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ARTICLE

Tradeoffs and entanglements among sustainability dimensions: the case of accessibility as a missing pillar of sustainable mobility policies in Italy

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This article analyzes the tradeoffs between the environmental and social dimensions in sustainable mobility policies. We focus on the Italian context, where car dependency is a particularly prominent feature of the transportation system. During the past decade, many local administrations have promoted policies to foster more “sustainable mobility” as a way to manage congestion and reduce environmental pollution. However, these initiatives have often missed an important sustainability pillar: improving the accessibility of the most vulnerable to economic and social resources. This issue may have implications for social justice because access to mobility is an important dimension of inequality. A proposed framework identifies some possible tradeoffs related to sustainable mobility policies, concerning medium- to long-range mobility and short-range mobility. The article argues that, paradoxically, policies fostering mobility may lead to environmental pollution (e.g., low cost airlines), and that policies to contain the environmental impacts of mobility may harm social justice (e.g., environmental taxation) in the absence of strong promotion of collective transportation. Finally, we analyze possible solutions to reach sustainable accessibility.

KEYWORDS: mobility, transportation, travel, public policy, environmental impact, civil rights, public access, pollution control

Introduction

Sustainable development clearly requires the integration of the economic, ecological, and social pillars. While scholars and practitioners have mainly approached sustainability from the standpoint of environmental protection and resource management, the social pillar has been a more limited part of the research agenda (Dillard et al. 2009), although it is generally recognized that “human well-being, equity, democratic government, and democratic civil society are central constituents of sustainability” (Magis & Shinn, 2009).

The most compelling contributions about sustainability are mainly related to the concept of environmental justice (Leonard, 1989), in terms of both inequalities in access to environmental goods and unequal distribution of environmental risks (Beck, 1986). While democratic inclusion in the governance of sustainability has also received a great deal of attention (see, e.g., Hajer, 1995; Glasbergen, 1998; van Tatenhoven, 2003; Pellizzoni, 2010), social inequalities, justice, and inclusiveness have rarely been integrated into studies of sustainability (with some interesting exceptions, e.g., Polese & Stren 2001; Vranken et al. 2002; Magis & Shinn, 2009). There

is, however, a broader and independent literature about the overlapping concepts of social cohesion and social exclusion (Pahl, 1991; Hopwood et al. 2005; Littig & Griessler, 2005; Dempsey et al. 2011; Ranci, 2011).¹

The main aims of this article are to highlight the relevance of an integrated approach to sustainability and to avoid possible tradeoff mechanisms among the different dimensions of this concept in the process of policy design and implementation. For instance, in a paradoxical way, initiatives oriented toward fostering mobility may lead to increases in environmental pollution while programs to contain the ecological impacts of mobility may undermine social justice and increase inequalities.

¹ Colantonio (2008) argues that “chronological analysis of social sustainability themes also shows how traditional themes, such as equity, poverty reduction and livelihood, have increasingly been complemented or replaced by more intangible and less measurable concepts such as identity, sense of place and the benefits of ‘social networks’.”

Accessibility as a Wobbly Pillar of Sustainable Mobility

To analyze possible tradeoff dynamics, this article discusses an even more important issue in the wider debate about sustainability: the challenges of fostering sustainable mobility. There are several reasons for growing attention to this issue, but most important is the idea that while mobility in one form or another has been essential throughout human history, in recent years it has undergone strong expansion and acceleration—of both people and goods—all around the globe (Urry, 2000). This development has been due to several drivers. First, a significant number of innovative technologies for transporting both people and goods, especially in the field of information technology and communication have encouraged greater mobility (Castells, 1996).² Second, recent decades have seen an increase in freedom of movement within many political and territorial contexts such as Eastern Europe and Asia (Bauman, 1998). Finally, the spread of the free market and the growth of the international financial economy have gradually enveloped almost all of the planet's main economies, promoting a significant increase in the movement of raw materials, workers, and products (Sheller & Urry, 2006).

These changing scenarios have promoted new mobility dynamics, with important environmental, economic, and social impacts.

First, there is little doubt that mobility has important consequences for environmental protection, in terms of both natural resource consumption (e.g., raw materials, fuel, soil) and air and noise pollution. More specifically, motorized transportation can be divided roughly into four main modalities, of which waterways and railways have a lower environmental impact, while airways and roadways are more harmful in terms of both pollution and natural resource utilization (EU, 2009). As far as the environmental dimension of sustainability is concerned, it is clear that the extraordinary growth of the most ecologically problematic forms of transportation is responsible for a preponderant share of the challenges.³

