

# Towards a Framework for Identifying and Measuring the Benefits of Accessibility

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# **Towards a Framework for Identifying and Measuring the Benefits of Accessibility**

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## Abstract

This paper (i) explains the motivation for articulating the benefits of accessibility; (ii) provides a narrative basis for articulating how accessibility affects economic and social life; and (iii) moves towards a framework for quantifying the benefits of accessibility.

In examining laws, regulations and judicial proceedings in different nations, the paper finds that most view cost as a limiting factor on what public and private entities can be compelled to provide in relation to the accessibility of transportation, the built environment, employment, and services. This is so even in the context of constitutionally and legislatively enshrined human rights. The paper also finds that cost-benefit balancing is emerging as a necessary part of the accessibility governance framework. When addressing the specific application of accessibility rights, governments, regulatory bodies and courts around the world deal comprehensively with costs but fail to value important categories of benefit, such as the reduction of stigmatic harms, “option” benefits and “existence” value, and capability value. The paper describes progress towards a comprehensive narrative and analytical framework for describing and measuring such benefits.

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## Introduction

This paper has three objectives, (i) to explain the motivation for articulating the benefits of accessibility; (ii) to provide a narrative basis for articulating how accessibility affects economic and social life; and (iii) to move towards a framework for quantifying the benefits of accessibility. To serve as the basis for a policy narrative, the framework needs to be easy to communicate and free of jargon, or at least free of jargon that is not intuitively obvious in its meaning. To succeed as the basis for quantifying the benefits of accessibility, the framework needs to reflect proven methodological applications or give clear indications of where additional methodological research is required.

Barriers to the realization of a fully accessibility transportation system and built environment lie in the very nature of the constitutional and legislative mandates that establish accessibility as a societal goal and a human right. The United States, Canada, the European Union, Australia and many nations of Asia and Africa have either established or are considering constitutional and legislative protections for people with disabilities against barriers to participating in the activities of daily life. Virtually all such mandates are formulated as human rights legislation. The Americans with Disabilities Act, for example, is crafted as an anti-discrimination law, not unlike the civil rights laws of the 1960s that prohibit discrimination on the basis of race; and not dissimilar from the U.S. Constitution's First Amendment protections against discrimination on the basis of religion. The Preamble to the United Nations Convention on The Rights of Persons with Disabilities (CRPD), now signed by more than a 150 countries, "*Reaffirm[s] the universality, indivisibility, interdependence and interrelatedness of all human rights and fundamental freedoms and the need for persons with disabilities to be guaranteed their full enjoyment without discrimination.*" Similarly, the Supreme Court of Canada has confirmed that accessible transportation provisions of the Canadian Transportation Act are, in essence, human rights protections that invoke the antidiscrimination principles of the Canadian Charter of Human Rights [Council of Canadians with Disabilities v. Via Rail Canada Inc., 2007]. In Australia, accessibility mandates fall under the "Australians with Disability Discrimination Act [Disability Discrimination Act 1992]; the European Union has enacted "The European Directive on Equal Treatment" [Council Directive 2000/78/EC] that obliges all member states to prohibit discrimination against people with disabilities.

Despite the fact that they establish accessibility as a human right, the mandates (i) universally acknowledge costs and (ii) often incorporate cost-benefit balancing as legitimate considerations in their implementation. The acknowledgement of costs represents a barrier to accessibility simply because making and keeping facilities accessible entails expenses which not all are willing to incur. The acknowledgement of benefits and cost-benefit balancing can cut both ways. On the one hand, recognizing that high costs can be balanced by proportionately high benefits helps counter the economic threat posed by the acknowledgement of costs alone. This advantage is offset however where the language or interpretation (the narrative) of legal mandates would indicate that costs overshadow benefits, or where the definition of benefits is too narrowly conceived.

### How societies treat the costs and benefits of accessibility

The similarity regarding the treatment of costs among the accessibility mandates of various nations is evident in Table 1. Perhaps the most far-reaching statement of disability rights is the United Nations

Convention on The Rights of Persons with Disabilities (CRPD), signed by more than a 150 countries since its adoption by the U.N. General Assembly in December 2006. The CRPD explicitly incorporates the consideration of costs to individual entities when determining what actions must be undertaken to ensure accessibility, so as to be sure “not [to] impos[e] a disproportionate or undue burden.”

Other laws and directives predating the CRPD, such as the United States’ Americans with Disabilities Act (1990), the Australian Disability Discrimination Act (1992), and The United Kingdom’s Disability Discrimination Act 1995 also included provisions limiting accessibility requirements on specific entities if meeting those requirements would result in an “undue hardship” (Americans with Disabilities Act, Section 36.104), “unjustifiable hardship” (Australian Disability Discrimination Act 1992, Cth, section 31) or would not be “reasonable.” (Disability Discrimination Act 1995). The Canadian Human Rights Act stipulates that providers of service to the public (such as public transportation) must show that “reasonable accommodation has been provided *up to the point of undue hardship*.”

