# Evaluating How Transportation Policy Addresses Transport Related Social Exclusion: A Novel Method Applied to the Amsterdam Transport Region

**Matthew Bruno**
Department of Transport and Planning
Delft University of Technology, Delft, the Netherlands, 2628CN
Email: m.bruno@tudelft.nl
https://orcid.org/0000-0003-0383-1240

**Machiel Kouwenberg**
Policy Advisor for Mobility Research
Amsterdam Transport Region
Amsterdam, The Netherlands 1025XM
Email: m.kouwenberg@vervoerregio.nl

**Niels van Oort**
Department of Transport and Planning
Delft University of Technology, Delft, the Netherlands, 2628CN
Email: n.vanoort@tudelft.nl
https://orcid.org/0000-0002-4519-2013

Word Count: 6890 words + 2 tables (250 words per table) = 7390 words

*Submitted July 26, 2023*

## ABSTRACT

Recent literature has given increasing attention to the different ways in which people can be excluded from transportation systems, with a reduction in economic, social, and recreational opportunities as a result. These theoretical insights into how transport poverty and transport accessibility can be measured and understood do not always relate directly to actual planning processes. Different government agencies have authority over different policy and infrastructure elements and within a transportation authority, different departments have different actors, goals, and approaches. An important first step in making advances in social inclusion is for transportation authorities to be able to evaluate their current approach as a starting point for policy improvements. Presently, however, no systematic method exists for conducting that evaluation. This article develops a method for comprehensively evaluating existing transport related social exclusion (TRSE) reduction efforts in transportation policy and applies it to the operating agreements for the three public transportation concession areas in the Amsterdam Transport Region, using textual analysis to develop a policy overview for ten dimensions of transport related social exclusion. The application of the method reveals that different forms of TRSE receive substantially different levels of attention within the Amsterdam Transport Region. The evaluation serves as a tool for systematically understanding how different dimensions of social exclusion are being addressed, allowing for a starting point for discussing whether or not existing policy is adequate and creating opportunities for incorporating new theoretical concepts into practice.


**Keywords:** Transport Related Social Exclusion; Transportation Policy; Inclusive Mobility

## INTRODUCTION

Since issues of geographical accessibility and social equity first became key components of the research agenda on sustainable transport in the late 1990s (Lucas, 2019a), researchers have created an expanding body of literature on transport related social exclusion (TRSE) and developed accessibility models to better identify the places and population groups that have their travel opportunities limit by the structures of the transportation system (*2–6*). One of the key elements in these models is understanding the multiple and often interconnected ways in which people can be excluded from the transportation system (*7*). Recent scholarship has synthesized and expanded on previous work to identify ten distinct forms of TRSE (*8*).

Examining TRSE from the framework of these ten dimensions has allowed for an exploration of new ways to potentially measure and then address the effects of TRSE on individuals and communities. The focus on novel policy approaches reflects much of the literature on transport equity in general and TRSE specifically (*8–10*). Novel policy approaches often face challenges from institutional actors with incremental changes often being much easier to implement (*11, 12*). Making even incremental improvements to policy, however, requires an understanding of what the current policies in order to begin a discussion over how they could be improved. This study provides a method for evaluating how existing transportation policy approaches TRSE. It describes a method of textual analysis to systematically evaluate how each of the different forms of transport related social exclusion are or are not being addressed and applies it to the legally binding documents that form the basis for operating transit service in the Amsterdam Transport Region.

Research has already been conducted to evaluate the specificity of stated equity goals and their accompanying metrics in long range transportation plans by comparing how different places explicitly conceptualized equity (*13*). As Carleton et al. (*14*) have noted, defining equity has always been a challenge and reducing equity to a single standard may mask the challenges faced by specific groups, areas, or individuals. A method for performing a comprehensive evaluation of how a transport agency is addressing each of the different forms of transport related social exclusion, whether explicitly or implicitly, and identifying which forms of exclusion are receiving significant attention and which forms are not being addressed, does not currently exist. This process is necessary in order for transit agencies to understand their own current approach and in order to begin the process of evaluating where it can be improved. This article, therefore, addresses a gap in the literature by developing a method for applying the framework of transport related social exclusion directly to transportation policy as a starting point for identifying where policies and evaluation metrics can be improved.

This article begins within an overview of the literature on transport related social exclusion. It then provides a summary of the 10 different forms of TRSE, including how this article has used different naming conventions than Luz & Portugal (2021) for two of the forms based on the source literature. It then provides a detailed description of the method used in this article for evaluating TRSE in transportation policy documents, including which documents were chosen for evaluation and how they were analysed. The results section presents the outcome of that analysis for each of the ten forms of TRSE, including an overview of the present policy, the evaluation metrics used, and potential limitations of the approach based on the current literature.

The results show that different dimensions of TRSE are given different levels of attention, evaluated through different methods, and addressed through different processes. While the different forms of TRSE are generally addressed similarly throughout the documents there are also some key differences. The results section provides a policy overview for each of the ten forms of TRSE, including examples. The discussion and conclusion section addresses the strengths and limitations of the method and reviews the main findings.

### Transport Related Social Exclusion: Key Terms and Concepts

TRSE looks at how people who are socially disadvantaged for reasons such as employment status, income, age, or ability, can face limitations in their ability to access transportation services. As income is only one of these factors, people can experience TRSE without having a low income (*7*). Rather, social exclusion is defined by an exclusion from economic life, social services, civic life, and social networks (*15*). As noted by Benevenuto and Caulfield (*10*), applying the broad definition of poverty as used by the United Nations to include a deprivation in access to key destinations means that those suffering from TRSE are by definition poor. TRSE looks at how elements of the transportation system contribute to this transport poverty (*7*).

A literature review on TRSE reveals its multiple forms. Church et al.(*16*) conducted the first systematic analysis of TRSE, creating a framework that divided the sources of TRSE into seven distinct categories. Since then, scholars working in the field of TRSE have built on their work, both adding categories and changing how the different categories are named and conceptualized (*7, 10, 17, 18*). Luz and Portugal synthesized this literature to create a list of nine previously identified forms of TRSE and then added divide exclusion (*8*).