Another important impact concerns economic externalities related to road congestion. The Euro-

pean Commission's most recent data, for example, demonstrate that 80% of all personal journeys are by car, and that in the European Union between 1975 and 1995 per capita daily travel distance doubled, with a further doubling forecasted by 2025 (Eurostat, 2007). Road congestion in Europe (EU-27) currently costs €130 billion (US\$170 billion) annually and the total external costs of motorized traffic are estimated at €270 billion (US\$300 billion) per year, around 4% of Europe's gross domestic product (GDP) (Eurostat, 2007).⁴

Finally, with respect to social impact, the growth of mobility is leading to new sources of polarization, largely dependent on the even more evident contrast between "desired" and "hindered" flows of mobility (Bauman, 1998). The first term describes an encouraged and supported mobility, such as the movements generated by international tourists or business travelers: in this case flows are often fast, autonomous, and free. The second concept refers to slow mobility flows, which in most cases are unwanted, and impeded movements, such as those of migrants around the world. Accordingly, we can assert that mobility problems are the basis of some important processes that build up the contemporary social system of inequalities.⁵

As a consequence, there is a need to reduce the harmful environmental and health effects exacerbated by polluting forms of transportation, as well as to mitigate the economic externalities generated by traffic jams. Policy efforts to ensure access to public goods have led to the establishment of institutions and public administrations to encourage measures that foster "sustainable mobility" (EU, 2006). According to the European Commission (CEC, 2000), sustainable mobility should provide the following:

- The basic needs of mobility and development of individuals, companies, and society must be satisfied, assuring safety in a way suitable for preserving human health and ecosystems, and promoting equity within each generation and between generations.
- The transportation systems must be economically accessible and operate efficiently; they should guarantee a variety of different transport-

² Although some movements of people have been replaced by online exchanges (Lyons & Kenyon, 2003), other flows are dependent on activities generated by information and communication technologies in a process of mutual reinforcement (Moos et al. 2006).

³ In Europe, for example, as far as people mobility is concerned, between 1995 and 2004 passenger movements increased dramatically in the air-transport sector (+48.8% passenger/kilometers) and private car mobility (+17.7%), while railway mobility increased at a lower rate (8.6%) and sea transportation decreased (-11.1%) (Eurostat, 2007).

⁴ Road congestion represents an economic cost of uncompensated environmental effects of production and consumption that diminish consumer utility and raise enterprise costs outside the market mechanism (UN, 1997).

⁵ Among others, Tomlison (1999) emphasizes that most of the world's population has no social skills or financial means to take advantage of the opportunities offered by mobility in the contemporary age. In strong disagreement with commentators who want "the whole world in movement," he says that the paradigmatic experience of global modernity for most people is to stay in one place.

tation means to choose and support a competitive economy and regional development.

- Emissions and waste must be restricted within the carrying capacity of the planet, using renewable resources at the rate of self regeneration, or slower, and using nonrenewable resources at rates lower than or equal to the development of renewable substitutes. In the meantime, land use and noise production should be minimized.

The first component of this definition clearly emphasizes the key issue of accessibility in sustainable mobility (Litman, 2003).⁶ It also calls for the elimination of barriers to equal access to education, employment, health services provision, and food shopping, as well as sporting, leisure, and cultural activities (SEU, 2003).⁷ The segment of the population most affected by this kind of social vulnerability comprises people without a car at their disposal (SEU, 2003), usually because of low income or inappropriate age (elderly and young people). Research suggests that women tend to be disproportionately subjected to such circumstances (Hine & Grieco, 2003; Mercado et al. 2011). They are also more likely to be at risk of social exclusion from lack of access to appropriate transportation, a concept defined as “the unique interplay of a number of factors, whose consequence is the denial of access, to an individual or group, to the opportunity to participate in the social and political life of the community, resulting not only in diminished material and non-material quality of life, but also in tempered life chances, choices and reduced citizenship” (Kenyon et al. 2002).

Although transit equity should be embedded in the definition of sustainable mobility, in some contexts it is absent or potentially (and paradoxically) weakened by tradeoff dynamics across the different dimensions of sustainability policies.⁸ To highlight these potential tradeoffs, we consider the tensions between environmental protection and the social justice dimensions in sustainable mobility policies in Italy.

⁶ Numerous scholars argue for shifting from policies oriented toward mobility (as ease of movement per se) to policies that foster sustainable accessibility (as ease of reaching destinations) because this focus might promote greater attention to equity impacts (see, e.g., Levine & Garb, 2002).

⁷ According to the Social Exclusion Unit in the UK, arguably the most important institution working on the links between transportation and social inclusion in Europe, the barriers to accessibility are mainly represented by the availability and physical accessibility of transportation, the cost of transportation, services located in inaccessible places, and personal safety and security.

⁸ Sustainable planning is another interesting example of possible tradeoffs between the different dimensions of sustainability (Coffman & Umemoto, 2010).

