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Economic Perspectives on Transport and Equality



Discussion Paper 2011 • 09

David LEWIS
HDR Corporation

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ECONOMIC PERSPECTIVES ON TRANSPORT AND EQUALITY

Discussion Paper No. 2011-09

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April 2011

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EXECUTIVE SUMMARY

Poverty, inequality and social exclusion are closely tied to personal mobility and the accessibility of goods and services. Evidence of the economic role of transport in promoting better living standards and greater wellbeing can be seen in the effects of both overall public investment in transport infrastructure, and in the impacts of specific transport policies, projects and multi-project plans.

At the level of overall public expenditure, transport capital investment measurably promotes growth in worker productivity: This is significant because productivity growth is key to facilitating growth in personal incomes and living standards, and to closing income disparities between regions and sub-regions.

At the level of specific policies, investments and plans, transport is seen to create economic wellbeing for a wide range socially disadvantaged groups, including the poor, elderly people, people with disabilities, children, young adults, and women. Such benefits include greater accessibility to work and other life-chances and reduced stigmatic harms associated with social exclusion.

This paper argues that transport planning, economic evaluation, and governance modalities need to do a better job of adapting to the perspective on transport as a legitimate policy instrument for diminishing inequality and creating a just distribution of social value. Analysis methods to identify and measure such value, and governance mechanisms to ensure that equity objectives are properly served, are beginning to appear. This is a trend to be encouraged, particularly through the extension of economic evaluation methods and governance mechanisms to:

- Account for a wider range of transport benefits and effects than traditionally recognized;
- Address multi-project and multi-policy plans as well as individual projects; and
- Shape transport plans with measures, both transport and non-transport, that mitigate systematic social biases; and
- Give transport a direct, proactive role in fostering equality (rather than merely mitigating social biases) by encouraging the development of emerging policy development and planning methods that are rooted less in welfare economics and more in the operational ideas of social justice.

1. INTRODUCTION

The recession has attuned the general public to the idea of transport infrastructure as something to be ramped up quickly when an economic slowdown motivates the need to stimulate employment. But as attention turns to reducing public sector deficits, it is vital to recognize that the fundamental economic purpose of transport policy is not the transitory jobs that arise during the construction of infrastructure projects. Transport policy is about nothing less than creating societies in which people can prosper and live a good life. To be sure, travel itself creates no economic value: Unless we're on a cruise, the time, money and effort spent getting from here to there represent a cost, not a benefit, of daily life. It is the life activities for which travel is the means of access that produce economic opportunity and value in peoples' lives - activities such as work, accessing food and water, going to the doctor, visiting family and friends, going to the pub, seeing a film. Recognizing that almost everything people do in the pursuit of well-being and happiness requires travel, the quality of government transport policy is ultimately manifest in nothing less than the quality of peoples' lives.

2. TRANSPORT AND INEQUALITY

According to transport scholar Martin Wachs, mobility and access to transportation are two of the most important global economic forces for the alleviation of poverty, inequality and social exclusion.¹ While the degree of empirical strength in this conclusion may be debated, most investigators agree that poverty, inequality and social exclusion are tied to personal mobility and to the accessibility of goods and services. In richer and poorer countries alike, Wachs notes that people with disabilities, women and girls and other disadvantaged people suffer from measurable deficits in nutrition, health care, employment and education. While such deficits reflect an array of simultaneously occurring causes (from poor housing to weak governance), problems traveling and moving goods at affordable cost can rank among them. Recognizing weak transport and energy infrastructure as key constraints to poverty reduction in Africa, the African Development Bank (ADB) has made infrastructure development a cornerstone in its development agenda and promotes private and public sector infrastructure development through the provision of financial and technical resources."²

A link between improved transport and diminished regional disparities in income and well-being is evident in emerging and developed economies alike -- mobility and transport have a role to play in diminishing economic and social gaps between rich and poor in literally all the world's economies.³ In coordination with other sectoral policies, transport represents an important policy instrument for reducing poverty and diminishing social exclusion. Germany, for example, is reported to have witnessed a larger reduction in sub-regional income disparity since the mid-1990s than most other OECD nations.

-
1. Martin Wachs, **Transportation Policy, Poverty, and Sustainability: History and Future**, 2010 **Thomas B. Deen Distinguished Lecture, Transportation Research Board, January 2010.**
 2. Mthuli Ncube, Hee-Sik and Albert Mafusire, **Governance and Infrastructure in Africa**, (in) 2010 Ibrahim Index of African Governance, Revised Edition, 2010, page 8.
 3. Ibid, (and) Social Exclusion Unit, **Making the Connections: Final Report on Transport and Social Exclusion**, Office of the [UK] Deputy Prime Minister, February 2003.

Analysis attributes this convergence in part to national and European Union funds for infrastructure (as well as to research and development, education and the transfer of some manufacturing jobs from factories in the western states to the east).⁴ As shown in Section 3 below, large infrastructure investment programs can promote productivity growth, one of the key factors in reducing income inequalities between regions and raising a real personal incomes.

A 2003 U.K. study on transport and social exclusion identifies a linkage between the concept of “accessibility” and economic disadvantage. The term accessibility goes to “whether people can get to key services at reasonable cost, in reasonable time, with reasonable ease.”⁵ Accessibility is shown to depend on whether transport exists between people and the services they require; whether people know about all available transport service; whether they find it reliable and feel safe using it; and whether people are physically and financially able to access it. The U.K. study also reports that accessibility can turn on whether key services and places of life activity are within reasonable distance one each other, observing that while solving accessibility problems may be about transport it can also be about locating and delivering key activities in ways that help people reach them. Based on surveys, the U.K. study identified six distinct transport-related problems associated with low income and social exclusion in that country:

- Access to work. Two out of five jobseekers say lack of transport is a barrier to getting a job. One in four jobseekers say that the cost of transport is a problem getting to interviews. One in four young people have not applied for a particular job in the last 12 months because of transport problems.
- Access to learning. 16-18 year old students spend on average £370 a year (in 2002) on education-related transport, and nearly half of them experience difficulty with the cost. Six percent of all 16-24 year-olds turn down training or further education opportunities because of problems with transport.
- Access to healthcare. 31% of people without a car have difficulties traveling to their local hospital, compared to 17% of people with a car. Over 1.4 million people say they have missed, turned down, or chosen not to seek medical help over the last 12 months because of transport problems.
- Access to food shops. 16% of people without cars find access to supermarkets difficult, compared with 6% of the population as a whole.
- Access to social, cultural, and sporting activities. 18% of people without a car find seeing friends and family difficult because of transport problems, compared with 8% for car owners. People without cars are also twice as likely to find it difficult getting to leisure centres (9%) and libraries (7%).
- Impact of traffic on deprived communities. Children from lowest social class are five times more likely to die in road accidents than those in the highest social class. More than a quarter of child pedestrian casualties were found to occur in the most deprived 10% of wards.

A common thread running through many of the inequities and practical mobility problems outlined above is the disparity between those with and without access to a car. Even in developed nation’s a significant minority of people do not have access to a car for reasons of affordability, disability, age (and choice). Low income is of particular significance. In the U.K., for example, statistics indicate that among the 20% of households with the lowest real incomes, fully 63% do not have access to a car (Figure 1). Women are less likely to have a driving license; in the U.K. statistics indicate 25% of women live in households

