

Not too small to fit us all but too small to provide us with enough food, clothes, electronic devices, housing and, of course, cars for everyone. A while ago, my students and I calculated for how long the amount of oxygen in the atmosphere would last if the process of photosynthesis stopped completely and nature was not able to recreate the oxygen constantly being used by the civilization of wasteful primates.

We used global statistics of fossil fuel consumption (gas, oil, coal), calculated molar mass of a simple chemical reaction $C + O_2 \Rightarrow CO_2$, and then calculated the volume of the atmosphere and the mass of oxygen accumulated in it. We omitted oxygen dissolved in the oceans, oxygen consumed by humans, animals, wildfires, etc.

Simple calculations showed that if plants stopped performing photosynthesis, for example as a result of a volcanic eruption and a subsequent dispersal of volcanic ashes, we would run out of oxygen after merely a decade. By run out of I mean that oxygen levels in the atmosphere would go down from 21% to 18%, which is equal to the concentration of oxygen in the expired air (!) and we would suffocate. If we went further with this simple experiment, it would turn out that oxygen would run out completely after fifty years, which would regress the development of life on Earth by around 3 billion years. Dispersal of volcanic ashes shading sunlight might really happen as it already did in the nineteenth century in Iceland and Ireland affecting the potato crops and causing famine.

However, in the meantime we would produce such an amount of CO₂ that before the oxygen would run out, we would be killed, or rather fried, by the greenhouse effect. Forests, so greedily logged both in the Amazon and in Poland, capture said CO₂ and convert it to oxygen we so desperately need to live. But each year, as the deforestation continues, they can capture less and less CO₂.

How do we use cars?

If we were to analyse the economic and ecological impact of different means of transport, we would soon discover that using any vehicle bigger than a bicycle is a sort of over-exploitation. For this reason, the author of this article, when in Warsaw, never uses anything other than his bicycle (or metro), even in minus temperatures. My belief system just doesn't allow me to drive a car in the city and now I will explain why.

It is an economic and ecological paradox, that in order to move by car 50-100 kg of our own bodyweight from point A to point B, we drag along a ton of steel, that is around 10-20 times more than we weight ourselves. There is a clear contrast with a bicycle which weights 10 times less than we do. And we make that ton of steel accelerate and then stop dozens of times during one trip, which consumes a great amount of energy and emits proportional amounts of CO₂ and other greenhouse gases. Similar disproportions can be seen when we compare how much road space one human being occupies when travelling by car (up to 100 sq. m, depending on the speed), by bus or by bike (a couple of sq. m) or by train (zero).

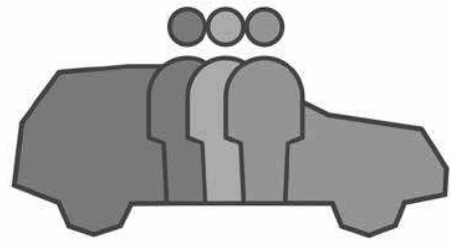
What is even worse, we usually travel by car alone. Reports state that in Poland, cars are usually occupied by 1,3 persons which means we use only about 30% of their capacity. We can see, when stuck in everyday traffic, that in the majority of cars the driver is the sole passenger.

Therefore, using a car seems to be an environmentally irresponsible manifestation of consumerism. No other animal consumes as much as homo, allegedly sapiens. We should applaud everyone who chooses a bike over a car for their daily commute.

However, in the suburban areas there is no sensible alternative to a car. Although more and more bicycle paths are being built, not everyone has enough strength and motivation to ride a bike to work every day no matter the weather or season.

For that reason the way we use cars should be changed. Driving a car alone results in heavy traffic,

Traffic jams are a serious environmental and economic issue with which we have been dealing for the past 50 years. Without great success. The issue is becoming more and more serious with every decade as the Earth's population keeps growing and our planet is becoming too small.



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Let's reduce traffic, get to know the neighbours and protect the environment together!

Piotr Krupa-Lubański

especially in the mornings, when everybody commutes to work or school and in the evenings, when people return home.

Nationwide research conducted by different Polish universities and consulting companies shows that traffic jams result in significant time and money waste. An average person living in a big Polish city wastes around 8-10 hours (!) a month while being stuck in traffic. It is almost one day that could be spend working, having fun or enjoying family time.

