

SOCIAL EQUITY AND SOCIAL ACCESSIBILITY

A PIARC SPECIAL PROJECT



STATEMENTS

The World Road Association (PIARC) is a non-profit organisation established in 1909 to improve international co-operation and to foster progress in the field of roads and road transport.

The study that is the subject of this report was defined in the [PIARC Strategic Plan 2020–2023](#) and approved by the Council of the World Road Association, whose members are representatives of the member national governments. PIARC selected University of Birmingham to develop this project after an international call for proposals. The project was developed under the supervision and guidance of a Project Oversight Team (POT). The members of the POT were appointed by the member national governments for their special competences.

Any opinions, findings, conclusions, and recommendations expressed in this publication are those of the authors and the POT and do not necessarily reflect the views of their parent organisations or agencies.

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PIARC - World Road Association has established a Special Projects mechanism to respond to emerging issues and priorities identified by its members. In response to this call, this project addressed the issue of 'Social equity' and 'Social accessibility' for transport projects. The project aimed to capture and analyse the current status quo in terms of how Road Authorities are currently managing social accessibility through their road infrastructure and services, whilst implementing this in the most socially equitable manner possible.

A systematic literature review has been undertaken to identify the existing approaches associated with equity and accessibility. The literature review was monitored to ensure good balance between High- (HIC) and Low- and Middle- income countries (LMIC). A total of 19,386 articles was reviewed. A questionnaire and set of interviews were designed by incorporating viewpoints and comments from the PIARC and Project Oversight Team (POT). The questionnaire and interviews were designed and conducted as such to ensure an appropriate balance between HICs and LMICs. Through the analysis process, the project identified significant observations and best practices through 21 identified case studies.

The findings from this report highlights the need for different requirements of HICs, LMICs when dealing with equity and accessibility issues in the transportation sector. This has been mostly related to the levels of standards desired by different countries as far as equity and accessibility are concerned, but also the affordability of these levels by countries considering available human and economic resources. For HIC (or global north) approaches to equity can be broadly framed as adopting a vertical equity approach (i.e., more targeted - though there are of course variations). For Lower-Middle- (Lower-MIC) and Low-Income Countries (LIC) the approach was predominantly one of Horizontal equity (i.e., more universal). The case of Upper Middle-Income Countries (UMIC) is more variable with some elements of Horizontal and Vertical.

The authors recommend that PIARC reviews its current definition of accessibility to include explicitly principles of social equity and social accessibility based on the findings and experiences emerged from this project.

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1. INTRODUCTION

Social equity and social accessibility principles have been lagging during road and transportation projects' appraisals which essentially weigh both the economic and the technological viabilities of the projects. A positive effect from this could be an unforeseen spin off effect, sometimes as part of a project, while there are rules and regulations in place in some countries to enforce it. Specially in terms of accessibility for physically challenged users, e.g., emergency exits in tunnels. Having said that, the World Bank's HDM-4 tool (HDM Global, 2021), which has been used to appraise approximately US\$18 bn of road investment per annum has no option to consider social equity and social accessibility. However, recent trends show that neglecting social equity and social accessibility can only hinder the effort and contribution of the road and transport sector to global sustainable development (Pitarch-Garrido, 2018, Cuthill et al., 2019). Having said that, governments are stepping up efforts to include rigorous consideration of social equity and accessibility in the road and transportation projects' appraisals.

For example, the Australian government recommends a separate submission to consider the issues related to social equity and accessibility for a very road project tender (Commonwealth of Australia, 2016). The UK government has gone further up to make it mandatory to include social equity and accessibility equity into every tender document for transportation development (Crown, 2020). Every transport initiative has differing impacts on road users and wider society. These impacts can arise from three sources: (1) *Transport benefits* including accessibility and mobility, greater transport choice, reduced time travel or safety; (2) *Transport costs* in comparison with the received benefits; and (3) *Externalities* including air and noise pollution, vibration, loss of visual amenity and open space, community severance, related property price effects and quality of life issues. Impacts may also be measured using a range of distribution dimensions including, geography, age, or mobility limitation. However, the difference between daily commuters and logistic or good transport (and the associated socioeconomic benefit, e.g., employment) should be considered in this prospective. Through considering the aforementioned factors, including both positive and negative impacts, an appropriate assessment for any infrastructure project could be achieved. By collecting data from analysing number of projects an insight could be achieved on which part of urban areas are most effected for a new infrastructure development (e.g., lower class vs middle class areas or neighbourhoods).

