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Travel Speed

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Definition

Short definition

Speed of travel is the relationship between the traveled distance and the time it takes for an individual to travel it.

Long definition

The increase in travel speeds is a new phenomenon in human history. It began with the first industrial revolution and has continued to develop to the present day: nowadays, within one hour we can travel several hundreds of kilometers by train or plane. Therefore speed became linked to the idea of progress. After all, hasn’t the course of history been directed at always achieving greater speeds, as evidenced today by the promoters of space travel or futuristic trains and planes? The answer to this question isn’t obvious, because the quest for speed faces certain limitations: physical of course (air resistance, energy consumption) but also social and economic. From a social standpoint, road speed is now being questioned. Speed limits are routinely lowered to reduce accidents, but also to tackle noise, pollution and congestion. For large distances, speed has become the hallmark of collective transport with trains and planes. Yet one question is worth asking: why didn’t supersonic aviation replace subsonic aviation? To answer this, we must put the importance of physical speed into perspective, as it will only benefit a large number of users if the ability to buy mobility is democratized, i.e. if the amount of kilometers that a person can buy with one hour’s work is worthwhile. This relationship is what we call economic speed. Concord, for instance, had a very low economic speed, as will future trips to Mars or to the Moon. It is therefore necessary, along with philosophers, sociologists and economists, for us to question the limits of this quest for speed. Because, contrary to what we may think, increasing speed doesn’t really reduce the amount of time people spend traveling, rather it increases the distances they cover in order to seize new opportunities for encounters or activities. Indeed, faster travel speeds allow us to manage time more intensively, leading to greater space consumption and, in the end, to greater constraints in organizing our activity schedules. This is the case, for instance, with people who commute daily over dozens of kilometers to go to work and have to be back on time to pick up their children at school or the nanny’s house. The same goes for improving economic speed, which has been the major trend of the last decades. The average speed of planes, trains or automobiles hasn’t changed much since the 1970s, but their economic speed has boomed - this trend continues today, so much so that it is coming into conflict with the goals of the ecological and energy transition. Will there come a time when we have to stop thinking that progress means always trying to go faster?

Development

I. Speed of travel: the hidden face of the industrial revolution

Long-distance trips have always taken place throughout history. The Carthaginian Hannibal and his elephants attacked Rome through Spain; Julius Caesar went to Gaul but also to Egypt. The time scale of these trips was very different then as the speed of travel was the same regardless of the length of the journey. Going to Compostela from Paris took several months - this was no longer the case after the industrial revolution, which was also a transport revolution.

a. The low-energy efficiency of human or animal traction

For centuries, land transport was as fast as men or animals (horses, oxen, dogs...) could go. Traveling took time, whether for short or long distances, especially if there were natural barriers to overcome. But one of those obstacles turned out to be a precious ally: water. Indeed, river and sea navigation played a central role in the history of mobilities, that historians captured in a simple formula: in the pre-industrial world, “land separates and water brings together.” That explains the emergence of the Roman Empire around the Mediterranean, or the saying that Egypt is a gift from the Nile or why most European capitals were established on riverbanks. Archaeological excavations show that two thousand years ago already, merchandise was regularly carried from northern Europe to the South. The key variable in all this is the source and amount of available energy. On water, you could leverage the winds and currents, and if they failed, you still had human or animal power: rowers in galleys, or horses on the Roman roads and towpaths. This energy is limited, however, because humans are very “low-yielding machines:” in order to survive, they must each consume the equivalent of 5 kW/h per day, for a net energy production of merely 0.5 kW/h! On the galleys of Louis XIV, rowers could only row at full speed for about 30 minutes before needing food and water. This is why in the Middle-Ages, whatever industrial advances were made, they didn’t lead to any real industrial revolution or a general rise in living standards. The daily life of a French peasant during the “Great Century” was not too different from that of his ancestor back in the Carolingian era. Their range of travel was limited to places within walking distance and only the wealthiest had access to the luxuries of horsepower.

b. Nineteenth century: the steam engine and railroads are game changers

The invention of the steam engine and the development of railroads is truly what changed everything, igniting a revolution that Marx[^1] summarized in the following way: “The windmill gives you society with the feudal lord; the steam mill, society with the industrial capitalist.” Although this may be pushing technical determinism too far, there is no doubt that the steam engine, leveraging heat from wood or coal, greatly increased the amount of available energy. Yet, the revolution didn’t happen overnight, and it would take another century for the first "fire machines" of the late seventeenth century to lead to James Watt’s patent (1769) and nearly 60 years to give rise to high-performance locomotives, using the tubular boiler of Frenchman Marc Seguin (1828).