Financial losses are also significant. Specialists estimate that people driving every day to the city centres in heavy traffic lose 3-5 thousand PLN yearly (in gas expenses, time wasted etc.). It equals to around 2 full refuels per month. It is an easily noticeable amount of money and that is why it is worth to deal with this issue.

The project of the DEMOK Foundation, www.DojazdyRazem.pl, is focused on providing the residents of suburban areas with an online and mobile system designed for quick, semiautomatic scheduling of everyday car rides from the neighbourhood to the city centre, work, school, shopping centres or to the nearest train station.

The project aims to minimize the number of cars leaving the suburban area every day and to make the process of car-pooling coordination faster and easier than in already existing applications. Whenever possible, the whole process should be automatic, so that it does not engaged the user, but at the same time follows user's directions.

The first step when using our system is to add all our friends and neighbours who are registered in the application (or to invite them if they are not). People who we know well in real life can be marked as "close friends". The system will match us with them automatically if we are going in the similar direction at the same time.

Users can be labelled either as drivers who announce their routes (by offering seats in their car) or as passengers who can post requests such as "Who will give me a ride from point A to point B tomorrow at a given time?".

To make the reservation process quick and easy, the system's searches are based mainly on people marked user's friends, that is people who the user already knows or is willing to meet because they live (and, often, have lived for many years) in the same town.

Matching drivers and passengers is not the only feature offered by the system. If the database includes two drivers' announcements with similar destination and time, the system will suggest that they go together and leave one car at home. If a driver declares in advance they are willing to leave their car and go with someone else, the system will automatically match them with a neighbour who has to drive their own car that day. By neighbours we mean people who live within a distance of a couple kilometres from each other.

What is important, on the one hand, the system will maintain users' security, for example by collecting such data as rating of driving style; on the other hand, it will not collect any sensitive data. The system will not require users to provide their home addresses, it will neither turn on the GPS in mobile phones, nor record users' locations in any other way.

In order to schedule a given ride, users will use virtual stops – places which are well-known and characteristic in an area, for example a post office, a school, a church, a train station, a shop or a café. Places which everyone knows or which are easy to identify. Users will mark their routes from their chosen "stop" in the starting town to the

appropriate "stop" in their target city. To maximally shorten scheduling of the everyday rides, at the beginning the system will allow users to define the list of their standard, recurrent routes, such as home – work/university, horse riding lessons, swimming pool or a shopping centre. Then users will only have to specify in the system's calendar when they need a given ride. In this way, users can create a schedule of rides for the whole month in only 5-10 minutes. Thanks to that feature, later on matching people for car-pooling will take about 20-30 seconds, or will even be fully automatic.

Transaction costs

Reducing the time needed to catch a ride is the essence of the whole internet revolution. From the beginning of the century, the aim of all the websites, shops and systems was to reduce transactional costs (it's an economical term) we all incurred when booking a hotel or a flight, buying theatre tickets or shopping. The first successful start-up created by the founders of DojazdyRazem.pl was eBilet.pl, managed by them from 2001-2009 and seized by Allegro in 2019 in an atmosphere of a scandal – but that is a whole different (crime-like) story (read more at eBiletHistoria.pl).

Before eBilet was launched, transaction costs of buying a ticket to the theatre included circa 2 hours for commute as well as gas and parking costs which, depending on how much our time was worth, equalled from few dozens to few hundreds PLN in today's money worth. Nowadays, it takes around 10 minutes to buy a ticket online and instead of paying for gas we have to pay some booking fees, which is still a good deal if we live far from the theatre. There are many more examples of how transaction costs can be reduced.

Using already existing carpooling applications required us to spend at least one hour to find a ride. Most of this hour was spent verifying other participants of the future trip. The creators of DojazdyRazem aim to reduce this time to under a minute, given the simple fact that everyday commute to work or school is repetitive and involves the same people every day, people who after a couple of rides should get to know each other quite well.

Benefits for the users

According to our estimations, the cost of fuel required to get to a city centre from a distance of 20-30 km should amount to 5 PLN a person, as long as there are three people travelling in one car. If there are only two people in one car, and we take into account not only fuel but also car depreciation, the cost would rise to 10 PLN.

This is still nearly 10 times cheaper than taking any kind of uber to or from the city centre to the suburban area. We only have to cover car costs, without paying the driver for their time as we are driving in the same direction.

The cost of a ride is the same, or even a little bit cheaper, than for example trying to get from Podkowa Leśna to Żoliborz by WKD train (8 PLN) and metro (3.40 PLN); furthermore, going with your neighbour might be also faster and more convenient. It turns out that even with the raise of gas prices, travelling by car is still cheaper than using public transport, providing that we are commuting with other people. Who would have thought?