Building on the alike topics and others, we will be able to explore other social subjects and factors such as:

- **Mobility and society:** mobility is a multidimensional concept expressing potential for the movement and the movement itself; or mobility as a start of a choice whose execution depends on economic and social goals. Reliability on mobility as an effective socio and economic development indicator for providing access to workforce, to suppliers and service customers are explored in this project. Also, **mobility constraining factors** are discussed including variations in the propensity, intensity, and scale of mobility that are linked to differences in the availability of transportation resources, including infrastructure. There are variations in the daily travel behaviour that are manifested in the frequency, time, mode, and distance of travel. There are also variations in transport accessibility resulting in different opportunities.
- **Mobility gaps:** mobility is one of the fundamental components of the economic benefits of

transportation, whereas its variations are likely to have substantial impacts on the employment, educational and social opportunities of individuals. There are four forms of gaps that can be detailed here. First, the differences in mobility because of the economic function of an area, particularly between **urban, peri-urban, and rural areas**. Second, the **unequal mobility and travel behaviour between social groups**, including their respective transport resources, such as car ownership, access to public transit, and average travel distance, frequency, and time. Third mobility as transport/logistics and daily commuters and the associated competition to use available spaces and infrastructure. Fourth and final the **inequalities in accessibility** to outside markets or services such as retail and opportunities such as employment. Research by (Brown et al., 2022) has explored the extent to which Boda-Boda (motorcycle taxis) in Uganda emerged as a response to the absence of a functional public transport system and provided a much-needed transport service for low- and middle-income groups.

- **Social externalities of transportation:** with increased mobility, it has become common for parts of transportation networks to be used above design capacity, particularly in urban areas. **Congestion** is the outcome of such a situation with its associated costs, delays, waste of energy, and increasing environmental impact which can also be a big difference between urban and rural transportation. Congestion can also cause significant air quality issues in urban centres impacting on both roadside pollution levels and contributing to poor urban air quality in urban areas more broadly. The impact of this poor air quality on commuters and public transport operators can be particularly stark (see Avis et al., 2018). Distribution systems that rely upon on-time deliveries are particularly susceptible to congestion as well as commuters seeking to arrive at work on time. In addition, when considering wider impacts, congestion involves additional time, which is perceived to be increasingly valuable in advanced economies. Also, all these issues underline the social implications of transportation in terms of opportunities, but as well in terms of **social exclusion**. Significant factors of social exclusion have a transportation component such as difficulties to afford transportation (public or private), transportation services that do not cover the demand appropriately, and a lack of appropriate infrastructures such as sidewalks and waiting areas. Research undertaken by Bhatkal et al. (2015) (in Ahmedabad, India) has explored how the roll out initiatives such as the Bus Rapid Transit (BRT) system have impacted both positively and negatively on city residents. Land use and housing policies can have the unintended consequence of undermining access to employment, education, healthcare, and other social activities. If this separation is not mitigated by efficient transportation, it becomes a factor of injustice. By considering these factors, the high level of subsidies that public transit systems are receiving is made socially acceptable as a form of support for the mobility of those perceived to be less advantaged. A similar observation applies to congestion and pricing schemes as the poorer segments of the population are less able to afford financial restrictions on mobility, even if undertaken with the rationale of managing scarce assets. The road remains perceived as a public good and impairing its free use becomes a divisive social issue.
- **Environment as a social transportation challenge:** The mobility provided by transport activities has a wide range of environmental consequences, with a cost that must be considered by the road agencies, users, and society. While many environmental issues can have negative health impacts, societal tolerance to environmental impacts has significantly

evolved. As education levels increase, society becomes more aware of environmental concerns and has less tolerance for its negative impacts. The most salient environmental challenges having social consequences include **air quality, noise, water quality, Carbon footprint**. The most common way for a society to mitigate the environmental impacts of transportation is to impose regulations related to standards, levels of emissions, and operating conditions. Research by Dr Avis and colleagues has extensively explored the impact of road-based emission of air pollutants on a range of groups. This includes studies on public transport in Addis Ababa (Avis et al., 2018), Boda-Boda in Kampala (Brown et al., 2022) and the impact of vehicular emissions on an inner-city school in Nairobi (Avis et al., 2019). A focus of these studies has been on social equity and public engagement.

