International Transport Forum

A People-Centred Approach to Accessibility

Discussion Paper

182 Roundtable

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The International Transport Forum

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Introduction

For at least three decades, academics have called for a paradigm shift in transport planning, from the traditional focus on mobility and car traffic flow in particular, to the measurement and enhancement of accessibility (see Banister, 2018; Bertolini, le Clercq and Kapoen, 2005; Cervero, 1997; Vigar, 1999). This call is increasingly resonating, although mobility-based performance indicators are still widely used in practice (Proffit et al., 2017).

The call for a paradigm shift is as much inspired by theoretical considerations as by concerns over the negative impacts related to traditional transport planning. Indeed, proponents of the accessibility shift seem to have high hopes that the use of accessibility metrics instead of mobility indicators will lead to very different outcomes of transport planning, thereby addressing key concerns like environmental pollution, urban sprawl, mono-functional urban development, traffic safety and even health.

This discussion paper, which is based on previous works by the author[1], argues that the accessibility shift itself is unlikely to deliver the goods. To emphasise this point, this paper distinguishes two versions of the proposed paradigm shift, a fully-fledged and a limited version. The fully-fledged version calls for a radical overhaul of the traditional approach to transport planning, substantially broadening the purpose of (transport) planning to include concerns over environment, urban sprawl, safety, and health. The limited version only calls for a replacement of the key performance indicators of traditional transport planning.

The arguments presented demonstrate that the fully-fledged shift is unlikely to happen any time soon, while the limited shift is unlikely to fundamentally alter the outcomes of transport planning. The latter observation calls for a critical reflection on the intellectual efforts to further refine accessibility measures and to develop ways to monetise the value of accessibility improvements. These efforts may ultimately lead to the adoption of accessibility metrics in transport appraisal, while failing to achieve the broader goals that have inspired much of the accessibility critique on traditional transport planning.

The discussion concludes with a call for a more profound change in transport planning. This change encompasses a shift away from a focus on the functioning of transport networks to a focus on the service differently positioned people receive from the transport system.

The remainder of this discussion paper is organised as follows. The first section looks at the traditional approach to transport planning and its inherently problematic nature. This is followed by a brief description of the accessibility critique of traditional transport planning and an explanation as to why neither the fully-fledged nor the limited version of the accessibility shift is likely to bring about a change in transport planning. The third section presents a people-centred critique of traditional transport planning and outlines a people-centred alternative to transport planning. The paper concludes with a brief summary of the arguments.

Traditional transport planning

This section takes a critical look at what could be described as traditional transport planning. While transport planning is practiced in different ways in different places, much of the traits of traditional transport planning can be discerned in the practices adopted by a wide range of transport authorities around the world. What follows is a brief introduction to the institutional perspective of transport planning. Following this perspective, transport planning can be seen as a particular kind of professional practice that follows a set of agreed upon rules. In the subsequent section, the roots of transport planning are described, as they are important in understanding the rules of traditional transport planning. This is followed by a presentation of the rules themselves, highlighting how the notion of mobility is clearly embedded in these rules. This section serves as a baseline to better understand the implications of the paradigm shift in transport planning advocated by an increasing number of authors.

Transport planning as an institution

Throughout this discussion paper transport planning is considered as an "institution". In the academic literature, institutions have been conceptualised as the "formal or informal (…) humanly devised constraints that structure political, economic and social interactions" (North, 1990), or as "the prescriptions that humans use to organize all forms of repetitive and structured interactions including those within families, neighbourhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales" (Ostrom, 2009).

So understood, it is easy to see that the practice of transport planning is in many ways an institution. Indeed, a wide variety of formal and informal rules, ranging from laws and regulations to informal conventions, structure decision making regarding interventions in the transport system. The discussion about the necessary shift from mobility to accessibility in transport planning belongs to the set of rules regarding the substance of transport planning (rather than the process of transport planning). These rules on the substance of transport planning cover the analytical, professional or "technical" part of the transport planning process, which feeds the political process that ultimately results in decisions to intervene (or not) in transport systems.

These preparatory rules relate to the type of analyses that should be carried out to determine the character and scope of transport "problems" worthy of policy attention, the type of solutions that may be considered to address these problems, the way possible solutions are to be assessed and evaluated, and, ultimately, the type of information to be provided to different stakeholders involved in the, inevitably political, decision-making process. These various analytical steps tend to be carried out by professionals with training and expertise in transport planning and related fields.

The "prescriptions" that guide this important part of the practice of transport planning can be formal and informal in nature. Formal rules are enshrined in laws and regulations. Deviations from these rules are often sanctioned, for instance in case a government withholds financial contributions to an infrastructure project if particular rules are not followed. The requirement to carry out an environmental impact assessment is a typical example of such a formal rule (e.g. Wood, 2003). Another example is the use of a cost-benefit analysis as a method of appraisal, which has become a formal element of transport planning for major infrastructure investments in a range of countries (Hayashi and Morisugi, 2000).

The informal rules refer to the shared practices of the community of transport planners (broadly defined). These rules also function as prescriptions, as they, too, can embody sanctions, for instance in a refusal to accept arguments from, or to cooperate with, an organisation that does not follow the informal rules. For instance, in some countries, applying a particular type of transport model has become a dominant element of the practice of transport planning, without any formal obligation to do so (Hensher and Button, 2000; De Jong et al., 2007). Transport planning agencies that do not follow this practice run the risk of being ignored or continuously challenged for not employing the shared practices of "good" transport planning.

This conceptualisation of transport planning as a primarily technical or analytical activity does not deny the inevitably political nature of transport planning. First, in any real-world context, the prescriptions regarding transport planning will be subject to pressures from various stakeholders, which may result in deviations from the general rules, the order in which they are executed, or the way the results of the transport planning exercise are used in the subsequent decision-making process.

As long as the incidence and scope of these deviations is relatively limited, they will not challenge the rules that guide proper transport planning. Second, the rules themselves are inevitably political in nature, as they direct the attention of transport planners to some issues rather than others (see below). The rules are thus not neutral, but embody a particular perspective on what counts as a transport problem, as a possible solution, or as a worthwhile benefit. This political nature can be traced back to the fact that (informal) institutions, like rules for transport planning, are defined by and maintained at base by culture and values (Stough and Rietveld, 1997).

The following section presents the informal rules of traditional transport planning. It starts with a brief summary of the historical roots of transport planning, as they have strongly shaped the rules of the practice.