If we go further in our calculations, we find out that the driver who will regularly give rides to 2-3 people will gather enough money to not only cover all fuel costs but also to finance other expenses

involved in car maintenance: 20 days x 2 rides x 2 people x 10 PLN = 800 PLN. The cost of forty rides on the distance of 25 km equals to the cost of fuel needed to travel 1000 km in the city, so let's say 10 hundreds km x 8 litres x 8 PLN = 640 PLN. Therefore, fuel costs are reimbursed and additionally the driver can save 160 PLN a month for insurance, technical reviews and repairs. There is a 20% margin of error in these calculations, which might cancel the surplus amount. But the results of shared commute microeconomics is still pretty good, isn't it?

The passengers who up until now commuted alone in their own cars will also save money as sharing fuel costs with other passengers will amount to about 30-50 % of their present expenses. It may seem like not much, but monthly or yearly it will add up to a considerable sum of money. Apart from that, the satisfaction of leaving a car in the garage and relieving the environment from one more oxygen-consuming CO₂ spewing machine is priceless. It brings to mind a well-known in Poland brand of cargo tricycles, which can be used to transport one's purchases from shops to home or to take small children to school, neatly named "one car less" ("jeden samochód mniej, written together with .pl at the end). Speaking of children, the system provides a special kind of profiles for them, which will be managed by their parents and will allow children to catch rides with people who are marked as "close friends" by their parents, that is with people who are trusted.

We all know how much time it takes to drive children to school or to different extracurricular activities. Yet it would be so easy to share this responsibility with friends and to play a role of a "school bus driver" only once or twice a week, and not five to six times. The situation is the same when it comes to weekend activities such as horse-riding lessons, swimming lessons or tennis. The first obvious choice should be a bike. When it is impossible to ride a bike, the "microcollective" transport should be an answer. Even small towns, in which a bike could be a sufficient mean of transport, are full of traffic. People are used to the convenience of going everywhere by car and as a result even a couple kilometres trip to a store causes traffic jams on weekends in such garden towns like Podkowa Leśna, Brwinów, Milanówek and many more. It is high time to do tackle this issue.

One time I was driving to the centre of Warsaw in a rush hour with a friend from the Netherlands. Upon seeing that in the majority of cars there was only one person, he remarked that Poland must be a really rich country.

I wonder if it is possible to convince any Polish people to forgo the intimacy and comfort of commuting alone in their own car in favour of a pleasure of getting to know and talking to their neighbours. Maybe improving neighbourly relations and saving the environment are worth it?

Payment methods

What about payments? In this matter, the system will allow users to choose their preferred method. The driver will have to post a price for a ride (it will be visible on the car seat in the booking form), then the passengers will pay the driver by cash or by money transfer. The owner of the car sets the price for a given route, and the passenger can either accept or reject the offer. We assume that the system will support carpooling among neighbours and

not commercial rides (or they will be easily distinguishable). This means that the price for the ride will be visible in the booking form. Additionally, the passenger will be able to enter in their profile the information about the maximum amount of money they are willing to pay for a ride, which will allow the system to filter the ride offers accordingly. The system will also allow to settle the payments without money by using a method developed for another project of our foundation - www.wzajemniak.pl.

If both sides declare this payment method in their profile, the system will automatically add in the driver's account for example 5 or 10 points (as 10 PLN), and in the passenger's account deduct 10 points.

The driver will then be able to use their points to pay for a ride with someone else. This type of transaction might become a popular solution among close friends. The payments will not be mandatory, and the system will neither charge any additional fees for scheduling rides, nor interfere with payments between drivers and passengers. What is more, the payments will not be recorded in the system (apart from potentially registering the points). It is worth mentioning that the neighbourly help is not taxed according to the Polish law, which means that pitching in for the shared commute to work (with cash or points) is the same as sharing a bill at the restaurant.

When it comes to the IT system and its maintenance, as well as moderation, they will be financed from the subscription fee. How high will it be? We assume that it will be 5 PLN a month which is the same amount a user would pay for one short ride. The first months will be free of charge, and inviting friends will be rewarded with additional months free of charge. We also hope to receive financial support from the municipalities and communes in which the system will be implemented.

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If you would like to support this project, please visit:

www.DojazdyRazem.pl

wzajemniak.pl