It is worth remembering that the idea of a railway – using a metal wheel on a metal rail, which in itself is counter-intuitive due to the risk of skidding – appeared several decades before the first locomotives. So-called “dry channels” consisted of railroads on which horses pulled carts with metal wheels whose low resistance on the rail track allowed for greater efficiency than towing barges on water channels. But at this point, it still remained a slow mode of transportation. Replacing horses with steam locomotives was the fundamental revolution, because the important increases in

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speed significantly reduced journey times. As a result, the average duration of a train journey between the 231 largest French cities, at an average distance of just over 410 km, dropped from 31.6 hours in 1860 (i.e. 13 km/h) to 12 hours in 1900 (34 km/h). Progress continued over the following century and in 2010, this average time had reached 4.7 hours, i.e. a speed of 87 km/h. The quest for speed had therefore become a constant feature of modern societies.

c. Twentieth and twenty-first centuries: ever faster?

The quest for speed has been a core feature in the history of transport as planes, trains and automobiles have continually increased their maximum speeds. As early as the 1950s, supersonic aircrafts were tested and later turned into commercial aircrafts. In 1960, in the United States, a car equipped with an airplane engine broke the sound barrier. From 1978 to 2007, the SNCF regularly improved on its own rail speed record, reaching 370 km/h in 1978 on the new Paris-Lyon line and then 574.8 km/h in April 2007 on the new LGV-East line. Recently, the Linear Chuo Shinkansen, built in Japan, exceeded 600 km/h and there are currently plans in California for a futuristic transportation project called "Hyperloop" which would reach speeds in excess of 1,000 km/h.

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This fascination for physical speed makes sense in a world where income per capita has steadily grown. In France, it is now 40 times higher than before the industrial revolution. But this abundance clashes with the radical scarcity of time. Even taking increased life expectancy into account, our available time hasn’t grown at the same rate as that of our income. To use the words of Staffan Linder (1970), time has become the scarcest resource – just look at how often we check our watches and smartphones every day to see what time it is.

The speed revolution is therefore closely linked to the industrial revolution, because it was these time-savings coupled with increased purchasing power that enabled people to deploy throughout time and space a more varied schedule of activities. As such, speed and purchasing power are closely related in what deserves to be called the “mobility revolution.” According to the figure below, we could even say that there is a practical correlation between increasing income, increasing distances and

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increasing average travel speeds.

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This graph plots the real GDP per capita on the x-axis against the annual distance traveled per inhabitant in the y-axis. For each country or region, the points represent the evolution, per capita, of the GDP-distance ratio from 1950 to 2005. The correlation between the two variables is almost perfect. A 1% increase in living standards brings about an equivalent increase in traveled distance[^2]. Given that during this period, people’s travel time budget (TTB), which is the time spent traveling each day, remained stable (about an hour a day), that means that the speed of travel grew alongside the traveled distance. Will the same occur in the coming decades? Will we keep going faster and further, leveraging the speed of supersonic planes, rockets or trains “flying” in tubes at 1,000 km/h? This question means analyzing both the technology on the one hand and the gains in purchasing power on the other. But instead of doing this separately, both variables should be joined in a single indicator of people’s “purchasing power for speed,” or what we might otherwise call “economic speed.”

