# Accessibility measures from an equity perspective

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**Samenvatting**
In de vervoersplanologie is, zowel in beleid als wetenschap, een verschuiving waar te nemen van mobiliteit naar bereikbaarheid. Dit heeft geleid tot een zoektocht naar adequate bereikbaarheidsindicatoren, een zoektocht die noch allerminst is beslecht. Meer dan mobiliteit dwingt de focus op bereikbaarheid tot expliciete aandacht voor het verdelings-vraagstuk in het verkeer en vervoersbeleid: wie profiteert van welke verbeteringen in de bereikbaarheid? Het doel van deze paper is om bereikbaarheidsindicatoren vanuit dit perspectief van verdeling – oftewel rechtvaardigheid of equity – aan een analyse te onder-werpen.

Het startpunt van de verkenning is de filosofische literatuur over de klassieke tegenstelling tussen 'equality of welfare' en 'equality of resources' en een middenweg genaamd 'equality of midfare'. 'Equality of welfare' verwijst naar een verdeling van goederen (of kosten en baten) op een zodanige wijze dat de preferenties van alle personen in eenzelfde mate worden bevredigd. 'Equality of resources' heeft betrekking op een eerlijke verdeling van de set van goederen die nodig zijn voor het behalen van welfare. 'Equality of midfare' vertegenwoordigt een tussenpositie. Deze benadering benadrukt dat het niet gaat om de set van goederen op zich, maar om wat mensen kunnen doen met die set goederen.

De bereikbaarheidsindicatoren uit de literatuur kunnen op een glijdende schaal van resources-midfare-welfare worden geplaatst. Afstandsmaten en infrastructuur-gebaseerde maatstaven zijn typische voorbeelden van 'resource' indicatoren. Utility-based measures, al dan niet gebaseerd op de tijd-geografie, behoren thuis in de groep 'welfare' indicatoren. Maatstaven die in beeld brengen in hoeverre bepaalde bestemmingen kunnen worden bereikt en uitgaan van contouren of gebaseerd zijn op zwaartekracht-modellen, zijn voorbeelden van 'midfare' indicatoren.

In de paper worden de drie benaderingen van rechtvaardigheid kritisch besproken. Op basis van argumenten uit de filosofische literatuur worden 'equality of welfare' en 'equality of resources' afgewezen en wordt betoogd dat 'equality of midfare' de meest robuuste benadering is. Op basis hiervan zal een aantal veelgebruikte bereikbaarheidsmaten worden afgewezen als relevante indicator voor het beoordelen van (voorgenomen) beleid vanuit het perspectief van rechtvaardigheid. Aanvullend onderzoek is noodzakelijk om te bepalen welke van de 'midfare' bereikbaarheidsindicatoren het meest geschikt is voor het in beeld brengen van het verdelingsvraagstuk.

## 1. Introduction

In recent years, as the various problems posed by mobility planning have grown in severity, there has been an increasing interest in accessibility planning in both academia and practice (Department for Transport 2004; Lucas 2006; Curtis and Scheurer 2010). The call for a shift towards accessibility planning inevitably implies the need to develop and apply adequate accessibility indicators to assess the performance of transport systems and, increasingly, of integrated land-use and transport interventions. Alongside regional issues, accessibility measures can generate insight into the level of accessibility for specific user groups, whether by geographical location, mode availability, income, race, or travel motive (work, leisure, business, freight). As a consequence, accessibility measures can be used to address the distributive question in transport: who reaps the accessibility benefits from investments in the transport system?

The use of accessibility measures may affect the result of a distributive investigation, however. Different measures may highlight different distributive patterns and hence point to the need for different policy responses. We argue, therefore, that the choice of accessibility measures employed to address distributive questions should be based on a clear understanding of the distributive question in transport. An exercise into understanding and developing a justice-theoretic approach to transport arguably requires three steps. First, the focus or dimension of an equity analysis in the field of transport will have to be determined (i.e., what should be distributed in a fair way?). In the philosophical literature on social justice this central dimension of comparison is termed the "equalisandum". Second, there is a need to derive a proper distributive goal regarding the equalisandum identified in the first step (i.e., to answer the question: what constitutes a fair distribution of the equalisandum?). Finally, it is necessary to delineate which type of measures to use to determine progress towards the distributive goal identified in the second step. In this paper, we perform step one: we explore what should be the focus of an equity analysis in transport. This will provide the first coordinates regarding the types of accessibility measures to be used in equity analyses of transport policies (step three).