This article makes minor adjustments in the names of two categories used by Luz & Portugal (*8*). The category "exclusion based on fear, prejudice or feelings" (*8*) is referred to here by the original category designation from Church et al. (2000): fear-based exclusion. In addition to this name being more direct, the addition of the term 'prejudice' in the category name by Luz & Portugal (2021) creates an unclear relationship with issues of discrimination, issues addressed in the second category name that was modified.

Luz & Portugal (2021) refer to social position-based exclusion based on the work of Benevenuto & Caulfield (2019). Benevenuto & Caulfield (2019) focus specifically on the application of the TRSE framework to the Global South. In their discussion of social position, they refer primarily to how transport policies have both intentionally and unintentionally resulted in discrimination based on race and gender, including the intersectionality of these and other forms of identity. In incorporating this category, Luz & Portugal (2021) use the same name but relate it to issues surrounding immigration rather than discrimination, stating, "Because of a lack of language skills and illiteracy, migrants and refugees may face problems reading and understanding public transportation instructions and following the timetables" (*8*). This interpretation of social position-based exclusion, which shifts the focus away from transportation policy towards the assumed skill sets of a particular group, is not mentioned by Benevenuto & Caulfield (2019) and involves elements already covered by informational exclusion. Most importantly, Luz & Portugal (2021) adopt the category from Benevenuto & Caulfield (2019) without making any reference to the large body of literature related to racial, ethnic, gender, age and religious discrimination in transportation (*19–32*). Both because of the relevance of this literature on discrimination in transportation to TRSE and because Benevenuto & Caulfield (2019) refer primarily to discriminatory practices when discussing what they refer to as social position-based exclusion, the category has been renamed here "Discrimination-based exclusion" to more directly reflect the issue being described. Table 1 provides an overview of the ten forms, along with their definitions and the academic sources from which they were taken.

**TABLE 1 The 10 Types of TRSE, adapted from Luz & Portugal (8)**

| Category | Definition | Source |
|---|---|---|
| Exclusion from facilities | The absence of or excessive distance to key opportunities | Church et al., 2000 |
| Geographical exclusion | Residence is too far from or not connected to the transportation system | Church et al., 2000; Hine & Mitchell, 2001 |
| Space exclusion | Certain groups are not welcome in controlled or surveilled spaces | Church et al., 2000; Hine & Mitchell, 2001 |
| Physical exclusion | The transport system has material barriers that prevent some people from using it | Church et al., 2000 |
| Time-based exclusion | The transport system is not fast enough or does not operate when a person needs it | Church et al., 2000 |
| Fear-based exclusion | Concerns about safety prevent people from using the transport system | Church et al., 2000 |
| Informational exclusion | Lack of knowledge about the transport system prevents people from using it | Yigitcanlar et al., 2018 |
| Economic exclusion | The costs of the transport system limit the ability of people to use it | Church et al., 2000 |
| Digital divide exclusion | Inability to use or access certain technologies prevents people from using the transportation system | Luz & Portugal, 2021 |
| Discrimination-based exclusion | People face barriers to access because of some element of their identity | Adapted from Benevenuto & Caulfield, 2019 |

## Methods

The evaluation method developed in this article involves a six step process (see Figure 1). The following subsections provide a detailed explanation for each of these steps.

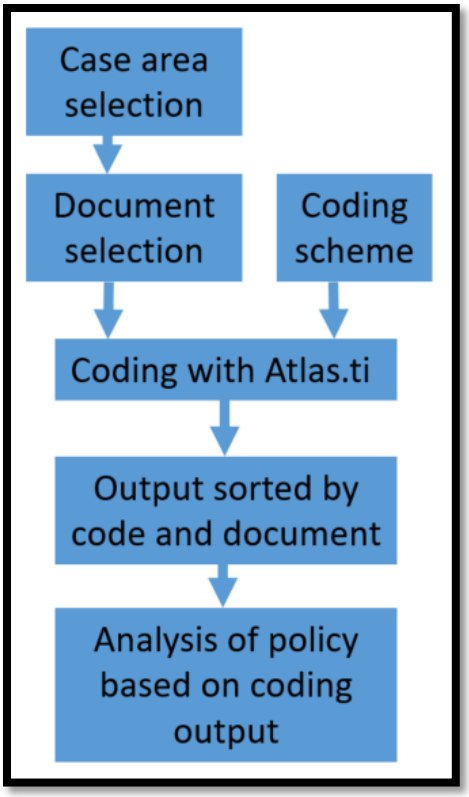


**Figure 1 An Overview of the Evaluation Process**

## 1. Case Study Selection

The process begins by defining a case study area. The Amsterdam Transport Region was chosen here because it covers both urban and rural areas and includes communities with distinct characteristics and significantly different access to transportation services. Selecting this region as a case allows for an examination of how a transportation authority addresses the elements of TRSE in a geographically and socially diverse area.

The Amsterdam Transport Region is responsible for financing transportation projects across 14 different municipalities of varying size, including negotiating the contracts for the companies that operate public transportation in their service areas (*33*) [see Figure 2].