II. Speed and value of time

a. Effective speed

The fact that increased speeds and the growth in purchasing power are the two key factors of mobility leads us to consider them simultaneously. In fact, this is what economists have been doing for several decades already, with the concept of generalized cost. For them, when people have to choose between several modes of transport, they take into account the monetary costs but also the travel times by actually attributing value to that time. By adding these two cost factors - monetary and temporal - we get the generalized cost. On the basis of this micro-economic tool, centered on individual choices, we can construct an indicator - the effective speed - designed to help understand collective choices by stressing the importance of economic speed. In his book, *Energy and Equity*, Ivan Illich, a major player in the rise of political ecology, claimed: “It is time to recognize that, in the field of transport, there are speed thresholds which must not be exceeded.” To support this critical viewpoint on modernity, I. Illich and J.-P. Dupuy[^3] pointed out that, if in order to establish the generalized cost time is converted into money, then the reverse is also possible. From the monetary units of the generalized cost, it is possible to calculate a “generalized time” that would include the amount of transport time and work time necessary to pay the monetary cost of the trip. Then, by relating the traveled distance to this generalized time, we can apply the conversion into another unit of value, i.e. speed, measured in km/h[^4]. For these theorists, this calculation method had the potential to challenge the supremacy of automobiles, that at the time were given an average effective speed of 6 km/h. Once all the constraints were taken into account (purchasing, maintenance, use...), a car’s speed would barely be greater than walking, and much less than using a bicycle or taking the train. As we will see later, while Jean-Pierre Dupuy (who was already aware of the limits of his theoretical model) and Ivan Illich had an interesting hypothesis, technical and economic evolutions partially proved them wrong: the effective speed of a car for intercity travel is today much higher than that of a bicycle, even for a person earning minimum wage. But the main contribution of their reasoning is that effective speed is a harmonic mean, within which the higher the physical speed gets, the less impact it has (Crozet 2017). Even if the physical speed became infinite, it would only marginally change the effective speed. At current speed thresholds, in particular with the development of aviation, the only relationship that still matters is the one between the cost per kilometer and purchasing power - in other words, economic speed.

b. Economic speed

The concept of economic speed answers one simple question: how many kilometers can I travel for an hour’s worth of work? It’s the economic component of effective speed[^5]. If subsonic commercial aviation has rapidly grown for decades while Concord disappeared, it is because the economic speed of supersonic aviation is much lower than that of subsonic aviation. Concord’s speed was more than 2,000 km/h, which is 2.5 times faster than a conventional aircraft, but the ticket price was nearly 20 times higher. In 2001, the 12,000 km Paris-to-New York round trip on Concorde cost almost 12,000 euros, which equates to 1 euro per kilometer. For a minimum wage worker at the time, earning a net hourly rate of around 6 euros, the ticket cost 2,000 hours of work, which meant an economic speed of 6 km/h. Even for people earning ten times the minimum wage, the economic speed was only 60 km/h, whereas with conventional planes (return flights costing around 600 euros, averaging

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5 cents/km), the economic speed was 1,200 km/h - and for the minimum wage worker, it came to 120 km/h. The same mechanism worked in the case of cars: just like subsonic planes, they imposed themselves thanks to the growth of their economic speed. But if the increase in economic speeds is appreciated by car drivers and plane travelers, is it good news for society as a whole and especially for the environment?

c. Socio-economic speed

Contrary to popular belief, the purchasing power of one hour of minimum wage work in terms of liters of gas has more than doubled: it was 3 liters in 1970 and more than 6 liters in 2017. Since the unit consumption of vehicles almost halved, the relative cost of one kilometer by car was therefore divided by 4! Another sign of this decrease in the relative cost of cars is that the weight of road fuel expenses on French household budgets dropped from 3% in 2007 to 2.3% in 2017. Of course, this average hides some disparities. A minimum-wage worker who travels 70 km every day to go to work spends almost 10% of his salary on fuel. A sudden rise in gas prices therefore has a real impact on modest incomes. With the Yellow Vest movement, rising fuel prices revealed the reality of automobile dependence (G. Dupuy), a phenomenon that is reinforced by the upward trend of its economic speed and thus the democratization of access to individual cars. The fact remains that car traffic poses several problems, in terms of the environment of course, but also in terms of quality of life and infrastructure. To account for the so-called external costs of transport, we can calculate a “socio-economic” speed where the cost of a traveled kilometer takes into account the costs incurred by the user but also all the indirect costs borne by the community (noise, pollution, safety, infrastructure...). The next graph connects these costs to revenues generated by the community on road traffic, in particular through fuel taxes. The difference between the two is presented in the last column. What it shows is that for intercity trips and trips in rural areas, cars and trucks cover their marginal external costs. But in urban areas this if far from being the case, even for electric vehicles as they don’t pay fuel taxes.

