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Kerosene Prices and Socio-Economic Change

Hans Geser
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It is highly probable that future air traffic will shrink due to higher fuel prices and unacceptable ecological pollution. Consequently, international trade will become deglobalized, giving way to more regionalized exchanges especially when flexible demands have to be met or "just-in-time-production systems have to be maintained. The thinning out of passenger flight schedules will particularly hurt peripheral locations and very large countries, and will have deep repercussions of tourism, labor markets and transnational organizations. While more transspatial communication will be transferred from in-person encounters to technically mediated channels, there is a danger of losing problem solving capacities where face-to-face interaction is necessary: e. g. in processes of international contact initiation, teamwork building, or negotiation.

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Prof. Dr. Hans Geser
h@geser.net
www.geser.net

Soziologisches Institut der Universität Zürich
Andreasstrasse 15, 8050 Zürich (Schweiz)
Tel: ++41 44 635 2310

1. The decline of air traffic as a realistic scenario

History teaches that most predictions about future technological developments turn out to be wrong, because they are too much inspired by current short-run developments, and because they underestimate the scope and impact of innovation.

Nevertheless, some forecasts can at least rely on high probabilities: for instance that computer chips will continue to become smaller and cheaper, or that fossil energy sources may rather become more scarce than more abundant.

In particular, it seems a sound guess that air traffic is more likely to shrink than to expand within the next decades, due to an unhappy combination of several adverse conditions.

Thus, Airlines were particularly hit by the fourfold increase in oil prices between 2000 and 2008, as the share of fuel on the total operating expense has jumped from about 15% to more than 40%.

Airlines are only marginally able to compensate higher fuel costs with tighter savings in other respects. Most of them have reduced passenger services already to a minimum, and expenses for technical supervision and repair cannot be lowered, because highest security standards have to be kept as a "conditio sine qua non" for the airline's survival. Thus, any further doubling in oil prices will make air tickets almost 50% more expensive, and low-cost carriers tend to lose their fundamental raison d'être because they are no longer able to offer much cheaper flights than their competitors.

Similarly, air traffic is most dramatically affected by all measure taken against global warming. While aviation is currently responsible for just 2-3 percent of man-made carbon dioxide emissions, it is one of the fastest-growing sources (a single flight from Frankfurt to New York causes about the same CO₂ emissions as all car rides during a year). In addition, these flight emissions are about 2.7 times more damaging than those of ships and cars, because they occur in the sensitive higher strata of the upper troposphere and lower stratosphere, five miles to seven miles above the Earth's surface.

While prospective trains may be driven by all types of renewable sources of electricity, future cars may switch to hybrid engines or hydrogen cells and coming ships to nuclear power, no such shifts toward eco-friendliness and sustainability fir air traffic are in sight.

As the Intergovernmental Panel on Climate Change concluded in its 1999 aviation study,

"There would not appear to be any practical alternatives to kerosene based fuels for commercial jet aircraft for the next several decades." (Penner et. al. ICPP report 1999).

Ships can save half of their fuel by simply reducing speed by about 30%; airplanes evidently can't do this because they need a rather high speed in order to keep themselves in the air.

For all these reasons, the aviation industry is highly vulnerable to kerosene price increases due to eco-taxes or to the need to buy Carbon dioxide emission allowances (as they are planned in the European Union after 2011). All these additional charges are not likely to promote major processes of technological innovation for saving or substituting fossil fuel, but will just translate into transport price increases of a similar magnitude.

As there is *"no such thing as "sustainable" or "low-impact" air travel"* (Hasbrouck 2003), flying is also likely to be most directly hit by any social movements and changes of cultural values concerning energy saving and the prevention of atmospheric pollution.

Thus, while flying may again become the privilege of wealthier social strata, it is not likely to regain the high prestige it had 50 years ago. To the contrary, jet-set people (as well as import products from far destinations) may become stigmatized or even vilified because they symbolize a lifestyle associated with negative ecological consequences.

Firms may be especially pressed to reduce their extensive business traveling because such travel has a huge impact on their carbon dioxide footprint - and because the economic necessity and profitability of such travelling can usually not be objectively demonstrated.

All these factors will coalesce to reduce air traffic, and their impact may well be additionally aggravated indirectly by their systemic effects on market structures.

In the last decades of cheap fuel prices, we have seen a "beneficial cycle" working: rising demand for flights has encouraged new carriers to enter the market, so that competition was intensified: resulting in falling prices and more densely woven connection networks - what again helped to increase demand and to induce further entries.

Symmetrically, rising prices are very likely to set a "vicious cycle" into motion: lower demand will cause many competitors to leave the market, so that more and more flight connections (particularly to second-and third order destinations) are controlled by monopolistic suppliers: with the well known consequences that prices will rise and flight schedules will be thinned out, so that flying becomes even less attractive and demand will be further reduced.

In addition, the need for governmental regulations will rise to levels known before the times of liberalization. There may even be a revival of governmentally owned and operated airlines, especially for securing that distant territories and islands are not completely marginalized.

2. Impact on the allocation and mobility of physical goods

In an economic perspective, the evolution of human society is strongly associated with developments of trade, which again were always heavily shaped by transport technologies: e. g. the invention of sailing ships after the Neolithic period or the herding of horses, mules and camels in landlocked regions (Chase-Dunn/Lerro 2008).

The scope and reliability of long-distance trade was crucial for the emergence of regional and local economic specializations (e. g. copper and zinc production in the Bronze Age) as well as for the rise of larger cities (which can only exist to the degree that large amounts of food and other essential goods can be regularly transported from an extensive "Hinterland" to the locally concentrated urban consumers).

Modern Western society is particularly the result of far-reaching economic exchange as it has been established by ocean shipping since the 16th century, by trains since about 1850, by automobile road systems since about 1900 and by an ever growing amount of air travel - as well as new surge of ship traffic by containerization since World War II.

It was only with the third wave of globalization since about 1980 that China and an expanding number of other developing nations have entered global markets (Rubin/Tal 2008).