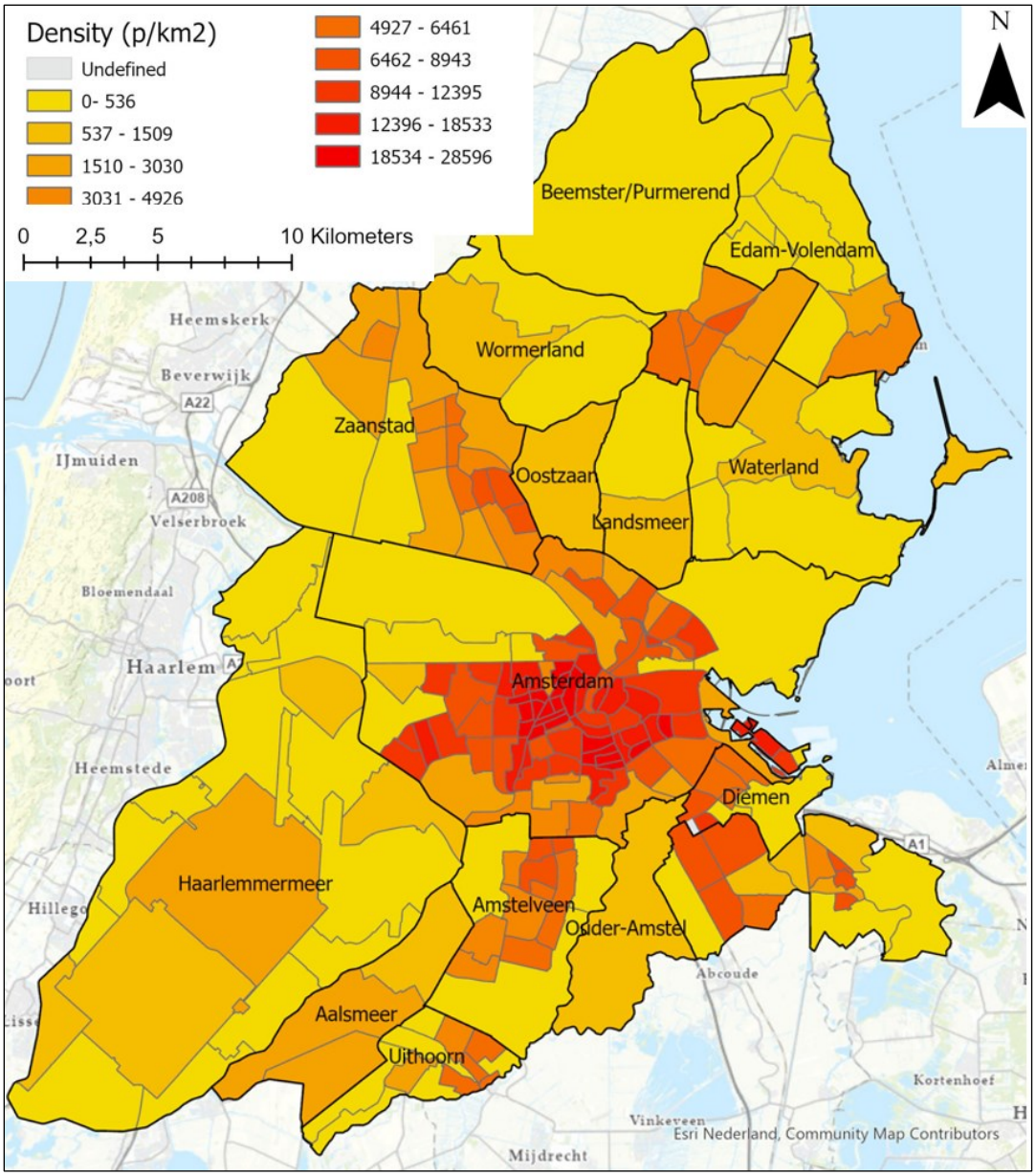


**Figure 2 The Amsterdam Transport Region, including the population density within each of the 14 municipalities**

## 2. Document Selection

The analysis requires selecting documents that reflect the current policy of the area under consideration. While the Amsterdam Transport Region produces a number of policy documents that outline how they intend to achieve a variety of long term goals (*34*), they also serve as the responsible agency for executing contracts related to operating regional public transportation (Vervoerregio Amsterdam, 2017). The conditions for private companies to provide transit service in these areas are established through the development of concession agreements, legally binding documents that state the minimum requirements that the transit provider must meet (*35*). The concession documents, approximately 100 pages in length each, state the actual conditions under which the transit system must

operate, providing insights into how the different forms of TRSE are addressed in practice. The analysis here, therefore, is based on the three most recent concession documents from the Amsterdam Transport Region: the Amsterdam Program Requirements (2013) (*36*), the Amstelland-Meerlanden Program Requirements (2016) (*35*), and the Zaandstreek-Waterland Program Requirements (2021) (*37*).

### 3. Coding Scheme Development

Because references to different types of social exclusion can appear both directly and indirectly, the text of each document was coded to track where and how each of the dimensions of social exclusion were addressed. Physical and cognitive exclusion were separated into separate codes because they are addressed by different sets of policies. For each type of social exclusion, two codes were created: one for locations in the document where a type of social exclusion was addressed and another for text that might have an influence on a type of social exclusion. For example, language that addressed providing discounts to people with low incomes would be coded with economic.a and language that simply discussed the cost of using the transport service would be coded with economic.i.

### 4. The Coding Process

The three concession documents were uploaded into the qualitative analysis program Atlas.ti., a software program that allow for manual qualitative coding. Every time any element of the text addressed or acknowledged any form of transportation related social exclusion, the sentence was highlighted and a code was applied for the relevant form of TRSE. Where a specific sentence referred to more than one type of TRSE, it was coded for both types.

### 5. Output Organization

After the coding was completed, the highlighted sections were exported to an Excel document. The quotes were then organized by type of exclusion and concession area to develop an overview of the policy approach for each type and to identify any differences between concession areas. Because the concession agreements originate with the same agency, the differences were minimal and the documents often contained similar or identical language. The agreements, however, were approved between 2013 and 2021, and some changes did occur over time. In the results section, the approach should be assumed to be the same for each of the three concession areas unless differences are specifically noted.

### 6. Output Analysis

After reading the highlighted quotes for type of TRSE, it became clear that different forms of TRSE had different levels of attention in the documents. Based on these differences, the forms of TRSE were organized into four categories [see Table 2]. For each of these categories, the output of highlighted quotes was used to define the approach and evaluation metric for each of the forms of TRSE.

## Results

This section organizes the forms of TRSE by the level of attention that they are given in the concession documents, provides an overview of the approach taken for each form, and details the assessment metrics when applicable, including any notable differences between the concession areas and a brief discussion of the potential limitations of the described approaches.