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Source: Y. Crozet and M. Koning, 2018, Les effets externes des transports : définition, évaluation et implications pour les politiques publiques, Note pour le conseil scientifique de TDIE, 35 pages. www.tdie.eu.

These results can be integrated into the calculation of economic speed. Thus, from the standpoint of a car-owner earning three times the minimum wage (24 euros per hour), driving a car by yourself for a trip within Paris, at a private cost of 25 cents per kilometer, corresponds to an economic speed of 96 km/h. With one hour of work, this person can buy a 96 km trip. This result explains why the use of cars in urban areas persists. However, if it is a diesel car, the public cost of which isn’t covered by taxes, this amounts to 6.81 euros per kilometer, which equates to a social cost of 7.06 euros. By analysing this in relation to the hourly wage, we get a socio-economic speed of 3.4 km/h[^6]. It is therefore understandable why most big cities seek to reduce or even eliminate diesel cars. There is therefore a huge gap, in urban areas, between the individual perception of economic speed and the collective measure of socio-economic speed. In this case we come back to Ivan Illich's harsh observation on cars. Given the social costs they require, the socio-economic speed of cars in an urban setting, from the community’s point of view, is much lower than the economic speed is for the individual user. It’s worth noting that even for electric cars, the socio-economic speed in urban areas barely exceeds 10 km/h. In general, public policies are therefore focused on reducing the supremacy of cars in cities, regardless how they are powered. Socio-economic speed thus becomes a valuable indicator for collective mobility choices (Crozet 2013). There are indeed other cases where socio-economic speed is much lower than economic speed, such as some high-speed railway projects (LGV, for Lignes ferroviaires à grande vitesse) that would require significant public subsidies for low volumes of traffic. The ticket cost (about 10 cents/km) could end up being 5 times lower than the social cost (50 cents/km). For a person earning twice the minimum wage, while the economic speed of the TGV would be 160 km/h, the socio-economic speed would only be 32 km/h. We can therefore understand why such projects are supported by local representatives but abandoned or rejected in the framework of policies proposed by the government’s Council on infrastructure (Conseil d’orientation des infrastructures, COI 2018).

III. Promoting vs. condemning speed

The speed revolution was so staggering over a few decades that public opinion ended up associating the idea of progress with increasing speed. Indeed, many consider the lowering of speed limits on roads as regressive. Yet this fascination for speed, which is still very prevalent among engineers and public decision-makers, has long been a target of radical criticism. But in a way, those who promote speed, much like its

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critics in truth, aren’t looking in the right direction.

a. The fascination for physical speed

During the expansion of railways, in Lutezia in 1854, Heinrich Heine presents, from Paris, a romantic vision of the benefits of increasing speeds: “Even the elementary concepts of time and space begin to fail. Trains kill space, only time remains. It takes four and a half hours to get to Orléans, and just as long to get to Rouen. What will this bring about when the lines to Belgium and Germany are completed and linked to local trains? It seems to me that the mountains and forests of all countries are getting closer to Paris. I can already smell the scent of the German lime trees, and the North Sea is crashing on my doorstep.” Here we find both the old dream of ubiquity and the way in which romantic discourse maintains it through hyperbolic reasoning. The emerging railway industry and its real promise of increased speeds (Rouen is now less than an hour and a half away from Paris) point to a complete abolition of distances, meaning infinite speed, which is undoubtedly an exaggeration! It is this dream of ubiquity that today fuels the various projects of supersonic planes, flying cars or trains approaching the speed of sound. Engineers only have to speculate on such ideas for them to be portrayed in the press as future realities. Without going so far as to aim for the abolition of distance, the theme of saving time through speed remains central to many projects, both for engineers and for public decision-makers or motorists. Couldn’t the TGVs, with the same technology, travel at 350 instead of 320 km/h? Couldn’t motorways be widened so as to allow for speeds of up to 130 km/h, or even 150 km/h? How many drivers dream of being able, at least once in their lifetimes, to drive at 200 km/h on German highways where there is no speed limit? From an economic standpoint, this passion for speed makes sense. Speed enables people to address a simple problem, namely the asymmetric relationship between time and money. With time we can get money, but even with a very high income, we can’t buy time. Days last only 24 hours and years 365 days. On the other hand, with income we can buy speed and thus enrich our schedule of activities within a given time period. This is true in the field of transport, but also in the field of telecommunications. The Internet enables us to find information, exchange documents, make purchases and even meet romantic partners more quickly. The incredible success of smartphones on a global scale is, of course, linked to their decreasing cost but also to the time they can save. But just as with speed, we can legitimately wonder about the possible adverse effects of this constant quest for greater speed.