Besides the mere technological availability of transportation *means*, the economic *costs* of transportation were always decisive. Thus, the first wave of global economic integration between 1870 and 1910 was heavily determined by cheaper shipping prices, and while the sharp increase in world trade between 1987 and 2002 was certainly influenced by the general tariff reduction (of about 30%) administered by organizations like the EU and the WTO, it relied also heavily on constantly low fuel prices (of about 25 \$ per barrel).

Publications like Thomas Friedman's bestseller "The World is Flat" (2005) have nourished the conception of a unified mankind drawn together by irreversible forces of "globalization": making historical and ethnical as well as geographical divisions less salient as they were at any time in the past.

However, we may well hypothesize that while certain loftier aspects of globalization (e. g. those brought by digital communication) may well stay with us in all foreseeable future, the globalized exchange of physical goods and mobility of human beings has remained critically dependent on such hard factors as transportation costs determined by fuel prices - and may well reverse to lower levels when these prices continue to rise.

For the case of overseas ship transportation, such reversal effects have already been neatly documented in a CIBC¹ study recently published. While the shipping costs of a 40 foot container from Shanghai to New York has remained on a level of about \$ 3000 until 2000 when the barrel price was \$ 20, it had already risen to \$ 8000 in spring 2008 and will be approximately \$ 15 000 in the case the barrel rises to \$ 200. (Rubin/Tal 2008; Steinbock 2008). Within the last 15 years, shipping prices have additionally been increased by higher ship travel speeds that resulted in a doubling of fuel consumption per unit of freight. (However, reduction of speed is not a viable option, because the trade of many goods would be hampered by slow transportation, and much more ship cargo would be needed to keep up with the present volume of traffic.)

The authors conclude that at least for heavier goods, where transport costs are high relative to selling prices, increasing fuel costs result in new trade barriers that wipe out all effects of recent tariff reductions:

"Currently, transport costs are equivalent to an average tariff rate of more than 9%. At \$150 per barrel, the tariff-equivalent rate is 11%, going back to the average tariff rates of the 1970s. And at \$200 per barrel, we are back at "tariff" rates not seen since prior to the Kennedy Round GATT negotiations of the mid-1960s." (Rubin/Tal 2008)

It might be concluded that these developments make it all the more urgent to implement further tariff reductions, because the culmination of natural and legal barriers would be highly unacceptable indeed.

As every 10% increase of distance nowadays translates into about 4-5% increase of transportation costs, there is a strong economic incentive to avoid longer trips by relying on suppliers and customers within closer regions.

This re-regionalization is particularly seen in the case of heavy products where market values are strongly determined by costs of transportation.

"It seems that American importers are starting to do the math and already shifting some business from China to Mexico. While the pace of shipments from China to the US is slowing—mainly among freight-intensive goods, even non-energy Mexican exports to the US are still rising at a healthy annual rate of more than 7%. And interestingly, the goods that have seen the fastest growth are the ones that, on average, are more freight-intensive and directly compete with China, such as furniture, iron and steel, rubber and paper products." (Rubin/Tal 2008).

Similarly, Swiss retail stores look for substitutes in Eastern Europe because imports from East Asia have become too expensive (Regenass 2008).

¹ Canadian Imperial Bank of Commerce

As a consequence, larger shares of trade tend to take place within regional free trade systems (like the EU or NAFTA), while the salience of transcontinental trade agreements declines.

Some Industries (especially those producing heavier goods) are slowly being repatriated, so that the shifts from the industrial to the tertiary sector may be slowed or even reversed in some highly developed countries. Thus, U.S. steel imports from China have, for example, declined by 20% between 2005 and 2007 while domestic steel production has increased by 10% within the same period (Rubin/Tal 2008). For the same reason, American wind-turbine makers want to avoid cumbersome offshore productions by establishing domestic plants (Hamilton 2008).

“We usually think about technological improvements in productivity as benefiting the highly skilled and educated, and disenfranchising the poorly skilled and uneducated, but what I find most interesting about globalization in an era of \$127 dollar-a-barrel oil is that blue-collar workers who make physical things in the West will stand to benefit, newly protected from foreign competition by energy tariffs, while white-collar workers who live off their wits will still feel the immense pressure of competing with everyone else in the world.” (Leonard 2008).

On the other hand, domestic industry will of course be reduced by the shrinking of distant export markets especially in countries like Germany and Japan which have specialized heavily on the worldwide selling of industrial goods.

Overseas exporters can be expected to move away from heavy raw materials and capital-intensive products and to turn to more sophisticated products the value of which is predominantly determined by innovation and skilled labor. In the case of apparel, for instance, transport costs are insignificant in comparison with production costs, so that Eastern and Southern countries with low wage levels are still preferred (Regenass 2008).

While these observations and predictions refer primarily to sea transport, they apply similarly to air traffic because it also operates under the condition that about 40% to 50% of total transportation costs are absorbed by fuel expenses.

While the share of goods transported by air is evidently small in terms of physical volume and weight, air freight encompasses a considerable percentage of total trade value (more than 33% of U. S. imports and about 30% of German exports), and it plays a vital and rapidly increasing role in the world economy because of its manifold crucial advantages over transportation by road, train or ship.

First of all, airplanes have made transcontinental trade universally accessible to all territories of this planet, even to landlocked countries. This contrasts with the conditions in the 19th century and before, where such far reaching exchanges of goods were mainly the privilege of maritime nations. A severe curtailment of air traffic would again increase the importance of geographical factors - thus encouraging some nations to secure access to seaports - maybe even with military means.

Secondly, air transportation allows an expansion of far-distance trade to many products that could only be traded locally in earlier times: e. g. perishable goods like fresh fruits or cut flowers. Thus, less air transportation would hardly hit all the export-oriented agrarian production centers that have developed in the last decades (e. g. in the Netherlands or in Southern Spain), while reviving local farming within or around densely populated regions. Farmers would lose their current fear from WTO liberalizations, because they would again enjoy "natural protections" not removable by any political measures.