This paper is organized as follows. Section 2 provides a brief background to the problem of equity and accessibility measures. We highlight three egalitarian approaches to equity: equality of welfare, equality of resources, and equality of 'midfare.' Each is subsequently discussed in separate sections 3, 4 and 5. In Section 6, we link these approaches to existing accessibility measures. This results in the elimination of a number of measures, which, based on the philosophical arguments presented in the paper, are considered unsuitable as an indicator for equity analyses in the field of transport. We end with a brief conclusion and call for additional, philosophically inspired, research into the relationship between transport, equity and accessibility measures.

## 2. The context

Transport is a field of government interventions in which considerations of justice traditionally play only a rather marginal role (Martens in press). Yet, transport is of key importance for citizens as it enables people to participate in a range of activities crucial for well-being and full-fledged citizenship, such as employment, education, or leisure activities. The rapidly growing body of literature on transport-related social exclusion demonstrates that the distributive question cannot be ignored in the transport field (e.g. Lucas 2006). As mentioned in the introduction, an explicit engagement with issues of justice, in our view, raises three basic questions. In this paper, we focus on the first of these questions: what should be the focus of an equity analysis in the field of transport?

We aim to answer this question by drawing on the long-standing debate in the social justice literature on the difference between equality of welfare and equality of resources. We will briefly outline both positions and translate them to the distributive question in the field of transport, primarily based on the work of Dworkin (1981a; 1981b) (Section 3 and 4). We will then distinguish a third position, later developed, which can be described as equality of midfare (Cohen 1989) (Section 5). Subsequently, we will compare the three approaches and take position. This will result in reflections of the type of access measures that should be used in future equity studies.

Note that while we use the term 'equality of welfare' and 'equality of resources' this by no means implies that we uphold that equality should be the distributive yardstick to be applied in the transport sector. As Cohen (1989: 908) points out, a difference can be made between a strong and a weak equality argument. The strong argument claims that people should be as equal as possible in the dimension (e.g., welfare or resources) it specifies. The weak argument claims that people should be as equal as possible in some dimension, but subject to whatever limitations need to be imposed in deference of other values. For example, in case income is the equalisandum, proponents of the strong version would argue that incomes should be as equal as reasonable possible. Proponents of the weak equality argument, in contrast, might argue that differences in income are acceptable if they result in a prospering economy and in this way in a better situation for all, including the lowest income group (cf. Rawls' theory of justice).

Note that, as  we have argued elsewhere, the *de facto* impossibility of equality in the field of transport might be an additional reason to opt for a weak equality claim (Martens in press); see also Lucy 1981). That is, a choice for a particular equity dimension (also called equalisandum in the social justice literature) implies at least a weak call for equality in that dimension, subject to possible limitations. In practice, this may mean that a distributive yardstick different from the principle of equality is called for.

## 3. Equality of welfare

Dworkin distinguishes between two main readings of welfare: welfare as enjoyment, or, more broadly, as a desirable or agreeable state of consciencesness (hedonic welfare); and welfare as preference satisfaction, where preferences order states of the worlds and where a person's preferences are satisfied if a state of the world that he prefers obtains, whether or not he knows that it does and, a fortiori, whatever hedonic welfare he actually receives (Cohen 1989: 909). A person's hedonic welfare increases as he gets more enjoyment, and his preference satisfaction increases as more of his preferences, or his stronger preferences, are fulfilled. Here, we will consider both as largely comparable, although there are clear differences between the two readings.

Proponents of equality of welfare call for a redistribution of goods in such a way that welfare is equalized. More precisely, the equality of welfare approach holds that a distributional scheme treats people as equals when it distributes or transfers resources among them until no further transfer would leave them more equal in welfare. Thus resources are being distributed (they are the 'object' of government intervention), but welfare levels determine *how* the resources are distributed.