With the emergence of an information society, the transactional structures of the economy have changed drastically towards networked organisational forms of individuals, institutions, and organisations with more intensive interactions, many of which are associated with new forms of mobility. Digitalisation of transport and mobility can be considered in three major forms, and these can be assessed throughout a separate project considering their feasibility and impacts in LICs:

- **Modal-oriented:** The direct ownership and operation of modes and terminals by organisations (owning a fleet) or individuals (owning a vehicle for exclusive use). Ownership guarantees access to mobility at any time. Digitalisation involves a more efficient internal use of the assets such as tracking and navigation using connected vehicles and Internet of Things (IoT) concept. Still, the optimal use is bounded by the ownership setting, data privacy, and technological barriers. The collected data can be used to better understand and if needed alter road user transport and trip choices.
- **Operation-oriented:** The direct lease and operation of modes and terminals by organisations and individuals. Leasing guarantees access to mobility for the terms of the lease, such as time and condition. Digitalisation involves making assets available across a market, reconciling supply and demand.
- **Demand-oriented:** Accessing mobility based on expected demand (for corporations) and need (for individuals). Digitalisation involves accessing in real-time the availability of transportation assets to temporarily rent their use for a purpose, such as e-scooter and bicycle rental schemes.

In addition, mobility is supported by various infrastructure, including transportation infrastructure and energy supply systems, as well as an environmental regulatory framework. The digital foundation (or digitalisation) of this mobility is becoming increasingly important as it creates new transportation markets. The three major spheres of the digitalisation of transportation that were looked at, with feasibility and constraints in LICs as well as in the context of urban and rural areas, involve:

- **Personal:** Information and Communications Technology (ICT) enables individuals to interact through additional mediums (e.g., social media platform), which may lead to more interactions, but also to changes over how these interactions are conducted. The diffusion of mobile personal computing devices (e.g., laptops, smartphones, and tablet computers) has also enabled individuals to enrich their mobility by performing various tasks while in transit or outside a conventional work environment setting. Several applications, such as

global positioning systems, also enable individuals to manage their mobility better. The intensity and the scheduling of mobility can become highly interactive since users are able to coordinate their mobility considering real-time changes, such as congestion or changes in time and cost preferences. A smartphone can act as a trip optimisation device as they have improved the efficiency of vehicles through less confusion and errors, as well as the capability to re-route because of changing traffic conditions. At the aggregate level, these improvements are substantial and could be associated with 10% to 30% overall efficiency improvements (Berggren et al., 2021).

- **Consumer to business (C2B):** ICT enables consumers to interact more effectively with the transportation services they use. A direct form is purchasing transport services through online platforms using booking systems for air and rail transport and ride-sharing services. An indirect form is E-commerce, which has opened a whole new array of commercial opportunities complementing or substituting conventional shopping, from necessities to discretionary goods. One important convenience of e-commerce is removing the distance and temporal restrictions associated with conventional retailing. Customers needed to physically travel to a store, which had defined opening hours. E-commerce does not necessarily imply more consumption but that a growing share of retailing transactions is taking place online, resulting in the growth of home deliveries, as an indirect form of transportation.
- **Business to business (B2B):** ICT enables businesses to transact more effectively, which indirectly results in changes in their transport operations. The increasing scale and intensity of business transactions are commonly linked with supply chain management strategies. For instance, inventory management strategies permitted by ICT enable a more significant share of the inventory to be in transit ('stored' in vehicles and at terminals), often in line with an increase in the frequency of deliveries.

The digitalisation of transportation incites the development of new platforms where actors can interact in the provision, use, and exchange of transportation services. The conventional urban mobility landscape is characterised by a patchwork of passengers and freight transportation services, which is associated with the inefficiencies of these assets. By integrating transportation service providers in an ICT platform, a new paradigm emerges, which is referred to as mobility as a service. **Mobility as a service** concerns transactions related to transportation and supply chains. Conventionally, each actor along a transport chain tended to keep its own centralised ledger recording its information and transactions. The emergence of Blockchain technologies provides an extended and distributed form of ledgers, adding value to the process. It has the potential to improve the transactional efficiency of supply chains by enabling the providers and users of transport services to share a common and distributed electronic ledger system. Through this technology, exact copies are maintained and simultaneously updated across several nodes. It becomes possible to more effectively manage access to transport infrastructures and conveyances (from a seat in a plane to a slot in a containership), the related data exchange, and payments for service provided.

