



Ministerie van Infrastructuur  
en Waterstaat

## Equitable transport policy

Research note

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Equitable transport policy

Netherlands Institute for Transport Policy Analysis (KiM) performs analyzes of mobility that finds its way into policy. As an independent institute within the Ministry of Infrastructure and Water Management (IenW), KiM conducts strategic explorations and policy analyses.

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## Summary

**With this research note we aim to improve the clarity of the notion of equity in transport policy so that decisions can be made about the importance of equity in such policies. To this end we present equity notions from the literature and provide examples of how these notions are applied in real (transport) policies, both national and international. This knowledge may lead to equity being the third pillar on which transport policies are systematically evaluated in future, in addition to their effectiveness and efficiency. The underpinning of transport policy choices with equity considerations can provide policymakers with justifiable and, for some groups, more acceptable policies.**

We emphasize the importance of examining the effects of mobility policy on equity in ex post evaluations because policy measures can also have unintended effects. Ex post evaluations can look beyond the effects (and the corresponding variables and indicators) that were initially considered important. One can look for the presence of unintended distributional effects, which can then be measured and corrected. The underpinning of choices regarding equity can provide policymakers with more defensible and for some groups easier to accept transport policies.

We regard utilitarianism, egalitarianism and sufficientarianism as the three main equity notions:

- Utilitarianism aims to provide the greatest good for the greatest number of people. An equitable distribution of policy effects is that which maximizes aggregated welfare.
- Egalitarianism strives to reduce inequalities of opportunities. According to egalitarianism, a transport policy is fair if it distributes positive and negative effects in a manner that reduces differences (in accessibility, exposure to emissions, etc.) between groups.
- Sufficientarianism strives for minimum standards for everyone. For example, everyone should be able to access certain key destinations, like schools or hospitals, within a certain maximum travel time.

These three notions show that equity research entails more than only examining the distribution of effects. Sometimes it is relevant to focus solely on the groups that are worst off. And to make matters more complicated, sometimes a double-notion approach may be needed, because policymakers must consider different interests simultaneously (limiting total CO<sub>2</sub>-emissions (utilitarianism) and assuring maximum noise emissions for all (sufficientarianism), for example) for a specific policy measure in the transport domain.

For each of the three main equity notions, we propose indicators for measuring the effects of policy measures. We propose indicators for the following variables: accessibility, traffic safety, polluting emissions, and noise emissions. According to utilitarianism, indicators focus on the aggregate effect (total accessibility); for egalitarianism, indicators show the distribution of effects (differences in accessibility between groups); and for sufficientarianism, indicators map the policy effects for people that is worst off (having travel times longer than the maximum acceptable travel time).

We conclude this research note by proposing a five-step approach for policy makers for including equity in transport policies. The questions that must be answered in these steps are:

1. Is equity a policy objective?
2. Which equity notion is most suitable for my policy objective?
3. Dependent on the equity notion:
  - a. In case of egalitarianism: for which groups of the population or spatial entities do we want to measure and compensate distributional effects?
  - b. In case of sufficientarianism: what is the desired boundary level?
  - c. Utilitarianism does not require additional questions.
4. Which are the indicators that will allow us to measure intended or unintended effects of transport policy on equity?
5. Did we achieve our goals? Did any unintended (distributional) effects arise?

By following these steps when developing transport policies, equity can become a basic element of these policies.

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# 1 Introduction

“Good policy should be effective, efficient and equitable” (van Wee, 2018, p.65). However, while there are ample insights into what makes transport policy effective and efficient, there is little clarity around what makes it equitable, or, in other words, just. Moreover, as Professor Bert van Wee notes, “the question of whether and how to include (equitable) options in decision-making (for transport policy) is primarily a political choice” (van Wee, 2018, p.69). Ultimately, equity considerations imply judgement, which is, by definition, subjective as long as standards are not set. For example, is it equitable to assign an equal share of the mobility budget to all regions or rather to assign a larger share to the more populous ones? Is it equitable to build more roads to ensure uncongested movement for all car drivers, or is it better to provide a sufficient number of alternatives for different transport modes? And is it equitable to spend large sums of public money on a relatively small number of disadvantaged individuals or should the available funds be divided roughly equally among all individuals?

While equity has long received substantial attention in health and education policies, the (increasing) interest in equity issues in Dutch transport policy is more recent and covers a shorter time period. For instance, questions are being raised about transport poverty, road pricing ('pay as you go') or the transport implications of inequalities in digital skills. Moreover, equity is of relevance in a wider range of Dutch Ministry of Infrastructure and Water Management (IenW) hot topics, like 'broad-based welfare' (*'brede welvaart'*) and its link to mobility<sup>1</sup> and the 'smart and sustainable mobility transition'. Note that for many years equity has been considered in policy questions, but the current move is towards a clear need for an equitable distribution of policy effects. If we take into account how policies affect equity, this can in turn have direct repercussions in the policies themselves.

Also among researchers in the field of transport, interest in equity is ascendant. We performed a Scopus search<sup>2</sup> and found that the number of yearly transport-related publications addressing equity doubled in four years time, between 2017 and 2021. The overall number of yearly transport-related publications also increased, but at a slower pace: we must cover the period between 2006 and 2021 to arrive at a doubling. Several Dutch transport academics are among those tackling the subject, including Professor Bert van Wee, Karel Martens and Tim Schwanen. Without question their publications have expanded the field further. This research note helps to make the complex findings of that research accessible to policymakers.

There is a range of what society considers equitable, and this range changes over time. What one political party considers fair, another considers unfair, and what was considered fair in 1960 differs from what we consider fair today. For example, we currently observe a shift of what is and what is not acceptable in relation to the rights of the environment and future generations. It is therefore important to understand that the equity notions are a frame, and their implementation in policy must be in sync with societal changes. Moreover, the range of issues that arise in

<sup>1</sup> The link between mobility and broad-based welfare is also addressed in, for example, *'Uitwerking van Brede Welvaart voor de Monitoring en Evaluatie van Mobiliteitsbeleid'* (Visser en Wortelboer-van Donselaar, 2021), and in *'Brede Welvaart en Mobiliteit'* from (Snellen e.a., 2021).