Translated to transport, a focus on welfare implies a focus on the 'satisfaction' people derive from their travel. Two possible interpretations seem possible here: it may relate to travel per se, i.e. the trip itself, or it may concern the pleasure derived from combined travel and activity participation. Note that in both cases, the welfare approach implies that the prime focus should be on *actual* travel or on the combination of *actual* travel and *actual* activity participation, as a person will derive most of her welfare from her actual behavior (although some welfare may be derived from potentialities (i.e. the ability to travel), in line with the economic concept of option value (e.g. Roson 2001). The former interpretation seems at odds with the general understanding of travel as a burden, a disutility or a derived demand; our starting point would therefore be to focus on the pleasure a person derives the combination of travel and activity participation.

In the literature, two main objections are formulated against equality of welfare: the argument of offensive tastes and the argument of expensive tastes. The first criticism is that the satisfaction a person may take in discriminating against other people or in subjecting others to a lesser liberty should not count equally with other satisfactions in the calculus of justice. Translated to transport, it could be argued that the welfare that persons derive of making somebody else's trip less attractive, e.g. a car driver enjoying speeding in part because of the danger she creates for other travelers, should not be accounted for in the welfare calculus. This objection is generally believed to defeat equality of welfare as an attractive equity goal, but there has also been formulated an easy way out. Rather than calling for equality of welfare as such, a welfare egalitarian can now simply shift to a call for equality of 'inoffensive' welfare (Cohen 1989).

The second criticism concerns the expensive tastes argument. That argument goes as follows. 'Imagine two persons, one satisfied with a diet of milk, bread and beans, while the other is distraught without expensive wines and exotic dishes. In short, one has expensive tastes and the other does not' (Cohen 1989: 913). A welfare egalitarian must provide both persons with a sufficient set of resources so that each can achieve the same level of satisfaction. This implies, ceteris paribus, that the person with expensive tastes will have to be provided with more resources than the modest person for them to be equally happy. For Rawls, this conclusion is unacceptable from the perspective of justice. He upholds that, as moral persons, citizens have some part in forming and cultivating their final ends and preferences. To argue in favor of equality of welfare seems to presuppose that citizens' preferences are beyond their control as propensities or cravings which simply happen; that citizens are passive carriers of desire (Cohen 1989: 913). In contrast, Rawls argues that citizens have the capacities to assume responsibilities for their goals in life. Comparable arguments have been made by others, such as Arrow. Cohen (1989: 913) concludes that the expensive tastes objection defeats welfare egalitarianism. In other words, the argument suggests that justice should not focus on equality in terms of persons' welfare.

To what extent can this argument be transposed to the field of transport? As suggested above, a focus on welfare implies a focus on the pleasure a person derives from the combination of travel and activity participation. Now, if we would follow the welfarist approach, equity would occur if each and every person derives the same level of pleasure from the combination of travel and activity participation. In line with the expensive tastes argument, this seems to lead to perverse results. Imagine two persons with identical activity patterns. Now, two situations could occur, in line with the expensive tastes argument. In one case, one person derives a lot of pleasure from activity participation, the other only little. Applying the welfarist approach in this case would suggest providing the latter with a high quality transport service so that the disutility ('negative pleasure') from travel is low, in order to compensate him for the low level of pleasure derived from activity participation.

In the other case, the two persons differ in terms of the disutility they derive from an identical trip (e.g., they ascribe a different disutility to the time involved in trip making). In that case, the person with the highest disutility from traveling should be provided with the best transport service, in order to guarantee equality of welfare (see Martens and Hurvitz 2011). Like in the case of the expensive tastes, both scenarios abstract from citizens' capacity to assume responsibility for their preferences. Furthermore, like in the general argument presented above, the application of the welfare approach to the distribution in the transport sector results in conclusions which run counter to an intuitive understanding of equity.

Sen (1980) adds another argument. He argues that welfare or utility is an unsuitable guide to policy, if only because a person may adjust his expectations to his condition. The fact that a person has learned to live under harsh conditions , and to smile courageously in the face of it, should not nullify his claim to a better life (Cohen 1993). Translated to transport, the fact that a person has learned to deal with the fact, for example, that he is not able to drive a car and has learned how to get around with a much slower transit system, should not nullify his claim for a better transit system. Note that other arguments against the welfare approach have been put forward by Dworkin and Scanlon (Cohen 1993: 19).