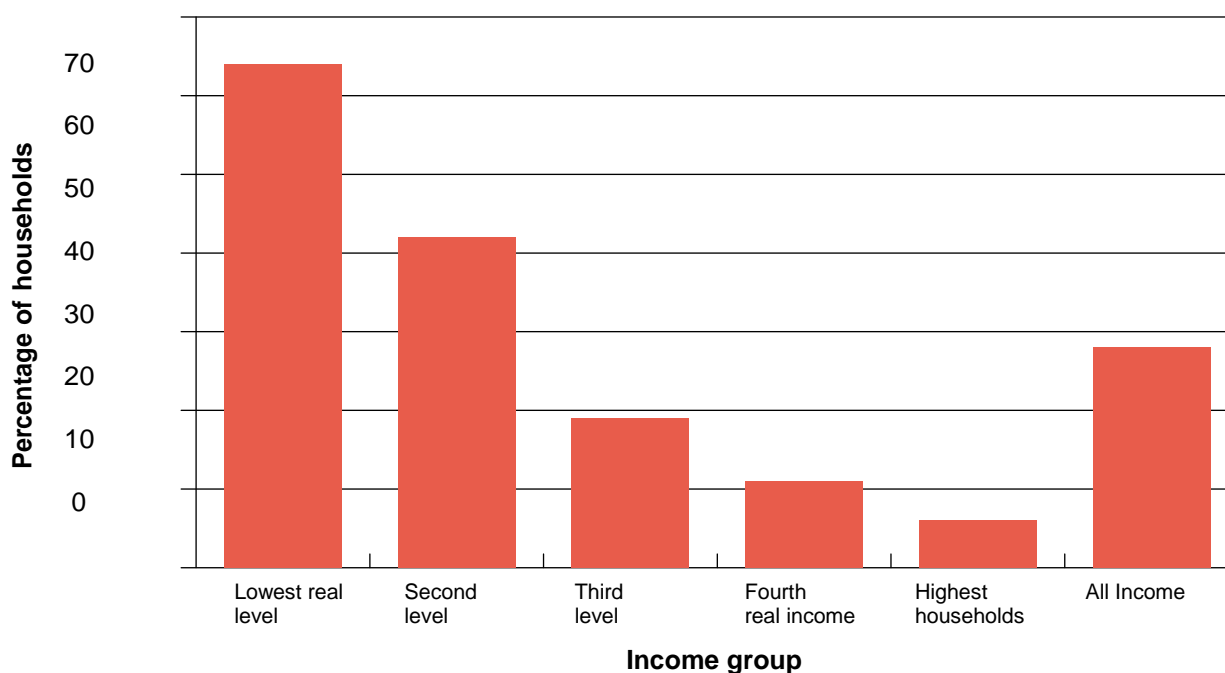
4. The Economist, **Regional Inequality**, March 12-18, 2011, pages 83-84.

5. Ibid.

without a car compared with 17% of men. The combination of low income and low car ownership make the poor, women, older people, the young and people with disabilities disproportionately dependent on public transport. Public transport can itself pose accessibility and mobility barriers through weaknesses in route coverage, schedule, frequency, reliability and physical accessibility to people with disabilities. Fares can also be a barrier to public transport, with real bus fares having risen multifold in real terms in many nations over the past two decades.

In the context of emerging economies, moreover, research documents that billions of people walk significant distances every day to find clean water, lack physical access to medicine, and have no school within walking distance of home. Transport investments of many sorts can bring people to the places they need and wish to go and to services they need to consume; and transport of many kinds can bring goods and services to people.

Figure 1: **Households without a car by income, 1998/2000**



Source: Office of the Deputy Prime Minister, Making the connections: Final Report on Transport and Social Exclusion, Report by the Social Exclusion Unit, February 2003.

3. TRANSPORT OPTIONS FOR ALLEVIATING ECONOMIC INEQUALITY

Wachs reports that the relative effectiveness of improvements in mobility to reduce poverty depends on the degree to which a society is already developed:

“A bicycle or an animal may be extremely important in some contexts and ineffective in others. Given the enormous disparities in mobility among societies, many areas can benefit greatly from improvements in the ability to travel from place to place on foot by using animal or human motive power, for example, or on land using bicycles and handcarts or on water using canoes or rafts; by using wind power for sailing; and by using mechanical motive power in the form of petroleum-based engines and electricity-powered motors.”⁶

6. Wachs, page 5.

In the highly developed European context, research on social exclusion identifies a further range of measures that might help tackle the kind of accessibility problems associated with poverty and social exclusion, including:

- Improving physical accessibility and availability
 - Wider network of mainstream bus routes
 - Making more public transport physically accessible to people with disabilities
 - More flexible bus services whose routes adjust according to demand
 - Shuttle services to specific work and other locations
 - Car clubs
 - “Wheels to work” programs
- Making travel more affordable
 - Concessionary public transport fares for particular groups
 - Travel vouchers that passengers can use on different modes
 - Driving lessons for unemployed people if they take up work opportunities
- Widening awareness - helping people understand the travel options available to them through
 - Travel advice
 - Travel training and personalized travel plans
 - Improved travel information
- Reducing the need to travel
 - Focusing shops, leisure facilities and offices in city centres or local centres
 - Travel training and personalized travel plans
 - Planning policies that promote development and services in suitable places
 - Encouraging outreach, home and virtual delivery services
- Safer streets and transport facilities and equipment.
 - Better street lighting
 - Traffic calming and road safety measures
 - Improved travel information
 - Secure station programs

The list of possible transport measures to address poverty, inequality and social exclusion also includes major capital investments in new capacity. Better roads and railways can sharply increase the geographic range of employment opportunities available to poorer individuals. Such improvements can also generate agglomeration economies in cities and urbanized regions, creating productivity-induced improvements in real wages.

4. IMPROVING ECONOMIC WELL-BEING THROUGH TRANSPORT POLICY

Public can create value and improve well-being. But investment costs money. This, together with the reality that, as shown above, there exist a great many options of relevance to the goals of transport policy, means that decision makers face difficult decisions and trade-offs. At the aggregate level, trade-offs are required in the allocation of public funds to the transport sector relative to other sectors. At the disaggregate level, trade-offs are required among competing projects and programs. It is helpful therefore to understand how transport creates economic value and promotes well-being at both levels.

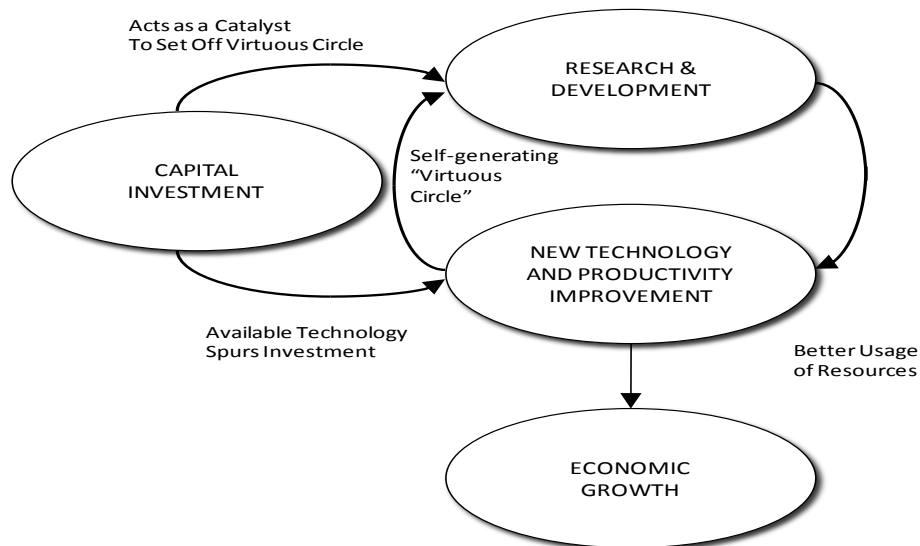
4.1 *Transport's Influence on Well-Being at the Aggregate Expenditure Level*

The aggregate level of transport investment creates improved well-being by enabling economic expansion (growth in Gross Domestic Product – GDP) and thus improved living standards. To be sure, there is a lot more to creating the conditions for a good life than growth in GDP. But without GDP growth, peoples' disposable incomes cannot grow and neither, therefore, can their standard of living improve.

GDP may be seen as the product of the number of workers times the amount of production per worker. Growth in the economy springs from these two sources, more people making goods and services (more workers) and more output per person (more productivity). But the two are not of equal significance to the alleviation of poverty and inequality. It's productivity growth that contributes most to most to long-term economic expansion. Research indicates that up to 85% of GDP growth over the past 50 years is attributable to increased worker productivity as opposed to increases in the sheer volume of workers.⁷ And studies suggest that differences in productivity are far more important than differences in joblessness in explaining regional income disparities (note the example of diminished regional income disparities in Germany noted in Section 2).

So what drives productivity growth? This is where capital investment in general, and transport infrastructure in particular enter the picture. The productivity of labour is significantly affected by the per-worker rate of capital investment – the amount of money spent in building up the nation's capital stock. In short, workers produce more per hour when they are equipped with better facilities and equipment. Less obvious is the fact that the *rate* of capital investment also affects the productivity of facilities and equipment, further improving worker productivity. Because new capital embodies the latest technology, the more rapidly new capital is added to the capital stock, the faster average productivity will grow. And the rate of technological progress itself is dependent on the rate of capital investment. The more quickly new capital is added to the capital stock, the better the quality of that capital will be in terms of embedded technology. This in turn means higher productivity and higher growth. Figure 2 illustrates how capital investment stimulates technological advance, productivity growth and economic expansion. Except for a small part devoted to basic science, research and development are seldom undertaken unless the results are expected to be applied in new facilities and superior operating modes that can increase productivity, reduce costs and improve the quality of goods and services. Therefore a larger rate of investment creates a market for technological improvements, spurring technological advance. The result is a "virtuous circle" of capital expansion and technological advance that yields economic growth and growth in peoples' earning power and standard of living.