<sup>2</sup> Scopus database is the largest abstract and citation database of peer-reviewed literature. We searched for articles that included in the keywords, title or abstract the words, "equity" and either "transport" or "transportation". Subsequently, we repeated the search for articles that included the words, "transport" or "transportation". See Appendix A for the figures that present the result of this SCOPUS-search.

equity discussions is also changing. Keeping an open mindset helps us realise that we hold many assumptions of fairness that may appear to be less fair once we question ourselves about how we arrived at them in the first place. And then those same situations can suddenly seem less fair to us.

This research note aims to be a fact based yet easy to read document that helps policymakers understand the various aspects of equity in transport. It can help policy makers translate the general concept of equity and equity ambitions into measurable objectives. Our focus is on various equity notions, rather than focusing on one notion exclusively.

The rest of this research note is structured as follows. Section 2 clarifies the meaning of equity (and related terms) and outlines three equity notions, including examples in the context of Dutch transport policy. Section 3 includes examples of how equity is included in transport policies outside the Netherlands. It also provides certain insights into how equity is considered in other fields (education and health) in the Netherlands. Section 4 analyses how transport policy is evaluated from an equity perspective, and, to this end, provides examples of equity indicators. Section 5 offers a reflection on the link between equity and (a) the concept of broad-based welfare and (b) mobility transition. Section 6 concludes this research note.

## 2 Terminology and the spectrum of equity notions

This section delves into equity-related terminology. First, we clarify the terms around equity. And second, we explore the various equity notions.

### 2.1 Terminology

Much knowledge in the field of equity has been described in English-language literature. The nouns 'equity' and 'justice' have the same Dutch translation: '*rechtvaardigheid*'. The corresponding adjectives are 'equitable' and 'just', or 'fair', and, in Dutch, '*rechtvaardig*'. Equity and justice always imply a moral judgement. This research note uses primarily the word equity.

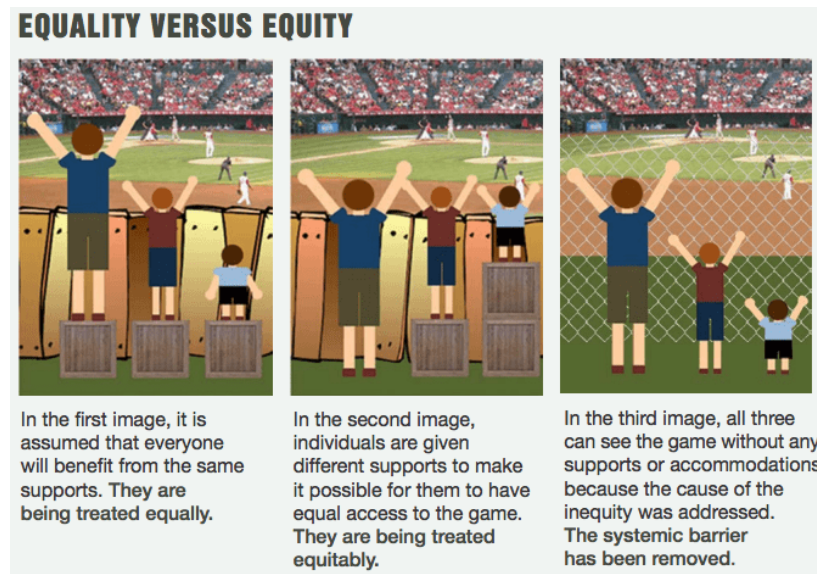
Note that all policies are supposed to be designed with equity in mind. However, not all individuals are of the same opinion when judging what is deemed equitable, as long as this term is not objectively described. Using the various equity notions can help explain, objectify, convey and justify the chosen equity notion.

Unlike the terms equity, justice and fairness, the term equality does not imply any judgement. Equality implies treating all individuals the same, regardless of their differences. Consequently, even if two people may not agree on what is equitable, one can objectively measure whether something is equal. Equality is translated in Dutch as *gelijkheid*. *Gelijkheid* is, grammatically speaking, a noun, and the corresponding adjective is *gelijk* (in English, equal).

Note that, even if equality does not imply a subjective judgement, deeming equality as the 'way to go' when considering equity in transport would include an underlying judgement, which is that all individuals should be given the same means, regardless of whether these means are suitable for all. Equal systems can arguably result in inequity, owing to a lack of consideration of differences in gender, age, physiology or employment status, for example (Jahanshahi et al., 2020). Equality not necessarily being equitable is also illustrated by Figure 2.1.



Figure 2.1 Equality, equity and systemic barriers. Source: (Brooks, 2015).



The term 'systemic barriers' ('*systemische Barrieren*') refers to the unintentional consequences of policies. Figure 2.1 depicts this concept. Transport-related systemic barriers can have different natures. The STEPS framework (Shaheen et al., 2018) highlights five types:

- 1 Spatial (e.g., gaps in the transport networks)
- 2 Temporal (e.g., mobility services not being available at the needed times)
- 3 Economic (e.g., transport prices being too high for some segment groups)
- 4 Physiological (e.g., no accessibility for wheelchairs in public transport)
- 5 Social (e.g., bike-theft in the neighbourhood where you live).

Such systemic barriers may result in unequal access to transport. Note that in most cases systemic barriers are unconscious and unintentional. Better understanding the transport needs of various groups of individuals can help eliminate these systemic barriers.

## 2.2 Equity notions

In the literature on equity in (transport) policy, reference is made to equity 'theories', equity 'perspectives', 'concepts' of equity, equity 'forms' and equity 'principles'. We choose to talk about 'equity notions' because a "notion" is objective, and open to only one interpretation.

Policy effects are generally mapped out with an ex-ante or ex-post evaluation. Nahmias-Biran et al. (2017, p.1) state, "behind every method for (economic) valuation of government interventions is an, often implicit, justice theory which provides the moral justification for the (distributive) considerations that underpin the evaluation approach". This is why a good understanding of the various equity notions can help identify whether, and argue why, a transport policy choice is an equitable one. In other words, the underpinning of transport policy choices on equity notions can provide decision-makers with more justifiable and more agreeable policy choices (Lucas et al., 2015).