Third, short-term orders can easily be realized, so that suppliers are can respond flexibly to high unpredictabilities and volatile changes in demands, local inventories can be kept smaller and even highly idiosyncratic demands can speedily be met. This (ever more costly) flexibility is vividly illustrated by the practice of FedEx to keep permanently a number of empty planes up in the air, so that it can better respond to unpredictable short-term requests.

Particularly transportation by sea is only viable when demand is stable and foreseeable, so that shippings can be ordered weeks or even months before they are delivered and can be bought in the stores. This stability is certainly fulfilled in the case of raw materials that can be used for many different purposes, or in the case of highly established products where demand does not depend on fads and fashions (e.g. Nescafé or Coke). Evidently air transport is much more adequate for products with a highly unstable demand that depends on changing fashion or on the unforeseeable moves of other competitors. Of course, this edge in flexibility will become even more dramatic when ships reduce their travel speed in order to save fuel.

Thus, reduced air travel would hit primarily the more dynamic branches that rely on high rates of innovation, on highly contested market settings where it important to react rapidly to the moves of competitors, or on volatile markets with highly variable consumer preferences.

In particular, it would have chilling effects on post-fordist "lean production" industries that rely much on interorganizational networks densely interrelated by flexible logistics. The more an enterprise specializes on its "core competences" by outsourcing auxiliary functions, the more dense and reliable relationships with other complementary producers it has to maintain in order to maintain its regular functioning (by schemes of "just-in-time-production"). The more expensive such flights, the less attractive it will be to outsource productions or services to distant suppliers, and the more there will be a trend to either

re-internalize them into the organization or to cooperate with nearby partners. As a consequence, we will see the reappearance of rather diversified organizations (and geographically focused "industrial districts") which offer a large spectrum of work roles and skilling opportunities to their local populations - thus decreasing the need for many workers to move far away in order to find fitting jobs.

As such fundamental reorganizations are costly and need much time, they will be implemented only when there is a widespread and strong belief that air freight costs will remain high (or even rise further) in the near or middle-range future.

To conclude, let's not ignore the central paradox associated with all these trends. On the one hand, at least all non-oil producing nations need to intensify their exports in order to pay the sharply rising bills for oil, gas and other sources of fossil energy. On the other hand, rising transportation costs decrease export opportunities by rising "natural walls" between the countries. Certainly, this dilemma is most acute for very isolated nations (like Australia or New Zealand) that are far away from all relevant trading partners (Bartlett 2007)

3. Impact on the allocation and mobility of human populations

History shows that crucial societal developments like the growth of cities and the migration of ethnic groups, the spatial mobility of military forces and the reach of territorial integration, the scope of economic cooperation and the diffusion of skills and cultural innovations are critically dependent on the available means, velocity (and economic feasibility) of travelling through geographical space.

In the last decades, the boosting of cheap air traffic has given rise to many social, economic and cultural patterns that are critically dependent on regular flight schedules: e. g. tourist resorts on distant islands, labor markets that rely on flying workforces, international scientific research teams and "communities of practice" holding regular meetings, or an ever expanding manifold of international events and globally active voluntary associations.

John Kasarda, a University of North Carolina business professor, has coined the term "aerotropolis" to describe the quasi-cities that have emerged around major airports;

"The Airport City, in fact, represents the spatial manifestation of the interaction of airport-centered commerce, real estate development, and multi-modal transportation shaped by contemporary financial, marketing, and strategic management processes. These have

all come together to position airports as new urban growth nodes. Airport-centric development has evolved to a point where the airport and its surrounding areas have morphed into major shopping, working, trading, meeting, and entertainment destinations. In the process, they have taken on many of the characteristics (both spatial and functional) of urban places (Kasarda 2008).

While air travel has become accessible to far larger social strata than in the 1960ies, it is important to notice that all this has not resulted in an inclusive "flying society". Even in Great Britain, about 50% of the consumers never fly (Cairns 2004); and in continental Europe, the percentage is likely to be higher because many international destinations can easily be reached by car or train. In addition, many air travels are not of a highly essential nature: I could well spend my vacation at a nearby destination; and visiting the three-days conference in Chicago has not added much to my professional knowledge (and only little more to my professional reputation).

Similar to air trade, however, air passenger traffic has become a highly crucial, even irreplaceable factor in many sectors of modern societies and modern individual life, so that its demise will have deeply disturbing effects on at least some geographical regions, collective activities and institutional spheres.

Compared to air freight, passenger transportation is likely to be even more disastrously affected by rising fare prices, because reduced air traffic has severe systemic effects that will induce additional downturns on the whole market. For example: less passengers usually means: thinned-out connection networks and flight schedules, so that flying becomes more cumbersome and many potential customers will abstain.

In the United States, the rising fuel prices in 2008 had the effect that very high numbers of smaller jets (with less than 50 seats) were grounded, because airlines tried to minimize losses by focusing on the more lucrative connections between bigger cities where passenger numbers were more predictable and larger airplanes could regularly be filled (Plumer 2008).

Thus, it is highly probable that price increases have the effect that an ever larger share of air traffic will take place between larger cities, while connections between peripheral and central cities (and even more between peripheral cities) will be reduced or even eliminated. This is vividly illustrated by the fact that according to ATA², 97 smaller U. S. cities have lost all their scheduled air service in 2007 or 2008 (Walker 2008). Consequently, attractiveness of flying will again decline as most destinations can no longer be reached by planes, but only by a cumbersome and time-consuming combination of air and land transportation.

² American Transport Association

It is well known that cities are eager to have airports that provide nonstop flights to many destinations, because such direct connections are an important argument for many corporations when they decide about where their headquarters shall be located (Bel/Fageda 2008). As the thinning out of air travel implies that many secondary cities lose nonstop connections, because air traffic is more focused on the big hubs, it has to be expected that smaller cities also become less attractive for businesses, so that headquarters will again become more concentrated in a small number of very big cities. This trend is illustrated in California where Sacramento has lost about 13% of its air traffic in 2008, while San Francisco had only reductions of 4-5 percent (Kasler 2008).