**TABLE 2 Summary of Results**

| Level of attention | Exclusion Type |
|---|---|
| Addressed in a separate, named section | Fear-based exclusion; informational exclusion |
| Addressed throughout the documents | Time-related exclusion, physical exclusion, exclusion from facilities |

| | |
|---|---|
| Addressed indirectly or to a limited degree | Digital divide exclusion; geographic exclusion; economic exclusion; cognitive exclusion |
| Not addressed | Space exclusion; discrimination-based exclusion |

**Addressed in a separate, named section**

Two different types of TRSE were directly named and addressed in all three of the concession documents: fear-based exclusion and informational exclusion. Each of these types of TRSE received their own section headings that detailed specific policies for addressing them as described in the following sub-sections.

**Fear-based Exclusion**

*Approach*

The concession documents use the term 'social safety' to describe reducing fear-based exclusion and each have a full section dedicated to this topic. The agreements specify security procedures and require working with other agencies to ensure people feel safe when using transit. They refer to a separate uniform policy on social safety for the Amsterdam Transport Region, the Policy Framework for Social Safety 2017-2021 (*38*). This document outlines specific rules for monitoring and reporting incidents around public transportation and details how public transportation providers must co-ordinate with the police and local agencies (*38*). The concession documents also specify the minimum amount that the public transportation providers must spend on monitoring, security, and ticket control (*35*).

*Evaluation Metric*

The level of social safety around public transportation in the Amsterdam Transport Region is evaluated based on three different metrics: (1) the general attitude of passengers regarding safety and public transportation and the specific sense of safety that passengers have while riding public transportation (based on passenger surveys); (2) the number of registered safety-related incidents; and (3) the estimated percentage of people riding without paying, as the majority of incidents of aggression in public transportation begin with ticket controls of people who have not paid (*35*, *39*, *40*).

*Limitations*

The agreements focus primarily on monitoring and reporting incidents and coordinating with other agencies to reduce the number of incidents. They do not make an effort to define the qualities of a public transportation system that is experienced as safe. They also do not include any gender specific policies. Research has shown significant gender differences in the perception of safety on public transit (*41*, *42*) and identified a need for more explicitly addressing gender-based safety needs of transit users(*43*).

**Informational Exclusion**

*Approach*

Each agreement dedicates a section to outlining the specific information that needs to be provided to people using the transit system, the formats in which it is to be provided, and the type and format for notices when the information changes. The agreements go into considerable detail, requiring the provision of real time information at stops, within buses and at information kiosks about schedules, payment, discounts, routes, and services. They also require transit data be provided in standardized formats for use across different transit apps (*35–37*).

*Limitations*

The concession documents provide very detailed requirements for what information needs to be provided and how, but do not include monitoring to determine if people actually have the informationthey need to use the transit system. Additionally, there is no requirement in the concession documents to evaluate the language needs of communities and take reasonable steps to minimize language barriers, as in the case in United States, for example, where people who speak a language other than English are entitled to equal treatment of English speakers in all federally funded programs, including public transportation (*44*)(*45*). Information is only provided in Dutch and English even though the combined number of Turkish and Arabic speakers in the Netherlands is greater than the number of English speakers (*46*).

**Addressed throughout the documents**

Time-related exclusion, physical exclusion, and exclusion from facilities do not have their own section headings within the concession agreements but still receive substantial attention throughout the documents.

**Time related exclusion**

*Approach*

The concession agreements consistently recognize the importance of providing fast and reliable public transportation, focusing on following the set schedules and having direct connections between key locations. The Amstelland-Meerland agreement states a specific goal of "striving for facilities in the city center being accessible from every suburban center within 45 minutes" (*35*). The concession agreements in general specify the frequency of the service between named key locations, including which locations require direct service or service with no more than one transfer. The agreements also specify service times, including the minimum hours, lines, frequencies and locations of the limited night services.

*Evaluation Metric*

The agreements focus on the restitution that riders will receive if their transit service is excessively late. It also includes the goals for service reliability, specifying that delays and service failures should be kept to a minimum.

*Limitations*

The agreements have clearly defined operation times, but the connection between these times and their underlying goal, ensuring people can reach their destinations when they need to, are not fully transparent. Specifically, the literature on transport poverty suggests that many people are unable to accept jobs that are not transit accessible at the times of their work (*47–49*). The concession agreements do not address shift work, with the exception of specifically providing night service to Schiphol Airport, a major employer with significant night operations (*36*).

**Physical Exclusion**

*Approach*

The approach to limiting physical exclusion has two main components in the concession documents:

(1) Buses must have a functioning wheelchair lift and be able to accommodate at least one wheelchair.
(2) Every resident must have a bus stop within a specified minimum distance of their home.

The documents also describe specific guidelines for people with sight impairments, including braille on the stop buttons and auditory announcements of all stops.

*Evaluation Metric*

The documents define physical accessibility by specific technical standards for wheelchair access and wheelchair priority areas. The documents also address physical exclusion by limiting the distance between people's homes or work areas and public transportation (90% of addresses need to be within 800 meters of a high speed transit line or within 400 meters of standard bus stop). Hospitals and care facilities need to have a stop with 250 meters of the main entrance (*36*).

*Limitations*

The agreements focus on access for a single wheelchair and specific rules for specific types of disabilities. They do not address the broader universal design paradigm that combine inclusive transgenerational design, barrier-free design, accessible design, and assistive technologies to create systems that destigmatize aging and disability (*50*) and that broadly reduce the risk of physical exclusion for people of all abilities (*50–52*).

**Exclusion from facilities**

*Approach*

The concession agreements try to ensure that the provided coverage connects people with where they want to go. The agreements try to reduce exclusion from facilities by providing detailed lists of locations that must have either direct connections or can be reached with a minimum of a single transfer.

*Evaluation Metric*

The agreements state that the provider must, at a minimum, have transit service between specific locations named in the document.

*Limitations*

The attributes of required locations are not explicitly defined in the documents, with a clear focus on places with either high densities or concentrations of commercial activity. Studies on transport poverty have highlighted the need for connecting low income workers with industrial employment centers that often have limited service by public transport (*1, 10, 53*). The concession documents do not address this form of exclusion from facilities.

**Addressed indirectly or to a limited degree**

Economic exclusion, digital divide exclusion, and geographical exclusion are not specifically named in the documents but are given a limited amount of attention in some form.