These tradeoffs are explored from a cross-disciplinary perspective (environmental and regional sociology, transportation economics, and urban planning) that integrates literature and statistical data on travel behavior and infrastructure supply, as well as evaluates the potential impacts of policies that have been adopted for both medium- to long-range mobility and short-range mobility. This expansive approach aims at filling a gap in the literature. In fact, studies and documentation on sustainable mobility usually concern cities or major metropolitan areas without taking into account long-distance movements (Ponti, 2010). The customary tendency of focusing on more urbanized areas is understandable because of several important issues that arise from the concentration of physical mobility flows in those areas, notably the problem of congestion.⁹ Nevertheless, some relevant effects on the urban context may depend on how long-distance (for example at the national level in Italy) and very long-distance movements (for example at the European level) are organized. The reason we consider both ranges is to highlight how long- and short-distance movements can become entangled, promoting vicious circles that are difficult to interrupt. For both dimensions we will describe the tradeoffs related to the policies that have been implemented and possible interventions to promote more sustainable accessibility, where accessibility is understood to be a broader concept than mobility; it is not just the ability to overcome a space, but to reach an opportunity (Vasconcellos, 2001).

Long-Range Sustainable Mobility

Although mobility of people and goods for long and very long distances has been an essential feature of human history, in recent years such travel has undergone strong development and acceleration (Figure 1).¹⁰ In particular, when we consider sustainable mo-

⁹ The first typology refers to short distances (sometimes possible to traverse on foot or by bicycle) and medium distances (such as commuter flows, usually limited to 50–100 kilometers). The second typology focuses on longer journeys.

¹⁰ Sociologist John Urry (2000), for example, argues that “For the present I consider some of the socio-spatial practices involved in travelling, especially as in many cultures travelling appears to be ‘always necessary’ for family life, leisure and friendship, as well as for work and security. The scale of such travelling is awesome. There are over 600 million international passenger arrivals each year (compared with 25 million in 1950); at any one time 300,000 passengers are in flight above the US; a half million new hotel rooms are being built each year worldwide; and there is one car for every 8.6 people worldwide...International travel now accounts for over one-twelfth of world trade. It constitutes by far the largest movement of people across boundaries that has occurred in the history of the world. International and domestic tourism together accounts for 10 per cent of global employment and global GDP. And this affects everywhere.”

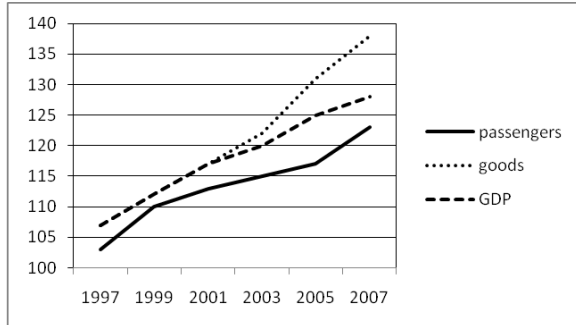


Figure 1 Increasing trends for passenger and goods movements (EU, 2009).

bility within this range it is necessary to distinguish between goods and people transportation, not only because they are entangled, but because these two modalities have different implications in terms of social justice and inequality.

Goods Transportation

Goods transportation worldwide has been increasing dramatically with the rise of the globalized economy and also due to innovations in transportation during the last century. While intercontinental flows of goods have been primarily (70%) managed by shipping (UNCTAD, 2010), at least for the European countries the most problematic areas in terms of transportation are related to intracontinental and national movements. In Europe, transportation by road remains prevalent, as evidenced by the massive presence on Italian highways of heavy goods vehicles (HGVs) coming from all European countries as a result of the International Road Transport Convention.¹¹ Eurostat's (2007) data indicate that between 1995 and 2005 goods transportation grew from 2,972 to 3,903 billion tons-kilometers. This increase was largely dependent on road and sea transportation, which accounted for 44% and 39%, respectively, of total freight moved in 2005. Conversely, rail volumes are still marginal in Europe (9%), while in Italy rail covers only around 5% of continental goods traffic and 3% of national movements.

As far as the sustainability of goods transportation is concerned, there are different policy perspectives. First, efforts have been made to achieve a general decoupling of economic growth and mobility by promoting local production through the use of subsidies or taxation (OECD, 2002; Muller & Sterner,

2006).¹² Second, reductions in the environmental impacts of transportation have been pursued by shifting flows of goods from roads to railway networks or to water through improvements in intermodality.¹³ This policy may be implemented through the empowerment of railways and harbors and discouraging road traffic.¹⁴ Finally, long-range flows of goods have been constrained by applying environmental taxation (incorporated into retail prices), especially to goods regarded as nonessential (e.g., alcohol, tobacco, luxuries) (Muller & Sterner, 2006). However, this latter measure seems to have negative social effects due to the degree that developing countries remain dependent on these kinds of products.