Paradoxically, while the largest planes are most fuel-saving, fewer of them will be operational when the total number of passengers declines. Thus, the planned giant Airbus 380 will burn only about three litres of fuel per passenger and 100 km (= less than a hybrid car), but such planes will never become numerous because few of them can be filled (with up to 850 passengers when all of them fly economic class) (Hickman 2006).

Other discouraging systemic effects stem from the particular vulnerability of long-haul flights. When starting for an 18 hour flight, an airplane has to bunker so much kerosene that a lot of this same fuel is used up just for lifting it to the flying height of 10-12000 meters. By comparison, fuel costs per passenger are about 50% lower when this same customer would reach his same destination with two intermediate stops (Michaels 2008). Thus, flying to very distant destinations is likely to become particularly unattractive because travels may afford two or three days.

Such developments are particularly hard to absorb for very distant countries like Australia, where Qantas Airways has earlier been eager to announce "hub-busting flights" without cumbersome stopovers. In fact, long-range intercontinental connections taking 15 hours or more have remained rather rare and are likely to decrease further in the near future (Shadare 2008).

Finally, systemic downgrading effects will also spill over into auxiliary infrastructures in which air traffic is embedded. For instance, it is to be expected that less efforts will be made to establish efficient means of public transportation from airports to the central city, because such investments only no longer pay out when the number of daily passenger declines. Consequently: connections from airports to city centers will remain unsatisfactory, thus lowering again the attractiveness of flying. (Correlatively, railway traffic may well become more competitive by offering direct downtown-to-downtown connections).

Evidently, any decline of air traffic is most consequential for countries and regions that depend heavily on it because of adverse geographic, topographic and demographic conditions.

Nations are particularly dependent on regular domestic traffic in order to keep up a suffi-

cient degree of political, economic, social and cultural integration. Thus, a huge volume of daily business travel is necessary to maintain integrated national markets, politicians and civil servants need easy shuttles between the capital and peripheral locations; and an ever increasing manifold of associations hold conventions and congresses where representatives and members of all regions are expected to convene. In addition, individual citizens are disposed to take their nation as an operational field for job seeking, looking out for marriage partners or for selecting educational or medical institutions.

Since the middle of the 19th century, several large-scale innovations like the railway and electric power have been milestones in national integration.

When a country is small and/or when its topography is rather simple, roads and railway systems are sufficient for giving all localities and citizens access to easy nationwide mobility, and for creating an integrated national market for goods and services. Even when it consists of many islands (like Indonesia), considerable integration levels are achieved by means of regular water connections by ships and boats.

However, countries like the United States, Canada, Brazil or Russia have not been able to achieve these goals by such conventional means, because territories are too large and topographic obstacles too hard to overcome.

For them, the rise of cheap flight traffic was an indispensable condition sine qua non for connecting their widely distant territories, populations, producers and consumers on a regular basis.

Such countries will face the problem that the maintenance of crucial spheres of nationwide interaction will be severely hampered, and that sharp class divisions will reappear as soon as broader social strata are no longer able to use the whole nation as their operating field: for schooling, job applications, vacation trips, or for contacting friends, family and kin.

For instance, cheap flights make American youngsters feel free to choose their most preferred college or university all over the country, because wherever they go, they can easily return home during vacation. Rising prices will make it more difficult for many students (with less wealthy backgrounds) to enroll in educational institutions highly distant from home (Willis 2006).

In the sphere of team sport (e. g. baseball), it may be difficult to continue established schemes of competition, especially when leagues include geographically extensive cities and areas: so that the normal program of plays implies very high travelling expenses:

"The sky-high skyrocketing price of oil is wreaking havoc on athletic travel budgets, particularly for minor league teams and smaller schools. Problems are especially acute because The Pacific Coast League is spread out among 16 teams in three time zones, and the league's 144-game schedule makes bus travel nearly impossible. Though some

teams receive financial help from their big-league partners, it's not nearly enough to offset the soaring cost of getting a group of about 30 players, coaches and support staff across half the country. Tacoma Rainiers president Aaron Artman estimates the baggage fees will cost his team at least \$100,000 this season. Some teams may even ship equipment overnight next year rather than throwing it on the plane with the team." (Graves 2008)

In severe cases, the government will have to step in with subsidies in order to keep up a minimal flight service to smaller cities that would be cut from any traffic when the market alone would be allowed to play:

"For now, the federal government picks up a large part of the tab for flights to roughly 140 smaller communities with its Essential Air Service Program, which costs \$110 million per year and provides subsidies as large as \$1,300 per passenger. As fuel prices rise, Congress will have to decide if it wants to directly bankroll ever larger portions of the air network."(Plumer 2008).

Evidently, any shrinking of air traffic will increase the economic and social viability of smaller states (e. g. Switzerland and Netherlands) where any location can easily be reached by car or train.

Larger and craggier nations may lose cohesion because population in boundary region may become more interacting with near foreign countries than with their native nation: as many Austrians from Vorarlberg often go to Swiss towns like St. Gallen or Zürich, while shying a longer trip to their own capital Vienna.

On the international level, rising air fares will have negative effects on labor markets that rely on the massive influx of "reversible migrants" who are only available because they face the opportunity to return regularly to their native country.

"Since 1980, the number of international migrants has doubled to nearly 200 million, as skilled workers and low-wage immigrants alike, knowing they could affordably return home, became more willing to set off for foreign shores. Within Europe, low-budget airlines like the Hungarian carrier Wizz Air will transport Poles and Hungarians to Western Europe for as low as \$26, which has enabled a surge of Eastern European migrant workers into the United Kingdom--most of whom stay for less than three months." (Plumer 2008).

Reversible short term migration will be substituted by longer-term or even irreversible migration, particularly on lower social class levels.

With the exception of extremely disprivileged "boat people" crossing the Mediterranean,

however, few emigrants may be willing to leave their country when they will not be able to uphold family contacts by regular returns. Similar to product markets, labor markets may become "re-regionalized": by sizing down to geographical dimensions that are compatible with regular home trips by train or car.

