent in order to minimize their costs.
  - All vehicles shall be operated on a constant driver-rotation basis by multiple drivers.
  - Telematics shall be used to control the driving habits of the drivers and the efficient response to daily mobility demand.
  - The city taxi company shall work as a non-profit organization, reinvesting its operational profit into its own fleet and systems.

Environmentally friendly taxi will have another important mission as well - it shall promote awareness. It is worth mentioning, that according to a study by Bosch in 2014 85% of Hungarian cars were using gasoline, 15% had diesel engines, and the presence of the other types of vehicles was statistically insignificant. The data had stayed practically unchanged, if compared to previous surveys of 2010 and of 2012. (Bosch, 2014)

To make it possible, the overall capacity of the Park and Ride (P+R) parking facilities (where you park your car for a low fee and then use the public transport) should be greatly increased. At the same time the available street parking should be gradually decreased (leaving only drop off points at schools and near public transport junctions), thus widening the streets, and giving cyclists more lanes.

When trying to promote more cycling in the city, cycling lanes are introduced, so we shall have more cyclists. Paradoxically, when some try to reduce congestion, then most often infrastructural development is presumed to be the key, but it only attracts more cars. When we speak about reducing congestion and pollution, we often misunderstand the game - it is not just about decreasing the exhaust gases of the vehicles, it is not just about speeding up traffic, but it is about decreasing unnecessary driving and substituting it with alternative more efficient means of transportation. Traffic jams will be always traffic jams, even if all vehicles are 100% electric, or pedal driven.

The city municipality shall strongly consider incorporating taxi services into its public transportation system, as well as integrating within it the so called Park and Ride (P+R) parking facilities located on the outskirts of the city.

Within the greater city center a congestion tax shall apply for all other vehicles, with the exception of public transport, emergency services, police. Waivers or discounts should be provided for school buses, home delivery vehicles, repair and maintenance vehicles, etc.

Some may argue, that this will make motoring very expensive, will reduce it, but will not eliminate it.

Yes. Mobility has always been expensive. In the past only high-income individuals had the opportunity to own their transportation means (first horses and carts, then automobiles, yachts, private jets, helicopters). But although the evolving technology and the steadily improving living standards have made cars affordable, we are still far away from having yachts and helicopters in each family.

Let us imagine, that the time has come, and the advances in science and production have created the basis for the flying population - each adult can afford a flying machine for himself. After a while huge air-traffic jams occur in the sky, midair-accidents cause considerable damage and loss of life, with private aircraft dropping daily from the sky and not only exterminating the crews (sometimes whole families), but also endangering

the population below. In light of this occurrence, the ruining of property by crashed down machines really appears to be a minor problem. Finally, the decision has been taken, that only public flying transport piloted by highly trained professionals shall be allowed to carry passengers. The skies are cleared, all comes to normal.

Perhaps, the same shall be achieved in road transport with professional taxi companies.

A taxi service from companies like that shall offer personal mobility on demand, complementing the public transport on a higher individual level and making private car ownership unnecessary for a growing part of the city dwellers. For those, who may occasionally need to travel longer distances, a scheme of rent-a-car service could be designed on similar public efficiency principle. For those, who would stick to their own cars, the growing costs of city parking or the alternative creation of no-parking city areas will lead to decreased use of their own cars within city limits, making it a weekend car or recreational vehicle. This shall make the city a better place to live, eliminating not only pollution, but the traffic jams themselves, and reducing the number of cars being parked everywhere. The increased use of city taxi with highly professional employed drivers can also contribute to better road safety - decrease of traffic accidents and injuries.

3.3.3. Bus lanes and High-occupancy vehicle lanes

The bus lanes are generally restricted to public transport in order to speed it up and provide time advantage for those who abandon personal vehicles.

In Budapest for example, the bus lanes by law can be used only by scheduled public buses, special service vehicles, motorcycles and licensed passenger taxi cars. When allowed by traffic signs, bicycles may use the bus lane too. Since 2015, another group of vehicles has been considered to be given (though not yet given) the right to use the bus lanes in Hungary:

- Solely Electric Vehicles with no other built-in propulsion equipment (Environmental Class 5E)
- Plug-in Hybrid Electric Vehicles capable of covering at least 25 km only in electric mode (Environmental Class 5P)

- Enhanced Hybrid Electric Vehicles capable of covering at leapt 50 km only in electric mode (Environmental Class 5N)
- Zero Emission vehicles (Environmental Class 5Z)

(Magyar Közlöny, 40/2015. (VI. 30.) NFM, 2015)

As a gesture intended to promote electromobility, the Hungarian government provides additional incentives for local electric vehicles, such as free parking and considerable tax breaks. In order to qualify the cars must obtain the so called Green Number Plates.

In peak hours when the traffic in the city of Budapest is devastatingly slow, bicycles smoothly overtake all private and company cars crammed bumper to bumper in long hopeless columns in front of traffic lights. At such times public transport modes (trams, buses, trolleybuses and the metro - the electrified underground railway) definitely become much faster form of transportation than personal driving. Depending on the starting point and the destination of your trip taxi can be even faster, though more expensive.

In most big European cities the situation is very similar, though some differences occur. For example, in Prague taxis can use the bus lanes, but only if they carry passengers, while in Brussels - when a special signal of permission is on.

In Paris taxis and bicycles can use the bus lanes as a rule.

In London in contrast to the Hungarian practice all buses which have a minimum of 10 seats (including the driver) can also use the bus lanes (Transport For London, 2015).

At the sight of public buses, moving faster through city traffic than private passenger vehicles thanks to the bus lanes, the car-orientated users often give expression to their dislike. Instead of using public transport - which is the main reason for the bus lanes to be introduced, the driving lobby struggles to restore what I would call 'the traffic jam equality for all', and searches for plausible reasons, like the following: "restricting access to bus lanes results in an inefficient use of road space for other vehicles during high traffic conditions." (Spinak, Chiu, & Casalegno, 2008) (p.1). Or, "the reduction in private vehicle capacity of a traditional bus lane can only be justified along roadways with very frequent or critical bus service", complaining at the same time, that "Increasing urban traffic congestion continues to decrease the effectiveness and attractiveness of bus systems." /both citations - (Eichler, 2005), p.1/ As a result, in some cities the idea of bus lanes mutates to "Intermittent Bus Lanes" (e.g. Lisbon), also called Bus Lane with Intermittent Priority Concept (BLIMP), Bus Lane with Intermittent

Priority (BLIP), Dynamic Freeway, Moving Bus Lane, Virtual Bus Lane, Intermittent Bus Lane, Adaptive Bus lane, etc.

Their idea is to reopen the bus lane to all other vehicles as soon as the bus passes a block. As applied in Lisbon, Portugal (University Avenue,) and Melbourne, Australia (Toorak Avenue), when an approaching bus is detected, the control signals activate (e.g. overhead lane-use control signals, in-pavement lights). All non-bus traffic begins exiting the Intermittent Bus lane, so the bus enters a cleared lane and proceeds on. As soon as the bus passes the block, the lane reopens to all other vehicles (Carey, 2009).

Perhaps, where there is no public bus service, or the buses are rare, this approach shall be a big step forward. Although, this resembles the way ambulances (as well as fire trucks, police cars, etc.) move through the traffic, just without their sirens blaring. But those are emergency cases, and treating public transport as emergency solutions instead of being the preferred means of mobility would most probably not qualify the municipality as being environmentally friendly.

According to the American Public Transportation Association (APTA) and the National Transit Database (NTD), the world's first designated bus lane was created in Chicago in 1940 (as cited by http://en.m.wikipedia.org/wiki/Bus_lane, accessed on May 2, 2015). But in the USA the concept of Bus lanes seems to have evolved into a wider defined concept of the High-Occupancy Vehicle (HOV) lanes, which can be used by any vehicle occupied by two, three or four occupants - depending on the local approach. This can be clearly seen in the expressions "Exclusive Busways", "Exclusive Bus Lane (XBL)", "Bus rapid transit (BRT, BRTS, Busway)", etc., when the lane described is used only in the original meaning - by buses, without allowing smaller high-occupancy vehicles. In those heavy traffic areas, where the number of other vehicles as compared to buses is overwhelming, the HOV lanes are still considered a progressive approach. Furthermore, in some urban areas the HOV rules can strongly influence public attitude, shifting user preferences to greener vehicles (hybrid-electric vehicles, plug-in hybrids, EV), and to carpooling. The concept behind the High-Occupancy Vehicle (HOV) lanes, is generally to increase the average number of people transported by cars and at the same time to reduce the number of cars needed for the purpose. Different sources - even within the same countries - sometimes approach the topic from a dissimilar viewpoint. Some consider HOV lanes to be a variation of Bus lanes, others give them a different perspective. According to California Air Resources Board local laws allows single-occupant use of High Occupancy Vehicle (HOVs) lanes by certain qualifying clean

alternative fuel vehicles. Use of these lanes with a single occupant requires a Clean Air Vehicle Sticker issued by the California Department of Motor Vehicles (DMV) (California Environmental Protection Agency, California Air Resources Board., 2016).

These lanes are usually emptier and faster-moving than the others during rush hours, and sometimes offer other privileges such as free bridge tolls. Unlike the bus lanes in Hungary, outside the posted rush hours, these HOV lanes are usually available for all traffic.

3.3.4. Car-sharing

Also known as ride-sharing, lift-sharing, carpooling and covoiturage - car-sharing is another way of reducing car ownership and improving the efficiency of car use. Different definitions are available for car-sharing within the broad topic of sharing economy - e.g. (Goudin, 2016) (p. 11), but the basic meaning is either travelling together (sharing a trip in one car instead of using two or more cars - a model present in every prudent family) or sharing a car (using it in turns, instead of using their own cars in parallel).

"While carsharing services have been around for over two decades, the industry has recently gained momentum, as several large car manufacturers entered the market, indicating that carsharing has moved into a period of commercial mainstreaming." (Schaefers, 2013) (p. 69). This can only relate to car-sharing in the present high-tech form using digital networks and tailor-made software. Actually, the phenomenon is much older than that.

"Carpooling is one of the many travel alternatives promoted by transport policies to reduce the amount of vehicles on the road. It was promoted during World War II to deal with oil and rubber shortages and during the oil crisis of the 1970s. More recently, carpooling was also advocated during the 2008 Olympics in Beijing as a response to driving restrictions. Nowadays, carpooling is promoted by mobility management policies to put more emphasis on the issue of sustainable transport." (Vanoutrive, et al., 2012) (p. 77).

In the Soviet Union in the 1970's and the 1980's, when the supply of private cars was tightly controlled, trip share was everyday experience. In the cities it was natural to stop any car by waving your hand at the driver and ask for a ride. Negotiating the right fare

(meaning much lower than that of the official taxi) was easy, especially when the vehicle was going in the same direction. Several years ago, in 2010, I had the same retro experience in the Uzbek capital Tashkent. The only difference is that in the old times the overwhelming majority of the vehicles offering the ride were state owned and driven by governmental employees breaking their employment rules, while nowadays all these vehicles are privately owned and the drivers are breaking other rules to get the extra income.

The extra income opportunity on behalf of the drivers and the insufficient supply of mobility means for the prospective passengers is probably the key to understanding the above mentioned spontaneous trip-share practices. In modern developed economies the high cost of mobility is a much stronger factor.

"Urban carsharing services allow individuals to gain the benefits of private vehicle use without the costs and responsibilities of vehicle ownership." (Costain, Ardron, & Habib, 2012) (p. 421). Here the emphasis is on cost efficiency and reduced burden, like the necessary investment and liability. Similar opinion on car-sharing is expressed by Efthymiou, et al., adding a slightly different angle; namely, the variability of their needs: "Unstable fuel prices and increasing maintenance costs, as well as the insurance and purchase cost of a car, make car ownership a luxury that not many people can afford. Under these circumstances, car-sharing attracts more and more people. Users can enjoy the privacy of any type of car (e.g. compact car, SUV, van, and luxury) depending on their current needs, without the need and commitment of a purchase." (Efthymiou, Antoniou, & Waddell, 2013) (p. 65).

This approach emphasizes improved standard of living for those, who would not be able to afford owing a vehicle at all. If we examine this situation together with the case of "oversized", "overpowered" and/or "underutilized" vehicles, mentioned earlier, we can naturally reach the conclusion, that car-sharing schemes are bridging together different consumer segments, allowing to improve the efficiency of car use, reduce redundancy, and provide cost efficient transport solutions with simultaneous reduction of car ownership. This reduction is confirmed by (Millard-Ball, Murray, & ter Schure, 2006), as well as by Martin, et al.:

"Evidence from this North American carsharing member survey demonstrates that carsharing facilitates a substantial reduction in household vehicle holdings, despite the fact that 60% of all households joining carsharing are carless. Households joining carsharing held an average 0.47 vehicles per household. Yet the vehicle holding

population exhibited a dramatic shift towards a carless lifestyle. Based on assumptions with respect to the active member population, it is estimated that carsharing has removed between 90,000 to 130,000 vehicles from the road (9 to 13 vehicles per carsharing vehicle, including shed and postponed car purchases) in North America to date. The vehicles shed are often older, and the carsharing fleet average is 10 mpg more efficient than the fuel economy of vehicles shed." (Martin, Shaheen, & Lidicker, 2010) (p. 15).

As cited by (Efthymiou, Antoniou, & Waddell, 2013) from (Rodier & Shaheen, 2003) the carsharing policies lead to the reduction of Vehicle Miles/Kilometers Traveled (VMT/VKT) and the greenhouse gases (GHG). In North America the reduction is 44% per car-sharing user (Shaheen, Cohen, & Chung, 2008). According to (Lane, 2005) car-sharing participants report increased environmental awareness after joining the program. Finally, households can save more money for their development (Ciari, Balmer, & Axhausen, 2009)

"As of May 2012, there were 33 personal vehicle sharing operators worldwide, with 10 active or in pilot phase, three planned, and four defunct in North America. Personal vehicle sharing could provide a model that overcomes some of the financial constraints and geographic limitations of fleet ownership and distribution, as in traditional carsharing. Interestingly, all personal vehicle sharing and traditional carsharing experts interviewed in this study agreed that personal vehicle sharing holds the potential to notably expand the shared-use vehicle market." (Shaheen, Mallery, & Kingsley, 2012) (p. 81).

This efficiency of use is closely connected to the public transport network. This opinion is supported, among others by the following studies: "It needs to be emphasized that any car-sharing system should be developed complementarily to public transportation, as only integrated mobility systems satisfy the variety of individual transportation needs, which is a necessary condition for a large-scale reduction of private vehicle usage." (Firnkorn & Müller, 2011, p. 1527). "In order to meet urban mobility needs, a sustainable urban mobility concept must be multi-modal, integrating different modes of public transport, private cars, and walking and cycling." (Santos, Behrendt, & Teytelboym, 2010) (p. 84).

At the same time the idea of trip-sharing is not as fully supported as it might be expected, and can become a source of controversy.

"While providing various benefits to its users – and probably to society as a whole – the sharing economy poses important questions for established businesses trying to avoid disruption, new entrants who wish to lure away clients and policy makers who try to regulate and manage the market. One example of the latter is that participants in the sharing economy often exhibit tax-avoiding behaviour, which is hard to uncover for tax authorities." (Zilahy, 2016), p.68. Back in 2012 carsharing drew the close attention of the Hungarian tax authorities, which prompted an interpellation by Endre Spaller, a member of the Hungarian Parliament. State Secretary Zoltán Cséfalvay in his answer called it a ticklish question - on the one hand the carsharing effort shall be supported for environmental and efficiency reasons, but on the other hand those who engage in it on a regular basis might be charged with tax evasion. (Demokrata, 2012) A clear confession, that the presumed loss of tax revenues by the governmental bodies can threaten this great environmental initiative. This attitude is typical not only for Hungary - the assessment by the European Added Value Unit summarizes the opinion of the economists on the subject as follows: "The sharing economy does not properly create assets by itself, and most of its actors do not create added value; peer-to-peer services between consumers, in particular, generate little VAT" (Goudin, 2016) (p. 14). Yes, if we buy or rent another car, there will be more VAT to collect. But if we fully succumb to this idea, then we may forget the efforts to stop unnecessary waste. On the other hand, what started as a trip-sharing initiative in the past, has now become a source of uncontrollable extra profit. A range of web based commercial applications like Uber, Lyft, Sidecar, Wundercar nowadays provide to any willing driver the opportunity to have a non-official job and, respectively, non-taxed income. This is well illustrated by the Uber phenomenon, which has prompted the Hungarian Minister of National Economy to call for an investigation. The reasoning is simple - Uber is providing taxi services in Hungary without paying taxes, while its drivers do not meet any professional requirements (Varga, 2015). Hungary is joining a long list of governmental officials - so far Uber has been banned from operating in many places, starting from its hometown San Francisco, through Los Angeles, Kansas, Rio de Janeiro, Delhi, and up to whole countries like France, Spain, Holland, South Korea and Thailand.

In a recent study by Schaefers four motivational patterns are named for using the carshare systems: value-seeking, convenience, lifestyle, and environmental motives (Schaefers, 2013). Even if customers with smartphones choose the convenience of the Internet-based Uber, Wundercar or similar applications mostly because of the

competitive prices, they also do it due to its creative and slick approach blended with the perception of being progressive and saving the environment.

Traditional taxi has never been able to provide this sense of modern community and mutual interest. Hence the best attitude could be that of the Seoul city government, who announced the decision to promote services connecting users with registered taxis via smartphone applications, and to establish a premium tax service to excel that of Uber (Reuters, 2015). Since then most taxi companies have joined in by developing their own software. Coming back to the issue of price, the above mentioned Uber is aiming below the market prices, and the success of its services shows the elasticity of customer demand for taxi. This supports my presumption, that efficient revitalization of city taxi service with lower costs, combined with proper promotion as green means of transportation, could lead to reduction in personal driving.

On January 18, 2016 Uber received tremendous public coverage in Hungary, when Deák tér - one of the busiest city junctions in Budapest - was blocked by angry taxi drivers protesting against Uber. The protesters demanded from the government to "stop Uber application". Local humorists reacted instantly: "Oh, what a scandal will ensue, when postal workers discover that there is e-mail!" Nevertheless, the authorities quickly agreed to introduce stricter measures to control the "non-professional" drivers. In fact, instead of developing their services, reducing costs and improving efficiency, the Budapest taxi drivers aggressively attacked a modern competitor. Perhaps, it would be much more productive, if we followed the example of the Estonian authorities, who agreed with Uber to collaborate and to establish a simplified tax declaration process for Uber’s partner drivers, as supported and confirmed by the local officials (Estonian Tax and Customs Board, 2015). In this way Uber drivers are now allowed to operate in Estonia, to provide tax revenues, and to strongly contribute to the modern mobility. Not the least, traditional taxis there have to offer their best service, if they want to be competitive.

The carpooling application Wunder from Hamburg chose a different strategy - to avoid confrontation with authorities Wunder offered the opportunity to book your driving partner for regular commuting routes, and share your everyday trips to work with friends & neighbors. If you need a ride to work in the morning and back to your home in the evening, then with their application you can find the right driver, who has a similar daily routine. Thus the drivers, who pretend to be offering car-sharing, but in reality drive full-time to earn a living, are expected to drop out of the scheme.

Another example of innovative approach to trip sharing is the Shared Taxi (where customers share part of their taxi ride with others) and the Taxi-Bus service (where customers pre-book their service at least 30 minutes in advance and walk short distances to a designated stop) from Lisbon (International Transport Forum at the OECD, 2017) (p. 12) The system uses minibuses and blends the features of taxi, public transport and car-sharing by using professional drivers.

Since 2016 a new car rental company GreenGo (www.greengo.hu) offers their services in Budapest and Pest county, which calls itself e-carsharing and rents to its registered customers small electric vehicles via smartphone application on a minute-based tariff. For those, who like driving in the city themselves, this could be a perfect solution.

3.3.5. Walking and cycling

The 2007 Green Paper of the European Union clearly stipulates its policy, namely, “To improve the attractiveness and safety of walking and cycling, local and regional authorities should ensure that these modes are fully integrated into the development and monitoring of urban mobility policies” - as cited by (Hefter & Deffner, 2012). According to Eurostat (2012) data used by the authors, while the motorisation rate in Germany had decreased between 1991 and 2009, in the same period all the Eastern European EU member states on the contrary showed huge growth rates of the number of passenger cars.

It should be noted, that promoting a durable modal shift towards more cycling traffic is extremely important in Central and Eastern Europe, where population is still keen to achieve car ownership as a status symbol. In the second half of the last century, while Western Europeans were going through their economic growth - and henceforth their car ownership experience - most Eastern Europeans were deprived of that opportunity, and thus naturally craved for it. When the authoritarian rules finally gave way to different types of transition routes toward market economy and democracy, and the citizens finally received the chance to reach their long aspired level of presumed high achievement and self-esteem, the front runners in the developed countries by that time already shifted their human values to environmental responsibility. Psychologically, many of the former inhabitants of the communist regimes are unwilling to jump over

this motorisation step in their historical development and want to enjoy personal driving before turning to cycling and walking (again). In this part of Europe, as well as in the developing countries with low average car ownership, it is vitally important to make clear and to popularize the next level of mobility and its benefits (i.e. the superior quality of life, that sustainable mobility shall bring to the urban areas). As my personal experience shows, this is important even in countries like Hong Kong. I can bring forward as a comparison my recent personal interview with a young Chinese business professional, a native person from the city of Hong Kong, who has never had a car, but is dreaming of having one. It will be outrageously expensive to maintain, it will not be efficient in terms of logistics due to its slow average speed compared to public transport and its parking difficulties, it will never be prudent to have it, which means you have to be quite rich to be able to afford it. Which makes it an object of desire... and may also partly explain the growth of car ownership in Hong Kong, described earlier in this paper.

To reach the state of mind, where you accept and enjoy "carless" existence, you need time and knowledge. Or experience. To illustrate the issue a bit further, another of my interviews was with a Swiss financier, presently based in Hong Kong, who casually told me, that after being a proud owner of Ferrari and other similarly expensive brands in the past, owing a car is not a thrill for him anymore - he is quite happy with Hong Kong's public transport.

While cycling in Hong Kong is not that popular due to the exceptionally efficient public transport, as well as the hilly terrain, in Central and Eastern European countries the situation is different. The following citation from the final publication of the mobile2020 project can be used as the best summary: "A paradox in the region is that cycling levels are higher than the European average, while cycling retains a stigma as a ‘peasant’ or ‘proletarian’ way to travel. The cycle chic image propounded in recent years from Copenhagen to Paris to London may not be especially relevant to small-town Hungary or Bulgaria, but some sort of aspirational marketing can’t hurt." (Spencer, 2014)

The Hungarian Cyclists’ Club (Magyar Kerékpárosklub, 2015) based on data published by (TNS Opinion & Social, 2013), is happy to state, that Hungary, where 25% of the respondents cycle daily, is a "cycling superpower", as only three countries produced better response: the Netherlands (43%), Denmark (30%) and Finland (28%) (TNS Opinion & Social, 2013), (p. 10). The report itself does not provide details on the

Hungarian respondents background, but data published on the website of the Hungarian Cyclists' Club shows, that in Budapest only 13% of the citizens cycle daily, while outside of the capital the ratio is 42% (TNS-Hoffmann Kft., 2015). This supports the previous opinion by Spencer, that in the big city cycling still needs an image improvement, promotion, and support. Like the bike-share approach, similar to car-share, giving the users the opportunity to use bikes just when they need them, without the hassle of storing, maintaining, parking and collecting them later. This is a successful approach to encouraging cycling in combination with the public transport.

"Despite the growing global motorisation, bike-sharing systems' demand, as a sustainable alternative transport mode, is continuously increasing. Such systems combine the advantages of bike usage, such as low cost, autonomy, flexibility, accessibility and health benefits, with the advantages of renting (as opposed to owning). Significant experience has already been gained regarding security, insurance and liability concerns, bicycle redistribution, applications of information technology systems, planning, management and pre-launch considerations." (Efthymiou, Antoniou, & Waddell, 2013) (p. 65).

There are multiple reasons for the low modal share of cycling in daily transport. Some are related to the underdeveloped infrastructure, where bicycles cannot use dedicated lanes only for themselves, and the car-drivers are not ready to treat cyclists on the road with due care and caution, making their traffic safety questionable and further scaring away potential cyclists. The other group of reasons is psychological, or even cultural. The earlier cited "peasant" stigma is a reality in Eastern Europe - though differences in the amount of negativity exist depending on the educational and cultural level of the population. For example, some 15 years ago I witnessed the reaction of managers from different car dealerships in Russia, when they were given a demonstration from the Netherlands - vehicle owners were offered different transportation options, while they were leaving their cars for the day at the service department for repairs and/or maintenance. The options included, among others: offer rental vehicles, call a taxi, loan bicycles. The burst of laughter related to the latter offer was genuine. All managers were categorically certain, that it would be a grave insult to the Russian customers. Unfortunately, they were right. Even if obstacles like difficult climate conditions (rain, snow, ice), huge distances and road safety happen to be controllable, cycling is still considered by the majority as a mode of transport for poor people, for children or for

leisure activities. Or for those chosen ones, who can afford living in the center of the city.

That was then, but time flies, today Moscow also has its cycling enthusiasts, and reading their blogs over the Russian Internet you can see, that many were enthused when visiting European "bicycle-friendly" cities. Their efforts to popularize the bicycle as a city transportation mode are really encouraging. Because if it is possible to cycle in Moscow, where they have to overcome so many hurdles, then cycling in Budapest shall be mostly a matter of proper marketing efforts by the municipality and the "green" society.

More progressive efforts are needed to help city dwellers embrace sustainable mobility. Batty, et al. differentiate ‘Pull’ and ‘Push’ mechanisms required to achieve this modal shift. ‘Pull’ mechanisms shall involve providing the "attractive, accessible, affordable" public transportation system that will appeal to all citizens, whilst ‘Push’ mechanisms shall "aim to break private car use habits". (Batty, Palacin, & González-Gil, 2015), p. 110.

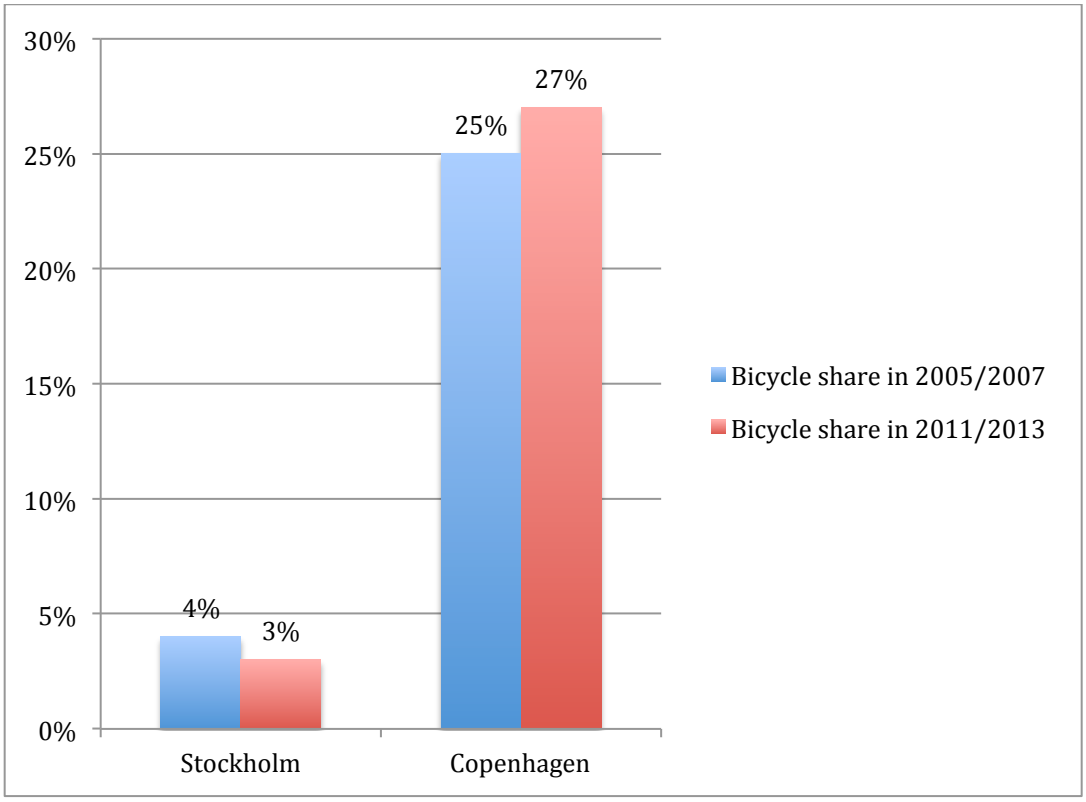
The BUBI programme in Budapest is a very good example of a "Pull" mechanism. In 2008 the Municipality of Budapest made a decision to establish a public bicycle sharing scheme. Due to delays associated with a complex mix of administrative, political and supplier related problems, it took 6 years from the formal decision to the official inauguration of the operational system in September 2014. Although the process was extremely slow, we should give credit to all involved for the comprehensive planning of the programme. Even the name Bubi was chosen through an online competition, meaning „Budapest bicikli” (Budapest bicycle). The official name was announced as MOL Bubi, after one of the main sponsors, the Hungarian Oil Company (MOL). By contract MOL provides half of Bubi's annual budget, i.e. HUF 122 million. Apparently, even bicycles in Hungary are fueled by petroleum... The Budapest Municipality is the other sponsor, covering 20% of the annual costs. The remaining 30% - presumably HUF 70 M - are expected to be covered by the rental fees. In the first phase 1,100 bikes became available at 76 locations: on the Pest side of the city in an area surrounded by the Nagykörút (Grand Boulevard) and Városliget (City Park), on the Buda side in Víziváros district, in the university quarter of South-Buda and on Margaret Island (Margitsziget). In June 2015 MOL Bubi service was expanded further to a total of 99 docking stations with 2,159 docking points and a fleet of 1,150 bicycles in 11 city districts. Presently according to the official site of MOL Bubi there are 123 docking

stations and 1,486 bicycles (data valid on 22 July 2017) (MOL Bubi, 2017) Whereas the Budapest Municipality considers its public bike-sharing system a success, the "Közlekedő Tömeg" Non-Governmental Organization believes it could have been more successful and regularly criticizes its management for the meager marketing and insufficient bicycle infrastructure development: "In addition to marketing, it is also important that cycling is really accepted in Budapest and that should be demonstrated by cycling-friendly transport measures" (Közlekedő Tömeg, 2017) I share the same opinion, because the obstacles to the introduction and development of the green transportation modes among the city residents are mainly of the "can" and "want" types, or perhaps it is more appropriate to call them "I cannot" and "I would not" attitude. The municipality shall create the cycling-friendly infrastructure, but after it is finally created, then it shall be promoted.

It is not easy at all to compare cities like Amsterdam, Hong Kong, Moscow and Budapest in terms of bicycle modal share in their urban transport, because of their city size, population density, climate conditions, terrain, standards of living and cultural background. Hence the comparison between cycling in Stockholm and in Copenhagen by (Koglin, 2015) is really valuable, because these cities are both Scandinavian capital cities, both have well developed public transport systems, and enjoy similar climate and weather conditions.

Koglin points out, that although both Copenhagen and Stockholm had a similarly high share of cycling in their modal split in the 1920s and 1930s, the two most recent national travel surveys of Denmark and Sweden show that Copenhagen now has a much higher share of cycling than Stockholm. On Figure 29 we see that the mode share for all trips that start or end in the city of Stockholm a decade ago was 4%, which has recently decreased to 3%. In contrast, the same Bicycle mode share in Copenhagen was 25% and has increased to 27%.

Figure 29. Bicycle mode share in Stockholm and in Copenhagen. Chart based on data by (Koglin, 2015) from the National Travel Survey Data of Sweden and Denmark.



Although there are differences in population density - Copenhagen's is 6,200 inhabitants/km^2 and Stockholm's is 4,309 inhabitants/km^2, the author consistently argues, that it is not the density, but the much better bicycle infrastructure in Copenhagen compared to Stockholm that explains the differences in the modal split. In Stockholm the bicycle infrastructure is built mainly on bicycle lanes (lanes painted on the streets), while Copenhagen has a system of bicycle tracks that are separated from pedestrians and motorised traffic and frequently run alongside streets and roads. This system even has special traffic lights for cyclists. As a whole that contributes considerably to the accessibility and safety of bicyclists, which is the strongest argument in favour of this "pull" mechanism. This seems to be supported by historic, as well as by financial comparisons.

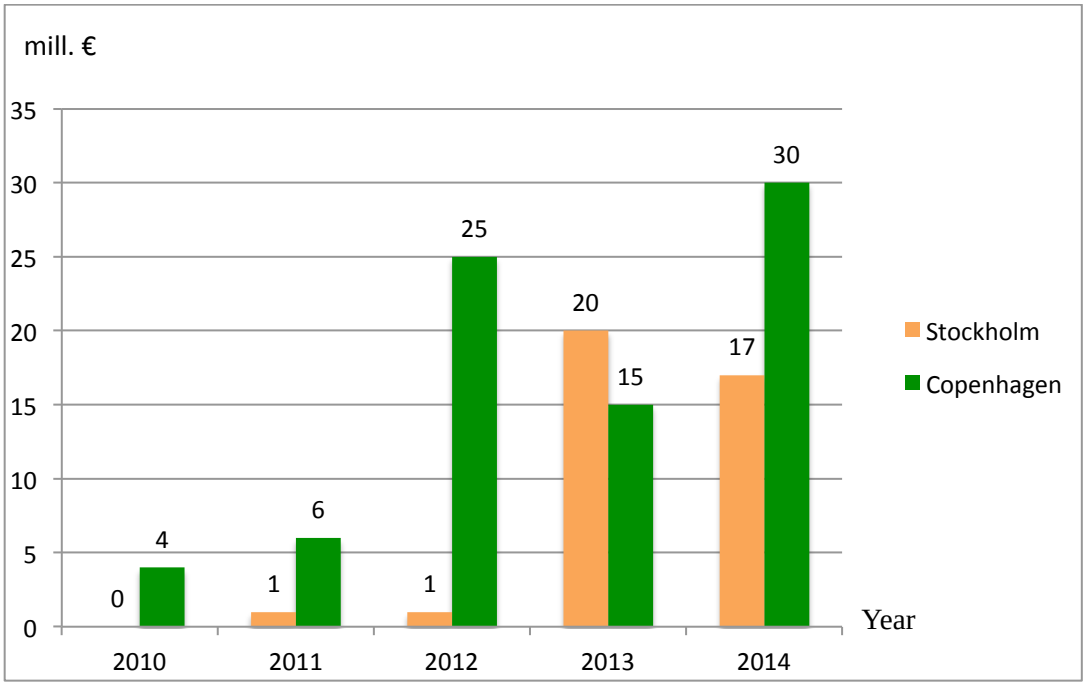
Historically, the first bicycle track in Copenhagen was built in the late 19th century to avoid accidents between cyclists and horses / carriages. At the time many streets were made out of gravel, which was not so good for cycling, and the city focused on supporting cycling until the 1960s and 1970s, when transport planning in Copenhagen

became shifted more towards motorised traffic. The already built bicycle infrastructure survived until the focus shifted back towards cycling in the 1980s, and has been very well maintained ever since. To compare with, during the early 20th century the streets in Stockholm were made out of cobblestone and different transport modes were mixed without any major problems, making special infrastructure for cyclists not necessary. Mass motorisation came to Swedish cities in general earlier than to Danish cities, to a great extent because of the automobile industry in Sweden, and that prioritized automobile transport within urban planning as early as the 1950s, effectively overshadowing cycling.

Financially, data collected between 2010 and 2014 shows, that Copenhagen has been allocating twice as much funding to improve bicycle transport more as the city of Stockholm (Figure 30).

Another important observation is that Copenhagen seems to have managed transport integration better than Stockholm, and Koglin states that while the organisation of planning in Copenhagen prevents struggles between the different divisions and departments, in Stockholm "the organisation of planning departments seems to lead to a focus on motorised traffic" (Koglin, 2015), (p. 59).

Figure 30. Comparing funding to improve bicycle transport in Stockholm and in Copenhagen. Chart based on data by (Koglin, 2015), based on budgets from Copenhagen and Stockholm (2010–2014). Data is in millions of EUR.



In Hungary the focus on motorised traffic seems to be strong as well. "The process is complicated by the wrong and self-reinforcing stance typical for the supply-demand oriented attitude, which has been integrated not only into the decision making and operative institutions, but into the established public expectations as well (when will they finally solve it, so I shall be able to drive and park everywhere, etc.)" (Fleischer, 2005), p.12.

Similar criticism - that the focus of the municipality is placed on cars and not on sustainable mobility modes - has often been expressed in Budapest by the above cited "Közlekedő Tömeg" and by other NGOs as well. E.g. The Hungarian Transport Club directly says that "the problem here is that the car lobby is much larger, since politicians and the managers of the traffic planning companies, and even those of the transport companies, almost exclusively travel by car" (Magyar Közlekedési Klub - Hungarian Transport Club, 2017) The statement was published in relation to the reprogramming of the street lights along the Nagykörút (Grand Boulevard) on 26th of April 2017, which sped up the car traffic and slowed down the electric trams/streetcars (the "villamos"). The Hungarian Transport Club lamented, that the public who used the trams did not raise their voice against this environmentally hostile act, because they considered it a lost cause and were unwilling to fight against the decision makers.

Based on everyday experience it seems that the transport management of the city municipality has failed to grasp the attitudes of the Budapest residents and is handling them as a homogeneous mass. It is obvious that among the residents there are big differences in the perception of city mobility, which should have been studied and addressed by the respective decision makers during the process of city mobility planning. It is especially important, because even in the cases of the most environmentally committed citizens they are often choosing their city mobility modes not according to their environmental friendliness. The city planners should have taken into consideration the various expectations of all consumer groups and should have used fine-tuning when creating transport policy for the whole city. Nowadays it is wide spread practice to study the consumer behavior in regard to the environment, but studies aimed at environmentally sound attitude to mobility are very few, as this topic has been rather neglected. Very often in everyday life when the residents are choosing the way how to reach a destination within the city their decision is influenced by non-environmental factors like habits, prestige, convenience and the feeling of free

movement and independent mobility, modern life style and fun. The city mobility communication must concentrate on overcoming this negative influence and consistently encourage sustainable mobility modes. Unfortunately, the city municipality has not been able to promote that. To achieve any sustainable results profound changes must be implemented, but without active pro-environmental public support a radical change in the right direction will never be feasible. That is why I investigated the opinion of those who might influence the process in everyday life.

Due to unavailable financial resources my investigation into the attitude of those who reside and/or work in the Hungarian capital could not be done with statistically relevant massive sampling, but had to be carried out with utmost efficiency and precise choice of the members of the sample.

4. The attitude of Budapest citizens towards city mobility – investigation and results

4.1. The advantages of the chosen Q-methodology and the necessary practical steps for accurate and acceptable outcome

To examine the attitude of Budapest citizens towards the environmentally sound city mobility modes and prove the hypotheses stated in the introduction to my dissertation I used the Q Methodology. Although there would be other possible techniques to investigate the topic, after careful deliberation I intentionally chose this approach to move away from the usual scheme and to differentiate my environmentally oriented probe from the traditional statistical data research used in sociology and based on questionnaires and large numbers of respondents to ensure right sampling. Similar stance has been voiced in the past by other colleagues. Ágnes Zsóka Nemcsicsné advocated Q methodology in the research of environmental awareness (Zsóka Nemcsicsné, 2005) citing Ágnes Hofmeister-Tóth (Hofmeister-Tóth, 2005), and Szilvia Luda pointed to the advantages of this method in comparison with all "questionnaire methods" that "think in socio-demographic categories, generate statistics based on age or occupation groups, gender and school qualifications." (Luda, 2012) Furthermore, due to the requirements of the relevant statistical methodology its application necessitates

solid financial resources, as opposed to the easily affordable Q Methodology for which free software is available, distributed under the terms of the GNU General Public License (GPL). With properly formulated statements the Q methodology gives the opportunity to outline and subsequently to inspect the basic types of attitudes.

As Professor Steve Brown from Kent State University said in his article "The history and principles of Q methodology in psychology and the social sciences", "what has come to be referred to as Q methodology" was initially introduced by William Stephenson in 1935 (Brown, The history and principles of Q methodology in psychology and the social sciences, 1997) (p. 1).

Stephenson first described the idea in a letter to the journal Nature on 30th of June 1935, and in September the same year published an article about his new technique with the highly eloquent title "Correlating Persons Instead of Tests", where he himself called the approach "a complete invertion of all previous factor techniques" (Stephenson, 1935) (p.17). "The instrumental basis of Q methodology is the Q-sort technique, which conventionally involves the rank-ordering of a set of statements from agree to disagree. Usually the statements are taken from interviews, hence are grounded in concrete existence..." (Brown, Q Methodology and Qualitative Research, 1996)

For my actual research I used the guidelines of the PQMethod, which has been adapted, revised and maintained by Peter Schmolck on his website http://schmolck.userweb.mwn.de/qmethod/ (Schmolck, 2014).

As stipulated by the Q methodology, the number of the participants (who are sometimes called the P-set) had to be smaller than the number of statements (Q-set).

As a first step I held a series of verbal interviews with different individuals, who were all - with one exception - living in Budapest.

The aim was to select city goers that would reflect different life styles, so even if anyone of them should be replaced by another citizen, the overall attitude would not be changed significantly. Based on preliminary conversations with the potential participants I consistently drafted 81 statements related to the city and centered on the perspectives, opinions and interests of the contributors. The role of the statements was first to generate a reaction from the respondents that would be typical to certain attitudes, then to align the respondents into groups of similar mindsets, attitudes. For example, if one is driving an expensive car then s/he shall most probably perceive it as a status symbol and shall agree with a set of similar statements, if one belongs to a younger generation, then s/he supposedly shall agree with environmentally friendly

statements, etc. Some of the statements were formulated from global perspective, others were directly city oriented. Some were intended to appeal to young at heart and presumably environmentally conscious respondents and were expected to be rejected by the die-hard motorists. Some of the presumably acceptable statements turned out to be contradictory or too challenging and their wording had to be changed. Other statements had to be dropped out in the selection process to ensure a smooth procedure for the respondents.

After thorough checking, selection and fine-tuning involving my tutor, other experts in the field as well as friends living in Budapest, I ultimately reduced the number of statements to 39 (the Q-set) (Figure 31).

