

Developments in transport: Sustainable solutions?

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Abstract This article explains how sustainable the European transport policy, which is clearly part of the economic policy, really is. Some strong policy limits are concerned here and are proven to be unjustified. Next we explore a real sustainable transport system and its attainability. We conclude with some propositions for future technological design, which was in fact the starting goal of this paper.

Keywords freight, transport, sustainable, solutions, systems

I. INTRODUCTION

This thesis started with one question: ‘Can airships, better known as zeppelins, improve the congested and to environmental and social problems leading transport system?’. The question was relatively quickly answered – which was of course unexpected – because profound study at the University of Delft had already been executed [1]. Air ships didn’t meet the needs of the modern economic climate and also some sustainability problems were found. A second check of the mean reasons did confirm the conclusion.

Also technological evolutions in the other transport modalities were investigated then, but real sustainable freight transport was never attainable if transport volumes would keep on growing or even would remain as large as they are now.

This conclusion was the start of the further investigation of the economic reasons for transport and the European transport policy. Mean question had instead become: ‘Can transport volumes be reduced?’ or ‘Why can’t they be reduced?’. In the end we would then come again to the starting point of this paper and suggest interesting technological developments.

II. INSIGHT INTO THE PROCEEDINGS

A. Transport is growing

The growth of transport can of course be seen every day, but still some remarkable evolutions are recognized in Belgium and the EU-15 [2][3][4][5][6][7]: the number of tonne-kms grew even more than the economic growth in the nineties, the number of tonne-kms also grew more than the number of tons transported, the international transport also grew strongly and the modal split changed.

Of course these evolutions are not independent. They are all related to the changed economic climate. Mean reasons for the transport growth next to the growth of wealth, are the international spreading of the production-distribution chains and outsourcing, which is possible since the removal of the barriers against free transport of goods and services and free factor migration, and of course the technological evolution of transport modalities. Mean reasons for the changing modal split are the Just In Time principle of goods transport, the

growing transport of high value goods and also a transport policy without much vision [8][9].

B. Some problems caused by transport

The growth of transport is not without its consequences [10][11]. Some examples: the transport sector is the only sector that can’t control its greenhouse gas emissions; pollution is still a growing problem; congestion paralyses economy and society; transport infrastructure causes fragmentation of natural habitats and the quality of city live is under attack of transport. These problems are to be solved and were also the reason for the choice of this paper.

C. EU transport policy

The European Commission recognizes the importance of transport but also the problems and has published in 2001 its policy till 2010 as a solution [9]. The Commission states that more transport infrastructure is needed till an intermodal Trans European Network, chaping cohesion in the EU is accomplished. To make the use of transport and the modal choice more rational it proposes the internalization of externalities and tradable emission permits. At first, incomes would have to be reinvested in the infrastructure system and financial aid between modalities would help alternative modalities. Unfortunately, recent developments suggest these links are to be dropped [12].

III. REASONS BEHIND THE EU POLICY

A. Why not lowering transport volumes?

The reason why the Commission recognizes the importance of freight transport is of its economic value [9]. The provision of freight transport makes competition possible, which in turn causes social wealth. The greater the market that is connected, the greater the competition can become and the more wealth can grow. Also transport provides the possibility to make use of location benefits, scale benefits and scope benefits and thus provides more possibilities for lowering production costs and the growth of wealth [13].

This is the reason why the EU plays a mean role in the development of the European economic integration and of the globalization [13]. Also the EU tries to provide enough transport possibilities as this integration and the globalization need [9].

B. Why then internalizing more transport costs?

Although it seems like a paradox then the internalization of externalities causes an extra growth of social wealth [13]. This is because production quantities, which also concern transport quantities, should be defined by maximum social benefit instead of maximum company benefit. Without governmental interference this is not the case because the use

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of the externalities as a source and a sink (air, pollution, noise, climate change, natural habitats, infrastructure,...) despite of the health of nature and society is by nature or by governmental choice free.