**Economic Exclusion**

*Approach*

The concession agreements primarily focus on making sure people are aware of prices, subscriptions, and payment options. There are some specific rules about making sure people do not pay the base travel price twice or are not charged for specific services. The concession operators, however, seem to have limited control over fares as these are set by a national agreement . Further, the concession agreements specifically limit the ability of the concession provider to change prices (*37*).

*Evaluation Metric*

Within the concession documents, the cost of using public transportation is simply measured against the costs as specified by various price agreements, including the national tariff (*37*). The documents state that passengers must be made aware of the prices, but do not include any mechanism for ensuring that low-income passengers can afford to use the system.

*Limitations*

Economic exclusion is one the key forms of TRSE. Literature has addressed the link between the ability of people to pay for transportation and the opportunities that they have available to them (*7, 48, 54*). Further, the average cost of public transportation in the Netherlands is the highest in the European Union (*55*). Low income has been found to be a key limiting factor for people's transport options to activities and employment as economic factors are often a prime determinant of accessibility (*7*). The ability to address this barrier at the level of concession area seems quite limited leaving open the question of how it can be effectively addressed.

**Digital Divide Exclusion**

The concession agreements do not directly address the need to ensure that people without smartphones and/or internet access can make full use of the transit system, but they do consistently require offline alternatives for acquiring personalized travel cards and obtaining travel information. Additionally each of the concession areas is required to staff a certain number of information booths at stations. Further, the agreements require that travel cards be made available at a wide variety of physical locations and people need to be able to submit complaints by mail to a physical address.

*Evaluation Metric*

The concession documents list the specific non-digital formats in which information needs to be provided.

*Limitations*

A literature review of 25 recent papers on digital inequality in transport services summarized how factors related to age, income, education, ethnicity and geographic region can all result in increased vulnerabilities to digitalization (*56*). While non-digital options are often presented for specific situations, none of the agreements have a general rule that any services that are available online or through an app must also be available in an alternative non-digital format.

**Geographical Exclusion**

*Approach*

The concession documents acknowledge the challenges of geographical exclusion without explicitly addressing how these challenges can be addressed. The concession agreements state minimum density levels that must be met for an area to require some form of fixed transit service, but only suggest possibilities for areas that do not meet this minimum threshold. For example, the concession agreement for Zaanstreek-Waterland classifies different areas by density and notes that alternatives to traditional public transportation are necessary for lower density places: "In less urban areas, greater use is made of individual, flexible and small-scale transport, such as the car, the (electric) bicycle and target group transport that connects to nodes" (*37*).

*Evaluation Metric*

Level of service is defined by population density with service not required for areas below a certain threshold. Each of the three concession areas use the same metric to determine the minimum requirements for receiving fixed transit service: Neighborhoods must have more than 1,000 residents and at least 20 residents per hectare. Business areas must contain at least 2,000 employees and at least 40 employees per acre (*35–37*).

*Limitations*

The agreements do not so much address geographical exclusion as acknowledge it, noting that people who live in areas below a certain level of density will not have regular transit service. While the agreements note that alternatives should be provided to people who fall outside of these minimum

thresholds, they do not specify the minimal level of service for people in low density areas or how it should be provided.

**Cognitive Exclusion**

*Approach*

Only one of the three concession documents Zaanstreek-Waterland, addresses cognitive exclusion, specifying that travel information needs to be written at level B1 of the European Reference framework (*37*).

*Evaluation Metric*

The specific texts used by the transit agency must be approved and verified to be at this level at least three months prior to the start of the concession agreement.

**Limitations**

In the Netherlands, 18% of the population has difficulty with reading, writing or basic math (*57*). The challenges they face in using the transit system and understanding complex fare structures could be more directly addressed in each of the concession areas.

**Not addressed**

Space exclusion and discrimination-based exclusion, are not mentioned either directly or indirectly in any of the concession agreements. The sections below discuss the relevance of each for public transportation and how future research could suggest possibilities for addressing them in concession agreements.

**Space Exclusion**

Space exclusion refers specifically to whether or not people have access and feel entitled to use transit services. This type of exclusion occurs most often in gated communities(*8*). While the Netherlands does not have the type of gated communities seen in the United States and South Africa where access is only possible through a secured entrance, it does have more than a hundred private residential communities that use design elements such as moats and bushes to create limited entry points that discourage access for non-residents (*58*). A study that focused specifically on how the gated community concept has been adapted to the Netherlands identified six common types of communities that limited access for non-residents in multiple ways, ranging from central courtyards only accessible from within the complex to modern day castles that included fortress style walls (*59*). While many of these communities may not have transit stops located within them, they may create physical barriers between people's residence and the nearest transit stop. In these situations, the linear distance to a stop may meet the requirements, but the actual travel distance may be much farther. Additional research could lead to a better understanding of how these closed off communities affect transit access.

**Discrimination-based Exclusion**

None of the concession agreements make any direct mention of the system being open to all people regardless of their identity or make any note of a general or specific policy against discrimination. The literature on transportation equity documents the many different ways in which discrimination, both intentional and unintentional, can have an impact on passengers. This includes how religious discrimination can affect people's sense of safety while traveling (*19*, *20*); the impact of gender and gender related transportation policies on mobility (*25–27*, *30*, *60*); how ethnic and racial discrimination can both shape the travel experience of individuals and have systemic impacts on the transportation system as a whole (*23*, *24*, *31*, *32*); and how the intersectionality of these and other identity factors can compound the impacts of transportation-related discrimination (*10*, *21*, *28*, *29*). There seems to be a

considerable amount of opportunity for building on this research to determine how these identity factors impact social inclusion in transportation in the Netherlands and for incorporating the results of that research into concession agreements.

**Discussion and Conclusion**

The method developed and applied here demonstrates the ability to systematically identify TRSE policy based on its ten different identified forms. The results show that different forms of TRSE can receive substantially different levels of attention. This evaluation provides clarity on what the existing policy is in order to create opportunities for improvement, opening the opportunity for further research into how these areas of TRSE could be addressed more systematically. For forms of TRSE that were not addressed in the concession documents, the method creates a rational for investigating the extent of these forms of TRSE as a step towards developing future policies to address them.