### 2.2.1 *The three most common equity notions*

There is no single list containing all available equity notions. While some equity notions do repeatedly appear in scientific publications, this is not the case for all. Within the context of ethical discussions about the distribution of effects from policies, we consider utilitarianism, egalitarianism and sufficientarianism as the three most common notions. This section describes these three notions. We also summarise them in **Fout! Verwijzingsbron niet gevonden..**

**Table 2.1 Summary of utilitarianism, egalitarianism and sufficientarianism.**

Equity notion	Utilitarianism	Egalitarianism	Sufficientarianism
Aim	The greatest good for all individuals together	Reducing inequality of opportunities	Minimum standards for everyone
Examples	Result Social Cost Benefit Analysis (SCBA)	<ul style="list-style-type: none"> <li>▪ 'Decision on public transport accessibility' (Besluit toegankelijkheid van het openbaar vervoer)<sup>3</sup></li> <li>▪ Development of the railway network in the Netherlands</li> </ul>	<ul style="list-style-type: none"> <li>▪ 'Healthcare Institutions Admissions Act' ('Wet toelating zorginstellingen; WTZI')<sup>4</sup></li> <li>▪ 15-min. city</li> <li>▪ Minimum parking requirements</li> </ul>

**Utilitarianism:** It strives for the greatest good for all individuals together. According to utilitarianism, an equitable distribution is that which maximizes aggregated welfare (see Table 1 in Perreira et al. 2016).<sup>5</sup> Note that utilitarianism considers all individuals to be the same, and therefore it links equity to wins for the total number of individuals, regardless of the particular characteristics of those winning and losing.

Utilitarianism is the main notion behind the SCBA (Social Cost Benefit Analysis, or, in Dutch, *MKBA*) which generally focuses on only the balance of total costs and total benefits. Road developments also follow the utilitarianism mindset, striving to ensure uncongested movement for car users. That aim directly leads to providing the most benefit to the large group of car users.

A point of increasing criticism on utilitarianism's is that it does not take into account negative effects for certain groups because it only focuses on the total. Critics highlight, among other points, that utilitarianism ignores distribution effects (Perreira et al., 2016, p.4; de Ciommo and Shifan, 2017, p.140).<sup>6</sup>

**Egalitarianism:** It strives to reduce inequality of opportunity. According to egalitarianism, transport policy is fair if it distributes the benefits of policy in ways

<sup>3</sup> <https://wetten.overheid.nl/BWBR0029974/2015-01-01>

<sup>4</sup> <https://wetten.overheid.nl/BWBR0018906/2022-01-01>

<sup>5</sup> Although some philosophers disagree, in literature utilitarianism is considered as an ethical principle for examining equity. We follow the literature in this because ignoring distributional effects does have equity implications.

<sup>6</sup> Note that the SCBA (*MKBA* in Dutch) guidelines go beyond pure utilitarianism and suggest to consider distributions.

that reduce this gap. Van Wee (2021) notes that mobility and accessibility may be a positional matter, meaning it is not so much the degree of mobility or accessibility that matters, but rather that appreciation of someone's own level of accessibility (or mobility) depends on the level of accessibility or mobility of others. In policy terms, this would mean that an individual's accessibility or mobility can improve or worsen while their absolute level of accessibility does not change.

Egalitarianism was important in the Netherlands in relation to earlier rail network developments, when areas of limited density were also provided with stations and access to (unprofitable) railway connections. Egalitarianism is also important in the 'Decision on public transport accessibility' (Besluit toegankelijkheid van het openbaar vervoer), which ensures that public transport is accessible to all (eliminating, for example, barriers for the elderly and disabled people).

**Sufficientarianism:** It strives to provide minimum standards for everyone. According to sufficientarianism, everyone should have sufficient accessibility to key destinations. The challenge, however, is defining what 'sufficient' is. Also, what is deemed 'sufficient' may change over time. Generally, the trend is towards higher and higher standards.

Sufficientarianism for example plays a role in the 'Healthcare Institutions Admissions Act' ('Wet toelating zorginstellingen; WTZi'), which is a law stating that ambulances must be able to reach patients within 15-minutes after a call has been made. One can also link the minimum parking requirements of CROW to the sufficientarianism notion: there should be sufficient numbers of parking spots available at a location (even if calculating the numbers deemed sufficient for different density areas requires transcending the sufficientarianism notion). Another similar example is the maximum (transport-related) noise levels for housing included in the 'Laws, regulations and policy on environmental noise' ('Wet- en regelgeving en beleid bij omgevingsgeluid').<sup>7</sup>

A final example of sufficientarianism is the notion of the 15-minute city (which is gaining momentum worldwide). The 15-minute city aims to provide sufficient accessibility to (most) daily necessities by walking or cycling for 15-minutes at most. Given that low-education and low-income individuals tend to cover shorter distances for their trips to the most common destinations, one could also deem the 15-minute city notion an egalitarian one: it reduces inequality in opportunities regarding accessibility to the common destinations. This example highlights that transport policies can be linked to various equity notions simultaneously (which to some extent can be considered as complementary). Note that in the examples this research note highlights, we tend to link the policy examples to a unique equity notion. They should be viewed as simplifications: several notions can be applicable at the same time.

### 2.2.2 *Other equity notions*

Without claiming to be complete, the following provides a comprehensive overview of other equity notions found in international transport literature. We have based our list of equity notions on works from Litman, T. (2002), Thomopoulos et al. (2009), Adli & Clowdhury (2021), and Perreira et al. (2016). Additionally, we have included two equity notions (environmental equity and intergenerational equity)

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<sup>7</sup> [Wet- en regelgeving en beleid bij omgevingsgeluid | RIVM](#)

that, are increasingly important as a result of the increased attention given to the environment.

Vertical equity: It strives to protect disadvantaged individuals, groups or regions (i.e., different treatment for different groups, benefiting those worse off). According to vertical equity, people should be burdened according to their ability to contribute. This principle is also applied in progressive tax schemes. In Figure 2.1, we see the middle figure with a vertical equity notion: the shorter the spectator is, the higher the support.

An example in the transport domain is an income-dependent tariff for road pricing. Such a measure would include both aspects of vertical equity and 'transport users should pay their way' equity. Additionally, vertical equity is implemented when deciding that students should receive discounted public transport cards.

Horizontal equity: It strives to treat comparable individuals, groups or regions in a comparable manner (i.e., the equal treatment of equals). Unlike vertical equity, horizontal equity does not require lower burdens for worse off individuals. For example, when discussing road pricing, horizontal equity would simply ensure that individuals with similar earnings travelling on the same road face a similar road price, but it does not say anything about what that price should be in comparison to individuals with different earnings.

Territorial cohesion: This equity notion aims to benefit deprived areas relatively much in order to reduce spatial economic inequality. Territorial cohesion is important for policies of the European Union (EU). Wherever one lives in the EU, a person must have access to housing, work and essential services everywhere (EC, 2022).