The distribution of tradable permits, if possible, is even better, as it allows society to seek for the cheapest solutions and sees to possible rebound effects [14][15].

Reinvestment and financial aid between modalities are not necessary according to the economic theory to maximize social wealth. Perhaps those links can indeed be omitted?

IV. SUSTAINABLE TRANSPORT ACCOMPLISHED?

A. Important remarks concerning pricing instruments

1) Only charging is useless

The proposed links by the Commission are necessary for sure; reinvestment must even be seen with a broader view.

Financial aid between modalities is needed if one wants to give transport modalities with high long term marginal costs but low short term marginal costs a chance. This is the case for railway transport but also for new, in the beginning rather expensive technologies [16].

Important externalities like the lowering of the quality of city live, fragmentation of natural habitats or noise emission can only be solved by constructive projects. Even if transport charges would be set high so to reduce transport quantities, these externalities can and thus must be further reduced.

Even pollution and greenhouse gas emission, that can be reduced by technological improvements who become more interesting investments with the changed pricing policy, need constructive projects because they can only be reduced sufficiently by the hydrogen propulsion, of which the market introduction is unlikely without a transition management of the government [17][18].

Reinvestment doesn't necessarily come at the cost of high charges because projects can be spread over time, a lot of subjective decisions are necessary to monetize externalities and externalities can even be left out of consideration. However, high charges are necessary to limit further transport growth. Freight transport is characterized by a small price elasticity and innovation makes transport even cheaper, which makes it of course more interesting to enjoy the smallest location, scale and scope benefits. This would cause a strong need for large infrastructure systems at the cost of fragmentation and loss of human and natural habitats. Even if emissions are zero, this would not be sustainable [19][20].

2) Open economies and competitiveness

The internalization of externalities or tradable permits are not only necessary in transport but also in the entire industry as it is a key part in a sustainable economy [15]. However, a stronger environmental policy causes damage to the comparative advantages of the European market, leading to delocalization [15]. This in turn causes more transport problems and even more environmental problems instead of less. Also it leads to an unacceptable pressure on social attainments in Europe (see for example [21]).

This is why a strong environmental policy is impossible without also the calculation of externalities produced abroad of products and services that are consumed in the EU. An organization that accomplishes this is therefore indispensable.

B. How far is the EU willing to go?

1) Need for economic growth

The need for economic growth in the most developed countries is no longer the need for more products to consume. Instead a constant economic growth is necessary to create again the lost number of jobs by productivity improvement, otherwise severe problems would arise in social security. Also one has to accomplish an economic growth to keep up with other countries that do too, again in order to preserve the wealth instead attaining more wealth [13][15].

2) Strong limits to a sustainable transport policy

High charges may be lowering externalities they don't create extra jobs, only economic growth in term of GDP does.

It is unlikely that the EU will account also the externalities abroad because it would strongly lower cheap imports and also exports, as non-EU countries will try to block the EU products as a reaction. This would of course solve many problems (see IV.A.2), and would lower intercontinental transport which is good, but could also mean a lower economic growth, even a fall. But without that organization also higher charges on continental transport needed for constructive projects are less attainable because of the competitiveness of the European economy.

Instead of lowering transport volumes one creates even more for a different reason. Logistics and transport is also seen as a very attractive sector to create jobs [22][23]. All the spatial needs of the sector are therefore certainly solved by the government. This creates although more possibilities for delocalization of other companies and thus a loss of jobs.

3) Future transport system isn't sustainable

Continental and intercontinental transport volumes are not reduced, they are in fact even more created in an unacceptable way. The choice to attain a modal shift instead is also not sustainable. A shift towards rail and water creates a large expansion of infrastructure [8] which is still created for the transport growth because of delocalization and will be created for the future transport growth because of lower transport costs through innovation. No doubt the use of space will be the most important externality in the future.

One can say all these negative impacts are justified because of the fact that economic growth creates wealth. But then this economic growth is more of a preservation of social wealth than an accumulation [15].