Even on higher social levels, transnational mobility may decline. For instance, fewer managers, diplomats and development aid workers (or their wives!) will be willing to occupy positions in peripheral Southern countries, when they are not granted paid frequent flights home for visiting their family and friends. This may well hamper the effective presence of corporations, institutions and governments in these far-away regions, and the control they can exert over their projects and subsidiaries in these countries.

As a result, multinational enterprises as well as aid agencies will tend to give up their offshore subsidiaries under their own control, and will turn more to franchising or to cooperative arrangements with domestic enterprises or institutions – thus empowering the population of these countries to manage their own economic and social matters.

While the first wave of decolonization after the Second World War has brought these countries political independence, this second wave may make them more independent in the economic realm (or in other spheres where north-south controls have hitherto been exerted by means of telecontrolled bureaucratic organizations).

Within all spheres of social and cultural activity, international movements, associations and institutions will find it more difficult to organize congresses, workshops, contests or festivals with a broad participation from many (even poorer) countries. For example,

"Twenty overseas groups were unable to travel to the Llangollen International Musical Eisteddfod in Summer 2008, with most citing rising costs." (Tryst 2008).

Many INGO conventions and events in science, sports, culture or politics will again shrink to regional dimensions, while others will have to mobilize much money in order to subsidize travel costs for participants from overseas and less wealthy countries.

To the pleasure of highly elitist conventions like WEF G8, World Bank or WTO, there may be a sharp decline of concomitant protest activities, because the typical younger demonstrators will not have the money for assembling massively at the respective locations.

Of course, tourism in general will be particularly affected by flight travel prices, because so many customers are well able to turn to substitutions by land or sea.

Evidently, the hardest challenges will be faced by "fly-only" destinations like the Maldives or Las Vegas, and by destinations like Benidorm or Disney World that address their services to those broader, less wealthy strata that can no longer afford to buy tick-

ets.

In addition, most tourist destinations will come under price pressures because higher air travel prices imply that travelers have to spend most of their vacation money to the flight, so that less money remains for hotels, restaurants, wellness programs or rented cars etc.

As leisure trips become more expensive, they are more likely to be dedicated to important travels and longer stays, and less to a two-or three days "urban hopping" as it has become so ubiquitous within the last 30 years.

These short trips are sociologically significant because they have contributed much to make personal life styles more independent from residence locations.

Thus, many historical cities have become attractive destinations for weekend travelers from very different, even quite distant regions. Barcelona, Prague or Paris have become flooded with tourists for the simple reason they were so easy to reach from any direction by nonstop flights. Similarly, islands like Mallorca or Tenerife have become beach holiday destinations for millions of Europeans living very far from the sea.

As a consequence, differences between attractive and unattractive places of residence have become somewhat leveled because even life in ugly and boring cities is more tolerable when it is so easy to escape every weekend or vacation.

When air fares are rising, however, people will spend their travel money to less distant destinations that can be reached by car or train. This will certainly result in a more egalitarian distribution of tourism, and higher shares of it will be redirected to nonurban regions. Thus, every larger city or conurbation will develop a "Hinterland" for its local population that will have to offer a rich spectrum of tourist attractions. Consequently, the attractiveness of cities as residence and work places will then again depend more on these local quality of life factors. Evidently, it will be very high in the case of perialpine cities like Zürich or Munich which offer a rich cultural program as well as a manifold of near getaway opportunities.

Consequently, we will see even more drastic regional inequalities in terms of housing prices, business location, emigration/immigration patterns and the like: divergences that are rather neatly correlated with geographical patterns like the proximity of mountains, skiing facilities or the sea.

On the other hand, far apart dual residencies will become more restricted to wealthy elites, because owning a second domicile in Antibes or Dubai becomes more costly when flights forth and back are very expensive. For the same reasons, it less has become less easy for owners to find temporary tenants for their properties during the time they are not present themselves (Wells 2008).

4. Impact on interpersonal communications

Many flight travels are motivated by the purpose of meeting absent wives or husbands, relatives, friends, business partners, scientific collaborators face-to-face or by attending collective events (like funerals, congresses, sports events etc.) in person.

Even when flying is cheap, the question looms why contacts are made in such expensive and time consuming ways instead of using the mailed letters, the phone, the Internet or other channels of modern communication.

In fact, an ever increasing amount of transspatial contacts is mediated by these media that have become almost free and ubiquitous as well as incredibly speedy, reliable and versatile within the last fifteen years.

Even if all physical passenger transportation would collapse, these technically mediated channels would still guarantee a very high level of global integration on the virtual level. enabling billions of people and millions of groups, organizations and institutions to enact in an ever widening variety of self-determined transspatial communications and performances (like buying, selling, spending, acquiring or ending formal memberships etc.) on a Real Time basis.

Every Internet surfer has immediate access to billions of websites, millions of interaction partners, thousands of groups and voluntary associations, hundreds of different activities and roles from any point of the planet and without changing location. Thus, all talk about a prospective "deglobalization" is futile insofar as planetary integration of mankind becomes less and less dependent on the physical movement of goods and people.

It is important to see that the decrease of in-person contacts is a long-term evolutionary trend that may just be somewhat accelerated by rising air ticket prices, without changing its basic course.

One reason is that from the point of view of individuals, living a complex, "multioptional" modern life collides increasingly with the physical limits of space and time. At any point of time, I can be only at a single place, and I will miss events and developments going on simultaneously at other places. Thus, while the Internet allows rapid and cost-free switching between different activities, communication partners and social roles, personal meetings are so cumbersome that they have to be reserved for special occasions. The more the role sets and time schedules of individuals are different from each other and the more they behave in a volatile, spontaneous fashion, the more difficult it is to arrange meetings where everybody can reliably and foreseeably attend (Geser 2004). As a consequence, gatherings of all kind tend to become infrequent, short and irregularly

attended, and many if them will be dismissed when time-consuming and expensive travelling is involved.