Figure 31. The 39 statements (the Q-set)

1. The developed countries should support the public transport in China, India and other developing countries with rapidly growing population, because otherwise their huge car park may cause too big global impact.
2. State sponsored environmental advertizing and awareness campaigns can transform the views and demands of car buyers and encourage them to buy more expensive, but more environmentally friendly vehicles.
3. Public transport is inferior to using your own car, even if it has been proven to be faster in some cases.
4. If the local government would only allow electric cars in the city center, they would spread without state subsidies and discounts.
5. Traffic jams can be eliminated by introducing an appropriate fee for using your car in the city.
6. We must accept that traditional cars shall be excluded from cities, only electric cars shall have the right to drive there.
7. Street parking fees in Budapest are unrealistically high, but they positively affect the everyday routines of the city.
8. If someone wants to drink alcohol during the night, even then it is better to go to the party with your own car, because there is driver service.
9. Much more people would use public transport, if there were more P+R parking lots (Park and Ride).
10. Car-free days should be organized, because if you cannot use your own car over a period of time, you will learn to organize your movement and time more efficiently.
11. The urban traffic jam is no problem in terms of time, because while you are driving you can usually make phone calls, carry out negotiations, talk, listen to music.
12. People do not even think about how much it costs to maintain their cars - depreciation, taxes, annual service and repair, fuel, parking fees, tolls, etc.
13. In China, India and other countries with rapidly growing population, the demand for cars will grow, which will positively affect the sales of European carmakers and thus the world economy.
14. People prefer to ride their own cars, because the taxi is more expensive than using a private car.
15. If there were more P+R parking lots (Park and Ride), it would be easier to drive in the city.
16. Most of the customers of electric cars choose them not because they are environmentally friendly, but because they are a status symbol.
17. Car buyers will still choose the peak performance, even if they cannot make use of it.
18. For modern successful urban people the comfort and performance of their car is more important than the cost of the trip.
19. State subsidies and discounts clearly increase demand for electric cars.
20. All cars should be equipped with a GPS-based speedometer and speeding shall be automatically penalized.
21. Everyone in Budapest should be obliged to buy a public transport pass, even if he has a car.
22. All adult family members should maintain their own cars to ensure their independent mobility.
23. The longer the time you spend in the city center, the more it is worth using public transport.
24. Those with higher incomes have the duty to drive the least polluting cars.
25. Those who can afford the most modern car shall buy it out of prestige considerations.
26. Business cars with free usage are a bad example and cause overspending.
27. Utilizing the bus lane would be more effective, if you could use it for additional fee.
28. Speed limitation is important and can save lives.
29. For a family of 3-5 members 1 car is enough.
30. The car is not something that a person lends.
31. If the taxi was cheaper, more people would leave their cars at home.
32. Those who do not enter the city do not care what the air there is like.
33. The use of the bus lane should be allowed for private cars for a fee.
34. All electric cars shall be allowed to use the bus lane free of charge.
35. Old, less modern vehicles shall be punished by a higher tax.
36. Public opinion underestimates the number of environmentally conscious people.
37. The impact of the transport habits of an individual on the environment is negligible.
38. The bigger and more expensive the car is, the greater the respect is.
39. By public transport you can comfortably get almost anywhere in Budapest.

The number was chosen on the basis of other examples of similar research. The aim of the study was not to develop the methodology, but to use it in accordance with its current state of development, although in the end I unexpectedly had the opportunity to check the methodology's sensitivity in respect to the so called *outliers*, which I will describe later on.

After selecting the final statements I asked each individual participating in my study to arrange these statements in three groups according to her/his own opinion:

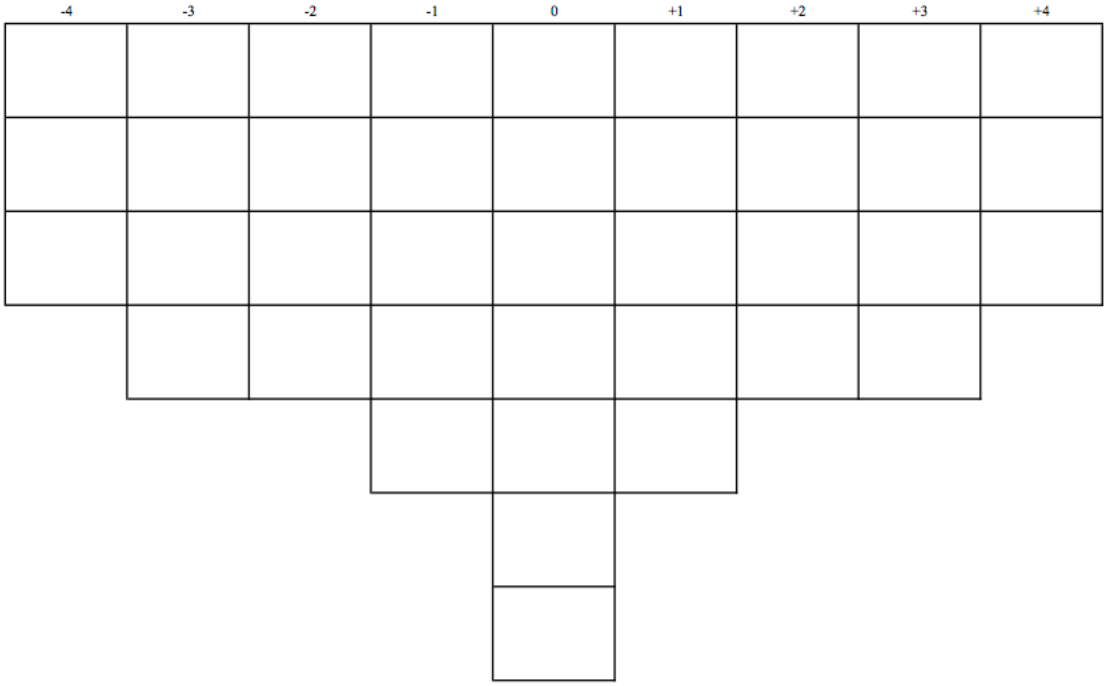
1. Statements they agree with
2. Statements they disagree with
3. Statements they neither agree nor disagree with – in other words, have almost neutral attitude.

After arranging the statements in the three basic groups, they had to sort the statements within the groups according to the degree of disagreement (-4, -3, -2), agreement (2, 3, 4) or neutrality / almost neutrality (-1, 0, 1).

The respondents had to place all their choices in the provided frame representing the discrete normal distribution (Figure 32), thus sorting the statements according to their individual ranking. These rankings are called q-sorts and are later entered into the PQMethod software for the analysis. The method compares the rankings to each other, calculates their correlations and produces the results in series of inter-correlation matrixes, from which typical Q-sorts or factors are revealed, exposing common individual opinions within different groups of respondents.

For the unrotated factor extraction the software uses QCENT (Centroid analysis, which is considered the original method of choice for the Q methodology) and QPCA (or PCA, Principal Components analysis), the default method of factor extraction in statistical packages like SPSS. Both, QCENT and QPCA use the raw data file to compute and output a correlation matrix; then, an unrotated factor loadings file is created by the application of the respective method of factor analysis.

Figure 32. The frame representing the discrete normal distribution.



The “triangle” of the discrete normal distribution, where the respondents had to arrange the statements in accordance with their personal choice and understanding, may seem somewhat rigid, but, fortunately, most of the participants felt quite comfortable to work with it and to give adequate responses. There were only two interviewees, who were not willing to accept these rules and did not define their preferences for the statements. One of them protested against the frame and insisted on changing the rules and the “triangle“ into a different format, the other one strongly disagreed with most of the statements and indicated not even one neutral statement, ignoring the discrete normal distribution. In both cases their answering sheets had to be disregarded from the study.

The actual data of the respondents can be seen in Table 3, where all the remaining participants are given a code name related to their occupation, hobby and/or type of living area. As seen from the list, they are not selected to represent any particular age groups or level of education. They live in different areas, have different levels of income, different jobs and different positions, etc. Their only common feature is the city where they live and/or work.

Table 3. The Respondents, p. 1

#	Respondent code name	Age / Életkor	Gender / Neme	Highest completed level of education / Iskolai végzettség	Type of employer / Milyen cégnél dolgozik	Job level / Beosztás	Number of children Gyermekek száma	Hobby / Hobbi	Residential area / Hol lakik - milyen a lakóhelye	Income level / Jövedelem	How environmentally conscious are you? / Mennyire tartja magát környezettudatosnak	Persons/Cars in the household - Fő/Autó a háztartásban	Car info (age in years/engine type/engine size in L/consumption in L per 100 km) - Autó infó (kora évben/meghajtása/motortérfogata literben/fogyasztása L-ben per 100 km)
1	MinFoAff	60+	Male / Férfi	University/ College - Egyetem/ főiskola	Own company / Saját vállalkozás	Senior manager / Felső vezető	2	Arts, museums	Villa area / Villanegyed	High / Magas	Somewhat / Valamennyire	2 / 2	1 / Diesel / 3 L / 9.4 L per 100 km 1 / Hybrid / 1.8 L / 5.4 L per 100 km
2	GenMan	60+	Male / Férfi	University/ College - Egyetem/ főiskola	Privately held company / Magáncég	Manager / Vezető	3	-	Dense residential district / Lakótelep	High / Magas	Somewhat / Valamennyire	1/1	7 / Petrol / 2 L / 8.2 L per 100 km
3	Dentist	41-50	Female / Nő	University/ College - Egyetem/ főiskola	Own company / Saját vállalkozás	Senior manager / Felső vezető	2	Music	City center / történelmi belváros (városcentrum, Várnegyed)	Middle class / Közepes	Somewhat / Valamennyire	4/2	16 / Petrol 1.8 L / 8 L per 100 km 11 / Hybrid / 2.3 L / 10 L per 100 km
4	Economist	41-50	Male / Férfi	University/ College - Egyetem/ főiskola	Own company / Saját vállalkozás	Senior manager / Felső vezető	2	-	City center / történelmi belváros (városcentrum, Várnegyed)	Middle class / Közepes	Very / Nagyon	4/2	16 / Petrol 1.8 L / 7.2 L per 100 km 11 / Hybrid / 2.3 L / 8.5 L per 100 km
5	CityBoy	18-30	Male / Férfi	High school / Érettségi	Student	-	0	Photo, driving, sport music	City center / történelmi belváros (városcentrum, Várnegyed)	Low / Alacsony	Very / Nagyon	4/2	11 / Hybrid / 2.3 L / 9 L per 100 km 16 / Petrol 1.8 L / 7 L per 100 km
6	CorpFinance	18-30	Male / Férfi	University/ College - Egyetem/ főiskola	Privately held company / Magáncég	Employee / Alkalmazott	0	Tennis, football	City center / történelmi belváros (városcentrum, Várnegyed)	High / Magas	Somewhat / Valamennyire	1/0	no car
7	Designer	41-50	Female / Nő	University/ College - Egyetem/ főiskola	Own company / Saját vállalkozás	Employee / Alkalmazott	5	Art	Villa area / Villanegyed	High / Magas	Somewhat / Valamennyire	7/2	doesn't know / Diesel / 2 L / 7 L per 100 km Second car: doesn't know
8	Banker	41-50	Male / Férfi	University/ College - Egyetem/ főiskola	State owned company/ organization - Állami cég/szervezet	Manager / Vezető	5	-	Villa area / Villanegyed	High / Magas	I am not / Nem vagyok környezettudatos	7/2	2 / Diesel / 2 L / 7 L per 100 km 10 / Petrol / 1.2 L / 7 L per 100 km
9	FinProf	60+	Male / Férfi	University/ College - Egyetem/ főiskola	State owned company/ organization - Állami cég/szervezet	Employee / Alkalmazott	2	-	Suburban house / Kertvárosi családi ház	Middle class / Közepes	Very / Nagyon	4/2	10 / Petrol / 1.6L / 7.5 L per 100 km 9 / Petrol / 1.4L / 6 L per 100 km
10	UniDocens	31-40	Male / Férfi	University/ College - Egyetem/ főiskola	State owned company/ organization - Állami cég/szervezet	Employee / Alkalmazott	2	Outing, jogging, gardening	Suburban condominium / Kertvárosi táesasház	Middle class / Közepes	Somewhat / Valamennyire	4/1	12 / Petrol / 1.4L / 7 L per 100 km

Table 3. The Respondents, p. 2

#	Respondent code name	Age / Életkor	Gender / Neme	Highest completed level of education / Iskolai végzettség	Type of employer / Milyen cégnél dolgozik	Job level / Beosztás	Number of children Gyermekek száma	Hobby / Hobbi	Residential area / Hol lakik - milyen a lakóhelye	Income level / Jövedelem	How environmentally conscious are you? / Mennyire tartja magát környezettudatosnak	Persons/Cars in the household - Fő/Autó a háztartásban	Car info (age in years/engine type/engine size in L/consumption in L per 100 km) - Autó infó (kora évben/meghajtása/motortérfogata literben/fogyasztása L-ben per 100 km)
11	Dezs	41-50	Male / Férfi	University/ College - Egyetem/ főiskola	State owned company/ organization - Állami cég/szervezet	Employee / Alkalmazott	0	Sport, travel	Villa area / Villanegyed	High / Magas	Somewhat / Valamennyire	4/2	10 / Petrol / 1.4L / 8 L per 100 km 5 / Diesel / 2L / 7.5 L per 100 km
12	FerfiKo	41-50	Male / Férfi	University/ College - Egyetem/ főiskola	-	-	1	Sport	Suburban house / Kertvárosi családi ház	Middle class / Közepes	Somewhat / Valamennyire	3/2	10 / Petrol / 1.4L / 6 L per 100 km 6 / Petrol / 1.6L / 7.5 L per 100 km
13	Olvaso	41-50	Male / Férfi	University/ College - Egyetem/ főiskola	State owned company/ organization - Állami cég/szervezet	Manager / Vezető	1	Reading, football	Suburban house / Kertvárosi családi ház	High / Magas	Somewhat / Valamennyire	3/2	11 / Petrol / 1.8L / 7 L per 100 km 16 / Petrol / 1.4L / 8 L per 100 km
14	LadyProf	60+	Female / Nő	University/ College - Egyetem/ főiskola	Retired	-	3	-	Villa area / Villanegyed	High / Magas	Somewhat / Valamennyire	2/2	10 / Petrol / doesn't know / doesn't know 3 / Diesel / doesn't know/ doesn't know
15	MathTeach	60+	Female / Nő	University/ College - Egyetem/ főiskola	Retired	-	3	Reading	Suburban condominium / Kertvárosi társasház	Low / Alacsony	I am not / Nem vagyok környezettudatos	1/1	11 / Petrol / doesn't know / 4-5 L per 100 km
16	Gellerth	41-50	Male / Férfi	University/ College - Egyetem/ főiskola	Own company / Saját vállalkozás	Manager / Vezető	2	Jogging, wine	Villa area / Villanegyed	Middle class / Közepes	Somewhat / Valamennyire	4/3	1 / ELectric / - / 0 L per 100 km 8 / Hybrid / 3.6L / 11 L per 100 km 12 / Petrol / 3.6 / 12 L per 100 km
17	CEO	41-50	Male / Férfi	University/ College - Egyetem/ főiskola	State owned company/ organization - Állami cég/szervezet	Senior manager / Felső vezető	2	History books	Suburban house / Kertvárosi családi ház	High / Magas	Very / Nagyon	4/2	4 / Diesel / 2L / 7.5 L per 100 km 3 / Petrol / 2L / 8 L per 100 km
18	PharmaGM	51-60	Female / Nő	University/ College - Egyetem/ főiskola	Own company / Saját vállalkozás	Employee / Alkalmazott	2	Theater, cinema, music, culinary art	Suburban condominium / Kertvárosi társasház	High / Magas	Somewhat / Valamennyire	2/2	1 / Petrol / 1.4L / 8L per 100 km 5 / Petrol / 1.6L / 8L per 100 km
19	KHTvez	60+	Male / Férfi	University/ College - Egyetem/ főiskola	Own company / Saját vállalkozás	Senior manager / Felső vezető	2	Ski, hunting, reading, writing	Suburban house / Kertvárosi családi ház	High / Magas	Somewhat / Valamennyire	2/4	2 / Diesel / 1.5L / 4.5L per 100 km 0 / Diesel / 3.2L / 8L per 100 km 1 / Diesel / 4L / 9L per 100 km 4 / Diesel / 2L / 8L per 100 km
20	CityGirl	18-30	Female / Nő	High school / Érettségi	Privately held company / Magáncég	Employee / Alkalmazott	0	-	City center / történelmi belváros (városcentrum, Várnegyed)	Middle class / Közepes	Somewhat / Valamennyire	2/1	6 / Petrol / 1.8L / 8-9L per 100 km

The personal preferences of the 20 respondents were fed into the PQMethod software with the full outcome seen in Appendix 1. For adequate explanatory power four factors were kept. The PQMethod software generated rankings of statements for each factor and computed the average scale values (from 4 to -4) attached to each of the statements by the respondents in the same factor. The first run of the software produced a result, where one of the respondents (FerfiKo) surprisingly showed a rare example of contradictory opinion to absolutely all the others, in other words, became a total "outlier" within the P-set. Technically the PQMethod software placed him in Factor 1, with which he did not agree to the point of -0.5549 (see in red colour, Table 4).

Table 4. Factor Matrix with an X Indicating a Defining Sort (first run of the software with 20 respondents)

		Loadings			
QSORT		1	2	3	4
1	MinFoAff	0.0250	0.1312	0.5271	0.5677X
2	GenMan	0.0905	0.6522X	0.0495	0.1350
3	Dentist	0.4239	0.4048	0.1178	-0.0540
4	Economis	0.7656X	-0.0452	0.2882	0.0396
5	CityBoy	0.1013	0.5782X	0.2612	-0.0083
6	CorpFin	0.1049	0.6216X	0.2901	0.0470
7	Designer	0.7186X	-0.1458	0.1368	0.2317
8	Banker	0.2801	-0.0923	0.1473	0.6684X
9	FinProf	0.4695	0.2577	-0.2036	0.5190
10	UniDocen	0.6883X	0.2705	0.1744	0.0399
11	Dezs	0.8003X	0.2124	-0.1106	0.1778
12	FerfiKo	-0.5549X	-0.1994	-0.1078	-0.4630
13	Olvaso	-0.3054	0.3734	0.2837	0.5499
14	LadyProf	0.3958	0.0251	0.6928X	-0.0313
15	MathTeach	0.0383	-0.1306	0.5972X	0.2677
16	Gellerth	0.0777	0.7125X	-0.2833	0.1315
17	CEO	0.1549	0.5407X	0.0786	0.4316
18	PharmaGM	-0.0861	0.6733X	-0.2913	0.3103
19	KHTvez	0.1813	0.2903	-0.0887	0.6272X
20	CityGirl	0.1226	0.3435	0.6565X	-0.0585
% expl.Var.		17	16	11	12

It is unknown, whether it happened unintentionally or because of his rebelliousness to the idea of the research, but in this case the methodology allows for the excluding of such respondents from the survey. The revision of the P-set brought an apparently favourable change, as the second run of the software (Appendix 2) for 19 respondents resulted in a set of factors with much cleaner structure, which is illustrated by the fact that the maximum correlation between any two factors of the set shrank from 0.4393 (Table 5) to 0.3994 (Table 6).

Table 5. Correlations Between Factor Scores (first run of the software with 20 respondents)

	1	2	3	4
1	1.0000	0.2428	0.3906	0.4393
2	0.2428	1.0000	0.1288	0.3536
3	0.3906	0.1288	1.0000	0.3177
4	0.4393	0.3536	0.3177	1.0000

Table 6. Correlations Between Factor Scores (second run of the software with 19 respondents)

	1	2	3	4
1	1.0000	0.2323	0.1094	0.3129
2	0.2323	1.0000	0.3781	0.3994
3	0.1094	0.3781	1.0000	0.3276
4	0.3129	0.3994	0.3276	1.0000

At this point another respondent, although her positive approach and sincere answers were beyond doubt, emerged as an outlier among the others (Dentist). After omitting her responses as well, the clarity of the results (Appendix 3) improved and the maximum correlation between any two factors dropped further to 0.3318 (Table 7).

Table 7. Correlations Between Factor Scores (third run of the software)

	1	2	3	4
1	1.0000	0.2540	0.1237	0.2341
2	0.2540	1.0000	0.3317	0.3282
3	0.1237	0.3317	1.0000	0.3318
4	0.2341	0.3282	0.3318	1.0000

At the same time the cumulative variance explained by the four factors grew from 56% in the first run (Table 8) to the 58% of the third run (Table 9).

Table 8. Cumulative Communalities Matrix (first run of the software with 20 respondents)

Factors 1 Thru ....

SORTS	1	2	3	4	5	6	7	8
1 MinFoAff	0.2669	0.2681	0.5078	0.6180	0.6975	0.7131	0.7168	0.7239
2 GenMan	0.2480	0.4075	0.4088	0.4542	0.6745	0.7460	0.7502	0.7502
3 Dentist	0.2384	0.2391	0.2482	0.3603	0.4828	0.4890	0.5000	0.8125
4 Economis	0.2911	0.6358	0.6530	0.6728	0.7163	0.7706	0.8279	0.8573
5 CityBoy	0.2041	0.2597	0.2996	0.4129	0.4939	0.5079	0.7363	0.7539
6 CorpFin	0.2637	0.3321	0.3844	0.4837	0.5177	0.6083	0.6481	0.8586
7 Designer	0.2579	0.5470	0.5995	0.6100	0.6781	0.7569	0.8491	0.8494
8 Banker	0.2407	0.2709	0.2719	0.5554	0.6042	0.6045	0.6917	0.7317
9 FinProf	0.3942	0.3987	0.5286	0.5977	0.6101	0.6926	0.7242	0.7421
10 UniDocen	0.4049	0.4833	0.5147	0.5789	0.6319	0.6355	0.6714	0.6763
11 Dezs	0.4363	0.4998	0.7221	0.7294	0.7704	0.8106	0.8119	0.8408
12 FerfiKo	0.4994	0.5230	0.5428	0.5737	0.5743	0.5808	0.6008	0.6042
13 Olvaso	0.1397	0.3153	0.5207	0.6155	0.6159	0.6739	0.7219	0.8203
14 LadyProf	0.1870	0.4271	0.5870	0.6383	0.7098	0.7888	0.7986	0.8032
15 MathTeach	0.0627	0.1524	0.4127	0.4469	0.6363	0.6589	0.6910	0.6988
16 Gellerth	0.1839	0.5170	0.5758	0.6112	0.6119	0.7238	0.7415	0.7962
17 CEO	0.3970	0.5014	0.5035	0.5089	0.5097	0.7654	0.8293	0.8300
18 PharmaGM	0.1552	0.6171	0.6417	0.6419	0.7207	0.7608	0.8910	0.9099
19 KHTvez	0.3101	0.3643	0.3761	0.5184	0.6770	0.7689	0.8174	0.8261
20 CityGirl	0.1765	0.1865	0.4531	0.5674	0.6607	0.7090	0.7423	0.7498
cum% expl.Var.	27	40	49	56	63	69	74	78

Table 9. Cumulative Communalities Matrix (third run of the software with 18 respondents)

Factors 1 Thru ....

SORTS	1	2	3	4	5	6	7	8
1 MinFoAff	0.2920	0.2975	0.5187	0.7085	0.7109	0.7304	0.7308	0.7727
2 GenMan	0.2455	0.3904	0.3936	0.4025	0.7159	0.7478	0.7525	0.7808
3 Economis	0.2504	0.6176	0.6454	0.6970	0.7030	0.7667	0.8183	0.8214
4 CityBoy	0.2403	0.2787	0.3048	0.4888	0.4888	0.5045	0.7300	0.8830
5 CorpFin	0.2971	0.3469	0.3909	0.4113	0.5563	0.7115	0.7840	0.7849
6 Designer	0.2296	0.5430	0.6136	0.6945	0.7081	0.7809	0.8459	0.8997
7 Banker	0.2378	0.2752	0.2754	0.5982	0.6097	0.6100	0.7461	0.7990
8 FinProf	0.3673	0.3702	0.5085	0.6019	0.6136	0.6772	0.7161	0.7541
9 UniDocen	0.3900	0.4858	0.5358	0.6381	0.6383	0.6424	0.6956	0.8388
10 Dezs	0.4141	0.4882	0.7562	0.7855	0.7856	0.8247	0.8318	0.9026
11 Olvaso	0.1544	0.3127	0.5312	0.5875	0.6286	0.7130	0.7446	0.8477
12 LadyProf	0.1683	0.4360	0.5843	0.5857	0.7590	0.8029	0.8108	0.8148
13 MathTeach	0.0701	0.1761	0.4004	0.4140	0.6483	0.6551	0.7054	0.7466
14 Gellerth	0.2074	0.5181	0.5813	0.5987	0.6518	0.7423	0.7472	0.7473
15 CEO	0.4285	0.5115	0.5120	0.5217	0.5255	0.7722	0.8384	0.8388
16 GyogyszV	0.1704	0.6175	0.6406	0.6649	0.7476	0.7752	0.8774	0.8846
17 KHTvez	0.3480	0.3905	0.4136	0.4187	0.6116	0.7593	0.7910	0.8021
18 CityGirl	0.1936	0.2138	0.4454	0.6487	0.6590	0.7080	0.7405	0.7746
cum% expl.Var.	26	40	50	58	65	72	77	82

These results confirmed that the omitting of the two outliers from the examination was highly reasonable, as the remaining 18 respondents now represented clearly distinct groups for further analysis. Regrettably, even in this case two of the respondents – FinProf and Olvaso – were not evidently identifiable in the structure of the factors, but on this occasion it was not because of the outlier phenomenon, but because on some statements they were both agreeing with Factors 1 and 4, and then their opinion on other statements was strikingly different from that of the respondents of Factor 2 and 3. To be precise, FinProf's coefficient for Factor 3 was -0.2076, and Olvaso's coefficient for Factor 2 was -0.3512. According to FinProf's highest score (0.4489) he would belong to Factor 2. (Table 10).

Table 10. Factor Matrix with an X Indicating a Defining Sort (third run of the software with 18 respondents)

		Loadings			
QSORT		1	2	3	4
1	MinFoAff	0.1974	-0.0514	0.3970	0.7136X
2	GenMan	0.5864X	-0.0093	0.0605	0.2343
3	Economis	-0.0767	0.7503X	0.3503	0.0734
4	CityBoy	0.5149X	0.1359	0.4196	-0.1706
5	CorpFin	0.5252X	0.0610	0.3468	0.1069
6	Designer	-0.1237	0.6679X	0.0364	0.4814
7	Banker	0.0903	0.2382	0.0127	0.7302X
8	FinProf	0.4183	0.4489	-0.2076	0.4268
9	UniDocen	0.2416	0.7018X	0.2947	-0.0180
10	Dezs	0.2824	0.8386X	0.0027	0.0504
11	Olvaso	0.4799	-0.3512	0.2701	0.4011
12	LadyProf	-0.1399	0.2797	0.6289X	0.3039
13	MathTeach	-0.0878	0.0583	0.6137X	0.1621
14	Gellerth	0.7480X	0.1037	-0.1513	-0.0743
15	CEO	0.6236X	0.1458	0.1211	0.3113
16	GyogyszV	0.7985X	-0.0366	-0.1177	-0.1100
17	KHTvez	0.5381X	0.2696	0.0030	0.2376
18	CityGirl	0.2106	0.1106	0.7647X	-0.0859
% expl.Var.		19	16	12	11

Similarly, Olvaso's highest coefficient is 0.4799, which could place him in Factor 1. On the other hand, in theory FinProf could be identified with Factors 1, 2 and 4, while Olvaso could belong to Factors 1 and 4, perhaps even to Factor 3. Both respondents, in fact, are not outliers, but nevertheless are difficult to categorize.

Even so, in comparison to the first run of the software with 20 respondents, now the structure of the data output visibly improved. Interestingly, the last run with 18 respondents strengthened the factors and even resulted in their reorganization - Factors 1 and 2 swapped over (Table 11).

Table 11. Comparison between Factor Matrix of the first and the third run of the software

PQMethod2.35 Attitude to city mobility
Path and Project Name: C:\PQMethod\projects/mobility

Factor Matrix with an X Indicating a Defining Sort

QSORT		Loadings 1	2	3	4
1	**MinFoAff**	0.0250	0.1312	0.5271	**0.5677X**
2	GenMan	0.0905	0.6522X	0.0495	0.1350
3	Dentist	0.4239	0.4048	0.1178	-0.0540
4	Economis	0.7656X	-0.0452	0.2882	0.0396
5	CityBoy	0.1013	0.5782X	0.2612	-0.0083
6	CorpFin	0.1049	0.6216X	0.2901	0.0470
7	Designer	0.7186X	-0.1458	0.1368	0.2317
8	**Banker**	0.2801	-0.0923	0.1473	**0.6684X**
9	FinProf	0.4695	0.2577	-0.2036	0.5190
10	UniDocen	0.6883X	0.2705	0.1744	0.0399
11	Dezs	0.8003X	0.2124	-0.1106	0.1778
12	FerfiKo	-0.5549X	-0.1994	-0.1078	-0.4630
13	Olvaso	-0.3054	0.3734	0.2837	0.5499
14	**LadyProf**	0.3958	0.0251	**0.6928X**	-0.0313
15	**MathTeach**	0.0383	-0.1306	**0.5972X**	0.2677
16	Gellerth	0.0777	0.7125X	-0.2833	0.1315
17	CEO	0.1549	0.5407X	0.0786	0.4316
18	PharmaGM	-0.0861	0.6733X	-0.2913	0.3103
19	**KHTvez**	0.1813	0.2903	-0.0887	**0.6272X**
20	**CityGirl**	0.1226	0.3435	**0.6565X**	-0.0585
	% expl.Var.	17	16	11	12

PQMethod2.35 Attitude to city mobility 3
Path and Project Name: C:\PQMethod/mobility3

Factor Matrix with an X Indicating a Defining Sort

QSORT		Loadings 1	2	3	4
1	**MinFoAff**	0.1974	-0.0514	0.3970	**0.7136X**
2	GenMan	0.5864X	-0.0093	0.0605	0.2343
3	Economis	-0.0767	0.7503X	0.3503	0.0734
4	CityBoy	0.5149X	0.1359	0.4196	-0.1706
5	CorpFin	0.5252X	0.0610	0.3468	0.1069
6	Designer	-0.1237	0.6679X	0.0364	0.4814
7	**Banker**	0.0903	0.2382	0.0127	**0.7302X**
8	FinProf	0.4183	0.4489	-0.2076	0.4268
9	UniDocen	0.2416	0.7018X	0.2947	-0.0180
10	Dezs	0.2824	0.8386X	0.0027	0.0504
11	Olvaso	0.4799	-0.3512	0.2701	0.4011
12	**LadyProf**	-0.1399	0.2797	**0.6289X**	0.3039
13	**MathTeach**	-0.0878	0.0583	**0.6137X**	0.1621
14	Gellerth	0.7480X	0.1037	-0.1513	-0.0743
15	CEO	0.6236X	0.1458	0.1211	0.3113
16	GyogyszV	0.7985X	-0.0366	-0.1177	-0.1100
17	KHTvez	0.5381X	0.2696	0.0030	0.2376
18	**CityGirl**	0.2106	0.1106	**0.7647X**	-0.0859
	% expl.Var.	19	16	12	11

After the outliers were omitted, the respondents that previously were allocated to Factor 2 on the left (blue colour) now are gathered in Factor 1 on the right, plus another respondent was added to this factor from the previous Factor 4 (KHTvez) and their total variance increased to 19%.

All respondents, who previously were in Factor 1 on the left (red colour) were relocated in Factor 2 on the right.

All respondents, who were in the previous Factor 3 on the left (purple colour) stayed the same in the new Factor 3 on the right.

All those, who were in the previous Factor 4 on the left (green colour) stayed the same in the new Factor 4, with the exception of the above mentioned KHTvez, who was relocated to Factor 1 on the right side.

To summarize, after omitting the two outliers from the first run of the software, during the third run only one respondent was transferred to a different factor!

4.2. Typifying respondents with different attitudes into separate groups and their analysis

In the above Table 10 the four different factors from the last run of the PQMethod software are shown. Based on the Distinguishing Statements for these factors I named the groups of the respondents as follows: "Speeding Drivers", "Environmentally Conscious", "Comfort Lovers", "Rich and Prudent".

4.2.1. Preferences of the "Speeding Drivers" group

Table 12 shows the distinguishing statements for Factor 1 ("Speeding Drivers") as compared to the other factors, while Table 13 shows the distinguishing statements for this factor as compared to the old Factor 2 (on the left). In Table 13 the statements that can be found in both factors are in yellow colour.

Table 12. Distinguishing Statements for Factor 1 (third run of the software with 18 respondents)

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Factors			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
9	Much more people would use public transport, if there were m	9	4	2.07*	0	0.35	0	-0.15	2	0.79
31	If the taxi was cheaper, more people would leave their cars	31	3	1.10*	-1	-0.49	-1	-0.41	-4	-1.79
34	All electric cars shall be allowed to use the bus lane free	34	2	0.73*	0	-0.26	-1	-0.42	-2	-0.53
18	For modern successful urban people the comfort and perme és	18	1	0.40	3	1.17	4	1.83	4	1.51
33	The use of the bus lane should be allowed for private cars f	33	1	0.32*	-3	-1.46	-4	-1.83	-3	-1.25
27	Utilizing the bus lane would be more effective, if you could	27	0	-0.04	-2	-0.83	-2	-0.89	-3	-1.30
30	The car is not something that a person lends.	30	-1	-0.57	-3	-1.32	0	0.14	1	0.49
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1.21	-1	-0.44	3	1.56	0	0.06
10	Car-free days should be organized, because if you cannot use	10	-3	-1.25*	2	0.99	-1	-0.26	0	0.25
20	All cars should be equipped with a GPS-based speedometer and	20	-4	-1.41*	3	1.30	3	0.84	1	0.28

Table 13. Comparison of distinguishing statements for Factor 1 (third run of the software) and Factor 2 (first run of the software)

I. run with 2 outliers - Distiguishing Statements for Factor 2
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
9. Much more people would use public transport, if there were more P+R parking lots (Park and Ride).	4	1.96
19. State subsidies and discounts clearly increase demand for electric cars.	4	1.57*
31. If the taxi was cheaper, more people would leave their cars at home.	3	1.10*
14. People prefer to ride their own cars, because the taxi is more expensive than using a private car.	3	1.03
8. If someone wants to drink alcohol during the night, even then it is better to go to the party with your own car, because there is driver service.	2	1.01
18. For modern successful urban people the comfort and performance of their car is more important than the cost of the trip.	1	0.58
33. The use of the bus lane should be allowed for private cars for a fee.	1	0.37*
27. Utilizing the bus lane would be more effective, if you could use it for additional fee.	0	-0.05*
26. Business cars with free usage are a bad example and cause overspending.	-1	-0.79
7. Street parking fees in Budapest are unrealistically high, but they positively affect the everyday routines of the city.	-3	-1.05*
10. Car-free days should be organized, because if you cannot use your own car over a period of time, you will learn to organize your movement and time more efficiently.	-3	-1.14*
20. All cars should be equipped with a GPS-based speedometer and speeding shall be automatically penalized.	-4	-1.83*

III. Run without the 2 outliers - Distiguishing Statements for Factor 1
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
9. Much more people would use public transport, if there were more P+R parking lots (Park and Ride).	4	2.07*
31. If the taxi was cheaper, more people would leave their cars at home.	3	1.10*
34. All electric cars shall be allowed to use the bus lane free of charge.	2	0.73*
18. For modern successful urban people the comfort and performance of their car is more important than the cost of the trip.	1	0.40
33. The use of the bus lane should be allowed for private cars for a fee.	1	0.32*
27. Utilizing the bus lane would be more effective, if you could use it for additional fee.	0	-0.04
30. The car is not something that a person lends.	-1	-0.57
7. Street parking fees in Budapest are unrealistically high, but they positively affect the everyday routines of the city.	-3	-1.21
10. Car-free days should be organized, because if you cannot use your own car over a period of time, you will learn to organize your movement and time more efficiently.	-3	-1.25*
20. All cars should be equipped with a GPS-based speedometer and speeding shall be automatically penalized.	-4	-1.41*

Distinguishing Statements 9 and 31 are those, with which the group of "Speeding Drivers" most agrees:

9. Much more people would use public transport, if there were more P+R parking lots (Park and Ride).

31. If the taxi was cheaper, more people would leave their cars at home.

These statements were similarly important in the old factor as well.

In comparison to the first run of the software Statement 34 came forward in the factor (*All electric cars shall be allowed to use the bus lane free of charge),* with which "Speeding Drivers" also agree, being the only ones among all the other factors.

Statement 18 *(For modern successful urban people the comfort and performance of their car is more important than the cost of the trip),* Statement 33 *(The use of the bus lane should be allowed for private cars for a fee)* and Statement *27 (Utilizing the bus lane would be more effective, if you could use it for additional fee)* remained in the factor as positively close to neutral.

The three distinguishing statements with which the respondents of this factor most disagree have also stayed absolutely the same (the least acceptable is in the last row):

7. Street parking fees in Budapest are unrealistically high, but they positively affect the everyday routines of the city.

10. Car-free days should be organized, because if you cannot use your own car over a period of time, you will learn to organize your movement and time more efficiently.

20. All cars should be equipped with a GPS-based speedometer and speeding shall be automatically penalized.

Altogether eight of the ten distinguishing statements for the factor have remained the same as before, while the scores of the newly appeared Statement 34 described above confirm the mindset of the "Speeding Drivers".

From these distinguishing ten statements I see that the respondents in Factor 1 strongly oppose the car-free days and dislike the street parking fees. They love speed so much, that the suggestion of Statement 20 to automatically penalize all cases of speeding is unacceptable to them.

Interestingly enough, while strongly opposing Statement 20 *(All cars should be equipped with a GPS-based speedometer and speeding shall be automatically penalized)* this group shows strong agreement with Statement 28 *(Speed limitation is important and can save lives)* - see Table 14.

Table 14. Factor Scores For Factor 1 (third run of the software)

No.	Statement	No.	Z-SCORES
9	Much more people would use public transport, if there were m	9	2.074
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710
28	Speed limitation is important and can save lives.	28	1.455
19	State subsidies and discounts clearly increase demand növeli	19	1.451
23	The longer the time you spend in the city center, the more i	23	1.402
14	People prefer to ride their own cars, because the taxi is mo	14	1.129
31	If the taxi was cheaper, more people would leave their cars	31	1.103
8	If someone wants to drink alcohol during the night, even the	8	1.063
34	All electric cars shall be allowed to use the bus lane free	34	0.728
4	If the local government would only allow electric cars in th	4	0.676
2	State sponsored environmental advertizing and awareness camp	2	0.630
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564
17	Car buyers will still choose the peak performance, even if t	17	0.556
13	In China, India and other countries with rapidly growing pop	13	0.425
18	For modern successful urban people the comfort and perme és	18	0.397
33	The use of the bus lane should be allowed for private cars f	33	0.324
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164
1	A fejlett országoknak támogatniuk kell a tömegközlekedést Kí	1	0.161
36	Public opinion underestimates the number of environmentally	36	0.119
27	Utilizing the bus lane would be more effective, if you could	27	-0.044
39	By public transport you can comfortably get almost anywhere	39	-0.092
16	Most of the customers of electric cars choose them not becaus	16	-0.153
12	People do not even think about how much it costs to maintain	12	-0.226
26	Business cars with free usage are a bad example and cause ov	26	-0.303
24	Those with higher incomes have the duty to drive the least p	24	-0.323
30	The car is not something that a person lends.	30	-0.573
37	The impact of the transport habits of an individual on the e	37	-0.585
22	All adult family members should maintain their own cars to e	22	-0.615
32	Those who do not enter the city do not care what the air the	32	-0.759
6	We must accept that traditional cars shall be excluded from	6	-0.824
3	Public transport is inferior to using your own car, even if	3	-0.949
29	For a family of 3-5 members 1 car is enough.	29	-0.983
38	The bigger and more expensive the car is, the greater the re	38	-1.105
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208
10	Car-free days should be organized, because if you cannot use	10	-1.247
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322
25	Those who can afford the most modern car shall buy it out o	25	-1.380
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032

Actually all groups share the same opinion in relation to Statement 28 - see Table 15.

Table 15. Consensus Statements (third run of the software)

Consensus Statements -- Those That Do Not Distinguish Between ANY Pair of Factors.
All Listed Statements are Non-Significant at P>.01, and Those Flagged With an * are also Non-Significant at P>.05.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
1	The developed countries should support the public transport	1	0	0.16	0	0.34	3	0.94	2	0.98
11*	The urban traffic jam is no problem in terms of time, becaus	11	-3	-1.32	-3	-1.16	-3	-1.53	-4	-1.53
16	Most of the customers of electric cars choose them not becau	16	0	-0.15	2	0.53	1	0.30	0	-0.26
22	All adult family members should maintain their own cars to e	22	-1	-0.61	-3	-1.24	-3	-1.03	-1	-0.49
28	Speed limitation is important and can save lives.	28	4	1.46	4	1.45	2	0.76	4	1.53

Still, "Speeding Drivers" are the only ones to disagree, moreover, strongly to disagree (Z-Score of -1.406) with the idea to punish every incident of breaking the speed limit. Most probable - and quite easy - explanation for this seemingly apparent contradiction is that they consider themselves to be good drivers, who shall be left to drive faster than the speed limit, while all others shall reduce their driving speed to make traffic safer. If GPS based speeding tickets shall be introduced, then all drivers shall keep speed limits, including our respondents - and that is intolerable for them.

Back to Distinguishing Statements 9 and 31, with which Factor 1 agrees most, based on my interviews with the respondents, it seems that "Speeding Drivers" rather hope that after P+R sites are built and taxi becomes cheaper, "others" will reduce their driving and make it easier to drive in the city. This is supported by their Z-Score (1.710) for Statement 15 *(If there were more P+R parking lots /Park and Ride/, it would be easier to drive in the city),* making it the second in rank for Factor 1 - see Table 14 above.

4.2.2. Preferences of the "Environmentally Conscious" group

Table 16 shows the distinguishing statements for Factor 2 ("Environmentally Conscious") as compared to the other factors, while Table 17 shows the distinguishing statements for this factor as compared to the old Factor 1 (on the left).

Table 16. Distinguishing Statements for Factor 2 (third run of the software with 18 respondents)

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
26	Business cars with free usage are a bad example and cause ov	26	-1	-0.30	4	1.89*	0	-0.12	1	0.53
17	Car buyers will still choose the peak performance, even if t	17	1	0.56	4	1.54*	1	0.41	-3	-1.30
29	For a family of 3-5 members 1 car is enough.	29	-2	-0.98	2	0.84	-1	-0.39	0	-0.00
39	By public transport you can comfortably get almost anywhere	39	0	-0.09	2	0.77	0	-0.10	-2	-0.53
24	Those with higher incomes have the duty to drive the least p	24	-1	-0.32	1	0.43	-2	-0.65	-3	-1.28
6	We must accept that traditional cars shall be excluded from	6	-2	-0.82	1	0.39	-3	-1.25	3	1.30
21	Everyone in Budapest should be obliged to buy a public trans	21	-4	-2.03	-2	-0.70*	-4	-1.79	-4	-1.77
30	The car is not something that a person lends.	30	-1	-0.57	-3	-1.32	0	0.14	1	0.49

Table 17. Comparison of distinguishing statements for Factor 2 (third run of the software) and Factor 1 (first run of the software)

I. run with 2 outliers - Distiguishing Statements for Factor 1
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
26. Business cars with free usage are a bad example and cause overspending.	4	1.96*
17. Car buyers will still choose the peak performance, even if they cannot make use of it.	4	1.46
10. Car-free days should be organized, because if you cannot use your own car over a period of time, you will learn to organize your movement and time more efficiently.	2	0.93
29. For a family of 3-5 members 1 car is enough.	2	0.92*
24. Those with higher incomes have the duty to drive the least polluting cars.	2	0.53
21. Everyone in Budapest should be obliged to buy a public transport pass, even if he has a car.	-2	-0.86
3. Public transport is inferior to using your own car, even if it has been proven to be faster in some cases.	-4	-1.56
8. If someone wants to drink alcohol during the night, even then it is better to go to the party with your own car, because there is driver service.	-4	-1.86

III. Run without the 2 outliers - Distiguishing Statements for Factor 2
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
26. Business cars with free usage are a bad example and cause overspending.	4	1.89*
17. Car buyers will still choose the peak performance, even if they cannot make use of it.	4	1.54*
29. For a family of 3-5 members 1 car is enough.	2	0.84
39. By public transport you can comfortably get almost anywhere in Budapest.	2	0.77
24. Those with higher incomes have the duty to drive the least polluting cars.	1	0.43
6. We must accept that traditional cars shall be excluded from cities, only electric cars shall have the right to drive there.	1	0.39
21. Everyone in Budapest should be obliged to buy a public transport pass, even if he has a car.	-2	-0.70*
30. The car is not something that a person lends.	-3	-1.32

The statements in yellow can be found in both the old and the new factor. Among them are Statements *26 (Business cars with free usage are a bad example and cause overspending), 17 (Car buyers will still choose the peak performance, even if they cannot make use of it), and 29 (For a family of 3-5 members 1 car is enough),* with which "Environmentally Conscious" agree and Statement *21 (Everyone in Budapest should be obliged to buy a public transport pass, even if he has a car),* with which they do not agree. The newly confirmed distinguishing Statements 39 *(By public transport you can comfortably get almost anywhere in Budapest)* and 6 *(We must accept that traditional cars shall be excluded from cities, only electric cars shall have the right to drive there)* underline the environmentally friendly thinking of the respondents in this factor, when compared to the other factors.