7. David Lewis, Daniel Hara, and Joseph Revis, **The Role of Infrastructure in the 21st Century** (in *A Look Ahead; Year 2020*, Transportation Research Board, Washington D.C., 1988.

Figure 2: **Economic Growth through Capital Investment: A Virtuous Circle**

Source: David Lewis, Daniel Hara, and Joseph Revis, *The Role of Infrastructure in the 21st Century (in) A Look Ahead; Year 2020, Transportation Research Board, Washington D.C., 1988.*

All of the above is true for private and public investment alike. Public investment (such as investment in transportation infrastructure), is a fundamental and necessary part of a nation's capital stock. So any strategy to boost productivity and achieve higher economic growth and well-being must include a commitment to the maintenance and enhancement of a nation's public infrastructure.

A number of studies give evidence of significant private sector productivity gains from public infrastructure investments. In many cases, returns to public investment are greater than returns to private investment.⁸ The research record indicates that infrastructure investment can raise economic growth, productivity, and land values, while also providing significant positive spillovers to areas such as economic development, energy efficiency, public health, manufacturing and overall living standards. While the direction of causality is difficult to prove unambiguously, a number of carefully designed studies lend weight to the probability of a causal link running from infrastructure investment to subsequent private sector productivity gains. On the premise that, in reasonably well functioning (i.e. competitive) economies, workers share in the gains to productivity, it can plausibly be inferred that aggregate infrastructure investment lifts well-being and living standards. A study centered on the Mexican city of Acayucan found that road paving substantially raised housing values substantially more than the cost of living, thereby substantially improving living standards.⁹ Edward Gramlich finds a high rate of return from bringing deteriorated roads up to a state of repair in line with their original design standards.¹⁰

An example of the entire virtuous circle at work was seen in the 1990s. Vigorous highway investment helped trigger research that, in turn, let loose the just-in-time revolution that sparked productivity growth in the manufacturing sector. Better roads and railways unleashed a wave of research and development of internet-based "e-procurement

8. United States Department of the Treasury with the Council of Economic Advisors, **an Economic Analysis of Infrastructure Investment**, October 11, 2010.

9. Quintana-Domeque, Climent and Marco Gonzalez-Navarro, **Street Pavement: Results from an Infrastructure Experiment in Mexico**," Industrial Relations Section, Princeton University, Working Paper No. 556, July, 2010 [as cited in *ibid.* page 6].

10. Gramlich, Edward, **Infrastructure Investment: A Review Essay**, *Journal of Economic Literature*, Vol. 32, No. 3 Sept., 1993 pp. 1176-1196 [as cited in *op.cit.* Department of the Treasury page 6].

purchasing systems,” digitized assembly lines, advanced robotics, networked stock replenishment systems and other technologies that enabled manufacturers to shed millions of square feet in storage and customer service infrastructure.¹¹ In most OECD nations, national productivity grew in the ‘90s like never before.

Another example of the virtuous circle at work is the dramatic improvement in well-being in China over the past two decades which, according to Wachs, rests on a foundation of significant investment in ports, airports, roads and public transportation. Wachs notes that whereas a significant rise in car ownership in China is the result of increased wealth, “it is also to a great extent the cause of China’s rise as a world power. This is in addition to a huge increase in the number of bicycles, electric bicycles, cars and buses that are becoming ubiquitous in cities and also in rural areas. Citizens are using all such means to access education, health care, and recreational opportunities and to obtain goods brought to them by the expanding freight transportation system.”

Today, the economic case for aggregate investment in transport infrastructure turns heavily the creation of faster and more reliable and predictable journey times that help promote productivity growth. By investing in new capacity to reduce congestion and in the repair and rehabilitation of wearing pavement and aging facilities and equipment, governments promote well-being by promoting productivity growth. The reverse is also true: an insufficient level of aggregate public investment in transportation infrastructure can starve a nation’s productivity growth, and that’s a threat to peoples’ well-being and standard of living.

4.2. Transport’s Influence on Well-Being at the Disaggregate Project and Plan Level

To say that aggregate spending on transport infrastructure investment promotes well-being is, however, partly to miss the point. The chief hope for increased productivity growth and higher standards of living comes not solely from the quantity of capital, but from more efficient and better-suited facilities, equipment and technology – namely, high quality investment. In the case of private-sector investment market forces help ensure high quality investment decisions: The virtuous circle of capital expansion, technological advance and economic growth is naturally driven by profit-seeking market forces. In the public sector, where market forces are weak, the achievement of sound infrastructure investment decisions requires concerted effort.

“Welfare economics,” including Cost-Benefit Analysis and a related family of project appraisal methods provide the principal lens through which a perspective on the quality of transportation investments is taken. The European Union¹² and most, national and sub-national governments, have formal methods and procedures for the appraisal of transport projects.

Prior to recent developments, applications of Cost-Benefit Analysis and related project appraisal methods took little or no direct account of equity and social exclusion. Indeed, equity and related social issues were viewed as lying outside the reach of economic analysis, something to be addressed in other, “social policy” arenas. A recent critique of project appraisal practices¹³ finds that, whereas the technical apparatus of Cost-Benefit Analysis rests on a foundation of accepted economic principles, the ethical, analytical and democratic foundations in which the procedures of Cost-Benefit Analysis are rooted have changed over the last 50 years. Thus, whereas the technical practices of Cost-Benefit Analysis generate little controversy among practitioners, citizens and decision makers might

11. David W. Gillen and David M. Levinson (Eds), **Assessing the Benefits and Costs of ITS: Making the Business Case**, Kluwer Academic Press, 2004.

12. European Commission: Directorate General Regional Policy, **Guide to Cost-Benefit Analysis of Investment Projects**, July, 2008.

13. David Lewis, **The New Cost-Benefit Analysis**, MacArthur Foundation, June 2006.

regard the product as unhelpful, irrelevant or wrong.¹⁴ Whereas Cost-Benefit Analysis recognizes the existence of obvious liberties and duties (due process of law and natural rights, for example), it draws no fundamental distinction between “the good,” “the right,” or “the fair” in seeking out economically efficient solutions. Such things as the distribution of income, social exclusion and human rights are viewed as “non-economic” or “political” factors to be introduced into decision making outside the context of Cost-Benefit Analysis. With Cost-Benefit Analysis, efficiency maximizing solutions are searched for outside the choice process itself. The Cost-Benefit Analysis is conducted as a research exercise within a larger context in which decisions about the allocation of resources and the character of fairness, rights and duties are taken by elected or appointed officials who receive advice on the resource dimension from third-party experts (such as economists). Experts treat resource values (time, life, property, environment, time-preference) as data to be drawn from the empirical analysis of consumer behaviour; the decision making process itself tends not to be regarded as a source of information about resource values.

When decisions veer from the steps recommended in Cost-Benefit Studies, economists tend to look for the “political logic” that might explain the divergence from the economically correct course of action. Does the maximization of welfare (happiness) really exist only within the province of economics, not that of politics? Or, has modern society’s view of what constitutes the basis for well-being and happiness gone beyond the assumptions of classical utilitarianism, the basis for traditional Cost-Benefit Analysis. In recent years, attempts have been made to adapt the technical apparatus of project appraisal to align with contemporary policy goals and democratic governance. Four ways in which this is so are:

- Translating the compensation principle from theory to reality;
- Recognizing inequality and social inclusion in the identification and measurement of costs and benefits;
- Embracing democratic procedures and good governance in the process of appraising projects and plans;
- Movement away from the economic paradigms of appraisal in favour of approaches rooted more directly in the concepts of social justice and human need.

4.2.1. *Making Compensation and Mitigation a Reality*

In theory, satisfying the Cost-Benefit Analysis criterion for a worthwhile policy or investment requires that benefits exceed costs and that no one is made worse off by the change under consideration (this is known as the Pareto criterion). Since projects and policies satisfying that rule are rarely observed in the real world, an attempt to improve upon the Pareto criterion was formulated in the early part of the 20th century. Called the compensation principle, it states that a policy change or investment can be deemed an economic improvement if the benefits exceed the costs and if those who stand to gain could, through lump sum transfer payments, compensate those who stand to lose and still remain better off. However, this rule requires only that prospective net benefits are sufficient to create the **potential** for such compensation, *not that compensation actually occur*.