In addition, face-to-face encounters are less needed in modern societies to build interpersonal trust because institutions provide enough bases for secure interactions even between strangers who have never met and will never meet.

While traders in the middle ages had to travel with their goods, because any selling and buying transactions had to be based on interpersonal trust as it could only evolve in personal meetings (Simmel 1908: 503f.), modern traders feel save to interact virtually because they can rely on the security of legal frameworks, collective evaluation systems (like in eBay) or software-based technical controls.

However, it is reasonable to suggest that more expensive travelling will induce additional shifts from in-person to virtual interactions by making increasing use of advanced multimedia technologies: e. g. sophisticated Videoconferencing Systems that allow the processing of even highly subtle aspects of nonverbal communication (Lohr 2008).

The rising costs of traveling compels us to think about and critically discuss many aspects of everyday behavior that has traditionally not been the object of much conscious reflection (Sette-Murphy 2007).

Thus, we tend to give little thought whether it is really worthwhile to visit a scientific congress in Sweden, instead of spending the time in reading or Email exchanges, and we do not make precise calculations how much more personal utility is provided by a vacation trip to the Dominican Republic than to a much less distant travel to the Mediterranean Sea. We tend to ignore how many irrational (latent) functions are served by physical meetings: e. g. ritualistic functions in the case of many family gatherings and congresses; functions of showing solidarity and increasing group cohesion (Boden 1994) or mere habitualizations in the case of routine business travels or regularized family summer trips.

Evidently, in-person encounters are essential when the very nature of the social relationship implies bodily (e. g. sexual) contacts, or when face-to-face contact is essential for establishing a relationship at all (e. in the case of younger children).

As the studies of Gregory Guldner have shown, there are currently about 3.5 million couples in the United States that maintain a long-distance relationship (involving on the average about two meetings per month and a 30 minute phone call every other day), because both partners work at widely distant locations. Many of them will find it difficult to maintain this minimum of interaction when travel tickets become more expensive. For the same reasons, divorce rulings which demand that a kid should see their father monthly will be more difficult to set into practice when these two persons are 500 miles apart.

On higher levels of social aggregation, international nongovernmental associations (INGO's) of all kinds have an essential need to hold regular meetings. Most of them are legally obliged to organize yearly conventions for electing board members, decide over statute changes and the budget etc. Others (like team sport leagues or trade show organizations) exist for the very purpose of organizing international events. And for all of them, such meetings have a strong expressive function: by demonstrating to their members as well as to their environment that the organization is still alive and functioning well, and by giving members the opportunity to experience the association for some hours or days as something "real" that can be seen or heard with one's own sense, not just as a bloodless formal construction emitting newsletters and collecting regular fees.

When international meetings become more expensive, there will be more pressure to restrict them to highly important occasions and essential purposes, and to organize them more carefully and efficiently, so that they generate more useful results.

For instance, there will be a tendency to relieve them from activities that can as easily be done by phone or mail. Why should participants of scientific congresses be bothered with time-consuming lectures and PowerPoint Presentations when they can absorb this same information more easily by consulting a website or Email attachments?

While oneway communication will be channelled into digital media, more time is gained for informal interaction processes where the advantages of face-to-face interaction really come into play.

"Hybrid" conventions may become a new standard: some members attend physically, others have sent their statements or papers per Email, some may attend meetings virtually by videoconferencing, many arrive too late or leave too early. All of them have been equipped *ex ante* with rich information material and will get informed afterwards by Emailed summaries and protocols, and whoever had no chance to rise his voice during the short meeting hours will be able to add *ex post* comments on virtual channels.

In particular, we may see a trend toward smaller gatherings: not only for keeping travel costs lower, but because larger plenary conferences can be most easily substituted by digital communication. When many people sit together, highly standardized and technically mediated forms of communication have to be implemented: e. g. standardized Power Point Presentations delivered by people who make identical presentations on many other conferences – so that exactly the same information could be drawn from a PPT-Website or a YouTube video version.

While such innovative developments have already gone a long way in many noneconomic spheres, the business sector has hitherto been most conservative in clinging to conventional modes of in-person encounters that generate heavy loads of expensive and cumbersome traffic.

While firms have taylorized their production facilities long ago and also rationalized their office work drastically within the last 30 years, little has been done to economize interactive and communicative activities on managerial levels.

Thus, a recent study on travelling business persons in Europe has found that more than 50% of them think that at least some of their trips are completely unnecessary, and a considerable part of them admit that travelling hampers their work-life balance and is reducing their productivity at work (TANDBERG 2008).

Evidently, mere economic considerations about savings of time and money are naïve because they neglect the many unintended and unreflected (but nevertheless functionally essential) functions of face-to-face encounters. For instance, frequent business traveling is often seen as an attractive (because tax-deductible) "fringe benefit" and a visible status cue which signals that the respective individual has achieved in making career.

"Beyond the making of decisions, meetings.... distribute rewards, status and blame, reinforce friendship, judge commitment, have fun with colleagues, and so on." (Lyons/Urry 2004).

Even when purposes of business trips are narrowly defined by formal regulations, their factual functions and consequences are manifold: spilling over into private personal spheres. In the survey of European business travelers cited above, *"69% of those surveyed stated that the enjoyment of experiencing new cultures was the highest rated benefit of business travel, compared to 47% who said getting face-to-face with clients was what they enjoyed"* (TANDBERG 2008).

Given that a very large share of passenger air traffic is caused by business, there is an urgent need to develop reliable scientific knowledge about the conditions under which in-person meetings are necessary (or at least functional), and the circumstances when they are useless or even damaging to the economic cause. Evidently, social psychology and sociology offer many insights that can be helpful in this respect.

Face-to-meeting are unique in producing a condition of full "mutual social presence" among participants: a condition that does not only imply the felt presence of other people, but the conviction that this felt presence is itself mutually perceived, so that there is a secure platform for the development of interpersonal understanding and empathy as well as for the realization of behavioral interdependence (Biocca/Nowak, 2001; Biocca/Harms 2002), and for the emergence of a collective "we-feeling" : a sense of "groupness" that transcends all bilateral relations (Geser 2002).