The "Environmentally Conscious" disapprove of the company cars (which are perceived as "no cost" by the drivers, but actually cause overspending); do not consider private vehicles to be exclusively personal belongings and support their efficient use; rather agree, than disagree with the necessity to replace traditional vehicles with electric ones, and similarly line up with the opinion that people with higher income shall support the environment through their choice of cleaner vehicles.

The respondents of Factor 2 also express positive opinion about the convenience of public transport, but at the same time refuse the idea of having a mandatory travel pass to public transport. Still, among the other factors, the "Environmentally Conscious" show the least resistance to Statement 21.

4.2.3. Preferences of the "Comfort Lovers" group"

Table 18 shows the distinguishing statements for Factor 3 ("Comfort Lovers") as compared to the other factors. The comparison of the distinguishing statements for this factor with the old Factor 3 is shown in Table 19 (the statements in yellow can be found in both).

Table 18. Distinguishing Statements for Factor 3 (third run of the software with 18 respondents)

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

		Factors 1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
38	The bigger and more expensive the car is, the greater the re	38	-3	-1.11	-2	-0.89	4	1.96*	0	-0.04
3	Public transport is inferior to using your own car, even if	3	-2	-0.95	-4	-1.49	4	1.80*	-1	-0.30
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1.21	-1	-0.44	3	1.56*	0	0.06
23	The longer the time you spend in the city center, the more i	23	3	1.40	3	1.36	-2	-0.47*	2	0.75

Table 19. Comparison of distinguishing statements for Factor 3 (third run of the software) and Factor 3 (first run of the software)

I. run with 2 outliers - Distiguishing Statements for Factor 3
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
38. The bigger and more expensive the car is, the greater the respect is.	4	1.98*
3. Public transport is inferior to using your own car, even if it has been proven to be faster in some cases.	4	1.69*
7. Street parking fees in Budapest are unrealistically high, but they positively affect the everyday routines of the city.	3	1.68*
26. Business cars with free usage are a bad example and cause overspending.	0	-0.04
23. The longer the time you spend in the city center, the more it is worth using public transport.	-2	-0.79*
8. If someone wants to drink alcohol during the night, even then it is better to go to the party with your own car, because there is driver service.	-2	-1.16

III. Run without the 2 outliers - Distiguishing Statements for Factor 3
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
38. The bigger and more expensive the car is, the greater the respect is.	4	1.96*
3. Public transport is inferior to using your own car, even if it has been proven to be faster in some cases.	4	1.80*
7. Street parking fees in Budapest are unrealistically high, but they positively affect the everyday routines of the city.	3	1.56*
23. The longer the time you spend in the city center, the more it is worth using public transport.	-2	-0.47*

Out of six distinguishing statements brought forward by the first run of PQMethod software for this factor (see left), two were dropped by the software after the exclusion of the outliers, but the other four remained the same. The "Comfort Lovers" strongly agree with Statement *38 (The bigger and more expensive the car is, the greater the respect is)* and Statement *3 (Public transport is inferior to using your own car, even if it has been proven to be faster in some cases)*, agree with Statement *7 (Street parking fees in Budapest are unrealistically high, but they positively affect the everyday routines of the city)* and disagree with Statement *23 (The longer the time you spend in the city center, the more it is worth using public transport).* Their opinion on each of these statements is totally opposite to the opinion of the other groups. In a nutshell - the "Comfort Lovers" enjoy using big and expensive cars, consider public transport inferior

and prefer to avoid it in favour of the passenger car, even if they want to spend more time in the city center and have to park in places with high parking fees.

4.2.4. Preferences of the "Rich and Prudent" group

Table 20 shows the distinguishing statements for Factor 4 ("Rich and Prudent") as compared to the other factors.

Table 20. Distinguishing Statements for Factor 4 (third run of the software)

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0.16	1	0.36	1	0.17	4	2.04*
6	We must accept that traditional cars shall be excluded from	6	-2	-0.82	1	0.39	-3	-1.25	3	1.30
12	People do not even think about how much it costs to maintain	12	0	-0.23	0	0.35	-1	-0.36	3	1.30
38	The bigger and more expensive the car is, the greater the re	38	-3	-1.11	-2	-0.89	4	1.96	0	-0.04
4	If the local government would only allow electric cars in th	4	2	0.68	3	1.42	2	0.82	-1	-0.49*
35	Old, less modern vehicles shall be punished by a higher tax.	35	1	0.56	1	0.45	2	0.84	-2	-1.00*
17	Car buyers will still choose the peak performance, even if t	17	1	0.56	4	1.54	1	0.41	-3	-1.30*
31	If the taxi was cheaper, more people would leave their cars	31	3	1.10	-1	-0.49	-1	-0.41	-4	-1.79*

On the basis of the above distinguishing statements and my individual conversations with the respondents of Factor 4, the "Rich and Prudent" can be described as people who would not let their cars at home even if taxi became cheaper, they would welcome any congestion charge to scare away other drivers and to keep driving. Probably for similar reasons, they accept the idea to exclude traditional vehicles from the city and allow only electric vehicles there, as they can easily afford to have such vehicles. At the same time, they never overspend and know exactly what vehicles they buy and how they want to use them. Having interviewed the responders personally (all of them have enough income to afford any car), I believe their disagreement with Statement 17 *(Car buyers will still choose the peak performance, even if they cannot make use of it)* is genuinely true and shows real prudence, as none of them ever buys a car above their actual needs and they utilize each respective vehicle they purchase with maximum efficiency. They are unique in their agreement with Statement 12 *(People do not even think about how much it costs to maintain their cars - depreciation, taxes, annual service and repair, fuel, parking fees, tolls, etc.)*, to which the respondents from the other factors are largely indifferent. Their attitude to Statement 38 *(The bigger and more expensive the car is, the greater the respect is)* is neutral, because they use the cars pragmatically and are not tempted to impress anyone by buying something big and expensive, they only buy it when they really need it.

Interestingly, after scrutinizing the statistical data of the P-set, I found that the respondents of the "Comfort Lovers", who strongly agreed with Statement 38, had modest vehicles in their households, as opposed to the car park of the "Rich and Prudent", for whom gaining more respect through bigger and more expensive cars was not a challenge anymore.

The comparison of the distinguishing statements for the new Factor 4 with the old Factor 4 is shown in Table 21 (the statements in yellow can be found in both).

Table 21. Comparison of distinguishing statements for Factor 4 (third run of the software) and Factor 4 (first run of the software)

I. run with 2 outliers - Distiguishing Statements for Factor 4
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
5. Traffic jams can be eliminated by introducing an appropriate fee for using your car in the city.	4	1.89*
9. Much more people would use public transport, if there were more P+R parking lots (Park and Ride).	3	1.24
26. Business cars with free usage are a bad example and cause overspending.	2	0.83
8. If someone wants to drink alcohol during the night, even then it is better to go to the party with your own car, because there is driver service.	1	0.24
22. All adult family members should maintain their own cars to ensure their independent mobility.	0	-0.12
4. If the local government would only allow electric cars in the city center, they would spread without state subsidies and discounts.	-1	-0.31
35. Old, less modern vehicles shall be punished by a higher tax.	-1	-0.50
39. By public transport you can comfortably get almost anywhere in Budapest.	-3	-1.21*
31. If the taxi was cheaper, more people would leave their cars at home.	-3	-1.36
17. Car buyers will still choose the peak performance, even if they cannot make use of it.	-4	-1.62*

III. Run without the 2 outliers - Distiguishing Statements for Factor 4
(P < .05 ; Asterisk (*) Indicates Significance at P < .01)
Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

Statement	Q-SV	Z-SCR
5. Traffic jams can be eliminated by introducing an appropriate fee for using your car in the city.	4	2.04*
6. We must accept that traditional cars shall be excluded from cities, only electric cars shall have the right to drive there.	3	1.30
12. People do not even think about how much it costs to maintain their cars - depreciation, taxes, annual service and repair, fuel, parking fees, tolls, etc.	3	1.30
38. The bigger and more expensive the car is, the greater the respect is.	0	-0.04
4. If the local government would only allow electric cars in the city center, they would spread without state subsidies and discounts.	-1	-0.49*
35. Old, less modern vehicles shall be punished by a higher tax.	-2	-1.00*
17. Car buyers will still choose the peak performance, even if they cannot make use of it.	-3	-1.30*
31. If the taxi was cheaper, more people would leave their cars at home.	-4	-1.79*

Five distinguishing statements for this factor remained the same as in the first run of the PQMethod software (see in yellow colour). Most significant of them, when compared to the other factors, is Statement 5 *(Traffic jams can be eliminated by introducing an appropriate fee for using your car in the city)*, with which the "Rich and Prudent" strongly agree (Z-Score 2.04), while the scores of the other factors for the same statement are indifferent (see Table 20). Cheaper taxi is not a solution for them - among all groups they show the greatest rejection (-1.79) of Statement 31 *(If the taxi was cheaper, more people would leave their cars at home).* To summarize the attitude of this group - they are ready to pay, but want to keep driving.

4.2.5. Differences and Similarities

Compared to each other the four factors look as follows.

Factors 1 "Speeding Drivers" against 2 "Environmentally Conscious" (Table 22).

Table 22. Descending Array of Differences Between Factors 1 and 2 (third run of the software)

No.	Statement	No.	Type 1	Type 2	Difference
8	If someone wants to drink alcohol during the night, even the	8	1.063	-1.797	2.860
33	The use of the bus lane should be allowed for private cars f	33	0.324	-1.455	1.779
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710	-0.020	1.730
9	Much more people would use public transport, if there were m	9	2.074	0.348	1.726
31	If the taxi was cheaper, more people would leave their cars	31	1.103	-0.486	1.588
14	People prefer to ride their own cars, because the taxi is mo	14	1.129	-0.312	1.441
19	State subsidies and discounts clearly increase demand növeli	19	1.451	0.417	1.034
34	All electric cars shall be allowed to use the bus lane free	34	0.728	-0.261	0.989
13	In China, India and other countries with rapidly growing pop	13	0.425	-0.378	0.803
27	Utilizing the bus lane would be more effective, if you could	27	-0.044	-0.833	0.789
30	The car is not something that a person lends.	30	-0.573	-1.318	0.745
36	Public opinion underestimates the number of environmentally	36	0.119	-0.580	0.699
22	All adult family members should maintain their own cars to e	22	-0.615	-1.236	0.621
2	State sponsored environmental advertizing and awareness camp	2	0.630	0.013	0.616
37	The impact of the transport habits of an individual on the e	37	-0.585	-1.152	0.568
3	Public transport is inferior to using your own car, even if	3	-0.949	-1.487	0.539
25	Those who can afford the most modern car shall buy it out o	25	-1.380	-1.637	0.258
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564	0.452	0.112
23	The longer the time you spend in the city center, the more i	23	1.402	1.355	0.047
28	Speed limitation is important and can save lives.	28	1.455	1.448	0.007
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322	-1.155	-0.167
1	The developed countries should support the public transport	1	0.161	0.345	-0.183
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164	0.364	-0.200
38	The bigger and more expensive the car is, the greater the re	38	-1.105	-0.891	-0.214
32	Those who do not enter the city do not care what the air the	32	-0.759	-0.232	-0.527
12	People do not even think about how much it costs to maintain	12	-0.226	0.353	-0.580
16	Most of the customers of electric cars choose them not becau	16	-0.153	0.533	-0.686
4	If the local government would only allow electric cars in th	4	0.676	1.423	-0.747
24	Those with higher incomes have the duty to drive the least p	24	-0.323	0.431	-0.754
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208	-0.441	-0.768
18	For modern successful urban people the comfort and perme és	18	0.397	1.172	-0.775
39	By public transport you can comfortably get almost anywhere	39	-0.092	0.768	-0.860
17	Car buyers will still choose the peak performance, even if t	17	0.556	1.536	-0.980
6	We must accept that traditional cars shall be excluded from	6	-0.824	0.391	-1.215
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032	-0.702	-1.331
29	For a family of 3-5 members 1 car is enough.	29	-0.983	0.842	-1.825
26	Business cars with free usage are a bad example and cause ov	26	-0.303	1.885	-2.189
10	Car-free days should be organized, because if you cannot use	10	-1.247	0.990	-2.237
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406	1.304	-2.710

The biggest difference (2.860) between **"Speeding Drivers" and "Environmentally Conscious"** is their attitude to Statement 8 *(If someone wants to drink alcohol during the night, even then it is better to go to the party with your own car, because there is driver service).* "Environmentally Conscious" disagree with that (with Z-Score of -1.797), while "Speeding Drivers" prefer to drive their own car even if they expect to drink, and then call a driver service to take them home (Z-Score of 1.063).

"Environmentally Conscious" support Statement 20 *(All cars should be equipped with a GPS-based speedometer and speeding shall be automatically penalized)* with Z-Score of 1.304, whereas "Speeding Drivers" strongly oppose it with Z-Score of -1.406 (difference of -2.237).

"Environmentally Conscious" support (Z-Score of -0.990) Statement 10 (car-free days), while "Speeding Drivers" oppose them with Z-Score of -1.247 (difference of -2.237).

The closest opinion these two groups show is on Statement 28 *(Speed limitation is important and can save lives)* and Statement 23 *(The longer the time you spend in the city center, the more it is worth using public transport)* - with both of which they equally agree. The latter shows that even Speeding Drivers might become potential users of public transport, if the circumstances would require so.

The Descending Array of Differences between **"Speeding Drivers" and "Comfort Lovers"** is seen in Table 23.

Table 23. Descending Array of Differences Between Factors 1 and 3 (third run of the software)

No.	Statement	No.	Type 1	Type 3	Difference
8	If someone wants to drink alcohol during the night, even the	8	1.063	-1.363	2.426
9	Much more people would use public transport, if there were m	9	2.074	-0.153	2.227
33	The use of the bus lane should be allowed for private cars f	33	0.324	-1.826	2.150
23	The longer the time you spend in the city center, the more i	23	1.402	-0.472	1.873
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710	-0.035	1.745
31	If the taxi was cheaper, more people would leave their cars	31	1.103	-0.408	1.510
34	All electric cars shall be allowed to use the bus lane free	34	0.728	-0.418	1.146
37	The impact of the transport habits of an individual on the e	37	-0.585	-1.683	1.099
27	Utilizing the bus lane would be more effective, if you could	27	-0.044	-0.890	0.846
28	Speed limitation is important and can save lives.	28	1.455	0.757	0.698
19	State subsidies and discounts clearly increase demand növeli	19	1.451	0.926	0.525
2	State sponsored environmental advertizing and awareness camp	2	0.630	0.127	0.503
14	People prefer to ride their own cars, because the taxi is mo	14	1.129	0.634	0.495
6	We must accept that traditional cars shall be excluded from	6	-0.824	-1.247	0.423
22	All adult family members should maintain their own cars to e	22	-0.615	-1.033	0.418
24	Those with higher incomes have the duty to drive the least p	24	-0.323	-0.651	0.327
13	In China, India and other countries with rapidly growing pop	13	0.425	0.151	0.274
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322	-1.530	0.208
17	Car buyers will still choose the peak performance, even if t	17	0.556	0.408	0.148
12	People do not even think about how much it costs to maintain	12	-0.226	-0.359	0.133
39	By public transport you can comfortably get almost anywhere	39	-0.092	-0.100	0.008
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164	0.167	-0.004
4	If the local government would only allow electric cars in th	4	0.676	0.820	-0.144
26	Business cars with free usage are a bad example and cause ov	26	-0.303	-0.124	-0.179
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032	-1.791	-0.241
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564	0.837	-0.272
16	Most of the customers of electric cars choose them not becau	16	-0.153	0.302	-0.455
25	Those who can afford the most modern car shall buy it out o	25	-1.380	-0.828	-0.551
36	Public opinion underestimates the number of environmentally	36	0.119	0.704	-0.585
29	For a family of 3-5 members 1 car is enough.	29	-0.983	-0.392	-0.592
30	The car is not something that a person lends.	30	-0.573	0.143	-0.716
1	The developed countries should support the public transport	1	0.161	0.945	-0.783
10	Car-free days should be organized, because if you cannot use	10	-1.247	-0.259	-0.988
32	Those who do not enter the city do not care what the air the	32	-0.759	0.651	-1.409
18	For modern successful urban people the comfort and perme és	18	0.397	1.834	-1.437
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406	0.839	-2.245
3	Public transport is inferior to using your own car, even if	3	-0.949	1.800	-2.748
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208	1.559	-2.767
38	The bigger and more expensive the car is, the greater the re	38	-1.105	1.959	-3.064

The biggest disparity is on Statement 38 *(The bigger and more expensive the car is, the greater the respect is)*, where "Comfort Lovers" agree, while "Speeding Drivers" do not really care about the size and the price of the car (difference of -3.064).

"Comfort Lovers" consider high parking fees useful for the city (Statement 7), while "Speeding Drivers" reject this opinion (difference of -2.767).

Another interesting difference between these two groups is their opinion on public transport. "Comfort Lovers" strongly agree with Statement 3 *(Public transport is inferior to using your own car, even if it has been proven to be faster in some cases)*, while "Speeding Drivers" do not agree with it (also illustrated earlier by Table 18). This

is another manifestation that, after all, in city mobility speed might be more important, than the feeling of personal driving.

The closest similarity between "Speeding Drivers" and "Comfort Lovers" is their neutral attitude to Statements 5 *(Traffic jams can be eliminated by introducing an appropriate fee for using your car in the city)* and 39 *(By public transport you can comfortably get almost anywhere in Budapest).*

In Table 24 we can see, that **"Speeding Drivers" and "Rich and Prudent"** disagree most (difference of 2.894) on Statement 31 *(If the taxi was cheaper, more people would leave their cars at home),* where respondents of Factor 1 agree (1.103) and respondents of Factor 4 strongly disagree (-1.791), presumably, because they themselves wouldn't leave their cars at home, however cheap the taxi would become.

Their next biggest difference (-2.125) is on Statement 6 *(We must accept that traditional cars shall be excluded from cities, only electric cars shall have the right to drive there),* which is accepted by the "Rich and Prudent", but is rejected by the "Speeding Drivers". The opinion of both groups is the same on the importance of speed limit as suggested by Statement 28 - they all welcome speed limitation for the sake of safety.

Table 24. Descending Array of Differences Between Factors 1 and 4 (third run of the software)

No.	Statement	No.	Type 1	Type 4	Difference
31	If the taxi was cheaper, more people would leave their cars	31	1.103	-1.791	2.894
14	People prefer to ride their own cars, because the taxi is mo	14	1.129	-0.773	1.902
17	Car buyers will still choose the peak performance, even if t	17	0.556	-1.301	1.856
19	State subsidies and discounts clearly increase demand növeli	19	1.451	-0.227	1.678
33	The use of the bus lane should be allowed for private cars f	33	0.324	-1.245	1.569
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564	-1.000	1.564
9	Much more people would use public transport, if there were m	9	2.074	0.792	1.282
27	Utilizing the bus lane would be more effective, if you could	27	-0.044	-1.301	1.257
34	All electric cars shall be allowed to use the bus lane free	34	0.728	-0.528	1.255
4	If the local government would only allow electric cars in th	4	0.676	-0.491	1.167
24	Those with higher incomes have the duty to drive the least p	24	-0.323	-1.282	0.959
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710	1.037	0.673
23	The longer the time you spend in the city center, the more i	23	1.402	0.754	0.647
8	If someone wants to drink alcohol during the night, even the	8	1.063	0.472	0.591
39	By public transport you can comfortably get almost anywhere	39	-0.092	-0.528	0.436
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322	-1.527	0.205
37	The impact of the transport habits of an individual on the e	37	-0.585	-0.717	0.133
36	Public opinion underestimates the number of environmentally	36	0.119	-0.000	0.119
16	Most of the customers of electric cars choose them not becau	16	-0.153	-0.264	0.111
28	Speed limitation is important and can save lives.	28	1.455	1.527	-0.072
22	All adult family members should maintain their own cars to e	22	-0.615	-0.491	-0.124
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032	-1.773	-0.259
13	In China, India and other countries with rapidly growing pop	13	0.425	1.000	-0.575
2	State sponsored environmental advertizing and awareness camp	2	0.630	1.264	-0.634
3	Public transport is inferior to using your own car, even if	3	-0.949	-0.301	-0.648
1	The developed countries should support the public transport	1	0.161	0.981	-0.820
26	Business cars with free usage are a bad example and cause ov	26	-0.303	0.528	-0.831
25	Those who can afford the most modern car shall buy it out o	25	-1.380	-0.509	-0.870
29	For a family of 3-5 members 1 car is enough.	29	-0.983	-0.000	-0.983
30	The car is not something that a person lends.	30	-0.573	0.491	-1.063
38	The bigger and more expensive the car is, the greater the re	38	-1.105	-0.037	-1.068
18	For modern successful urban people the comfort and perme és	18	0.397	1.509	-1.111
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208	0.056	-1.264
32	Those who do not enter the city do not care what the air the	32	-0.759	0.509	-1.268
10	Car-free days should be organized, because if you cannot use	10	-1.247	0.245	-1.493
12	People do not even think about how much it costs to maintain	12	-0.226	1.301	-1.527
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406	0.282	-1.688
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164	2.037	-1.873
6	We must accept that traditional cars shall be excluded from	6	-0.824	1.301	-2.125

"Environmentally Conscious" and "Comfort Lovers" disagree most on Statement 3 *(Public transport is inferior to using your own car, even if it has been proven to be faster in some cases)*, where "Environmentally Conscious" strongly disagree, while "Comfort Lovers" strongly support the opinion (see Table 25). "Environmentally Conscious" do not approve of Statement 38 *(The bigger and more expensive the car is, the greater the respect is)*, but "Comfort Lovers" strongly agree with it. Both factors agree with Statement 15 *(If there were more P+R parking lots (Park and Ride), it would be easier to drive in the city)*, and both disagree with the idea to allow bus lanes to be used for a fee (Statement 27).

Table 25. Descending Array of Differences Between Factors 2 and 3 (third run of the software)

No.	Statement	No.	Type 2	Type 3	Difference
26	Business cars with free usage are a bad example and cause ov	26	1.885	-0.124	2.010
23	The longer the time you spend in the city center, the more i	23	1.355	-0.472	1.827
6	We must accept that traditional cars shall be excluded from	6	0.391	-1.247	1.638
10	Car-free days should be organized, because if you cannot use	10	0.990	-0.259	1.249
29	For a family of 3-5 members 1 car is enough.	29	0.842	-0.392	1.233
17	Car buyers will still choose the peak performance, even if t	17	1.536	0.408	1.128
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.702	-1.791	1.090
24	Those with higher incomes have the duty to drive the least p	24	0.431	-0.651	1.082
39	By public transport you can comfortably get almost anywhere	39	0.768	-0.100	0.868
12	People do not even think about how much it costs to maintain	12	0.353	-0.359	0.712
28	Speed limitation is important and can save lives.	28	1.448	0.757	0.691
4	If the local government would only allow electric cars in th	4	1.423	0.820	0.603
37	The impact of the transport habits of an individual on the e	37	-1.152	-1.683	0.531
9	Much more people would use public transport, if there were m	9	0.348	-0.153	0.501
20	All cars should be equipped with a GPS-based speedometer and	20	1.304	0.839	0.465
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.155	-1.530	0.375
33	The use of the bus lane should be allowed for private cars f	33	-1.455	-1.826	0.371
16	Most of the customers of electric cars choose them not becau	16	0.533	0.302	0.231
5	Traffic jams can be eliminated by introducing an appropriate	5	0.364	0.167	0.196
34	All electric cars shall be allowed to use the bus lane free	34	-0.261	-0.418	0.157
27	Utilizing the bus lane would be more effective, if you could	27	-0.833	-0.890	0.057
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.020	-0.035	0.015
31	If the taxi was cheaper, more people would leave their cars	31	-0.486	-0.408	-0.078
2	State sponsored environmental advertizing and awareness camp	2	0.013	0.127	-0.113
22	All adult family members should maintain their own cars to e	22	-1.236	-1.033	-0.203
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.452	0.837	-0.384
8	If someone wants to drink alcohol during the night, even the	8	-1.797	-1.363	-0.434
19	State subsidies and discounts clearly increase demand növeli	19	0.417	0.926	-0.509
13	In China, India and other countries with rapidly growing pop	13	-0.378	0.151	-0.529
1	The developed countries should support the public transport	1	0.345	0.945	-0.600
18	For modern successful urban people the comfort and perme és	18	1.172	1.834	-0.662
25	Those who can afford the most modern car shall buy it out o	25	-1.637	-0.828	-0.809
32	Those who do not enter the city do not care what the air the	32	-0.232	0.651	-0.883
14	People prefer to ride their own cars, because the taxi is mo	14	-0.312	0.634	-0.946
36	Public opinion underestimates the number of environmentally	36	-0.580	0.704	-1.284
30	The car is not something that a person lends.	30	-1.318	0.143	-1.461
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.441	1.559	-2.000
38	The bigger and more expensive the car is, the greater the re	38	-0.891	1.959	-2.850
3	Public transport is inferior to using your own car, even if	3	-1.487	1.800	-3.287

Table 26 shows that the opinion of **"Environmentally Conscious" and "Rich and Prudent"** differs most (2.837) on Statement 17 *(Car buyers will still choose the peak performance, even if they cannot make use of it).* Their next biggest (-2.269) difference in opinion is on Statement 8, where the "Environmentally Conscious" would leave their cars at home, if they should plan to drink alcohol during the night, but the "Rich and Prudent" would go by their own car and rather use a driver service. Both factors are unanimous in their opinion that speed shall be limited to help save lives (Statement 28) and that bus lanes shall be left to the buses (Statement 33).

Table 26. Descending Array of Differences Between Factors 2 and 4 (third run of the software)

No.	Statement	No.	Type 2	Type 4	Difference
17	Car buyers will still choose the peak performance, even if t	17	1.536	-1.301	2.837
4	If the local government would only allow electric cars in th	4	1.423	-0.491	1.914
24	Those with higher incomes have the duty to drive the least p	24	0.431	-1.282	1.713
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.452	-1.000	1.452
26	Business cars with free usage are a bad example and cause ov	26	1.885	0.528	1.358
31	If the taxi was cheaper, more people would leave their cars	31	-0.486	-1.791	1.306
39	By public transport you can comfortably get almost anywhere	39	0.768	-0.528	1.296
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.702	-1.773	1.071
20	All cars should be equipped with a GPS-based speedometer and	20	1.304	0.282	1.022
29	For a family of 3-5 members 1 car is enough.	29	0.842	-0.000	0.842
16	Most of the customers of electric cars choose them not becau	16	0.533	-0.264	0.797
10	Car-free days should be organized, because if you cannot use	10	0.990	0.245	0.744
19	State subsidies and discounts clearly increase demand növeli	19	0.417	-0.227	0.644
23	The longer the time you spend in the city center, the more i	23	1.355	0.754	0.601
27	Utilizing the bus lane would be more effective, if you could	27	-0.833	-1.301	0.467
14	People prefer to ride their own cars, because the taxi is mo	14	-0.312	-0.773	0.461
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.155	-1.527	0.372
34	All electric cars shall be allowed to use the bus lane free	34	-0.261	-0.528	0.267
28	Speed limitation is important and can save lives.	28	1.448	1.527	-0.079
33	The use of the bus lane should be allowed for private cars f	33	-1.455	-1.245	-0.210
18	For modern successful urban people the comfort and perme és	18	1.172	1.509	-0.337
37	The impact of the transport habits of an individual on the e	37	-1.152	-0.717	-0.435
9	Much more people would use public transport, if there were m	9	0.348	0.792	-0.443
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.441	0.056	-0.496
36	Public opinion underestimates the number of environmentally	36	-0.580	-0.000	-0.580
1	The developed countries should support the public transport	1	0.345	0.981	-0.636
32	Those who do not enter the city do not care what the air the	32	-0.232	0.509	-0.741
22	All adult family members should maintain their own cars to e	22	-1.236	-0.491	-0.745
38	The bigger and more expensive the car is, the greater the re	38	-0.891	-0.037	-0.854
6	We must accept that traditional cars shall be excluded from	6	0.391	1.301	-0.909
12	People do not even think about how much it costs to maintain	12	0.353	1.301	-0.947
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.020	1.037	-1.057
25	Those who can afford the most modern car shall buy it out o	25	-1.637	-0.509	-1.128
3	Public transport is inferior to using your own car, even if	3	-1.487	-0.301	-1.186
2	State sponsored environmental advertizing and awareness camp	2	0.013	1.264	-1.250
13	In China, India and other countries with rapidly growing pop	13	-0.378	1.000	-1.378
5	Traffic jams can be eliminated by introducing an appropriate	5	0.364	2.037	-1.673
30	The car is not something that a person lends.	30	-1.318	0.491	-1.808
8	If someone wants to drink alcohol during the night, even the	8	-1.797	0.472	-2.269

The Descending Array of Differences for the last pair of factors - **"Comfort Lovers" and "Rich and Prudent"** - is shown on Table 27.

The biggest value on the table (-2.547) is related to Statement 6 *(We must accept that traditional cars shall be excluded from cities, only electric cars shall have the right to drive there)*, which "Comfort Lovers" oppose and with which "Rich and Prudent" choose to agree. Regarding their closest similarity of opinion, the two groups are equally sympathetic with Statement 1 *(The developed countries should support the public transport in China, India and other developing countries with rapidly growing population, because otherwise their huge car park may cause too big global impact).*

Table 27. Descending Array of Differences Between Factors 3 and 4 (third run of the software)

No.	Statement	No.	Type 3	Type 4	Difference
3	Public transport is inferior to using your own car, even if	3	1.800	-0.301	2.101
38	The bigger and more expensive the car is, the greater the re	38	1.959	-0.037	1.996
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.837	-1.000	1.836
17	Car buyers will still choose the peak performance, even if t	17	0.408	-1.301	1.709
7	Street parking fees in Budapest are unrealistically high, bu	7	1.559	0.056	1.503
14	People prefer to ride their own cars, because the taxi is mo	14	0.634	-0.773	1.407
31	If the taxi was cheaper, more people would leave their cars	31	-0.408	-1.791	1.383
4	If the local government would only allow electric cars in th	4	0.820	-0.491	1.311
19	State subsidies and discounts clearly increase demand növeli	19	0.926	-0.227	1.153
36	Public opinion underestimates the number of environmentally	36	0.704	-0.000	0.704
24	Those with higher incomes have the duty to drive the least p	24	-0.651	-1.282	0.631
16	Most of the customers of electric cars choose them not becau	16	0.302	-0.264	0.566
20	All cars should be equipped with a GPS-based speedometer and	20	0.839	0.282	0.556
39	By public transport you can comfortably get almost anywhere	39	-0.100	-0.528	0.428
27	Utilizing the bus lane would be more effective, if you could	27	-0.890	-1.301	0.411
18	For modern successful urban people the comfort and perme és	18	1.834	1.509	0.326
32	Those who do not enter the city do not care what the air the	32	0.651	0.509	0.142
34	All electric cars shall be allowed to use the bus lane free	34	-0.418	-0.528	0.109
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.530	-1.527	-0.003
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.791	-1.773	-0.019
1	The developed countries should support the public transport	1	0.945	0.981	-0.037
25	Those who can afford the most modern car shall buy it out o	25	-0.828	-0.509	-0.319
30	The car is not something that a person lends.	30	0.143	0.491	-0.348
29	For a family of 3-5 members 1 car is enough.	29	-0.392	-0.000	-0.392
10	Car-free days should be organized, because if you cannot use	10	-0.259	0.245	-0.504
22	All adult family members should maintain their own cars to e	22	-1.033	-0.491	-0.542
33	The use of the bus lane should be allowed for private cars f	33	-1.826	-1.245	-0.581
26	Business cars with free usage are a bad example and cause ov	26	-0.124	0.528	-0.652
28	Speed limitation is important and can save lives.	28	0.757	1.527	-0.770
13	In China, India and other countries with rapidly growing pop	13	0.151	1.000	-0.849
9	Much more people would use public transport, if there were m	9	-0.153	0.792	-0.945
37	The impact of the transport habits of an individual on the e	37	-1.683	-0.717	-0.966
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.035	1.037	-1.072
2	State sponsored environmental advertizing and awareness camp	2	0.127	1.264	-1.137
23	The longer the time you spend in the city center, the more i	23	-0.472	0.754	-1.226
12	People do not even think about how much it costs to maintain	12	-0.359	1.301	-1.660
8	If someone wants to drink alcohol during the night, even the	8	-1.363	0.472	-1.835
5	Traffic jams can be eliminated by introducing an appropriate	5	0.167	2.037	-1.869
6	We must accept that traditional cars shall be excluded from	6	-1.247	1.301	-2.547

On Table 15 the Consensus Statements are shown. Although there seems to be general agreement on five statements altogether, in fact on three of the statements the opinion of the respondents is only relatively similar. For example, the above described Statement 1 about supporting public transport in developing countries is really welcomed by "Comfort Lovers" and by "Rich and Prudent", but the other two groups have produced although positive, but close to neutral attitude.

Similarly, only the "Environmentally Conscious" and the "Comfort Lovers" gave a definite negative response to the idea of Statement 22 to provide all adult family members with their own cars; the other two groups were also rejective, but not at all that explicit. Still I consider it a positive phenomenon that as a whole the idea was declined.

Statement 16 *(Most of the customers of electric cars choose them not because they are environmentally friendly, but because they are a status symbol)* also produced consensus. "Environmentally Conscious" and "Comfort Lovers" agreed, while "Speeding Drivers" and "Rich and Prudent" were neutral on the subject.

I already described the supportive attitude of all four factors to Statement 28, when first discussing Table 15. Statement 11 *(The urban traffic jam is no problem in terms of time, because while you are driving you can usually make phone calls, carry out*

negotiations, talk, listen to music) is the other example of full consensus on behalf of all four factors. All of them strongly rejected Statement 11 with the respective scores of

-1.32, -1.16, -1.53, -1.53.

For comparison, in the first run the results of the factors were

-1.33, -1.26, -1.52, -1.52.

In my opinion that is a very noteworthy sign, because the biggest problem, which this statement succeeds to highlight, seems to be not that we cannot do useful things and be efficient while being stuck in city traffic, but something totally different. Perhaps, simply the emotion that we are not going fast, the bad/stressful feeling that we will be late for a meeting, etc. So why not use a faster mode of transportation - public transport or taxi? Perhaps due to a more powerful negative emotion associated with public transport - lack of safety or hygiene, increased vulnerability, decreased comfort. This assumption was confirmed when one of the interviewees added a handwritten comment at the bottom of the questionnaire, saying that she avoided public transport in order not to catch an infection.

5. Summary and Recommendations

5.1. Personal mobility in the cities and its impact on our lives

The easy affordability of private cars.

The mass production of the automobiles, as shown in point 2.1.6., has made private passenger cars so affordable, that we have reached a point, where most people in the developed countries (and not only there) cannot imagine a day without driving. The number of passenger cars continuously increases.

Addiction to driving.

The evolution of the automobile, finely influenced by the subtle power of the oil lobby (see point 2.1.3.), together with the stable growth of living standards (point 3.1.3.) lead to our present addiction to vehicles using fossil fuels. This addiction is so serious, that apart from threatening human health through its negative effects, the inefficient use of personal passenger vehicles is wasting colossal resources all over the planet. Although the growth of car ownership in the developed countries is slowing down, that is mostly the result of saturation, not of new thinking (3.1.2.). As a whole the wealthier countries continue to increase their already massive car fleets. The damage is being done day by day. But the historically set trend of western type personal mobility has also given a bad example for the less developed countries as well (3.1.4.). The citizens in the newer members of the EU are fascinated with cars, which is leading them in the wrong direction, since they already start to overtake the richer states in terms of motorisation - like Lithuania, having more cars per 1,000 inhabitants than Austria, Germany and Switzerland. The hunger for owing a car as a level of self esteem is distorting general attitude to mobility, well expressed by the result of my Maltese research, where for a person after turning 18 years old gaining personal independence has come to be symbolized by acquiring one's own car. That leads to overmotorisation, congestion, useless loss of time, environmental deterioration and reduced quality of life. Which, according to empirical data, most local people are clearly aware of.

Dominance of fossil fuels.

Among the various types of propulsion (e.g. Internal Combustion Engines, Electric Engines and their combinations, generally called Hybrid) the most common are the internal combustion engines; among the different types of fuel gasoline and diesel are dominating (see 2.2.). Although many countries are boldly and conscientiously supporting the development of alternative solutions, the renewable automotive fuels such as bio-methane, bio-ethanol, bio-diesel, green diesel and green gasoline still have a long way to go. They are currently generally considered only to contribute to sustainability, but not to solve the issue in the foreseeable future. For example, in case of hydrogen, most of it is still produced from fossil resources such as natural gas, oil and coal. With the exception of Iceland, rich in geothermal and hydroelectric power, there are very few opportunities to produce it sustainably, which for the time being makes electricity a better choice. Introduction of zero emission cars is on the agenda of all progressive governments, some of which (see 2.2.4.) already announce future plans to ban petrol and diesel cars, but many countries will not be that drastic for years to come and until then will try to improve the efficiency of the traditionally used engines and try to save fossil fuel.

Reducing emission, diminishing damage.

National emission standards in the EU and in other economic areas already stimulate car manufacturers to constantly reduce emissions, and taxation in most cases is motivating the buyers to choose less polluting vehicles (see 2.1.5.). Technical progress has brought tremendous improvements in the efficiency of the orthodox internal combustion engines and has utterly refined conventional fuels - gasoline and diesel. The fuel consumption and the harmful emissions of the modern vehicles have been steadily decreasing. Manufacturers heavily invest in the development of systems for alternative fuels like CNG, LNG, bio-ethanol, bio-diesel, hydrogen and electricity. Hybrid vehicles are gaining market share, with Plug-in Hybrids already considered mature technology, preparing us for the age of silent vehicles with purely electric engines. But on the Schnitzer scale (see 2.1.1.) all of the above-listed development is just an old-fashioned approach, reducing the waste, which we constantly produce, decreasing the damage, smoothing out the sharp edges. The research shows, that the traditional solutions strive to improve the existing infrastructure and decrease congestion, meaning building more, better, safer roads for our passenger cars, increasing the number of lanes in motorways

and main urban roads, computerizing traffic lights to avoid loss of time at crossroads, building roundabouts and smart junctions to avoid traffic lights, striving to decrease the consumption of our engines, to make them emit less pollutants into our cities, and so on. All these approaches are focused on improving efficiency, but try to keep our old travel patterns unchanged. If we continue in the same way, we will keep setting wrong goals like minimum laboratory fuel consumption of the vehicles, and will keep achieving totally unpredictable real life results, as in the case of the revealed cheating software installed by Volkswagen and other carmakers in point 2.1.5. Without changing our approach to the situation we will keep chasing false horizons.

5.2. The desirable future model of sustainable city mobility

Can it be true, that by replacing the traditional internal combustion engines in modern passenger vehicles with less polluting or even zero emission propulsion technology we will reach sustainable mobility? Definitely not, because the vehicles themselves will still remain on the roads in ever growing excessive numbers.

We all shall certainly agree, that it is important to improve the cars we drive, but when we finally improve them to have zero emissions, we will have the same congestion on the roads, although luckily (and finally), with no exhaust smokes above them. We will still experience the same useless waste of time when sitting stuck in traffic jams. We will have additional millions of vehicles, most of them being used regularly, nonetheless mainly resting in the parking lots - not only an incomprehensible waste of material resources, but stealing our space as well. It is time to reach for the next level of environmental care - to rethink our behaviour and avoid creating the damage in the first place.

The only possible approach to urban mobility is not only to improve the vehicles, but to improve the different attitudes to city travel, where citizens suffer from traffic congestions.

The lesson we should be able to learn from our predecessors is that if we want to achieve sustainable personal mobility, we shall constantly pursue environmental issues on a broad scale. Innovation and competition-inspired efficiency improvement bringing us reduction of fuel consumption is good, strict emission regulations are also needed, as well as the promotion of alternative fuels and futuristic engineering, but the most

important role in the struggle to achieve sustainable mobility is nowadays played not by the car manufacturers, but by the innovative municipalities, who support new mobility trends. They endorse psychological change and promote healthy mobility as an organic part of healthy life style. Our whole society shall go through a psychological regeneration regarding motoring habits, which can be and shall be influenced in the same way as doctors emphasize and prescribe healthy eating habits. Growing GDP per capita shows correlation with increasing car ownership (see the analysis of different markets in point 3.1.1., 3.1.2. and 3.1.3.). This brings a peculiar parallel with the phenomenon of food consumption, increasing proportionally to growing wealth and well-being. Both types of consumption - eating and driving - can go to excess, as shown in 2.1.5. and 3.1.2. Excess eating leads to obesity, physical and mental deterioration. Excess driving leads to pollution, material waste and ruined quality of city life. Besides, constant driving door-to-door steals our opportunity for naturally required daily physical exercise, and can likewise lead to decline in health... In terms of motoring most people shall be educated to the importance of personal self-restriction, analogously to the above described attitude to food.

Based on my research I can voice the opinion that modern municipalities can make cities better places to live by consistently reducing personal driving and constantly enhancing public transport and the green modes of personal transportation.

Public transport shall be given full priority through dedicated bus lanes, and its safety and convenience shall be constantly monitored and promoted.

Personal mobility in the modern city can be sustainable only if the city itself offers very few other alternatives, but **walking areas, bicycle lanes and public transport, which shall definitely include taxi.** This future taxi shall be much more affordable than it is now. The expensive taxi makes personal driving economically preferable. But it will not be right nor fair to make personal driving killingly expensive without providing a decent alternative beside traditional public transport. To make taxi more affordable we shall redesign the taxi business (see 3.3.2.).

At the moment the overwhelming majority of vehicles in the cities are built with massive overdose of power - some can drive at speeds up to 4 to 5 times higher than the average city speed limit. For private passenger cars it may be important to have the additional power in case they leave the city on a longer trip, though there will be quite a few, who will never happen to do it. But for the ideal city taxi it is imperative to have its

top speed reduced, its cost cut to the bone and its public transport appeal solidly established.

The taxi vehicles shall be electric, and they shall not need to reach speeds of more than 75km/h, as the maximum legal speed within the city limits is rarely above 70km/h anyway. The financing, purchasing and servicing/maintenance processes shall be subject to public tenders and made transparent in order to minimize their costs. All vehicles shall be operated on a constant driver-rotation basis by multiple drivers to reduce idling of vehicles. Telematics shall be used to control the driving habits of the taxi drivers and the efficient response to daily mobility demand. The city taxi company shall work as a non-profit organization, reinvesting its operational profit into its own fleet and systems.

Apart from its basic form taxi may well be differentiated by the level of services offered - luxury taxi may appeal to people with prestige requirements, in the same way as expensive cars do now.

Is it possible to live in cities without private passenger vehicles, only with public transport? Definitely yes!

On the example of Hong Kong and other densely populated cities with good public transport we can clearly see the birth of a new attitude among people from different age groups and different levels of income, who are happy to lead a carless life in the city (see 3.3.5.). Some of them have never even had a car, they like the fast and efficient public transport, they enjoy walking and cycling. We shall be able to popularize this way of life even in smaller cities than Hong Kong. To complement the fixed network of the public transport, taxi (and its "mutant" siblings like Shared Taxi and the Taxi-Bus - see 3.3.4) shall progressively be incorporated into it. The taxi can easily become more time and cost efficient to use than a private passenger car. In practice nobody needs a passenger car for personal use 24 hours per day for every day of the week. Similarly, it will never be prudent to own a private plane, if you have reliable and efficient airline network.