b. Criticizing speed and “acceleration”

Criticizing speed and its impacts on people’s lifestyles is nothing new. In his fables, the ancient Greek writer Aesop (620-554) praised the wisdom of the country rat which, to paraphrase the famous words of Cervantès, “gave time to time.” 600 years later, the Roman poet Horace (65-8) repeated this as would Lafontaine another 1,600 years later. Indeed, the country rat bemoans the rush of city life and reminds us that, where he lives, “at my leisure still I eat, There’s nought to damp my cheer.” This criticism of acceleration resurfaced just as the first railways were emerging. In 1825, in a letter to his nephew Nicolovius, J. W. Goethe, who by this time had already published the first versions of Faust, developed the same themes as H. Heine, only 30 years earlier and from a diametrically opposite perspective: “To the greatest misfortune of our time, in which nothing can ripen, I observe that we swallow each moment as it comes, that we waste our days and always live day by day without any gain. [...] As such, we go from house to house, from town to town, from empire to empire and from one far corner of the world to another, all in “velociferic" fashion." Velociferic is an English translation of “veloziferisch,” a portmanteau word coined by Goethe that combines speed (from the Latin velocitas) and the Devil (from the German Luzifer) – a term he would later use on several occasions in his letters and that was further regularly quoted by authors criticizing the acceleration of modern life. Indeed, philosopher and sociologist Hartmut Rosa (2010) developed a critical approach to the universal phenomenon of acceleration, seen as central to the idea of modernity. He calls for a social critique of the uses of time and of the intensification of activity schedules. Could our constant hunger for “even more and even faster” be a form of alienation, the fruit of a conditioning that undermines the very notion of free will (Sansot 2000)? This approach is in line with the critical analyses of the consumer society (Dupuy and Robert, 1976). In this school of thought, the question of time scarcity was addressed very early on. Already in 1975, J. P. Dupuy published a critical note entitled "In search of gained time" (*À la recherche du temps gagné*[^7]). Based on Illich’s concept of effective speed (see above), he pointed out that trying to save time, particularly by increasing speed, turns out to be costly in terms of working time. Indeed, if we try to feed this constant hunger for more, do we not risk losing our lives trying to make a living? Do we not risk spending more time working to buy and maintain a car than the amount of time it would save us?

c. When gains in purchasing power become a problem

The problem with this reasoning is that it does not stand up to scrutiny. As Frédéric Héran or Vincent Bagard have shown, far from decreasing, the effective speed of cars has steadily grown in recent decades. As mentioned above, the relative price of fuels and cars has declined, as has the amount of time spent at work. Sociologist Jean Viard even showed that during the twentieth century, in France, the amount of free time in a lifetime rose from 100,000 to 400,000 hours. But this did not give rise to a society of leisure and spare time as foretold by Joffre Dumazedier over 50 years ago. Despite a significant increase in available time, we are well and truly subject to a movement of acceleration. We often feel like we don’t have enough time, that we aren’t able to fully or properly carry out all our scheduled activities. The important thing to recognize here is that this feeling doesn’t come from any absolute time scarcity, where, as the saying goes, time would go by faster. The source of the problem lies in a relative time scarcity, as Gary Becker pointed out in his Nobel prize acceptance speech: “The most fundamental constraint is limited time. Economic and medical progress have greatly increased length of life, but not the physical flow of time itself, which always restricts everyone to twenty-four hours per day. So while goods and services have expended enormously in rich countries, the total time available to consume has not.” The problem is therefore first and foremost an economic one, stemming from an increase in purchasing power, and the fact that in order to optimize the use of this scarce resource of time, we become “hyper-mobile” (Crozet 2016). The study of people’s time budgets in France (INSEE) reveals that in order to address this issue, people have increased their awake time, now sleeping on average one hour less than their ancestors. This spare time “gained” from sleep and work, as well as the extra time obtained through longer life spans, has not been spent being idle, even if some of it has undoubtedly been spent looking at screens. What people’s activity schedules show us is that available time is increasingly fragmented between various activities. We come to observe the phenomenon of people "hopping" from one activity to another, as well as the development, with NICTs, of multi-tasking, like people watching TV while browsing the Internet on a smartphone. Increased economic speed doesn’t give us more time, it lets us have busier activity schedules.