V. A REAL SUSTAINABLE TRANSPORT SYSTEM

A. Why do we have to go further?

In fact this question is already answered by now. Even one can not say that the globalization is providing wealth in third countries [24]. They would in fact also be helped by a more regional focus on globalization [25] and a European organization that internalizes externalities produced abroad of products and services that are consumed in the EU.

Constant economic growth is also not attainable for infinity because markets can not be anymore expanded when welfare has equalized in the entire world and because of the natural saturation of consumption. The search for a solution for this problem seems much easier for Europe to do than for the entire world to do. This could also be an example for other continents.

B. Reorganization of the LoMo

The organization of logistics and mobility, and even of economic competition, needs to be rethought. First of all the calculation of externalities produced at home and abroad is necessary. This will cause less continental and intercontinental transport, but as said before, to limit transport also on the long term this is insufficient.

A more profound approach is needed. One can choose to limit transport volumes by limiting transport infrastructure together with a controlling congestion charge. A network, consisting of rail and road, provides the necessary cohesion in the EU. Big hubs need to be replaced by smaller hubs and better spread in over Europe. Maritime shipping, short sea shipping and inland water transport need to be fully interoperable to replace big seaports by smaller ones and more inland ports. Intra-European air freight transport needs to be replaced by rail transport and extra-European air freight should also be controlled by small and well spread airports, together with a congestion charge.

C. Attainability

The network mentioned above would of course be unattainable if transport volumes would remain high or even grow, but the goal of this infrastructure is in fact to lower transport needs. This is also possible because local economies and glocal economies can arise. Glocal economies are very interesting and are consisted of glocal companies which compete and design at a global or regional level but produce their products at local level [26]. Freight transport is hereby replaced with digital information transport and is possible as of today. The lowering of production costs is still possible by local cooperation with other firms or by automation but doesn't come at the cost of a strong need of transport infrastructure anymore. Glocal economies instead of global economies are also more at the level of local economies which provide more possibilities for the latter and the pursuit of economical, ecological and social performance [27].

The attainability for the employment is by no doubt the hardest problem to solve. Some factors create more jobs like lower production scale benefits and again local production, but some also cause the loss of jobs, like less transport and less production of goods because of the lower economic growth. But the possibility of a moderate and controlled economic growth should be the key goal in modern society. As said, constant economic growth is impossible. And without evading this need neither a sustainable transport system nor a sustainable society is possible. Glocal-local economies and a more regional focus on globalization are on the other hand two useful possible evolutions to higher the labor-intensivity in the economy again which was partly lost by delocalization. Also a shift from labor taxes to environmental taxes and consumption taxes could help of course and certainly more is needed also to see to the possibility of a lower labor activity in the future, such as shorter working hours or basic income [28].

This is the time one should investigate an integral economic and transport policy because they clearly support each other. Of course more research is needed but one can see the possibilities if transport and economic policy are matched with a long term vision.

D. Interesting technological innovations

No mass freight transport is needed; even no air freight transport is needed except for small extra-European postal packages. The reason is they do not match in a glocal-local economy. Instead one should focus on emission reduction, control of energy consumption, reduction of spatial needs, noise control, reduction of the social awareness of freight transport, efficient charging technologies and better spatial planning.

Interesting technologies therefore are the use of biofuels and hydrogen, hybrid rail-road networks with central energy systems and hydrogen fuel cells propulsion in addition, underground rail or even better hybrid rail-road networks in cities and satellite systems for charging.

E. The position of Belgium

Of course glocal-local economies have to be installed by the EU. Yet Belgium has some possibilities.

First, Belgium has to explore other economic sectors then logistics for creating jobs. Only then can freight transport be reduced in Belgium, which means less road transport, less big seaports and even no air freight transport in Belgium.

Concerning technological evolutions, Belgium can invest in underground hybrid city transport while funds are created with cordon charges. Belgium can also set up a transition management for hydrogen propulsion in a niche market as the rail sector.

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