The success of ride-sharing mobile applications like Uber, attracting users, who prefer this mode of personal mobility to driving, points at high elasticity of customer demand for taxi. This is important, as it means that an affordable taxi fare, prudently chosen after a proper business case study, and then fine-tuned on a regular basis, when necessary, will make many citizens, who presently insist on using their own cars, to abandon their vehicles and choose the convenience of the taxi.

Life in the city shall be organized in such a way, that using a private car will prove to be an inferior mode of transportation, as compared to public transport, due to its speed, convenience and cost efficiency at the same time. **It shall never be the aim of the municipalities totally to eliminate privately driven passenger cars in the cities.** Private vehicles as well as rent-a-car solutions will remain as a possible choice, but will have their restrictions, and shall be used outside of the densely populated urban areas. This will create more living space and better quality of life for both the locals and their visitors.

5.3. The role of the market lobby and that of the policy makers

We have many examples of cities whose life style is not dependent on private driving. Some of them are evolving naturally out of necessity - like the case of Hong Kong, where there is simply no other alternative, but to use public transport, and where the municipality is working hard to maintain the efficiency of the public mobility options (see 3.3.1. and 3.3.5.). There are other, extremely inspiring examples, like that of the small European cities of Graz (Austria) and Freiburg (Germany), which have achieved very high rates of green mode usage simply because they are planned around these non-auto modes (3.3.1.). This attitude is exactly what we need to achieve. In contrast, almost all US cities of similar population size are predestined to be totally automobile dependent, because of practically non-existing public transport and too long distances for walking and cycling to be realistic. **The policy makers shall prioritize sustainability against short-term business interests.**

The comparison study between Stockholm and Copenhagen is another proof that attitude matters, and that the high bicycle share of Copenhagen within the mobility modes owes its standing to the much better bicycle infrastructure, consistent funding and persistent coordinated efforts (3.3.5.).

Best practice shall be targeted to reduce the risk of taking wrong aims and/or repeating mistakes already made by others. The commitment of the municipalities shall be supported and reinforced by full transparency of their decisions and by professional planning.

Tighter pro-environmental standards and efficiency targets pushing technology developers into the right direction are extremely important, but if we want to achieve

sustainable personal mobility, it is not the vehicles, but rather the humans that have to be improved.

The outcome of my research (4.3) strongly confirmed my hypotheses:

Passenger car buyers and/or users in their choice of personal cars are motivated by convenience, social status, cost efficiency and not by environmentally friendly attitude.

When choosing the means of travel in the city, citizens are mostly motivated by convenience.

However strong the environmental commitment of the citizens is, in itself it will never be enough in terms of personal city mobility, because their desire for safety and comfort is stronger.

Consequently, the sustainable mobility modes based on minimal private car use cannot be expected to spread spontaneously without the strong limitation of the current conventional mobility based on private car use.

All respondents of my research saw personal driving as the best option for city mobility. Some openly oppose car-free days and dislike parking fees (Speeding Drivers - see 4.2.1.), some admit to prefer big and expensive cars and consider public transport inferior (Comfort Lovers - see 4.2.2.), others verbally support public transport, but prefer not to use it (Environmentally Conscious - see 4.2.3.); or readily agree to possible future congestion fees due to the expectations that it will reduce traffic volumes and only they themselves will keep driving (Rich & Prudent - see 4.2.4.).

One of the most positive findings during the investigation of respondents' opinion was the negative reaction to the idea of providing all adult family members with their own cars (4.2.5.). This shows that all investigated groups exhibit clear sensibility and correct judgement regarding excessive waste and are able to limit themselves to a certain extend.

Additionally my research showed that even if a group of people fully agrees with the importance of some measures, it will not make them automatically accept these measures for themselves. Like the importance of speed limitation for safety, with which all people will easily agree, but not all of them will accept the strict GPS based speed control.

So even if citizens would generally agree that something should be done to make city mobility sustainable, they might probably choose the least inconvenient path for themselves, and we cannot blame them for that - just imagine yourself and your own family!

The time is ripe to offer different patterns. There is no need to make everyone in the city an everyday driver or an everyday pilot. We can be more mobile than ever even without driving our own family car or our company car. It is time to change the old "dream image" of car ownership, to replace the false prestige of the urban driver with the modern image of the free urban movement backed by affordable, safe, professional and accurate public transport working like precision mechanism around the clock. We shall one day eliminate the time unnecessarily lost in traffic jams and parking "expeditions" around the block, we can reduce our driving distances and we must increase active travel like walking and cycling, and lessen the burden of the automobiles on the environment and on our quality of life.

Works Cited

Adachi, Y., Komoto, M., Watanabe, I., Ohno, Y., & Fujimoto, K. (2000). Effective utilization of remote coal through dimethyl ether synthesis. Fuel, 79, 229-234.

Agarwal, A. K. (2007). Biofuels (alcohols and biodiesel) applications as fuels for internal combustion engines. Progress in Energy and Combustion Science (33), 233–271.

An, F., Earley, R., & Green-Weiskel, L. (2011). 2011 Global Overview on Fuel Efficiency and Motor Vehicle Emission Standards. United Nations, Department Of Economic And Social Affairs. Beijing-Los Angeles-New York: The Innovation Center for Energy and Transportation (iCET).

Arnott, R. (1996). Taxi Travel Should Be Subsidized. Journal Of Urban Economics (40), 316-333.

Asquith, G., Mills, S., & Forder, S. (2012). Telematics insurance. A disruptive innovation. Thought Leadership White Paper. IBM United Kingdom Limited. London: IBM Corporation.

Attard, M., Von Brockdorff, P., & Bezzina, F. (2015). The External Costs of Passenger and Commercial Vehicles Use in Malta. European Union.

Balat, M., & Balat, H. (2009). Recent trends in global production and utilization of bio-ethanol fuel. Applied Energy (86), 2273–2282.

Ball, M., & Wietschel, M. (2009). The future of hydrogen – opportunities and challenges. International Journal of Hydrogen Energy, 34 (2), 615-627.

Banister, D. (2011). Cities, mobility and climate change. Journal of Transport Geography (19), 1538-1546.

Banister, D. (2008). The sustainable mobility paradigm. Transport Policy (15), 73-80.

Barkenbus, J. (2009). Our electric automotive future: CO2 savings through a disruptive technology. Policy and Society, 27 (4), 399-410.

Batty, P., Palacin, R., & González-Gil, A. (2015). Challenges and opportunities in developing urban modal shift. Travel Behaviour and Society, 2, 109–123.

Bitsche, O., & Gutmann, G. (2004). Systems for hybrid cars. Journal of Power Sources, 127, 8-15.

Bordelanne, Montero, Bravin, Prieur-Vernat, Oliveti-Selmi, Pierre, et al. (2011). Biomethane CNG hybrid: A reduction by more than 80% of the greenhouse gases emissions compared to gasoline. Journal of Natural Gas Science and Engineering, 3, 617-624.

Borg, J. (2016, 08 11). Parts Manager, GasanZammit Motors. (R. Tkatchenko, Interviewer) Malta.

Bosch. (2014). Bosch-kutatás: Magyarországon 100-ból 85 autó még mindig benzines. Press release, Budapest.

Bresson, G., Dargay, J., Madre, J.-L., & Pirotte, A. (2004). Economic and structural determinants of the demand for public transport: an analysis on a panel of French urban areas using shrinkage estimators. Transportation Research Part A, 38 (4), 269-285.

Brons, M., Nijkamp, P., Pels, E., & Rietveld, P. (2008). A meta-analysis of the price elasticity of gasoline demand. A SUR approach. Energy Economics, 30 (5), 2105-2122.

Brown, S. R. (1996, November 1). Q Methodology and Qualitative Research. Retrieved April 30, 2017, from http://schmolck.userweb.mwn.de/qmethod/srbqhc.htm

Brown, S. R. (1997). The history and principles of Q methodology in psychology and the social sciences.

California Environmental Protection Agency, California Air Resources Board. (2016). Retrieved 09 10, 2016, from https://www.arb.ca.gov/msprog/carpool/carpool.htm

Carey, G. (2009). Bus Lane with Intermittent Priority.

Chrest, A. P., Smith, M. S., Bhuyan, S., Monahan, D. R., & Iqbal, M. (2001). Parking Structures: Planning, Design, Construction, Maintenance and Repair. Norwell, Massachusetts, USA: Kluwer Academic Publishers.

Ciari, F., Balmer, M., & Axhausen, K. W. (2009). Concepts for a large scale car-sharing system: Modeling and evaluation with an agent-based approach. Proceed- ings of the 88th Annual Meeting of the Transportation Research Board. Washington, DC.

Clerides, S., & Zachariadis, T. (2008). The effect of standards and fuel prices on automobile fuel economy: An international analysis. Energy Economics, 30 (5), 2657-2672.

Costain, C., Ardron, C., & Habib, K. (2012). Synopsis of users' behaviour of a carsharing program: A case study in Toronto. Transportation Research Part A (46), 421-434.

Csutora, M. (2012). One More Awareness Gap? The Behaviour–Impact Gap Problem. Journal of Consumer Policy (35), 145-163.

Csutora, M., & Kerekes, S. (2004). A környezetbarát vállalatirányítás eszközei. Budapest: KJK KERSZÖV.

Cuenot, F. (2009). CO2 emissions from new cars and vehicle weight in Europe; How the EU regulation could have been avoided and how to reach it?; Energy Policy. Energy Policy .

Cullinane, S. (2003). Hong Kong's low car dependence: lessons and prospects. Journal of Transport Geography, 11, 25-35.

Dahl, C., & Sterner, T. (1991). Analysing gasoline demand elasticities: a survey. Energy Economics, 13 (3), 203-210.

Dargay, J. M. (2001). The effect of income on car ownership: evidence of asymmetry. Transportation Research Part A (35), 807-821.

Dargay, J. M., & Hanley, M. (2002). The demand for local bus services in England. Journal of Transport Economics and Policy, 36, 73-91.

Das, D. (2009). Advances in biohydrogen production processes: An approach towards commercialization. International Journal of Hydrogen Energy, 34 (17), 7349-7357.

de Haan, P., Mueller, M. G., & Peters, A. (2006). Does the hybrid Toyota Prius lead to rebound effects? Analysis of size and number of cars previously owned by Swiss Prius buyers. Ecological Economics, 58, 592-605.

de Haan, P., Peters, A., & Scholz, R. W. (2007). Reducing energy consumption in road transport through hybrid vehicles: investigation of rebound effects, and possible effects of tax rebates. Journal of Cleaner Production, 15, 1076-1084.

de Jong, G., Kouwenhoven, M., Geurs, K., Bucci, P., & Tuinenga, J. (2009). The impact of fixed and variable costs on household car ownership. Journal of Choice Modelling, 2 (2), 173-199.

De Witte, A., Macharis, C., Lannoy, P., Polain, C., Steenberghen, T., & Van de Walle, S. (2006). The impact of ‘‘free’’ public transport: The case of Brussels. Transportation Research, Part A (40), 671-689.

Demirbas, A. (2009). Political, economic and environmental impacts of biofuels: A review. Applied Energy, 86, S108–S117.

Demokrata. (2012, 03 19). Retrieved 10 05, 2013, from www.demokrata.hu: http://www.demokrata.hu/tartalmak/marcius__3

Department for Transport. (2013). National Travel Survey statistics. Retrieved 11 03, 2013, from www.gov.uk: https://www.gov.uk/government/statistical-data-sets/nts01-average-number-of-trips-made-and-distance-travelled

Department for Transport. (2016). National Travel Survey 2015: Notes and Definitions.

Department for Transport. (2016). National Travel Survey: England 2015. Statistical Release.

D'Agosto, M. d., Ribeiro, S. K., & de Souza, C. (2013). Opportunity to reduce greenhouse gas by the use of alternative fuels and technologies in urban public transport in Brazil. Sustainability, 5 (2), 177-183.

Diamond, D. (2009). The impact of government incentives for hybrid-electric vehicles: Evidence from US states. Energy Policy, 37, 972–983.

Dings, J. (2011). Fuelling oil demand. What happened to fuel taxation in Europe? European Federation for Transport and Environment (T&E).

Donmez, B., Boyle, L. N., & Lee, J. D. (2008). Mitigating driver distraction with retrospective and concurrent feedback. Accident Analysis and Prevention, 40, 776–786.

Donmez, B., Boyle, L. N., & Lee, J. D. (2007). Safety implications of providing real-time feedback to distracted drivers. Accident Analysis and Prevention, 39, 581-590.

Dowd, A.-M., & Hobman, E. (2013). Mobilizing citizens for a low and clean energy future. Current Opinion in Environmental Sustainability, 5 (2), 191-196.

Ecola, L., & Wachs, M. (2012). Exploring the Relationship between Travel Demand and Economic Growth. Federal Highway Administration, Washington, DC.

Efthymiou, D., Antoniou, C., & Waddell, P. (2013). Factors affecting the adoption of vehicle sharing systems by young drivers. Transport Policy, 29, 64-73.

Eichler, M. D. (2005). Bus Lanes with Intermittent Priority: Assessment and Design; A thesis submitted in partial satisfaction of the requirements for the degree of Master of City Planning In City and Regional Planning in the Graduate Division of the University Of California, Berkeley. University Of California, Berkeley.

Elbehri, A., Segerstedt, A., & Liu, P. (2013). Biofuels and the sustainability challenge: A global assessment of sustainability issues, trends and policies for biofuels and related feedstocks. UN, Food and Agriculture Organization of the United Nations, Trade and Markets Division, Rome.

Espey, M. (1998). Gasoline demand revisited: an international meta-analysis of elasticities. Energy Economics, 20, 273-295.

Estonian Tax and Customs Board. (2015, October 9). Retrieved February 27, 2016, from https://www.emta.ee/eng/etcb-and-uber-collaborate-seeking-solutions-development-sharing-economy

European Automobile Manufacturers' Association - ACEA. (n.d.). Retrieved from www.acea.be: http://www.acea.be/statistics/tag/category/passenger-car-fleet-per-capita

European Union. (2013). Sustainable development in the European Union — Key messages, 2013 edition. European Commission, Luxembourg.

EUROSTAT. (2015, 10 30). Retrieved 01 17, 2016, from http://ec.europa.eu/eurostat/statistics-explained/index.php/Passenger_cars_in_the_EU

EUROSTAT. (2015). Retrieved October 25, 2015, from http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdpc340

Federal Highway Administration. (2016, 02 22). Retrieved 07 27, 20174, from https://www.fhwa.dot.gov/pressroom/fhwa1607.cfm

Figueroa, M. J., Fulton, L., & Tiwari, G. (2013). Avoiding, transforming, transitioning: pathways to sustainable low carbon passenger transport in developing countries. Current Opinion in Environmental Sustainability, 5 (2), 184-190.

Firnkorn, J., & Müller, M. (2011). What will be the environmental effects of new free-floating car-sharing systems? The case of car2go in Ulm. Ecological Economics (70), 1519-1528.

Fleischer, T. (2005). Fenntartható fejlődés - fenntartható közlekedés. Budapest: MTA Világgazdasági Kutatóintézet.

Fontaras, G., Zacharof, N.-G., & Ciuffo, B. (2017). Fuel consumption and CO2 emissions from passenger cars in Europe. Laboratory versus real-world emissions. Progress in Energy and Combustion Science 60 (2017) 97 131 (60), 97-131.

Ford, H. (1922). My Life and Work. Garden City, N.Y.: Doubleday, Page & Company.

Frändberg, L., & Vilhelmson, B. (2011). More or less travel: personal mobility trends in the Swedish population focusing gender and cohort. Journal of Transport Geography (19), 1235-1244.

Gagarin, M., & Perlman, P. (2016). The Laws of Ancient Crete c.650-400 BCE. New York: Oxford University Press.

Global Energy Statistical Yearbook. (2017). Enerdata. Retrieved 07 23, 2017, from https://yearbook.enerdata.net/natural-gas/world-natural-gas-production-statistics.html

Goudin, P. (2016). The Cost of Non-Europe in the Sharing Economy. Assessment, European Added Value Unit.

Graham, D. J., & Glaister, S. (2002). The Demand for Automobile Fuel: A Survey of Elasticities. Journal of Transport Economics and Policy, 39 (1), 1-25.

Hanna, J. (1996). Transport and Health: Fit to Get About. Urban Transport International, 4, 11.

Harangozó, G., & Marjainé Szerényi, Z. (2014). Mennyit ér a zajterhelés csökkenése? Zajvédelmi intézkedések értékelése a haszonértékelések átvitelével. Közgadasági Szemle, LXI. Évf. (1), 68-91.

Hefter, T., & Deffner, J. (2012, 05 12). Sustainable mobility culture: An approach for capacity development in Eastern Europe? 15th European Roundtable on Sustainable Consumption and Production . Bregenz, Austria.

Helm, D. (2013, December 1). All change: the Unfolding Geopolitics of Oil and Gas in the US and the Middle East. Retrieved January 12, 2014, from http://www.dieterhelm.co.uk/node/1367

Hensher, D. A. (2007). Bus transport: Economics, policy and planning. Research in Transportation Economics, 18, xix-xxviii,1-507.

Hidalgo, D., & Huizenga, C. (2013). Implementation of sustainable urban transport in Latin America. Research in Transportation Economics (40), 66-77.

Hofmeister-Tóth, Á. (2005). A Q módszer: és alkalmazása a marketingkutatásban. Műhelytanulmány, Marketingkutatás és Fogyasztói Magatartás Tanszék, Budapesti Corvinus Egyetem.

Holden, E., Linnerud, K., & Banister, D. (2014). Sustainable development: Our Common Future revisited. Global Environmental Change (26), 130–139.

Hong Kong Census and Statistics Department. (2015, April). Hong Kong Census and Statistics Department. Retrieved Auust 1, 2015, from http://www.censtatd.gov.hk

Hong Kong Transport and Housing Bureau. (2015). Retrieved August 1, 2015, from http://www.thb.gov.hk/eng/whatsnew/transport/news.htm

Hughes, T. (1969, August). Technological Momentum: Hydrogenation in Germany, 1900-1933. Past and Present .

International Energy Agency. (2012). CO Emissions from Fuel Combustion.

International Organization of Motor Vehicle Manufacturers. (2013). Retrieved 07 30, 2013, from http://oica.net/category/production-statistics/.

International Organization of Motor Vehicle Manufacturers. (2017). Retrieved 07 23, 2017, from http://oica.net/category/production-statistics/.

International Organization of Motor Vehicle Manufacturers. (n.d.). Retrieved 09 07, 2016

International Organization of Motor Vehicle Manufacturers. (2016). Retrieved 09 07, 2016, from http://www.oica.net/category/production-statistics/

International Transport Forum at the OECD. (2017, 05 31). Transition to Shared Mobility. How large cities can deliver inclusive transport services. Retrieved 08 20, 2017, from International Transport Forum: https://www.itf-oecd.org/transition-shared-mobility

Jacobson, S. H., & King, D. M. (2009). Measuring the potential for automobile fuel savings in the US: The impact of obesity. Transportation Research Part D (14), 6-13.

JapaneseCarTrade.com. (2016). Retrieved 08 10, 2016

Közlekedő Tömeg. (2017, 03 15). Retrieved 07 22, 2017, from Merre tovább, Bubi?: http://kozlekedotomeg.blog.hu/2017/03/15/merre_tovabb_bubi

Kerekes, S. (1998). A környezetgazdaságtan alapjai. Budapest: Aula házi sokszorosítás.

Kerekes, S., & Kiss, K. (2000). Basic Environmental Requirements for EU Accession: An Impact Study on Hungary. Environment, Development and Sustainability, 2 (1), 61-76.

Kerekes, S., & Wetzker, K. (2007). Keletre tart a „társadalmilag felelős vállalat" koncepció. Harvard Businessmanager: Korszerű Menedzsment Elmélet és Megvalósítás, 9 (4), 37-47.

Kim, J., & Brownstone, D. (2010). The impact of residential density on vehicle usage and fuel consumption. University of California Transportation Center, Dept. of Economics, Irvine, CA.

Kiss, K. (2011, May). Rise and Fall of the Concept Sustainability. New York, USA.

Klinger, T., Kenworthy, J. R., & Lanzendorf, M. (2013). Dimensions of urban mobility cultures – a comparison of German cities. Journal of Transport Geography, 31, 18-19.

Koglin, T. (2015). Organisation does matter – planning for cycling in Stockholm and Copenhagen. Transport Policy, 39, 55–62.

Krammer, A. (1978, July). Fuelling the Third Reich. Technology and Culture, 394-422.

Lam, W. H., & Bell, M. G. (2003). Advanced Modeling for Transit Operations and Service Planning. Elsevier publishing.

Lane, C. (2005). PhillyCarShare: First-year social and mobility impacts of carsharing in Philadelphia, Pennsylvania. ransportation Research Record: Journal of the Transportation Research Board, (1927), 158–166.

Langbroek, J. H., Franklin, J. P., & Susilo, Y. O. (2017). Electric vehicle users and their travel patterns in Greater Stockholm. Transportation Research Part D: Transport and Environment, 98-111.

Larson, E. D., & Tingjin, R. (2003). Synthetic fuel production by indirect coal liquefaction. Energy for Sustainable Development, VII (4).

Lave, L. B., & MacLean, H. L. (2002). An environmental-economic evaluation of hybrid electric vehicles: Toyota's Prius vs. its conventional internal combustion engine Corolla. Transportation Research Part D, 7 (2), 155-162.

Lindström, M. (2008). Means of transportation to work and overweight and obesity: A population-based study in southern Sweden. Preventive Medicine, 46, 22-28.

Litman, T. (2002). The Costs of Automobile Dependency and the Benefits of Balanced Transportation. Victoria Transport Policy Institute, Victoria, BC, CANADA.

Luda, S. (2012). Vidékfejlesztés Integrált Szemléletben. Agrárvállalkozói életutak és értékrendek. Ph.D. értekezés, Környezetgazdaságtani és Technológiai Tanszék, Budapesti Corvinus Egyetem.

Macdonald, V. (2014, 07 03). Retrieved 08 10, 2016, from http://www.timesofmalta.com/articles/view/20140703/business-news/Tension-growing-between-new-and-used-car-importers.526139

Magyar Közlöny, 40/2015. (VI. 30.) NFM. (2015). Retrieved 09 10, 2016

Magyar Közlekedési Klub - Hungarian Transport Club. (2017, 02 16). Retrieved 07 22, 2017, from Miért lassúak a villamosok Budapesten?: http://www.mkk.zpok.hu/

Magyar Kerékpárosklub. (2015). Magyar Kerékpárosklub. Retrieved 08 23, 2015, from http://kerekparosklub.hu/kerekparhasznalat_2014_majus

Marchetti, C. (1994). Anthropological invariants in travel behaviour. Technological forecasting and social change (47), 75-88.

Marchetti, C. (1986). Environmental Problems and Technological Opportunities. Technological forecasting and social change (30), 1-4.

Marchetti, C. (1983). The automobile in a system context. The past 80 years and the next 20 years. Technological Forecasting and Social Change, 23, 3-23.

Martin, E., Shaheen, S. A., & Lidicker, J. (2010). Carsharing's Impact On Household Vehicle Holdings: Results From A North American Shared-Use Vehicle Survey. Retrieved 10 20, 2013, from www.scholr.ly: http://www.scholr.ly/paper/1741347/carsharings-impact-on-household-vehicle-holdings-results-from-a-north-american-shared-use-vehicle-survey

Masternaut. (2013). Retrieved 09 22, 2013, from http://www.masternaut.com

Meier, K. (2014). Hydrogen production with sea water electrolysis using Norwegian offshore wind energy potentials. International Journal of Energy and Environmental Engineering, 5 (2-3), 1-12.

Metz, D. (2012). Demographic determinants of daily travel demand. Transport Policy, 21, 20-25.

Metz, D. (2010). Saturation of Demand for Daily Travel. Transport Reviews, 30 (5), 659-674.

Michelberger, P. (1986). Járműipar - műszaki fejlesztés - mechanikai kutatás. In Műszaki fejlődés - közgazdasági feltételrendszer: A Magyar Tudományos Akadémia Műszaki Tudományok Osztálya, valamint Gazdaság- és Jogtudományok Osztálya 1986. május 5-i együttes ülésén elhangzott előadások. (pp. 41-82). Budapest: Közgazdasági és Jogi Könyvkiadó.

Millard-Ball, A., Murray, G., & ter Schure, J. (2006). Car-sharing as a parking management strategy. Proceedings of the 85th Annual Meeting of the Transportation Research Board, Washington, DC.

Mock, P., Tietge, U., Franco, V., German, J., Bandivadekar, A., Ligterink, N., et al. (2014). From Laboratory To Road. A 2014 Update Of Official And “Real-World” Fuel Consumption And CO_2 Values For Passenger Cars In Europe. International Council on Clean Transportation, Berlin.

MOL Bubi. (2017). Retrieved 07 22, 2017, from https://molbubi.bkk.hu/a-molbubi.php

MTR Corporation Limited. (2015). Retrieved 08 05, 2015, from http://www.mtr.com.hk/en/corporate/overview/profile_index.html

Musk, E. (2006, August 2). The Secret Tesla Motors Master Plan (just between you and me). Retrieved October 26, 2014, from www.teslamotors.com: http://www.teslamotors.com/blog/secret-tesla-motors-master-plan-just-between-you-and-me

NGVA Europe. (2009). NGVA Europe, Fact Sheet: NG/biomethane used as vehicle fuel. Retrieved 2 22, 2012, from www.ngvaeurope.eu.

NGVA Europe. (2012). www.ngvaeurope.eu. Retrieved from NGVA Europe, Fact Sheet: NG/biomethane used as vehicle fuel.

Nieuwenhuis, P., Vergragt, P., & Wells, P. E. (2006). The business of sustainable mobility: from vision to reality. Greenleaf Publishing.

Nriagu, J. O. (1990). The Rise and Fall of Leaded Gasoline. The Science of the Total Environment, 92, 13-28.

Ntziachristos, L., & Dilara, P. (2012). Sustainability Assessment of Road Transport Technologies. European Commission, Joint Research Centre, Institute for Reference Materials and Measurements. Luxembourg: Publications Office of the European Union.

OECD. (2013). International Transport Forum, Long-run Trends in Car Use. OECD Publishing/ITF.

Office for National Statistics. (2016, 05 26). Retrieved 07 27, 2017, from http://visual.ons.gov.uk/uk-perspectives-2016-how-we-travel/#footnote_2

Official Porsche Website. (2009). Retrieved July 25, 2009, from http://www.porsche.com/all/media/pdf/environment_usa.pdf

Orfeuil, J.-P., & Soleyret, D. (2002). Quelles interactions entre les marchés de la mobilité à courte et à longue distance? What are the interactions between the short and long-distance travel markets? Recherche Transports Sécurité, 76, 208-221.

Organisation For Economic Cooperation and Development. (1983). Long Term Outlook For The World Automobile Industry. Paris.

Orsato, R., & Wells, P. (2007). U-turn: the rise and demise of the automobile industry. Journal of Cleaner Production, 15, 994-1006.

Ortúzar, J., & Willumsen, L. G. (2011). Modelling Transport (4th Edition ed.). John Wiley & Sons, Ltd.

Pauli, G. (2010). The Blue Economy: 10 Years, 100 Innovations, 100 Million Jobs. Report to the Club of Rome. Taos, New Mexico, USA: Paradigm Publications.

Physical Activity Task Force. (1995). More People, More Active, More Often. UK Department of Health, London.

Piac és Profit. (2014, 12 16). Retrieved 09 10, 2016, from http://www.piacesprofit.hu/tarsadalom/az-olcso-uzemanyag-elocsalogatja-a-hetvegi-soforoket/

Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. (2011). World Urbanization Prospects: The 2011. (W. P., Producer) Retrieved 02 22, 2014, from United Nations Department of Economic and Social Affairs: http://esa.un.org/unup/unup/p2k0data.asp

Puentes, R., & Tomer, A. (2008). The Road...Less Traveled: An Analysis of Vehicle Miles Traveled Trends in the U.S. Metropolitan Policy Program at Brookings. Brookings.

Quality Planning. (2009). Quality Planning. Retrieved August 30, 2009, from www.qualityplanning.com/index.cfm?event=showNews&newsId=46&displayType=page

(1987). Report of the World Commission on Environment and Development: Our Common Future.

Reuters. (2015, 02 12). Retrieved 05 09, 2015, from http://uk.reuters.com/article/2015/02/12/uk-southkorea-uber-idUKKBN0LG0ZU20150212

Reuters. (2017a, 05 17). Retrieved 07 23, 2017, from http://www.reuters.com/article/us-volvocars-diesel-idUSKCN18D0Q7

Reuters. (2017b, 07 06). Retrieved 07 23, 2017, from http://www.reuters.com/article/us-germany-emissions-eu-idUSKBN1A70G8

Reuters. (2017c, 07 28). Retrieved 08 17, 2017, from https://www.reuters.com/article/us-germany-emissions-idUSKBN1AD10Y

Rissel, C., Curac, N., Greenaway, M., & Bauman, A. (2012). Physical Activity Associated with Public Transport Use - A Review and Modelling of Potential Benefits. International Journal of Environmental Research and Public Health, 9, 2454-2478.

Rodier, C., & Shaheen, S. A. (2003, August). Carsharing and Carfree Housing: Predicted Travel, Emission, and Economic Benefits. Retrieved 10 20, 2013, from tsrc.berkeley.edu/sites.

Santos, G., Behrendt, H., & Teytelboym, A. (2010). Part II: Policy instruments for sustainable road transport. Research in Transportation Economics (28), 46-91.

Schaefers, T. (2013). Exploring carsharing usage motives: A hierarchical means-end chain analysis. Transportation Research Part A (47), 69-77.

Schipper, L. (2009). Fuel economy, vehicle use and other factors affecting CO2 emissions from transport. Energy Policy, 37 (10), 3711-3713.

Schmolck, P. (2014, March). PQMethod Manual. Retrieved April 30, 2017, from The QMethod Page.: http://schmolck.org/qmethod/

Schnitzer, H. (2015, 05 20). Resource efficient and clean urban technologies. Sao Paolo, Brazil.

Seidel, M., Loch, C. H., & Chahil, S. (2005). Quo Vadis, Automotive Industry? A Vision of Possible Industry Transformations. European Management Journal, 23 (4), 439–449.

Shaheen, S. A., Mallery, M. A., & Kingsley, K. J. (2012). Personal vehicle sharing services in North America. Research in Transportation Business & Management (3), 71-81.

Shaheen, S., Cohen, A., & Chung, M. (2008). North American Carsharing: A Ten-Year Retrospective. Retrieved 10 22, 2013, from http://www.escholarship.org/uc/item/8jg510td.pdf;origin=repeccitec

Shields, W. M. (2007). The automobile as an open to closed technological system. Theory and practice in the study of technological systems. Ph.D. Dissertation, Blacksburg: Virginia Polytechnic Institute & State University.

Shinnar, R. (2003). The hydrogen economy, fuel cells, and electric cars. Technology in Society (25), 455–476.

Shove, E. (2003). Comfort, cleanliness and convenience: The social organization of normality. Berg.

Slym, K. (2013). Lead the Future.. Morgan Stanley India Summit Keynote Address.

Small, K. A., & Van Dender, K. (2007). Fuel Efficiency and Motor Vehicle Travel: The Declining Rebound Effect. Energy Journal, 28 (1), 25-51.

Sobrino, F. H., & Monro, C. R. (2009). Critical analysis of the European Union directive which regulates the use of biofuels: An approach to the Spanish case. Renewable and Sustainable Energy Reviews, 13, 2675–2681.

Souche, S. (2010). Measuring the structural determinants of urban travel demand. Transport Policy, 17, 127–134.

Sovacool, B. K. (2009). Early modes of transport in the United States: Lessons for modern energy policymakers. Policy and Society, 27, 411-427.

Sovacool, B. K., & Hirsh, R. F. (2009). Beyond batteries: An examination of the benefits and barriers to plug-in hybrid electric vehicles (PHEVs) and a vehicle-to-grid (V2G) transition. Energy Policy, 1095-1103.

Spencer, G. (2014). Keeping Balance - Maintaining the Strong Cycling Culture of Central and Eastern Europe. mobile2020. The Regional Environmental Center for Central and Eastern Europe (REC).

Spinak, A., Chiu, D., & Casalegno, F. (2008). Intermittent Bus Lane System (Lisbon). Massachusetts Institute of Technology.

Statistics Finland. (2016). Retrieved 08 01, 2016, from www.stat.fi

Stephenson, W. (1935). Correlating Persons Instead of Tests. Journal of Personality, 4 (1), 17-24.

Stevens, P. (2012). The ‘Shale Gas Revolution’: Developments and Changes. The Royal Institute of International Affairs. London: Chatham House.

Suppes, G. J. (2006). Roles of plug-in hybrid electric vehicles in the transition to the hydrogen economy. International Journal of Hydrogen Energy, 31, 353 – 360.

Szlávik, J. (2014). Lépések a fenntartható gazdálkodás irányába: Gondolatok Láng István és Kerekes Sándor Megalakult a Túlélés Szellemi Kör című vitairatához. Magyar Tudomány (1), 99-108.

Taminiau, Y. (2006). Beyond known uncertainties: Interventions at the fuel–engine interface. Research Policy, 35, 247-265.

The Gallup Organisation. (2011). Future of transport.

The New York Times. (2017, 05 23). Retrieved 07 18, 2017, from nytimes.com: https://www.nytimes.com/2017/05/23/business/daimler-diesel-emissions-germany.html

The U.S. Energy Information Administration. (2013, October 23). Retrieved January 12, 2014, from http://www.eia.gov/todayinenergy/detail.cfm?id=13491

The US District Court for the Eastern District of Michigan. (2017, 05 23). Retrieved 07 18, 2017, from Documentcloud: https://www.documentcloud.org/documents/3729017-U-S-vs-Fiat-Chrysler-Automobiles.html

The World Bank. (2014). Retrieved 02 22, 2014, from http://data.worldbank.org/indicator/IS.VEH.NVEH.P3

The World Bank. (2016). Retrieved 01 02, 2016, from http://databank.worldbank.org/data/reports.aspx?source=2&type=metadata&series=NY.GDP.PCAP.CD#

The World Bank. (2016). Retrieved 09 09, 2016, from http://databank.worldbank.org/data/reports.aspx?source=2&series=NY.GDP.PCAP.PP.CD&country=

Thengane, S. K., Hoadley, A., Bhattacharya, S., Mitra, S., & Bandyopadhyay, S. (2014). Cost-benefit analysis of different hydrogen production technologies using AHP and Fuzzy AHP. International Journal of Hydrogen Energy, 39, 15293-15306.

Tietge, U., Mock, P., Franco, V., & Zacharof, N. (2017). From laboratory to road: Modeling the divergence between official and real-world fuel consumption and CO2 emission values in the German passenger car market for the years 2001–2014. Energy Policy (103), 212-222.

Tkatchenko, R. (2009). The Hybrid-Electric Vehicles (HEV) – History, Possible Future, Pros and Cons. In S. Kerekes, M. Csutora, & M. Székely (Ed.), Sustainable Consumption, Production and Communication, (pp. 135-143). Budapest.

TNS Opinion & Social. (2013). Attitudes of Europeans Towards Urban Mobility. Special Eurobarometer 406.

TNS-Hoffmann Kft. (2015). Kerékpárhasználati adatok . Retrieved 08 23, 2015, from https://drive.google.com/folderview?id=0BzFp9an85_x4ak1vbWNLN0h6U0U&usp=sharing

Transport Advisory Committee. (2014). Report on Study of Road Traffic Congestion in Hong Kong. Hong Kong.

Transport For London. (2015). Retrieved 05 09, 2015, from http://www.tfl.gov.uk/modes/driving/red-routes/rules-of-red-routes/bus-lanes

Transport Malta. (2013). The National ITS Action Plan for Malta. National Transport Authority and National Transport Regulator.

Turrentine, T. S., & Kurani, K. S. (2007). Car buyers and fuel economy? Energy Policy, 35, 1213-1223.

Tóth, G. (2016). Az új paradigma építőkövei – 1. rész: Nagy vallások gazdasági tanításai. Köz-Gazdaság, XI (4), 207-219.

Tóth, G. (2016). Az új paradigma építőkövei – 2. rész: A keresztény társadalmi tanítás. Köz-Gazdaság, XI (5), 50-67.

Tóth, G. (2017). Az új paradigma építőkövei – 3. rész. Köz-Gazdaság, XII (1), 119-134.

U.S. Department of Energy. (2013). Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States. Washington: U.S. Energy Information Administration (EIA).

United States Environmental Protection Agency. (2015, September 18). EPA, California Notify Volkswagen of Clean Air Act Violations / Carmaker allegedly used software that circumvents emissions testing for certain air pollutants . Retrieved February 27, 2016, from EPA News Releases - Air: http://yosemite.epa.gov/opa/admpress.nsf/6424ac1caa800aab85257359003f5337/dfc8e33b5ab162b985257ec40057813b!OpenDocument

Vanoutrive, T., Van De Vijver, E., Van Malderen, L., Jourquin, B., Thomas, I., Verhetsel, A., et al. (2012). What determines carpooling to workplaces in Belgium: location, organisation, or promotion? Journal of Transport Geography (22), 77-86.

Varga, M. (2015, 04 30). Retrieved 05 09, 2015, from https://www.facebook.com/pages/Varga-Mih%C3%A1ly/324771568775

Velazquez Abad, A., & Dodds, P. E. (2017). Production of Hydrogen. Encyclopedia of Sustainable Technologies, 293-304.

Vietor, Richard H. K. (1980). The synthetic liquid fuels program: energy politics in the Truman era. (T. P. College, Ed.) The Business History Review, 54 (1), 1-34.

Vilhelmson, B. (1999). Daily mobility and the use of time for different activities. The case of Sweden. GeoJournal (48), 177-185.

Volkswagen AG. (2010). Be aware and save fuel. Think Blue. Wolfsburg: VM Marketing.

Wackemagel, M., & Rees, W. E. (1997). Perceptual and structural barriers to investing in natural capital: Economics from an ecological footprint perspective. Ecological Economics, 20, 3-24.

WardsAuto. (2013). World Vehicle Population Tops 1 Billion Units. Retrieved 08 03, 2013, from WardsAuto: http://wardsauto.com/ar/world_vehicle_population_110815

White, C. M., Steeper, R. R., & Lutz, A. E. (2006). The hydrogen-fueled internal combustion engine: a technical review. International Journal of Hydrogen Energy (31), 1292 – 1305.

Wikipedia. (2015). Retrieved 08 05, 2015, from https://en.wikipedia.org/wiki/Transport_in_Hong_Kong#cite_ref-1

World Health Organization. (2009). Global Status Report on Road Safety: Time for Action.

Worldometers. (2013). www.worldometers.info/cars/. Retrieved 10 27, 2013

Yaegashi, T. (2003). Future Automotive Power-trains: Does hybridization enable vehicles to meet the challenge of sustainable development? UK-Japan automotive technology forum. London.

Zachariadis, T., & Clerides, S. (2008). The effect of standards and fuel prices on automobile fuel economy: An international analysis. Energy Economics, 30 (5), 2657-2672.

Zahavi, J. (1976, June 14). The Unified Mechanism of Travel (UMOT) Model.

Zegras, P. C. (2005). Sustainable Urban Mobility: Exploring the Role of the Built Environment. Dept. of Urban Studies and Planning. Cambridge, MA: Massachusetts Institute of Technology.

Zilahy, G. (2016). Sustainable business models – what do management theories say? Vezetéstudomány (10), 62-72.

Zsóka Nemcsicsné, Á. (2005). Következetesség és rések a környezettudatos szervezeti magatartásban. Ph.D. Értekezés, környezetgazdaságtani és technológiai tanszék, Budapesti Corvinus Egyetem.

Publications on the topic of the dissertation

Publications in English language

1. Tkatchenko, R. (2009). The Hybrid-Electric Vehicles (HEV) – History, Possible Future, Pros and Cons. In: S. Kerekes, M. Csutora, & M. Székely (Ed.), Sustainable Consumption, Production and Communication, Budapesti Corvinus Egyetem., pp. 135-143.
2. Tkatchenko, R. (2011). The evolution of the car making industry. Vezetéstudomány XLII. évf., vol. 4., pp. 38-45.
3. Tkatchenko, R. (2013). The use of methane as automotive fuel – a step to sustainable economy? Vezetéstudomány XLIV. évf., vol. 12., pp. 1-9.
4. Tkatchenko, R. (2013). Personal Mobility In The Context Of Sustainable Development, Journal of Environmental Sustainability: (ISSN: 2159-2519) 3 (3) pp. 49-71.