"The full conditions of co-presence, however, are found in less variable circumstances: persons must sense that they are close enough to be perceived in whatever they are doing, including their experiencing of others, and close enough to be perceived in this sensing of being perceived. In our walled-in Western society, these conditions are ordi-

narily expected to obtain throughout the space contained in a room, and to obtain for any and all persons present in the room.” Goffman 1963:17).

While Goffman considered "mutual co-presence" as a dichotomous variable that is fully present under conditions of physical meetings and fully absent in all other circumstances, the ever growing spectrum of technical communication media makes us think of this same concept as a continuous variable that is rather low in the case of phone or Email contacts (but assumes quite impressive values in the case of advanced multimedia conferencing systems which allow participants not only to perceive others, but to recognize (and give feedback to) their mutual cognitions (Settle-Murphy 2007).

As a *first* proposition, it might be stated that face-to-face encounters are particularly indispensable at the very start of a relationship: for getting a synthetic impression about a partner's character, values, world views and personal skills and for establishing a generalized feeling of mutual sympathy, cooperativeness and trust.

Thus, reductions in air travel are viable when business runs between stable role incumbents (e.g. salesmen) who know each other for years, because they can easily communicate by Email, Fax or phone. However, frequent travelling is needed when partners change frequently because of fluctuation or reorganization.

Secondly, in-person meetings are most useful for developing "social capital" in the form of "diffuse" relationships that cannot be limited to specialized topics and problems, skills or motivations, but may spill over into private and personal matters and result in "friendships" that may be useful for many different communications and transactions in the future.

Even most advanced videoconferencing schemes will tend to limit contacts to specialized topics and situational conditions (e.g. business talks in the more narrow sense). Given the strictly delimited time of Video sessions, such virtualized contacts are not likely to broaden into private small talk, even less into framing situations where participants meet for coffee break or a common meal, for playing golf or visiting night clubs together. In an intercultural perspective, pure virtualized contacts are of course most akin to "Northwestern" puritan conditions where businessmen tend to do business and nothing else, but completely contradictory to most nonwestern traditions: e. g. the Arabian practice of treating business matters as a side activity embedded in extensive ritualistic conversation while drinking tea (Algozaibi 1998).

Even in the Western hemisphere, there are significant divergences between Italian managers who use to travel very often and their Swedish managers who conduct business matters mostly from home (TANDBERG 2008).

Thus, substitution of in-person contacts by technical media may be rather successful within certain Western settings, but impracticable in most trans-cultural relations.

Unfortunately, such "virtualization pressures" occur at a time when it becomes more and more imperative for firms to be present in the various markets in order to adapt to the different cultures and to cultivate empathic relationships with various segments of customers.

Third, face-to-face meetings have an important function in *energizing conversation and cooperation* (Benson 2008). Thus, an early meeting can give new life to a group: by motivating participants to dedicate themselves with new efforts to a common endeavor and engage afterwards vigorously in many forms of mediated communication: contributing to websites, exchanging emails, maintaining discussion fora, blogs and wikis etc.

Most group development activities are critically dependent on face-to-interaction, because being together in the same room offers far the best opportunities for all participants to experience themselves as members of a group and to maintain real multilateral (instead of just a web of bilateral) communications,

In scientific research, for instance, the generation of new team cooperation has to be done at an initial meeting in which all prospective members participate physically. A main reason is that such a physical group environment creates a sense of high mutual commitment as it is essential for defining common goals and fixing contractual obligations. When participant E says "I assure you all that I will have finished my study in September next year" or when group leader A proposes "I think that B and C should work closely together on this topic", such statements in the presence of all other participants carries more weight than when exactly the same utterance is transmitted by mail or any other media channel.

Fourth, in-person meetings are indispensable when it is necessary to make "on site visits" in order to meet a partner or client within his own environment: e. g. in order to get an impression about work places, machineries, furniture, office locations and other factors that may be decisive for a mutual cooperation. Even highly sophisticated Web conferencing will filter out these environmental conditions, focusing completely on the video room (that provides no impression on a firm's infrastructure and environmental embedment).

Fifth, face-to-face interactions are usually indispensable in activities related to negotiations and conflict resolution: in order to check how partners interpret problems, what kind of motivations and goals they bring into play, where they are ready to give in and where they are resistant to any compromises, and how dissatisfactions can be distributed optimally so that nobody feels discriminated and motivated to continue the quarrel.

Many of these processes imply highly subtle sensory perceptions and reactions, including many paralinguistic and nonverbal cues that are helpful to interpret the precise meaning verbal utterances: e. g. to decide how much serious weight should be given to a verbal utterance of anger or disappointment.

Many of these cues (e.g. spontaneous gestures and facial expressions) are sent out inadvertently, so that they reveal authentically “what the partner really thinks and feels” – regardless of what is explicitly said.

Some of the “authentic” subjective reactions may not be seen during the formal meeting, but only during the intermediate breaks or the subsequent informal dinner. For these reasons, even the most sophisticated video conferencing technologies are only a partial substitute because they will cover only the more formal sequences of “being together”.

Sixth, the need for in-person contacts is higher when business activities involve flows of complex and unpredictable communication.

If the product to be sold is simple, so that its usage is self-evident for everybody, a firm can easily sell it over large distances without sending specialists for demonstrating its application - as it is the case in most consumer branches.

However, if the product is a complicated machinery or manufacturing installation to be implemented, technical personnel has to be present on the site in order to test out and demonstrate its functioning, to train domestic employees, and to insert the new technology neatly in existing organizational structures. Thus, complex software applications need adaptations specific to the local organizational environment, and hardware technology may need specialized add-ons in order to be compatible with other machineries or with local public utility systems. In some cases, suppliers have to provide permanent emergency services in cases of breakdown: by flying in specialists able to repair the system within a few hours.