Table 1. **Legislative limits on undue financial burden**

Country / Governing Body	Laws/Rule Regarding Access and Prohibiting Discrimination on Basis of Disability	Limits on Accommodation Requirements
United Nations	Convention on The Rights of Persons with Disabilities (CRPD)	Accommodation required as long as it does “not impos[e] a disproportionate or undue burden, . . .” [ <i>Convention on The Rights of Persons With Disabilities, Article 2, 2006</i> ]
Australia	The Australian Disability Discrimination Act 1992	Accommodation required unless would impose an “unjustifiable hardship” [ <i>Disability Discrimination Act 1992, Cth, section 31</i> ].
Canada	Covered by the Canadian Charter of Rights, Freedoms and the Canada Transportation Act	Service providers must make provision for accessible transport up the point of ‘undue hardship’ [ <i>Canada Transportation Act and Council of Canadians with Disabilities v. Via Rail Canada Inc., 2007</i> ]
New Zealand	Human Rights Act 1993 (amended Human Rights Amendment Act 2001)	Accommodation required, including for access to “places, vehicles, and facilities,” except “when it would not be reasonable to require the provision of such special services or facilities” ( <i>section 43</i> )
European Union	European Accessibility Act (proposed 2015)	Accessibility requirements referred to in Article 3 apply to the extent that they do not impose a disproportionate burden on the economic operators concerned.” [ <i>Directive Of The European Parliament and of The Council , Article 12</i> ]
United Kingdom	Disability Discrimination Act 1995; The Equality Act 2010	Prohibits discrimination against persons with disabilities, requiring “reasonable adjustments” which includes consideration of “financial and other costs which would be incurred” (1995)
United States	Americans with Disabilities Act, 1990	Entities must to make ‘reasonable accommodation’ “unless such covered entity can demonstrate that the accommodation would impose an undue hardship . . . “or “would result in an undue burden, i.e., significant difficulty or expense.” [ <i>Americans With Disabilities Act Of 1990, Sec. 12111 and section 36.104</i> ]

More recent initiatives, such as the European Union’s proposed European Accessibility Act, continue to explicitly incorporate limits on accessibility requirements so as not to “impose a disproportionate burden on the economic operators concerned” (Directive of The European Parliament And of The Council on the Approximation of the Laws, Regulations and Administrative Provisions of the Member States as Regards the Accessibility Requirements for Products and Services, Article 12).

The concept of undue, disproportionate or unjust burden or hardship in these laws is focused on those costs which would be incurred by a public or private entity to ensure accessibility, as well as the point at which these costs become so high as to no longer require making the accommodations. The Australian Disability Discrimination Act stipulates that accessible accommodation is required unless doing so would impose an unjustifiable hardship in relation to the *financial circumstances* and estimated *amount of expenditure* required of the entity making the adjustments. The Americans with Disabilities Act in the United States also invokes the term “undue hardship” and defines it as an “action requiring significant difficulty or expense” (Emens 2008, p. 871). The CRPD specifies that ‘economic operators’ look at “the size, resources and nature of the economic operators” and “the estimated costs and benefits for the economic operators” when assessing whether or not an accessibility accommodation “imposes as disproportionate burden” (Convention on The Rights of Persons with Disabilities, Article 12, 2006).

Yet, what makes an accessibility accommodation “reasonable” and not an “undue burden” is, in the words of legal scholar Elizabeth Emens, “a murky business” (Emens, 2008, p. 877, fn 118). With notable exceptions, such as Australia’s Disability Discrimination Act in which the benefits of accessibility are acknowledged as a factor to be balanced against cost, an economic barrier to accessibility arises from the tendency of costs to overshadow benefits in both legal and non-legal conversations about the accessibility mandates of most nations. Emens speculates on possible reasons for this including legal and cultural factors. From a legal perspective, she notes that the Americans with Disabilities Act is different from other human rights legislation because it defines discrimination in terms of design change and accommodation: Under the ADA, the term ‘discriminate’ includes ... not making reasonable accommodations to the known physical or mental limitations of an otherwise qualified individual with a disability ...” (Emens 2008, p.877, fn 118). Because of the explicit accommodation requirement, the ADA is likely to be understood as imposing costs.

From a cultural perspective, Emens (2008, p.882) speculates that society’s ideas about disability make costs more visible than benefits:

“A prevailing assumption about disability is that it means loss or lack. Indeed, the etymology of ‘disability’ suggests that something is missing that needs to be made up for, filled in, supplied. Disability is thus often understood as something lesser that requires the distribution of resources toward it to compensate. For this reason, disability may be generally associated with imposing costs on some for the benefits of others.”

Emens (2008, p.882) also says that despite efforts by advocates and scholars to promote a “social” model of disability, the “medical” model<sup>i</sup> prevails in the broader culture, as does the sense that a disability is a lack that requires costly filling.

“It seems plausible that this understanding of disability primes courts, commentators and others to see the accommodations made for disability as beneficial to those for whom they are designed and costly for all others, particularly for those others who are not disabled.” (Emens, p.884)

Although society tends to give more weight to the costs of accessibility than to the benefits, there are two channels through which attempts are being made to take benefits into account. One is through judicial proceedings; the other is regulatory analysis. In general, benefits tend to be defined more narrowly than costs.

## Judicial proceedings

A number of influential court cases provide foundations for the way societies tend to think about the benefits of accessibility. In the United States, the case *Zande v. Wisconsin Department of Administration*

(1995, 44 F.3d 538 (7<sup>th</sup> Circuit)) is pivotal. Two matters of accessibility and accommodation were at issue, (i) an employer’s refusal to allow Ms. Vande Zande to telecommute and to provide computer equipment to enable her to do so; and (ii) the employer’s refusal to alter the design of a kitchenette on her floor at work to install the counter two inches lower than planned so that she could use it rather than using the bathroom sink for activities such as washing out her coffee cup.