While this analysis can serve as a starting point for developing new standards within concession agreements, it does come with limitations. It only reveals the existing policy, not the degree to which different forms of TRSE constitute a problem in the study area. The concession agreements are also only one policy tool for addressing TRSE and are limited to public transportation. Some forms of TRSE might be better addressed through other policy instruments and the analysis does not cover measures that are already in place to provide alternatives for those who cannot use public transportation.

In the described case, the coding method revealed multiple existing interagency agreements and legal requirements that both defined and constrained how the different forms of TRSE could be addressed. The analysis, therefore opens up the possibility for future research on how certain forms of TRSE can be addressed within existing structures and on how changes to those structures might allow for novel approaches for reducing TRSE.

**ACKNOWLEDGMENTS**

The research was conducted with the support and financing of the Amsterdam Transport Region through their funding of the project Advancing Socially Inclusive Mobility in the Amsterdam Transport Region, research project within the Smart Public Transit Lab in the Department of Transportation and Planning at Delft University of Technology. The author would like to thank everyone at both the Amsterdam Transport Region and TU Delft that donated their time and considerable knowledge to improving this article.

**AUTHOR CONTRIBUTIONS**

The authors confirm contribution to the paper as follows: study conception and design: M. Bruno, M. Kouwenberg. N. Van Oort, Y.; data collection: M. Bruno; analysis and interpretation of results: M. Bruno; draft manuscript preparation: M. Bruno, M. Kouwenberg, N. Van Oort. All authors reviewed the results and approved the final version of the manuscript.

## REFERENCES


1. Lucas, K. A New Evolution for Transport-Related Social Exclusion Research? *Journal of Transport Geography*, Vol. 81, 2019, p. 102529. https://doi.org/10.1016/J.JTRANGEO.2019.102529.

2. Lucas, K. Transport and Social Exclusion: Where Are We Now? *Transport Policy*, Vol. 20, 2012, pp. 105–113. https://doi.org/10.1016/J.TRANPOL.2012.01.013.

3. Jones, P., and K. Lucas. The Social Consequences of Transport Decision-Making: Clarifying Concepts, Synthesising Knowledge and Assessing Implications. *Journal of Transport Geography*, Vol. 21, 2012, pp. 4–16. https://doi.org/10.1016/j.jtrangeo.2012.01.012.

4. Martens, K., J. Bastiaanssen, and K. Lucas. Measuring Transport Equity: Key Components, Framings and Metrics. *Measuring Transport Equity*, 2019, pp. 13–36. https://doi.org/10.1016/B978-0-12-814818-1.00002-0.

5. Lucas, K., B. van Wee, and K. Maat. A Method to Evaluate Equitable Accessibility: Combining Ethical Theories and Accessibility-Based Approaches. *Transportation*, Vol. 43, No. 3, 2016, pp. 473–490. https://doi.org/10.1007/S11116-015-9585-2/TABLES/1.

6. Lucas, K., J. Bates, J. Moore, and J. A. Carrasco. Modelling the Relationship between Travel Behaviours and Social Disadvantage. *Transportation Research Part A: Policy and Practice*, Vol. 85, 2016, pp. 157–173. https://doi.org/10.1016/J.TRA.2016.01.008.

7. Yigitcanlar, T., A. Mohamed, M. Kamruzzaman, and A. Piracha. Understanding Transport-Related Social Exclusion: A Multidimensional Approach. *https://doi-org.dianus.libr.tue.nl/10.1080/08111146.2018.1533461*, Vol. 37, No. 1, 2018, pp. 97–110. https://doi.org/10.1080/08111146.2018.1533461.

8. Luz, G., and L. Portugal. Understanding Transport-Related Social Exclusion through the Lens of Capabilities Approach. *Transport Reviews*, 2021. https://doi.org/10.1080/01441647.2021.2005183.

9. Schwanen, T., K. Lucas, N. Akyelken, D. Cisternas Solsona, J. A. Carrasco, and T. Neutens. Rethinking the Links between Social Exclusion and Transport Disadvantage through the Lens of Social Capital. *Transportation Research Part A: Policy and Practice*, Vol. 74, 2015, pp. 123–135. https://doi.org/10.1016/J.TRA.2015.02.012.

10. Benevenuto, R., and B. Caulfield. Poverty and Transport in the Global South: An Overview. 2019. https://doi.org/10.1016/j.tranpol.2019.04.018.

11. Rotmans, J., R. Kemp, and M. van Asselt. More Evolution than Revolution: Transition Management in Public Policy. *The journal of futures studies, strategic thinking and policy*, Vol. 03, No. 01, 2001, pp. 015–031.

12. Ieromonachou, P., S. Potter, and M. Enoch. Adapting Strategic Niche Management for Evaluating Radical Transport Policies—the Case of the Durham Road Access Charging Scheme. *International Journal of Transport Management*, Vol. 2, No. 2, 2004, pp. 75–87. https://doi.org/10.1016/j.ijtm.2004.09.002.

13. Manaugh, K., M. G. Badami, and A. M. El-Geneidy. Integrating Social Equity into Urban Transportation Planning: A Critical Evaluation of Equity Objectives and Measures in Transportation Plans in North America. *Transport Policy*, Vol. 37, 2015, pp. 167–176. https://doi.org/10.1016/j.tranpol.2014.09.013.

14. Carleton, P. R., and J. D. Porter. A Comparative Analysis of the Challenges in Measuring Transit Equity: Definitions, Interpretations, and Limitations. *Journal of Transport Geography*, Vol. 72, 2018, pp. 64–75. https://doi.org/10.1016/J.JTRANGEO.2018.08.012.

15. Spoor, M. Multidimensional Social Exclusion and the 'Rural-Urban Divide' in Eastern Europe and Central Asia. *Sociologia Ruralis*, Vol. 53, No. 2, 2013, pp. 139–157. https://doi.org/10.1111/SORU.12008.

16. Church, A., M. Frost, and K. Sullivan. Transport and Social Exclusion in London. *Transport Policy*, Vol. 7, No. 3, 2000, pp. 195–205. https://doi.org/10.1016/S0967-070X(00)00024-X.