The historical roots of transport planning

Transport planning as a profession has developed at a relatively late stage in comparison to other civil engineering disciplines like water, electricity and sanitary engineering. It may therefore be no surprise that transport planning borrowed heavily from the approaches developed in these disciplines. In order to understand the traditional approach to transport planning, it is therefore worthwhile to briefly reflect on these other disciplines of civil engineering.

The early engineers in the disciplines of water, electricity and sanitary engineering embraced the possibilities offered by the new technologies. These disciplines, which emerged and developed during the industrial revolution, were revolutionary in nature. Early engineers realised the potential of the new technologies to substantially improve a person's quality of life, in particular in the heavily polluted and crowded cities of the 19th century. The ambition of the early civil engineers was to provide a basic service to an entire population by gradually expanding the system to all parts of a nation (Graham and Marvin, 2001). Thus, water, electricity and sewerage systems were gradually introduced and expanded over time, with the ambition to ultimately connect each and every home to the new technology. The task of engineering was to design, operate and maintain the (ever expanding) infrastructure system, delivering a service to each connected household and business in a reliable and a cost-effective way. From the very inception thus, civil engineers focused on the infrastructure system and its functioning.

This perspective resonated in the practice of highway planning in the United States, which preceded transport planning (Weiner, 2008). Like other engineers, transport engineers embraced the new technology of the future: the car. They saw it as their goal to connect each and every home to a road

system suitable for car travel at high speed. As a result, early highway planning in the United States concentrated on developing a network of high-quality roads connecting various parts of the nation. A comparable approach was taken in European countries after the Second World War. The approach to highway planning reflected the modernist ambitions prevalent in the other domains of civil engineering, i.e. the ambition to provide a basic service to an entire population by gradually expanding the system to all parts of a nation. The aim of early highway planning was thus to provide a system of roads of comparable quality across a nation, to a large extent irrespective of the costs or benefits of connecting particular geographical areas to the network (Black, 2003).

Transport planning in the United States developed out of highway planning in the late 1950s. The fundamentals of traditional transport planning were developed in the context of the pioneering Detroit and Chicago Transportation Studies (Bates, 2000). In many respects, these studies were firmly in line with the focus of the other engineering disciplines on the functioning of the technological system. The aim of transport planning was to guarantee a well-functioning transport system. Like the other engineering disciplines, the underlying rationale was to provide a reliable service in a cost-effective way. Given the fast growth in car ownership and use, this implied expanding and improving the road system. The practice of transport planning developed to guarantee this reliable service: from its very inception, transport planning was framed as an activity to tackle the problem of congestion (Black, 2003; Levine, 2013). This ambition is reflected in the generally accepted definition of transport planning as the "field of government intervention that aims to ensure the effective and efficient movement of people and goods" (Shiftan, Button and Nijkamp, 2007; Cervero, 2001).

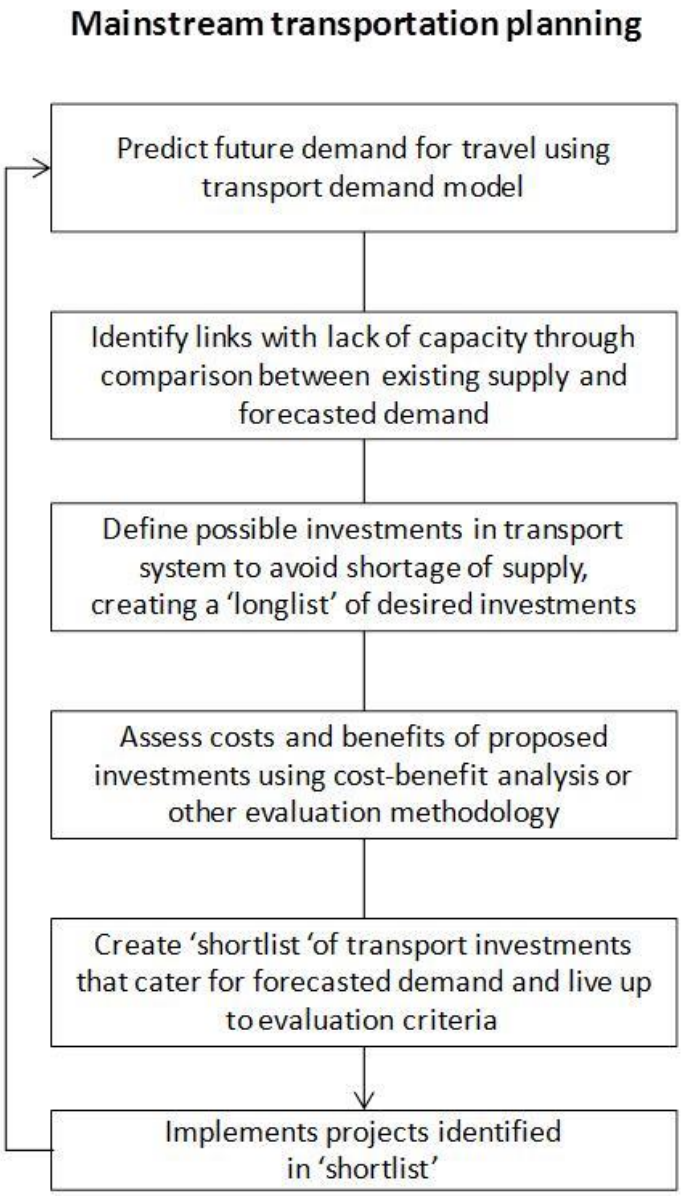
The informal rules of traditional transport planning

The, mostly informal, rules guiding the practice of traditional transport planning are well-known and have been described in a number of text books (e.g. Lane, Powell and Smith, 1974). They can be briefly described as follows.

As with other engineering disciplines, the delivery of a reliable service requires the understanding of future demand. The first step of proper transport planning practice is thus the forecasting of future demand for travel (Hartgen, 2003). The standard tool used to forecast future demand is the well-known four-step travel-demand model. On the input side, this model requires data on the size and spatial distribution of the population and economic activity in the future. These data are then used for a series of sequential mathematical steps, which lead to the output of the model: detailed forecasts of future trips on major road and transit links in a metropolitan area (Cervero, 2001).

The purpose of the second step is to identify transport problems. The understanding of what a transport problem is follows from the ambition of transport planners to provide a well-functioning transport system. Transport problems occur where and when "effective and efficient movement of people and goods" is obstructed. In other words, transport problems occur whenever congestion occurs in the transport system or, in other words, whenever the transport system provides a poor level of service. Following this perspective, in the second step of traditional transport planning the data on expected travel on each transport link are compared to the capacity of each link. Whenever expected travel (travel demand) is larger than capacity (transport supply), congestion occurs, level of service goes down, and a transport problem occurs. It is here where the focus on mobility in traditional transport planning comes clearly to the fore.