The Court’s decision in the Vande Zande case set two key precedents, one positive one negative. On the plus side, the Court ruled that benefits matter as well as costs in making a determination of what constitutes undue financial burden. On the down side, the Court employed a very narrow definition of what constitutes benefit. Noting that the ADA defines “an action requiring significant difficulty or expense” but offers incomplete guidance on its application, the Court ruled that the “financial condition of the employer is only one consideration” and concluded that “undue” must be interpreted to mean that the expense is undue in relation to the resulting benefit, as well as the employer’s resources. On the other hand, the Vande Zande court case established a very narrow definition of benefit: it ruled that the telecommuting accommodation was not reasonable because it would interfere with teamwork and direct supervision, yet without acknowledging that telecommuting would also benefit many workers, whether or not they have disabilities, and could lead to potentially lower corporate overhead expenses: and it ruled that the harm involved in using the different sink was “merely stigmatic” and therefore too insignificant to warrant mandatory accommodation.

The Vande Zande case was decided in 1995. A 2007 Canadian Supreme Court decision recognizes a broader perspective on benefits. In *Council of Canadians with Disabilities v. VIA Rail* (a ruling against the use of passenger rail cars that do not meet a stated standard of accessibility) the Court states as follows:

“A factor relied on to justify the continuity of a discriminatory barrier in almost every case is the cost of reducing or eliminating it to accommodate the needs of the person seeking access. This is a legitimate factor to consider: *Central Alberta Dairy Pool v. Alberta (Human Rights Commission)*, 1990 2.S.C.R. 489, at pp. 520-21. But, as this Court admonished in *Grismer*, at para. 41, tribunals must be wary of putting too low a value on accommodating the disabled (emphasis added).”

A subsequent Canadian case goes further still in broadening the scope of benefits deemed legitimate in balancing judgments about of undue hardship. In a 2007 decision, upheld by the Supreme Court in 2008 [*Council of Canadians with Disabilities v. Air Canada*], the Canadian Transportation Agency (a quasi-judicial tribunal of the Canadian federal government) ruled against the legality of charging personal assistants of passengers with disabilities for a second seat (the “one-person-one-fare” ruling, or 1P1F). In its decision [*Norman and Neubauer v Air Canada*, 2008] the Agency explicitly “*recognized the evidence presented by the applicants’ expert of the following positive social impact*” of ‘cross-sector benefits’ from reduced pressure on social welfare systems, and lower fiscal burdens related to the ‘insurance value’ of a potential future need of persons currently without disabilities for accessible facilities, and an ‘existence value’ of ensuring a protection deemed an aspect of civil society. On this basis the Agency found that the benefits were sufficient to justify the estimated increase in overall ticket prices likely to result from a 1P1F policy and that the costs of such a policy were reasonable in light of the improved access to the transportation network for persons with disabilities.

## Regulatory analysis

In nations with broad constitutional and legal mandates for accessibility, 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 (“RIA”), or regulatory assessment or regulatory evaluation. The role of an 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 underlying RIA underlines the need to ensure value for money and to guard against the risk that regulatory costs will exceed benefits for society as a whole. From this perspective, the central purpose of an RIA is to ensure that regulation will be “welfare-enhancing” from the societal viewpoint – that is, that total benefits will exceed total costs.

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. 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 AUD 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, 2010) 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 derive 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 a significant development, In 2011, the U.S. federal government issued Executive Order 13,563 on cost-benefit analysis (CBA) authorizing agencies to consider “human dignity” (stigmatic harms, humiliation, embarrassment) in identifying the costs and benefits of proposed regulations (see Box 1 and discussion later).

### **Box 1. Human Dignity and Evaluating Reductions in Stigmatic Harm**

In 2011, the U.S. federal government issued Executive Order 13,563 on cost-benefit analysis (CBA) authorizing agencies to consider “human dignity” (stigmatic harms, humiliation, embarrassment) in identifying the costs and benefits of proposed regulations. Bayefsky writes that just prior to that step in 2010.

“The Department of Justice (DOJ) issued a Rule regarding non-discrimination on the basis of disability in state and local government services [sic] [and many commercial entities]. This Rule requires increased access for disabled people in a variety of settings. The [Regulatory Impact Assessment] RIA first considers dignity-related benefits in a cost-benefit analysis of a specific part of the rule, which sets standards requiring sufficient space in single-user toilet rooms for a wheelchair user to transfer to the toilet from the side rather than from the front. This means that wheelchair users will not have to go to an establishment with someone who can help them in the bathroom, or go alone to the bathroom and risk needing help once they get there. The RIA explains that “[a]lthough the monetized costs of these requirements substantially exceed the monetized benefits, the benefits that have not been monetized (avoiding stigma and humiliation, protecting safety, and enhancing independence) are expected to be quite high.”

If the “avoidance of stigma and humiliation” is understood as a dignity interest, then dignity as an un-monetized benefit is being set against monetized costs and used to help make up a shortfall in monetized benefits. DOJ, in other words, is practicing Cost Monetization.