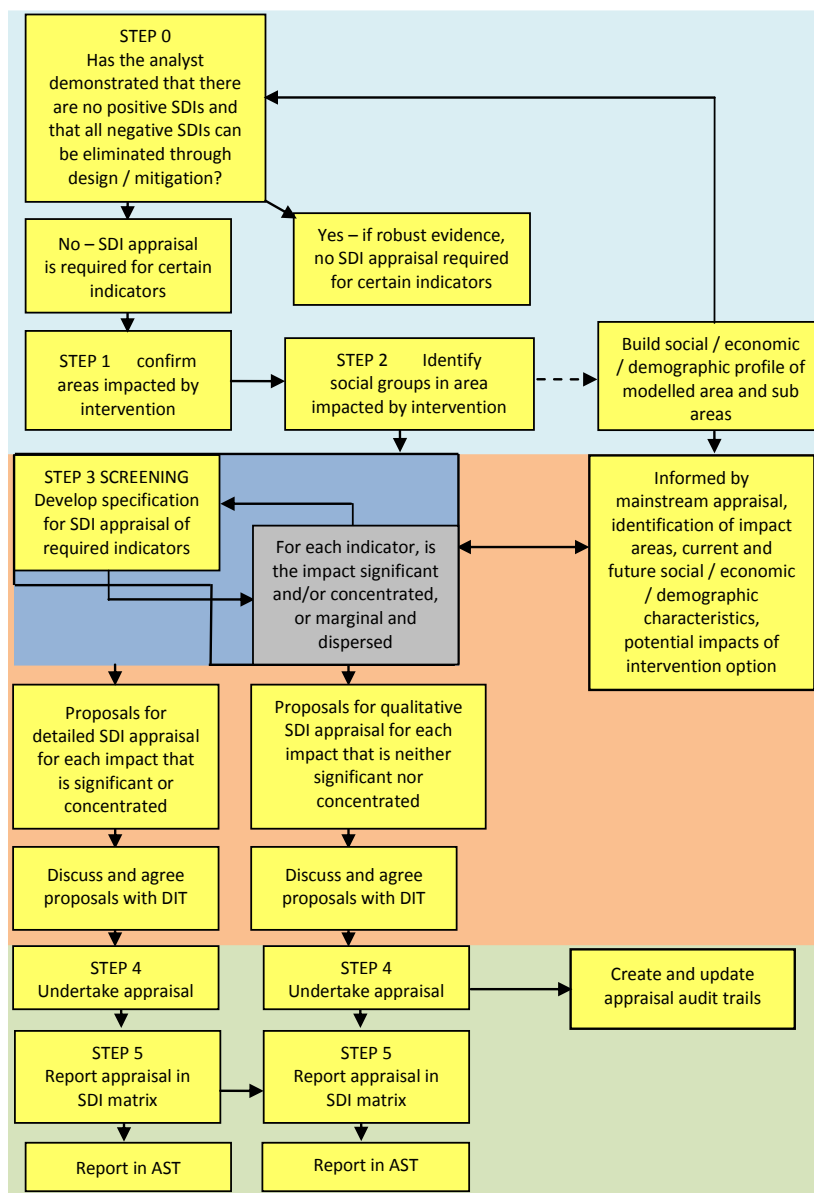
Some of the more recent formulations of project appraisal seek to go beyond looking at merely the potential for compensation. In European Union guidelines for the Cost-Benefit Analysis of transport projects, practical methods for the calculation of distributional impacts are suggested.¹⁵ In the United Kingdom, detailed guidance is being formulated for the

14. For a related discussion see, Joint Transport Research Centre, OECD, International Transport Forum, **The Wider Benefits of Transport, Macro-, Meso and Micro Transport Planning and Investment Tools**, Discussion Paper No. 2008-6 J, January 2008.

15. Op.cit., European Union, Appendix E of the EU Guide gives three possible methods of analyzing distributional issues; (i) a more general formula for shadow prices could be used, plugging in the

appraisal of transport investment options that would require the specific analysis of social and distributional impacts. Where negative consequences for particular social groups are identified, actual mitigating steps would need to be formulated and integrated into the proposal under consideration prior to the possibility of it being deemed economically worthwhile¹⁶ (see Figure 3).

Figure 3: **United Kingdom Standardized Accounting Framework for Measuring the Benefits of Accessibility**



Note: SDI denotes social and distributional impacts.

Source: Detailed Guidance on Social and Distributional Impacts of Transport Interventions, TAG Unit 3.17, IN DRAFT, U.K. Department for Transport, Transport Analysis Guidance (TAG), January 2010

welfare weights in the shadow prices, and thus avoiding further distribution calculations; (ii) explicit welfare weights derived from social inequality aversion estimates to be attached to the project winners and losers, when shadow prices do not include welfare weights; and (iii) focus on the impact of the projects on the poor, and particularly on the share of income necessary to pay for the service.

16. Department for Transport (U.K.), **Detailed Guidelines on Social and Distributional Impacts of Transport Interventions, TAG** (Transport Analysis Guidance) Unit 3.17 (Draft) January, 2010.

In North America, Cost-Benefit Analysis appraisals of transport policy proposals are also beginning to examine ways and means of mitigating negative effects they may have on disadvantaged groups. A recent Cost-Benefit appraisal of nationwide congestion pricing, for example, found that whereas the net economic benefits would likely be highly positive (\$113 billion in net congestion relief benefits over 20 years, as shown in Table 1), the effect on low income drivers would be highly regressive, with low income households expected to pay significantly more on tolls as a percentage of their household income than higher income households (see Figure 4). The study, published by the Brookings Institution,¹⁷ concluded that congestion pricing would be unacceptable without steps to mitigate the disadvantages for low income households and devised a scheme to capture compensate low income travelers in such a way as to avoid diluting the incentives that congestion prices are designed to serve. As shown in Table 2, the cost of the compensation scheme was estimated at \$41 billion – significant, but not enough to erode the net benefits of congestion pricing, thereby creating a win-win congestion pricing policy framework.

Table 1: Time Savings and Accident Cost Savings from Congestion Pricing Relative to the Loss of Economic Value (“Consumer Surplus”) for those Priced Off Roads (Interstates and Freeways with Volume-to-Capacity Ratio above 0.7)

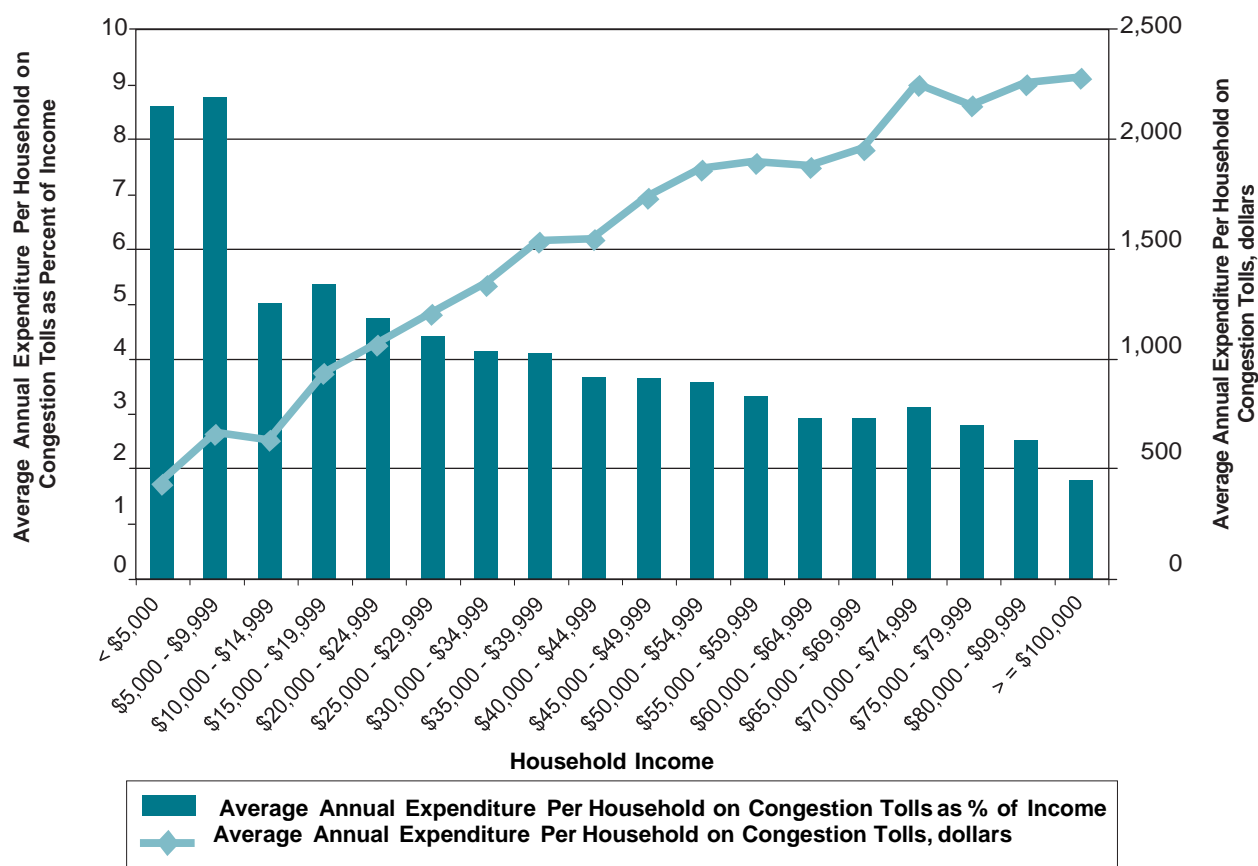
Economic benefits and costs		Year 1 of congestion pricing	Year 20 of congestion pricing
Benefits (U.S. billions, 2002 dollars)			
1	Travel Time savings to Road Users who stay on the Roads and Accident Cost savings	\$13.68	\$26.84
Costs (U.S. billions, 2002 dollars)			
2	Loss in Economic Value to Road Users who Reduce the Number of Trips They Take or Divert to Other Times of Day, Other Roads or Other Modes	\$0.70	\$2.33
3	Costs of Toll Collection	\$6.20	\$7.60
4	Total Costs: (2)+(3)	\$6.90	\$9.93
5	Net benefit: (1)-(4)	\$6.78	\$16.91
Net benefit (net present value) over 20 years (7% discount rate)			\$113 billion