IV. How to accommodate individual preferences and collective choices?

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As John Urry recalled[^8] with the new paradigm of the “mobilities turn,” societies have been totally transformed by the democratization of access to speed. With an average speed of 40 km/h, 8 times faster than walking, people’s management of time and space has been totally transformed. If new activities become accessible for the same travel cost, why not perform more activities, even if this means reducing the time spent on each one? This expansion of space, enabled by speed, comes with an intensification of activity schedules that is also mostly the result of gains in purchasing power. We have therefore entered a form of mobility dependence that expresses itself through extensive space consumption and intensive time management. But this individual preference causes perverse effects that complicate collective choices.

a. The “mobilities turn” and its implications

To understand the “mobilities turn,” we must remember that transport time is not, as economic analysis implies, a cost that we are always trying to lower. Statistically, this may be the case: for a given trip, reducing the TTB is a goal in itself. But dynamically, things are more complicated. In terms of activity schedules – daily, but also weekly or yearly – the goal isn’t to reduce the TTB but to improve the ratio between activities and transport times. Therefore, if an increase in speed leads to new opportunities (work, leisure, social relations, housing...), there will be a rebound effect and people will accept an increase in the TTB if it gives them access to better opportunities. As such, being able to use a car means significantly increasing the number of accessible places and activities that are achievable with a constant TTB and a constant or even decreasing monetary budget. This hypothesis of a constant TTB, one that isn’t decreasing due to a higher average speed, was put forward in the 1980s by two World Bank researchers, Yacov Zahavi and Antti Talvitie. They relied on statistics collected in a large number of cities in developed and developing countries. They also stressed that, in addition to time budget, the share of household budgets allotted to travel was also constant, despite the decrease in relative transport costs. This double constancy reveals a kind of reinvestment of gained time and purchasing power. If the temporal and/or monetary cost of mobility decreases, the result will be an increase in mobility. This is what has been observed with daily commuting in both urban and rural areas. Average daily traveled distances keep growing, just like the proportion of people who live and work in different towns. The vast majority of these trips are made by car, except in the Paris region. The same expansion of the space of mobilities was observed in the field of international air transport. In France, from 1992 to 2017, the number of passengers in French airports (international flights and overseas territories) rose from 42 million to 134 million. This increase of over 200% means that in 2017, on average, French people traveled over 11 km per day by plane[^9]. The average distance traveled per capita thus reaches 51 km per day, which is a 34% increase over 25 years, just like the gross domestic product. The question is therefore how far the space of mobilities can be extended. Can economic speed possibly continue to progress for all trips in the coming decades? For individuals, this would mean a permanent race against time, leading to a new form of alienation. From a collective standpoint, this requires continued economic growth and a relative decline in energy prices, which is at odds with the collective goals set forth in the context of environmental and energy transition policies.