Box 1 Digital dividends versus divides

Digital dividends: The World Development Report (World Bank, 2016) has the title Digital Dividends under which it provides examples of multiple ways in which the use of digital technology can be leveraged to reduce poverty, increase income, and empower citizens (World Bank, 2016). It argues that this is possible through three main mechanisms: (i) inclusion – bringing down transaction and information costs and overcoming physical barriers to reach remote populations; (ii) efficiency – automating existing processes can bring down costs of existent services and transactions; and (iii) innovation – digital platforms can scale rapidly at near zero marginal cost. The positive development impacts, or “digital dividends,” include economic growth, job creation, increased productivity, access to digital services, increased participation and feedback, and improved public sector capability (World Bank, 2016). To this end, The U.S. Department of Transportation (USDOT, 2022) implemented data-driven equity assessment as part of its vision.

Digital divide: The term digital divide in its simplest form refers to the binary division between people who own, or do not own, digital devices such as mobile phones or computers. It is also used to refer to the binary division between people who are connected to the internet and mobile phone networks and those who are unconnected. This binary understanding of access or inclusion has been subject to increasing scrutiny in recent years and the literature has sought to go “beyond access” to develop a multi-dimensional understanding of digital divides (this includes divides in terms of access, affordability, age gender etc.,)

1.1. SCOPE AND OBJECTIVES

The main goal of the project was to assess how and at what level road authorities address social equity in their operations and infrastructure projects ‘social equity and social accessibility’ across the PIARC’s community, which was achieved through the following objectives (Os):

- O1. To identify the most appropriate existing practices in measuring accessibility and its components.
- O2. To identify the most appropriate existing frameworks and approaches for combining accessibility and equity, equity-based accessibility, and its components.
- O3. To identify the most appropriate current practices and means of collecting stakeholders’ needs/claims associated with equity-based accessibility, and its components.
- O4. Through the analysis process, identify significant observations and develop a best practice guideline based on these observations.

2. METHODOLOGY

2.1. WS1: SYSTEMATIC LITERATURE REVIEWS

To identify the existing approaches associated with equity and accessibility, a systematic literature review was conducted (O1-3). The process involved identifying and retrieving relevant articles using a systematic approach as shown in a. The literature review was designed to ensure good balance between High- and Low- and Middle-income countries (HICs and LMICs).

To identify the documents to be included in this review, a systematic database search was performed. The first step consisted of defining the key search terms. The key terms have been identified based on the concepts of social equity and accessibility linked with the research questions mentioned in the proposal for this project. These include the terms "social equity", "accessibility," "social exclusion", "transport inequalities" and "transportation justice". Each term has been searched together with terms associated with "road," "highway" and "pavement" synonyms and alternative spellings by using Boolean operators to generate standard database search strings. Thereafter, the key terms were searched in databases including Scopus, Web of Science, Transport Research International Documentation (TRID), Google Scholar, PIARC, and World Bank.

The database search returned a set of 19,386 articles, which were initially screened for duplicates and further refined by title and abstract. Exclusion criteria for this stage were publication date (before 2000); language (documents not in English, French, or Spanish); focus on railway (Light Rail Transit was however included), land-use; spatial accessibility; documents not on road/highway/pavements; and road-focused documents but not on social equity and accessibility. From this screening, a set of 3678 documents were identified for further analysis based on full text content (see Figure 1). Before deciding the final studies to be used to inform the process, the studies were subjected to a weight of evidence (WoE) screening method to confirm the quality of the studies through their soundness, appropriateness, and relevance levels. However, to ensure that the articles from LIC were included in the final set, as suggested by the POT, two different sets for each of the LIC and HIC-LMIC were generated and evaluated with an associated WoE, grouped as Global North and South (Table 1). Accessibility and equity were then broken down to features presented in Figure 2, to evaluate the soundness of each article. Through the process, the required data, types of measurements associated with social equity and social accessibility were identified.

Considering the wide range of topics under accessibility and equity, the identified articles after the WoE process were synthesized under the following themes:

- Transport planning / road building processes and mechanisms (34 studies)
- Road pricing / Tolls (38 studies)
- Public transport (40 studies)
- Externalities (24 studies)
- Active travel / NMT infra (26 studies)
- Vulnerable groups (25 studies)

The literature review was carried out by using the EPPI-Reviewer software (UCL, 2019). EPPI-Reviewer is a web-based software designed for managing and analysing data in literature reviews, particularly systematic ones. The software is built to manage references, stores PDF files and facilitates qualitative and quantitative analyses such as meta-analysis and thematic synthesis. It also

contains machine learning feature for priority screening and ‘text mining’ technology, allowing the review team to work more efficiently throughout the screening process.