Source: David Lewis, America’s Traffic Congestion Problem: Toward a Framework for Nationwide Reform, The Brookings Institution, Discussion Paper 2008-06, July 2008.

Notes: Time savings represent \$4.8 billion (35%) of total benefits in Year 1 while the social benefit from accident reduction accounts for \$8.9 billion (65%). By the twentieth year, time savings and accident cost savings account for 44% and 56%, respectively, of total benefits. Time savings are probably understated due to the simplified version of the underlying speed-flow relation used. Research is ongoing in relation to this issue.

17. David Lewis, **America’s Traffic Congestion Problem: Towards a Framework for Nationwide Reform**, The Brookings Institution, July 2008.

Figure 4: **Income Distributional Consequences of Congestion Pricing on Congested Roads in urbanized Areas**



Source: David Lewis, The Brookings Institution, America's Traffic Congestion Problem: Toward a Framework for Nationwide Reform, Discussion Paper 2008-06, July 2008.

4.2.2. *Recognizing inequality and social inclusion in the identification and measurement of economic costs and benefits*

Economic appraisal methods are beginning to appear that identify indicators and metrics against which to ascertain, in addition to conventional transport benefits and costs (time savings, for example), the effect of transport projects and multi-project and policy plans on the poor, the socially excluded, people with disabilities and otherwise transport-disadvantaged groups. The framework depicted in Table 3, for example, was developed in 2010 by the U.K. Department for Transport. As the Table shows, the effects of investment plans or projects on eight social groups (the rows in the table) are evaluated in terms of up to eight dimensions of inequality and social exclusion (the columns). It is noteworthy that the eight dimensions of inequality and social exclusion cover, in addition to accessibility, connectivity and affordability (see earlier), exposure to environmental problems (air and noise pollution), injury, crime, neighbourhood severance. These wider factors of deprivation go to the concept of "environmental justice."

Table 2: Income Distributional Impact of Congestion Charges on Interstates and Freeways with Volume-to-Capacity Ratio above 0.7

Gross annual household income	Annual household expenditure on congestion charges per household	Annual household expenditure on congestion charges as a percentage of annual income	Annual cost of compensation for congestion charges to households (Billions of 2007 dollars)
< \$5,000	\$428.55	8.6%	\$1.0
\$5,000–\$9,999	\$655.28	8.7%	\$3.4
\$10,000–\$14,999	\$622.30	5.0%	\$2.9
\$15,000–\$19,999	\$930.49	5.3%	\$5.3
\$20,000–\$24,999	\$1,061.29	4.7%	\$5.1
\$25,000–\$29,999	\$1,198.90	4.4%	\$7.9
\$30,000–\$34,999	\$1,334.43	4.1%	\$5.8
\$35,000–\$39,999	\$1,530.65	4.1%	\$10.0
\$40,000–\$44,999	\$1,540.55	3.6%	\$4.94
\$45,000–\$49,999	\$1,730.82	3.6%	\$9.61
\$50,000–\$54,999	\$1,858.29	3.5%	\$4.80
\$55,000–\$59,999	\$1,890.05	3.3%	\$8.47
\$60,000–\$64,999	\$1,871.12	3.0%	\$3.57
\$65,000–\$69,999	\$1,950.93	2.9%	\$6.23
\$70,000–\$74,999	\$2,243.30	2.9%	\$3.58
\$75,000–\$79,999	\$2,146.45	2.8%	\$5.98
\$80,000–\$99,999	\$2,248.22	2.5%	\$11.33
> = \$100,000	\$2,277.41	1.8%	\$18.92
Total			\$41.4

Source: David Lewis, The Brookings Institution, America's Traffic Congestion Problem: Toward a Framework for Nationwide Reform, Discussion Paper 2008-06, July 2008.

Notes: Assumptions are (1) the percentage of vehicle miles of travel (VMT) in urban areas is equal to 55% of total VMT (assumption based on 2001 Highway Performance Monitoring system (HPMS) runs obtained from FHWA); (2) the percentage of VMT in congestion conditions exceeding VC of 0.7 is equal to 41% (assumption based on 2001 HPMS runs obtained from FHWA); and (3) the expenditure on congestion costs includes a charge of \$0.25 per mile for all miles driven in congested conditions. Annual compensation is calculated as the average expenditures on congestion charges in Column 2, multiplied by the number of households in income bracket category. Income groupings shown reflect 2001 conditions, whereas tolls paid reflect 2007 prices.

Table 3: **Scope of Socio-Demographic Analyses for Social and Distributional Indicators**

Dataset / social group (Shading indicates analysis required for each indicator)	Improve connectivity access to leisure (User Benefits)	Reduce exposure to noise	Reduce air quality health costs	Reduce the risk of death or injury	Reduce crime	Reduce severance	Improve accessibility	Improve affordability
Income Distribution								
Children: proportion of population aged <16								
Young adults: proportion of population aged 16-25								
Older people: proportion of population aged 70+								
Proportion of population with a disability								
Proportion of population of Black and Minority Ethnic (BME) origin								
Proportion of households without access to a car								
Carers: proportion of households with dependent children								

Source: Detailed Guidance on Social and Distributional Impacts of Transport Interventions, TAG Unit 3.17, IN DRAFT, U.K. Department for Transport, Transport Analysis Guidance (TAG), January 2010.

Another example of widening the Cost-Benefit Analysis framework is seen in Canada where the Canadian federal Department of Transport (Transport Canada) has developed the “TRANSDEC” framework of benefits wherein the (un-double counted) effects of projects and plans are valued in four categories, as shown in the text box below:

TEXT BOX: TAXONOMY OF TRANSPORT EFFECTS FOR USE IN COST-BENEFIT ANALYSIS, TRANSPORT CANADA’S TRANSDEC FRAMEWORK

CONGESTION MANAGEMENT

Time savings – car users
Savings in vehicle operating costs
Emission savings
Accident cost savings

MOBILITY

Time Savings - car users and public transport users
Value to Low-Income Travelers
Cross Sector Benefits

COMMUNITY DEVELOPMENT

Commercial Development
Residential Development

ECONOMIC OUTPUT NOT ACCOUNTED FOR ABOVE

As shown, effects on disadvantaged groups are identified in two distinct ways. The first is the benefit or cost to low-income households stemming from the availability of transport at a less (or more) affordable price than their next-best alternative (such as taxis). These are called “affordable mobility” benefits and are in both case and time-denominated value. The second form of benefit is the resource savings (or costs) arising from reduced social service agency outlays when people are able to travel to centralized points of service delivery rather than receiving more costly home-based care. These are called “cross-sector benefits.”