Figure 1. The informal rules of traditional transport planning, prescribing how to conduct transport planning.



Source: Taken from Martens (2015), "Traditional transportation planning and its alternatives".

In the third step, solutions are developed to address the identified problems. In the traditional approach, these solutions primarily encompass proposals for road capacity expansion or the addition of new links to the existing road network. Solutions are subsequently rated based on their contribution to congestion reduction on the major links of the system, with the ultimate aim to maintain free-flow traffic across the entire system. The (four-step) transport model again plays a key role in the assessment of the possible contribution of various infrastructure investments to congestion reduction, i.e. of their contribution to the proper functioning of the transport system.

The identification of a set of links in need of upgrading and the related solutions would only be the final result of transport planning in a world of unlimited resources. In the real world, it is not possible to upgrade all links that experience some level of congestion due to a lack of funds. Hence, the necessary step following the modelling efforts encompasses a way to prioritise possible investments. While various evaluation frameworks have been applied over recent decades (Browne and Ryan, 2011), one has emerged as the dominant tool in most industrialised societies: cost-benefit analysis (Willis, Garrod and Harvey, 1998; Bristow and Nellthorp, 2000).

Cost-benefit analysis (CBA) generates data on the economic efficiency of a transport project, which can be defined as the maximisation of the net contribution of the project to the national income. The most important benefit included in cost-benefit analysis is travel time savings, which account for as much as 80% of total benefits of most roads projects. The focus on travel time savings follows logically from the focus on the functioning of the transport system and from the understanding of the transport problem as congestion. Travel time losses are a direct measure of the severity of transport problems in a transport network and a clear indicator of its poor performance. Travel time savings are its mirror image and represent a measure of the improvement in the functioning of the transport network due to infrastructure investments. Figure 1 provides an overview of the informal rules of traditional transport planning.

The appeal of traditional transport planning

The traditional approach to transport planning has been very successful over the past six decades. The approach has been adopted in many countries around the world and it has justified the investment in thousands of roads.

The rules of traditional transport planning are powerful, because of their simplicity and their intuitive appeal. The engineers' pride resonates also among the people: transport systems should function properly and congestion is a clear failure of the transport system to do so. Hourly traffic jam reports on the radio confirm that congestion is the major transport problem to be tackled. Professionals and decision makers, many of whom drive (certainly in the past) cars regularly, often experienced congestion, confirming the relevance of the traditional approach. The approach is also seemingly neutral: it merely seeks to make sure that a public infrastructure system functions properly. Who could disagree with that? It is important to understand the powerful appeal of this approach for all these reasons.

The accessibility response

This section briefly considers the perspective of accessibility proponents on transport planning. The term accessibility proponents refers to academics and professionals that have argued that accessibility should take centre stage in transport planning. A very brief account of the accessibility critique on the traditional approach to transport planning is given, followed by a presentation of three possible interpretations of the way forward proposed by accessibility proponents. The first way forward encompasses a radical paradigm shift, which would have far-reaching consequences for the practice of transport planning and the role of transport planners. The second shift is limited in nature and only calls for the replacement of the

performance metrics in transport planning, from mobility-oriented to accessibility-focused metrics. The third interpretation represents a middle ground between these two extremes. The section concludes by highlighting the problematic nature of both proposed shifts.

The accessibility critique of traditional transport planning

Traditional transport planning has been criticised on a number of grounds. One of the most powerful critiques has underscored the negative environmental impacts caused by an approach that uncritically seeks to cater for the projected demand for (car-based) travel (Owens, 1995). These environmental impacts range from deterioration of air quality at the local level to resource depletion and from fragmentation of natural habitats to an intensified greenhouse effect at the global scale. These concerns date back at least to the early 1970s, but have gained in force since the coining of the notion of sustainable development in the late 1980s. From the sustainability perspective, car-based travel is perceived as the most problematic form of transport, given its vast environmental impacts.

Many of the accessibility proponents share the environmental critique of traditional transport planning. Yet, their critique is more fundamental in nature. Accessibility proponents argue that since its inception, traditional transport planning has focused on the wrong goal of mobility rather than accessibility. This critique is at least four decades old (Wachs and Kumagai, 1973; Black and Conroy, 1977; Morris, Dumble and Wigan, 1979). Roughly, the argument reads as follows. People are not interested in travel per se, i.e. in mobility, but in accessing places where they can fulfil needs and wants. While improved mobility can imply improved accessibility, the later does not necessarily follow from the former. For instance, if land uses are dispersed over a large area, high levels of mobility do not necessarily equate with high levels of accessibility.

Conversely, it is argued that areas with poor mobility, such as congested urban centres, do not necessarily provide poor levels of accessibility, precisely because of the high density of various types of land uses in a small area. Based on these observations, it is argued that traditional transport planning directs the attention to the wrong problems: it seeks to improve mobility where accessibility is already high, ignores areas with low accessibility but high mobility, and fails to acknowledge the potentially detrimental impacts of improved mobility on accessibility in the long-term. Furthermore, the argument goes, accessibility cannot only be improved through interventions in the transport system, but also through interventions in the land use system as well as through changes in the way in which services such as health care or education are provided.

Based on this critique, accessibility proponents argue that transport planning should focus on accessibility rather than mobility. This proposition has taken a more radical and a more limited form, as discussed below.

The radical shift: accessibility planning

The accessibility critique of traditional transport planning is convincing in nature. Travel is (mostly) a derived demand; what counts for people and businesses is not mobility per se, but access to valued destinations. Yet, what should be the implication for transport planning? A range of accessibility proponents have given sweeping answers to that question. Let me give some examples.

In her paper “Highway blues: Nothing a little accessibility can't cure”, Susan Handy calls for a rethinking of the goals of transport planning (Handy, 1994). Referring to the work of transport planners, she writes:

"[t]hey have focused on the performance of the transport system, not the overall performance of the metropolitan system". Handy argues that transport planners' focus on accommodating car traffic has led to urban sprawl and low densities, decreasing accessibility in the long-term in spite of all efforts to speed up traffic. She continues that "[a]s a planning goal, accessibility has two critical advantages over mobility". In describing the first advantage, Handy adopts the transport planners' jargon of "level of service" when she writes that accessibility as a goal "allows for trade-offs between land use and transportation policies and focuses the attention on the level of service of the metropolitan area as a whole, rather than just of the transport system".