An example of territorial cohesion for the Netherlands is the Dutch 'dispersal policy' (*'spreidingsbeleid'*) after 1960, aimed at the spatial distribution of governmental services (van den End and Huynh, 2022).

Individuals that are negatively affected by policies must be compensated: It strives towards compensation from winners to losers. The starting point is considered as the status quo situation.

An example of this notion is the compensation that the state provides to home owners when they are negatively impacted by the construction of infrastructure in their vicinity (e.g., with the addition of noise-barriers). A difference in this case is that it is the government that compensates the losers, and not the road users.

Level playing field: It strives to treat the various transport sectors similarly in terms of various aspects like taxation or payment for the use of infrastructure. Note that the previous equity notions are generally used when considering the equity among individuals, while the level playing field notion is generally used to refer to companies or sectors.

For example, presently, the VAT rates and subsidies of public transport operators and shared mobility operators are different, yet both contribute to increases in accessibility. Shared mobility providers are advocating for a 'level playing field', in which they receive (some of) the benefits that public transport providers receive.

Intergenerational equity: It strives for equity between generations, which includes the needs of future generations in the design and implementation of current

policies. According to intergenerational equity, present generations have a duty towards future generations, and therefore they should take care of natural resources in order to ensure that all future generations can enjoy the same level of nature (More, 2015).

The EU's 'Fit for 55' package was also implemented to ensure intergenerational equity: to ensure that future generations have a world in which they can comfortably live. Note that the intergenerational equity notion is used primarily in aspects related to the environment.

Capabilities notion: It focuses on capabilities, understood as the set of choices that people can actually use. Capabilities notion is applied in various ways in transport research. From an accessibility perspective, capabilities notion reflects on the set of choices one has for being able to reach the desired destinations. This set of choices depends on personal characteristics, but also on the available means offered by the transport and spatial planning systems. It is more related to what people could do, and less to what they actually do (since lack of means may prevent them from doing certain things).

The capabilities notion has gained attention in recent years. It is often the notion through which transport poverty discussions are addressed. This notion, however, remains vastly theoretical, and its feasibility for practical applications is deemed to be more limited than the general sufficientarianism notion (Vecchio and Martens, 2021).

The right to the city: It strives to ensure that interventions do not increase the suffering caused to any individual by insufficient accessibility.

This notion takes the initial status quo as benchmark. In addition, it focuses on the goal of providing a minimum level of accessibility, as sufficientarianism does.

Environmental equity: It strives for protection from environmental hazards and for access to environmental benefits, regardless of the individuals' socioeconomic characteristics. According to environmental equity, one should have policies that empower communities, and particularly low-income households, to access clean technologies (electric cars e.g.) and infrastructure (UCLA, 2022).

In a sense, the Fit for 55 package is drawn up to ensure environmental equity: to ensure that climate change does not exceed a level that would lead to extreme environmental hazards.

Transport users should pay their way: It strives to ensure that the various individuals pay for the mobility they use. In environmental terms, this would relate to the polluter pays principle. The issue of road pricing, which was included in the Dutch government's 2022 legislative program, is an example of this equity notion. However, road pricing can also serve other objectives, such as financing public investments.

Libertarianism: according to libertarianism, the fairest distribution is the one resulting from transactions in the free market, as long as it does not violate the rights of others. According to libertarianism, the free market must not be disturbed by interventions by the government or other actors. This notion applies to ride hailing companies that let prices quickly rise when demand rises. Rode (2022) indicates that the transport sector is pre-eminently a sector where the rights of

individuals to make use of mobility limits the freedom of others (future generations for example). Banister (2018) notes that this cannot be considered fair.

**Intuitionism:** It strives for different distribution patterns depending on the problem at hand. According to intuitionism, dilemmas in the policy context usually involve a plurality of competing principles of justice, leading to differing policy alternatives, and different distributions should prevail on different occasions.

One could argue that this is the notion followed in the Netherlands: as previously witnessed, not all transport policies can be linked to the same equity notion. However, the intuitionism equity notion does not provide any directions for how to choose the most appropriate alternative for each situation.

There are relations among the various notions. To some extent they can be linked to the (often) broader notions of utilitarianism, egalitarianism and sufficientarianism. These (at least partial) relations are highlighted in Table 2.2, but note that this table is an interpretation made by the authors of this research note, with the aim to provide insight into the relations between the notions. It should not be understood as a strict classification.

**Table 2.2: Relations between the most common notions and the rest of the notions. Authors interpretation for simplification purposes.**

Other equity notions	Main equity notions		
	Utilitarianism	Egalitarianism	Sufficientarianism
Vertical equity		X	
Horizontal equity		X	
Territorial cohesion		X	
Individuals who are negatively affected by policies must be compensated		X	
Level playing field		X	
Intergenerational equity		X	
Capabilities notion			X
The right to the city			X
Environmental equity			X
Transport users should pay their way	X		
Libertarianism	X		
Intuitionism	X	X	X

## 3 Equity beyond Dutch transport policy

The examples embedded in the explanation of the various equity notions pertain to the Dutch transport policy field. This section transcends Dutch transport policy. First, we provide examples of how equity is being considered in transport policy outside the Netherlands. Second, we discuss how equity is considered in other domains (particularly in the health and education fields) in the Netherlands. And finally, it provides certain insights into what policy can learn from these two sets of insights.

### 3.1 Equity and transport in an international context

This section highlights selected examples of how equity is being considered in transport policy in various countries worldwide.

#### **The US – Distribution standards**

The US Department of Transportation requires metropolitan planning organizations (MPOs) to analyse and mitigate equity impacts in their plans and projects. The US regulations tackle three main equity concerns (Martens and Golub, 2018):

1. Traditionally marginalized groups should be taken into account in the planning of public transport. This mainly concerns communities with low incomes and minorities. Especially they experience the disadvantages of mobility (air pollution, for example) and have lower access to mobility.
2. Exposure of people to the externalities of transportation systems.
3. Distribution of the costs and benefits of transportation investments and policies over (groups of) people.

Especially the first and the third are linked to the egalitarianism notion, and this aligns with the increasing role that social equity plays in the public US context, as well as its relation to past inequalities and the need to reverse that trend. Martens & Golub (2018) conclude from their research that US metropolitan planning organisations already tend to employ strong distributional standards. Moreover, they argue that more explicit guidance regarding standards could improve implementation.