Publications in Hungarian language

1. Tkatchenko, R. (2017). Személyes mobilitás a fenntartható fejlődés kontextusában. In: Bodor M; Kerekes S; Zilahy Gy (szerkesztők) - „Jót s Jól!”: 26 tanulmány a fenntarthatóságról. „A hazai fenntartható fejlődés vezérfonala” - „Blueprint for the Hungarian Sustainability” c. konferencia lektorált, szerkesztett anyaga. Konferencia helye, ideje: Kőszeg, Magyarország, 2017.01.20-2017.01.21. Kőszeg: Felsőbbfokú Tanulmányok Intézete, 2017. pp. 226-233. (iASK–KRAFT Könyvek) (ISBN:978-615-80529-8-6) Nyelv: Magyar

Annex 1. Output of the first run of PQMethod software with 20 respondents

PQMethod2.35 Attitude to city mobility PAGE 1
Path and Project Name: C:\PQMethod\projects/mobility Apr 16 17

Correlation Matrix Between Sorts

SORTS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	MinFoAff	100	32	18	17	10	26	22	40	22	10	18	-26	43	38	25	9	35	-2	30	29
2	GenMan	32	100	35	4	24	39	6	8	26	10	20	-30	30	28	-14	49	35	30	19	4
3	Dentist	18	35	100	31	18	20	33	12	34	29	24	-25	15	24	-5	21	24	19	1	21
4	Economis	17	4	31	100	13	4	40	24	24	57	66	-46	2	45	25	-8	-2	-2	18	26
5	CityBoy	10	24	18	13	100	21	9	-5	14	29	17	-14	28	22	15	36	40	20	33	29
6	CorpFin	26	39	20	4	21	100	12	21	23	32	16	-22	20	21	8	38	42	32	3	40
7	Designer	22	6	33	40	9	12	100	41	46	49	39	-35	-15	32	14	-6	34	-28	13	5
8	Banker	40	8	12	24	-5	21	41	100	31	27	25	-39	30	24	7	4	20	10	30	9
9	FinProf	22	26	34	24	14	23	46	31	100	22	45	-50	11	2	9	28	50	30	36	3
10	UniDocen	10	10	29	57	29	32	49	27	22	100	55	-45	10	23	13	18	27	16	23	31
11	Dezs	18	20	24	66	17	16	39	25	45	55	100	-52	-15	26	4	32	23	21	45	14
12	FerfiKo	-26	-30	-25	-46	-14	-22	-35	-39	-50	-45	-52	100	-23	-34	-20	-18	-35	-23	-37	-17
13	Olvaso	43	30	15	2	28	20	-15	30	11	10	-15	-23	100	7	17	25	23	38	30	11
14	LadyProf	38	28	24	45	22	21	32	24	2	23	26	-34	7	100	24	-8	8	-33	1	34
15	MathTeach	25	-14	-5	25	15	8	14	7	9	13	4	-20	17	24	100	-19	14	-10	20	37
16	Gellerth	9	49	21	-8	36	38	-6	4	28	18	32	-18	25	-8	-19	100	21	37	45	1
17	CEO	35	35	24	-2	40	42	34	20	50	27	23	-35	23	8	14	21	100	53	32	23
18	PharmaGM	-2	30	19	-2	20	32	-28	10	30	16	21	-23	38	-33	-10	37	53	100	37	19
19	KHTvez	30	19	1	18	33	3	13	30	36	23	45	-37	30	1	20	45	32	37	100	13
20	CityGirl	29	4	21	26	29	40	5	9	3	31	14	-17	11	34	37	1	23	19	13	100

Unrotated Factor Matrix

	Factors 1	2	3	4	5	6	7	8
SORTS								
1 MinFoAff	0.5167	-0.0338	0.4896	0.3320	-0.2819	-0.1249	0.0611	-0.0841
2 GenMan	0.4980	0.3994	0.0359	-0.2131	-0.4694	-0.2674	0.0650	0.0024
3 Dentist	0.4883	-0.0255	-0.0956	-0.3348	-0.3500	0.0784	-0.1049	0.5591
4 Economis	0.5395	-0.5871	-0.1313	-0.1406	0.2085	-0.2331	-0.2393	0.1716
5 CityBoy	0.4518	0.2358	0.1996	-0.3366	0.2846	-0.1184	0.4779	0.1326
6 CorpFin	0.5135	0.2616	0.2287	-0.3151	-0.1844	0.3010	-0.1996	-0.4588
7 Designer	0.5078	-0.5377	-0.2290	0.1027	-0.2609	0.2807	0.3036	-0.0187
8 Banker	0.4906	-0.1736	0.0323	0.5325	-0.2209	0.0178	-0.2953	-0.1999
9 FinProf	0.6279	0.0671	-0.3604	0.2628	-0.1116	0.2872	0.1777	0.1339
10 UniDocen	0.6363	-0.2799	-0.1773	-0.2534	0.2301	0.0604	-0.1894	-0.0704
11 Dezs	0.6605	-0.2521	-0.4715	-0.0853	0.2025	-0.2005	-0.0353	-0.1701
12 FerfiKo	-0.7067	0.1536	0.1407	-0.1756	-0.0247	0.0808	0.1415	-0.0580
13 Olvaso	0.3738	0.4190	0.4531	0.3080	-0.0210	-0.2409	-0.2191	0.3136
14 LadyProf	0.4324	-0.4900	0.3999	-0.2264	-0.2674	-0.2811	0.0991	-0.0682
15 MathTeach	0.2504	-0.2995	0.5102	0.1847	0.4352	0.1504	0.1792	0.0880
16 Gellerth	0.4288	0.5772	-0.2426	-0.1881	-0.0257	-0.3345	0.1332	-0.2338
17 CEO	0.6301	0.3232	0.0457	0.0733	-0.0285	0.5057	0.2527	0.0266
18 PharmaGM	0.3940	0.6796	-0.1567	0.0150	0.2806	0.2002	-0.3609	0.1375
19 KHTvez	0.5569	0.2328	-0.1085	0.3772	0.3983	-0.3032	0.2201	-0.0933
20 CityGirl	0.4201	-0.1003	0.5163	-0.3381	0.3055	0.2198	-0.1825	-0.0869
Eigenvalues	5.3578	2.5884	1.8060	1.4433	1.3982	1.1717	0.9961	0.8739
% expl.Var.	27	13	9	7	7	6	5	4

Cumulative Communalities Matrix

	Factors 1 Thru 1	2	3	4	5	6	7	8
SORTS								
1 MinFoAff	0.2669	0.2681	0.5078	0.6180	0.6975	0.7131	0.7168	0.7239
2 GenMan	0.2480	0.4075	0.4088	0.4542	0.6745	0.7460	0.7502	0.7502
3 Dentist	0.2384	0.2391	0.2482	0.3603	0.4828	0.4890	0.5000	0.8125
4 Economis	0.2911	0.6358	0.6530	0.6728	0.7163	0.7706	0.8279	0.8573
5 CityBoy	0.2041	0.2597	0.2996	0.4129	0.4939	0.5079	0.7363	0.7539
6 CorpFin	0.2637	0.3321	0.3844	0.4837	0.5177	0.6083	0.6481	0.8586
7 Designer	0.2579	0.5470	0.5995	0.6100	0.6781	0.7569	0.8491	0.8494
8 Banker	0.2407	0.2709	0.2719	0.5554	0.6042	0.6045	0.6917	0.7317
9 FinProf	0.3942	0.3987	0.5286	0.5977	0.6101	0.6926	0.7242	0.7421
10 UniDocen	0.4049	0.4833	0.5147	0.5789	0.6319	0.6355	0.6714	0.6763
11 Dezs	0.4363	0.4998	0.7221	0.7294	0.7704	0.8106	0.8119	0.8408
12 FerfiKo	0.4994	0.5230	0.5428	0.5737	0.5743	0.5808	0.6008	0.6042
13 Olvaso	0.1397	0.3153	0.5207	0.6155	0.6159	0.6739	0.7219	0.8203
14 LadyProf	0.1870	0.4271	0.5870	0.6383	0.7098	0.7888	0.7986	0.8032
15 MathTeach	0.0627	0.1524	0.4127	0.4469	0.6363	0.6589	0.6910	0.6988
16 Gellerth	0.1839	0.5170	0.5758	0.6112	0.6119	0.7238	0.7415	0.7962
17 CEO	0.3970	0.5014	0.5035	0.5089	0.5097	0.7654	0.8293	0.8300
18 PharmaGM	0.1552	0.6171	0.6417	0.6419	0.7207	0.7608	0.8910	0.9099
19 KHTvez	0.3101	0.3643	0.3761	0.5184	0.6770	0.7689	0.8174	0.8261
20 CityGirl	0.1765	0.1865	0.4531	0.5674	0.6607	0.7090	0.7423	0.7498
cum% expl.Var.	27	40	49	56	63	69	74	78

Factor Matrix with an X Indicating a Defining Sort

		Loadings			
QSORT		1	2	3	4
1	MinFoAff	0.0250	0.1312	0.5271	0.5677X
2	GenMan	0.0905	0.6522X	0.0495	0.1350
3	Dentist	0.4239	0.4048	0.1178	-0.0540
4	Economis	0.7656X	-0.0452	0.2882	0.0396
5	CityBoy	0.1013	0.5782X	0.2612	-0.0083
6	CorpFin	0.1049	0.6216X	0.2901	0.0470
7	Designer	0.7186X	-0.1458	0.1368	0.2317
8	Banker	0.2801	-0.0923	0.1473	0.6684X
9	FinProf	0.4695	0.2577	-0.2036	0.5190
10	UniDocen	0.6883X	0.2705	0.1744	0.0399
11	Dezs	0.8003X	0.2124	-0.1106	0.1778
12	FerfiKo	-0.5549X	-0.1994	-0.1078	-0.4630
13	Olvaso	-0.3054	0.3734	0.2837	0.5499
14	LadyProf	0.3958	0.0251	0.6928X	-0.0313
15	MathTeach	0.0383	-0.1306	0.5972X	0.2677
16	Gellerth	0.0777	0.7125X	-0.2833	0.1315
17	CEO	0.1549	0.5407X	0.0786	0.4316
18	PharmaGM	-0.0861	0.6733X	-0.2913	0.3103
19	KHTvez	0.1813	0.2903	-0.0887	0.6272X
20	CityGirl	0.1226	0.3435	0.6565X	-0.0585
% expl.Var.		17	16	11	12

Free Distribution Data Results

QSORT		MEAN	ST.DEV.
1	MinFoAff	0.000	2.351
2	GenMan	0.000	2.351
3	Dentist	0.000	2.351
4	Economis	0.000	2.351
5	CityBoy	0.000	2.351
6	CorpFin	0.000	2.351
7	Designer	0.000	2.351
8	Banker	0.000	2.351
9	FinProf	0.000	2.351
10	UniDocen	0.000	2.351
11	Dezs	0.000	2.351
12	FerfiKo	0.000	2.351
13	Olvaso	0.000	2.351
14	LadyProf	0.000	2.351
15	MathTeach	0.000	2.351
16	Gellerth	0.000	2.351
17	CEO	0.000	2.351
18	PharmaGM	0.000	2.351
19	KHTvez	0.000	2.351
20	CityGirl	0.000	2.351

Factor Scores with Corresponding Ranks

No.	Statement	No.	Factors 1		2		3		4	
1	The developed countries should support the public tran	1	0.23	19	-0.08	22	0.74	8	1.19	7
2	State sponsored environmental advertizing and awarenes	2	-0.12	22	0.77	11	0.02	21	0.91	9
3	Public transport is inferior to using your own car, ev	3	-1.56	37	-0.83	31	1.69	3	-0.74	31
4	If the local government would only allow electric cars	4	1.20	6	0.84	9	0.70	10	-0.31	24
5	Traffic jams can be eliminated by introducing an appro	5	0.29	18	0.12	20	0.36	14	1.89	2
6	We must accept that traditional cars shall be excluded	6	0.45	15	-0.87	32	-1.19	33	0.47	13
7	Street parking fees in Budapest are unrealistically hi	7	-0.23	23	-1.05	34	1.68	4	0.01	18
8	If someone wants to drink alcohol during the night, ev	8	-1.86	39	1.01	8	-1.16	32	0.24	15
9	Much more people would use public transport, if there	9	0.45	14	1.96	1	-0.21	24	1.24	6
10	Car-free days should be organized, because if you cann	10	0.93	8	-1.14	35	-0.13	23	0.15	17
11	The urban traffic jam is no problem in terms of time,	11	-1.26	35	-1.33	37	-1.52	36	-1.52	37
12	People do not even think about how much it costs to ma	12	0.47	13	0.20	18	0.04	20	0.47	13
13	In China, India and other countries with rapidly growi	13	-0.39	27	0.57	14	0.22	16	1.07	8
14	People prefer to ride their own cars, because the taxi	14	-0.34	25	1.03	7	0.22	17	-0.60	30
15	If there were more P+R parking lots (Park and Ride), i	15	-0.01	20	1.58	2	-0.25	26	1.40	4
16	Most of the customers of electric cars choose them not	16	0.48	12	-0.18	23	0.45	12	-0.03	19
17	Car buyers will still choose the peak performance, eve	17	1.46	3	0.82	10	0.37	13	-1.62	38
18	For modern successful urban people the comfort and per	18	1.28	5	0.58	13	1.95	2	1.64	3
19	State subsidies and discounts clearly increase demand	19	0.37	16	1.57	3	0.62	11	-0.28	23
20	All cars should be equipped with a GPS-based speedomet	20	1.15	7	-1.83	38	0.82	7	0.48	11
21	Everyone in Budapest should be obliged to buy a public	21	-0.86	30	-2.16	39	-1.62	37	-1.86	39
22	All adult family members should maintain their own car	22	-1.16	33	-0.91	33	-1.36	35	-0.12	21
23	The longer the time you spend in the city center, the	23	1.45	4	1.26	4	-0.79	31	1.30	5
24	Those with higher incomes have the duty to drive the l	24	0.53	11	-0.31	24	-0.36	27	-0.60	29
25	Those who can afford the most modern car shall buy it	25	-1.55	36	-1.16	36	-0.77	30	-1.14	33
26	Business cars with free usage are a bad example and ca	26	1.96	1	-0.79	27	-0.04	22	0.83	10
27	Utilizing the bus lane would be more effective, if you	27	-1.08	32	-0.05	21	-1.21	34	-1.24	35
28	Speed limitation is important and can save lives.	28	1.53	2	1.21	5	1.10	5	1.90	1
29	For a family of 3-5 members 1 car is enough.	29	0.92	9	-0.77	26	-0.23	25	-0.19	22
30	The car is not something that a person lends.	30	-0.97	31	-0.51	25	0.16	19	-0.07	20
31	If the taxi was cheaper, more people would leave their	31	-0.29	24	1.10	6	-0.37	28	-1.36	36
32	Those who do not enter the city do not care what the a	32	-0.08	21	-0.81	29	0.36	15	-0.39	25
33	The use of the bus lane should be allowed for private	33	-1.61	38	0.37	16	-1.88	39	-1.03	32
34	All electric cars shall be allowed to use the bus lane	34	-0.34	26	0.26	17	-0.42	29	0.32	14
35	Old, less modern vehicles shall be punished by a highe	35	0.34	17	0.40	15	0.84	6	-0.50	27
36	Public opinion underestimates the number of environmen	36	-0.42	28	0.15	19	0.73	9	0.19	16
37	The impact of the transport habits of an individual on	37	-1.21	34	-0.81	28	-1.72	38	-0.40	26
38	The bigger and more expensive the car is, the greater	38	-0.81	29	-0.81	30	1.98	1	-0.52	28
39	By public transport you can comfortably get almost any	39	0.68	10	0.59	12	0.17	18	-1.21	34

Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.2428	0.3906	0.4393
2	0.2428	1.0000	0.1288	0.3536
3	0.3906	0.1288	1.0000	0.3177
4	0.4393	0.3536	0.3177	1.0000

Factor Scores -- For Factor 1

No.	Statement	No.	Z-SCORES
26	Business cars with free usage are a bad example and cause ov	26	1.962
28	Speed limitation is important and can save lives.	28	1.530
17	Car buyers will still choose the peak performance, even if t	17	1.456
23	The longer the time you spend in the city center, the more i	23	1.453
18	For modern successful urban people the comfort and performan	18	1.276
4	If the local government would only allow electric cars in th	4	1.198
20	All cars should be equipped with a GPS-based speedometer and	20	1.146
10	Car-free days should be organized, because if you cannot use	10	0.929
29	For a family of 3-5 members 1 car is enough.	29	0.923
39	By public transport you can comfortably get almost anywhere	39	0.680
24	Those with higher incomes have the duty to drive the least p	24	0.533
16	Most of the customers of electric cars choose them not becau	16	0.482
12	People do not even think about how much it costs to maintain	12	0.469
9	Much more people would use public transport, if there were m	9	0.450
6	We must accept that traditional cars shall be excluded from	6	0.447
19	State subsidies and discounts clearly increase demand for el	19	0.365
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.342
5	Traffic jams can be eliminated by introducing an appropriate	5	0.293
1	The developed countries should support the public transport	1	0.226
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.009
32	Those who do not enter the city do not care what the air the	32	-0.083
2	State sponsored environmental advertizing and awareness camp	2	-0.117
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.234
31	If the taxi was cheaper, more people would leave their cars	31	-0.291
14	People prefer to ride their own cars, because the taxi is mo	14	-0.344
34	All electric cars shall be allowed to use the bus lane free	34	-0.344
13	In China, India and other countries with rapidly growing pop	13	-0.394
36	Public opinion underestimates the number of environmentally	36	-0.419
38	The bigger and more expensive the car is, the greater the re	38	-0.809
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.862
30	The car is not something that a person lends.	30	-0.972
27	Utilizing the bus lane would be more effective, if you could	27	-1.079
22	All adult family members should maintain their own cars to e	22	-1.163
37	The impact of the transport habits of an individual on the e	37	-1.210
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.260
25	Those who can afford the most modern car shall buy it out of	25	-1.548
3	Public transport is inferior to using your own car, even if	3	-1.559
33	The use of the bus lane should be allowed for private cars f	33	-1.609
8	If someone wants to drink alcohol during the night, even the	8	-1.856

Factor Scores -- For Factor 2

No.	Statement	No.	Z-SCORES
9	Much more people would use public transport, if there were m	9	1.961
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.581
19	State subsidies and discounts clearly increase demand for el	19	1.571
23	The longer the time you spend in the city center, the more i	23	1.264
28	Speed limitation is important and can save lives.	28	1.212
31	If the taxi was cheaper, more people would leave their cars	31	1.104
14	People prefer to ride their own cars, because the taxi is mo	14	1.033
8	If someone wants to drink alcohol during the night, even the	8	1.011
4	If the local government would only allow electric cars in th	4	0.837
17	Car buyers will still choose the peak performance, even if t	17	0.818
2	State sponsored environmental advertizing and awareness camp	2	0.775
39	By public transport you can comfortably get almost anywhere	39	0.587
18	For modern successful urban people the comfort and performan	18	0.583
13	In China, India and other countries with rapidly growing pop	13	0.569
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.403
33	The use of the bus lane should be allowed for private cars f	33	0.374
34	All electric cars shall be allowed to use the bus lane free	34	0.259
12	People do not even think about how much it costs to maintain	12	0.197
36	Public opinion underestimates the number of environmentally	36	0.146
5	Traffic jams can be eliminated by introducing an appropriate	5	0.120
27	Utilizing the bus lane would be more effective, if you could	27	-0.053
1	The developed countries should support the public transport	1	-0.083
16	Most of the customers of electric cars choose them not becau	16	-0.178
24	Those with higher incomes have the duty to drive the least p	24	-0.308
30	The car is not something that a person lends.	30	-0.505
29	For a family of 3-5 members 1 car is enough.	29	-0.768
26	Business cars with free usage are a bad example and cause ov	26	-0.788
37	The impact of the transport habits of an individual on the e	37	-0.806
32	Those who do not enter the city do not care what the air the	32	-0.810
38	The bigger and more expensive the car is, the greater the re	38	-0.814
3	Public transport is inferior to using your own car, even if	3	-0.833
6	We must accept that traditional cars shall be excluded from	6	-0.869
22	All adult family members should maintain their own cars to e	22	-0.911
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.052
10	Car-free days should be organized, because if you cannot use	10	-1.143
25	Those who can afford the most modern car shall buy it out of	25	-1.163
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.329
20	All cars should be equipped with a GPS-based speedometer and	20	-1.832
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.157

Factor Scores -- For Factor 3

No.	Statement	No.	Z-SCORES
38	The bigger and more expensive the car is, the greater the re	38	1.983
18	For modern successful urban people the comfort and performan	18	1.945
3	Public transport is inferior to using your own car, even if	3	1.691
7	Street parking fees in Budapest are unrealistically high, bu	7	1.684
28	Speed limitation is important and can save lives.	28	1.102
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.836
20	All cars should be equipped with a GPS-based speedometer and	20	0.818
1	The developed countries should support the public transport	1	0.738
36	Public opinion underestimates the number of environmentally	36	0.730
4	If the local government would only allow electric cars in th	4	0.700
19	State subsidies and discounts clearly increase demand for el	19	0.620
16	Most of the customers of electric cars choose them not becau	16	0.448
17	Car buyers will still choose the peak performance, even if t	17	0.368
5	Traffic jams can be eliminated by introducing an appropriate	5	0.360
32	Those who do not enter the city do not care what the air the	32	0.358
13	In China, India and other countries with rapidly growing pop	13	0.224
14	People prefer to ride their own cars, because the taxi is mo	14	0.222
39	By public transport you can comfortably get almost anywhere	39	0.166
30	The car is not something that a person lends.	30	0.156
12	People do not even think about how much it costs to maintain	12	0.040
2	State sponsored environmental advertizing and awareness camp	2	0.020
26	Business cars with free usage are a bad example and cause ov	26	-0.038
10	Car-free days should be organized, because if you cannot use	10	-0.126
9	Much more people would use public transport, if there were m	9	-0.206
29	For a family of 3-5 members 1 car is enough.	29	-0.232
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.254
24	Those with higher incomes have the duty to drive the least p	24	-0.358
31	If the taxi was cheaper, more people would leave their cars	31	-0.368
34	All electric cars shall be allowed to use the bus lane free	34	-0.418
25	Those who can afford the most modern car shall buy it out of	25	-0.768
23	The longer the time you spend in the city center, the more i	23	-0.790
8	If someone wants to drink alcohol during the night, even the	8	-1.155
6	We must accept that traditional cars shall be excluded from	6	-1.186
27	Utilizing the bus lane would be more effective, if you could	27	-1.208
22	All adult family members should maintain their own cars to e	22	-1.364
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.515
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.624
37	The impact of the transport habits of an individual on the e	37	-1.721
33	The use of the bus lane should be allowed for private cars f	33	-1.877

Factor Scores -- For Factor 4

No.	Statement	No.	Z-SCORES
28	Speed limitation is important and can save lives.	28	1.899
5	Traffic jams can be eliminated by introducing an appropriate	5	1.895
18	For modern successful urban people the comfort and performan	18	1.639
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.398
23	The longer the time you spend in the city center, the more i	23	1.297
9	Much more people would use public transport, if there were m	9	1.243
1	The developed countries should support the public transport	1	1.193
13	In China, India and other countries with rapidly growing pop	13	1.070
2	State sponsored environmental advertizing and awareness camp	2	0.911
26	Business cars with free usage are a bad example and cause ov	26	0.829
20	All cars should be equipped with a GPS-based speedometer and	20	0.483
12	People do not even think about how much it costs to maintain	12	0.475
6	We must accept that traditional cars shall be excluded from	6	0.475
34	All electric cars shall be allowed to use the bus lane free	34	0.318
8	If someone wants to drink alcohol during the night, even the	8	0.241
36	Public opinion underestimates the number of environmentally	36	0.191
10	Car-free days should be organized, because if you cannot use	10	0.155
7	Street parking fees in Budapest are unrealistically high, bu	7	0.014
16	Most of the customers of electric cars choose them not becau	16	-0.032
30	The car is not something that a person lends.	30	-0.072
22	All adult family members should maintain their own cars to e	22	-0.119
29	For a family of 3-5 members 1 car is enough.	29	-0.191
19	State subsidies and discounts clearly increase demand for el	19	-0.277
4	If the local government would only allow electric cars in th	4	-0.310
32	Those who do not enter the city do not care what the air the	32	-0.386
37	The impact of the transport habits of an individual on the e	37	-0.396
35	Old, less modern vehicles shall be punished by a higher tax.	35	-0.497
38	The bigger and more expensive the car is, the greater the re	38	-0.519
24	Those with higher incomes have the duty to drive the least p	24	-0.597
14	People prefer to ride their own cars, because the taxi is mo	14	-0.602
3	Public transport is inferior to using your own car, even if	3	-0.742
33	The use of the bus lane should be allowed for private cars f	33	-1.034
25	Those who can afford the most modern car shall buy it out of	25	-1.143
39	By public transport you can comfortably get almost anywhere	39	-1.211
27	Utilizing the bus lane would be more effective, if you could	27	-1.239
31	If the taxi was cheaper, more people would leave their cars	31	-1.358
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.517
17	Car buyers will still choose the peak performance, even if t	17	-1.621
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.863

Descending Array of Differences Between Factors 1 and 2

No.	Statement	No.	Type 1	Type 2	Difference
20	All cars should be equipped with a GPS-based speedometer and	20	1.146	-1.832	2.977
26	Business cars with free usage are a bad example and cause ov	26	1.962	-0.788	2.750
10	Car-free days should be organized, because if you cannot use	10	0.929	-1.143	2.073
29	For a family of 3-5 members 1 car is enough.	29	0.923	-0.768	1.691
6	We must accept that traditional cars shall be excluded from	6	0.447	-0.869	1.317
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.862	-2.157	1.295
24	Those with higher incomes have the duty to drive the least p	24	0.533	-0.308	0.841
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.234	-1.052	0.818
32	Those who do not enter the city do not care what the air the	32	-0.083	-0.810	0.728
18	For modern successful urban people the comfort and performan	18	1.276	0.583	0.694
16	Most of the customers of electric cars choose them not becau	16	0.482	-0.178	0.660
17	Car buyers will still choose the peak performance, even if t	17	1.456	0.818	0.638
4	If the local government would only allow electric cars in th	4	1.198	0.837	0.361
28	Speed limitation is important and can save lives.	28	1.530	1.212	0.319
1	The developed countries should support the public transport	1	0.226	-0.083	0.309
12	People do not even think about how much it costs to maintain	12	0.469	0.197	0.272
23	The longer the time you spend in the city center, the more i	23	1.453	1.264	0.188
5	Traffic jams can be eliminated by introducing an appropriate	5	0.293	0.120	0.173
39	By public transport you can comfortably get almost anywhere	39	0.680	0.587	0.093
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.260	-1.329	0.070
38	The bigger and more expensive the car is, the greater the re	38	-0.809	-0.814	0.005
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.342	0.403	-0.061
22	All adult family members should maintain their own cars to e	22	-1.163	-0.911	-0.252
25	Those who can afford the most modern car shall buy it out of	25	-1.548	-1.163	-0.386
37	The impact of the transport habits of an individual on the e	37	-1.210	-0.806	-0.404
30	The car is not something that a person lends.	30	-0.972	-0.505	-0.466
36	Public opinion underestimates the number of environmentally	36	-0.419	0.146	-0.565
34	All electric cars shall be allowed to use the bus lane free	34	-0.344	0.259	-0.603
3	Public transport is inferior to using your own car, even if	3	-1.559	-0.833	-0.726
2	State sponsored environmental advertizing and awareness camp	2	-0.117	0.775	-0.892
13	In China, India and other countries with rapidly growing pop	13	-0.394	0.569	-0.963
27	Utilizing the bus lane would be more effective, if you could	27	-1.079	-0.053	-1.025
19	State subsidies and discounts clearly increase demand for el	19	0.365	1.571	-1.205
14	People prefer to ride their own cars, because the taxi is mo	14	-0.344	1.033	-1.376
31	If the taxi was cheaper, more people would leave their cars	31	-0.291	1.104	-1.395
9	Much more people would use public transport, if there were m	9	0.450	1.961	-1.511
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.009	1.581	-1.590
33	The use of the bus lane should be allowed for private cars f	33	-1.609	0.374	-1.984
8	If someone wants to drink alcohol during the night, even the	8	-1.856	1.011	-2.867

Descending Array of Differences Between Factors 1 and 3

No.	Statement	No.	Type 1	Type 3	Difference
23	The longer the time you spend in the city center, the more i	23	1.453	-0.790	2.243
26	Business cars with free usage are a bad example and cause ov	26	1.962	-0.038	2.000
6	We must accept that traditional cars shall be excluded from	6	0.447	-1.186	1.633
29	For a family of 3-5 members 1 car is enough.	29	0.923	-0.232	1.155
17	Car buyers will still choose the peak performance, even if t	17	1.456	0.368	1.088
10	Car-free days should be organized, because if you cannot use	10	0.929	-0.126	1.055
24	Those with higher incomes have the duty to drive the least p	24	0.533	-0.358	0.891
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.862	-1.624	0.762
9	Much more people would use public transport, if there were m	9	0.450	-0.206	0.656
39	By public transport you can comfortably get almost anywhere	39	0.680	0.166	0.515
37	The impact of the transport habits of an individual on the e	37	-1.210	-1.721	0.511
4	If the local government would only allow electric cars in th	4	1.198	0.700	0.498
12	People do not even think about how much it costs to maintain	12	0.469	0.040	0.429
28	Speed limitation is important and can save lives.	28	1.530	1.102	0.428
20	All cars should be equipped with a GPS-based speedometer and	20	1.146	0.818	0.328
33	The use of the bus lane should be allowed for private cars f	33	-1.609	-1.877	0.268
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.260	-1.515	0.256
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.009	-0.254	0.245
22	All adult family members should maintain their own cars to e	22	-1.163	-1.364	0.201
27	Utilizing the bus lane would be more effective, if you could	27	-1.079	-1.208	0.129
31	If the taxi was cheaper, more people would leave their cars	31	-0.291	-0.368	0.077
34	All electric cars shall be allowed to use the bus lane free	34	-0.344	-0.418	0.074
16	Most of the customers of electric cars choose them not becau	16	0.482	0.448	0.034
5	Traffic jams can be eliminated by introducing an appropriate	5	0.293	0.360	-0.067
2	State sponsored environmental advertizing and awareness camp	2	-0.117	0.020	-0.137
19	State subsidies and discounts clearly increase demand for el	19	0.365	0.620	-0.254
32	Those who do not enter the city do not care what the air the	32	-0.083	0.358	-0.440
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.342	0.836	-0.494
1	The developed countries should support the public transport	1	0.226	0.738	-0.511
14	People prefer to ride their own cars, because the taxi is mo	14	-0.344	0.222	-0.565
13	In China, India and other countries with rapidly growing pop	13	-0.394	0.224	-0.618
18	For modern successful urban people the comfort and performan	18	1.276	1.945	-0.669
8	If someone wants to drink alcohol during the night, even the	8	-1.856	-1.155	-0.701
25	Those who can afford the most modern car shall buy it out of	25	-1.548	-0.768	-0.781
30	The car is not something that a person lends.	30	-0.972	0.156	-1.128
36	Public opinion underestimates the number of environmentally	36	-0.419	0.730	-1.148
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.234	1.684	-1.917
38	The bigger and more expensive the car is, the greater the re	38	-0.809	1.983	-2.793
3	Public transport is inferior to using your own car, even if	3	-1.559	1.691	-3.250

Descending Array of Differences Between Factors 1 and 4

No.	Statement	No.	Type 1	Type 4	Difference
17	Car buyers will still choose the peak performance, even if t	17	1.456	-1.621	3.077
39	By public transport you can comfortably get almost anywhere	39	0.680	-1.211	1.892
4	If the local government would only allow electric cars in th	4	1.198	-0.310	1.508
26	Business cars with free usage are a bad example and cause ov	26	1.962	0.829	1.133
24	Those with higher incomes have the duty to drive the least p	24	0.533	-0.597	1.130
29	For a family of 3-5 members 1 car is enough.	29	0.923	-0.191	1.114
31	If the taxi was cheaper, more people would leave their cars	31	-0.291	-1.358	1.067
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.862	-1.863	1.001
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.342	-0.497	0.838
10	Car-free days should be organized, because if you cannot use	10	0.929	0.155	0.774
20	All cars should be equipped with a GPS-based speedometer and	20	1.146	0.483	0.663
19	State subsidies and discounts clearly increase demand for el	19	0.365	-0.277	0.643
16	Most of the customers of electric cars choose them not becau	16	0.482	-0.032	0.514
32	Those who do not enter the city do not care what the air the	32	-0.083	-0.386	0.304
14	People prefer to ride their own cars, because the taxi is mo	14	-0.344	-0.602	0.258
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.260	-1.517	0.257
27	Utilizing the bus lane would be more effective, if you could	27	-1.079	-1.239	0.161
23	The longer the time you spend in the city center, the more i	23	1.453	1.297	0.155
12	People do not even think about how much it costs to maintain	12	0.469	0.475	-0.006
6	We must accept that traditional cars shall be excluded from	6	0.447	0.475	-0.027
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.234	0.014	-0.248
38	The bigger and more expensive the car is, the greater the re	38	-0.809	-0.519	-0.290
18	For modern successful urban people the comfort and performan	18	1.276	1.639	-0.363
28	Speed limitation is important and can save lives.	28	1.530	1.899	-0.369
25	Those who can afford the most modern car shall buy it out of	25	-1.548	-1.143	-0.406
33	The use of the bus lane should be allowed for private cars f	33	-1.609	-1.034	-0.575
36	Public opinion underestimates the number of environmentally	36	-0.419	0.191	-0.610
34	All electric cars shall be allowed to use the bus lane free	34	-0.344	0.318	-0.662
9	Much more people would use public transport, if there were m	9	0.450	1.243	-0.793
37	The impact of the transport habits of an individual on the e	37	-1.210	-0.396	-0.814
3	Public transport is inferior to using your own car, even if	3	-1.559	-0.742	-0.816
30	The car is not something that a person lends.	30	-0.972	-0.072	-0.899
1	The developed countries should support the public transport	1	0.226	1.193	-0.966
2	State sponsored environmental advertizing and awareness camp	2	-0.117	0.911	-1.028
22	All adult family members should maintain their own cars to e	22	-1.163	-0.119	-1.045
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.009	1.398	-1.407
13	In China, India and other countries with rapidly growing pop	13	-0.394	1.070	-1.464
5	Traffic jams can be eliminated by introducing an appropriate	5	0.293	1.895	-1.602
8	If someone wants to drink alcohol during the night, even the	8	-1.856	0.241	-2.098

Descending Array of Differences Between Factors 2 and 3

No.	Statement	No.	Type 2	Type 3	Difference
33	The use of the bus lane should be allowed for private cars f	33	0.374	-1.877	2.252
9	Much more people would use public transport, if there were m	9	1.961	-0.206	2.167
8	If someone wants to drink alcohol during the night, even the	8	1.011	-1.155	2.167
23	The longer the time you spend in the city center, the more i	23	1.264	-0.790	2.054
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.581	-0.254	1.835
31	If the taxi was cheaper, more people would leave their cars	31	1.104	-0.368	1.472
27	Utilizing the bus lane would be more effective, if you could	27	-0.053	-1.208	1.154
19	State subsidies and discounts clearly increase demand for el	19	1.571	0.620	0.951
37	The impact of the transport habits of an individual on the e	37	-0.806	-1.721	0.915
14	People prefer to ride their own cars, because the taxi is mo	14	1.033	0.222	0.811
2	State sponsored environmental advertizing and awareness camp	2	0.775	0.020	0.755
34	All electric cars shall be allowed to use the bus lane free	34	0.259	-0.418	0.677
22	All adult family members should maintain their own cars to e	22	-0.911	-1.364	0.453
17	Car buyers will still choose the peak performance, even if t	17	0.818	0.368	0.450
39	By public transport you can comfortably get almost anywhere	39	0.587	0.166	0.421
13	In China, India and other countries with rapidly growing pop	13	0.569	0.224	0.345
6	We must accept that traditional cars shall be excluded from	6	-0.869	-1.186	0.316
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.329	-1.515	0.186
12	People do not even think about how much it costs to maintain	12	0.197	0.040	0.157
4	If the local government would only allow electric cars in th	4	0.837	0.700	0.137
28	Speed limitation is important and can save lives.	28	1.212	1.102	0.110
24	Those with higher incomes have the duty to drive the least p	24	-0.308	-0.358	0.049
5	Traffic jams can be eliminated by introducing an appropriate	5	0.120	0.360	-0.240
25	Those who can afford the most modern car shall buy it out of	25	-1.163	-0.768	-0.395
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.403	0.836	-0.433
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.157	-1.624	-0.534
29	For a family of 3-5 members 1 car is enough.	29	-0.768	-0.232	-0.537
36	Public opinion underestimates the number of environmentally	36	0.146	0.730	-0.584
16	Most of the customers of electric cars choose them not becau	16	-0.178	0.448	-0.626
30	The car is not something that a person lends.	30	-0.505	0.156	-0.661
26	Business cars with free usage are a bad example and cause ov	26	-0.788	-0.038	-0.751
1	The developed countries should support the public transport	1	-0.083	0.738	-0.820
10	Car-free days should be organized, because if you cannot use	10	-1.143	-0.126	-1.017
32	Those who do not enter the city do not care what the air the	32	-0.810	0.358	-1.168
18	For modern successful urban people the comfort and performan	18	0.583	1.945	-1.363
3	Public transport is inferior to using your own car, even if	3	-0.833	1.691	-2.524
20	All cars should be equipped with a GPS-based speedometer and	20	-1.832	0.818	-2.650
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.052	1.684	-2.735
38	The bigger and more expensive the car is, the greater the re	38	-0.814	1.983	-2.798

Descending Array of Differences Between Factors 2 and 4

No.	Statement	No.	Type 2	Type 4	Difference
31	If the taxi was cheaper, more people would leave their cars	31	1.104	-1.358	2.462
17	Car buyers will still choose the peak performance, even if t	17	0.818	-1.621	2.439
19	State subsidies and discounts clearly increase demand for el	19	1.571	-0.277	1.848
39	By public transport you can comfortably get almost anywhere	39	0.587	-1.211	1.798
14	People prefer to ride their own cars, because the taxi is mo	14	1.033	-0.602	1.634
33	The use of the bus lane should be allowed for private cars f	33	0.374	-1.034	1.408
27	Utilizing the bus lane would be more effective, if you could	27	-0.053	-1.239	1.186
4	If the local government would only allow electric cars in th	4	0.837	-0.310	1.146
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.403	-0.497	0.900
8	If someone wants to drink alcohol during the night, even the	8	1.011	0.241	0.770
9	Much more people would use public transport, if there were m	9	1.961	1.243	0.718
24	Those with higher incomes have the duty to drive the least p	24	-0.308	-0.597	0.289
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.329	-1.517	0.187
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.581	1.398	0.183
25	Those who can afford the most modern car shall buy it out of	25	-1.163	-1.143	-0.020
23	The longer the time you spend in the city center, the more i	23	1.264	1.297	-0.033
36	Public opinion underestimates the number of environmentally	36	0.146	0.191	-0.045
34	All electric cars shall be allowed to use the bus lane free	34	0.259	0.318	-0.059
3	Public transport is inferior to using your own car, even if	3	-0.833	-0.742	-0.090
2	State sponsored environmental advertizing and awareness camp	2	0.775	0.911	-0.136
16	Most of the customers of electric cars choose them not becau	16	-0.178	-0.032	-0.146
12	People do not even think about how much it costs to maintain	12	0.197	0.475	-0.278
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.157	-1.863	-0.294
38	The bigger and more expensive the car is, the greater the re	38	-0.814	-0.519	-0.295
37	The impact of the transport habits of an individual on the e	37	-0.806	-0.396	-0.410
32	Those who do not enter the city do not care what the air the	32	-0.810	-0.386	-0.424
30	The car is not something that a person lends.	30	-0.505	-0.072	-0.433
13	In China, India and other countries with rapidly growing pop	13	0.569	1.070	-0.501
29	For a family of 3-5 members 1 car is enough.	29	-0.768	-0.191	-0.577
28	Speed limitation is important and can save lives.	28	1.212	1.899	-0.687
22	All adult family members should maintain their own cars to e	22	-0.911	-0.119	-0.792
18	For modern successful urban people the comfort and performan	18	0.583	1.639	-1.057
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.052	0.014	-1.066
1	The developed countries should support the public transport	1	-0.083	1.193	-1.275
10	Car-free days should be organized, because if you cannot use	10	-1.143	0.155	-1.298
6	We must accept that traditional cars shall be excluded from	6	-0.869	0.475	-1.344
26	Business cars with free usage are a bad example and cause ov	26	-0.788	0.829	-1.617
5	Traffic jams can be eliminated by introducing an appropriate	5	0.120	1.895	-1.775
20	All cars should be equipped with a GPS-based speedometer and	20	-1.832	0.483	-2.315

Descending Array of Differences Between Factors 3 and 4

No.	Statement	No.	Type 3	Type 4	Difference
38	The bigger and more expensive the car is, the greater the re	38	1.983	-0.519	2.502
3	Public transport is inferior to using your own car, even if	3	1.691	-0.742	2.434
17	Car buyers will still choose the peak performance, even if t	17	0.368	-1.621	1.989
7	Street parking fees in Budapest are unrealistically high, bu	7	1.684	0.014	1.669
39	By public transport you can comfortably get almost anywhere	39	0.166	-1.211	1.377
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.836	-0.497	1.332
4	If the local government would only allow electric cars in th	4	0.700	-0.310	1.010
31	If the taxi was cheaper, more people would leave their cars	31	-0.368	-1.358	0.990
19	State subsidies and discounts clearly increase demand for el	19	0.620	-0.277	0.897
14	People prefer to ride their own cars, because the taxi is mo	14	0.222	-0.602	0.823
32	Those who do not enter the city do not care what the air the	32	0.358	-0.386	0.744
36	Public opinion underestimates the number of environmentally	36	0.730	0.191	0.539
16	Most of the customers of electric cars choose them not becau	16	0.448	-0.032	0.480
25	Those who can afford the most modern car shall buy it out of	25	-0.768	-1.143	0.375
20	All cars should be equipped with a GPS-based speedometer and	20	0.818	0.483	0.335
18	For modern successful urban people the comfort and performan	18	1.945	1.639	0.306
24	Those with higher incomes have the duty to drive the least p	24	-0.358	-0.597	0.240
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.624	-1.863	0.239
30	The car is not something that a person lends.	30	0.156	-0.072	0.229
27	Utilizing the bus lane would be more effective, if you could	27	-1.208	-1.239	0.032
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.515	-1.517	0.002
29	For a family of 3-5 members 1 car is enough.	29	-0.232	-0.191	-0.041
10	Car-free days should be organized, because if you cannot use	10	-0.126	0.155	-0.281
12	People do not even think about how much it costs to maintain	12	0.040	0.475	-0.435
1	The developed countries should support the public transport	1	0.738	1.193	-0.455
34	All electric cars shall be allowed to use the bus lane free	34	-0.418	0.318	-0.736
28	Speed limitation is important and can save lives.	28	1.102	1.899	-0.797
33	The use of the bus lane should be allowed for private cars f	33	-1.877	-1.034	-0.844
13	In China, India and other countries with rapidly growing pop	13	0.224	1.070	-0.846
26	Business cars with free usage are a bad example and cause ov	26	-0.038	0.829	-0.867
2	State sponsored environmental advertizing and awareness camp	2	0.020	0.911	-0.891
22	All adult family members should maintain their own cars to e	22	-1.364	-0.119	-1.245
37	The impact of the transport habits of an individual on the e	37	-1.721	-0.396	-1.325
8	If someone wants to drink alcohol during the night, even the	8	-1.155	0.241	-1.397
9	Much more people would use public transport, if there were m	9	-0.206	1.243	-1.450
5	Traffic jams can be eliminated by introducing an appropriate	5	0.360	1.895	-1.535
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.254	1.398	-1.652
6	We must accept that traditional cars shall be excluded from	6	-1.186	0.475	-1.660
23	The longer the time you spend in the city center, the more i	23	-0.790	1.297	-2.087

Exact Factor Scores (á la SPSS) in Z-Score and T-Score units

No.	Statement	No.	Factors 1		2		3		4	
1	The developed countries should support the public tran	1	0.28	53	-0.01	50	0.46	55	0.58	56
2	State sponsored environmental advertizing and awarenes	2	-0.37	46	0.44	54	0.64	56	0.64	56
3	Public transport is inferior to using your own car, ev	3	-1.93	31	-0.07	49	2.62	76	-0.86	41
4	If the local government would only allow electric cars	4	1.37	64	0.76	58	-0.09	49	-1.01	40
5	Traffic jams can be eliminated by introducing an appro	5	-0.10	49	-0.05	49	0.53	55	1.34	63
6	We must accept that traditional cars shall be excluded	6	0.41	54	-1.35	37	-0.62	44	0.99	60
7	Street parking fees in Budapest are unrealistically hi	7	0.05	51	-1.36	36	1.32	63	0.07	51
8	If someone wants to drink alcohol during the night, ev	8	-2.22	28	0.62	56	-0.58	44	1.21	62
9	Much more people would use public transport, if there	9	0.34	53	2.02	70	-0.63	44	1.06	61
10	Car-free days should be organized, because if you cann	10	0.86	59	-1.01	40	0.61	56	-0.61	44
11	The urban traffic jam is no problem in terms of time,	11	-0.81	42	-1.24	38	-1.47	35	-0.45	45
12	People do not even think about how much it costs to m	12	0.67	57	0.13	51	0.39	54	-0.22	48
13	In China, India and other countries with rapidly growi	13	-0.59	44	0.28	53	0.45	54	0.77	58
14	People prefer to ride their own cars, because the taxi	14	-1.05	40	1.29	63	0.40	54	-0.09	49
15	If there were more P+R parking lots (Park and Ride), i	15	-0.23	48	1.43	64	-0.56	44	1.29	63
16	Most of the customers of electric cars choose them not	16	0.63	56	-0.13	49	-0.04	50	-0.50	45
17	Car buyers will still choose the peak performance, eve	17	1.47	65	1.20	62	0.11	51	-2.08	29
18	For modern successful urban people the comfort and per	18	0.34	53	0.18	52	2.08	71	1.12	61
19	State subsidies and discounts clearly increase demand	19	0.40	54	1.79	68	0.27	53	-0.57	44
20	All cars should be equipped with a GPS-based speedomet	20	0.94	59	-1.98	30	0.37	54	0.21	52
21	Everyone in Budapest should be obliged to buy a public	21	-0.25	48	-1.78	32	-1.43	36	-1.23	38
22	All adult family members should maintain their own car	22	-0.72	43	-1.12	39	-1.58	34	0.32	53
23	The longer the time you spend in the city center, the	23	1.22	62	1.05	60	-1.09	39	1.03	60
24	Those with higher incomes have the duty to drive the l	24	1.08	61	-0.19	48	-0.49	45	-0.51	45
25	Those who can afford the most modern car shall buy it	25	-1.26	37	-1.27	37	-0.28	47	-0.23	48
26	Business cars with free usage are a bad example and ca	26	2.02	70	-1.19	38	-0.64	44	1.28	63
27	Utilizing the bus lane would be more effective, if you	27	-1.30	37	0.53	55	-0.94	41	-1.12	39
28	Speed limitation is important and can save lives.	28	0.99	60	0.27	53	0.31	53	2.27	73
29	For a family of 3-5 members 1 car is enough.	29	0.94	59	-0.88	41	0.26	53	-0.28	47
30	The car is not something that a person lends.	30	-1.09	39	-0.52	45	0.80	58	0.43	54
31	If the taxi was cheaper, more people would leave their	31	-0.53	45	1.36	64	-0.44	46	-0.06	49
32	Those who do not enter the city do not care what the a	32	0.14	51	-0.45	45	0.41	54	0.11	51
33	The use of the bus lane should be allowed for private	33	-1.13	39	0.75	57	-1.52	35	-1.62	34
34	All electric cars shall be allowed to use the bus lane	34	-0.54	45	0.35	53	-1.09	39	0.69	57
35	Old, less modern vehicles shall be punished by a highe	35	0.56	56	0.58	56	-0.13	49	-1.21	38
36	Public opinion underestimates the number of environmen	36	-0.34	47	0.07	51	0.43	54	0.52	55
37	The impact of the transport habits of an individual on	37	-1.22	38	-0.83	42	-1.11	39	-0.19	48
38	The bigger and more expensive the car is, the greater	38	-0.53	45	-0.24	48	2.45	75	-1.45	35
39	By public transport you can comfortably get almost any	39	1.48	65	0.58	56	-0.19	48	-1.64	34