Yet the RIA then moves closer to fuller monetization. First, the RIA conducts a break-even analysis. The RIA calculates that the monetized costs of the new standards exceed their monetized benefits by USD 36.2 million per year for one type of toilet room, and USD 19.14 million per year for another type of toilet room. Therefore, “for the costs and benefits to break even in this context, people with the relevant disabilities will have to value safety, independence, and the avoidance of stigma and humiliation at just under 5 cents per use” for one type of toilet room, and USD 2.20 per use for another type of toilet room.

The attempt to put a price on safety, independence, and the avoidance of stigma and humiliation suggests that the RIA is approaching Full Monetization which involves the monetization of dignity. The RIA confirms this impression with a section elsewhere in the Rule titled “Value of Stigmatic Harm.” In this section, the RIA measures “the proportion of persons with disabilities who elect to use adapted transit when dial-a-ride is available at equal or lesser fare and better time costs,” on the basis that these people’s preference for “integrated transportation service as opposed to segregated service suggests an interest in avoiding the stigma of being disabled.” The RIA uses this proportion to calculate a “weight on the value of time” of 0.25, which it then applies to the time savings measure used to calculate monetized benefits. The result is to narrow the gap between monetized costs and monetized benefits. This exercise, in essence, monetizes the “avoidance of stigmatic harm” through the medium of people’s valuations of time on the basis of a revealed-preference study.”

*Source:* Bayefsky, Yale Law Journal (The RIA in question was conducted by HDR as consultants to the Department of Justice).

## **Accounting comprehensively for the benefits of accessibility: Towards an international standard**

When examining the judicial and regulatory record, we see that the kind of benefits considered relevant and measurable in relation to accessibility ranges from very narrow to fairly broad. What is lacking is a consistent and comprehensive approach, within countries and, needless to say, across nations. The authors' preliminary framework for such an approach is presented in Figure 1. An outline of possible means of quantification, monetization, and indexing for different dimensions of the framework is given in Table 2.

Drawing on the judicial and regulatory record as well as progress in welfare economics, the framework recognizes both use and non-use related benefits; benefits to people both with and without disabilities; benefits as actual outcomes as well as the freedoms available to people to realize an improved quality of life; and, incorporates reduced stigmatic harms and humiliation as distinct benefits of accessibility.

The framework combines elements of utility theory, as manifest in Cost-Benefit Analysis (CBA), and it also draws on aspects of Capability Theory. Cost-Benefit Analysis is an established means of organizing and facilitating a public discourse on the use of resources and the likelihood of welfare gains in relation to prospective alternatives for change. Capability Theory as advanced by Amartya Sen and others, holds that governments should consider not only the kind of lives we manage to lead (the outcomes, or “benefits” in CBA), but also, as explained by Sen, the freedom that we have to choose between different styles and ways of living. Capability thus refers to ‘the real opportunity that we have to accomplish what we value’. It is ‘the various combinations of functionings (beings and doings) that the person can achieve. Capability reflects a person’s freedom to lead one type of life or another... to choose from possible livings’ (Sen 2009). The operational application of the Capability approach is by no means as advanced as Cost-Benefit Analysis but has been influential in the formulation of various indices of well-being (see later).

The framework recognizes the benefits of accessibility in four broad categories, (i) agency benefits (ii) user benefits; (iii) non-user benefits; and (iv) capability. (Note that capability elements to the right of the dashed line in Figure 1 and below the dashed line in Table 2 and not additive to elements to the left and above the dashed line).

### **Agency benefits**

Accessible vehicles and facilities can lead to fewer accidents among agency employees and reductions in some maintenance and operating costs.

*Worker Safety:* Improvements such as level platforms, improved wayfinding, and accessible ticket kiosks can improve worker safety in addition to that of transit patrons.

*O&M Savings:* Some improvements can reduce the wear on facilities, such as level platforms (as wheelchairs travel more smoothly across gaps) and others can lead to greater independence of passengers as they navigate facilities, and which in turn leads to less worker time to assist passengers.

New passenger demand can also lead to increased revenue to service providers. Ordinarily however increased revenue from fares is not treated as an economic benefit in Cost-Benefit Analysis since it often represents a transfer from taxpayers (through subsidy) to passengers.