The second advantage is that "accessibility as a planning goal provides a clear direction for policy makers. While increasing mobility may be a good thing, higher levels of accessibility are inherently a good thing". Handy thus suggests that the goal of transport and land-use planning should be accessibility, but does not provide clear pointers regarding the problems that planning needs to address. Should transport planners merely increase (average) accessibility (as suggested by the phrase "the overall performance of the metropolitan system") or should they solve particular accessibility problems? Or should transport planners focus on something more? Elsewhere in her paper, Handy suggests that enhancing accessibility is a "crucial step toward building liveable communities" and that "[i]nstead of fighting the endless conflict between maintaining mobility and controlling the negative effects of transportation, we can move to constructive discussions of alternatives that enhance accessibility while protecting the environment and improving the quality of life in our communities". This suggests that the transport problem to be solved encompasses the negative environmental externalities and poor quality of life in cities, rather than merely a lack of accessibility. Handy thus seems to propose a substantial broadening of the realm of transport planning and the role of transport planners.

The same broadening of the purpose of transport planning can be observed in the classic 1997 paper of Robert Cervero entitled "Paradigm shift: from automobility to accessibility planning". In his paper, he both observes and proposes a radical shift in transport planning. He argues that "[t]he first step in reformulating transport planning is a clearer articulation of objectives, framed not only in terms of economic efficiency but (…) accessibility and sustainability as well". He subsequently compares "automobility planning" with "accessibility planning", terming both of them "transportation mitigation approaches". Cervero argues that "automobility planners" are focused solely on mitigating congestion, while their toolbox consists mostly of road construction and traffic management, supplemented in some cases by investments in suburb-to-city public transport (i.e. heavy rail).

In contrast, the mitigation efforts of the "accessibility planner" are much broader in nature, as they are (also) concerned about the environmental externalities, urban sprawl and traffic safety. The accessibility toolbox also encompasses a wider range of tools, including land use management, transport demand management, and investments in community-scale public transport (e.g. light rail) and non-motorised transport. Where traditional transport planning was about "enhancing automobility", accessibility planning "is about creating places that reduce the need to travel and, in doing so, help conserve resources, protect the environment, and promote social justice".

Litman, another important accessibility proponent, also seems to argue for in favour of a broad approach to accessibility planning, although less explicitly. Like Cervero, he argues that transport planning is going through a paradigm shift, i.e. "a fundamental change in how problems are defined and solutions evaluated". He compares the traditional approach with the accessibility perspective and concludes: "Accessibility is the broadest perspective and so offers the most potential solutions to transport problems, including more accessible land use development and mobility substitutes such as improved telecommunications and delivery services". In the eyes of Litman, accessibility planning is thus first and

foremost important because it "expands the range of possible solutions to transport problems, which can lead to better solutions". But he also argues that these "better solutions" do not only solve transport problems, but are also likely to have "co-benefits", such as infrastructure cost savings (reduced road and parking requirements), reduced pollution emissions, and increased fitness and health, "all of which should be considered in analysis" (Litman 2019). Like Handy and Cervero, Litman thus seems to suggest that accessibility planning should seek to address a broad range of problems.

This brief account gives rise to two observations. First, the account underscores the breadth of the ambition of some accessibility proponents. They seem to want to radically expand transport planning beyond the confines of transport proper, both in its understanding of what the problem is that transport planning should address and what kind of interventions to consider in the search for solutions. This stands in stark contract with traditional transport planning, which is characterised by a clear (albeit narrow) understanding of the transport problem at hand and a clear indicator for policy success (i.e. the performance of the transport network).

In contrast, accessibility planning seems to evolve into a form of comprehensive urban planning, encompassing multiple goals, while simultaneously being based on a rather narrow indicator for success: accessibility. The subtitle of Handy's paper is particularly revealing here: "nothing a little accessibility can't cure". It is hard to imagine how accessibility can be a proper indicator for policy goals as diverse as air pollution, urban sprawl and traffic safety, let alone how accessibility can cure these ills (Martens, 2019). Yet, this seems exactly what the accessibility proponents are proposing.

Second, the broad account of transport planning leaves ill-defined the role of the transport planner. The duty of the transport planner seems not merely to encompass the analysis of accessibility levels, but also the identification of possible transport and non-transport solutions that can enhance accessibility, as well as the assessment of this broad set of solutions in terms of their impact on accessibility. This pushes transport planners well beyond their field of expertise and confidence. Accessibility planning as described above seems to require transport planners to enormously broaden the scope of interventions they need to take into account, which takes them well outside the domain of transport proper, into urban planning and even urban service delivery.

It also seems to require transport planners to be knowledgeable regarding environmental and other impacts, issues which are typically the domain of other professions. This broadening of the scope is reasonable given the problems at hand, but it is highly problematic from an institutional perspective. From the very start, transport planners will need to negotiate with other actors in the governance arena. And during the exercise, there is no particular part of expertise which "belongs" to the transport planner. The transport planner is ill-equipped to adopt the role that is expected in the integrated approach and is likely to be outperformed by the land-use planner who is often trained to manage broad visionary processes. In this light, it is unlikely that accessibility planning is an attractive alternative to traditional transport planning.

This brief account provides only some of the arguments why a sweeping paradigm shift is unlikely to happen any time soon. An earlier paper argues more fully that accessibility proponents have failed to develop a comprehensive alternative to traditional transport planning, blocking the envisaged paradigm shift are (Martens, 2015). However, the focus here is to explore the merits of a more limited shift from mobility to accessibility.

A limited shift: accessibility gains

Given the complexities involved in a fully-fledged paradigm shift in transport planning, it may come as no surprise that a substantial share of the accessibility literature is more modest in its ambitions. There is an enormous body of literature that develops, tests and applies a wide range of accessibility indicators. While much of this literature is academic (or positive) in nature (Levine, 2019), a substantial share explicitly seeks to propose accessibility metrics that can be used as a performance indicator of transport (and land use) systems and can thus be employed as part of the process of transport planning. While hardly ever made explicit, this latter type of study often seems to be based on the assumption that the introduction of new key performance indicators in transport planning will lead to a change in the outcomes of transport planning.

More precisely, the argument seems to be that where mobility-related performance indicators (level of service, traffic speeds, travel time losses and savings) have resulted in past decades in continuous interventions to speed up road traffic, the use of accessibility-related performance measures will lead to fundamentally different results. The idea here is not only that accessibility-based analysis will expand "the range of possible solutions to transport problems", as suggested by Litman (2019), but also that such analyses will provide the justification for fundamentally different solutions than those adopted in the past. Indeed, the assumption seems to be that the application of accessibility-based performance indicators in transport planning will lead to the adoption of "sustainable" solutions that would avoid many of the negative impacts related to the road-based solutions proposed by mobility-driven transport planning.