Factor Q-Sort Values for Each Statement

No.	Statement	No.	Factor Arrays 1	2	3	4
1	The developed countries should support the public transport	1	0	0	2	3
2	State sponsored environmental advertizing and awareness camp	2	0	2	0	2
3	Public transport is inferior to using your own car, even if	3	-4	-2	4	-2
4	If the local government would only allow electric cars in th	4	3	2	2	-1
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0	1	4
6	We must accept that traditional cars shall be excluded from	6	1	-2	-3	1
7	Street parking fees in Budapest are unrealistically high, bu	7	0	-3	3	0
8	If someone wants to drink alcohol during the night, even the	8	-4	2	-2	1
9	Much more people would use public transport, if there were m	9	1	4	-1	3
10	Car-free days should be organized, because if you cannot use	10	2	-3	0	0
11	The urban traffic jam is no problem in terms of time, becaus	11	-3	-4	-3	-4
12	People do not even think about how much it costs to maintain	12	1	0	0	1
13	In China, India and other countries with rapidly growing pop	13	-1	1	1	2
14	People prefer to ride their own cars, because the taxi is mo	14	-1	3	0	-2
15	If there were more P+R parking lots (Park and Ride), it woul	15	0	4	-1	3
16	Most of the customers of electric cars choose them not becau	16	1	0	1	0
17	Car buyers will still choose the peak performance, even if t	17	4	2	1	-4
18	For modern successful urban people the comfort and performan	18	3	1	4	4
19	State subsidies and discounts clearly increase demand for el	19	1	4	2	0
20	All cars should be equipped with a GPS-based speedometer and	20	3	-4	3	2
21	Everyone in Budapest should be obliged to buy a public trans	21	-2	-4	-4	-4
22	All adult family members should maintain their own cars to e	22	-3	-3	-3	0
23	The longer the time you spend in the city center, the more i	23	3	3	-2	3
24	Those with higher incomes have the duty to drive the least p	24	2	-1	-1	-2
25	Those who can afford the most modern car shall buy it out of	25	-3	-3	-2	-3
26	Business cars with free usage are a bad example and cause ov	26	4	-1	0	2
27	Utilizing the bus lane would be more effective, if you could	27	-2	0	-3	-3
28	Speed limitation is important and can save lives.	28	4	3	3	4
29	For a family of 3-5 members 1 car is enough.	29	2	-1	-1	0
30	The car is not something that a person lends.	30	-2	-1	0	0
31	If the taxi was cheaper, more people would leave their cars	31	-1	3	-1	-3
32	Those who do not enter the city do not care what the air the	32	0	-2	1	-1
33	The use of the bus lane should be allowed for private cars f	33	-4	1	-4	-2
34	All electric cars shall be allowed to use the bus lane free	34	-1	0	-2	1
35	Old, less modern vehicles shall be punished by a higher tax.	35	0	1	3	-1
36	Public opinion underestimates the number of environmentally	36	-1	0	2	1
37	The impact of the transport habits of an individual on the e	37	-3	-1	-4	-1
38	The bigger and more expensive the car is, the greater the re	38	-2	-2	4	-1
39	By public transport you can comfortably get almost anywhere	39	2	1	0	-3

Variance = 5.385 St. Dev. = 2.320

Factor Q-Sort Values for Statements sorted by Consensus vs. Disagreement (Variance across Factor Z-Scores)

No.	Statement	No.	Factor Arrays 1	2	3	4
11	The urban traffic jam is no problem in terms of time, becaus	11	-3	-4	-3	-4
12	People do not even think about how much it costs to maintain	12	1	0	0	1
25	Those who can afford the most modern car shall buy it out of	25	-3	-3	-2	-3
16	Most of the customers of electric cars choose them not becau	16	1	0	1	0
28	Speed limitation is important and can save lives.	28	4	3	3	4
34	All electric cars shall be allowed to use the bus lane free	34	-1	0	-2	1
36	Public opinion underestimates the number of environmentally	36	-1	0	2	1
32	Those who do not enter the city do not care what the air the	32	0	-2	1	-1
24	Those with higher incomes have the duty to drive the least p	24	2	-1	-1	-2
30	The car is not something that a person lends.	30	-2	-1	0	0
2	State sponsored environmental advertizing and awareness camp	2	0	2	0	2
22	All adult family members should maintain their own cars to e	22	-3	-3	-3	0
21	Everyone in Budapest should be obliged to buy a public trans	21	-2	-4	-4	-4
35	Old, less modern vehicles shall be punished by a higher tax.	35	0	1	3	-1
1	The developed countries should support the public transport	1	0	0	2	3
27	Utilizing the bus lane would be more effective, if you could	27	-2	0	-3	-3
37	The impact of the transport habits of an individual on the e	37	-3	-1	-4	-1
18	For modern successful urban people the comfort and performan	18	3	1	4	4
13	In China, India and other countries with rapidly growing pop	13	-1	1	1	2
4	If the local government would only allow electric cars in th	4	3	2	2	-1
29	For a family of 3-5 members 1 car is enough.	29	2	-1	-1	0
14	People prefer to ride their own cars, because the taxi is mo	14	-1	3	0	-2
19	State subsidies and discounts clearly increase demand for el	19	1	4	2	0
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0	1	4
10	Car-free days should be organized, because if you cannot use	10	2	-3	0	0
6	We must accept that traditional cars shall be excluded from	6	1	-2	-3	1
39	By public transport you can comfortably get almost anywhere	39	2	1	0	-3
9	Much more people would use public transport, if there were m	9	1	4	-1	3
15	If there were more P+R parking lots (Park and Ride), it woul	15	0	4	-1	3
33	The use of the bus lane should be allowed for private cars f	33	-4	1	-4	-2
31	If the taxi was cheaper, more people would leave their cars	31	-1	3	-1	-3
23	The longer the time you spend in the city center, the more i	23	3	3	-2	3
7	Street parking fees in Budapest are unrealistically high, bu	7	0	-3	3	0
26	Business cars with free usage are a bad example and cause ov	26	4	-1	0	2
8	If someone wants to drink alcohol during the night, even the	8	-4	2	-2	1
17	Car buyers will still choose the peak performance, even if t	17	4	2	1	-4
20	All cars should be equipped with a GPS-based speedometer and	20	3	-4	3	2
38	The bigger and more expensive the car is, the greater the re	38	-2	-2	4	-1
3	Public transport is inferior to using your own car, even if	3	-4	-2	4	-2

Factor Characteristics

	Factors			
	1	2	3	4
No. of Defining Variables	5	6	3	3
Average Rel. Coef.	0.800	0.800	0.800	0.800
Composite Reliability	0.952	0.960	0.923	0.923
S.E. of Factor Z-Scores	0.218	0.200	0.277	0.277

Standard Errors for Differences in Factor Z-Scores

(Diagonal Entries Are S.E. Within Factors)

Factors	1	2	3	4
1	0.309	0.296	0.353	0.353
2	0.296	0.283	0.342	0.342
3	0.353	0.342	0.392	0.392
4	0.353	0.342	0.392	0.392

Distinguishing Statements for Factor 1

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
26	Business cars with free usage are a bad example and cause ov	26	4	1.96*	-1	-0.79	0	-0.04	2	0.83
17	Car buyers will still choose the peak performance, even if t	17	4	1.46	2	0.82	1	0.37	-4	-1.62
10	Car-free days should be organized, because if you cannot use	10	2	0.93	-3	-1.14	0	-0.13	0	0.15
29	For a family of 3-5 members 1 car is enough.	29	2	0.92*	-1	-0.77	-1	-0.23	0	-0.19
24	Those with higher incomes have the duty to drive the least p	24	2	0.53	-1	-0.31	-1	-0.36	-2	-0.60
21	Everyone in Budapest should be obliged to buy a public trans	21	-2	-0.86	-4	-2.16	-4	-1.62	-4	-1.86
3	Public transport is inferior to using your own car, even if	3	-4	-1.56	-2	-0.83	4	1.69	-2	-0.74
8	If someone wants to drink alcohol during the night, even the	8	-4	-1.86	2	1.01	-2	-1.16	1	0.24

Distinguishing Statements for Factor 2

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
9	Much more people would use public transport, if there were m	9	1	0.45	4	1.96	-1	-0.21	3	1.24
19	State subsidies and discounts clearly increase demand for el	19	1	0.37	4	1.57*	2	0.62	0	-0.28
31	If the taxi was cheaper, more people would leave their cars	31	-1	-0.29	3	1.10*	-1	-0.37	-3	-1.36
14	People prefer to ride their own cars, because the taxi is mo	14	-1	-0.34	3	1.03	0	0.22	-2	-0.60
8	If someone wants to drink alcohol during the night, even the	8	-4	-1.86	2	1.01	-2	-1.16	1	0.24
18	For modern successful urban people the comfort and performan	18	3	1.28	1	0.58	4	1.95	4	1.64
33	The use of the bus lane should be allowed for private cars f	33	-4	-1.61	1	0.37*	-4	-1.88	-2	-1.03
27	Utilizing the bus lane would be more effective, if you could	27	-2	-1.08	0	-0.05*	-3	-1.21	-3	-1.24
26	Business cars with free usage are a bad example and cause ov	26	4	1.96	-1	-0.79	0	-0.04	2	0.83
7	Street parking fees in Budapest are unrealistically high, bu	7	0	-0.23	-3	-1.05*	3	1.68	0	0.01
10	Car-free days should be organized, because if you cannot use	10	2	0.93	-3	-1.14*	0	-0.13	0	0.15
20	All cars should be equipped with a GPS-based speedometer and	20	3	1.15	-4	-1.83*	3	0.82	2	0.48

Distinguishing Statements for Factor 3

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
38	The bigger and more expensive the car is, the greater the re	38	-2	-0.81	-2	-0.81	4	1.98*	-1	-0.52
3	Public transport is inferior to using your own car, even if	3	-4	-1.56	-2	-0.83	4	1.69*	-2	-0.74
7	Street parking fees in Budapest are unrealistically high, bu	7	0	-0.23	-3	-1.05	3	1.68*	0	0.01
26	Business cars with free usage are a bad example and cause ov	26	4	1.96	-1	-0.79	0	-0.04	2	0.83
23	The longer the time you spend in the city center, the more i	23	3	1.45	3	1.26	-2	-0.79*	3	1.30
8	If someone wants to drink alcohol during the night, even the	8	-4	-1.86	2	1.01	-2	-1.16	1	0.24

Distinguishing Statements for Factor 4

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0.29	0	0.12	1	0.36	4	1.89*
9	Much more people would use public transport, if there were m	9	1	0.45	4	1.96	-1	-0.21	3	1.24
26	Business cars with free usage are a bad example and cause ov	26	4	1.96	-1	-0.79	0	-0.04	2	0.83
8	If someone wants to drink alcohol during the night, even the	8	-4	-1.86	2	1.01	-2	-1.16	1	0.24
22	All adult family members should maintain their own cars to e	22	-3	-1.16	-3	-0.91	-3	-1.36	0	-0.12
4	If the local government would only allow electric cars in th	4	3	1.20	2	0.84	2	0.70	-1	-0.31
35	Old, less modern vehicles shall be punished by a higher tax.	35	0	0.34	1	0.40	3	0.84	-1	-0.50
39	By public transport you can comfortably get almost anywhere	39	2	0.68	1	0.59	0	0.17	-3	-1.21*
31	If the taxi was cheaper, more people would leave their cars	31	-1	-0.29	3	1.10	-1	-0.37	-3	-1.36
17	Car buyers will still choose the peak performance, even if t	17	4	1.46	2	0.82	1	0.37	-4	-1.62*

Consensus Statements -- Those That Do Not Distinguish Between ANY Pair of Factors.

All Listed Statements are Non-Significant at P>.01, and Those Flagged With an * are also Non-Significant at P>.05.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
11*	The urban traffic jam is no problem in terms of time, becaus	11	-3	-1.26	-4	-1.33	-3	-1.52	-4	-1.52
12*	People do not even think about how much it costs to maintain	12	1	0.47	0	0.20	0	0.04	1	0.47
16	Most of the customers of electric cars choose them not becau	16	1	0.48	0	-0.18	1	0.45	0	-0.03
25	Those who can afford the most modern car shall buy it out of	25	-3	-1.55	-3	-1.16	-2	-0.77	-3	-1.14
28	Speed limitation is important and can save lives.	28	4	1.53	3	1.21	3	1.10	4	1.90
34	All electric cars shall be allowed to use the bus lane free	34	-1	-0.34	0	0.26	-2	-0.42	1	0.32

QANALYZE was completed at 18:25:59

Annex 2. Output of the second run of PQMethod software with 19 respondents

PQMethod2.35 Attitude to city mobility 2 PAGE 1
Path and Project Name: C:\PQMethod/mobility2 Jul 29 17

Correlation Matrix Between Sorts

SORTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 MinFoAff	100	32	18	17	10	26	22	40	22	10	18	43	38	25	9	35	-2	30	29
2 GenMan	32	100	35	4	24	39	6	8	26	10	20	30	28	-14	49	35	30	19	4
3 Dentist	18	35	100	31	18	20	33	12	34	29	24	15	24	-5	21	24	19	1	21
4 Economis	17	4	31	100	13	4	40	24	24	57	66	2	45	25	-8	-2	-2	18	26
5 CityBoy	10	24	18	13	100	21	9	-5	14	29	17	28	22	15	36	40	20	33	29
6 CorpFin	26	39	20	4	21	100	12	21	23	32	16	20	21	8	38	42	32	3	40
7 Designer	22	6	33	40	9	12	100	41	46	49	39	-15	32	14	-6	34	-28	13	5
8 Banker	40	8	12	24	-5	21	41	100	31	27	25	30	24	7	4	20	10	30	9
9 FinProf	22	26	34	24	14	23	46	31	100	22	45	11	2	9	28	50	30	36	3
10 UniDocen	10	10	29	57	29	32	49	27	22	100	55	10	23	13	18	27	16	23	31
11 Dezs	18	20	24	66	17	16	39	25	45	55	100	-15	26	4	32	23	21	45	14
12 Olvaso	43	30	15	2	28	20	-15	30	11	10	-15	100	7	17	25	23	38	30	11
13 LadyProf	38	28	24	45	22	21	32	24	2	23	26	7	100	24	-8	8	-33	1	34
14 MathTeach	25	-14	-5	25	15	8	14	7	9	13	4	17	24	100	-19	14	-10	20	37
15 Gellerth	9	49	21	-8	36	38	-6	4	28	18	32	25	-8	-19	100	21	37	45	1
16 CEO	35	35	24	-2	40	42	34	20	50	27	23	23	8	14	21	100	53	32	23
17 PharmaGM	-2	30	19	-2	20	32	-28	10	30	16	21	38	-33	-10	37	53	100	37	19
18 KHTvez	30	19	1	18	33	3	13	30	36	23	45	30	1	20	45	32	37	100	13
19 CityGirl	29	4	21	26	29	40	5	9	3	31	14	11	34	37	1	23	19	13	100

Unrotated Factor Matrix

	Factors 1	2	3	4	5	6	7	8
SORTS								
1 MinFoAff	0.5309	-0.0655	0.4830	0.3690	-0.2333	-0.1463	0.0240	-0.0755
2 GenMan	0.5107	0.3798	0.0277	-0.1632	-0.4988	-0.2517	0.0883	-0.0194
3 Dentist	0.5007	-0.0523	-0.1320	-0.2570	-0.3847	0.0851	-0.1016	0.5729
4 Economis	0.5121	-0.6030	-0.1577	-0.1520	0.1912	-0.2307	-0.2539	0.1828
5 CityBoy	0.4837	0.2018	0.1685	-0.3546	0.2415	-0.1323	0.4653	0.1347
6 CorpFin	0.5403	0.2281	0.2012	-0.2799	-0.2231	0.3166	-0.1931	-0.4569
7 Designer	0.4947	-0.5585	-0.2637	0.2048	-0.2253	0.2452	0.2688	-0.0056
8 Banker	0.4757	-0.1854	0.0398	0.5751	-0.1415	-0.0054	-0.3541	-0.1599
9 FinProf	0.6135	0.0568	-0.3618	0.3156	-0.0636	0.2664	0.1851	0.1190
10 UniDocen	0.6274	-0.3046	-0.2120	-0.2474	0.2031	0.0578	-0.2184	-0.0405
11 Dezs	0.6399	-0.2661	-0.4942	-0.0726	0.1994	-0.2137	-0.0640	-0.1683
12 Olvaso	0.3853	0.4038	0.4759	0.2685	0.0100	-0.2371	-0.2297	0.3348
13 LadyProf	0.4189	-0.5146	0.3729	-0.2054	-0.3007	-0.2693	0.1124	-0.0838
14 MathTeach	0.2429	-0.3156	0.5094	0.1122	0.4536	0.1433	0.2005	0.0663
15 Gellerth	0.4550	0.5597	-0.2530	-0.1673	-0.0470	-0.3439	0.0978	-0.2247
16 CEO	0.6475	0.2950	0.0331	0.1089	-0.0085	0.4909	0.2695	0.0125
17 PharmaGM	0.4092	0.6720	-0.1431	-0.0275	0.2788	0.2138	-0.3435	0.1411
18 KHTvez	0.5577	0.2190	-0.0987	0.3390	0.4512	-0.3397	0.1676	-0.0838
19 CityGirl	0.4402	-0.1366	0.4836	-0.3791	0.2565	0.2339	-0.1749	-0.0835
Eigenvalues	4.9134	2.5668	1.7906	1.4208	1.3973	1.1675	0.9851	0.8724
% expl.Var.	26	14	9	7	7	6	5	5

Cumulative Communalities Matrix

	Factors 1 Thru 1	2	3	4	5	6	7	8
SORTS								
1 MinFoAff	0.2818	0.2861	0.5194	0.6555	0.7100	0.7314	0.7319	0.7376
2 GenMan	0.2608	0.4050	0.4058	0.4324	0.6812	0.7446	0.7524	0.7528
3 Dentist	0.2507	0.2535	0.2709	0.3369	0.4850	0.4922	0.5025	0.8308
4 Economis	0.2622	0.6259	0.6508	0.6739	0.7104	0.7637	0.8281	0.8615
5 CityBoy	0.2339	0.2747	0.3030	0.4287	0.4871	0.5045	0.7211	0.7392
6 CorpFin	0.2919	0.3440	0.3845	0.4628	0.5125	0.6128	0.6501	0.8589
7 Designer	0.2447	0.5567	0.6262	0.6682	0.7189	0.7790	0.8512	0.8513
8 Banker	0.2263	0.2606	0.2622	0.5929	0.6130	0.6130	0.7384	0.7639
9 FinProf	0.3764	0.3796	0.5105	0.6101	0.6142	0.6851	0.7194	0.7335
10 UniDocen	0.3937	0.4864	0.5314	0.5926	0.6339	0.6372	0.6849	0.6865
11 Dezs	0.4094	0.4803	0.7245	0.7298	0.7695	0.8152	0.8193	0.8476
12 Olvaso	0.1484	0.3115	0.5379	0.6100	0.6101	0.6663	0.7191	0.8311
13 LadyProf	0.1754	0.4403	0.5794	0.6216	0.7120	0.7845	0.7972	0.8042
14 MathTeach	0.0590	0.1586	0.4181	0.4307	0.6364	0.6569	0.6971	0.7015
15 Gellerth	0.2070	0.5203	0.5843	0.6123	0.6145	0.7328	0.7423	0.7929
16 CEO	0.4193	0.5063	0.5074	0.5192	0.5193	0.7603	0.8330	0.8331
17 PharmaGM	0.1674	0.6190	0.6395	0.6402	0.7180	0.7637	0.8817	0.9016
18 KHTvez	0.3111	0.3590	0.3688	0.4837	0.6873	0.8027	0.8308	0.8378
19 CityGirl	0.1937	0.2124	0.4463	0.5900	0.6558	0.7105	0.7410	0.7480
cum% expl.Var.	26	39	49	56	64	70	75	80

Factor Matrix with an X Indicating a Defining Sort

		Loadings			
QSORT		1	2	3	4
1	MinFoAff	0.1331	-0.0000	0.4955	0.6264X
2	GenMan	0.6368X	0.0787	0.0787	0.1208
3	Dentist	0.3617	0.4329X	0.1364	-0.0081
4	Economis	-0.0589	0.7574X	0.3058	0.0565
5	CityBoy	0.5628X	0.1267	0.3055	-0.0514
6	CorpFin	0.5879X	0.1108	0.3206	0.0458
7	Designer	-0.1673	0.7125X	0.1025	0.3494
8	Banker	-0.0546	0.2449	0.1053	0.7203X
9	FinProf	0.3004	0.4504	-0.2093	0.5227
10	UniDocen	0.2575	0.6946X	0.2061	0.0366
11	Dezs	0.2320	0.8015X	-0.0833	0.1630
12	Olvaso	0.4138	-0.3346	0.2871	0.4943
13	LadyProf	-0.0404	0.3706	0.6938X	0.0351
14	MathTeach	-0.1242	0.0195	0.5906X	0.2569
15	Gellerth	0.7356X	0.0972	-0.2394	0.0665
16	CEO	0.5598X	0.1508	0.0885	0.4186
17	PharmaGM	0.7346X	-0.0816	-0.2434	0.1864
18	KHTvez	0.3693	0.1742	-0.0791	0.5574X
19	CityGirl	0.3019	0.1321	0.6899X	-0.0730
% expl.Var.		17	16	12	12

Free Distribution Data Results

QSORT		MEAN	ST.DEV.
1	MinFoAff	0.000	2.351
2	GenMan	0.000	2.351
3	Dentist	0.000	2.351
4	Economis	0.000	2.351
5	CityBoy	0.000	2.351
6	CorpFin	0.000	2.351
7	Designer	0.000	2.351
8	Banker	0.000	2.351
9	FinProf	0.000	2.351
10	UniDocen	0.000	2.351
11	Dezs	0.000	2.351
12	Olvaso	0.000	2.351
13	LadyProf	0.000	2.351
14	MathTeach	0.000	2.351
15	Gellerth	0.000	2.351
16	CEO	0.000	2.351
17	PharmaGM	0.000	2.351
18	KHTvez	0.000	2.351
19	CityGirl	0.000	2.351

Factor Scores with Corresponding Ranks

No.	Statement	No.	Factors 1		2		3		4	
1	The developed countries should support the public tran	1	-0.06	22	0.50	14	0.78	8	1.10	7
2	State sponsored environmental advertizing and awarenes	2	0.72	11	0.14	20	0.01	20	1.02	9
3	Public transport is inferior to using your own car, ev	3	-0.87	32	-1.41	36	1.71	3	-0.68	30
4	If the local government would only allow electric cars	4	0.80	10	1.23	5	0.71	10	-0.35	25
5	Traffic jams can be eliminated by introducing an appro	5	0.10	20	0.21	19	0.35	15	1.97	1
6	We must accept that traditional cars shall be excluded	6	-0.81	29	0.50	15	-1.21	34	0.77	12
7	Street parking fees in Budapest are unrealistically hi	7	-1.13	34	-0.40	26	1.65	4	0.10	17
8	If someone wants to drink alcohol during the night, ev	8	1.05	8	-1.89	39	-1.21	33	0.27	14
9	Much more people would use public transport, if there	9	2.00	1	0.43	16	-0.16	24	1.16	5
10	Car-free days should be organized, because if you cann	10	-1.22	36	1.06	7	-0.14	23	0.17	15
11	The urban traffic jam is no problem in terms of time,	11	-1.31	37	-1.32	34	-1.56	36	-1.55	37
12	People do not even think about how much it costs to ma	12	0.11	19	0.53	12	-0.00	21	0.77	12
13	In China, India and other countries with rapidly growi	13	0.47	12	-0.52	28	0.21	17	1.04	8
14	People prefer to ride their own cars, because the taxi	14	1.09	7	-0.36	24	0.28	16	-0.68	29
15	If there were more P+R parking lots (Park and Ride), i	15	1.62	2	0.09	21	-0.22	25	1.34	4
16	Most of the customers of electric cars choose them not	16	-0.20	23	0.40	18	0.43	12	-0.12	20
17	Car buyers will still choose the peak performance, eve	17	0.80	9	1.41	2	0.42	14	-1.59	38
18	For modern successful urban people the comfort and per	18	0.46	14	1.03	8	1.93	2	1.60	3
19	State subsidies and discounts clearly increase demand	19	1.58	3	0.52	13	0.70	11	-0.23	24
20	All cars should be equipped with a GPS-based speedomet	20	-1.74	38	1.13	6	0.79	7	0.47	13
21	Everyone in Budapest should be obliged to buy a public	21	-2.10	39	-0.72	30	-1.64	37	-1.86	39
22	All adult family members should maintain their own car	22	-0.85	31	-1.32	35	-1.30	35	-0.21	23
23	The longer the time you spend in the city center, the	23	1.27	4	1.33	3	-0.72	30	1.14	6
24	Those with higher incomes have the duty to drive the le	24	-0.38	24	0.58	11	-0.42	28	-0.83	31
25	Those who can afford the most modern car shall buy it	25	-1.20	35	-1.67	38	-0.78	31	-0.97	32
26	Business cars with free usage are a bad example and ca	26	-0.69	26	1.91	1	-0.07	22	0.78	10
27	Utilizing the bus lane would be more effective, if you	27	0.01	21	-1.01	31	-1.15	32	-1.32	35
28	Speed limitation is important and can save lives.	28	1.25	5	1.33	4	1.02	5	1.82	2
29	For a family of 3-5 members 1 car is enough.	29	-0.84	30	0.96	9	-0.28	26	-0.14	22
30	The car is not something that a person lends.	30	-0.52	25	-1.31	33	0.15	18	0.07	18
31	If the taxi was cheaper, more people would leave their	31	1.14	6	-0.37	25	-0.42	27	-1.53	36
32	Those who do not enter the city do not care what the a	32	-0.74	27	-0.08	22	0.42	13	-0.12	21
33	The use of the bus lane should be allowed for private	33	0.42	16	-1.44	37	-1.86	39	-1.08	34
34	All electric cars shall be allowed to use the bus lane	34	0.40	17	-0.36	23	-0.43	29	0.04	19
35	Old, less modern vehicles shall be punished by a highe	35	0.47	13	0.40	17	0.85	6	-0.64	28
36	Public opinion underestimates the number of environmen	36	0.12	18	-0.51	27	0.72	9	0.14	16
37	The impact of the transport habits of an individual on	37	-0.75	28	-1.25	32	-1.72	38	-0.44	27
38	The bigger and more expensive the car is, the greater	38	-0.92	33	-0.65	29	2.00	1	-0.43	26
39	By public transport you can comfortably get almost any	39	0.43	15	0.89	10	0.14	19	-1.05	33

Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.2323	0.1094	0.3129
2	0.2323	1.0000	0.3781	0.3994
3	0.1094	0.3781	1.0000	0.3276
4	0.3129	0.3994	0.3276	1.0000

Factor Scores -- For Factor 1

No.	Statement	No.	Z-SCORES
9	Much more people would use public transport, if there were m	9	1.999
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.624
19	State subsidies and discounts clearly increase demand növeli	19	1.584
23	The longer the time you spend in the city center, the more i	23	1.271
28	Speed limitation is important and can save lives.	28	1.247
31	If the taxi was cheaper, more people would leave their cars	31	1.143
14	People prefer to ride their own cars, because the taxi is mo	14	1.092
8	If someone wants to drink alcohol during the night, even the	8	1.052
17	Car buyers will still choose the peak performance, even if t	17	0.798
4	If the local government would only allow electric cars in th	4	0.798
2	State sponsored environmental advertizing and awareness camp	2	0.718
13	In China, India and other countries with rapidly growing pop	13	0.472
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.470
18	For modern successful urban people the comfort and perme és	18	0.457
39	By public transport you can comfortably get almost anywhere	39	0.425
33	The use of the bus lane should be allowed for private cars f	33	0.424
34	All electric cars shall be allowed to use the bus lane free	34	0.400
36	Public opinion underestimates the number of environmentally	36	0.121
12	People do not even think about how much it costs to maintain	12	0.114
5	Traffic jams can be eliminated by introducing an appropriate	5	0.099
27	Utilizing the bus lane would be more effective, if you could	27	0.010
1	The developed countries should support the public transport	1	-0.060
16	Most of the customers of electric cars choose them not beca	16	-0.199
24	Those with higher incomes have the duty to drive the least p	24	-0.380
30	The car is not something that a person lends.	30	-0.515
26	Business cars with free usage are a bad example and cause ov	26	-0.686
32	Those who do not enter the city do not care what the air the	32	-0.739
37	The impact of the transport habits of an individual on the e	37	-0.750
6	We must accept that traditional cars shall be excluded from	6	-0.811
29	For a family of 3-5 members 1 car is enough.	29	-0.841
22	All adult family members should maintain their own cars to e	22	-0.846
3	Public transport is inferior to using your own car, even if	3	-0.875
38	The bigger and more expensive the car is, the greater the re	38	-0.919
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.131
25	Those who can afford the most modern car shall buy it out o	25	-1.196
10	Car-free days should be organized, because if you cannot use	10	-1.220
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.311
20	All cars should be equipped with a GPS-based speedometer and	20	-1.742
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.100

Factor Scores -- For Factor 2

No.	Statement	No.	Z-SCORES
26	Business cars with free usage are a bad example and cause ov	26	1.914
17	Car buyers will still choose the peak performance, even if t	17	1.407
23	The longer the time you spend in the city center, the more i	23	1.330
28	Speed limitation is important and can save lives.	28	1.325
4	If the local government would only allow electric cars in th	4	1.226
20	All cars should be equipped with a GPS-based speedometer and	20	1.126
10	Car-free days should be organized, because if you cannot use	10	1.059
18	For modern successful urban people the comfort and perme és	18	1.034
29	For a family of 3-5 members 1 car is enough.	29	0.960
39	By public transport you can comfortably get almost anywhere	39	0.890
24	Those with higher incomes have the duty to drive the least p	24	0.582
12	People do not even think about how much it costs to maintain	12	0.527
19	State subsidies and discounts clearly increase demand növeli	19	0.523
1	The developed countries should support the public transport	1	0.502
6	We must accept that traditional cars shall be excluded from	6	0.499
9	Much more people would use public transport, if there were m	9	0.432
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.401
16	Most of the customers of electric cars choose them not beca	16	0.396
5	Traffic jams can be eliminated by introducing an appropriate	5	0.212
2	State sponsored environmental advertizing and awareness camp	2	0.139
15	If there were more P+R parking lots (Park and Ride), it woul	15	0.094
32	Those who do not enter the city do not care what the air the	32	-0.081
34	All electric cars shall be allowed to use the bus lane free	34	-0.359
14	People prefer to ride their own cars, because the taxi is mo	14	-0.364
31	If the taxi was cheaper, more people would leave their cars	31	-0.366
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.400
36	Public opinion underestimates the number of environmentally	36	-0.513
13	In China, India and other countries with rapidly growing pop	13	-0.520
38	The bigger and more expensive the car is, the greater the re	38	-0.650
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.719
27	Utilizing the bus lane would be more effective, if you could	27	-1.014
37	The impact of the transport habits of an individual on the e	37	-1.248
30	The car is not something that a person lends.	30	-1.305
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.315
22	All adult family members should maintain their own cars to e	22	-1.323
3	Public transport is inferior to using your own car, even if	3	-1.408
33	The use of the bus lane should be allowed for private cars f	33	-1.439
25	Those who can afford the most modern car shall buy it out o	25	-1.667
8	If someone wants to drink alcohol during the night, even the	8	-1.885

Factor Scores -- For Factor 3

No.	Statement	No.	Z-SCORES
38	The bigger and more expensive the car is, the greater the re	38	1.996
18	For modern successful urban people the comfort and perme és	18	1.930
3	Public transport is inferior to using your own car, even if	3	1.712
7	Street parking fees in Budapest are unrealistically high, bu	7	1.650
28	Speed limitation is important and can save lives.	28	1.015
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.852
20	All cars should be equipped with a GPS-based speedometer and	20	0.794
1	The developed countries should support the public transport	1	0.780
36	Public opinion underestimates the number of environmentally	36	0.717
4	If the local government would only allow electric cars in th	4	0.714
19	State subsidies and discounts clearly increase demand növeli	19	0.700
16	Most of the customers of electric cars choose them not beca	16	0.430
32	Those who do not enter the city do not care what the air the	32	0.419
17	Car buyers will still choose the peak performance, even if t	17	0.415
5	Traffic jams can be eliminated by introducing an appropriate	5	0.353
14	People prefer to ride their own cars, because the taxi is mo	14	0.281
13	In China, India and other countries with rapidly growing pop	13	0.215
30	If the taxi was cheaper, more people would leave	30	0.146
39	By public transport you can comfortably get almost anywhere	39	0.142
2	State sponsored environmental advertizing and awareness camp	2	0.007
12	People do not even think about how much it costs to maintain	12	-0.001
26	Business cars with free usage are a bad example and cause ov	26	-0.066
10	Car-free days should be organized, because if you cannot use	10	-0.142
9	Much more people would use public transport, if there were m	9	-0.156
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.218
29	For a family of 3-5 members 1 car is enough.	29	-0.277
31	If the taxi was cheaper, more people would leave their cars	31	-0.415
24	Those with higher incomes have the duty to drive the least p	24	-0.419
34	All electric cars shall be allowed to use the bus lane free	34	-0.426
23	The longer the time you spend in the city center, the more i	23	-0.724
25	Those who can afford the most modern car shall buy it out o	25	-0.783
27	Utilizing the bus lane would be more effective, if you could	27	-1.150
8	If someone wants to drink alcohol during the night, even the	8	-1.206
6	We must accept that traditional cars shall be excluded from	6	-1.209
22	All adult family members should maintain their own cars to e	22	-1.296
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.559
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.643
37	The impact of the transport habits of an individual on the e	37	-1.716
33	The use of the bus lane should be allowed for private cars f	33	-1.861

Factor Scores -- For Factor 4

No.	Statement	No.	Z-SCORES
5	Traffic jams can be eliminated by introducing an appropriate	5	1.972
28	Speed limitation is important and can save lives.	28	1.819
18	For modern successful urban people the comfort and perme és	18	1.605
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.336
9	Much more people would use public transport, if there were m	9	1.163
23	The longer the time you spend in the city center, the more i	23	1.142
1	The developed countries should support the public transport	1	1.101
13	In China, India and other countries with rapidly growing pop	13	1.044
2	State sponsored environmental advertizing and awareness camp	2	1.023
26	Business cars with free usage are a bad example and cause ov	26	0.775
12	People do not even think about how much it costs to maintain	12	0.772
6	We must accept that traditional cars shall be excluded from	6	0.772
20	All cars should be equipped with a GPS-based speedometer and	20	0.466
8	If someone wants to drink alcohol during the night, even the	8	0.268
10	Car-free days should be organized, because if you cannot use	10	0.173
36	Public opinion underestimates the number of environmentally	36	0.136
7	Street parking fees in Budapest are unrealistically high, bu	7	0.099
30	The car is not something that a person lends.	30	0.075
34	All electric cars shall be allowed to use the bus lane free	34	0.040
16	Most of the customers of electric cars choose them not beca	16	-0.116
32	Those who do not enter the city do not care what the air the	32	-0.119
29	For a family of 3-5 members 1 car is enough.	29	-0.136
22	All adult family members should maintain their own cars to e	22	-0.211
19	State subsidies and discounts clearly increase demand növeli	19	-0.231
4	If the local government would only allow electric cars in th	4	-0.347
38	The bigger and more expensive the car is, the greater the re	38	-0.429
37	The impact of the transport habits of an individual on the e	37	-0.442
35	Old, less modern vehicles shall be punished by a higher tax.	35	-0.636
14	People prefer to ride their own cars, because the taxi is mo	14	-0.677
3	Public transport is inferior to using your own car, even if	3	-0.680
24	Those with higher incomes have the duty to drive the least p	24	-0.830
25	Those who can afford the most modern car shall buy it out o	25	-0.969
39	By public transport you can comfortably get almost anywhere	39	-1.047
33	The use of the bus lane should be allowed for private cars f	33	-1.081
27	Utilizing the bus lane would be more effective, if you could	27	-1.316
31	If the taxi was cheaper, more people would leave their cars	31	-1.527
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.547
17	Car buyers will still choose the peak performance, even if t	17	-1.588
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.856

Descending Array of Differences Between Factors 1 and 2

No.	Statement	No.	Type 1	Type 2	Difference
8	If someone wants to drink alcohol during the night, even the	8	1.052	-1.885	2.938
33	The use of the bus lane should be allowed for private cars f	33	0.424	-1.439	1.862
9	Much more people would use public transport, if there were m	9	1.999	0.432	1.567
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.624	0.094	1.530
31	If the taxi was cheaper, more people would leave their cars	31	1.143	-0.366	1.509
14	People prefer to ride their own cars, because the taxi is mo	14	1.092	-0.364	1.456
19	State subsidies and discounts clearly increase demand növeli	19	1.584	0.523	1.061
27	Utilizing the bus lane would be more effective, if you could	27	0.010	-1.014	1.024
13	In China, India and other countries with rapidly growing pop	13	0.472	-0.520	0.992
30	The car is not something that a person lends.	30	-0.515	-1.305	0.790
34	All electric cars shall be allowed to use the bus lane free	34	0.400	-0.359	0.759
36	Public opinion underestimates the number of environmentally	36	0.121	-0.513	0.634
2	State sponsored environmental advertizing and awareness camp	2	0.718	0.139	0.579
3	Public transport is inferior to using your own car, even if	3	-0.875	-1.408	0.534
37	The impact of the transport habits of an individual on the e	37	-0.750	-1.248	0.498
22	All adult family members should maintain their own cars to e	22	-0.846	-1.323	0.477
25	Those who can afford the most modern car shall buy it out o	25	-1.196	-1.667	0.471
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.470	0.401	0.069
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.311	-1.315	0.005
23	The longer the time you spend in the city center, the more i	23	1.271	1.330	-0.059
28	Speed limitation is important and can save lives.	28	1.247	1.325	-0.078
5	Traffic jams can be eliminated by introducing an appropriate	5	0.099	0.212	-0.114
38	The bigger and more expensive the car is, the greater the re	38	-0.919	-0.650	-0.269
12	People do not even think about how much it costs to maintain	12	0.114	0.527	-0.413
4	If the local government would only allow electric cars in th	4	0.798	1.226	-0.428
39	By public transport you can comfortably get almost anywhere	39	0.425	0.890	-0.465
1	The developed countries should support the public transport	1	-0.060	0.502	-0.562
18	For modern successful urban people the comfort and perme és	18	0.457	1.034	-0.578
16	Most of the customers of electric cars choose them not beca	16	-0.199	0.396	-0.594
17	Car buyers will still choose the peak performance, even if t	17	0.798	1.407	-0.608
32	Those who do not enter the city do not care what the air the	32	-0.739	-0.081	-0.658
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.131	-0.400	-0.731
24	Those with higher incomes have the duty to drive the least p	24	-0.380	0.582	-0.962
6	We must accept that traditional cars shall be excluded from	6	-0.811	0.499	-1.310
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.100	-0.719	-1.381
29	For a family of 3-5 members 1 car is enough.	29	-0.841	0.960	-1.801
10	Car-free days should be organized, because if you cannot use	10	-1.220	1.059	-2.278
26	Business cars with free usage are a bad example and cause ov	26	-0.686	1.914	-2.600
20	All cars should be equipped with a GPS-based speedometer and	20	-1.742	1.126	-2.868

Descending Array of Differences Between Factors 1 and 3

No.	Statement	No.	Type 1	Type 3	Difference
33	The use of the bus lane should be allowed for private cars f	33	0.424	-1.861	2.285
8	If someone wants to drink alcohol during the night, even the	8	1.052	-1.206	2.259
9	Much more people would use public transport, if there were m	9	1.999	-0.156	2.155
23	The longer the time you spend in the city center, the more i	23	1.271	-0.724	1.995
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.624	-0.218	1.843
31	If the taxi was cheaper, more people would leave their cars	31	1.143	-0.415	1.559
27	Utilizing the bus lane would be more effective, if you could	27	0.010	-1.150	1.160
37	The impact of the transport habits of an individual on the e	37	-0.750	-1.716	0.966
19	State subsidies and discounts clearly increase demand növeli	19	1.584	0.700	0.884
34	All electric cars shall be allowed to use the bus lane free	34	0.400	-0.426	0.827
14	People prefer to ride their own cars, because the taxi is mo	14	1.092	0.281	0.811
2	State sponsored environmental advertizing and awareness camp	2	0.718	0.007	0.711
22	All adult family members should maintain their own cars to e	22	-0.846	-1.296	0.450
6	We must accept that traditional cars shall be excluded from	6	-0.811	-1.209	0.399
17	Car buyers will still choose the peak performance, even if t	17	0.798	0.415	0.383
39	By public transport you can comfortably get almost anywhere	39	0.425	0.142	0.284
13	In China, India and other countries with rapidly growing pop	13	0.472	0.215	0.257
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.311	-1.559	0.249
28	Speed limitation is important and can save lives.	28	1.247	1.015	0.231
12	People do not even think about how much it costs to maintain	12	0.114	-0.001	0.115
4	If the local government would only allow electric cars in th	4	0.798	0.714	0.084
24	Those with higher incomes have the duty to drive the least p	24	-0.380	-0.419	0.039
5	Traffic jams can be eliminated by introducing an appropriate	5	0.099	0.353	-0.254
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.470	0.852	-0.382
25	Those who can afford the most modern car shall buy it out o	25	-1.196	-0.783	-0.412
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.100	-1.643	-0.457
29	For a family of 3-5 members 1 car is enough.	29	-0.841	-0.277	-0.564
36	Public opinion underestimates the number of environmentally	36	0.121	0.717	-0.596
26	Business cars with free usage are a bad example and cause ov	26	-0.686	-0.066	-0.620
16	Most of the customers of electric cars choose them not beca	16	-0.199	0.430	-0.628
30	The car is not something that a person lends.	30	-0.515	0.146	-0.661
1	The developed countries should support the public transport	1	-0.060	0.780	-0.840
10	Car-free days should be organized, because if you cannot use	10	-1.220	-0.142	-1.077
32	Those who do not enter the city do not care what the air the	32	-0.739	0.419	-1.159
18	For modern successful urban people the comfort and perme és	18	0.457	1.930	-1.474
20	All cars should be equipped with a GPS-based speedometer and	20	-1.742	0.794	-2.536
3	Public transport is inferior to using your own car, even if	3	-0.875	1.712	-2.587
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.131	1.650	-2.781
38	The bigger and more expensive the car is, the greater the re	38	-0.919	1.996	-2.915