17. Hine, J., and F. Mitchell. Better for Everyone? Travel Experiences and Transport Exclusion. *Urban Studies*, Vol. 38, No. 2, 2001, pp. 319–332. https://doi.org/10.1080/00420980020018619.

18. Cass, N., E. Shove, and J. Urry. Social Exclusion, Mobility and Access. *The Sociological Review*, Vol. 53, No. 3, 2005, pp. 539–555. https://doi.org/10.1111/J.1467-954X.2005.00565.X.

19. Abdelkader, E. Savagery in the Subways: Anti-Muslim Ads, the First Amendment, and the Efficacy of Counterspeech. *Asian American Law Journal*, Vol. 21, 2014.

20. Najib, K., and C. Teeple Hopkins. Geographies of Islamophobia. *https://doi.org/10.1080/14649365.2019.1705993*, Vol. 21, No. 4, 2019, pp. 449–457. https://doi.org/10.1080/14649365.2019.1705993.

21. Hashem, H., M. Ghani, S. Hirani, A. Bennett, and G. H. Awad. Solo Status, Religious Centrality, and Discrimination among American Muslim Women. *International Journal of Intercultural Relations*, Vol. 88, 2022, pp. 32–41. https://doi.org/10.1016/J.IJINTREL.2022.03.005.

22. Reynolds, L. Aging and Disability Awareness Training for Drivers of a Metropolitan Taxi Company. *http://dx.doi.org/10.1080/01924780903552279*, Vol. 34, No. 1, 2010, pp. 17–29. https://doi.org/10.1080/01924780903552279.

23. Swistara, M. A Fare Share: A Proposed Solution to Address the Racial Disparity in Access to Public Transportation Funding in America. *Michigan Journal of Race and Law*, Vol. 26, No. 2, 2021, pp. 521–566. https://doi.org/https://doi.org/10.36643/mjrl.26.2.fare.

24. Larson, S. J. Examining the Efficacy of Title VI Social Equity Analysis: A Comparative Case Study of Transit Access and Neighborhood Segregation Outcomes Over Time. *https://doi.org/10.1080/10999922.2018.1441595*, Vol. 20, No. 4, 2018, pp. 344–357. https://doi.org/10.1080/10999922.2018.1441595.

25. Currah, P., and T. Mulqueen. Securitizing Gender: Identity, Biometrics, and Transgender Bodies at the Airport. *Social Research: An International Quarterly*, Vol. 78, No. 2, 2011, pp. 557–582. https://doi.org/10.1353/SOR.2011.0030.

26. Adeel, M., A. G. O. Yeh, and F. Zhang. Gender Inequality in Mobility and Mode Choice in Pakistan. *Transportation*, Vol. 44, No. 6, 2017, pp. 1519–1534. https://doi.org/10.1007/S11116-016-9712-8/METRICS.

27. Law, R. Beyond 'Women and Transport': Towards New Geographies of Gender and Daily Mobility. *http://dx.doi.org/10.1191/030913299666161864*, Vol. 23, No. 4, 2016, pp. 567–588. https://doi.org/10.1191/030913299666161864.

28. Lee, J., I. Vojnovic, and S. C. Grady. The 'Transportation Disadvantaged': Urban Form, Gender and Automobile versus Non-Automobile Travel in the Detroit Region. *Urban Studies*, Vol. 55, No. 11, 2018, pp. 2470–2498. https://doi.org/10.1177/0042098017730521/ASSET/IMAGES/LARGE/10.1177_0042098017730521-FIG3.JPEG.

29. Ayres, I. Fair Driving: Gender and Race Discrimination in Retail Car Negotiations. *Harvard Law Review*, Vol. 104, No. 4, 1991, pp. 817–872. https://doi.org/10.2307/1341506.

30. Dunckel Graglia, A. Finding Mobility: Women Negotiating Fear and Violence in Mexico City's Public Transit System. *http://dx.doi.org/10.1080/0966369X.2015.1034240*, Vol. 23, No. 5, 2015, pp. 624–640. https://doi.org/10.1080/0966369X.2015.1034240.

31. Long, H. H. Racial Desegregation in Railroad and Bus Transportation. *The Journal of Negro Education*, Vol. 23, No. 3, 1954, p. 214. https://doi.org/10.2307/2293218.

32. Golub, A., R. A. Marcantonio, and T. W. Sanchez. Race, Space, and Struggles for Mobility: Transportation Impacts on African Americans in Oakland and the East Bay. *https://doi.org/10.1080/02723638.2013.778598*, Vol. 34, No. 5, 2013, pp. 699–728. https://doi.org/10.1080/02723638.2013.778598.

33. Amsterdam Transport Region. Vervoerregio Amsterdam: Veertien Gemeenten Werken Samen Aan Bereikbaarheid En Leefbaarheid [Amsterdam Transport Region: Fourteen Municipalities Working Together on Accessbility and Livabiity]. https://www.vervoerregio.nl/pagina/20170321-vervoerregio-amsterdam-veertien-gemeenten-werken-sam. Accessed Nov. 14, 2022.

34. Vervoerregio Amsterdam. *Beleidskader Mobiliteit [Mobility Policy Framework]*. Amsterdam, 2017.

35. Stadsregio Amsterdam. *Programma van Eisen: Concessie Amstelland-Meerlanden 2018 [Program of Requirements: Amsterdam-Meerlanded Concession 2018]*. 2016.

36. Stadsregio Amsterdam. *Programma van Eisen: Aangepaste Concessie Amsterdam 2012 [Program of Requirements: Adapted Amsterdam Concession 2012]*. 2013.

37. Vervoerregio Amsterdam. *Programma van Eisen: Concessieverlening Zaanstreek-Waterland 2024 [Program of Requirements: Zaanstreek-Waterland Concession 2024]*. 2021.

38. Stadsregio Amsterdam, and MuConsult. *Beleidskader Sociale Veiligheid Openbaar Vervoer 2017-2021 [Policy Framework for Public Transportation Social Safety 2017-2021]*. Amsterdam, 2016.