#### **The UK – Distributional impacts**

The UK stands out for the consideration given to social and distributional impacts in mobility policy (Martens, 2021). For example, performing a Social and Distributional Impact (SDI) appraisal is a requirement for all new road projects over £10 million. The aim is to ensure that new projects do not adversely affect vulnerable population groups. This would be an example of an egalitarianism-related equity notion. Martens (2021) argues that the link between the conducted distributive analyses (SDI appraisals) and the proposed interventions and policies is unclear. The mapping of equity impacts seems to be conducted as an add-on that does little to change the primary concern in transport planning with congestion mitigation.

### **Flanders – Basic mobility and basic accessibility**

The Law on Mobility Policy, implemented in 2001, ensured that a bus stop was located within a predefined distance of all homes situated in a built-up area. This approach tried to provide sufficient access to mobility to all individuals (sufficiency). In 2019 the new law focused on the term 'basic accessibility', which also included other transport modes (e.g., shared cars). A potential point of discussion is whether this shift includes a move towards the capabilities notion (since the aim is to provide a set of mobility options that individuals could use) or whether a traditional sufficiency notion makes more sense given that not all people possess a driving licence. In any case, the core remains the underlying concept of providing a guaranteed minimum set of mobility options.

### **Wales – Future generations.**

Wales is a pioneer in the importance given to future generations (intergenerational equity) in its overall policy direction. In 2015, Wales passed the 'Wellbeing of Future Generations Act'<sup>8</sup>. It focuses on the general policy direction, rather than the transport policy particularly, yet the transport domain is directly affected by in the Act described goals on equality, health, the environment, prosperity, responsibility and cohesiveness. The act includes 46 wellbeing indicators that ensure the progress made towards a wellbeing economy is measurable (Welsh Government, 2016). This policy direction contributed in 2021 to the decision to suspend new road-building plans and provide better alternatives to individual motorised transport (Morris, 2021). This example also shows the interlink between intergenerational equity and environmental equity in the transport domain.

### **What can IenW policy extract from these worldwide examples?**

These examples from around the world reveal that there are several similarities with the Dutch context. First, the examples (especially the Flemish and UK examples) show that there is a strong focus on accessibility in transport equity discussions. Second, the examples reveal a growing interest in the topic of transport equity among policymakers and society generally. This is also the case at the Dutch ministry of Infrastructure and Water Management where 'mobility poverty' is also a topic of increasing attention. And third, the examples show that equity considerations in mobility in the Netherlands and in the cited countries are developing somewhat similarly.

The examples also suggest that there are ongoing developments about how to consider equity in transport policy. The Wales example highlights how the environment and future generations are increasingly relevant in transport policy decisions, directly influencing the equity discourse. Similarly, the Flemish example illustrates how changes in the transport sector (e.g., through shared mobility) can directly influence how transport equity standards are tackled in practice.

## **3.2. Equity in the Dutch education and health sectors**

Equity has only recently become a major topic in the transport domain, but it has long been a major topic in other sectors, such as education and health (both in the Netherlands and abroad). Arguably, health and education are more relevant for an

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<sup>8</sup> [Well-being of Future Generations \(Wales\) Act 2015 \(legislation.gov.uk\)](https://legislation.gov.uk)



individual's well-being than transportation, and low consumption of health and education can lead to increased societal costs over the longer term. Consequently, in these fields, a solidarity and egalitarian equity notion is commonplace: all individuals, regardless of their income level, social status or geographical location should be provided similar minimum standards.

Jeekel & Martens (2017) argue that equity in transport should follow similar lines of thought. After all, delivering equity in healthcare and education depends on there being adequate transport services, so that individuals can reach healthcare and education locations. This point highlights what is widely agreed upon in transport planning practice and academic literature: namely, that equitable transport policies should focus on improving access for all to key destinations (e.g., healthcare, educational services or employment) (Perreira et al., 2017). This example shows that equity in the transport domain is related to equity in other domains. Using policy measures in the transport domain to support society's less favoured people can contribute to a more equitable distribution of well-being, simply because the less favoured are given access to key services for well-being.

### **What can IenW policy extract from equity discussions in the education and health sectors?**

The previous paragraphs raise the question as to whether accessibility of key locations (e.g., healthcare facilities) should follow the equity principles linked to the activity itself. Or, in other words, if concepts like the 'right to health' are currently applicable, is there also a 'right to accessibility'?

If for example an individual cannot access healthcare facilities, and therefore healthcare, is the healthcare sector, the transport sector or the individual to blame? The answer may be that 'it depends' (in which case, the next question would be, 'what does it depend on?'). Whatever the chosen answer, transport's role in achieving "equity of opportunity" (van Wee and Geurs, 2011) should be weighted into the benefits and costs of the decision.

## 4 How to evaluate transport policy from an equity perspective?

The different notions reveal that there is not simply one right way to assess equity of transport policies. It all depends on policy objectives. This section will provide examples of indicators<sup>9</sup> that can measure equity for the three mainstream equity notions. Indeed, if it is decided that equity should have a more central place in transport policy, equity of that policy must also be evaluated. Before introducing several indicators, we first briefly discuss two important issues for policy evaluation.

In general, when evaluating policies, it is essential that two conditions are met: (1) policy goals must be specific and clear, and (2) indicators must be measurable (Jonkeren, 2020). Thus, equity-related goals and indicators in transport policy must also fulfil these conditions.

Another important issue in policy evaluation is the distribution of effects. Since the year 2000, the Netherlands' guideline for social cost-benefit analysis and its predecessors contain the recommendation to map distributional effects (Eijgenraam et al., 2000). However, at present, calculating such distributional effects is not a standard procedure (Visser and Wortelboer van Donselaar, 2021). For policy measures in the transport domain, it is indeed possible to use social cost-benefit analysis to analyse the distribution of travel time gains for people who are, for example, segmented by regions or by travel motives (Visser and Wortelboer van Donselaar, 2021). Measuring the distribution of the effects can be applied to societal gains (positive effects) and also to losses (negative effects). Indeed, a policy measure may result in travel time gains for one group of travellers and travel time losses for another group of travellers. In addition, negative side effects may occur for non-travellers (people residing in the proximity of newly constructed infrastructure may suffer from additional noise hindrance, for example). How are such negative and positive effects distributed among different groups? Do we accept an outcome in which the positive effects benefit the wealthy, while the negative effects are disadvantageous for the poor?