Descending Array of Differences Between Factors 1 and 4

No.	Statement	No.	Type 1	Type 4	Difference
31	If the taxi was cheaper, more people would leave their cars	31	1.143	-1.527	2.670
17	Car buyers will still choose the peak performance, even if t	17	0.798	-1.588	2.386
19	State subsidies and discounts clearly increase demand növeli	19	1.584	-0.231	1.815
14	People prefer to ride their own cars, because the taxi is mo	14	1.092	-0.677	1.769
33	The use of the bus lane should be allowed for private cars f	33	0.424	-1.081	1.505
39	By public transport you can comfortably get almost anywhere	39	0.425	-1.047	1.473
27	Utilizing the bus lane would be more effective, if you could	27	0.010	-1.316	1.326
4	If the local government would only allow electric cars in th	4	0.798	-0.347	1.144
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.470	-0.636	1.106
9	Much more people would use public transport, if there were m	9	1.999	1.163	0.836
8	If someone wants to drink alcohol during the night, even the	8	1.052	0.268	0.784
24	Those with higher incomes have the duty to drive the least p	24	-0.380	-0.830	0.450
34	All electric cars shall be allowed to use the bus lane free	34	0.400	0.040	0.360
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.624	1.336	0.288
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.311	-1.547	0.237
23	The longer the time you spend in the city center, the more i	23	1.271	1.142	0.129
36	Public opinion underestimates the number of environmentally	36	0.121	0.136	-0.015
16	Most of the customers of electric cars choose them not beca	16	-0.199	-0.116	-0.083
3	Public transport is inferior to using your own car, even if	3	-0.875	-0.680	-0.194
25	Those who can afford the most modern car shall buy it out o	25	-1.196	-0.969	-0.227
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.100	-1.856	-0.244
2	State sponsored environmental advertizing and awareness camp	2	0.718	1.023	-0.305
37	The impact of the transport habits of an individual on the e	37	-0.750	-0.442	-0.308
38	The bigger and more expensive the car is, the greater the re	38	-0.919	-0.429	-0.490
13	In China, India and other countries with rapidly growing pop	13	0.472	1.044	-0.571
28	Speed limitation is important and can save lives.	28	1.247	1.819	-0.572
30	The car is not something that a person lends.	30	-0.515	0.075	-0.590
32	Those who do not enter the city do not care what the air the	32	-0.739	-0.119	-0.620
22	All adult family members should maintain their own cars to e	22	-0.846	-0.211	-0.635
12	People do not even think about how much it costs to maintain	12	0.114	0.772	-0.658
29	For a family of 3-5 members 1 car is enough.	29	-0.841	-0.136	-0.705
18	For modern successful urban people the comfort and perme és	18	0.457	1.605	-1.148
1	The developed countries should support the public transport	1	-0.060	1.101	-1.161
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.131	0.099	-1.231
10	Car-free days should be organized, because if you cannot use	10	-1.220	0.173	-1.393
26	Business cars with free usage are a bad example and cause ov	26	-0.686	0.775	-1.461
6	We must accept that traditional cars shall be excluded from	6	-0.811	0.772	-1.583
5	Traffic jams can be eliminated by introducing an appropriate	5	0.099	1.972	-1.873
20	All cars should be equipped with a GPS-based speedometer and	20	-1.742	0.466	-2.208

Descending Array of Differences Between Factors 2 and 3

No.	Statement	No.	Type 2	Type 3	Difference
23	The longer the time you spend in the city center, the more i	23	1.330	-0.724	2.054
26	Business cars with free usage are a bad example and cause ov	26	1.914	-0.066	1.980
6	We must accept that traditional cars shall be excluded from	6	0.499	-1.209	1.708
29	For a family of 3-5 members 1 car is enough.	29	0.960	-0.277	1.237
10	Car-free days should be organized, because if you cannot use	10	1.059	-0.142	1.201
24	Those with higher incomes have the duty to drive the least p	24	0.582	-0.419	1.002
17	Car buyers will still choose the peak performance, even if t	17	1.407	0.415	0.991
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.719	-1.643	0.924
39	By public transport you can comfortably get almost anywhere	39	0.890	0.142	0.748
9	Much more people would use public transport, if there were m	9	0.432	-0.156	0.588
12	People do not even think about how much it costs to maintain	12	0.527	-0.001	0.528
4	If the local government would only allow electric cars in th	4	1.226	0.714	0.512
37	The impact of the transport habits of an individual on the e	37	-1.248	-1.716	0.467
33	The use of the bus lane should be allowed for private cars f	33	-1.439	-1.861	0.422
20	All cars should be equipped with a GPS-based speedometer and	20	1.126	0.794	0.332
15	If there were more P+R parking lots (Park and Ride), it woul	15	0.094	-0.218	0.312
28	Speed limitation is important and can save lives.	28	1.325	1.015	0.310
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.315	-1.559	0.244
27	Utilizing the bus lane would be more effective, if you could	27	-1.014	-1.150	0.136
2	State sponsored environmental advertizing and awareness camp	2	0.139	0.007	0.132
34	All electric cars shall be allowed to use the bus lane free	34	-0.359	-0.426	0.067
31	If the taxi was cheaper, more people would leave their cars	31	-0.366	-0.415	0.050
22	All adult family members should maintain their own cars to e	22	-1.323	-1.296	-0.027
16	Most of the customers of electric cars choose them not beca	16	0.396	0.430	-0.034
5	Traffic jams can be eliminated by introducing an appropriate	5	0.212	0.353	-0.141
19	State subsidies and discounts clearly increase demand növeli	19	0.523	0.700	-0.177
1	The developed countries should support the public transport	1	0.502	0.780	-0.278
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.401	0.852	-0.452
32	Those who do not enter the city do not care what the air the	32	-0.081	0.419	-0.500
14	People prefer to ride their own cars, because the taxi is mo	14	-0.364	0.281	-0.645
8	If someone wants to drink alcohol during the night, even the	8	-1.885	-1.206	-0.679
13	In China, India and other countries with rapidly growing pop	13	-0.520	0.215	-0.734
25	Those who can afford the most modern car shall buy it out o	25	-1.667	-0.783	-0.884
18	For modern successful urban people the comfort and perme és	18	1.034	1.930	-0.896
36	Public opinion underestimates the number of environmentally	36	-0.513	0.717	-1.230
30	The car is not something that a person lends.	30	-1.305	0.146	-1.451
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.400	1.650	-2.050
38	The bigger and more expensive the car is, the greater the re	38	-0.650	1.996	-2.646
3	Public transport is inferior to using your own car, even if	3	-1.408	1.712	-3.121

Descending Array of Differences Between Factors 2 and 4

No.	Statement	No.	Type 2	Type 4	Difference
17	Car buyers will still choose the peak performance, even if t	17	1.407	-1.588	2.995
39	By public transport you can comfortably get almost anywhere	39	0.890	-1.047	1.937
4	If the local government would only allow electric cars in th	4	1.226	-0.347	1.572
24	Those with higher incomes have the duty to drive the least p	24	0.582	-0.830	1.412
31	If the taxi was cheaper, more people would leave their cars	31	-0.366	-1.527	1.161
26	Business cars with free usage are a bad example and cause ov	26	1.914	0.775	1.138
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.719	-1.856	1.137
29	For a family of 3-5 members 1 car is enough.	29	0.960	-0.136	1.096
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.401	-0.636	1.037
10	Car-free days should be organized, because if you cannot use	10	1.059	0.173	0.885
19	State subsidies and discounts clearly increase demand növeli	19	0.523	-0.231	0.754
20	All cars should be equipped with a GPS-based speedometer and	20	1.126	0.466	0.660
16	Most of the customers of electric cars choose them not beca	16	0.396	-0.116	0.512
14	People prefer to ride their own cars, because the taxi is mo	14	-0.364	-0.677	0.313
27	Utilizing the bus lane would be more effective, if you could	27	-1.014	-1.316	0.302
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.315	-1.547	0.232
23	The longer the time you spend in the city center, the more i	23	1.330	1.142	0.188
32	Those who do not enter the city do not care what the air the	32	-0.081	-0.119	0.038
38	The bigger and more expensive the car is, the greater the re	38	-0.650	-0.429	-0.221
12	People do not even think about how much it costs to maintain	12	0.527	0.772	-0.245
6	We must accept that traditional cars shall be excluded from	6	0.499	0.772	-0.274
33	The use of the bus lane should be allowed for private cars f	33	-1.439	-1.081	-0.358
34	All electric cars shall be allowed to use the bus lane free	34	-0.359	0.040	-0.399
28	Speed limitation is important and can save lives.	28	1.325	1.819	-0.494
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.400	0.099	-0.500
18	For modern successful urban people the comfort and perme és	18	1.034	1.605	-0.570
1	The developed countries should support the public transport	1	0.502	1.101	-0.600
36	Public opinion underestimates the number of environmentally	36	-0.513	0.136	-0.649
25	Those who can afford the most modern car shall buy it out o	25	-1.667	-0.969	-0.698
3	Public transport is inferior to using your own car, even if	3	-1.408	-0.680	-0.728
9	Much more people would use public transport, if there were m	9	0.432	1.163	-0.731
37	The impact of the transport habits of an individual on the e	37	-1.248	-0.442	-0.807
2	State sponsored environmental advertizing and awareness camp	2	0.139	1.023	-0.884
22	All adult family members should maintain their own cars to e	22	-1.323	-0.211	-1.112
15	If there were more P+R parking lots (Park and Ride), it woul	15	0.094	1.336	-1.242
30	The car is not something that a person lends.	30	-1.305	0.075	-1.380
13	In China, India and other countries with rapidly growing pop	13	-0.520	1.044	-1.563
5	Traffic jams can be eliminated by introducing an appropriate	5	0.212	1.972	-1.760
8	If someone wants to drink alcohol during the night, even the	8	-1.885	0.268	-2.154

Descending Array of Differences Between Factors 3 and 4

No.	Statement	No.	Type 3	Type 4	Difference
38	The bigger and more expensive the car is, the greater the re	38	1.996	-0.429	2.425
3	Public transport is inferior to using your own car, even if	3	1.712	-0.680	2.393
17	Car buyers will still choose the peak performance, even if t	17	0.415	-1.588	2.004
7	Street parking fees in Budapest are unrealistically high, bu	7	1.650	0.099	1.551
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.852	-0.636	1.488
39	By public transport you can comfortably get almost anywhere	39	0.142	-1.047	1.189
31	If the taxi was cheaper, more people would leave their cars	31	-0.415	-1.527	1.111
4	If the local government would only allow electric cars in th	4	0.714	-0.347	1.061
14	People prefer to ride their own cars, because the taxi is mo	14	0.281	-0.677	0.958
19	State subsidies and discounts clearly increase demand növeli	19	0.700	-0.231	0.931
36	Public opinion underestimates the number of environmentally	36	0.717	0.136	0.582
16	Most of the customers of electric cars choose them not beca	16	0.430	-0.116	0.545
32	Those who do not enter the city do not care what the air the	32	0.419	-0.119	0.538
24	Those with higher incomes have the duty to drive the least p	24	-0.419	-0.830	0.410
20	All cars should be equipped with a GPS-based speedometer and	20	0.794	0.466	0.328
18	For modern successful urban people the comfort and perme és	18	1.930	1.605	0.326
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.643	-1.856	0.213
25	Those who can afford the most modern car shall buy it out o	25	-0.783	-0.969	0.186
27	Utilizing the bus lane would be more effective, if you could	27	-1.150	-1.316	0.166
30	The car is not something that a person lends.	30	0.146	0.075	0.071
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.559	-1.547	-0.012
29	For a family of 3-5 members 1 car is enough.	29	-0.277	-0.136	-0.141
10	Car-free days should be organized, because if you cannot use	10	-0.142	0.173	-0.316
1	The developed countries should support the public transport	1	0.780	1.101	-0.321
34	All electric cars shall be allowed to use the bus lane free	34	-0.426	0.040	-0.467
12	People do not even think about how much it costs to maintain	12	-0.001	0.772	-0.773
33	The use of the bus lane should be allowed for private cars f	33	-1.861	-1.081	-0.780
28	Speed limitation is important and can save lives.	28	1.015	1.819	-0.804
13	In China, India and other countries with rapidly growing pop	13	0.215	1.044	-0.829
26	Business cars with free usage are a bad example and cause ov	26	-0.066	0.775	-0.841
2	State sponsored environmental advertizing and awareness camp	2	0.007	1.023	-1.016
22	All adult family members should maintain their own cars to e	22	-1.296	-0.211	-1.085
37	The impact of the transport habits of an individual on the e	37	-1.716	-0.442	-1.274
9	Much more people would use public transport, if there were m	9	-0.156	1.163	-1.319
8	If someone wants to drink alcohol during the night, even the	8	-1.206	0.268	-1.474
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.218	1.336	-1.555
5	Traffic jams can be eliminated by introducing an appropriate	5	0.353	1.972	-1.619
23	The longer the time you spend in the city center, the more i	23	-0.724	1.142	-1.866
6	We must accept that traditional cars shall be excluded from	6	-1.209	0.772	-1.982

Exact Factor Scores (á la SPSS) in Z-Score and T-Score units

No.	Statement	No.	Factors 1		2		3		4	
1	The developed countries should support the public tran	1	-0.03	50	0.43	54	0.37	54	0.90	59
2	State sponsored environmental advertizing and awarenes	2	0.38	54	-0.19	48	0.52	55	1.02	60
3	Public transport is inferior to using your own car, ev	3	-0.24	48	-1.82	32	2.63	76	-0.80	42
4	If the local government would only allow electric cars	4	0.70	57	1.53	65	0.06	51	-1.09	39
5	Traffic jams can be eliminated by introducing an appro	5	0.04	50	-0.17	48	0.47	55	1.37	64
6	We must accept that traditional cars shall be excluded	6	-1.27	37	0.37	54	-0.81	42	1.27	63
7	Street parking fees in Budapest are unrealistically hi	7	-1.41	36	-0.07	49	1.24	62	0.14	51
8	If someone wants to drink alcohol during the night, ev	8	0.75	57	-2.19	28	-0.67	43	1.25	63
9	Much more people would use public transport, if there	9	2.11	71	0.30	53	-0.55	45	0.89	59
10	Car-free days should be organized, because if you cann	10	-1.12	39	0.93	59	0.56	56	-0.37	46
11	The urban traffic jam is no problem in terms of time,	11	-1.13	39	-0.81	42	-1.51	35	-0.56	44
12	People do not even think about how much it costs to ma	12	-0.03	50	0.53	55	0.36	54	-0.01	50
13	In China, India and other countries with rapidly growi	13	0.29	53	-0.61	44	0.38	54	0.84	58
14	People prefer to ride their own cars, because the taxi	14	1.33	63	-0.97	40	0.53	55	-0.37	46
15	Ha több lenne a P+R parkoló (Park and Ride, jelentése:	15	1.56	66	-0.22	48	-0.54	45	1.21	62
16	Most of the customers of electric cars choose them not	16	-0.17	48	0.54	55	0.02	50	-0.61	44
17	Car buyers will still choose the peak performance, eve	17	0.99	60	1.49	65	0.35	53	-2.26	27
18	For modern successful urban people the comfort and per	18	0.19	52	0.22	52	2.09	71	1.06	61
19	State subsidies and discounts clearly increase demand	19	1.69	67	0.58	56	0.39	54	-0.55	45
20	All cars should be equipped with a GPS-based speedomet	20	-1.87	31	0.94	59	0.33	53	0.20	52
21	Everyone in Budapest should be obliged to buy a public	21	-1.81	32	-0.16	48	-1.52	35	-1.03	40
22	All adult family members should maintain their own car	22	-0.98	40	-0.75	43	-1.69	33	0.30	53
23	The longer the time you spend in the city center, the	23	1.20	62	1.14	61	-1.02	40	0.82	58
24	Those with higher incomes have the duty to drive the l	24	-0.25	48	1.09	61	-0.49	45	-0.43	46
25	Those who can afford the most modern car shall buy it	25	-1.30	37	-1.33	37	-0.42	46	-0.08	49
26	Business cars with free usage are a bad example and ca	26	-1.01	40	1.96	70	-0.72	43	1.34	63
27	Utilizing the bus lane would be more effective, if you	27	0.56	56	-1.17	38	-0.83	42	-1.36	36
28	Speed limitation is important and can save lives.	28	0.47	55	0.88	59	0.27	53	2.18	72
29	For a family of 3-5 members 1 car is enough.	29	-0.94	41	0.96	60	0.20	52	-0.09	49
30	The car is not something that a person lends.	30	-0.49	45	-1.44	36	0.80	58	0.12	51
31	If the taxi was cheaper, more people would leave their	31	1.45	64	-0.67	43	-0.26	47	-0.56	44
32	Those who do not enter the city do not care what the a	32	-0.49	45	0.00	50	0.37	54	0.12	51
33	The use of the bus lane should be allowed for private	33	0.71	57	-0.95	41	-1.42	36	-1.75	33
34	All electric cars shall be allowed to use the bus lane	34	0.57	56	-0.53	45	-1.03	40	0.38	54
35	Old, less modern vehicles shall be punished by a highe	35	0.51	55	0.62	56	0.01	50	-1.37	36
36	Public opinion underestimates the number of environmen	36	0.11	51	-0.42	46	0.43	54	0.44	54
37	The impact of the transport habits of an individual on	37	-0.72	43	-1.17	38	-1.15	38	-0.25	47
38	The bigger and more expensive the car is, the greater	38	-0.58	44	-0.48	45	2.43	74	-1.16	38
39	By public transport you can comfortably get almost any	39	0.25	52	1.60	66	-0.20	48	-1.15	38

Factor Q-Sort Values for Each Statement

No.	Statement	No.	Factor Arrays 1	2	3	4
1	The developed countries should support the public transport	1	0	1	2	3
2	State sponsored environmental advertizing and awareness camp	2	2	0	0	2
3	Public transport is inferior to using your own car, even if	3	-2	-3	4	-2
4	If the local government would only allow electric cars in th	4	2	3	2	-1
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0	1	4
6	We must accept that traditional cars shall be excluded from	6	-2	1	-3	1
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1	3	0
8	If someone wants to drink alcohol during the night, even the	8	2	-4	-3	1
9	Much more people would use public transport, if there were m	9	4	1	-1	3
10	Car-free days should be organized, because if you cannot use	10	-3	3	0	1
11	The urban traffic jam is no problem in terms of time, becaus	11	-4	-3	-3	-4
12	People do not even think about how much it costs to maintain	12	0	1	0	1
13	In China, India and other countries with rapidly growing pop	13	1	-1	0	2
14	People prefer to ride their own cars, because the taxi is mo	14	3	-1	1	-2
15	If there were more P+R parking lots (Park and Ride), it woul	15	4	0	-1	3
16	Most of the customers of electric cars choose them not beca	16	0	0	1	0
17	Car buyers will still choose the peak performance, even if t	17	2	4	1	-4
18	For modern successful urban people the comfort and perme és	18	1	2	4	4
19	State subsidies and discounts clearly increase demand növeli	19	4	1	2	-1
20	All cars should be equipped with a GPS-based speedometer and	20	-4	3	3	1
21	Everyone in Budapest should be obliged to buy a public trans	21	-4	-2	-4	-4
22	All adult family members should maintain their own cars to e	22	-2	-3	-3	0
23	The longer the time you spend in the city center, the more i	23	3	4	-2	3
24	Those with higher incomes have the duty to drive the least p	24	-1	2	-1	-2
25	Those who can afford the most modern car shall buy it out o	25	-3	-4	-2	-2
26	Business cars with free usage are a bad example and cause ov	26	-1	4	0	2
27	Utilizing the bus lane would be more effective, if you could	27	0	-2	-2	-3
28	Speed limitation is important and can save lives.	28	3	3	3	4
29	For a family of 3-5 members 1 car is enough.	29	-2	2	-1	0
30	The car is not something that a person lends.	30	-1	-3	0	0
31	If the taxi was cheaper, more people would leave their cars	31	3	-1	-1	-3
32	Those who do not enter the city do not care what the air the	32	-1	0	1	0
33	The use of the bus lane should be allowed for private cars f	33	1	-4	-4	-3
34	All electric cars shall be allowed to use the bus lane free	34	0	0	-2	0
35	Old, less modern vehicles shall be punished by a higher tax.	35	1	0	3	-1
36	Public opinion underestimates the number of environmentally	36	0	-1	2	1
37	The impact of the transport habits of an individual on the e	37	-1	-2	-4	-1
38	The bigger and more expensive the car is, the greater the re	38	-3	-2	4	-1
39	By public transport you can comfortably get almost anywhere	39	1	2	0	-3

Variance = 5.385 St. Dev. = 2.320

Factor Q-Sort Values for Statements sorted by Consensus vs. Disagreement (Variance across Factor Z-Scores)

No.	Statement	No.	Factor Arrays 1	2	3	4
11	The urban traffic jam is no problem in terms of time, becaus	11	-4	-3	-3	-4
16	Most of the customers of electric cars choose them not beca	16	0	0	1	0
28	Speed limitation is important and can save lives.	28	3	3	3	4
12	People do not even think about how much it costs to maintain	12	0	1	0	1
25	Those who can afford the most modern car shall buy it out o	25	-3	-4	-2	-2
34	All electric cars shall be allowed to use the bus lane free	34	0	0	-2	0
32	Those who do not enter the city do not care what the air the	32	-1	0	1	0
2	State sponsored environmental advertizing and awareness camp	2	2	0	0	2
1	The developed countries should support the public transport	1	0	1	2	3
36	Public opinion underestimates the number of environmentally	36	0	-1	2	1
22	All adult family members should maintain their own cars to e	22	-2	-3	-3	0
37	The impact of the transport habits of an individual on the e	37	-1	-2	-4	-1
27	Utilizing the bus lane would be more effective, if you could	27	0	-2	-2	-3
24	Those with higher incomes have the duty to drive the least p	24	-1	2	-1	-2
21	Everyone in Budapest should be obliged to buy a public trans	21	-4	-2	-4	-4
35	Old, less modern vehicles shall be punished by a higher tax.	35	1	0	3	-1
13	In China, India and other countries with rapidly growing pop	13	1	-1	0	2
18	For modern successful urban people the comfort and perme és	18	1	2	4	4
4	If the local government would only allow electric cars in th	4	2	3	2	-1
30	The car is not something that a person lends.	30	-1	-3	0	0
19	State subsidies and discounts clearly increase demand növeli	19	4	1	2	-1
29	For a family of 3-5 members 1 car is enough.	29	-2	2	-1	0
14	People prefer to ride their own cars, because the taxi is mo	14	3	-1	1	-2
39	By public transport you can comfortably get almost anywhere	39	1	2	0	-3
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0	1	4
15	If there were more P+R parking lots (Park and Ride), it woul	15	4	0	-1	3
9	Much more people would use public transport, if there were m	9	4	1	-1	3
10	Car-free days should be organized, because if you cannot use	10	-3	3	0	1
6	We must accept that traditional cars shall be excluded from	6	-2	1	-3	1
23	The longer the time you spend in the city center, the more i	23	3	4	-2	3
33	The use of the bus lane should be allowed for private cars f	33	1	-4	-4	-3
31	If the taxi was cheaper, more people would leave their cars	31	3	-1	-1	-3
26	Business cars with free usage are a bad example and cause ov	26	-1	4	0	2
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1	3	0
17	Car buyers will still choose the peak performance, even if t	17	2	4	1	-4
20	All cars should be equipped with a GPS-based speedometer and	20	-4	3	3	1
8	If someone wants to drink alcohol during the night, even the	8	2	-4	-3	1
38	The bigger and more expensive the car is, the greater the re	38	-3	-2	4	-1
3	Public transport is inferior to using your own car, even if	3	-2	-3	4	-2

Factor Characteristics

	Factors			
	1	2	3	4
No. of Defining Variables	6	5	3	3
Average Rel. Coef.	0.800	0.800	0.800	0.800
Composite Reliability	0.960	0.952	0.923	0.923
S.E. of Factor Z-Scores	0.200	0.218	0.277	0.277

Standard Errors for Differences in Factor Z-Scores

(Diagonal Entries Are S.E. Within Factors)

Factors	1	2	3	4
1	0.283	0.296	0.342	0.342
2	0.296	0.309	0.353	0.353
3	0.342	0.353	0.392	0.392
4	0.342	0.353	0.392	0.392

Distinguishing Statements for Factor 1

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
9	Much more people would use public transport, if there were m	9	4	2.00	1	0.43	-1	-0.16	3	1.16
19	State subsidies and discounts clearly increase demand növeli	19	4	1.58*	1	0.52	2	0.70	-1	-0.23
31	If the taxi was cheaper, more people would leave their cars	31	3	1.14*	-1	-0.37	-1	-0.42	-3	-1.53
14	People prefer to ride their own cars, because the taxi is mo	14	3	1.09	-1	-0.36	1	0.28	-2	-0.68
8	If someone wants to drink alcohol during the night, even the	8	2	1.05	-4	-1.89	-3	-1.21	1	0.27
33	The use of the bus lane should be allowed for private cars f	33	1	0.42*	-4	-1.44	-4	-1.86	-3	-1.08
27	Utilizing the bus lane would be more effective, if you could	27	0	0.01*	-2	-1.01	-2	-1.15	-3	-1.32
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1.13	-1	-0.40	3	1.65	0	0.10
10	Car-free days should be organized, because if you cannot use	10	-3	-1.22*	3	1.06	0	-0.14	1	0.17
20	All cars should be equipped with a GPS-based speedometer and	20	-4	-1.74*	3	1.13	3	0.79	1	0.47

Distinguishing Statements for Factor 2

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
26	Business cars with free usage are a bad example and cause ov	26	-1	-0.69	4	1.91*	0	-0.07	2	0.78
17	Car buyers will still choose the peak performance, even if t	17	2	0.80	4	1.41	1	0.42	-4	-1.59
10	Car-free days should be organized, because if you cannot use	10	-3	-1.22	3	1.06	0	-0.14	1	0.17
29	For a family of 3-5 members 1 car is enough.	29	-2	-0.84	2	0.96*	-1	-0.28	0	-0.14
24	Those with higher incomes have the duty to drive the least p	24	-1	-0.38	2	0.58*	-1	-0.42	-2	-0.83
13	In China, India and other countries with rapidly growing pop	13	1	0.47	-1	-0.52	0	0.21	2	1.04
21	Everyone in Budapest should be obliged to buy a public trans	21	-4	-2.10	-2	-0.72*	-4	-1.64	-4	-1.86
30	The car is not something that a person lends.	30	-1	-0.52	-3	-1.31*	0	0.15	0	0.07

Distinguishing Statements for Factor 3

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
38	The bigger and more expensive the car is, the greater the re	38	-3	-0.92	-2	-0.65	4	2.00*	-1	-0.43
3	Public transport is inferior to using your own car, even if	3	-2	-0.87	-3	-1.41	4	1.71*	-2	-0.68
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1.13	-1	-0.40	3	1.65*	0	0.10
23	The longer the time you spend in the city center, the more i	23	3	1.27	4	1.33	-2	-0.72*	3	1.14

Distinguishing Statements for Factor 4

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0.10	0	0.21	1	0.35	4	1.97*
9	Much more people would use public transport, if there were m	9	4	2.00	1	0.43	-1	-0.16	3	1.16
26	Business cars with free usage are a bad example and cause ov	26	-1	-0.69	4	1.91	0	-0.07	2	0.78
8	If someone wants to drink alcohol during the night, even the	8	2	1.05	-4	-1.89	-3	-1.21	1	0.27
19	State subsidies and discounts clearly increase demand növeli	19	4	1.58	1	0.52	2	0.70	-1	-0.23
4	If the local government would only allow electric cars in th	4	2	0.80	3	1.23	2	0.71	-1	-0.35*
35	Old, less modern vehicles shall be punished by a higher tax.	35	1	0.47	0	0.40	3	0.85	-1	-0.64*
39	By public transport you can comfortably get almost anywhere	39	1	0.43	2	0.89	0	0.14	-3	-1.05*
31	If the taxi was cheaper, more people would leave their cars	31	3	1.14	-1	-0.37	-1	-0.42	-3	-1.53*
17	Car buyers will still choose the peak performance, even if t	17	2	0.80	4	1.41	1	0.42	-4	-1.59*

Consensus Statements -- Those That Do Not Distinguish Between ANY Pair of Factors.

All Listed Statements are Non-Significant at P>.01, and Those Flagged With an * are also Non-Significant at P>.05.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
11*	The urban traffic jam is no problem in terms of time, becaus	11	-4	-1.31	-3	-1.32	-3	-1.56	-4	-1.55
12	People do not even think about how much it costs to maintain	12	0	0.11	1	0.53	0	-0.00	1	0.77
16	Most of the customers of electric cars choose them not becau	16	0	-0.20	0	0.40	1	0.43	0	-0.12
25	Those who can afford the most modern car shall buy it out o	25	-3	-1.20	-4	-1.67	-2	-0.78	-2	-0.97
28	Speed limitation is important and can save lives.	28	3	1.25	3	1.33	3	1.02	4	1.82
34	All electric cars shall be allowed to use the bus lane free	34	0	0.40	0	-0.36	-2	-0.43	0	0.04

QANALYZE was completed at 15:21:49

Annex 3. Output of the third run of PQMethod software with 18 respondents

PQMethod2.35 Attitude to city mobility 3 PAGE 1
Path and Project Name: C:\PQMethod/mobility3 Jul 29 17
Correlation Matrix Between Sorts

SORTS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	MinFoAff	100	32	17	10	26	22	40	22	10	18	43	38	25	9	35	-2	30	29
2	GenMan	32	100	4	24	39	6	8	26	10	20	30	28	-14	49	35	30	19	4
3	Economis	17	4	100	13	4	40	24	24	57	66	2	45	25	-8	-2	-2	18	26
4	CityBoy	10	24	13	100	21	9	-5	14	29	17	28	22	15	36	40	20	33	29
5	CorpFin	26	39	4	21	100	12	21	23	32	16	20	21	8	38	42	32	3	40
6	Designer	22	6	40	9	12	100	41	46	49	39	-15	32	14	-6	34	-28	13	5
7	Banker	40	8	24	-5	21	41	100	31	27	25	30	24	7	4	20	10	30	9
8	FinProf	22	26	24	14	23	46	31	100	22	45	11	2	9	28	50	30	36	3
9	UniDocen	10	10	57	29	32	49	27	22	100	55	10	23	13	18	27	16	23	31
10	Dezs	18	20	66	17	16	39	25	45	55	100	-15	26	4	32	23	21	45	14
11	Olvaso	43	30	2	28	20	-15	30	11	10	-15	100	7	17	25	23	38	30	11
12	LadyProf	38	28	45	22	21	32	24	2	23	26	7	100	24	-8	8	-33	1	34
13	MathTeach	25	-14	25	15	8	14	7	9	13	4	17	24	100	-19	14	-10	20	37
14	Gellerth	9	49	-8	36	38	-6	4	28	18	32	25	-8	-19	100	21	37	45	1
15	CEO	35	35	-2	40	42	34	20	50	27	23	23	8	14	21	100	53	32	23
16	GyogyszV	-2	30	-2	20	32	-28	10	30	16	21	38	-33	-10	37	53	100	37	19
17	KHTvez	30	19	18	33	3	13	30	36	23	45	30	1	20	45	32	37	100	13
18	CityGirl	29	4	26	29	40	5	9	3	31	14	11	34	37	1	23	19	13	100

Unrotated Factor Matrix

	Factors 1	2	3	4	5	6	7	8
SORTS								
1 MinFoAff	0.5404	0.0738	0.4703	0.4357	0.0491	-0.1397	0.0183	-0.2049
2 GenMan	0.4955	-0.3805	0.0566	0.0945	0.5598	-0.1787	0.0679	-0.1683
3 Economis	0.5004	0.6060	-0.1667	-0.2271	-0.0776	-0.2523	-0.2272	-0.0558
4 CityBoy	0.4902	-0.1960	0.1616	-0.4290	-0.0054	-0.1250	0.4749	0.3911
5 CorpFin	0.5451	-0.2233	0.2098	-0.1426	0.3808	0.3940	-0.2691	-0.0298
6 Designer	0.4792	0.5599	-0.2656	0.2844	0.1167	0.2697	0.2551	0.2320
7 Banker	0.4877	0.1933	0.0136	0.5682	-0.1073	-0.0155	-0.3690	0.2299
8 FinProf	0.6061	-0.0536	-0.3719	0.3055	-0.1083	0.2522	0.1973	-0.1949
9 UniDocen	0.6245	0.3096	-0.2235	-0.3198	-0.0136	0.0646	-0.2305	0.3784
10 Dezs	0.6435	0.2723	-0.5176	-0.1713	-0.0071	-0.1979	-0.0840	-0.2661
11 Olvaso	0.3930	-0.3978	0.4674	0.2374	-0.2027	-0.2905	-0.1778	0.3211
12 LadyProf	0.4102	0.5174	0.3851	-0.0376	0.4162	-0.2095	0.0893	-0.0632
13 MathTeach	0.2648	0.3255	0.4735	-0.1168	-0.4840	0.0825	0.2244	-0.2030
14 Gellerth	0.4555	-0.5574	-0.2514	-0.1318	0.2305	-0.3008	0.0698	-0.0090
15 CEO	0.6546	-0.2881	0.0222	0.0986	-0.0618	0.4967	0.2572	0.0192
16 GyogyszV	0.4128	-0.6686	-0.1522	-0.1556	-0.2876	0.1662	-0.3197	-0.0851
17 KHTvez	0.5900	-0.2060	-0.1520	0.0713	-0.4392	-0.3843	0.1781	-0.1055
18 CityGirl	0.4401	0.1420	0.4813	-0.4508	-0.1014	0.2214	-0.1803	-0.1846
Eigenvalues	4.7050	2.5648	1.7819	1.4145	1.2955	1.1626	0.9823	0.7872
% expl.Var.	26	14	10	8	7	6	5	4

Cumulative Communalities Matrix

	Factors 1 Thru 1	2	3	4	5	6	7	8
SORTS								
1 MinFoAff	0.2920	0.2975	0.5187	0.7085	0.7109	0.7304	0.7308	0.7727
2 GenMan	0.2455	0.3904	0.3936	0.4025	0.7159	0.7478	0.7525	0.7808
3 Economis	0.2504	0.6176	0.6454	0.6970	0.7030	0.7667	0.8183	0.8214
4 CityBoy	0.2403	0.2787	0.3048	0.4888	0.4888	0.5045	0.7300	0.8830
5 CorpFin	0.2971	0.3469	0.3909	0.4113	0.5563	0.7115	0.7840	0.7849
6 Designer	0.2296	0.5430	0.6136	0.6945	0.7081	0.7809	0.8459	0.8997
7 Banker	0.2378	0.2752	0.2754	0.5982	0.6097	0.6100	0.7461	0.7990
8 FinProf	0.3673	0.3702	0.5085	0.6019	0.6136	0.6772	0.7161	0.7541
9 UniDocen	0.3900	0.4858	0.5358	0.6381	0.6383	0.6424	0.6956	0.8388
10 Dezs	0.4141	0.4882	0.7562	0.7855	0.7856	0.8247	0.8318	0.9026
11 Olvaso	0.1544	0.3127	0.5312	0.5875	0.6286	0.7130	0.7446	0.8477
12 LadyProf	0.1683	0.4360	0.5843	0.5857	0.7590	0.8029	0.8108	0.8148
13 MathTeach	0.0701	0.1761	0.4004	0.4140	0.6483	0.6551	0.7054	0.7466
14 Gellerth	0.2074	0.5181	0.5813	0.5987	0.6518	0.7423	0.7472	0.7473
15 CEO	0.4285	0.5115	0.5120	0.5217	0.5255	0.7722	0.8384	0.8388
16 GyogyszV	0.1704	0.6175	0.6406	0.6649	0.7476	0.7752	0.8774	0.8846
17 KHTvez	0.3480	0.3905	0.4136	0.4187	0.6116	0.7593	0.7910	0.8021
18 CityGirl	0.1936	0.2138	0.4454	0.6487	0.6590	0.7080	0.7405	0.7746
cum% expl.Var.	26	40	50	58	65	72	77	82

Factor Matrix with an X Indicating a Defining Sort

		Loadings			
QSORT		1	2	3	4
1	MinFoAff	0.1974	-0.0514	0.3970	0.7136X
2	GenMan	0.5864X	-0.0093	0.0605	0.2343
3	Economis	-0.0767	0.7503X	0.3503	0.0734
4	CityBoy	0.5149X	0.1359	0.4196	-0.1706
5	CorpFin	0.5252X	0.0610	0.3468	0.1069
6	Designer	-0.1237	0.6679X	0.0364	0.4814
7	Banker	0.0903	0.2382	0.0127	0.7302X
8	FinProf	0.4183	0.4489	-0.2076	0.4268
9	UniDocen	0.2416	0.7018X	0.2947	-0.0180
10	Dezs	0.2824	0.8386X	0.0027	0.0504
11	Olvaso	0.4799	-0.3512	0.2701	0.4011
12	LadyProf	-0.1399	0.2797	0.6289X	0.3039
13	MathTeach	-0.0878	0.0583	0.6137X	0.1621
14	Gellerth	0.7480X	0.1037	-0.1513	-0.0743
15	CEO	0.6236X	0.1458	0.1211	0.3113
16	GyogyszV	0.7985X	-0.0366	-0.1177	-0.1100
17	KHTvez	0.5381X	0.2696	0.0030	0.2376
18	CityGirl	0.2106	0.1106	0.7647X	-0.0859
	% expl.Var.	19	16	12	11

Free Distribution Data Results

QSORT		MEAN	ST.DEV.
1	MinFoAff	0.000	2.351
2	GenMan	0.000	2.351
3	Economis	0.000	2.351
4	CityBoy	0.000	2.351
5	CorpFin	0.000	2.351
6	Designer	0.000	2.351
7	Banker	0.000	2.351
8	FinProf	0.000	2.351
9	UniDocen	0.000	2.351
10	Dezs	0.000	2.351
11	Olvaso	0.000	2.351
12	LadyProf	0.000	2.351
13	MathTeach	0.000	2.351
14	Gellerth	0.000	2.351
15	CEO	0.000	2.351
16	GyogyszV	0.000	2.351
17	KHTvez	0.000	2.351
18	CityGirl	0.000	2.351

Factor Scores with Corresponding Ranks

No.	Statement	No.	Factors 1		2		3		4	
1	The developed countries should support the public tran	1	0.16	18	0.34	19	0.94	5	0.98	9
2	State sponsored environmental advertizing and awarenes	2	0.63	11	0.01	20	0.13	19	1.26	6
3	Public transport is inferior to using your own car, ev	3	-0.95	31	-1.49	37	1.80	3	-0.30	24
4	If the local government would only allow electric cars	4	0.68	10	1.42	4	0.82	9	-0.49	26
5	Traffic jams can be eliminated by introducing an appro	5	0.16	17	0.36	16	0.17	16	2.04	1
6	We must accept that traditional cars shall be excluded	6	-0.82	30	0.39	15	-1.25	34	1.30	5
7	Street parking fees in Budapest are unrealistically hi	7	-1.21	34	-0.44	26	1.56	4	0.06	18
8	If someone wants to drink alcohol during the night, ev	8	1.06	8	-1.80	39	-1.36	35	0.47	15
9	Much more people would use public transport, if there	9	2.07	1	0.35	18	-0.15	23	0.79	10
10	Car-free days should be organized, because if you cann	10	-1.25	35	0.99	8	-0.26	24	0.25	17
11	The urban traffic jam is no problem in terms of time,	11	-1.32	36	-1.16	33	-1.53	36	-1.53	37
12	People do not even think about how much it costs to ma	12	-0.23	23	0.35	17	-0.36	25	1.30	5
13	In China, India and other countries with rapidly growi	13	0.42	14	-0.38	25	0.15	17	1.00	8
14	People prefer to ride their own cars, because the taxi	14	1.13	6	-0.31	24	0.63	13	-0.77	31
15	If there were more P+R parking lots (Park and Ride), i	15	1.71	2	-0.02	21	-0.03	20	1.04	7
16	Most of the customers of electric cars choose them not	16	-0.15	22	0.53	11	0.30	15	-0.26	23
17	Car buyers will still choose the peak performance, eve	17	0.56	13	1.54	2	0.41	14	-1.30	36
18	For modern successful urban people the comfort and per	18	0.40	15	1.17	7	1.83	2	1.51	3
19	State subsidies and discounts clearly increase demand	19	1.45	4	0.42	14	0.93	6	-0.23	22
20	All cars should be equipped with a GPS-based speedomet	20	-1.41	38	1.30	6	0.84	7	0.28	16
21	Everyone in Budapest should be obliged to buy a public	21	-2.03	39	-0.70	29	-1.79	38	-1.77	38
22	All adult family members should maintain their own car	22	-0.61	28	-1.24	34	-1.03	33	-0.49	26
23	The longer the time you spend in the city center, the	23	1.40	5	1.36	5	-0.47	29	0.75	11
24	Those with higher incomes have the duty to drive the l	24	-0.32	25	0.43	13	-0.65	30	-1.28	34
25	Those who can afford the most modern car shall buy it	25	-1.38	37	-1.64	38	-0.83	31	-0.51	27
26	Business cars with free usage are a bad example and ca	26	-0.30	24	1.89	1	-0.12	22	0.53	12
27	Utilizing the bus lane would be more effective, if you	27	-0.04	20	-0.83	30	-0.89	32	-1.30	36
28	Speed limitation is important and can save lives.	28	1.46	3	1.45	3	0.76	10	1.53	2
29	For a family of 3-5 members 1 car is enough.	29	-0.98	32	0.84	9	-0.39	26	-0.00	20
30	The car is not something that a person lends.	30	-0.57	26	-1.32	35	0.14	18	0.49	14
31	If the taxi was cheaper, more people would leave their	31	1.10	7	-0.49	27	-0.41	27	-1.79	39
32	Those who do not enter the city do not care what the a	32	-0.76	29	-0.23	22	0.65	12	0.51	13
33	The use of the bus lane should be allowed for private	33	0.32	16	-1.46	36	-1.83	39	-1.25	33
34	All electric cars shall be allowed to use the bus lane	34	0.73	9	-0.26	23	-0.42	28	-0.53	29
35	Old, less modern vehicles shall be punished by a highe	35	0.56	12	0.45	12	0.84	8	-1.00	32
36	Public opinion underestimates the number of environmen	36	0.12	19	-0.58	28	0.70	11	-0.00	20
37	The impact of the transport habits of an individual on	37	-0.58	27	-1.15	32	-1.68	37	-0.72	30
38	The bigger and more expensive the car is, the greater	38	-1.11	33	-0.89	31	1.96	1	-0.04	21
39	By public transport you can comfortably get almost any	39	-0.09	21	0.77	10	-0.10	21	-0.53	29

Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.2540	0.1237	0.2341
2	0.2540	1.0000	0.3317	0.3282
3	0.1237	0.3317	1.0000	0.3318
4	0.2341	0.3282	0.3318	1.0000