In short, with regard to the long-range mobility of goods, two important tradeoff mechanisms emerge between the environmental and the social dimensions. On one hand, there may be warrant in wondering if a small elite has the right to maintain low costs for nonessential goods, dumping the environmental impacts of mobility on the community. On the other hand, the potential social impacts of fiscal measures that limit the distribution and availability of certain goods needs to be accounted for.

People Mobility

There is a little doubt that the reduction of goods transportation could leave more space for the mobility of people, an important civic right from many points of view. This civic right concerns freedom of movement, at least in terms of leaving a country or

¹¹ The International Road Transport Convention is also known as the TIR (Transports Internationaux Routiers) Convention negotiated in 1975 under the auspices of the United Nations Economic Commission for Europe.

¹² Decoupling is often used in the context of economic production and environmental quality: it refers to the ability of an economy to grow without corresponding increases in environmental pressure. An economy that is able to sustain growth of its gross domestic product without simultaneously worsening environmental conditions is said to be decoupled (OECD, 2002).

¹³ Furthermore, the long length of the Italian coasts offers the opportunity to more effectively exploit the so-called "motorways of the sea" by shifting high traffic volumes to this mode. The process has already partly occurred, mainly with respect to goods movements. According to Assotrasporti, the Italian Transport Management Agency, cargo shipments at the twelve major Italian ports increased from 253 to 319 tons between 1998 and 2007, a rise of more than 25% (Ispra, 2008). Rail transportation is not growing in Europe because of its generally poor flexibility, which often makes it an uneconomic alternative. Numerous programs, such as the Marco Polo Programme in the EU or the intermodal container terminal on the Pacific coast of Canada, have been developed to try to overcome this problem (Santos et al. 2010).

¹⁴ To encourage greater use of rail transportation, some European countries have imposed a quota on the number of tractor-trailer trucks allowed to cross the Alps by road. Such a measure could be usefully extended to several congested and critical areas of the Italian peninsula.

moving inside domestically.¹⁵ Nations typically considered to be “democratic” may also be distinguished from authoritarian regimes through mobility, since the former have freedom of internal movement (Bauman, 1998) and international mobility (which is, conversely, restricted by most dictatorships) (Sheller & Urry, 2006).

Along with these political considerations, we can add other cultural and social issues. Modern means of transportation, especially by airplane and car, make physical interconnections faster, cheaper, and safer, although they are usually worse in terms of environmental impact.¹⁶ Combined with the diffusion of contemporary communications technologies, low cost means of transportation offer opportunities for enhancing people’s relations at different levels (Castells, 1996; Castells et al. 2007): we can travel very far in a reasonable time and at a low cost (e.g., to attend a university or a language course, to contact new customers, to receive specialized hospital treatment, to participate in tourism, or to partake in appealing popular events such as sports, entertainment, and public or family ceremonies). As Poulit (2007) argues, mobility also represents a huge advantage both in terms of choice and freedom, as well as with respect to economic growth and cultural opportunities. For example, the effective social unification of Europe has been largely supported by low-cost air travel. However, tensions between the ecological and social dimensions of sustainability may be very strong. The Italian case is a clear example. With respect to people’s medium- to long-distance mobility, Italians have a particularly high level of automobile dependency due to the economic and social history of the postwar period (Paolini, 2005). In terms of cars per capita, Italy scores second in the world ranking, just after the United States. Italy has 63.2 vehicles per 100 inhabitants in comparison to an average for Europe (EU-27) of 46 per 100 people. This extreme situation generates disabling traffic congestion and severe air-pollution problems, which are compounded by the national fleet’s high average age and the large percentage of diesel vehicles operating in the country.

The environmental impact of car dependency can to some degree be mitigated by new “green” technologies, such as electric cars or biofuels (Ambiente Italia, 2007). However, this strategy suffers from paradoxes and tradeoffs between the different dimen-

sions of sustainability. Contemporary electric vehicles face difficult obstacles to increase their share in road transportation, mainly due to high costs, low autonomy, and lack of recharging infrastructure. Additionally, they do not represent a solution to the problem of traffic congestion. In regard to biofuels, many studies have demonstrated their potential social impacts, especially in developing countries, when large amounts of land customarily used for food crops are converted to the production of fuel crops despite a need to feed the local population (von Braun & Pachauri, 2006; Sawyer, 2008; Carrosio, 2011).

In Italy, at the moment, the most important problem is that a strong emphasis on improving the road network is prominent in national transportation policies (Ambiente Italia, 2007), although it is well known that such prioritization can only lead to an increase in road traffic (Noland, 2007).