An illustration of the TRANSDEC framework in application is given in Tables 4 and 5. The example draws on the recent economic analysis of the Toronto region's 30-year, \$31 billion multimodal regional transportation plan. As the Table 4 shows, at \$356 million (in present-day value) the plan's estimated benefits to low income people together with cross-sector benefits are significant. Due however to the huge congestion-relieving effects of the plan, benefits to low income travelers per se constitute less than one percent of the \$46 billion in total benefits. This apparently low percentage understates the true value to disadvantaged groups, however, since the large delay reductions counted under "congestion management" will have a disproportionately positive impact on low income groups by broadening the accessibility of labour markets and increasing worker productivity.

4.2.2.1. Costs and Benefits in Multi-Project Planning:

The Toronto example cited above illustrates an important new trend in the appraisal of transport policy – that of evaluating the economic and social costs and benefits of **entire portfolios of transport projects and policies** rather than single projects or policies one at a time. This allows planners to identify and highlight systematic biases in the transport system that benefit some groups or regions over others, and to nudge the transport system towards greater equity by introducing specific adjustments to help iron out such biases. Such adjustments can include both transport and non-transport measures. As shown in Section 3 above, transport measures might include such things as the redesign of rail alignments to favour lower income areas, the redirection of paratransit and bus services to underserved groups and locations, and the reallocation of capital spending into operating support (subsidy) to help make fares more affordable. Non-transport steps can include land-use measures (such as planning for higher density and more physically accessible and walkable communities), lump-sum cash transfers and negative income taxes to promote mobility and wider labour market reach; affordable housing and mortgage policies; and so on.

Table 5 indicates how, by comparing benefits on a per-capita basis among distinct sub-regional districts (districts defined by markedly different socio-economic profiles), the Transport Canada framework is used to test for balance in the geographic equity of a multi-project, multi-policy transportation planning portfolios. The Toronto regional plan continues to go through policy iterations in seeking geographic balance and balance in relation to other dimensions of equity.

4.2.2.2. Costs and Benefits Relating to Rights and Freedoms:

A major challenge to the identification and measurement of economic benefits arises in nations with broad constitutional and legal mandates requiring the physical accessibility of transport facilities to people with disabilities.¹⁸ In many situations, the mandates are given operational meaning through the process of government regulation. In so doing, governments employ in one form or another, a process called Regulatory Impact Analysis, or "RIA". The role of RIA is to provide a detailed and systematic appraisal of the potential impacts of a new regulation in order to assess whether the regulation is likely to achieve the desired objectives. The philosophy of RIA underlines the need to ensure value for money and to guard against the risk that regulatory costs will exceed benefits. From this perspective, the central purpose of RIA is to ensure that regulation will be "welfare-enhancing" from the societal viewpoint – that is, that benefits will exceed costs. A problem arising in the application of RIA to transport rights and freedoms, however, is that costs are much easier to identify than benefits, creating the risk of systematic under-provision of accessibility

18. This section draws heavily on; David Lewis, Sing Suen, Daphne Federing, **Countering the Economic Threat to Sustainable Accessibility**, 12th International Conference on Mobility and Transport for Elderly and Disabled People, Hong Kong, June 2010.

Table 4: **Estimated Benefits of the Toronto-Hamilton Regional Transportation Plan, by Source and by Sub-Region (2010-2031)**

CATEGORY	REGION	CITY OF HAMILTON	HALTON REGION	PEEL REGION	CITY OF TORONTO	YORK REGION	DURHAM REGION
BENEFITS							
CONGESTION MANAGEMENT							
Time Savings - Auto Users	\$21,656	\$1,245	\$2,360	\$4,589	\$4,315	\$5,619	\$3,527
Savings in Vehicle Operating Costs	\$4,812	\$288	\$323	\$988	\$1,543	\$1,115	\$554
Emission Savings	\$823	\$96	\$112	\$196	\$2	\$256	\$161
Accident Cost Savings	\$669	\$58	\$56	\$132	\$164	\$148	\$111
Total Congestion Management	\$27,959	\$1,688	\$2,850	\$5,905	\$6,024	\$7,138	\$4,354
MOBILITY							
Time Savings - Transit Users	\$3,249	\$3	\$59	\$599	\$2,109	\$551	-\$74
Value to Low-Income Travelers	\$307	\$27	\$40	\$55	\$73	\$69	\$43
Cross Sector Benefits	\$49	\$2	\$4	\$8	\$22	\$5	\$6
Total Mobility Benefits	\$3,604	\$33	\$103	\$663	\$2,205	\$626	-\$25
COMMUNITY DEVELOPMENT							
Commercial Development	\$1,887	\$52	\$31	\$224	\$1,483	\$66	\$30
Residential Development	\$3,173	\$67	\$53	\$216	\$2,612	\$184	\$41
Total Community Development	\$5,060	\$119	\$84	\$440	\$4,095	\$251	\$71
ECONOMIC OUTPUT							
Economic Output	\$10,051	\$607	\$1,025	\$2,123	\$2,166	\$2,566	\$1,565
ALL BENEFITS	\$46,674	\$2,446	\$4,062	\$9,131	\$14,489	\$10,581	\$5,966

Source: HDR Corporation, Costs of Road Congestion in the Grater Toronto and Hamilton Area: Impact and Cost Benefit Analysis of the Metrolinx Draft Regional Transportation Plan, Final Report, November 2008.

Note: values are in millions of dollars (\$2006), in present value terms.

Table 5: Estimated Benefits per Capita of the Toronto-Hamilton Regional Transportation Plan, by Source and by Sub-Region (2010-2031)

CATEGORY	REGION	CITY OF HAMILTON	HALTON REGION	PEEL REGION	CITY OF TORONTO	YORK REGION	DURHAM REGION
BENEFITS							
CONGESTION MANAGEMENT							
Time Savings - Auto Users	\$2,950	\$2,139	\$3,870	\$3,279	\$1,546	\$4,697	\$4,637
Savings in Vehicle Operating Costs	\$656	\$495	\$529	\$706	\$553	\$932	\$729
Emission Savings	\$112	\$165	\$184	\$140	\$1	\$214	\$212
Accident Cost Savings	\$91	\$100	\$92	\$94	\$59	\$124	\$146
Total Congestion Management	\$3,809	\$2,898	\$4,674	\$4,219	\$2,158	\$5,967	\$5,725
MOBILITY							
Time Savings - Transit Users	\$443	\$5	\$97	\$428	\$756	\$461	-\$97
Value to Low-Income Travelers	\$42	\$47	\$65	\$39	\$26	\$58	\$56
Cross Sector Benefits	\$7	\$4	\$7	\$6	\$8	\$5	\$8
Total Mobility Benefits	\$491	\$56	\$169	\$473	\$790	\$523	-\$33
COMMUNITY DEVELOPMENT							
Commercial Development	\$257	\$90	\$52	\$160	\$531	\$56	\$39
Residential Development	\$432	\$115	\$87	\$154	\$936	\$154	\$54
Total Community Development	\$689	\$205	\$138	\$314	\$1,467	\$210	\$94
ECONOMIC OUTPUT							
Economic Output	\$1,369	\$458	\$1,948	\$1,354	\$4,702	\$1,204	\$5,152
ALL BENEFITS	\$6,359	\$4,201	\$6,662	\$6,523	\$5,190	\$8,844	\$7,843

Source: HDR Corporation, *Costs of Road Congestion in the Greater Toronto and Hamilton Area: Impact and Cost Benefit Analysis of the Metrolinx Draft Regional Transportation Plan, Final Report, November 2008.*

Note: Values are in dollars (\$2006), in present value terms, and divided by the average population between 2006 and 2031 in each region.

Since regulatory impact analysis is generally conducted in a comparative context, with differently scoped alternatives for achieving stated objectives, the breadth of benefits considered will go far in determining the degree of accessibility to be mandated by regulation. A notable example is Australia's 1999 regulatory analysis designed "to assist decisions regarding the provision of transportation services to people with disabilities under the Australian Disability Discrimination Act" [Attorney General's Department, Government of Australia, 1999]. The Australian RIA cites as its objective:

"To promote recognition and acceptance within the community of the principle that persons with disabilities have the same fundamental rights as the rest of the community."

The RIA also states, however, that:

"The Disability Discrimination Act also recognizes that these rights do not mean access at any cost; there must be a balance between benefit and cost."