Taken together, the arguments above suggest that the equity analysis of transport should not focus on the welfare that people derive from either actual travel or the combination of actual travel and actual activity participation. In other words, the argument suggests that transport-related equity analyses should not focus on the welfare levels that persons derive from travel or combined travel and activity participation.

## 4. Equality of resources

Based on the arguments provided above, both Rawls and Dworkin dismiss welfare as the key equalisandum, or central dimension of comparison, of a theory of justice (see also Denier, 2007). Rawls argues in favor of the difference principle, i.e. *in*equality in the division of primary goods is only acceptable if it works to the benefit of the worst-off economic class (a weak equality claim regarding resources). Dworkin, in contrast, argues in favor of equality of resources (a strong, or stronger, equality claim). Here, we will take a closer look at the latter theory, as we believe it can help in determining the type of accessibility measure to be used in transport-related equity analyses.

Dworkin proposes resources rather than welfare as the proper equalisandum. He conceptualizes resources as the sum of material resources and mental and physical capabilities. He argues that people should enter economic activity with equal initial resources (Dworkin 1981b: 335). He develops a complex argument stating that people should be compensated for deficiencies in these resources. Where most philosophers of social justice juxtapose equity and free market exchange, Dworkin argues that the idea of an economic market, as a device for setting prices for a variety of goods and services, must be at the center of any feasible theoretical development of equality of resources. As Dernier (2007, p. 216) argues, this point is most clearly shown by his example of the ambition-sensitive auction.

Dworkin proposes an imaginary auction as a model whereby equality of resources might be achieved. He starts with an imaginative society in which all resources are up for sale. He further assumes that each member of that society has an equal amount of some form of currency – 100 clamshells in his example – and uses the clamshells to bid for those resources that best suit their life plan. Since each person has equal 'wealth', each person plays an equal role in determining the bundle of resources that will be chosen. Therefore, if the auction is properly executed, no one will envy another person's set of purchases after the auction, because he could have bid for that bundle of goods, rather than the goods he bid for. Dworkin calls this the envy test: 'no division of recourses is an equal division if, once the division is complete, any [person] would prefer someone else's bundle of resources to his own bundle' (Dworkin 1981b: 217).

Now, Dworkin recognizes that not all are born equal. Some may have disabilities, while others are very talented. These differences will shape the benefit a person may derive from a set of purchased resources. Dworkin develops the concept of the hypothethical insurance scheme as a way to solve these differences. Again, he presents an imaginative society in which each person is given an equal share of some currency. Furthermore, he argues, let us assume that everyone has the same risk of developing physical or mental handicaps in the future. Subsequently, each person is asked how much he is willing to spend on insurance for the natural disadvantages one may suffer, in addition to the purchase of the other resources up for sale in the auction. How much coverage would the average person of the community purchase? Dworkin argues that this question would provide a workable baseline from which to work out a premium. This will be so, even though particular persons differ in the risks they are willing to take and the insurance premiums they would be prepared to pay. People would, Dworkin argues, make roughly the same assessment of the value of insurance against handicaps such as blindness or loss of limbs, as is currently the case, at least partly, in the actual insurance market. On average, for instance, people might be willing to spend 10% of their income. Consequently, we could compensate those who develop handicaps accordingly, out of some fund collected by income taxation or other compulsory insurance with a fixed premium.

What is the relation with transport? First, if equality of resources is taken as the starting point, it implies that only the distribution of transport-related resources deserves attention. That is, we should not focus on the welfare a person derives from travel and activity participation, but solely on the resources that assist people to travel in order to participate in activities. The resource approach thus implies a focus on mobility or, better perhaps, potential mobility: the ease with which a person can move through space (Martens 2008). Second, Dworkin's approach would only compensate for particularities of the person, such as disabilities which are typically important in the case of transport. That is, the resource approach suggests looking only at a person's ability to travel through space, rather than at the access that is actually provided by that travel.

The resource approach has been criticized strongly by Sen (1980). While his original argument focused on Rawls' primary goods, much of the argument can be extended to the resource approach more basically. Sen's argument is simple but powerful. It argues that differently constructed and situated people require different amounts of resources to satisfy the same needs. Therefore, it is overly cumbersome to focus on equality of resources when it is often disconnected to its actual meaning for satisfaction of needs. It is a 'fetishist handicap' to be concerned with goods or resources as such, rather then to concentrate on what goods 'do to human beings'. Or, as Sen expressed it later: 'what people get out of goods depends on a variety of factors, and judging personal advantage just by the size of personal ownership of goods and services can be very misleading. (…) It seems reasonable to move away from a focus on goods as such to what goods do to human beings' (Sen 1982 in Cohen 1993: 16).