Equity indicators should take into account the two issues discussed above: they need to be measurable, and capable of analysing distribution effects of policy in line with the adopted equity notion. For this, we do not need completely new variables for the construction of equity indicators. In fact, we can use existing variables and analyse them in such a way that they can measure how effects from transport policies are distributed across groups of people or spatial entities using different statistical measures. The following sections explain how this can be done according to the various equity notions. The aim of this chapter is to show that equity indicators differ for different equity notions. As a result, one indicator is more meaningful than the other. The indicators are not derived from policy practice. We stress that the mentioned indicators are only examples and not the only possible indicators - other researchers may design them differently.

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<sup>9</sup> We present *examples*, and not a *proposal* for indicators. Which indicators can best be used depends on the relevant policy measure that is being evaluated on equity.

## 4.1 Equity indicators for utilitarianism

As explained in Chapter 2, the utilitarianism notion strives to achieve the greatest benefit for the greatest number of individuals (maximise total utility). Although we can hope that everyone benefits, in principle distributional effects are ignored in this notion, and thus the indicators for monitoring and evaluation need not account for such effects. One may argue that if distributional effects are ignored, this utilitarianism is not an equity notion. In the literature however utilitarianism is seen as an ethical principle to indicate if something is equitable. Text box 4.1 presents examples of indicators based on utilitarianism for measuring effects of transport policy. We also mention the higher social goals to which they contribute. More indicators can be devised, depending on the effect that must be measured.<sup>10</sup>

### Text box 4.1: Example indicators utilitarianism

1. Aggregate change in the number of activities (work, hospitals, shops, etc.) that can be accessed within an acceptable travel time. Goal: increase the total number of activities that can be accessed within an acceptable travel time (accessibility).
2. Aggregate change in the number of traffic incident victims. Goal: minimise total number of victims (traffic safety).
3. Aggregate change in NO<sub>x</sub> or particle matter emissions. Goal: minimize total emissions (health and living environment).
4. Aggregate change in noise emissions. Goal: minimize total (excessive) noise exposure (living environment).

According to the utilitarianism notion, the preferred transport policy is the policy that maximises the contribution to social welfare, taking into account all effects (so, the joint monetized value of all effects, measured by the indicators).

## 4.2 Equity indicators for egalitarianism

Reducing inequality of opportunity is the central thought behind the egalitarianism notion. The variance is a statistical measure capable of grasping this concept. Instead of the variance, one may also consider other measures of dispersion for egalitarianism-indicators. Examples of such measures are the Gini-coefficient (Gini, (1936), often used for measuring income inequality) and the quartile range. Van Wee and Mouter (2021) discuss distribution metrics in greater detail.

For the goal of this research note, it does not matter so much which metric we use for the egalitarianism notion. We choose the variance because it is a well-known and relatively simple metric. The variance can be measured for different attributes such as income groups, a set of regions/localities, travel motives, age groups, groups with different migration backgrounds, groups with differing levels of education, or another segmentation. The attribute chosen may depend on the variable and the preference of the given politician. In theory differences can be minimised by making the situation worse for those who are well off; however, in most cases this is not something to strive for. Text box 4.2 shows several example indicators based on the egalitarianism notion.

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<sup>10</sup> Social safety or travel time reliability are examples of other effects that can be measured.

#### **Text box 4.2: Example indicators egalitarianism**

1. The variance of the number of activities (work, hospitals, shops, etc.) that can be accessed within an acceptable travel time of groups of people or spatial entities. Goal: minimise differences in number of activities that can be accessed within acceptable travel time between groups/spatial entities.<sup>1</sup>
2. The variance of the number of traffic incident victims of groups of people or spatial entities. Goal: minimise differences in traffic incident victims between groups/spatial entities.
3. The variance of the level of NOx or particle matter emissions of groups of people or spatial entities. Goal: minimise differences in emissions between groups/spatial entities.
4. The variance of the level of noise nuisance of groups of people or spatial entities. Goal: minimise differences in noise emissions between groups/spatial entities.

With the egalitarianism notion, the preferred transport policy is the policy that minimises the variance on the relevant indicator(s).<sup>11</sup>

### **4.3 Equity indicators for sufficientarianism**

According to sufficientarianism, everyone should be provided a certain minimum level of service or product. This implies that one only need focus on the groups of people (or areas, or companies) that are above or below a certain boundary value set by policy objectives. The group on the sufficient side of this boundary can be ignored. An example of a sufficientarianism-based transport policy measure can be found at RIVM (2022). This law sets thresholds for noise-hindrance, while another, outside of the transport domain, is for the 'poverty line' ('armoedegrens'). Policies aimed at fighting poverty could be evaluated with an indicator that measures the proportion of people under the 'poverty line' before and after the implementation of said policies. Determining the minimum acceptable level of (disposable) income for a person or household is a political choice. With this in mind, by looking at the proportion of people above or below a certain threshold value, sufficientarianism can be included in indicators for transport policies. In text box 4.3 examples of indicators for sufficientarianism can be found.

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<sup>11</sup> Minimizing differences is our interpretation of the policy goal according to the egalitarian notion. However, policy can also be considered successful if the differences after the have been reduced, instead of minimized. It is ultimately up to politicians to determine how small the differences should be.

#### **Text box 4.3: Example indicators sufficientarianism**

1. The proportion of people (in a country, region, city) that cannot reach a certain minimum number of activities (education, healthcare locations, jobs, etc.) within an acceptable travel time. Goal: guarantee a certain minimum number of (essential) activities that can be accessed within an acceptable travel time for everyone.
2. The proportion of people living in neighbourhoods subject to an accident-risk level which is higher than the maximum acceptable level. Goal: guarantee that everyone is subject to an accident risk level lower than the maximum acceptable level.
3. The proportion of people exposed to a level of particle matter emissions (per km<sup>2</sup>) higher than the maximum acceptable level. Goal: guarantee a maximum possible level of emissions exposure for everyone that cannot be exceeded.
4. The proportion of people exposed to a level of noise emissions higher than the maximum acceptable level. Goal: guarantee a maximum possible noise level exposure for everyone that cannot be exceeded.

The preferred policy according to the sufficientarianism notion is the policy that delivers the highest proportion of people on the sufficient side of the boundary (preferably 100%).