Since the RIA compares the costs and benefits of mandating alternative degrees of accessibility, the scope and definition of benefits counted in the Cost-Benefit Analysis matters greatly. Typical of many such analyses, the Australian study quantifies two categories of benefit, (i) those associated with projected additional transportation trip-making; and (ii) "cross-sector" benefits. As indicated earlier, cross-sector benefits, resource savings that accessible transportation facilitates through the substitution of distributed services for more fiscally costly home-based services, arise across a broad spectrum, including services like chiropody, meals, and home care.

Notwithstanding the seemingly wide range of benefits it considered, the Australian study found that the costs of the selected option would exceed the benefits by fully Aus\$1.1 billion. Indeed, higher accessibility standards than those in the selected option were rejected as, "not being consistent with the concept of unjustifiable hardship as set out in the DDA."

A more recent Regulatory Impact Analysis, this one in the United States concerning the establishment of architectural accessibility requirements for commercial and state and local government buildings, recognizes a wider range of benefits. The RIA [US Department of Justice, 2004] picks up on Canadian themes outlined above in stating that:

"Benefits are primarily represented by the creation of social value, and can be divided into three categories. "**Use value**" is the value that people both with and without disabilities derive from the use of accessible facilities. "**Option value**" is the value that people both with and without disabilities derives from the opportunity to obtain the benefit of accessible facilities. Finally, "**existence value**" is the value that people both with and without disabilities derive from the guarantees of equal protection and non-discrimination that are accorded through the provision of accessible facilities."

In reviewing the judicial and regulatory record across nations, Lewis *et al.* find that the kind of benefits considered relevant and measurable in relation to accessibility ranges from very narrow to very broad¹⁹. What is lacking is a consistent and comprehensive approach, within countries and, needless to say, across nations. Lewis et al are working on developing such a framework, as depicted in Figure 5. Drawing on the judicial and regulatory record as well as the state-of-practice in micro-economics, the framework embraces both use and non-use related benefits of accessibility; it recognizes benefits to people both with and without disabilities; and it identifies reduced stigmatic harms and humiliation as a distinct, separate and quantifiable benefit of accessibility.

19. Ibid.

The framework depicted in Figure 5 helps clarify the broader nature of benefits than is typically taken into account, but is also indicative of measurement problems still in need of further research. Thus while valuing the mitigation of discomfort, pain and humiliation could well make a serious difference in the measured economic worth of major investments in improved accessibility for people with disabilities, methods for measuring such value remain elusive and controversial. For example, some researchers (including Lewis, et.al) are using evidence from studies on the premiums people attach to the value of time spent in different conditions. Others find this approach unsatisfactory and subject to logical flaws: they, quite understandably, call for more direct measurement approaches. It is also important to avoid the risk of double-counting, such as the common error of adding employment benefits that arise from time savings to the value of employment arising from such time savings.²⁰

Impetus for the framework shown in Figure 5, and impetus for its continued development, comes from sharper clarity in stated government policy objectives and from government accountability initiatives that demand more complete evidence of the economic value proposition for proposed policies and regulations. With oversight authority for regulatory analysis in the United States, the U.S. Office of Information and Regulatory Affairs (ORIA, an arm of the federal government's Office of Management and Budget) is pressing for greater quantification of the intangible benefits of accessibility. This includes the benefits of reduced stigmatic harm and humiliation linked to inaccessible facilities). Legal scholar Cass Sunstein, presently the Director of ORIA, has shown that the absence of such quantification leads the policy and enforcement process to trivialize key benefits sought under the Americans with Disabilities Act and, accordingly, to the under-provision of accessibility.²¹ The framework shown in Figure 3 continues to develop as a response to that challenge.

4.2.3. *Democratic Procedures and Governance in the Development and Appraisal of Transport Projects and Infrastructure Investment Plans*

4.2.3.1. Democratic Process:

As discussed earlier, project and multi-project appraisals *tend to be* conducted as desk studies - stakeholder involvement in the analysis process is rare. The rarity of stakeholder involvement in the appraisal process is ironic in the context of matters dealing directly with the inequality and social exclusion of individuals. There are however, ways and means, and some examples, of giving voice to citizens in the conduct of economic appraisals of transport projects and plans. Citizen voice matters: It has been shown in the research literature pertaining to democratic governance that citizen engagement can provide a corrective to analytic assumptions regarding the nature and magnitude of social costs and benefits and in that way help ensure the accountability of governments²².

Consider as an example the efforts to expand capacity at Vancouver International Airport, one of North America's most congested commercial airports. Despite three major planning efforts over three decades, each of which projected a new runway to be

20. The category called "third-party employment benefits" in Figure 4 does not refer to the employment of new workers, which would double count with the value of time savings, but pertains rather to benefits to existing non-disabled employees associated with the process of redesigning accommodation for disabled people. Legal scholar Elizabeth Emens gives many examples of ways in which accommodation for accessibility can benefit non-disabled third parties. [See Elizabeth Emens, **Integrating Accommodation**, University of Pennsylvania Law Review, April 2008].

21. Cass R. Sunstein, **Cost-Benefit Analysis without Analyzing Costs or Benefits: Reasonable Accommodation, Balancing, and Stigmatic Harms**. University of Chicago Law and Economics Olin Working Paper No. 325. March 2007.

22. Op. cit. David Lewis, **The New Cost-Benefit Analysis**.

economically worthwhile and environmentally sustainable, debate over the key assumptions and inequitable impacts on noise-affected people kept opposing forces deadlocked for years. A stakeholder engagement process that was conducted as an integral part of the project appraisal study helped bring the community to consensus, leading in turn to a decision to build. The principal success factors were, first, that the process did not seek to prove “one side right and the other wrong.” Instead risk analysis was used to determine the probability of noise and other social and environmental sacrifices and to indicate the likelihood that the benefits of a runway would be enough to finance a noise compensation plan for disrupted householders and still improve the regional economy. Second, stakeholders both for and against the runway were drawn deeply into the analysis of possible outcomes for each technical, social and economic projection. The final probability forecasts thus constituted a community consensus on a wide range of possible outcomes and the relative odds of each. The result was a shift in the debate from forecasts—now purged of a combative element and sufficiently broad to be a meaningful foundation for discussion.

Instead of arguments about the technical merit of underlying assumptions, the discussion turned to community goals: whether the greater Vancouver area wanted to promote the likelihood of continued economic growth, whether householders near the airport ought to be compensated for their possible economic losses and social disruption, whether peak-period airport users should pay more to cover the probable social costs imposed by their peak-period consumption, and so on. In 1992 the runway project won approval, largely on the basis of a strong probability of positive net benefits for the region as a whole combined with a negotiated compensation package for householders based on probabilistic forecasts of social costs.²³