Figure 1. Framework for measuring the benefits of accessibility

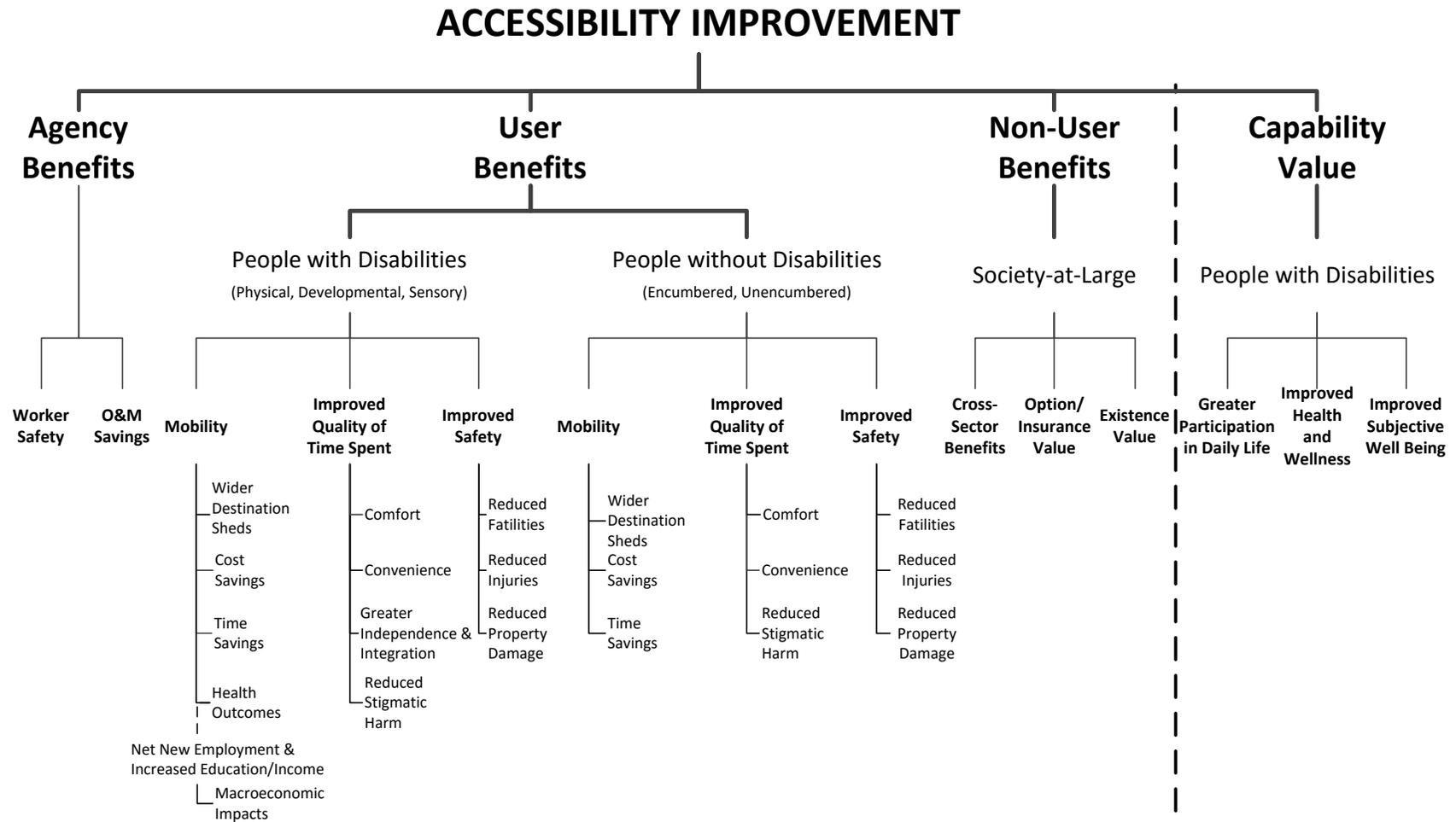


Table 2. Framework for measuring the benefits of accessibility: Quantification, monetization, and indexation

Class of benefit	Type of benefit	Beneficiary	Description	Quantification	Monetization - indexing
<i>Use</i>	Mobility	People with Disabilities	Wider access to desired destinations, generated trips.	Demand Analysis; Geographic Information Systems; Gravity and Isochronic Indices	Willingness to Pay/Accept;
<i>Use</i>	Mobility	People with Disabilities	Time Savings	Demand Analysis	Value of Time
<i>Use</i>	Mobility	People with Disabilities	Improved Health Outcomes	Quality-Adjusted Life Years	Value of Quality-Adjusted Life Years.
<i>Use</i>	Mobility	People with Disabilities	Net New Employment	Labour Market Analysis and Multiplier Effects	Personal Income (Productivity); tax revenue
<i>Use</i>	Quality of Time Spent	People with Disabilities	Increased Comfort	Demand Analysis	Willingness to Pay premiums
<i>Use</i>	Quality of Time Spent	People with Disabilities	Increased Convenience	Demand Analysis	Willingness to Pay premiums
<i>Use</i>	Quality of Time Spent	People with Disabilities	Reduced Stigmatic Harms	Cost Monetization or Demand Analysis	Willingness to Pay/Accept Premiums
<i>Use</i>	Safety	People with Disabilities	Reduced fatalities, injuries, property damage	Demand and Incidence Analysis	Willingness-to-Pay based Statistical Value of Life, Limb, Suffering, Property
<i>Use</i>	Mobility	People without Disabilities	Wider access to desired destinations, generated trips.	Demand Analysis; Geographic Information Systems; Gravity and Isochronic Indices	Willingness to Pay/Accept; Value of Quality-Adjusted Life Years.
<i>Use</i>	Mobility	People without Disabilities	Time Savings	Demand Analysis	Value of Time
<i>Use</i>	Mobility	People without Disabilities	Increased Comfort	Demand Analysis	Willingness to Pay premiums
<i>Use</i>	Mobility	People without Disabilities	Increased Convenience	Demand Analysis	Willingness to Pay premiums
<i>Use</i>	Safety	People without Disabilities	Reduced fatalities, injuries, property damage	Demand and Incidence Analysis	Statistical Value of Life, Limb, Suffering, Property
<i>Use</i>	Macro-economic Impacts	Society-at-Large	Income gains through higher labour market participation and educational attainment	Input-Output Analysis	Direct, Indirect and induced GDP
<i>Non-Use</i>	Cross-Sector	Society at-Large	Social Service Agency Resources	Demand and Budget Analysis	Budgetary Resource Savings
<i>Non-Use</i>	Option Value	Society at Large	Insurance	Demographic Analysis; Stated Preference Analysis	Willingness to Pay/Contingent Valuation Analysis
<i>Non-Use</i>	Existence Value	Society at-Large	Civic Society	Stated Preference	Contingent Valuation
<i>Capability</i>		People with Disabilities	Access to Freedoms through Due Process; Political Process; Judicial Process	Periodic Randomized Sample Survey	Index of Participation in Daily Life
<i>Capability</i>		People with Disabilities	Increased Life-Opportunities through Access to Health, Employment, Education, Social outlets ...	Periodic Randomized Sample Survey	Index of Health, Education, and Wellness
<i>Capability</i>		People with Disabilities	Increased Subjective Well-Being	Periodic Randomized Survey	Index of Subjective Well-Being