#### **4.4 Applying equity indicators**

The use of indicators need not be limited to the three main equity notions; they could also be used in the remaining notions if one of these notions is considered appropriate for a specific transport policy. In addition, not all the types of groups across which the distribution of effects can be measured are relevant for all equity notions. As an example, the territorial cohesion notion or spatial equity notion accounts for geographical disparities, and not for social disparities.

Indicators can be applied to both monitoring and evaluation of measures/policies for passenger and freight transport. Measures in both domains can result in effects that are unequally distributed across groups or regions. For freight transport, seemingly the most relevant effects are on traffic safety and the living environment. One can envision how groups or spatial entities are unequally impacted by the distribution of negative effects from rail freight traffic on a newly constructed rail line. Additionally, for freight transport, we may consider the effect on (differences in) accessibility of production companies: do some companies gain more travel time (transport cost) savings than others due to the proposed policy measures?

We emphasize the importance of paying attention to unintended (distribution) effects of mobility policy. Ex post evaluations can look beyond the effects that were initially considered important (the intended effects) prior to the implementation of a particular policy measure. Ex post evaluations can be used to search for the presence of unintended (distribution) effects, which can then be measured using indicators, and subsequently corrected.

Last, as stressed in this chapter's introduction, the indicators must be measurable. In this exploratory research note we chose not to precisely determine whether data is available for the proposed indicators; this step will be taken once it is clear in which direction policy is headed regarding equity in transport policy.

## 5 Equity in broad-based welfare and mobility transitions

A systematic consideration of equity can help with the comprehensive and currently relevant policy questions about broad-based welfare and the 'smart and sustainable mobility transition'. Here, we present some insights that help further the discussion about these issues.

### 5.1 Broad-based welfare

First, broad-based welfare is a concept which covers everything people consider of value for a good life. This consists of economic factors, like income, but also non-economic factors such as health, accessibility of services, and the quality of the natural environment in which people live. It also includes subjective elements like people's satisfaction with their lives (PBL, SCP and CPB, 2017). So, in addition to 'traditional' measurements of economic development, such as gross domestic product (GDP), the broad-based welfare concept includes elements of well-being.

A core transport policy goal of the broad-based welfare concept is accessibility to activities, rather than the time savings of a trip itself (Huibregtse et al., 2021; Snellen et al., 2021). This implies a shift from mobility planning to accessibility planning; from vehicle indicators to people indicators. The focus on accessibility in the broad-based welfare concept brings transport closer to other sectors, like health and education.

Broad-based welfare in theory also differentiates between population groups and regions. However, contrary to equity notions, the definition itself does not specify how this distribution should occur, and consequently the broad-based welfare concept brings to the forefront the question of distribution effects of policy measures (i.e., how is it equitable to distribute benefits and costs over different groups). The equity notions can subsequently provide potential directions to choose from. Clear and measurable indicators can help further develop these directions.

As noted in Section 4, indicators need not be new; modifications of current indicators, using the same variables as previously, often suffice for including equity notions as presented in this research note. In transport, geographical and societal attributes (income and age groups e.g., see the examples in the previous chapter) are often used, and they help provide insights into geographical and societal equity aspects depending on the intended policy goals with regard to equity. For example, income is the attribute most often used in analysis of societal equity.

To conclude, the broad-based welfare concept asks for two things: 1) the use of an equity notion, because insight into the distribution of effects is needed due to the care given to all individuals and their needs and differences); and 2) the addition of new attributes to specify existing indicators in evaluations, according to the policy goals with regard to equity.

## 5.2 Smart and sustainable mobility transition

Much is currently changing in the mobility sector: examples of developments are digitalisation, automation, and decarbonisation. Such changes can raise new equity-related concerns, and the question as to whether the government should intervene to ensure there is a smart and sustainable mobility transition which is also equitable.

For example, the transition can promote inequality in the digital field: not everyone can benefit from the digitization of access to mobility (Durand and Zijlstra, 2020). Another form of inequality can arise in the area of the availability of shared mobility. Shared mobility services are mainly found in wealthier neighbourhoods, where vandalism is generally less frequent and where the expected return on investment is higher.

The smart mobility transition offers the opportunity to collect and analyze large amounts of data. The benefits and costs that different groups or individuals experience as a result of different policy measures could be monitored on the basis of that data. This can benefit the attention for equity in transport policies: with all that data, certain distribution effects of mobility policy can perhaps better be analysed than before. Who benefits from the mobility policy, and who should bear the costs? Are these the same people? Are costs and positive effects equitably distributed?

According to a recent US study (Cantilina et al, 2021), problems in accessing and collecting data are seen as the biggest hurdle to raise attention for equity. Further analysis is needed to determine whether this is also the case in the Netherlands. In the meantime, we can perform various distribution analyzes with the data currently available and the traditional analysis techniques.

## 6 Conclusion

We started the introduction of this research note with a citation by van Wee (2018, p.65), "Good policy should be effective, efficient and equitable." However, the subjective understanding of what is equitable/just/fair (and where priorities should lie for an equitable policy) can vary. This research note helps policymakers in the transport domain have debates about equity and consider equity in transport policy in a more systematic way. To that end, this research note argues for choices based on equity notions. Such notions can help one better understand the equitable side of a policy choice. This research note also shows how equity indicators can measure the chosen equity direction (if any). The indicators can be used to evaluate equity of transport policies.

Compared to other policy domains, like health and education, equity has received relatively little attention in the transport domain. The increasing attention to equity in transport policy (increasingly coming to the forefront) may require that we consider it in a more systematic manner going forward. The general concept of 'equity' can be described more precisely by means of the clearer equity notions utilitarianism, egalitarianism and sufficientarianism. They offer us the freedom to choose which equity direction we want to proceed. Egalitarianism is certainly not always the chosen notion, as we saw in the examples used to illustrate the various equity notions.

The examples used in this research note were primarily used to clarify the various equity notions. This is why we linked (only) one equity notion to each of the transport policies mentioned. The reality however is more complex. First, interrelations among the various equity notions exist. For example, the 15-minute city notion can be regarded from both a sufficientarianism and egalitarianism viewpoint: by taking a specific measure to ensure that only individuals with more than 15 minutes travel time by bicycle or on foot to essential destination fall below that 15-minute limit, not only does a lower limit of 15 minutes apply to everyone, but travel time differences between individuals are also reduced. And second, framework conditions exist. Policymakers often need to consider simultaneously conflicting interests: something which is equitable from the perspective of one notion may not be equitable from the perspective of another notion. Consequently, compromises arise.