In contrast, policies to improve water transportation are quite absent from contemporary policy debates, although the Italian coasts offer extensive underutilized opportunity for passenger transportation. A reported increase of 23% in passengers between 1998 and 2007 is comprised primarily of very short-range traffic (such as crossing the Strait of Messina between Calabria and Sicily or connecting Naples with the islands of Campania) or cruise-based tourism (Ispra, 2008).

Concerning very long distances, air traffic in Italy has dramatically increased in recent years as a result of the widespread presence of over 60 airports, while the railway system is not competitive on high-speed routes, especially due to very high fares (Ispra, 2008). As a matter of fact, several initiatives have worked in opposition to efforts to shift flows of passengers from aircraft to railways, such as the reactivation of flights between Milan and Trieste; they roughly follow the Lisbon-Kiev European Intermodal Corridor,¹⁷ along a completely flat region. As the literature explains, the railway seems unable to match the low-cost airline pricing strategies (reducing operating costs and perceived ticket prices, increasing revenues by offering amenities) (Sauter-Servaes & Nash, 2007).

In general, as far as the mobility of people is concerned, we can observe in Italy relatively higher development of those transportation modes with greater environmental impacts, while the relatively “greener” sectors show widespread weakness. Under these circumstances, it is difficult to identify strategies to improve long-range sustainable mobility in

¹⁵ We avoid here a discussion of barriers to the inflow movements of immigrants which occupies the attention of virtually all Western countries.

¹⁶ For instance, according to <http://www.ecopassenger.org>, trains are usually less polluting—carbon dioxide, particulate matter, and nitrous oxides—and energy consuming than airplanes and cars.

¹⁷ Council Decision of 29 October 1993 on the creation of a trans-European road network (93/629/EEC).

Italy. The only recent encouraging investment has been in implementation of a high-speed railway system (connecting Turin to Naples, passing through Milan and Rome), plans for which local communities have (ironically) contested for their environmental impact and very high costs. Also contributing to this opposition has been a perception that the project seems mainly devoted to satisfying the needs of the elite travelers (Della Porta & Piazza, 2008). The price of rail transportation is not competitive with air travel and the high cost of developing the necessary rail infrastructure has reduced public funds for maintenance of the traditional railway system that commuters use on a daily basis (Zanchini et al. 2010). There is a little doubt that promoting sustainable accessibility of people to distant locations will not be possible without strong intervention to make the railway network economically sustainable, for instance by adopting the marketing strategies used by the low-cost airlines (Sauter-Servaes & Nash, 2007). At the same time, transportation of goods needs to be decreased or shifted to water or to railways.

Short- to Medium-Range Sustainable Mobility

Global changes brought about by mobility heavily affect local contexts, in terms of both human well-being and environmental quality, and from a perspective of inequality concerning local resource access. By focusing the analysis on short- to medium-range mobility, two different territorial dimensions are particularly important for the Italian situation: problems related to urban mobility (Colleoni, 2008), that are discussed in the section below, and challenges associated with moving into “fragile areas” characterized by economic and demographic decline, a lack of public services (e.g., schools, hospitals, leisure services) and a shortage of public transportation facilities (Osti, 2004). As outlined in the subsequent section, for Italy it is a relevant issue because approximately 35% of the country’s total land area—supporting 8.5% of the country’s population—is characterized as “fragile” (Cresme, 2000).

Urban Mobility

In Italy, the issue of sustainable mobility in cities is a rather well-developed research and policy topic because of the high concentration of movement within urban boundaries (Asstra-ISFORT, 2005). Based on national data for 2005, approximately nine out of ten trips by motorized transportation modes occur within cities (Asstra-ISFORT, 2005). Cars account for approximately 80% and public transportation represents 12% of urban trips (Asstra-ISFORT, 2005). This modal split has pronounced implications for local sustainability.

Table 1 Distribution of casualties by type of road occurring in Italy in 2007 (ISAT, 2007).

Typology of Road	% Accidents	% Deaths	% Injuries
Highway	5.9%	10.3%	7.1%
Extra-urban road	17.5%	45.5%	19.6%
Urban road	76.6%	44.2%	73.3%

From an ecological perspective, the major problem is the periodic violation of European-mandated particulate and gaseous concentration limits, especially in the northern parts of the country. In Milan, for example, air-quality conditions fell below regulated levels on more than 100 days during 2009, nearly three times more than the maximum permitted by EU legislation. Even if the correlations between air emissions and human health are complex to assess (Finkelstein et al. 2004), the likely impacts on public health seem clear enough and are particularly severe for elderly people and children (Hoek et al. 2002; Gorman et al. 2003). The same sociodemographic groups are also the principle victims of automobile accidents. In Italy, there were more than 230,000 accidents in 2007 with at least 5,000 fatalities and 325,000 injuries. Approximately 76% of these accidents occurred in urban areas, comprising 44% of all fatalities and 73% of all injuries (Table 1). The disproportionate percentage of deaths in urban areas is mainly due to accidents involving members of vulnerable populations (pedestrians and cyclists).