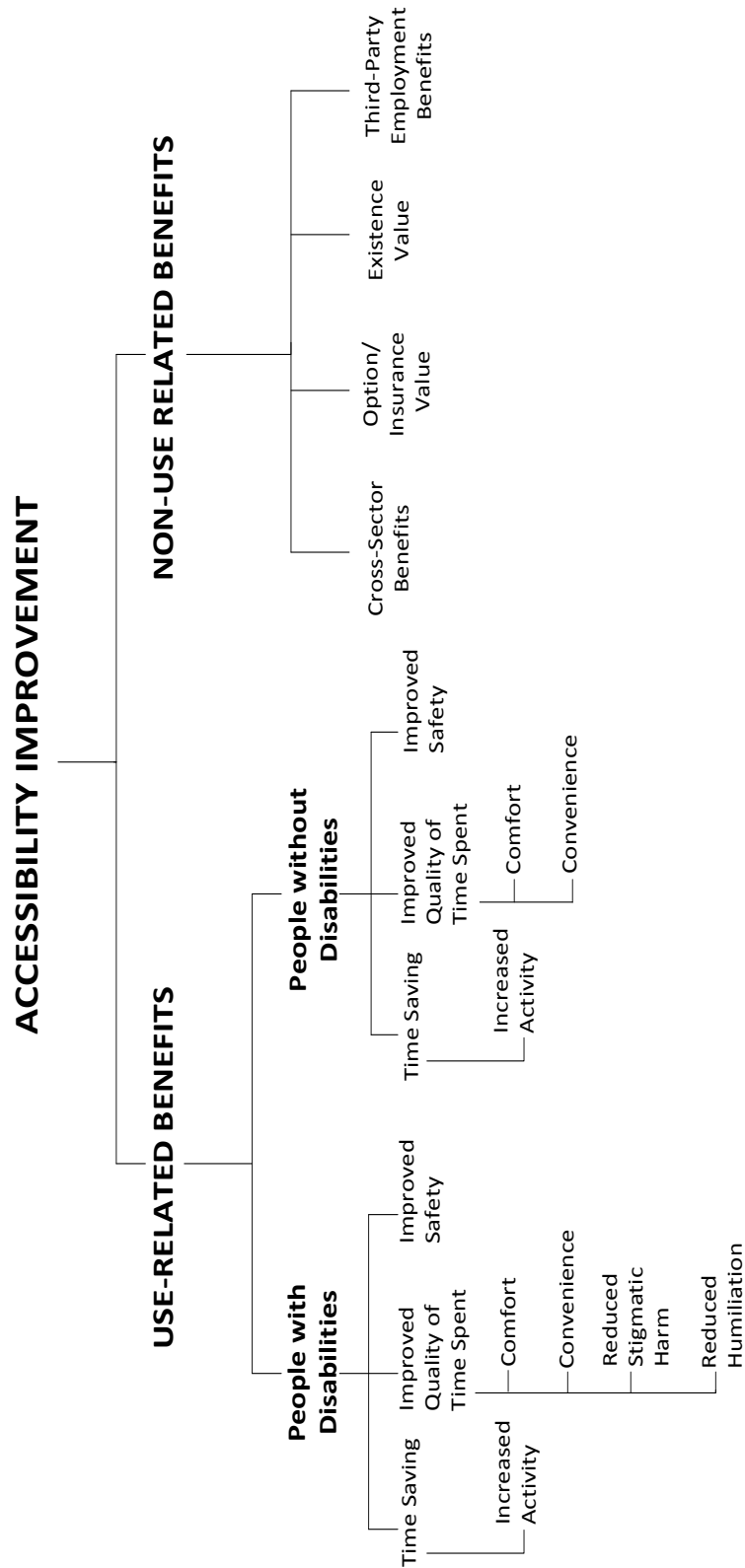
4.2.3.2. Governance

The results of project and multi-project economic appraisal studies represent but one input into infrastructure decision making – many other factors, including “political” factors, enter into the decision making mix. While this is as it should be in democratic society, an important relationship nonetheless exists between the quality of governance and the quality of infrastructure policy and investment decisions. Research conducted for the Mo Ibrahim Foundation²⁴ reports that the quality of a nation’s physical infrastructure is associated with a number of (interrelated) governance-related performance indicators, including, the degree of nation’s judicial independence; property rights; corruption in government and public officials; prosecution of abuse of office; and corruption and bureaucracy. The implication is that nations can improve the quality and fairness of transport through improving governance, especially in the areas of property rights, rule of law, accountability and corruption. Improved governance means improved market conditions within which to attract capital to help finance infrastructure investment.

23. See, David Lewis, **The Future of Forecasting: Risk Analysis as a Philosophy of Transportation Planning**, TR News, Transportation Research Board, July 1995. It is noteworthy that a schedule of peak-period surcharges, one of the first in North America, was also implemented.

24. 2010 Ibrahim Index of African Governance, Revised Edition, 2010.

Figure 5: **Towards an Accounting Framework for Measuring the Benefits of Accessibility**



Source: David Lewis, Sing Suen, Daphne Federing, Countering the Economic Threat to Sustainable Accessibility, 12th International Conference on Mobility and Transport for Elderly and Disabled People, Hong Kong, June 2010.

The list of governance factors that drive the quality of transport policy and investment also includes the quality of information provided to decision makers. Although, as indicated earlier, things are beginning to change, the methods conventionally used to formulate and evaluate major transport investment projects and plans tend to focus more on single projects than on integrated plans, and on impacts on passenger (and freight) time savings, safety, and environment more so than specific effects on inequality. Planning and evaluation methods need to adapt to the emerging perspective on transport as a legitimate policy instrument for diminishing economic inequality, including income inequalities, unequal access to opportunity and life chances, unequal access to democratic institutions, rights and freedoms, and social exclusion (including exclusion in relation to gender, age, race and location). It is true that such adaptations are underway, although in different degrees in different parts of the world. The degree of adaptation ranges from lip service to distributional issues to serious attempts to develop and evaluate policies and plans with a view to diminishing economic inequality and social exclusion. The more serious attempts are limited by available evidence, however, and an aggressive research program is required.

4.2.4. Moving Towards Appraisal Rooted in Concepts of Social Justice and Human Need

An emerging belief however is that most all recent attempts to address inequality through transport policy and investment are hidebound by the premises of utilitarianism and welfare economics in which today's appraisal methods are fundamentally rooted. A recent review and analysis by Eda Beyazit argues that the essential dominance of market considerations in conventional techniques inevitably "forces transport investments to move away from a socially just picture."²⁵ Beyazit points to recent developments in the social justice literature, particularly the Capability Approach originated by Professor Amartya Sen, that seek to take direct account of quality of life and individual freedoms. To be sure, conventional appraisal approaches and the various adaptations to them (as outlined above) can help identify the risk of unjust outcomes of transport proposals; and such methods can suggest the ways and means of mitigating unjust outcomes. But approaches rooted less in the fundamentals of welfare economics and more directly in the ideas of social justice (such as the Capability Approach) are needed to give transport a more direct, proactive role in actually promoting equality rather than merely avoiding inequitable outcomes.

5. CONCLUSION

Poverty, inequality and social exclusion are closely tied to personal mobility and the accessibility of goods and services. The economic role of transport in promoting living standards and wellbeing can be seen at both the aggregate level of public capital expenditure on transport infrastructure and at the disaggregate level of transport policies, projects and plans.

At the aggregate level, transport capital investment can promote growth in worker productivity, a key to facilitating growth in personal incomes and standards of living, and a key means of closing income disparities between regions and sub-regions.

25. Eda Beyazit, **Evaluating Social Justice in Transport: Lessons to be Learned from Capability Approach**, *Transport Reviews*, Vol. 31, No. 1, 117–134, January 2011. See also Lewis, op.cit. MacArthur Foundation.

At the disaggregate level, transport policies, investments and plans can create or diminish economic wellbeing for a wide range socially disadvantaged groups, including the poor, elderly people, people with disabilities, children and young adults, and women. Steps to identify and measure such value are beginning to appear in project, planning and policy appraisal methods, a trend that is to be encouraged.

An emerging trend in the development of transport policy is that of evaluating the economic and social costs and benefits of **entire portfolios of transport projects and policies** rather than single projects or policies one at a time. This helps planners to identify biases and inequities in the transport system, and to adjust plans accordingly by introducing specific mitigating initiatives. Such initiatives can include both transport and non-transport measures, and combinations of the two, such as rerouted rail alignments to lower income areas; enhanced paratransit and bus service to underserved groups and locations; reallocation of capital spending to hold down fares; land-use measures such as higher density planning regulations for more physically accessible and walkable communities; lump-sum cash transfers and negative income taxes; affordable housing and mortgage programs; and so on. However, the effective coordination of transport and non-transport measures requires new governance modalities, including institutional coordination among government agencies. A recent example of such coordination is a U.S. federal task force on livable and sustainable communities that integrates the policy and planning activities of the United States' Departments of Transportation, Housing and Urban Development, and Environment. Governance factors that drive the quality of transport policy and investment also include the quality of information provided to decision makers. While things are beginning to change, the methods conventionally used to formulate and evaluate major transport investment projects and plans tend to focus on single projects more so than on integrated plans, and on impacts on time savings, safety, and environment more so than on specific impacts on inequality.

In short planning, economic evaluation, and governance modalities need to adapt to the emerging perspective on transport as a legitimate policy instrument for diminishing inequality, including income inequalities, unequal access to opportunity and life chances, unequal access to democratic institutions, rights and freedoms, and social exclusion (including exclusion associated with gender, age, race, disability and geographic location). Some such adaptations are underway, although in different degrees in different parts of the world. The degree of adaptation ranges from lip service to distributional issues to serious attempts, as in the U.K., to develop and evaluate integrated transport and non-transport policies and plans with a view to diminishing economic inequality and social exclusion. The more serious attempts are limited by available data, evidence and methodology, however, and aggressive research and development efforts are needed. An important impetus for such efforts comes from clarity in stated government policy objectives, from government accountability initiatives that demand evidence of the economic value proposition for proposed policies and regulations and from fundamentally new lines of thinking, especially in the area of social justice. Impetus for the evolving framework of benefits for assessing accessibility standards for people with disabilities, for example (see Section 4) came from clear public policy pronouncements and from accountability requirements under the regulatory process. That framework continues to evolve in response to that impetus and governments should continue to challenge economic research and analysis to find methods that align proposed public policies and plans with public policy objectives.

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