Thus, a decline of air travel costs will affect most deeply the international trade in high-tech investment goods, especially in the case of singular products (e.g. manufacturing systems) which are designed and realized differently in each particular case.

Similarly, offshore software projects may be hampered by the fact that lower salary costs are more than neutralized by high communication costs: involving frequent staff flights in order to socialize, instruct supervise, and redirect the far away workers.

Evidently, the thinning out of international in-person contacts is least consequential for firms with highly stable and standardized products, because when innovation is low, the need for communication is much reduced and efficient control can be exerted by technically mediated forms of communication.

However, when new products are developed and marketed, there is much more need for face-to-face interactions in order to explore needs, preferences and sensitivities within different cultural settings, to work out new processes of cooperation and to cope with new problems arising within the specific legal, political and cultural environments where new staff is hired, additional production facilities are erected and the new products are advertised and marketed.

Consequently, we may hypothesize that the decline of air travel will particularly damage expansive and innovative transnational endeavors.

Finally, a curtailment of business travel will certainly affect the geographical transfers of knowledge and skills.

While the worldwide diffusion of highly explicit knowledge can easily take place by any technical media, the transfer of implicit or "tacit" knowledge can only take place in extensive processes of informal microsocial communication (Raghuram 1996:862). Thus, European firms have to send skilled professionals to Africa in order to train and coach domestic specialists in master-apprentice relationships that involve time-consuming learning processes adapted to individual capacities and needs.

When instructing personnel of this kind is reduced or eliminated by raising travel costs, many essential skills necessary for complete economic production will remain under the exclusive domain of Western enterprises that encourage intraorganizational knowledge sharing by means of intensive group communication (e. g. "quality circles" as a constituent of "lean production" (Nonaka/Takeuchi 1995)), or of smaller geographical regions ("industrial districts") where firms maintain densely related knowledge exchanges (mainly based on frequent personal transfers). (Pyke/Sengenberger 1994).

It is a shortcoming of all communication technologies (video conferencing included) that they focus almost exclusively on the exchange of symbols. Thus, they are not viable for communications that involve complex sensory perceptions and behavioral interactions with physical objects (e. g. in handicraft production, gardening or artistic activities) or with human bodies (e. g. in sports coaching or techniques of medical examination).

To the degree that learning processes involve processes of senso-motoric coordination and not only visual and auditive, but also tactile, tasting and olfactory cues, (e. g. in the case of cooking lessons that involve the savoring of sauces, vines etc.), the less they can take place successfully in systems of technically mediated communication.

In all such cases, learning has to be made within a particular context that involves specific landscapes, physical objects, architectural structures, plants and animals, weather conditions or human participants.

Transferring all these skills geographically implies human travel, and all activities based on such skills will become more locally immobile when such travelling declines.

5. Some preliminary conclusions

It can hardly be denied that the breathtaking advances in global Information flows brought by the Internet contrast ever more sharply with countervailing trends in the mobility of physical goods and human beings.

If an analogue of Moore's law (that has successfully predicted a 50% performance increase and cost decrease of electronic processors every 18-24 month since the late 1960'ies) would apply for passenger traffic, we should currently be able to move from Paris to New York within about 20 seconds for about 50 cents. However, traveling from my Swiss home to London Trafalgar square takes somewhat more time nowadays than 40 years ago: due to increased traffic congestions, queue waiting in front of crowded check-in desks and cumbersome control procedures, notorious flying delays and the deplorable state of the Piccadilly line running from Heathrow to the central city.

Given the highly diversified patterns and purposes for using airplanes, increasing flight tariffs will have a boundless manifold of direct and indirect consequences on almost all aspects of individual and collective life.

Future analysis will have to focus particularly on the question how all these impacts are shaped by the accompanying informational revolution.

On the one hand, the availability of virtual communication channels makes it easier to tolerate the losses in travel speed and traffic connections, because ever more potent technologies for technically mediated communication are cheaply and ubiquitously at hand. Especially the mobile phone has shown to be a highly inclusive device that may well provide access to Internet services to more than 50% of mankind within the next 5 to 8 years.

It has also been remarked that these same technologies create more toleration for slower traffic speed because they provide travelers with extensive possibilities to entertain themselves and to be productive on transit: e. g. by using laptops for gaming and working on documents, or by contacting distant partners Email and mobile phone.

In their British study involving about 1900 informants, Mokhtarian and Salomon conclude that

"...nearly half (of the persons asked) disagree that travel time is generally wasted time. More than a third see their commute trip as a useful transition, and use that time productively. With respect to travelling itself, more than two-thirds of the respondents disagree that "the only good thing about travelling is arriving at your destination", and nearly half agree that "getting there is half the fun" (Mokhtarian and Salomon, 2001:709).

This is certainly a major shift from earlier times where travel time is considered as unwanted, wasted and unproductive time, so that the major (or even: the only) goal of modern technological development was directed at its minimization.

Thus, there may be a rising need for travel modes which offer good conditions for unhampered activities: e. g. in trains with seats that offer a certain privacy and with special equipment for computer or phones (Lyons/Urry 2004).

On the other hand, it is also evident that increasing virtual communication create additional needs for physical transportations: so that restraints in these sectors are more painfully felt: I want to receive quickly the medication or electronic equipment I have ordered by Internet in the United States, and I would like to meet my promising Facebook acquaintance from Australia in person, because I feel nearer to her than to anybody in my proximity.

As sociologists know since Thorsten Veblen (living at the beginning of the 20th century), goods have to be scarce in order to receive a value that makes them prone to become status symbols or to confer a particular form of dignity, prestige and reputation. Thus, my appearance at a funeral implies more respect for the deceased when my flight ticket was 2000 instead of 200 Dollars, visiting my girlfriend regularly in Dublin implies that I'm deeply involved in the relationship, and my expensive travel to an anti-WTO demonstration signals to everybody that I must be very angry about neoliberalist trade policies indeed.

Thus, while the frequency of flying is likely to decline, it is certain to keep a quite significant place in individual and collective life.

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