This situation of “unsafety” represents a high barrier to the accessibility of local resources by vulnerable members of society who often do not have access to cars and may self-segregate from certain public spaces (Beckmann, 2004). Children, the elderly, and disabled people represent targets particularly affected by negative traffic impacts.¹⁸ For safety reasons, they are generally kept away from the streets and squares (Appleyard, 1981).

Abandonment of the streets by the most vulnerable groups actually started with the progressive expansion of public spaces devoted to vehicle mobility and the decreasing of areas available for socialization (Engwicht, 1993). To develop automobility, many urban public spaces were converted into vehicular thoroughfares or parking facilities and new collective spaces have, in turn, been created in suburban dis-

¹⁸ Disabled people comprise another category that is adversely affected by the contemporary mobility system. A necessary condition for their participation in society is that the physical space and the transportation system focus on the removal of barriers and the accessibility of services (Dauhs, 1982). Although in recent years significant progress has been made, at least in terms of planning regulations, physical barriers are often insurmountable or do not allow disabled people to travel autonomously (SEU, 2003).

districts (e.g., decentralized administrative offices, grocery stores, scientific and technological parks, leisure-time areas), in most cases, unreachable without a car and often generating supplementary mobility demands (Viale, 2007). In fact, when this process of decentralization is not well-supported by the public transportation system, automobiles can expand their influence zone, with all the resulting consequences, such as increasing travel speeds and traffic-flow intensity (Moriarty & Reed, 1989).

These issues raise the wider problem of justice with respect to urban mobility, especially in terms of access to social and economic resources. Actually, there is a strong relationship between access to means of transportation and social exclusion of the unemployed, the elderly, families with children, youngsters, and low-income people (Cass et al. 2005). Although vulnerable social groups often do not perceive themselves as socially excluded, because of a general inability to recognize alternatives outside of their immediate local contexts (Oppenchain, 2010), research widely recognizes it to be a significant factor in accessing higher education and employment opportunities, and adequate medical care (Boffi et al. 2004; Mercado et al. 2011). It seems that in a society where automobile ownership is taken for granted, not having a car or a driver's license can limit life chances (Viale, 1996).

To address problems related to congestion and air pollution, some Italian cities such as Milan, Parma, and Reggio Emilia, have recently implemented measures that have generated international visibility. Unfortunately, these interventions have not, according to our interpretation, generally demonstrated a satisfactory balance across sustainability dimensions. In particular, policies have focused on reducing environmental impacts and neglected the social aspects of sustainability.

We consider here Milan, a city where transportation policies have been characterized by a strong tradeoff between, on one hand, environmental protection and, on the other hand, equity in accessibility to social and economic resources. While Milan has a creditable public transportation system, particularly in comparison to other Italian cities, many of its disadvantaged areas are not well connected to the rest of the city. This is the case for some social housing districts on the outer fringes (Infussi, 2006), as well as for outlying suburban areas that are only weakly linked to the inner city and to other municipalities on the metropolitan periphery (Laris, 2009).¹⁹ At the

¹⁹ This research was carried out in a suburban area (Pinzano) located 15 kilometers from Milan and characterized by severe socioeconomic deprivation, lack of public services, and poor infrastructure connecting the area to other suburbs or to the inner city of Milan. Focus groups highlighted several problems: restrictions on

same time, recent efforts to develop the accessibility of these poor areas have neither received many resources from local administrations to improve traditional public transportation nor have they used many innovative tools, such as demand response transportation systems (DRTS), car sharing, and carpooling.²⁰ Local public action has instead been largely oriented to sustainable mobility strategies focused on the ecological dimension.

One example is *Ecopass*, a pollution charge with variable fees to enter the city center based on the specific "EURO class" of the vehicle.²¹ Although this measure is innovative with respect to the environmental dimension of sustainable mobility, it does not consider appropriately the potential social justice impacts on the weakest sectors of society. In Italy, vulnerable people typically live in deprived areas poorly connected by public transportation to the city center and cannot afford low-emission vehicles, despite public funding to support the renewal of private parking facilities in recent decades. For this reason, policies oriented to increasing automobile operating costs should be implemented with caution. While such measures could confer environmental benefits, they could hurt low-income people who have no option but to drive (Mercado et al. 2011). Furthermore, policies oriented to renewing private parking facilities show another interesting tradeoff between the different sustainability dimensions: by fostering ownership of zero-emission vehicles (ZEVs), public administrators are reducing environmental impacts from congestion, but are not acting on the underlying problems that create these conditions in the first place.²² As outlined in Figure 2, time (minutes per person) spent daily in movements in Italy has increased in recent years. In addition, congestion may also worsen dangerous conditions that lead to road accidents.

the selection of schools by students, poor accessibility to health services by elderly people, and the impossibility for currently unemployed people to reach potential workplaces.