## User benefits

User-related benefits stem from the consumption of accessible facilities and arise for two categories of people, those with and those without disabilities.

For people with disabilities, user-related benefits take three forms; mobility benefits, improvements in the quality of time spent traveling; and safety.

*Mobility:* Mobility benefits of improved accessibility to transportation systems and the built environment can arise in the form of increased geographic reach (“larger destination sheds”) for people with disabilities to job opportunities, healthcare, educational facilities, and social networks. Improved health and wellness can arise from greater access to healthcare services and facilities.<sup>ii</sup> Such increased reach can also yield net new (or higher wage) employment and greater long-run education and related income opportunities. Mobility benefits can also arise in the form of time and cost savings for currently-made trips. As shown in Figure 1, the increased range of destinations can yield greater employment, education and income for people with disabilities, resulting in macro-economic gains (gains to GDP) and government tax revenues.

*Quality:* Enhanced accessibility can improve the quality of trip-making in various respects. People with disabilities can travel more independently, free of dependence on friends, family, or volunteer assistance and free of stigmatic harms, humiliation and embarrassment (see Box 1).

*Safety:* Access improvements such as the reduction or elimination of gaps between platforms and rail carriages can measurably reduce the number of passenger fatalities and injuries. Reductions in the frequency of property damage (to things such as wheelchairs) also arise.

All three categories of mobility benefit can result in net new employment and education and related income opportunities with associated incremental (as distinct from economic transfers) macro-economic effects (direct, indirect, induced economic impacts). Their incremental nature makes them additive in the context of Cost-Benefit Analysis.

For people without disabilities, user benefits also take three forms; mobility benefits; improvements in the quality of spent traveling; and safety. Although employment and educational effects may arise for people without disabilities, these are far less likely to represent net new or “incremental” effects from an economic perspective.

### **Box 2. Wider benefits of accessibility: Accessible ticketing machines**

Using an accessible ticketing machine or kiosk is faster than using one which is non-accessible or only partly accessible. Cost Benefit Analysis recognizes the value travellers place on their time. For example, current guidance in the United States (from the U.S. Department of Transportation (USDOT) recommends USD 44.30 per hour as the value of travel time savings for air and high-speed rail travellers (all purposes) (USDOT, 2015). Thus, the benefit to a traveller of the time saved from using an accessible ticketing machine or kiosk would be estimated by multiplying the number of minutes saved by the value of that person's time (e.g. 5 minutes saved multiplied by USD 44.30/hour, for a total of USD 3.69 per use).

But in addition to making the check-in process go faster, an accessible kiosk could also make the process more comfortable (or less uncomfortable) – for example, by not requiring an awkward reach for buttons. Multiple studies have shown that people are willing to pay for a more comfortable travel experience – say, being able to sit down during a subway ride instead of standing. Drawing from such studies, analysts can estimate the value of greater comfort by applying a premium (or “mark-up”) on the base value of the time. One estimate of this premium is 50% (Goodwin, 1976 cited in HDR Decision Economics, 2008; additional research summarized in USDOT, 2014). In other words, five minutes saved of uncomfortable travel time – or time using a non-accessible ticketing machine – is worth 50% more than five minutes of time saved that is not uncomfortable.

Additionally, evidence indicates (see Box 1) that people attach greater value to time that is spent without experiencing humiliation or embarrassment, such as time spent struggling with facilities and equipment or having to ask someone for assistance. The value of avoiding time spent enduring ‘stigmatic harm’ can be estimated in a similar manner to the value of improved comfort. According to one estimate, the added premium to the base value of time per hour for avoiding such stigmatic harm is about 25% (Lewis, 1985).

The premium for greater comfort and the premium for avoided stigmatic harm can both be applied to our accessible ticketing machine example from above, in which 5 minutes of time is saved by using the accessible equipment. Those saved 5 minutes were minutes that would have previously been spent in uncomfortable conditions and with additional risk of stigmatic harm; the value of that time saved has a premiums of 50% and 25% added, increasing the value of the time saved by an additional 88%.

## **Non-user benefits**

Non-user benefits of accessibility arise in the form of cross-sector resource savings, option value, and existence value.