This can be characterised as a "limited shift", because the literature does not seem to imply a radical change in the practice of transport planning. Rather, the suggestion seems to be that the rules of traditional transport planning as described above can still be applied. What is needed is the use of a different performance indicator in the assessment stage of transport planning. Where in the traditional approach, transport solutions are assessed on their contribution to the performance of the transport system, with congestion reduction as the primary goal and travel time savings as the most important performance indicator, the accessibility proponents argue that solutions should be evaluated based on their contribution to enhancement of accessibility.

This limited shift would by and large imply that the existing understanding of the transport problem – as a malfunctioning of the transport system – remains intact. The expectation seems to be that a focus on accessibility will trigger transport planners to consider a broader range of alternative solutions. The question is whether such a limited shift will indeed lead to the broadening of the set of solutions considered to solve the (old) problems. Given the increasing emphasis on sustainability in general policy discourse, it seems reasonable to assume that transport planners would be willing to consider various types of transport interventions beyond traditional road capacity schemes, such light rail projects, separated bus lanes, and in some cases even bicycle highway investments and improvements in public transport services (rather than infrastructure investments). It is much less likely that transport planners would willingly agree to analyse a broader set of transport interventions, such as travel demand management, parking pricing or road pricing, as these are typically considered to lie outside of the realm of the traditional transport planner. Still less likely would be the analysis of integrated solutions that take into account interventions in land use patterns. Limiting the accessibility shift to a change in performance indicators thus implies that the envisaged paradigm shift will at best halt halfway.

Yet, the advantage of this limited shift lies in its easy adoption in the practice of transport planning. Transport planners, understood as a broad community including engineers, modellers and economists, are skilled in the development of technical approaches to systematically measure the impacts of transport

interventions and familiar with the assessment of proposed interventions based on monetised benefits. A limited shift thus fits in the existing paradigm and is thus much more likely to occur in the short-term than the proposed (radical) paradigm shift discussed above.

Will such a limited shift deliver the goods? In other words, will the assessment of transport solutions based on accessibility rather than travel time savings result in the selection of more sustainable transport interventions? While it is impossible to answer this question in general terms, there are enough reasons to assume that the limited accessibility shift will fail to bring about the changes envisaged by the proponents of accessibility measurement.

To understand this better, it is necessary to define the shape of an accessibility performance indicator. Rather than selecting one indicator from the multitude of options developed in the literature, a very general formulation will be used (based on Martens and di Ciommo, 2017). As an alternative to travel time savings, the use of the notion of accessibility gains, roughly defined as an improvement in the number or range of destinations a person can reach is preferred. In line with a number of authors (Moseley, 1979; Farrington and Farrington, 2005; Fol and Gallez, 2014), the amount of accessibility gains reaped by a person should be perceived as independent of the actual level of trips made by a person and of the range of activities the person is currently engaged in. This conceptualisation is based on theoretical and methodological considerations, as discussed elsewhere (Martens and di Ciommo, 2017).

The consequence of this formulation is that accessibility gains generated by a transport improvement are reaped per person and by each person to the same extent, provided the person has (or will have) access to the transport mode being improved. Given this formulation, well-known cumulative opportunity or gravity-based indices of accessibility can be used as a measure of accessibility gains, provided they take into account the (set of) transport mode(s) available to a person. In line with the practice of cost-benefit analysis, an accessibility gain (or loss) is subsequently defined as the difference in accessibility level between the "project" and "no project" scenario (the latter being referred to as a person's "initial" level of accessibility).

This formulation does not yet define how the monetary value of accessibility gains should be assessed, but it is sufficient for an analysis of how the use of accessibility gains in the assessment may work out for the different interventions in the transport system. (For some initial thoughts on how accessibility gains could be monetised see: Niemeier, 1997; Handy and Niemeier, 1997; Wang, Monzon and di Ciommo, 2015; Nahmias-Biran and Shiftan, 2016).

Given this straightforward conceptualisation of accessibility gains, it is relatively easy to see why the replacement of travel time savings by accessibility gains is not so likely to deliver different results. There are three reasons for this, three effects, which will be at play in virtually all cases in developed countries.

First, there is the group size effect. In developed countries, the vast majority of the (adult) population typically has access to a car and the car typically accounts for a larger share in modal split than either public transport or the bicycle. An improvement in the road system will thus lead to increases in accessibility for a large share of the population, as they have access to the car. It could of course be argued that public transport improvements may benefit an even a larger share of the population, as public transport services can be used by both car-owning and car-less persons.

For people who own a car, however, improvements in public transport often do not imply an absolute improvement in accessibility. In many cases, the car will remain the fastest mode to reach many destinations, and so the car will still provide a higher level of accessibility than the improved public transport system. Thus, public transport improvements do not, or hardly, improve the situation of the car-owning share of the population. Even when public transport improvements succeed in luring a share of

people out of their cars, for instance because of severe congestion or parking restrictions, it may still not lead to an increase in accessibility if measured as the range and variety of destinations that can be reached. In other words, road investments are likely to generate accessibility gains for more people than public transport projects.

The difference between these types of project is greater where road improvements also speed up road-based public transport, as in that case road building may even generate accessibility benefits for the car-less (even if only in the short term). So without making any calculations, it is very likely that road investments will generate more total accessibility gains than alternative investments (whether public transport or cycling). It may be possible to reach a different conclusion by employing a different notion of accessibility, but it would be an improper move to continue adjusting the performance indicator until we get the desirable outcome. For the accessibility shift to really make a change, it should be robust in its outcomes, whatever the exact specification of the accessibility measure.

There is also a geometry effect at play. The faster a transport mode, the larger the area that can be traversed. All else being equal, accessibility increases with the square of speed (Metz, 2008). While this only holds in the ideal situation of unhindered travel in all directions, the effect also occurs under less ideal circumstances. It implies that an increase in travel speed for a fast mode will result in a much larger increase in the area that can be accessed, than an identical increase in travel speed for the slow mode. Since land uses are not uniformly dispersed over space, this does not directly imply a comparable increase in accessibility levels, but it does suggest that increases in the speed of a fast mode are likely to generate more accessibility gains than a comparable increase in the speed of a slow mode. Like in the case of the group size effect, the geometry effect thus implies that improvements in the (typically) faster road network are likely to generate more accessibility gains than investments in the (currently) slower public transport or bicycle networks.