39. NOS. Boete Zwartrijden in Het Ov Wordt 50 Euro. https://nos.nl/artikel/2071500-boete-zwartrijden-in-het-ov-wordt-50-euro. Accessed Mar. 13, 2023.

40. ANP. NS: Minder Zwartrijders En Agressie Dankzij Inchecken Met Poortjes [NS: Fewer Fare Dodgers and Agression Because of Check-in Gates]. *NU.nl*. https://www.nu.nl/binnenland/5643689/ns-minder-zwartrijders-en-agressie-dankzij-inchecken-met-poortjes.html. Accessed Mar. 13, 2023.

41. Ouali, L. A. B., D. J. Graham, A. Barron, and M. Trompet. Gender Differences in the Perception of Safety in Public Transport. *Journal of the Royal Statistical Society Series A: Statistics in Society*, Vol. 183, No. 3, 2020, pp. 737–769. https://doi.org/10.1111/RSSA.12558.

42. Namgung, M., and G. Akar. Role of Gender and Attitudes on Public Transportation Use | Enhanced Reader. *Transportation Research Record: Journal of the Transportation Research Board*, 2014, pp. 136–144.

43. Chowdhury, S., and B. van Wee. Examining Women's Perception of Safety during Waiting Times at Public Transport Terminals. *Transport Policy*, Vol. 94, 2020, pp. 102–108. https://doi.org/10.1016/J.TRANPOL.2020.05.009.

44. Chen, A. H., M. K. Youdelman, and J. Brooks. The Legal Framework for Language Access in Healthcare Settings: Title VI and Beyond. *J Gen Intern Med*, Vol. 22, No. 2, 2007, pp. 362–369. https://doi.org/10.1007/s11606-007-0366-2.

45. U.S. Department of Transportation. DOT's LEP Guidance. https://www.transportation.gov/civil-rights/civil-rights-awareness-enforcement/dots-lep-guidance. Accessed Jan. 9, 2023.

46. Hans Schmeets, and Leonie Cornips. Talen En Dialecten in Nederland [Languages and Dialects in the Netherlands]. https://www.cbs.nl/nl-nl/longread/statistische-trends/2021/talen-en-dialecten-in-nederland?onepage=true. Accessed Jul. 19, 2023.

47. Bastiaanssen, J. *Vervoersarmoede Op Zuid Een Verkennend Onderzoek Naar de Mate Waarin Verplaatsingsmogelijkheden van Invloed Zijn Op de Arbeidsre-Integratie van Werklozen [Transport Poverty in South Rotterdam: An Exploratory Research on the Degree to Which Motility Influenes Worker Integration]*. Masters Thesis. Radboud University, Nijmegen, 2012.

48. Cervero, R. S. J. S. O. L. J. Transportation as a Stimulus of Welfare-to-Work Private versus Public Mobility. *Journal of Planning Education and Research*, Vol. 1, 2002.

49. Sanchez, T. S. Q. Z.-R. P. Transit Mobility, Jobs Access and Low-Income Labour Participation in US Metropolitan Areas. *Urban Studies*, Vol. 41, No. 7, 2004.

50. Audirac, I. Accessing Transit as Universal Design. *http://dx.doi.org/10.1177/0885412208318558*, Vol. 23, No. 1, 2008, pp. 4–16. https://doi.org/10.1177/0885412208318558.

51. Zajac, A. P. City Accessible for Everyone – Improving Accessibility of Public Transport Using the Universal Design Concept. *Transportation Research Procedia*, Vol. 14, 2016, pp. 1270–1276. https://doi.org/10.1016/J.TRPRO.2016.05.199.

52. Sze, N. N., and K. M. Christensen. Access to Urban Transportation System for Individuals with Disabilities. *IATSS Research*, Vol. 41, No. 2, 2017, pp. 66–73. https://doi.org/10.1016/J.IATSSR.2017.05.002.

53. Bastiaanssen, J., and M. Breedijk. *Toegang Voor Iedereen? Een Analyse van de (on)Bereikbaarheid van Voorzieningen En Banen in Nederland [Accessible for Everyone? An Analysis of the (in)Accessibility of Facilities and Jobs in the Netherlands]*. The Hague, 2022.

54. Brown, A. E. Fair Fares? How Flat and Variable Fares Affect Transit Equity in Los Angeles. *Case Studies on Transport Policy*, Vol. 6, No. 4, 2018, pp. 765–773. https://doi.org/10.1016/j.cstp.2018.09.011.

55. ANP. Nederlands Openbaar Vervoer Het Duurste van EU [Dutch Public Transportation the Most Expensive in the EU]. *Het Parool*. https://www.parool.nl/nieuws/nederlands-openbaar-vervoer-het-duurste-van-eu~b97c9248/. Accessed Jan. 12, 2023.

56. Durand, A., T. Zijlstra, N. van Oort, S. Hoogendoorn-Lanser, and S. Hoogendoorn. Access Denied? Digital Inequality in Transport Services. *Transport Reviews*, Vol. 42, No. 1, 2022, pp. 32–57. https://doi.org/10.1080/01441647.2021.1923584.

57. Foundation for Reading & Writing. *Feiten & Cijfers Laaggeletterheid [Low Literacy Facts & Numbers]*. Maastricht, 2018.

58. Schuilenburg, M., and R. Van Steden. Afgeschermd Wonen in Nederland: Een Studie Naar Waarom Mensen Hiervoor Kiezen En Hoe Zij Omgaan Met Interne Regelgeving [Separated Living in the Netherlands: A Study of Why People Choose It and How They Deal with Internal Regulations]. *Tijdschrijft voor Veligheid*, Vol. 14, 2015, pp. 3–18. https://doi.org/10.5553/TvV/187279482015014030400 1.

59. Hamers, D., K. Nabielek, S. Schluter, and M. Van Middelkoop. *Afgeschermde Woondomeinen in Nederland [Separated Living Complexes in the Netherlands]*. The Hague, 2007.

60. Priya Uteng, T., Y. J. Singh, and T. Lam. Safety and Daily Mobilities of Urban Women - Methodologies to Confront the Policy of “Invisibility.” In *Measuring Transport Equity*, Elsevier, pp. 187–202.