*Cross-Sector Benefits.* Cross-sector benefits are economies achievable in another sector of the economy as a result of expenditure in the transport sector. Such economies are manifest principally in the form benefits to non-transportation social service programs. Some studies have shown that more accessible transit can relieve demand and financial pressure on non-transportation social safety net programs. The reverse is also true; reductions in accessibility lead either to increased expenditures on non-transportation social service expenditures (health, nutrition and unemployment support programs) or, alternatively, to reduced benefits for those in need of such programs.

*Option Value.* Option value can be viewed as the willingness of individuals who do not use a particular resource (such as an accessible rail service) to pay for the option of using it should they deem it desirable to do so. Option value also extends to the willingness of users of the resource to use it more extensively. The U.K. Department for Transport states that:

*Option values* are associated with unexpected use of the transport facility which is not built into demand forecasts and would otherwise not appear in Cost-Benefit Analysis as a benefit; Option values are related to individuals' attitude to uncertainty - in practice a range of option values is likely to be found within the population.

*Existence Value.* Existence value is defined as a person's willingness to pay for a resource for which he or she has no current or future plans for use. The existence value of accessibility 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.

### **Capability value**

The Capability perspective on benefits recognizes increases in the range of freedoms that newly accessible facilities open up for people to pursue life chances, opportunities and ways of life. It also recognises the wider range of access to rights, and diverse facets of social justice facilitated by a more accessible environment.

As indicated above, the Capability approach has been influential in human development theories and valuation methods (see Box 3). It has led to the creation the Human Development Index (HDI); the Inequality-Adjusted Human Development Index (IHDI); and the Gender Inequality Index (GII). As shown in Figure 1 and Table 2, we propose that nations and large urbanized areas develop, track and employ in policy making three Capability indices specifically pertaining to people with disabilities, as follows:

1. Index of Participation in Daily Life among People with Disabilities;
2. Index of Health and Wellness among People with Disabilities; and
3. Index of Subjective Well-Being among People with Disabilities.

Each index would be based on appropriate component factors and weighted according to a scheme developed by consensus among policy experts, lay people with disabilities and other stakeholders. An on-going program of empirical research would measure the impact of improvements in accessibility on desired progress in each index and inform policy directions accordingly (see Box 3).

### **Box 3. Do capability indicators influence policy?**

The Human Development Index is an easy-to-understand numerical measure made up of what most people believe are the basic ingredients of human well-being: health, education, and income. The first Human Development Index was presented in 1990. It has been an annual feature of every Human Development Report since, ranking virtually every country in the world from number one (currently Iceland) to number 177 (currently Sierra Leone).

This composite index has become one of the most widely used indices of well-being around the world and has succeeded in broadening the measurement and discussion of well-being beyond just income. In a number of countries, the Human Development Index is now an official government statistic; its annual publication has been found to inspire serious political discussion and renewed efforts, nationally and regionally, to improve lives.

The United States uses a modified version of HDI methodology to evaluate the development levels of different states, regions and population groups within the country. This version is called the American Human Development Index (AHDI), and it uses data drawn from the Bureau of Census and other official government sources. Using the AHDI, differences between populations and regions can be identified, and the well-being of the general U.S. population can be studied. While statistics about high-income and low-income populations were available prior to AHDI use, not as much was known about the general population.

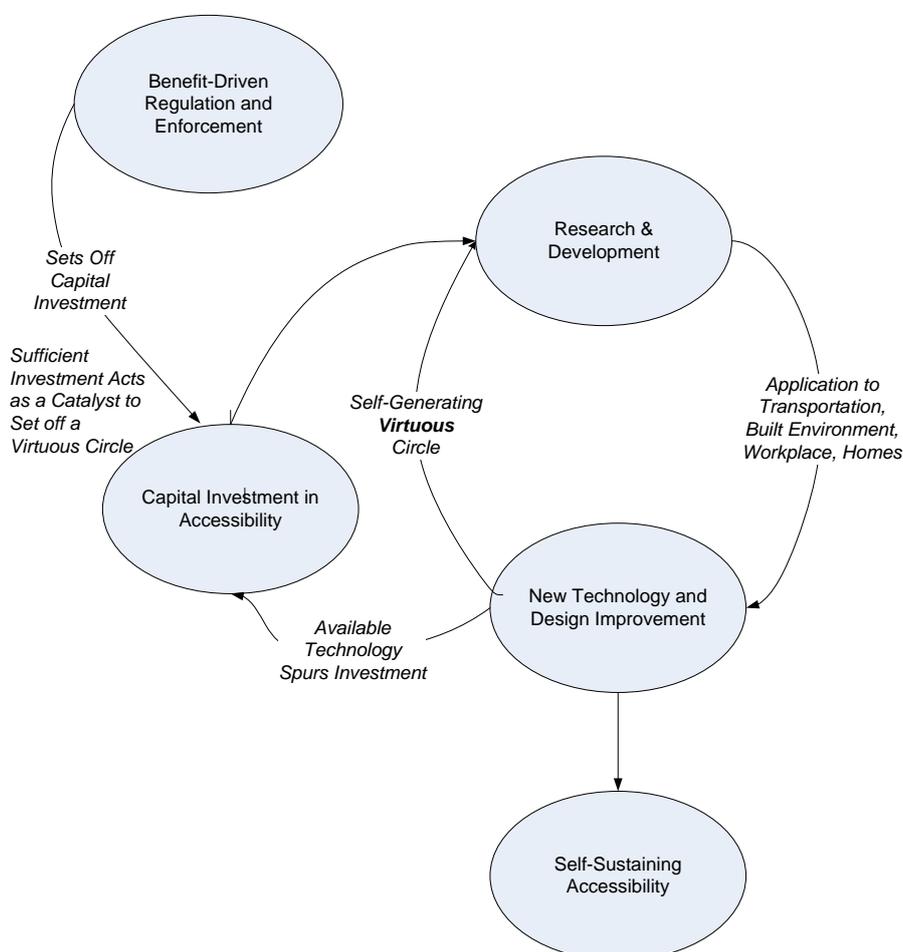
In some cases, the HDI approach has focused on excluded groups, to understand the root causes and persistent patterns of deprivation beyond national averages usually reported in international documents. The Central and Eastern Europe Human Development Report of 2003 presented the first large scale household survey of the Roma, with over 5 000 interviews and data comparable across five countries in Central Europe. The data allowed the calculation of the HDI for Roma, the disaggregation of Millennium Development Goal (MDG) indicators and the comparison with similar indicators for non-Roma populations. The report was used as a reference by the World Bank and Open Society Institute initiative called “A Decade of Roma Inclusion”, with the objective to meet the MDGs for Roma people. This case is not unique; in Chile, beyond the publication of HDIs, a team of human development experts measured human development trends at the communal level, and calculated the HDI for the Mapuche populations to determine interethnic and intra-ethnic inequalities. According to a United Nations report, the analysis revealed insights on sub-national circumstances, with a focus on indigenous populations, informing diagnostics and planning at the regional level.