This argument could also be translated to the distribution in the field of transport. If the focus is merely on a person's ability to travel through space, then it is ignored what this ability can *do* to a person. Potential mobility, for instance defined in terms of the speed with which one can travel through space, does not provide insight into the possibility of a person to translate the resource into something useful. In Sen's terms this would be capability; in transport terms it would be activity participation.

The critique to the resource approach is thus twofold. In relation to a pure resource approach, such as that proposed by Rawls, it is argued that a resource approach does not take into account the differences between the recipients of those resources. This relates to disabilities, but goes further than that. Sen, for instance, gives as an example a pregnant woman who is in need of more nutrition than would normally be the case. The second critique relates to the fact that resources say little about what a person can do with those resources given the circumstances in which he finds himself. This critique relates to the circumstances outside the individual, and may include the particular spatial setting of the person. While hardly explicitly addressed in the philosophical literature, this latter objection is of key importance for the distributive question in the field of transport, as circumstances outside the person determine to a large extent what a person can do with a particular level of potential mobility.

Based on the above argument, it may be concluded that the resource approach is also insufficient as a guide for addressing equity concerns in the field of transport.

## 5. Equality of 'midfare'

Cohen (1993) develops a third position in the debate between equality of resources and equality of welfare based on Sen's capabilities approach. He notes that the major contribution of Sen to the debate is to define an equalisandum that lies between resources and welfare, between (primary) goods and utility. However, he argues that Sen's conceptualization of capabilities was imprecise. Rather than capabilities, he introduces the term "midfare," because it falls midway between goods and utility. Midfare 'is constituted of states of persons produced by goods [or resources], states in virtue of which utility levels take the values they do. It is "posterior" to "having goods" and "prior" to "having utility" (Cohen 1993: 18). The concept of midfare includes capabilities as coined by Sen, but is broader. It is a heterogeneous collocation 'because goods do categorically various things for people: (1) they endow them with capabilities (…) which they may or may not use; (2) through people's exercise of those capabilities, goods contribute to the performance of valuable activities *and* the achievement of desirable states; and (3) goods cause further desirable states directly, without any exercise of capability on the part of their beneficiary: an example would be the goods which destroy the insects that cause malaria' (Cohen 1993: 19). Cohen distinguishes the latter category to emphasize that capabilities are only a part, albeit it an important one, of midfare and that some goods can provide welfare without giving a person a certain capability.

The concept of midfare emphasizes that, in the enterprise of assessing a person's well-being, we must look at her condition in abstraction from its utility for her. For example, in case of food, we should look at the nutrition level obtained by a particular person and not at the food supply, as the resource approach suggests, nor at the utility a person gets out of eating food, as the welfare approach argues. A person's utility level is only *evidence* of a person's well-being, and the goods at his disposal are only *causes* of that well-being.

There are two powerful motivations for focusing on something between resources or utilities in a comprehensive characterization of a person's well-being: (1) possessions of goods and enjoyment or utility are not the only actual states that matter; and (2) it is not only actual states, but the range of states the agent can attain, that matter (Cohen 1993: 24). The latter contrasts with the welfare approach, the former with both the resource and welfare approach.

The concept of midfare can also be translated to transport, although it is by no means a simple exercise. A broad set of circumstances shape a person's ability to turn goods or resources into capabilities or welfare. More than in the case of food, a wide set of factors can be distinguished that determine the 'level of nutrition' a person can derive from a particular level of transport resources or potential mobility. Note that welfare is ultimately related to activity participation; midfare can thus be defined as the extent to which a person is able to translate transport resources into the possibility to participate in activities. As it is a "matching" between the person and the activity being accessed, at least two factors determine this ability:

- Land use patterns. The ability of a person to translate a transport resource (defined as potential mobility, or the speed at which a person can travel given mode availability and the transport network) into a capability depends first and foremost on the spatial distribution of various types of land uses and how they correspond to the needs of the person in question. Here, we enter into questions of the types of and affordability of the services and the types of jobs available at different locations.
- Personal circumstances. The ability to turn a resource into a capability also depends on personal circumstances, among which financial means, education and skill level, caring obligations (e.g. children), and long-term commitments (notably job obligations or life-phase, which shape the ability to participate in certain types of activities).