b. Collective choices, scarcity of public funds and lack of space

The constant quest for greater speed first has to contend with the reality of decreasing yields. In order to save 2 hours between Paris and Lyon on the TGV, we had to double the train’s speed. But if tomorrow we were able to double that train’s speed again, we would only save 1 extra hour, and then only another half hour were we to double the physical speed once more after that. The consequence of this decreasing yield means that the costs grow increasingly out of hand. Since most transport infrastructures are subsidized, we have to consider not only the private cost of mobilities, but also the public financial cost that would be incurred to subsidize them. If many high-speed railway (LGV) projects are currently on hold, it is because they require very large public subsidies which, when invested for potentially modest volumes of traffic, would come at a very high social cost. The scarcity of public funds has led to a change in the priorities of public policies. Since the Mobility 21 commission (2013), the main challenge of the day is no longer to pursue huge railway, road or airport projects, but to prioritize the mobilities of daily life, the maintenance of existing networks and the desaturation of railway hubs. This change of course started several decades ago in many cities. While from the 1950s to the 1970s, everything was done to adapt cities to cars and widen traffic lanes by removing, for example, tram lines, the 1980s saw the emergence of a desire to reduce the amount of cars, especially in urban spaces where they were no longer a time-saver during rush hours. In fact, cars take up 5 to 10 times more ground space than pedestrians, posing a serious problem for cities where the most precious resource isn't time but space. Motorists, being solely focused on the duration of their journey, were therefore the least happy to see streets becoming pedestrianized or being narrowed and some express lanes turned into avenues with traffic lights. Collective choices had thereby clearly opted to challenge the reign of motorized speed in urban spaces. All this didn't lead to an outright ban on cars and despite the development of public transport, their presence remains non-negligible in the heart of major cities and is still clearly predominant in smaller towns. But most importantly, cars and the speed they offer have continued to rule in peri-urban and rural areas where space is abundant, and so in a country like France at least, urban sprawl has prospered, further reinforcing a dependence on cars and fossil fuels. Given this evolution, how can the ecological transition be achieved, as it will require that we consume less space and energy, in particular fossil fuels?

c. Economic speed and ecological transition

Within the framework of the Paris Agreement (COP 21), the European Union committed to significantly reducing its CO^2 emissions, in particular in transport. In 2014, transport represented 60% of emissions in the EU. The goal by 2030 is to reduce them by 30% compared to the 2005 levels. However, given recent trends, this seems a very ambitious goal, because while emissions dropped between 2009 and 2011 due to the economic recession, they increased again when economies picked up. As a result, in 2017, transport emissions in France were barely lower than they were in 2000. So while it is therefore possible to avoid increasing emissions, reducing them is a much more arduous task. Indeed, the EU's policies must contend with their own contradictions. For decades, in developed countries, transport policies have been based on the idea that all forms of mobility should be made available to the entire population. At the same time, the EU promotes greater competition, a key factor in reducing costs and increasing demand. That is what happened with air transportation, where deregulation led to a significant drop in ticket prices. For trips within the EU, passenger ticket prices now cost on average 5 cents per kilometer, which is half the cost of taking the train (10 cents) and five times less than driving a car (about 25 cents). It is therefore no surprise that the number of airline passengers is growing much faster than the amount of car traffic, which itself is growing faster than train traffic. In other words, the modal shift to trains isn't happening, whether for travelers or goods. It has therefore been discreetly abandoned by European policymakers who are now turning towards technical levers of action: reducing the