²⁰ DRTS is an advanced, user-oriented form of public transport characterized by flexible routing and scheduling of small/medium vehicles, operating in shared-ride mode between pick-up and drop-off locations according to passenger's needs.

²¹ *Ecopass* differs from the congestion charge used in London, Stockholm and Trondheim because cars pay fees depending on their level of environmental impact. More specifically, Euro 4 vehicles do not pay a charge to enter the city center, while more polluting cars are subject to a variable fee (Gervasoni & Sartori, 2007; Villavecchia, 2009).

²² Some recent data on the impacts of the *Ecopass* charge in Milan demonstrate that decreases in traffic congestion have been tempered by adoption of less polluting vehicles (Comune di Milano, 2009).

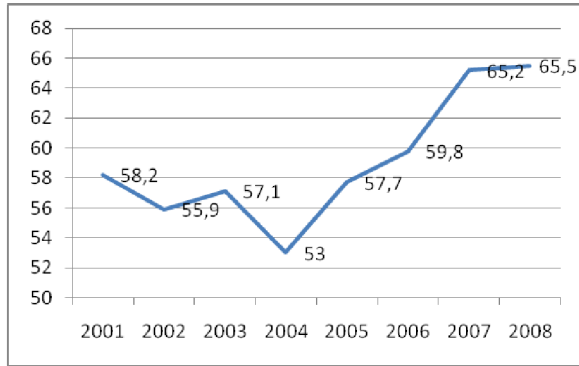


Figure 2 Trend of the time (minutes/person) spent daily in movements in Italy (Author's elaborations on Asstra-ISFORT, 2009).

We have highlighted several reasons why effective action to promote sustainable mobility should be oriented to tools sensitive to the social dimension, encouraging the weak Italian attitude toward organizing individual transfer (e.g., by private car) in collective movements (e.g., buses, trains, collective cars). For example, the introduction of car-sharing schemes, or means of transportation that are available “on demand” (sometimes known as DRTS), have achieved few results in areas that have tested such measures because they are too expensive for public administrations, or lack a “critical mass” of users paying a fee for the service (Debernardi & Battaiotto, 2009). It is well known that the struggle against automobile culture is a big challenge in Italy due to a long history of public support for car manufacturing (Featherstone et al. 2004; Paolini, 2005). There is little doubt that this change requires a strong information strategy and time to reach all possible users (Banister, 2008), especially the most vulnerable such as elderly people (Mercado et al. 2011).

Mobility into Fragile Areas

All of the problems discussed above with respect to urban mobility also affect Italy's fragile areas, and their gravity is compounded because of very weak public action to address the issue (Osti, 2007). Recent studies identify progressive demographic decline in a very significant number of communities in the country's rural or mountainous areas (Cresme, 2008). A total of 1,650 towns out of 8,101 in Italy are deemed to be at risk of permanent abandonment by 2015 (Cresme, 2008). Although there are many reasons for this phenomenon, a particularly prominent factor is the lack of economic opportunities in these communities, a problem exacerbated by inadequate public transportation (Osti, 2007).

The provision of bus service in rural and mountainous areas is expensive because of low population

density, thus there is potential for DRTS interventions in the form of subsidized taxis alongside conventional public transportation (UK Commission for Integrated Transport, 2008). However, public institutions, nongovernmental organizations (NGOs), or businesses have launched some meaningful experiments along these lines (Cucca, 2009b). These initiatives are oriented, first of all, to improving the accessibility of public services and communities and to spread services throughout the territory. Because of the Internet's relevance in the development of such services, many local administrations in rural and mountainous regions are acting to limit the digital divide that still characterizes these fragile areas (Warren, 2007). As far as these services are concerned, there are some interesting examples from the care sector, especially related to the needs of the elderly who comprise a prominent part of the rural population, the delivery of prescription drugs and the provision of home-health services by NGOs and cooperatives as a strategic tool to enhance their sustainable life conditions. In addition, some actors are promoting new kinds of collective transportation that are less expensive than traditional public bus services. An NGO in northern Italy's mountainous areas has recently introduced an interesting system of carpooling to organize people who are commuting regularly, as well as traveling more infrequently, along common routes (Panna, 2009).

However, these experiments will likely be insufficient if they are not framed as part of a more general strategy of integrated transportation policies for these so-called fragile areas (Santos et al. 2010). Contemporary organizational modes have many impacts on local sustainability and demonstrate some interesting paradoxes, the most prominent of which is the lack of environmental pollution generated by the population's low access to economic and social resources. This phenomenon not only fosters the economic and demographic decline of fragile areas, but also implies huge social costs for residents, who are forced to become daily commuters or are pressed to migrate toward the suburbs, increasing urban sprawl and is associated environmental impacts.