Factor Scores -- For Factor 1

No.	Statement	No.	Z-SCORES
9	Much more people would use public transport, if there were m	9	2.074
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710
28	Speed limitation is important and can save lives.	28	1.455
19	State subsidies and discounts clearly increase demand növeli	19	1.451
23	The longer the time you spend in the city center, the more i	23	1.402
14	People prefer to ride their own cars, because the taxi is mo	14	1.129
31	If the taxi was cheaper, more people would leave their cars	31	1.103
8	If someone wants to drink alcohol during the night, even the	8	1.063
34	All electric cars shall be allowed to use the bus lane free	34	0.728
4	If the local government would only allow electric cars in th	4	0.676
2	State sponsored environmental advertizing and awareness camp	2	0.630
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564
17	Car buyers will still choose the peak performance, even if t	17	0.556
13	In China, India and other countries with rapidly growing pop	13	0.425
18	For modern successful urban people the comfort and perme és	18	0.397
33	The use of the bus lane should be allowed for private cars f	33	0.324
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164
1	The developed countries should support the public transport	1	0.161
36	Public opinion underestimates the number of environmentally	36	0.119
27	Utilizing the bus lane would be more effective, if you could	27	-0.044
39	By public transport you can comfortably get almost anywhere	39	-0.092
16	Most of the customers of electric cars choose them not becau	16	-0.153
12	People do not even think about how much it costs to maintain	12	-0.226
26	Business cars with free usage are a bad example and cause ov	26	-0.303
24	Those with higher incomes have the duty to drive the least p	24	-0.323
30	The car is not something that a person lends.	30	-0.573
37	The impact of the transport habits of an individual on the e	37	-0.585
22	All adult family members should maintain their own cars to e	22	-0.615
32	Those who do not enter the city do not care what the air the	32	-0.759
6	We must accept that traditional cars shall be excluded from	6	-0.824
3	Public transport is inferior to using your own car, even if	3	-0.949
29	For a family of 3-5 members 1 car is enough.	29	-0.983
38	The bigger and more expensive the car is, the greater the re	38	-1.105
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208
10	Car-free days should be organized, because if you cannot use	10	-1.247
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322
25	Those who can afford the most modern car shall buy it out o	25	-1.380
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032

Factor Scores -- For Factor 2

No.	Statement	No.	Z-SCORES
26	Business cars with free usage are a bad example and cause ov	26	1.885
17	Car buyers will still choose the peak performance, even if t	17	1.536
28	Speed limitation is important and can save lives.	28	1.448
4	If the local government would only allow electric cars in th	4	1.423
23	The longer the time you spend in the city center, the more i	23	1.355
20	All cars should be equipped with a GPS-based speedometer and	20	1.304
18	For modern successful urban people the comfort and perme és	18	1.172
10	Car-free days should be organized, because if you cannot use	10	0.990
29	For a family of 3-5 members 1 car is enough.	29	0.842
39	By public transport you can comfortably get almost anywhere	39	0.768
16	Most of the customers of electric cars choose them not becau	16	0.533
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.452
24	Those with higher incomes have the duty to drive the least p	24	0.431
19	State subsidies and discounts clearly increase demand növeli	19	0.417
6	We must accept that traditional cars shall be excluded from	6	0.391
5	Traffic jams can be eliminated by introducing an appropriate	5	0.364
12	People do not even think about how much it costs to maintain	12	0.353
9	Much more people would use public transport, if there were m	9	0.348
1	The developed countries should support the public transport	1	0.345
2	State sponsored environmental advertizing and awareness camp	2	0.013
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.020
32	Those who do not enter the city do not care what the air the	32	-0.232
34	All electric cars shall be allowed to use the bus lane free	34	-0.261
14	People prefer to ride their own cars, because the taxi is mo	14	-0.312
13	In China, India and other countries with rapidly growing pop	13	-0.378
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.441
31	If the taxi was cheaper, more people would leave their cars	31	-0.486
36	Public opinion underestimates the number of environmentally	36	-0.580
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.702
27	Utilizing the bus lane would be more effective, if you could	27	-0.833
38	The bigger and more expensive the car is, the greater the re	38	-0.891
37	The impact of the transport habits of an individual on the e	37	-1.152
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.155
22	All adult family members should maintain their own cars to e	22	-1.236
30	The car is not something that a person lends.	30	-1.318
33	The use of the bus lane should be allowed for private cars f	33	-1.455
3	Public transport is inferior to using your own car, even if	3	-1.487
25	Those who can afford the most modern car shall buy it out o	25	-1.637
8	If someone wants to drink alcohol during the night, even the	8	-1.797

Factor Scores -- For Factor 3

No.	Statement	No.	Z-SCORES
38	The bigger and more expensive the car is, the greater the re	38	1.959
18	For modern successful urban people the comfort and perme és	18	1.834
3	Public transport is inferior to using your own car, even if	3	1.800
7	Street parking fees in Budapest are unrealistically high, bu	7	1.559
1	The developed countries should support the public transport	1	0.945
19	State subsidies and discounts clearly increase demand növeli	19	0.926
20	All cars should be equipped with a GPS-based speedometer and	20	0.839
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.837
4	If the local government would only allow electric cars in th	4	0.820
28	Speed limitation is important and can save lives.	28	0.757
36	Public opinion underestimates the number of environmentally	36	0.704
32	Those who do not enter the city do not care what the air the	32	0.651
14	People prefer to ride their own cars, because the taxi is mo	14	0.634
17	Car buyers will still choose the peak performance, even if t	17	0.408
16	Most of the customers of electric cars choose them not becau	16	0.302
5	Traffic jams can be eliminated by introducing an appropriate	5	0.167
13	In China, India and other countries with rapidly growing pop	13	0.151
30	The car is not something that a person lends.	30	0.143
2	State sponsored environmental advertizing and awareness camp	2	0.127
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.035
39	By public transport you can comfortably get almost anywhere	39	-0.100
26	Business cars with free usage are a bad example and cause ov	26	-0.124
9	Much more people would use public transport, if there were m	9	-0.153
10	Car-free days should be organized, because if you cannot use	10	-0.259
12	People do not even think about how much it costs to maintain	12	-0.359
29	For a family of 3-5 members 1 car is enough.	29	-0.392
31	If the taxi was cheaper, more people would leave their cars	31	-0.408
34	All electric cars shall be allowed to use the bus lane free	34	-0.418
23	The longer the time you spend in the city center, the more i	23	-0.472
24	Those with higher incomes have the duty to drive the least p	24	-0.651
25	Those who can afford the most modern car shall buy it out o	25	-0.828
27	Utilizing the bus lane would be more effective, if you could	27	-0.890
22	All adult family members should maintain their own cars to e	22	-1.033
6	We must accept that traditional cars shall be excluded from	6	-1.247
8	If someone wants to drink alcohol during the night, even the	8	-1.363
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.530
37	The impact of the transport habits of an individual on the e	37	-1.683
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.791
33	The use of the bus lane should be allowed for private cars f	33	-1.826

Factor Scores -- For Factor 4

No.	Statement	No.	Z-SCORES
5	Traffic jams can be eliminated by introducing an appropriate	5	2.037
28	Speed limitation is important and can save lives.	28	1.527
18	For modern successful urban people the comfort and perme és	18	1.509
6	We must accept that traditional cars shall be excluded from	6	1.301
12	People do not even think about how much it costs to maintain	12	1.301
2	State sponsored environmental advertizing and awareness camp	2	1.264
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.037
13	In China, India and other countries with rapidly growing pop	13	1.000
1	The developed countries should support the public transport	1	0.981
9	Much more people would use public transport, if there were m	9	0.792
23	The longer the time you spend in the city center, the more i	23	0.754
26	Business cars with free usage are a bad example and cause ov	26	0.528
32	Those who do not enter the city do not care what the air the	32	0.509
30	The car is not something that a person lends.	30	0.491
8	If someone wants to drink alcohol during the night, even the	8	0.472
20	All cars should be equipped with a GPS-based speedometer and	20	0.282
10	Car-free days should be organized, because if you cannot use	10	0.245
7	Street parking fees in Budapest are unrealistically high, bu	7	0.056
29	For a family of 3-5 members 1 car is enough.	29	-0.000
36	Public opinion underestimates the number of environmentally	36	-0.000
38	The bigger and more expensive the car is, the greater the re	38	-0.037
19	State subsidies and discounts clearly increase demand növeli	19	-0.227
16	Most of the customers of electric cars choose them not becau	16	-0.264
3	Public transport is inferior to using your own car, even if	3	-0.301
4	If the local government would only allow electric cars in th	4	-0.491
22	All adult family members should maintain their own cars to e	22	-0.491
25	Those who can afford the most modern car shall buy it out o	25	-0.509
34	All electric cars shall be allowed to use the bus lane free	34	-0.528
39	By public transport you can comfortably get almost anywhere	39	-0.528
37	The impact of the transport habits of an individual on the e	37	-0.717
14	People prefer to ride their own cars, because the taxi is mo	14	-0.773
35	Old, less modern vehicles shall be punished by a higher tax.	35	-1.000
33	The use of the bus lane should be allowed for private cars f	33	-1.245
24	Those with higher incomes have the duty to drive the least p	24	-1.282
27	Utilizing the bus lane would be more effective, if you could	27	-1.301
17	Car buyers will still choose the peak performance, even if t	17	-1.301
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.527
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.773
31	If the taxi was cheaper, more people would leave their cars	31	-1.791

Descending Array of Differences Between Factors 1 and 2

No.	Statement	No.	Type 1	Type 2	Difference
8	If someone wants to drink alcohol during the night, even the	8	1.063	-1.797	2.860
33	The use of the bus lane should be allowed for private cars f	33	0.324	-1.455	1.779
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710	-0.020	1.730
9	Much more people would use public transport, if there were m	9	2.074	0.348	1.726
31	If the taxi was cheaper, more people would leave their cars	31	1.103	-0.486	1.588
14	People prefer to ride their own cars, because the taxi is mo	14	1.129	-0.312	1.441
19	State subsidies and discounts clearly increase demand növeli	19	1.451	0.417	1.034
34	All electric cars shall be allowed to use the bus lane free	34	0.728	-0.261	0.989
13	In China, India and other countries with rapidly growing pop	13	0.425	-0.378	0.803
27	Utilizing the bus lane would be more effective, if you could	27	-0.044	-0.833	0.789
30	The car is not something that a person lends.	30	-0.573	-1.318	0.745
36	Public opinion underestimates the number of environmentally	36	0.119	-0.580	0.699
22	All adult family members should maintain their own cars to e	22	-0.615	-1.236	0.621
2	State sponsored environmental advertizing and awareness camp	2	0.630	0.013	0.616
37	The impact of the transport habits of an individual on the e	37	-0.585	-1.152	0.568
3	Public transport is inferior to using your own car, even if	3	-0.949	-1.487	0.539
25	Those who can afford the most modern car shall buy it out o	25	-1.380	-1.637	0.258
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564	0.452	0.112
23	The longer the time you spend in the city center, the more i	23	1.402	1.355	0.047
28	Speed limitation is important and can save lives.	28	1.455	1.448	0.007
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322	-1.155	-0.167
1	The developed countries should support the public transport	1	0.161	0.345	-0.183
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164	0.364	-0.200
38	The bigger and more expensive the car is, the greater the re	38	-1.105	-0.891	-0.214
32	Those who do not enter the city do not care what the air the	32	-0.759	-0.232	-0.527
12	People do not even think about how much it costs to maintain	12	-0.226	0.353	-0.580
16	Most of the customers of electric cars choose them not becau	16	-0.153	0.533	-0.686
4	If the local government would only allow electric cars in th	4	0.676	1.423	-0.747
24	Those with higher incomes have the duty to drive the least p	24	-0.323	0.431	-0.754
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208	-0.441	-0.768
18	For modern successful urban people the comfort and perme és	18	0.397	1.172	-0.775
39	By public transport you can comfortably get almost anywhere	39	-0.092	0.768	-0.860
17	Car buyers will still choose the peak performance, even if t	17	0.556	1.536	-0.980
6	We must accept that traditional cars shall be excluded from	6	-0.824	0.391	-1.215
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032	-0.702	-1.331
29	For a family of 3-5 members 1 car is enough.	29	-0.983	0.842	-1.825
26	Business cars with free usage are a bad example and cause ov	26	-0.303	1.885	-2.189
10	Car-free days should be organized, because if you cannot use	10	-1.247	0.990	-2.237
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406	1.304	-2.710

Descending Array of Differences Between Factors 1 and 3

No.	Statement	No.	Type 1	Type 3	Difference
8	If someone wants to drink alcohol during the night, even the	8	1.063	-1.363	2.426
9	Much more people would use public transport, if there were m	9	2.074	-0.153	2.227
33	The use of the bus lane should be allowed for private cars f	33	0.324	-1.826	2.150
23	The longer the time you spend in the city center, the more i	23	1.402	-0.472	1.873
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710	-0.035	1.745
31	If the taxi was cheaper, more people would leave their cars	31	1.103	-0.408	1.510
34	All electric cars shall be allowed to use the bus lane free	34	0.728	-0.418	1.146
37	The impact of the transport habits of an individual on the e	37	-0.585	-1.683	1.099
27	Utilizing the bus lane would be more effective, if you could	27	-0.044	-0.890	0.846
28	Speed limitation is important and can save lives.	28	1.455	0.757	0.698
19	State subsidies and discounts clearly increase demand növeli	19	1.451	0.926	0.525
2	State sponsored environmental advertizing and awareness camp	2	0.630	0.127	0.503
14	People prefer to ride their own cars, because the taxi is mo	14	1.129	0.634	0.495
6	We must accept that traditional cars shall be excluded from	6	-0.824	-1.247	0.423
22	All adult family members should maintain their own cars to e	22	-0.615	-1.033	0.418
24	Those with higher incomes have the duty to drive the least p	24	-0.323	-0.651	0.327
13	In China, India and other countries with rapidly growing pop	13	0.425	0.151	0.274
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322	-1.530	0.208
17	Car buyers will still choose the peak performance, even if t	17	0.556	0.408	0.148
12	People do not even think about how much it costs to maintain	12	-0.226	-0.359	0.133
39	By public transport you can comfortably get almost anywhere	39	-0.092	-0.100	0.008
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164	0.167	-0.004
4	If the local government would only allow electric cars in th	4	0.676	0.820	-0.144
26	Business cars with free usage are a bad example and cause ov	26	-0.303	-0.124	-0.179
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032	-1.791	-0.241
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564	0.837	-0.272
16	Most of the customers of electric cars choose them not becau	16	-0.153	0.302	-0.455
25	Those who can afford the most modern car shall buy it out o	25	-1.380	-0.828	-0.551
36	Public opinion underestimates the number of environmentally	36	0.119	0.704	-0.585
29	For a family of 3-5 members 1 car is enough.	29	-0.983	-0.392	-0.592
30	The car is not something that a person lends.	30	-0.573	0.143	-0.716
1	The developed countries should support the public transport	1	0.161	0.945	-0.783
10	Car-free days should be organized, because if you cannot use	10	-1.247	-0.259	-0.988
32	Those who do not enter the city do not care what the air the	32	-0.759	0.651	-1.409
18	For modern successful urban people the comfort and perme és	18	0.397	1.834	-1.437
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406	0.839	-2.245
3	Public transport is inferior to using your own car, even if	3	-0.949	1.800	-2.748
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208	1.559	-2.767
38	The bigger and more expensive the car is, the greater the re	38	-1.105	1.959	-3.064

Descending Array of Differences Between Factors 1 and 4

No.	Statement	No.	Type 1	Type 4	Difference
31	If the taxi was cheaper, more people would leave their cars	31	1.103	-1.791	2.894
14	People prefer to ride their own cars, because the taxi is mo	14	1.129	-0.773	1.902
17	Car buyers will still choose the peak performance, even if t	17	0.556	-1.301	1.856
19	State subsidies and discounts clearly increase demand növeli	19	1.451	-0.227	1.678
33	The use of the bus lane should be allowed for private cars f	33	0.324	-1.245	1.569
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.564	-1.000	1.564
9	Much more people would use public transport, if there were m	9	2.074	0.792	1.282
27	Utilizing the bus lane would be more effective, if you could	27	-0.044	-1.301	1.257
34	All electric cars shall be allowed to use the bus lane free	34	0.728	-0.528	1.255
4	If the local government would only allow electric cars in th	4	0.676	-0.491	1.167
24	Those with higher incomes have the duty to drive the least p	24	-0.323	-1.282	0.959
15	If there were more P+R parking lots (Park and Ride), it woul	15	1.710	1.037	0.673
23	The longer the time you spend in the city center, the more i	23	1.402	0.754	0.647
8	If someone wants to drink alcohol during the night, even the	8	1.063	0.472	0.591
39	By public transport you can comfortably get almost anywhere	39	-0.092	-0.528	0.436
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.322	-1.527	0.205
37	The impact of the transport habits of an individual on the e	37	-0.585	-0.717	0.133
36	Public opinion underestimates the number of environmentally	36	0.119	-0.000	0.119
16	Most of the customers of electric cars choose them not becau	16	-0.153	-0.264	0.111
28	Speed limitation is important and can save lives.	28	1.455	1.527	-0.072
22	All adult family members should maintain their own cars to e	22	-0.615	-0.491	-0.124
21	Everyone in Budapest should be obliged to buy a public trans	21	-2.032	-1.773	-0.259
13	In China, India and other countries with rapidly growing pop	13	0.425	1.000	-0.575
2	State sponsored environmental advertizing and awareness camp	2	0.630	1.264	-0.634
3	Public transport is inferior to using your own car, even if	3	-0.949	-0.301	-0.648
1	The developed countries should support the public transport	1	0.161	0.981	-0.820
26	Business cars with free usage are a bad example and cause ov	26	-0.303	0.528	-0.831
25	Those who can afford the most modern car shall buy it out o	25	-1.380	-0.509	-0.870
29	For a family of 3-5 members 1 car is enough.	29	-0.983	-0.000	-0.983
30	The car is not something that a person lends.	30	-0.573	0.491	-1.063
38	The bigger and more expensive the car is, the greater the re	38	-1.105	-0.037	-1.068
18	For modern successful urban people the comfort and perme és	18	0.397	1.509	-1.111
7	Street parking fees in Budapest are unrealistically high, bu	7	-1.208	0.056	-1.264
32	Those who do not enter the city do not care what the air the	32	-0.759	0.509	-1.268
10	Car-free days should be organized, because if you cannot use	10	-1.247	0.245	-1.493
12	People do not even think about how much it costs to maintain	12	-0.226	1.301	-1.527
20	All cars should be equipped with a GPS-based speedometer and	20	-1.406	0.282	-1.688
5	Traffic jams can be eliminated by introducing an appropriate	5	0.164	2.037	-1.873
6	We must accept that traditional cars shall be excluded from	6	-0.824	1.301	-2.125

Descending Array of Differences Between Factors 2 and 3

No.	Statement	No.	Type 2	Type 3	Difference
26	Business cars with free usage are a bad example and cause ov	26	1.885	-0.124	2.010
23	The longer the time you spend in the city center, the more i	23	1.355	-0.472	1.827
6	We must accept that traditional cars shall be excluded from	6	0.391	-1.247	1.638
10	Car-free days should be organized, because if you cannot use	10	0.990	-0.259	1.249
29	For a family of 3-5 members 1 car is enough.	29	0.842	-0.392	1.233
17	Car buyers will still choose the peak performance, even if t	17	1.536	0.408	1.128
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.702	-1.791	1.090
24	Those with higher incomes have the duty to drive the least p	24	0.431	-0.651	1.082
39	By public transport you can comfortably get almost anywhere	39	0.768	-0.100	0.868
12	People do not even think about how much it costs to maintain	12	0.353	-0.359	0.712
28	Speed limitation is important and can save lives.	28	1.448	0.757	0.691
4	If the local government would only allow electric cars in th	4	1.423	0.820	0.603
37	The impact of the transport habits of an individual on the e	37	-1.152	-1.683	0.531
9	Much more people would use public transport, if there were m	9	0.348	-0.153	0.501
20	All cars should be equipped with a GPS-based speedometer and	20	1.304	0.839	0.465
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.155	-1.530	0.375
33	The use of the bus lane should be allowed for private cars f	33	-1.455	-1.826	0.371
16	Most of the customers of electric cars choose them not becau	16	0.533	0.302	0.231
5	Traffic jams can be eliminated by introducing an appropriate	5	0.364	0.167	0.196
34	All electric cars shall be allowed to use the bus lane free	34	-0.261	-0.418	0.157
27	Utilizing the bus lane would be more effective, if you could	27	-0.833	-0.890	0.057
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.020	-0.035	0.015
31	If the taxi was cheaper, more people would leave their cars	31	-0.486	-0.408	-0.078
2	State sponsored environmental advertizing and awareness camp	2	0.013	0.127	-0.113
22	All adult family members should maintain their own cars to e	22	-1.236	-1.033	-0.203
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.452	0.837	-0.384
8	If someone wants to drink alcohol during the night, even the	8	-1.797	-1.363	-0.434
19	State subsidies and discounts clearly increase demand növeli	19	0.417	0.926	-0.509
13	In China, India and other countries with rapidly growing pop	13	-0.378	0.151	-0.529
1	The developed countries should support the public transport	1	0.345	0.945	-0.600
18	For modern successful urban people the comfort and perme és	18	1.172	1.834	-0.662
25	Those who can afford the most modern car shall buy it out o	25	-1.637	-0.828	-0.809
32	Those who do not enter the city do not care what the air the	32	-0.232	0.651	-0.883
14	People prefer to ride their own cars, because the taxi is mo	14	-0.312	0.634	-0.946
36	Public opinion underestimates the number of environmentally	36	-0.580	0.704	-1.284
30	The car is not something that a person lends.	30	-1.318	0.143	-1.461
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.441	1.559	-2.000
38	The bigger and more expensive the car is, the greater the re	38	-0.891	1.959	-2.850
3	Public transport is inferior to using your own car, even if	3	-1.487	1.800	-3.287

Descending Array of Differences Between Factors 2 and 4

No.	Statement	No.	Type 2	Type 4	Difference
17	Car buyers will still choose the peak performance, even if t	17	1.536	-1.301	2.837
4	If the local government would only allow electric cars in th	4	1.423	-0.491	1.914
24	Those with higher incomes have the duty to drive the least p	24	0.431	-1.282	1.713
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.452	-1.000	1.452
26	Business cars with free usage are a bad example and cause ov	26	1.885	0.528	1.358
31	If the taxi was cheaper, more people would leave their cars	31	-0.486	-1.791	1.306
39	By public transport you can comfortably get almost anywhere	39	0.768	-0.528	1.296
21	Everyone in Budapest should be obliged to buy a public trans	21	-0.702	-1.773	1.071
20	All cars should be equipped with a GPS-based speedometer and	20	1.304	0.282	1.022
29	For a family of 3-5 members 1 car is enough.	29	0.842	-0.000	0.842
16	Most of the customers of electric cars choose them not becau	16	0.533	-0.264	0.797
10	Car-free days should be organized, because if you cannot use	10	0.990	0.245	0.744
19	State subsidies and discounts clearly increase demand növeli	19	0.417	-0.227	0.644
23	The longer the time you spend in the city center, the more i	23	1.355	0.754	0.601
27	Utilizing the bus lane would be more effective, if you could	27	-0.833	-1.301	0.467
14	People prefer to ride their own cars, because the taxi is mo	14	-0.312	-0.773	0.461
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.155	-1.527	0.372
34	All electric cars shall be allowed to use the bus lane free	34	-0.261	-0.528	0.267
28	Speed limitation is important and can save lives.	28	1.448	1.527	-0.079
33	The use of the bus lane should be allowed for private cars f	33	-1.455	-1.245	-0.210
18	For modern successful urban people the comfort and perme és	18	1.172	1.509	-0.337
37	The impact of the transport habits of an individual on the e	37	-1.152	-0.717	-0.435
9	Much more people would use public transport, if there were m	9	0.348	0.792	-0.443
7	Street parking fees in Budapest are unrealistically high, bu	7	-0.441	0.056	-0.496
36	Public opinion underestimates the number of environmentally	36	-0.580	-0.000	-0.580
1	The developed countries should support the public transport	1	0.345	0.981	-0.636
32	Those who do not enter the city do not care what the air the	32	-0.232	0.509	-0.741
22	All adult family members should maintain their own cars to e	22	-1.236	-0.491	-0.745
38	The bigger and more expensive the car is, the greater the re	38	-0.891	-0.037	-0.854
6	We must accept that traditional cars shall be excluded from	6	0.391	1.301	-0.909
12	People do not even think about how much it costs to maintain	12	0.353	1.301	-0.947
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.020	1.037	-1.057
25	Those who can afford the most modern car shall buy it out o	25	-1.637	-0.509	-1.128
3	Public transport is inferior to using your own car, even if	3	-1.487	-0.301	-1.186
2	State sponsored environmental advertizing and awareness camp	2	0.013	1.264	-1.250
13	In China, India and other countries with rapidly growing pop	13	-0.378	1.000	-1.378
5	Traffic jams can be eliminated by introducing an appropriate	5	0.364	2.037	-1.673
30	The car is not something that a person lends.	30	-1.318	0.491	-1.808
8	If someone wants to drink alcohol during the night, even the	8	-1.797	0.472	-2.269

Descending Array of Differences Between Factors 3 and 4

No.	Statement	No.	Type 3	Type 4	Difference
3	Public transport is inferior to using your own car, even if	3	1.800	-0.301	2.101
38	The bigger and more expensive the car is, the greater the re	38	1.959	-0.037	1.996
35	Old, less modern vehicles shall be punished by a higher tax.	35	0.837	-1.000	1.836
17	Car buyers will still choose the peak performance, even if t	17	0.408	-1.301	1.709
7	Street parking fees in Budapest are unrealistically high, bu	7	1.559	0.056	1.503
14	People prefer to ride their own cars, because the taxi is mo	14	0.634	-0.773	1.407
31	If the taxi was cheaper, more people would leave their cars	31	-0.408	-1.791	1.383
4	If the local government would only allow electric cars in th	4	0.820	-0.491	1.311
19	State subsidies and discounts clearly increase demand növeli	19	0.926	-0.227	1.153
36	Public opinion underestimates the number of environmentally	36	0.704	-0.000	0.704
24	Those with higher incomes have the duty to drive the least p	24	-0.651	-1.282	0.631
16	Most of the customers of electric cars choose them not becau	16	0.302	-0.264	0.566
20	All cars should be equipped with a GPS-based speedometer and	20	0.839	0.282	0.556
39	By public transport you can comfortably get almost anywhere	39	-0.100	-0.528	0.428
27	Utilizing the bus lane would be more effective, if you could	27	-0.890	-1.301	0.411
18	For modern successful urban people the comfort and perme és	18	1.834	1.509	0.326
32	Those who do not enter the city do not care what the air the	32	0.651	0.509	0.142
34	All electric cars shall be allowed to use the bus lane free	34	-0.418	-0.528	0.109
11	The urban traffic jam is no problem in terms of time, becaus	11	-1.530	-1.527	-0.003
21	Everyone in Budapest should be obliged to buy a public trans	21	-1.791	-1.773	-0.019
1	The developed countries should support the public transport	1	0.945	0.981	-0.037
25	Those who can afford the most modern car shall buy it out o	25	-0.828	-0.509	-0.319
30	The car is not something that a person lends.	30	0.143	0.491	-0.348
29	For a family of 3-5 members 1 car is enough.	29	-0.392	-0.000	-0.392
10	Car-free days should be organized, because if you cannot use	10	-0.259	0.245	-0.504
22	All adult family members should maintain their own cars to e	22	-1.033	-0.491	-0.542
33	The use of the bus lane should be allowed for private cars f	33	-1.826	-1.245	-0.581
26	Business cars with free usage are a bad example and cause ov	26	-0.124	0.528	-0.652
28	Speed limitation is important and can save lives.	28	0.757	1.527	-0.770
13	In China, India and other countries with rapidly growing pop	13	0.151	1.000	-0.849
9	Much more people would use public transport, if there were m	9	-0.153	0.792	-0.945
37	The impact of the transport habits of an individual on the e	37	-1.683	-0.717	-0.966
15	If there were more P+R parking lots (Park and Ride), it woul	15	-0.035	1.037	-1.072
2	State sponsored environmental advertizing and awareness camp	2	0.127	1.264	-1.137
23	The longer the time you spend in the city center, the more i	23	-0.472	0.754	-1.226
12	People do not even think about how much it costs to maintain	12	-0.359	1.301	-1.660
8	If someone wants to drink alcohol during the night, even the	8	-1.363	0.472	-1.835
5	Traffic jams can be eliminated by introducing an appropriate	5	0.167	2.037	-1.869
6	We must accept that traditional cars shall be excluded from	6	-1.247	1.301	-2.547

Exact Factor Scores (á la SPSS) in Z-Score and T-Score units

No.	Statement	No.	Factors 1		2		3		4	
1	The developed countries should support the public tran	1	0.02	50	0.23	52	0.22	52	0.98	60
2	State sponsored environmental advertizing and awarenes	2	0.48	55	-0.32	47	0.38	54	1.07	61
3	Public transport is inferior to using your own car, ev	3	-0.67	43	-1.94	31	2.66	77	-0.63	44
4	If the local government would only allow electric cars	4	0.57	56	1.79	68	0.57	56	-1.58	34
5	Traffic jams can be eliminated by introducing an appro	5	0.31	53	-0.15	48	0.26	53	1.43	64
6	We must accept that traditional cars shall be excluded	6	-0.95	41	0.27	53	-1.20	38	1.53	65
7	Street parking fees in Budapest are unrealistically hi	7	-1.41	36	-0.03	50	1.07	61	0.43	54
8	If someone wants to drink alcohol during the night, ev	8	1.08	61	-2.15	28	-0.95	40	1.20	62
9	Much more people would use public transport, if there	9	2.22	72	0.19	52	-0.44	46	0.61	56
10	Car-free days should be organized, because if you cann	10	-1.27	37	0.84	58	0.47	55	0.00	50
11	The urban traffic jam is no problem in terms of time,	11	-0.96	40	-0.58	44	-1.49	35	-0.87	41
12	People do not even think about how much it costs to ma	12	-0.40	46	-0.06	49	-0.17	48	1.35	64
13	In China, India and other countries with rapidly growi	13	0.51	55	-0.47	45	0.27	53	0.81	58
14	People prefer to ride their own cars, because the taxi	14	1.29	63	-0.77	42	0.90	59	-0.98	40
15	If there were more P+R parking lots (Park and Ride), i	15	1.74	67	-0.36	46	-0.53	45	0.85	58
16	Most of the customers of electric cars choose them not	16	-0.31	47	0.53	55	0.06	51	-0.44	46
17	Car buyers will still choose the peak performance, eve	17	0.41	54	1.45	64	0.76	58	-1.99	30
18	For modern successful urban people the comfort and per	18	0.33	53	0.37	54	2.06	71	1.08	61
19	State subsidies and discounts clearly increase demand	19	1.45	65	0.52	55	0.72	57	-0.75	43
20	All cars should be equipped with a GPS-based speedomet	20	-1.61	34	1.28	63	0.47	55	-0.30	47
21	Everyone in Budapest should be obliged to buy a public	21	-1.87	31	-0.18	48	-1.71	33	-0.67	43
22	All adult family members should maintain their own car	22	-0.58	44	-0.44	46	-1.75	33	-0.09	49
23	The longer the time you spend in the city center, the	23	1.47	65	1.25	63	-0.83	42	0.35	54
24	Those with higher incomes have the duty to drive the l	24	-0.34	47	1.04	60	-0.42	46	-0.38	46
25	Those who can afford the most modern car shall buy it	25	-1.24	38	-1.33	37	-0.80	42	0.46	55
26	Business cars with free usage are a bad example and ca	26	-0.53	45	2.16	72	-0.67	43	0.84	58
27	Utilizing the bus lane would be more effective, if you	27	0.42	54	-0.98	40	-0.50	45	-1.85	32
28	Speed limitation is important and can save lives.	28	1.06	61	1.14	61	0.32	53	1.54	65
29	For a family of 3-5 members 1 car is enough.	29	-0.97	40	0.93	59	0.11	51	0.20	52
30	The car is not something that a person lends.	30	-0.55	44	-1.52	35	0.57	56	0.40	54
31	If the taxi was cheaper, more people would leave their	31	1.26	63	-0.75	43	0.03	50	-1.00	40
32	Those who do not enter the city do not care what the a	32	-0.61	44	-0.24	48	0.20	52	0.44	54
33	The use of the bus lane should be allowed for private	33	0.44	54	-0.93	41	-1.17	38	-1.96	30
34	All electric cars shall be allowed to use the bus lane	34	0.85	58	-0.31	47	-0.79	42	-0.46	45
35	Old, less modern vehicles shall be punished by a highe	35	0.19	52	0.63	56	0.33	53	-1.47	35
36	Public opinion underestimates the number of environmen	36	0.15	52	-0.46	45	0.36	54	0.46	55
37	The impact of the transport habits of an individual on	37	-0.50	45	-0.89	41	-1.13	39	-0.61	44
38	The bigger and more expensive the car is, the greater	38	-1.21	38	-0.85	41	2.24	72	-0.23	48
39	By public transport you can comfortably get almost any	39	-0.29	47	1.09	61	-0.50	45	0.24	52

Factor Q-Sort Values for Each Statement

No.	Statement	No.	Factor Arrays 1	2	3	4
1	The developed countries should support the public transport	1	0	0	3	2
2	State sponsored environmental advertizing and awareness camp	2	2	0	0	3
3	Public transport is inferior to using your own car, even if	3	-2	-4	4	-1
4	If the local government would only allow electric cars in th	4	2	3	2	-1
5	Traffic jams can be eliminated by introducing an appropriate	5	0	1	1	4
6	We must accept that traditional cars shall be excluded from	6	-2	1	-3	3
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1	3	0
8	If someone wants to drink alcohol during the night, even the	8	2	-4	-3	1
9	Much more people would use public transport, if there were m	9	4	0	0	2
10	Car-free days should be organized, because if you cannot use	10	-3	2	-1	0
11	The urban traffic jam is no problem in terms of time, becaus	11	-3	-3	-3	-4
12	People do not even think about how much it costs to maintain	12	0	0	-1	3
13	In China, India and other countries with rapidly growing pop	13	1	-1	0	2
14	People prefer to ride their own cars, because the taxi is mo	14	3	-1	1	-2
15	If there were more P+R parking lots (Park and Ride), it woul	15	4	0	0	3
16	Most of the customers of electric cars choose them not becau	16	0	2	1	0
17	Car buyers will still choose the peak performance, even if t	17	1	4	1	-3
18	For modern successful urban people the comfort and perme és	18	1	3	4	4
19	State subsidies and discounts clearly increase demand növeli	19	3	1	3	0
20	All cars should be equipped with a GPS-based speedometer and	20	-4	3	3	1
21	Everyone in Budapest should be obliged to buy a public trans	21	-4	-2	-4	-4
22	All adult family members should maintain their own cars to e	22	-1	-3	-3	-1
23	The longer the time you spend in the city center, the more i	23	3	3	-2	2
24	Those with higher incomes have the duty to drive the least p	24	-1	1	-2	-3
25	Those who can afford the most modern car shall buy it out o	25	-4	-4	-2	-1
26	Business cars with free usage are a bad example and cause ov	26	-1	4	0	1
27	Utilizing the bus lane would be more effective, if you could	27	0	-2	-2	-3
28	Speed limitation is important and can save lives.	28	4	4	2	4
29	For a family of 3-5 members 1 car is enough.	29	-2	2	-1	0
30	The car is not something that a person lends.	30	-1	-3	0	1
31	If the taxi was cheaper, more people would leave their cars	31	3	-1	-1	-4
32	Those who do not enter the city do not care what the air the	32	-2	0	1	1
33	The use of the bus lane should be allowed for private cars f	33	1	-3	-4	-3
34	All electric cars shall be allowed to use the bus lane free	34	2	0	-1	-2
35	Old, less modern vehicles shall be punished by a higher tax.	35	1	1	2	-2
36	Public opinion underestimates the number of environmentally	36	0	-1	2	0
37	The impact of the transport habits of an individual on the e	37	-1	-2	-4	-2
38	The bigger and more expensive the car is, the greater the re	38	-3	-2	4	0
39	By public transport you can comfortably get almost anywhere	39	0	2	0	-2

Variance = 5.385 St. Dev. = 2.320

Factor Q-Sort Values for Statements sorted by Consensus vs. Disagreement (Variance across Factor Z-Scores)

No.	Statement	No.	Factor Arrays 1	2	3	4
11	The urban traffic jam is no problem in terms of time, becaus	11	-3	-3	-3	-4
22	All adult family members should maintain their own cars to e	22	-1	-3	-3	-1
28	Speed limitation is important and can save lives.	28	4	4	2	4
16	Most of the customers of electric cars choose them not becau	16	0	2	1	0
1	The developed countries should support the public transport	1	0	0	3	2
37	The impact of the transport habits of an individual on the e	37	-1	-2	-4	-2
25	Those who can afford the most modern car shall buy it out o	25	-4	-4	-2	-1
27	Utilizing the bus lane would be more effective, if you could	27	0	-2	-2	-3
36	Public opinion underestimates the number of environmentally	36	0	-1	2	0
39	By public transport you can comfortably get almost anywhere	39	0	2	0	-2
2	State sponsored environmental advertizing and awareness camp	2	2	0	0	3
13	In China, India and other countries with rapidly growing pop	13	1	-1	0	2
34	All electric cars shall be allowed to use the bus lane free	34	2	0	-1	-2
21	Everyone in Budapest should be obliged to buy a public trans	21	-4	-2	-4	-4
18	For modern successful urban people the comfort and perme és	18	1	3	4	4
32	Those who do not enter the city do not care what the air the	32	-2	0	1	1
24	Those with higher incomes have the duty to drive the least p	24	-1	1	-2	-3
19	State subsidies and discounts clearly increase demand növeli	19	3	1	3	0
12	People do not even think about how much it costs to maintain	12	0	0	-1	3
29	For a family of 3-5 members 1 car is enough.	29	-2	2	-1	0
4	If the local government would only allow electric cars in th	4	2	3	2	-1
30	The car is not something that a person lends.	30	-1	-3	0	1
35	Old, less modern vehicles shall be punished by a higher tax.	35	1	1	2	-2
15	If there were more P+R parking lots (Park and Ride), it woul	15	4	0	0	3
14	People prefer to ride their own cars, because the taxi is mo	14	3	-1	1	-2
23	The longer the time you spend in the city center, the more i	23	3	3	-2	2
5	Traffic jams can be eliminated by introducing an appropriate	5	0	1	1	4
10	Car-free days should be organized, because if you cannot use	10	-3	2	-1	0
33	The use of the bus lane should be allowed for private cars f	33	1	-3	-4	-3
9	Much more people would use public transport, if there were m	9	4	0	0	2
26	Business cars with free usage are a bad example and cause ov	26	-1	4	0	1
6	We must accept that traditional cars shall be excluded from	6	-2	1	-3	3
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1	3	0
17	Car buyers will still choose the peak performance, even if t	17	1	4	1	-3
31	If the taxi was cheaper, more people would leave their cars	31	3	-1	-1	-4
20	All cars should be equipped with a GPS-based speedometer and	20	-4	3	3	1
8	If someone wants to drink alcohol during the night, even the	8	2	-4	-3	1
38	The bigger and more expensive the car is, the greater the re	38	-3	-2	4	0
3	Public transport is inferior to using your own car, even if	3	-2	-4	4	-1

Factor Characteristics

	Factors			
	1	2	3	4
No. of Defining Variables	7	4	3	2
Average Rel. Coef.	0.800	0.800	0.800	0.800
Composite Reliability	0.966	0.941	0.923	0.889
S.E. of Factor Z-Scores	0.186	0.243	0.277	0.333

Standard Errors for Differences in Factor Z-Scores

(Diagonal Entries Are S.E. Within Factors)

Factors	1	2	3	4
1	0.263	0.305	0.334	0.382
2	0.305	0.343	0.368	0.412
3	0.334	0.368	0.392	0.434
4	0.382	0.412	0.434	0.471

Distinguishing Statements for Factor 1

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
9	Much more people would use public transport, if there were m	9	4	2.07*	0	0.35	0	-0.15	2	0.79
31	If the taxi was cheaper, more people would leave their cars	31	3	1.10*	-1	-0.49	-1	-0.41	-4	-1.79
34	All electric cars shall be allowed to use the bus lane free	34	2	0.73*	0	-0.26	-1	-0.42	-2	-0.53
18	For modern successful urban people the comfort and perme és	18	1	0.40	3	1.17	4	1.83	4	1.51
33	The use of the bus lane should be allowed for private cars f	33	1	0.32*	-3	-1.46	-4	-1.83	-3	-1.25
27	Utilizing the bus lane would be more effective, if you could	27	0	-0.04	-2	-0.83	-2	-0.89	-3	-1.30
30	The car is not something that a person lends.	30	-1	-0.57	-3	-1.32	0	0.14	1	0.49
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1.21	-1	-0.44	3	1.56	0	0.06
10	Car-free days should be organized, because if you cannot use	10	-3	-1.25*	2	0.99	-1	-0.26	0	0.25
20	All cars should be equipped with a GPS-based speedometer and	20	-4	-1.41*	3	1.30	3	0.84	1	0.28

Distinguishing Statements for Factor 2

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
26	Business cars with free usage are a bad example and cause ov	26	-1	-0.30	4	1.89*	0	-0.12	1	0.53
17	Car buyers will still choose the peak performance, even if t	17	1	0.56	4	1.54*	1	0.41	-3	-1.30
29	For a family of 3-5 members 1 car is enough.	29	-2	-0.98	2	0.84	-1	-0.39	0	-0.00
39	By public transport you can comfortably get almost anywhere	39	0	-0.09	2	0.77	0	-0.10	-2	-0.53
24	Those with higher incomes have the duty to drive the least p	24	-1	-0.32	1	0.43	-2	-0.65	-3	-1.28
6	We must accept that traditional cars shall be excluded from	6	-2	-0.82	1	0.39	-3	-1.25	3	1.30
21	Everyone in Budapest should be obliged to buy a public trans	21	-4	-2.03	-2	-0.70*	-4	-1.79	-4	-1.77
30	The car is not something that a person lends.	30	-1	-0.57	-3	-1.32	0	0.14	1	0.49

Distinguishing Statements for Factor 3

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
38	The bigger and more expensive the car is, the greater the re	38	-3	-1.11	-2	-0.89	4	1.96*	0	-0.04
3	Public transport is inferior to using your own car, even if	3	-2	-0.95	-4	-1.49	4	1.80*	-1	-0.30
7	Street parking fees in Budapest are unrealistically high, bu	7	-3	-1.21	-1	-0.44	3	1.56*	0	0.06
23	The longer the time you spend in the city center, the more i	23	3	1.40	3	1.36	-2	-0.47*	2	0.75

Distinguishing Statements for Factor 4

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
5	Traffic jams can be eliminated by introducing an appropriate	5	0	0.16	1	0.36	1	0.17	4	2.04*
6	We must accept that traditional cars shall be excluded from	6	-2	-0.82	1	0.39	-3	-1.25	3	1.30
12	People do not even think about how much it costs to maintain	12	0	-0.23	0	0.35	-1	-0.36	3	1.30
38	The bigger and more expensive the car is, the greater the re	38	-3	-1.11	-2	-0.89	4	1.96	0	-0.04
4	If the local government would only allow electric cars in th	4	2	0.68	3	1.42	2	0.82	-1	-0.49*
35	Old, less modern vehicles shall be punished by a higher tax.	35	1	0.56	1	0.45	2	0.84	-2	-1.00*
17	Car buyers will still choose the peak performance, even if t	17	1	0.56	4	1.54	1	0.41	-3	-1.30*
31	If the taxi was cheaper, more people would leave their cars	31	3	1.10	-1	-0.49	-1	-0.41	-4	-1.79*

Consensus Statements -- Those That Do Not Distinguish Between ANY Pair of Factors.

All Listed Statements are Non-Significant at P>.01, and Those Flagged With an * are also Non-Significant at P>.05.

			Factors							
			1		2		3		4	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
1	The developed countries should support the public transport	1	0	0.16	0	0.34	3	0.94	2	0.98
11*	The urban traffic jam is no problem in terms of time, becaus	11	-3	-1.32	-3	-1.16	-3	-1.53	-4	-1.53
16	Most of the customers of electric cars choose them not becau	16	0	-0.15	2	0.53	1	0.30	0	-0.26
22	All adult family members should maintain their own cars to e	22	-1	-0.61	-3	-1.24	-3	-1.03	-1	-0.49
28	Speed limitation is important and can save lives.	28	4	1.46	4	1.45	2	0.76	4	1.53

QANALYZE was completed at 17:00:34