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unit emissions of CO^2 from vehicles (in particular by promoting electric vehicles) all the while increasing their fill rate. The problem is that this is precisely what happened in the airline industry over the last twenty years. And because it led to lower ticket prices, economic speed increased and traffic volume soared along with it. While aircraft CO^2 emissions have only slightly increased overall, they still represent 10% of all transport-related emissions, as plane engines still run on fossil fuels. To reduce the unit emissions of vehicles, we must therefore change their energy source. That’s why today there is much talk about electric cars and even electric trucks. To this end, the European Union is considering mandatory regulations for car manufacturers forcing them to continuously lower the CO^2/km emissions of all new vehicles put on the market. Several countries, including France, are even considering a total ban on the sale of combustion engine cars from 2040, so that the entire automobile fleet is fully electric by 2050. But what are the chances that such a scenario will become reality and, if it does, what would be its real impact on CO^2 emissions? These two questions deserve to be asked. On the one hand, the announcement effects on making the entire automobile fleet electric is reminiscent of those that occurred at the turn of the century about the modal shift... And on the other, the electricity consumed by electric motors may itself need fossil fuels to be produced, while the manufacture and recycling of batteries is also a source of CO^2 emissions. It is therefore highly probable that the transport sector will struggle to meet our collective environmental commitments by relying solely on technology. The remaining lever of action, therefore, is an economic one: letting go of our fascination for speed, both economic and physical, and refocusing on socio-economic speed. By comparing socio-economic speeds, we can determine the area of relevance of the different modes of transport. As such, cars are not optimal in urban spaces, but they remain necessary in rural areas. By the same token, public transport should be favored in urban spaces, while it is costly and not very useful in sparsely populated areas. Again, following the same logic, TGVs make sense for crossing several hundreds of kilometers on axes with high volumes of passengers or goods, but aren’t suitable for short distances or lines with little traffic. Socio-economic speed therefore sheds light on some recent developments in public policies in urban spaces and on the cancelling of certain large-scale projects, but not all of them. This indicator is still far from being included across all transport policies, insofar as policymakers refuse to accept that the indefinite growth of mobilities will have to be put into question. Will things change as we progressively come to acknowledge the growing contradiction between our climate commitments on the one hand and the promotion of mobility on the other?

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V. Future prospects

In recent years, public policies have sought to define the area of relevance of different modes of transport: prioritizing public transport and active modes in urban areas, cars for medium distances, TGV and planes for long distances. Meanwhile, measures are taken to reduce the external costs of transport. Reducing the maximum speed allowed on roads is clearly a way to reduce safety costs, but also, in dense areas, of noise and atmospheric pollution. The same applies to all regulations such as vehicle safety inspections or CO^2 emission thresholds. In the same vein, prioritizing collective transport or active modes in urban areas is another way of pursuing this goal of reducing the environmental impacts of mobilities. But public policies don’t call into question the general trend to increase the economic speed of different modes of transport, and therefore more generally to increase mobility. Given the commitments we made in the Paris Agreement and considering other impacts such as the degradation of biodiversity or the shrinking of available farmland, we will unquestionably have to take far more binding measures that challenge the very idea of a steadily growing economic speed. This could mean heavily taxing kerosene, or implementing congestion charges in major cities or steadily increasing the price of fossil fuels... Yet this simple list of suggestions is enough to show that such a change of course is unlikely in the short term. Socio-economic speed remains largely ignored. For cars, just as for taxis, public transport, TGV trains or airplanes, the current mindset is to do things low-cost, not to lower the economic speed!

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<!-- Notes -->
[^1]: K. Marx, *The Poverty of Philosophy*, 1847. [^2]: The authors of this graph chose a “log-log” model, where the x-variables and y-variables are logarithmic and not arithmetical. With the same distance on the axis, we go from 10 to 100 and then to 1,000, allowing us to directly compare the growth of each variable. The fact that the points are more or less aligned with the first bisector shows that the growth rates are similar. [^3]: See HÉRAN F., 2009, “About the effective speed of transport. An Ivan

Illich's concept revisited", *Revue d'économie régionale et urbaine*, A. Colin, 2009-3, July, p. 449-470. [^4]: Effective speed (Es) is thus defined as follows: Es=1/((1/V)+(k/w)) V being the average speed, k the kilometric cost and w the hourly wage. [^5]: This is only about taking into account the w/k ratio, i.e. the hourly wage compared to the cost per kilometer. [^6]: For a minimum-wage worker, the economic speed is 32km/h and the socio-economic speed is barely more than 1km/h. [^7]: *Interministerial bulletin for the rationalization of budget choices (Bulletin interministériel pour la RCB (Rationalisation des choix budgétaires)*, no 20, March 1975. [^8]: Urry J. (2008). *Mobilities*, Polity Press, Malden. [^9]: On the conservative assumption that an international flight is on average 3.000 km long and that two thirds of the passengers are residents.

Mots clés
speed
travel
transport
economy
Discipline
Sciences humaines
Sciences sociales
Économie, droit et gestion
Visuel

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Activer

Activé

Niveau de profondeur

Balise H2 + H3

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Désactivé

Auteur lié

Yves Crozet (Économiste)

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Concepts

History