Finally, there is the well-known valuation effect. Recall that traditional transport planning requires the estimation of the size of the benefits (travel time savings) and subsequently a calculation of the monetary valuation of these benefits. If this same approach is applied to accessibility gains, these gains have to be monetised. This is clearly a conceptual as well as a methodological challenge, but this is not the point here. The point is that market-based valuation methodologies may be applied and, if they are, this will work out in favour of investments in road infrastructure. This is so because the users of road infrastructure have higher incomes on average than the users of public transport (the situation is less clear for cycling). Any form of market-based estimate of willingness-to-pay for accessibility gains is thus likely to point towards road building rather than sustainable investments.

This valuation effect can be neutralised by applying an equity value of accessibility gains, in line with the practice of using equity values of travel time. The valuation effect could potentially even work to the benefit of sustainable solutions if the concept of diminishing marginal utility of accessibility gains is used. In that case, one unit of accessibility gain accruing to people with low initial levels of accessibility would be valued higher than an identical unit by people with high initial accessibility levels. Since car-less persons are more likely to have lower initial accessibility levels than people with access to a car, applying this logic of diminishing marginal utility might thus work in favour of sustainable transport interventions. However, it will depend on the particular case at hand whether this would compensate for the volume and geometry effects described above. My estimate is that the correction will not be strong enough.

In defence of the shift towards accessibility-based performance measures, it could be argued that the assessment of various transport investments would change in favour of sustainable solutions if land use impacts of proposed investments were taken into account. The argument here would be that road building would encourage urban sprawl, single-use zoning, and low densities, while investments in public transport

would generate the opposite land use changes: urban containment, mixed uses, and an increase in urban densities. Note that taking such land use changes into account in the appraisal of transport solutions would imply quite a drastic change in the practice of transport planning, as the traditional approach is based on the (faulty) understanding that land use patterns are a given and not influenced by transport decisions. But if land use changes are taken into account, the argument would be that increased road capacity may well improve mobility, but would result in a decrease of accessibility due to the land use dynamics mentioned above, if not in the short run than certainly in the longer term. This is precisely the argument of Handy (and others) in favour of accessibility planning.

This argument has some appeal, but it is problematic for at least two reasons. On the one hand, the impacts of land use changes on accessibility seem to be overestimated. While road building may increase some of the land use dynamics described before, it is unlikely that any single transport project will have a substantial impact on the total of land use patterns in an urban region. Even if a project would substantially affect the location of new development, such new development will be a relatively small addition in comparison to the already existing land uses. The marginal impact on spatial patterns of any single transport project is thus likely to be small. On the other hand, the inclusion of land use dynamics in the assessment of alternatives raises all kind of conceptual issues.

Most important is the fact that accessibility proponents need to make a choice: either urban planning is a means of intervention in the toolbox of the accessibility planner and thus subject to control, or land use patterns are shaped in large part by transport systems and are thus essentially beyond regulatory control. Accessibility planners cannot assume that both hold at the same time. Taken together, these considerations seem to suggest that it will not be easy to incorporate the impacts of land use changes in the assessment of transport interventions and, even if it were possible, it is by no means certain that these impacts would substantially shift the assessment in favour of more sustainable transport investments.

A moderate shift

Clearly, the radical and the limited shift do not represent the entire set of positions held among accessibility proponents. The works of Levine, Grengs and Merlin (2017, 2018, 2019), in particular, can be seen as a representative of what can be called a moderate shift. They argue that the accessibility shift should affect all stages of transport planning, from the stage of problem definition up till the stage of evaluation of transport interventions. In doing so they go beyond the limited shift, which limits its focus to the use of accessibility metrics in evaluation only. In contrast to the radical shift, Levine and colleagues argue that the use of accessibility metrics in transport planning should focus on the ultimate goal of transport, i.e. accessibility, and not on the instrumental relationship between accessibility and other goals like reduction of environmental externalities or improvement of health. Moreover, in their most recent book, Levine, Grengs and Merlin (2019) make a strong case for employing accessibility metrics for assessing the transport aspects of land-use planning, thereby substantially adding to the accessibility literature.

Yet, this work falls short of defining a clear-cut goal for transport planning. For them, the accessibility shift "does not imply that accessibility maximization is the criterion of a successful metropolitan area; accessibility goals necessarily compete for priority with those of other realms such as education, health, or economic development". They argue that the question underlying traditional transport planning "How fast can people travel" should be replaced by the question "How many places can people reach?" They add that an accessibility perspective to transport planning "merely seeks to make the values tied to … decisions an explicit subject of public discourse" and suggest that this would lead to explicit discussion about questions like: "Do planning actions increase or degrade accessibility? Do they advantage mobility

by some modes versus others? Do they render its distribution more or less equitable?" (Levine, Grengs and Merlin, 2019).

While it is clear that accessibility is but one goal among many, the approach proposed by Levine and colleagues leaves the role of the transport planner ill defined. If the goal is not maximisation of accessibility, then what is the goal of transport planning? And how do we answer the questions posed above? How do we weigh accessibility improvement versus an increase in goal attainment in other domains? Which decreases in accessibility are acceptable and which are not? Which accessibility improvements would trump other societal concerns? While the moderate shift is convincing in its insistence that "accessibility thinking" should guide transport planning from the very stage of problem conceptualisation onwards, and that its focus should be on accessibility and not on other goals, it does not provide clear guidance on the purpose of transport planning.[2]

An alternative approach?

Accessibility proponents have criticised the traditional approach to transport planning on theoretical grounds and have called for a paradigm shift towards accessibility planning. Three versions of this paradigm shift have been briefly discussed: a radical, a limited, and a moderate shift. In the radical version, the purpose of transport planning is substantially expanded to incorporate a range of concerns, including the environment, urban sprawl, traffic safety and even health. While praiseworthy in its broad ambitions, it is unclear how a focus on accessibility can assist in addressing this broad variety of (transport-related) problems. In the limited version, it is assumed that the use of accessibility-focused performance indicators rather than traditional mobility-oriented indicators will lead to radically different outcomes of transport planning, outcomes that are more in line with the ambitions embraced in the radical approach.

The analysis presented in this section suggests that a mere change in the performance indicator, while leaving the other rules of traditional transport planning intact, is unlikely to lead to sustainable outcomes of transport planning. The moderate shift calls for accessibility thinking to guide the entire process of transport planning, from problem formulation to evaluation and prioritisation, but fails to define a clear goal of transport planning. This bleak conclusion leads to the obvious question: What role can accessibility play in transport planning? This is dealt with in the next section.