Final Remarks: Fostering Sustainable Accessibility

This article has sought to demonstrate the complexity of issues related to sustainable mobility and to analyze some of the tradeoffs that emerge out of current policies that have been adopted in Italy. A harmonious balance among environmental protection, economic prosperity, and social integration is difficult to achieve through initiatives for the reorganization of people and goods mobility. Current mobility

trends are contributing to a range of environmental problems including resource consumption (fuel and soil) and air and noise pollution. In addition, the advantages and disadvantages of mobility are not equally distributed in terms of access to social and economic resources. High levels of accessibility have been achieved only by a minority of the world's population that is able to enjoy the benefits of very favorable economic, logistical, and infrastructural conditions. In fact, ecological harm from mobility is mainly generated by the most developed countries, which arguably should assume some financial burden for environmental mitigation or renewal. A further challenge is that the social and environmental costs often accrue to people who can hardly enjoy the related benefits. This situation entails a problem of fairness in burden sharing for environmental protection that unduly encumbers low-income people. As a result, the socioenvironmental costs of transportation systems should be carefully evaluated, with consideration devoted to identifying who gains and who loses from specific policy decisions.

However, there is little doubt that mobility represents, at the same time, an increasingly strategic asset for human development. Research has shown how social inequalities can be measured, *inter alia*, in terms of differential access to resources (SEU, 2003). For this reason, the challenge is to improve strategies oriented to more sustainable accessibility by limiting some of the tradeoffs between the different dimensions of the concept: environmental protection, economic sustainability, and accessibility (CEC, 2000). Such an approach becomes possible only by the innovation of tools available for the task, with particular attention to facilitating, controlling, and reorganizing the flows at different territorial levels, to interrupt the vicious feedback loops between short and long ranges of mobility (Cucca, 2009a).

First, it is necessary to facilitate individual movements by structuring actions that make individual travel more ecofriendly and safe. This objective can be achieved by encouraging transportation that does not promote automobile dependency, such as walking and bicycling and the development of a new transportation hierarchy that reduces urban traffic speeds and reallocates space to light mobility and social life (Banister, 2008). The above discussion describes how such strategies can improve accessibility to local resources for the most vulnerable people. However, because of the personal automobile's high legitimacy, it is also important to foster the diffusion of ZEVs and to improve traffic flows through the innovative use of traffic-control systems (Begg & Gray, 2004).

Second, planners should seek to contain individual movements in various ways. The most important

approaches are related to land-use policies that reduce the physical separation of activities, increase density and concentration (e.g., mixed-use development, housing location, space and route layouts), and situate public services in proximity to already-existing infrastructures. Successful compact cities are, however, only attainable by creating attractive and affordable spaces and localities in the urban area, and by reducing opportunities and motivations for "escape mobility" (Heinze, 2000). It is also important to put services at accessible points in rural and mountainous areas and to fight urban sprawl dynamics. Another strategy to facilitate this process is to encourage the uptake of information and communications technologies to reduce mobility demand through telework and computerization of utility services (Moos et al. 2006). Initiatives that enable home care, especially with respect to the needs of elderly or disabled people can have this desirable effect (Shergold & Parkhurst, 2010). The containment of movement also seems particularly important in terms of the mobility of goods and strategies that decouple and valorize local production.

Finally, there is the ambitious goal of reorganizing individual movements by creating opportunities for collective mobility. This objective can be pursued through the "classic cure of iron" by extending underground networks and developing railway infrastructure, including penetration into the urban context (Tacchi, 2007). There is also the upgrading of buses and increasing their efficiency by, for instance, creating new dedicated lanes. Opportunities additionally exist to trial and diffuse innovative strategies such as DRTS, car sharing, and carpooling. The provision of information about how to effectively combine different means of transportation to reach a particular destination can play an important role as a component of these strategies.

The ultimate goal should be promotion of integrated transportation policies (Santos et al. 2010) at different territorial levels that are able to manage the pressures of globalized modernity, where challenges of movement have become prominent features of social inequality (Cass et al. 2005). Accordingly, some experimental policies to promote sustainable mobility, as part of wider policy programs, have begun to receive attention and deserve to be supported. These measures, often promoted by civil society, effect different sustainability dimensions and take into consideration both the ecological and social pillars. Only a balanced transportation system can contribute to comprehensive and unambiguous progress toward sustainable development and promote a transition from the focus on ecofriendly mobility to sustainable accessibility. The real challenge is not one of fostering greener mobility for a narrow elite, but

promoting fair and responsible access to resources for all.

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