### **Triggering self-sustaining accessibility**

Broadening and standardizing the way in which society thinks about and measures benefits will help facilitate the adoption of higher standards of accessibility. But this is only the beginning of the story: for a deeper economic dynamic now comes into play. Economic theory and supporting evidence shows that achieving a threshold rate of capital investment can set off a market dynamic called a “virtuous circle.” Because new capital embodies the latest technology and design innovations, the more rapidly new capital is added to, or integrated into a sector, the faster average productivity in that sector will grow and the faster costs will decline. Moreover, the rate of technological progress is itself dependent on the rate of capital investment. The more quickly new capital is added to or integrated into the capital stock, the

better the quality of that capital stock will be in terms of embedded technology and design. The virtuous circle is illustrated in Figure 2.

Figure 2. **Triggering a virtuous circle of self-sustaining accessibility**



An example of the virtuous circle specifically in relation to accessibility is the evolution of accessible urban buses in the United States. Prior to passage of the Americans with Disabilities Act in 1991, level-change technology for wheelchair boarding was expensive and unreliable, adding some 15 percent to the price and running costs of a bus. Following the mandate for 100 percent accessible buses within a specified period of time, the demand for better technology led to an on-going virtuous circle of investment, research and development, more investment and so-on until today the addition of bus accessibility represents less than a fraction of one-percent. Costs for curb cuts in urban pavements have followed a similar path in North America and Europe.

Importantly, due to the work of investment experts such as Richard Donovan and others, the financial sector is awakening to the reality of sizeable “returns to disability” that stem in part from public sector nudges to create markets and inspire corporate steps to satisfy related market demands.

The strategic message in the above is fourfold:

1. The key to achieving sustainable accessibility is to trigger a virtuous circle of self-sustaining investment in accessible technology and design;
2. The key to triggering the virtuous circle is sufficient capital investment;
3. The key to sufficient capital investment is strong regulatory and court enforced mandates; and
4. The key to developing strong mandates is the recognition of benefits in the widest sense, namely the framework presented in Figure 1.

Strong benefits and capability-driven mandates are needed to unlock a virtuous circle of investment and research and development which in turn drives down the costs of accessibility to levels that permit self-sustaining investment in accessible facilities and equipment. While there is evidence of this dynamic beginning to take hold in some nations, it has not done so in many others.

## Conclusion

This paper (i) explains the motivation for articulating the benefits of accessibility; (ii) provides a narrative basis for articulating how accessibility affects economic and social life; and (iii) moves towards a framework for quantifying the benefits of accessibility. While there remains technical research and development to be conducted in order to operationalize the framework depicted in Figure 1, each component of the framework has precedence in the application of Cost-Benefit Analysis and Capability Theory, precedence that speaks to its feasibility.

Adoption of the framework as a narrative tool can take the form of reference to it in policy debates and reports in order to provide perspective on questions of cost-benefit balancing.

Adoption of the framework as an analytical tool can include both the quantification and monetization of those aspects for which there is enough existing data to make robust estimates of benefits, as well as qualitative assessments of those benefits which cannot yet be adequately measured and assigned monetary-equivalent value. While different nations and organizations will need to move toward quantification at their own pace, such adoption, with differing degrees of quantification, can help keep the focus on the full spectrum of benefits of greater accessibility.

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## Notes

<sup>i</sup> Whereas the medical model of disability views disability as a medical problem requiring a medical solution, the social model says that someone is disabled by the interaction between her body or mind and the disabling environment that is built for one kind of body or mind rather than another.

<sup>ii</sup> Mobility may be viewed as a healthcare intervention that improves generates increased quality-adjusted life-years, as indicated in Table 2.