Adopting a people-centred approach to accessibility

This section presents an approach that builds on the paradigm shift towards accessibility planning, but also radically expands that shift. It starts with a critique of traditional transport planning from a people-centred perspective. This leads to the understanding that transport planning should move away from a focus on the transport system towards a focus on people. A brief description of a people-centred approach to transport planning is provided, concluding with a brief discussion of the implications of the people-centred approach for (the role of accessibility gains in) transport project appraisal.

A people-centred critique of traditional transport planning

As discussed above, traditional transport planning has its roots in other civil engineering disciplines and the progressive ambitions embodied by these disciplines. The ambition of water, electricity and sanitation engineering to provide an efficient and reliable system connecting each and every home to the new technologies was also embraced by the early transport planner, most of whom were (transport) engineers by training. From the 1950s onwards, the progressive ambition of the civil engineering disciplines was adopted in the transport domain and applied to the transport technology of the future: the car. Following the engineering approach, each and every house was to be connected to a network of high-quality roads.

Where this progressive approach works well for water, electricity and sewerage systems, it does not work when planning the transport system. Where the aim to connect each and every home to modern water, electricity and sanitation systems can be seen as virtually inherently inclusive, the same approach applied to transport was doomed to create large disparities. Water, electricity and sanitation engineers could safely focus on the functioning of their systems. As long as this focus went hand in hand with the gradual expansion of the system across a geography, the engineering project was also an inclusive project. This was so because the new technologies could be used by virtually everybody and costs of use were rarely an issue.

But the same did not apply for transport. Rather the opposite. Transport engineers' embrace of the car in combination with a modern road system was from its very start an exclusionary project, albeit unintended. Here, it was not enough to connect each and every home to the new network. Unlike water and electricity, the car was and still is too expensive for a substantial share of the population. Unlike water and electricity, the car cannot be used by a large share of people with impairments. And unlike water and electricity, young people are not able to use cars on their own. Unlike in the other engineering disciplines, the engineering approach to transport failed to develop a transport system that serves everybody well.

The engineers were certainly not the only ones who were seemingly blind to the exclusionary nature of the car-road system. Also in the public discourse of the 1950s and 1960s, the car was seen as the mobility means of the future, providing a previously unknown level of freedom of movement to its citizens. This belief was not only firmly inscribed in the minds of engineers, but also in those of leading politicians of the time, many of whom promised "a car for each household". The traditional approach to transport planning developed in this environment. The discourse justified the focus on the car and road building. The engineering roots shaped its focus on the functioning of the transport system.

The fundamental flaw of transport planning, then, is its focus on the system rather than on the service people receive from that system. Where the success of water, electricity and sanitation engineering can be largely equated with a successful functioning of the respective systems (with costs of delivery and reliability of service as key performance indicators), the success of transport planning cannot be determined based on the functioning of transport systems. In this perspective, the accessibility proponents are correct in their analysis: the success of transport planning cannot be reduced to its success in providing mobility.

Yet, it is also insufficient to focus merely on accessibility as an alternative. Precisely because of the differences between people, a people-centred approach is necessary, an approach that analyses what *differently positioned* people receive from the transport system. Merely setting the "enhancement of accessibility" as the goal of accessibility planning is not sufficient to avoid the fundamental flaw of traditional transport planning.

From its very start, the accessibility critique of transport planning has brought people into play. In their path-breaking paper, Wachs and Kumagi (1973) call for accessibility analysis by socio-economic groups as

an important input in the evaluation of policy alternatives and the measurement of goal attainment. The three accessibility proponents briefly discussed above also all relate to people. Handy writes: "To plan for accessibility is to focus on the ends rather than the means and to focus on the traveller rather than the system: do people have access to the activities that they need or want to participate in?" (Handy, 2005) Cervero (1997) observes that that it is "people and places that matter, not transportation" and continues that the difference between planning for automobility versus accessibility "is the difference between planning for movement versus planning for places and people". Likewise, Litman (2015) argues that while traditional transport planning "places automobiles at the center", the new accessibility-based paradigm "places people at the center".

These statements point in the right direction but fall short of providing a clear way on how to relate to people in accessibility planning. Indeed, as long as the goal of transport planning is to "enhance accessibility" without further specifying this goal, accessibility planning may be as blind to the differences between people as traditional transport planning has been. Handy's call to focus on the "overall performance of the metropolitan system" rather than the performance of the transport system is remarkably close to the engineering approach with its focus on systems rather than people. If accessibility planning merely seeks to increase "average accessibility", there is no guarantee that all people will benefit from efforts to gradually improve overall accessibility.

As the discussion of the assessment effects above suggests, it is even highly likely that interventions that work out well for the majority of the population will outperform interventions that improve the situation of population groups experiencing low levels of accessibility. The focus on accessibility may perhaps lead to less road building and more public transport investments, and it may even lead to less urban sprawl, more mixed land use, and higher densities, but it will remain to be seen whether these positive benefits will primarily flow to people already enjoying high levels of accessibility or also to those who have historically been poorly served by traditional transport planning.

People-centred transport planning

Elsewhere, I have provided an extensive argument in favour of an approach to transport planning that puts people at its core (Martens, 2017). My approach is rooted in the tradition of social contract theory. Government, in this perspective, is seen as the representative of all citizens and its duties are seen as the outcome of a social contract between the citizens. According to social contract theory, citizens are willing to give up some of their rights and freedoms to a government in order to obtain other goods, goods which none of the citizens could obtain individually or collectively without giving up some of those freedoms.

To help develop a social contract approach to the domain of transport a series of thought experiments can be used. These are conducted using the famous veil of ignorance developed by the philosopher John Rawls. In the thought experiments, people are placed behind the veil of ignorance. Behind the veil, they need to reach an agreement on the design of the transport system that will serve them in the society in which they will live once the veil of ignorance is lifted. The people behind the veil have to reach an agreement, without knowing who they will be in society: whether they will be rich or poor, whether they will end up living in a suburb or in the city centre, whether they are fit and healthy or old and frail. Rawls argues that the fundamental uncertainty faced by the people positioned behind the veil of ignorance about who they will be, will induce them to take the situation of all people seriously in their design of the transport system. They will want to achieve an agreement that will not leave them stranded once the veil of ignorance is lifted.

This logic also applies in the thought experiments for the design of transport. Not knowing who they will be, the people positioned behind the veil will design a transport system that will (virtually) always serve them, no matter who they will turn out to be. However, given the costs related to the provision of transport to all, the people behind the veil will also limit the resources they will spend on transport provision. The outcome of the thought experiments is then that people will agree on a transport system that provides them with sufficient accessibility. Such an agreement will never leave them stranded, no matter who they will be when the veil is lifted, while also not absorbing an unacceptable amount of the resources jointly produced in society.