We have indicated that when evaluating transport policy our focus was primarily on how indicators can measure the *intended* distributional effects (see chapter 4). In practice however, also *unintended* distributional effects may arise. In order to fully consider the wide range of equity-related aspects stemming from a certain policy, it is important that an ex-post evaluation transcends the use of indicators for only the intended effects. It should also search for the possible existence of additional unintended equity-related distributional effects.

As shown in Chapter 2, the utilitarianism notion does not include distributional effects (it is total utility that counts). In Social Cost Benefit Analyses (SCBA), which are based on utilitarianism, distributional effects have largely been ignored. However, these effects can be added to a SCBA, by means of additional indicators. Moreover, the SCBA guideline and its predecessors have recommended mapping the distributive effects since 2000.

How can policymakers use this research note in practice? We recommend following a five step approach.



1. Determine whether there are equity related policy goals. If so, there are four next steps.
2. Determine which equity notion is most suitable for achieving the equity goal. Section 2.2 describes a wide range of equity notions.
3. Identify variables that describe the equity goals.
4. Design indicators by means of which those variables can be monitored and evaluated (see chapter 4).
5. Conduct an ex-post evaluation that measures intended and unintended (distribution) effects.

These steps are also summarised in 6.1.

**Table 6.1: Summary of suggested systematic consideration of equity aspects (for a specific imaginary example).**

Question	Answer (as an example)
1 Is equity a policy objective?	Yes, guarantee a minimum level of accessibility to school for every student and teacher.
2 Which equity notion is most suitable for my policy objective?	Sufficientarianism.
3a In case of egalitarianism: for which population groups or spatial entities do we want to measure distributional effects? 3b In case of sufficientarianism: what is the desired boundary level? For utilitarianism additional questions are not applicable.	At least three schools within a 10-minute cycling distance.
4 Which are the indicators that will allow us to measure the (un)intended effects of policy on equity?	The proportion of people under age 18 who can reach a school within an acceptable travel time.
5 Did we achieve our goals? Did any unintended (distributional) effect arise?	After the policy intervention the proportion of people under age 18 and under the minimum level (established in step 3) has decreased from 20% to 10%, as compared to before the intervention.

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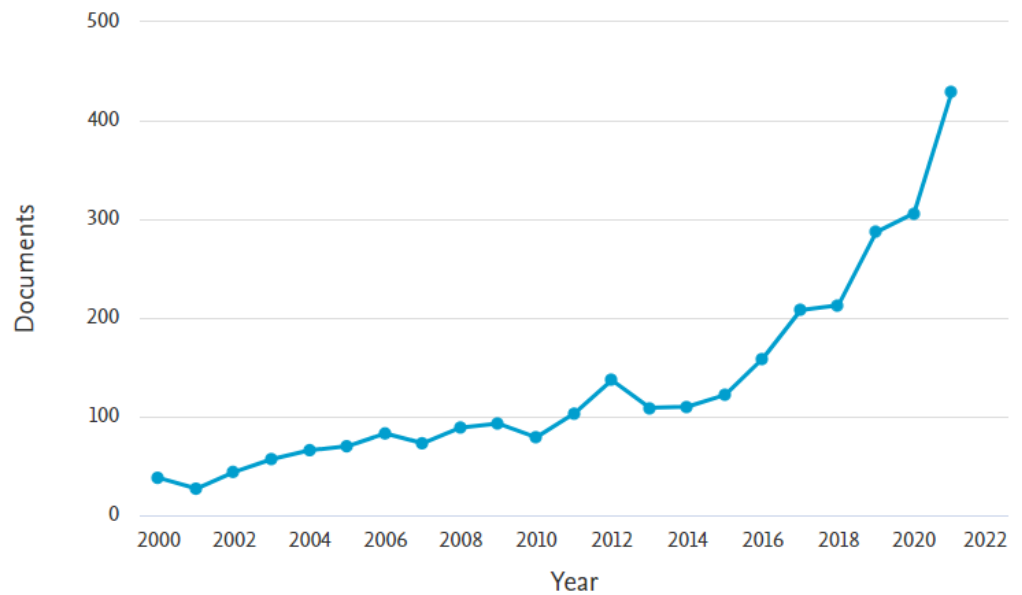
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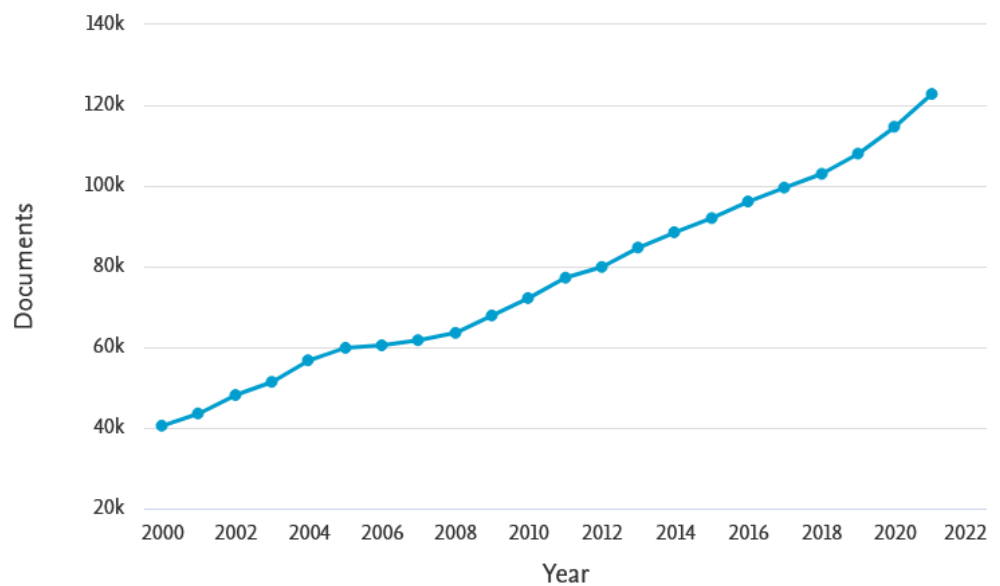
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## Appendix A Development interest in equity and transport

**Figure A.1** Number of documents per year in SCOPUS that included in the keywords, title, or abstract the words 'Equity' and 'Transport' or 'Transportation'



**Figure A.2** Number of documents per year in SCOPUS that included in the keywords, title, or abstract the words 'Transport' or 'Transportation'



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