Possibly, other factors need to be taken into account when assessing a person's well-being based on midfare. What is clear, is that we need to address the particular needs and spatial contexts of the communities if we are carrying out an equity analysis in the field of transport.

## 6. Making up the balance

Above, we have distinguished three egalitarian approaches: equality of welfare, equality of resources and equality of midfare. Each approach calls for a different way to compare a person's situation vis-à-vis others and thus implicates a certain type of equity analysis. Table 1 briefly summarizes the different positions. Translated to transport, they also imply the use of different types of accessibility measures.

Table 1 Focus of different egalitarian or equity approaches and application to food

| **Author** | **Equalisandum** | **Application** |
|---|---|---|
| Rawls | Goods | Amount of food received |
| Dworkin | Resources | Amount of food received, corrected for disabilities |
| Cohen | Midfare | Nutrition level acquired from food matched to nutritional needs of person |
| Sen | Capability | Health from diet which allows for important activities |
| -- | Welfare/utlity | Utility (Health) derived from eating |

In line with the resource-midfare-welfare sequence distinguished by Cohen (1993), it is now possible to position a number of widely used access or accessibility measures. We have attempted to do so in the figure below, based on the accessibility measures distinguished by, amongst others, Handy and Niemeier (1997), Geurs and Ritsema van Eck (2001), and Geurs and van Wee (2004) (Figure 1).

Two types of access or accessibility measures can be distinguished that clearly are in line with the resource approach to equity: infrastructure-based measures and distance measures. The first focuses on travel speed or level of service provided by a transport system, the second on travel distances. While both tend to be applied at the level of transport networks, they could be easily used to compare the resource levels between individuals, groups, or neighborhoods. However, these measures ignore the large differences between persons and their circumstances, even if transport modalities are taken into account.

A range of accessibility measures can be linked to the midfare approach. Well-known measures, like contour measures or and potential accessibility measures, address only a limited part of what could constitute a midfare approach, as they only account for two particular circumstances of persons: (1) mode availability; and (2) land use patterns. Note that the former is not always taken into account; it depends on the particular specification of the measure. However, from a midfare perspective, at least a distinction by transport mode (or set of transport modes, depending on a person's abilities, e.g. walking, cycling and transit; walking and transit; car driving only etc.) is of crucial importance, as persons and households differ substantially in mode availability. Space-time measures take account of more personal circumstances that may influence a person's ability to turn a resource into a capability or welfare, such as a person's limitations flowing from life in a multi-person household (see Kwan 1998). The midfare approach furthermore suggests taking into account e.g. the match between the skills of a person or community and the types of jobs that can be accessed given a particular set of transport-related resources.

Finally, space-time measures that analyze accessibility as resulting from an *actual* space-time path belong to a welfare approach to equity. Utility-based measures (e.g. such as those presented by Dong, Ben-Akiva et al. 2006) clearly reflect the principle underlying the welfare approach to equity.