This then, is the responsibility of government in the field of transport, if understood through the eyes of contract theory. It is the responsibility of government is to provide everybody with sufficient accessibility. This is a modest principle of justice and also an intuitively appealing one. It does not call for equality nor for a strong reduction in disparities. It merely sets a minimum standard, a baseline.

The higher good which citizens obtain through this standard of justice is the guarantee that none of them will ever find themselves in a situation of transport poverty, in a situation where the transport system is a barrier to, rather than an enabler of, activity participation. The price that citizens have to pay for this safety net is some form of taxation. Governments cannot guarantee sufficient accessibility to all without adequate funding. Since transport in many cases does not pay for itself or, if it does, excludes a substantial share of the population from its use, taxation is the only option to provide a transport system that guarantees sufficient accessibility to all. The result of the thought experiments, briefly described here, is thus the delineation of the fundamental duty of governments in the domain of transport as the obligation to provide everybody with sufficient accessibility - under virtually all circumstances (Martens, 2017).

This people-centred approach thus radically redefines the purpose of transport planning. Where traditional transport planning has been defined as the “field of government intervention that aims to ensure the effective and efficient movement of people and goods”, the people-centred approach would define transport planning as the “field of government intervention that seeks to guarantee sufficient accessibility for all through interventions in the transport system”. The latter addition is of crucial importance. It makes an explicit distinction between the role of transport planners, who focus on interventions in the transport system, and the role of urban planners, who may seek to enhance accessibility through land-use interventions.

This distinction does not intend to separate two interlinked policy domains, but rather to clarify the duties of different professions. Integrated transport and land-use planning remains the ideal, but transport and urban planners should contribute to this planning process based on clearly defined bodies of expertise. This is one key advantage of people-centred transport planning in comparison to accessibility planning. Where the latter takes transport planners out of their comfort zone, the former guarantees that the transport planner can focus on the functioning of the transport system. What has changed is the goal or, in other words, the measure of a transport planner’s success. Success can no longer be measured based on the functioning of the transport system itself, nor on the overall performance of the metropolitan system, but has to be assessed on its ability to provide sufficient accessibility to all.

Implications for the appraisal of transport projects

The people-centred approach to transport planning has radical implications for the appraisal of transport projects. In contrast to the limited accessibility shift discussed above, the people-centred approach results in a fundamentally different understanding of transport problems. The approach thus has implications for all stages of traditional transport planning, including the crucial stage of problem identification. Elsewhere,

I have provided a fully-fledged set of informal rules for an approach to transport planning that seeks to provide every person with sufficient accessibility (Martens, 2017). Here, it is important to reflect briefly on the implications for the appraisal of transport projects.

The people-centred approach to transport planning can go hand in hand with transport project appraisal based on cost-benefit analysis. What is key is not the type of project assessment, nor the way in which accessibility gains are being measured and monetised. What is of key importance is the understanding of the transport problem to be addressed by transport planning and the type of solutions worthy of appraisal. From the people-centred approach, the transport problem is no longer the malfunctioning of the transport system (i.e. congestion), but the delivery of a sub-standard, insufficient level of accessibility to population groups. This understanding of the problem, in turn, guides the search for solutions. Only (transport) solutions that address the identified problems should be subject to transport appraisal. Transport projects that do not directly address these problems, should not be considered further. Under such conditions is it meaningful to employ cost-benefit analysis. Only under such conditions is the replacement of travel time savings by accessibility gains likely to lead to fundamentally different outcomes of transport planning.

Conclusion

The traditional approach to transport planning has been challenged on multiple grounds by people from multiple backgrounds. The accessibility proponents argue that a paradigm shift from mobility to accessibility will result in a planning approach that is likely to deliver radically different transport outcomes that address many of the (environmental) concerns of the critics of transport planning.

This paper argues that a mere shift from mobility to accessibility is not enough to deliver the goods. The radical paradigm shift turns transport planning into urban planning, fails to clearly define the new role of transport planners, and links too many goals to the narrow performance indicator of accessibility. The limited shift, consisting merely of a replacement of performance indicators, is unlikely to fundamentally change the outcomes of transport planning.

In spite of this, the position of accessibility proponents that transport planning should focus on accessibility not mobility remains valid, as does Levine's argument that the "transition to accessibility-based planning will not be complete—in fact, it cannot even really begin—until accessibility-based performance indicators supplant metrics such as highway level of service in evaluating transportation success and guiding transportation and land-use decision making" (Levine, 2019). The real shift "cannot even really begin" if the paradigm shift remains limited to a change in the performance measures employed in transport planning. The adoption of accessibility measures is merely a necessary, but not a sufficient, condition for a change in the outcomes of transport planning.

To summarise, what is needed is a fundamental rethinking of the purpose of transport planning. While proponents of accessibility will probably agree that the original definition of transport planning as "the field of government intervention that aims to ensure effective and efficient movement" is defunct, no clear alternative has been proposed. An appropriate definition, in light of the above discussion, would be that transport planning as the field of governance that seeks to guarantee sufficient accessibility for all through the regulation, operation, maintenance, and improvement of the transport system. That reformulation, in

combination with the systematic measurement and assessment of accessibility improvements of (transport) interventions, is likely to lead to the desired change in transport and land-use systems around the world.

Notes

1 Martens, K. (2015), “Traditional transportation planning and its alternatives”, paper presented at the 94th Annual Meeting of the Transportation Research Board, 12-15 January 2015, Washington DC, USA.

Martens, K. (2015), “Accessibility and potential mobility as a guide for policy action”, Transportation Research Record: Journal of the Transportation Research Board 2499: 18-24.

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2 The term “accessibility thinking” was proposed by Cecilia Silva at the OECD/ITF Roundtable on Accessibility and Transport Appraisal, 21-22 October 2019, Paris, France.

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A People-Centred Approach to Accessibility

This paper discusses two variants of the accessibility paradigm for transport planning. The extensive paradigm aims to radically overhaul transport planning to incorporate issues of environmental quality, urban sprawl, safety and health. Its adoption is unlikely in the medium term and raises questions about the role of the transport planner. The limited paradigm calls for transport planning to adopt accessibility indicators in place of mobility indicators. However this will not meet the underlying goals of the accessibility critique. A change in the focus of transport planning is needed from the functioning of transport networks to the service that differently placed people receive from the transport system.

All resources from the Roundtable on Accessibility and Transport Appraisal are available at:
www.itf-oecd.org/accessibility-and-transport-appraisal-roundtable

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