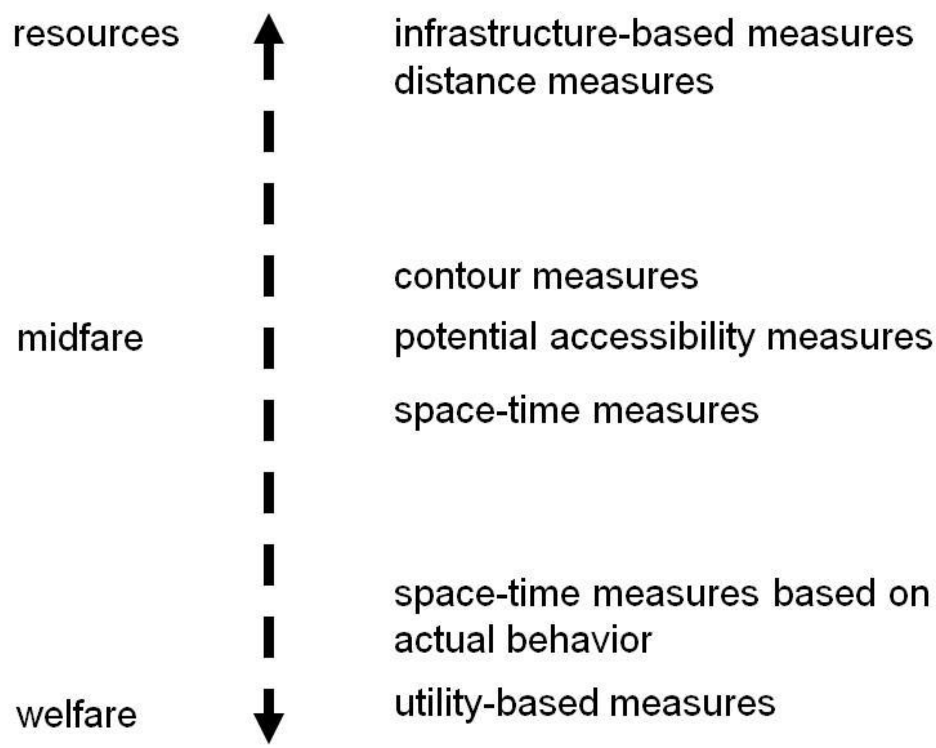


Figure 1 Position of various accessibility measures on the resource-midfare-welfare sequence.

From the above, two important conclusions regarding access measures can be drawn. First, we can dismiss all access measures that focus on the *actual* travel behavior of individuals. From a perspective of equity, not actual travel behavior but *possible* behaviors are what count in comparing individuals. This relates to the idea of "freedom" motivating Sen's work (Cohen 1993: 23-24). Second, we can dismiss indicators that measure access in terms of the utility a person derives from travel and activity participation. While possibly relevant from an economic or efficiency perspective, these utilities are not relevant from an equity perspective, for the reasons given above. Finally, we can also dismiss infrastructure-based measures, based on the argument provided in Section 4.

## 7. Conclusions and next steps

In this paper, we have explored what type of access or accessibility measures are suitable for an equity analysis in the field of transportation.

We have built an argument around an exploration of different egalitarian traditions to social justice: equality of welfare, equality of resources, and equality of midfare. We argue that the extremes in the resources-midfare-welfare sequence can be rejected as the proper metric for the assessment of the distribution of access. A resources-only focus would ignore a person's particular circumstances as well as his particular setting. A welfare-only focus, in turn, would lead to undesirable distributive responses. Translated to access or accessibility measures, this implies that two types of measures can be considered unsuitable as equity indicators. First, measures that only take a person's ability to travel, or potential mobility, into account can be dismissed as appropriate measures from an equity perspective. This would include all infrastructure-based measures, including measures that build on the level-of-service concept but translate it to a personal or group level. Second, it implies that utility-based accessibility measures are not relevant from an equity perspective, for the reasons outlined above (notably the expensive tastes argument). Furthermore, the analysis suggests that any type of accessibility measure that focuses on *actual* travel and activity participation of persons is not suitable as an equity indicator.

This leaves us with midfare as the proper conceptualization of access from Walzer's perspective. However, as we have argued, midfare is a multi-dimensional concept that still allows for a wide variety of interpretations. Furthermore, a wide set of accessibility measures would comply with some of the components that would encompass midfare. This includes various types of location-based measures, such as contour and potential accessibility measures, as well as space-time measures. More research is necessary to explore which of these measures would be most suitable as a performance indicator for equity analyses in actual practice. Apart from well-known evaluation criteria like interpretability, communicability and data availability, the research should also follow philosophical lines and address issues of personal responsibility and collective provision, as well as choice (e.g., Stark 2002).

Seeing that this project is best divided into three steps defined in our introduction, and this exercise attempted to tackle only the first, there are some next steps for us to follow. For one, we must define what is the distributive goal that transport (and land use) policies should strive for if justice, as reflected by measures of midfare, is a central aim of public action. We have made arguments in this area in other work (Martens, in press; Martens, Golub, et al., under review), but this may need to be revisited in light of the argument developed in this chapter. Second, we must work out the proper measures to reflect the meaning of access as midfare. While we make some first steps in this direction above, this arguably demands more attention and detail.

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