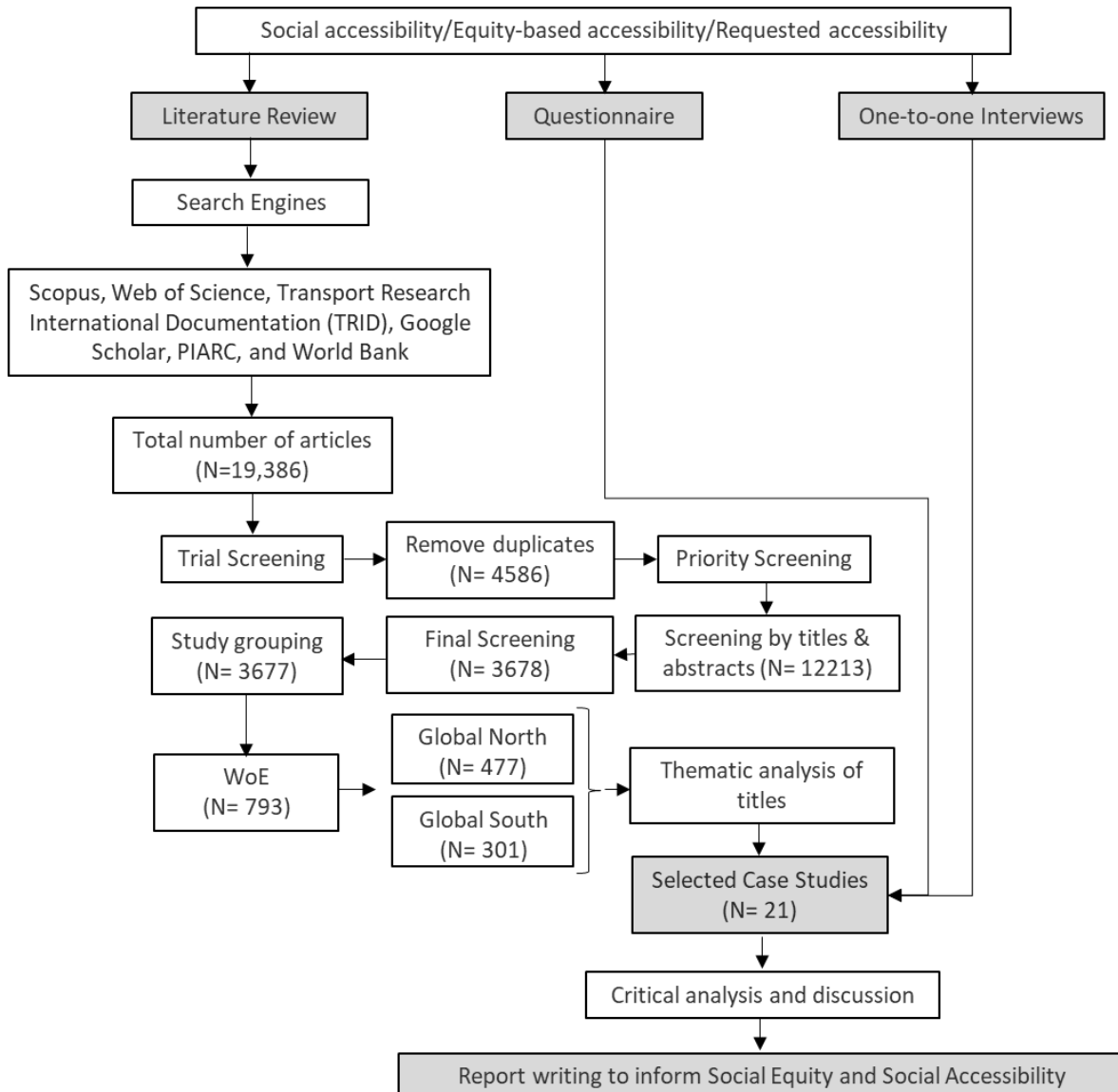


Figure 1: Schematic overview of the individual stages in the data collection, analysis and report writing

Table 1: The adopted WoE for the Global North and South

Main Categories	Description	Geographical context	Criteria		
			High	Medium	Low
Soundness	Explicit and detailed methods, data collection and analysis of results, interpretation are firmly based on the findings. Explicit focus on features of accessibility and social equity	Global North and South	5+ features from Figure 2	3 features from Figure 2	2 features from Figure 2
Appropriateness	Clearness and detail of the study's road map from design through methods to the results	Global North	Case study (ies) on accessibility or equity tested or trialled	Case study (ies) on accessibility or equity developed or initiated	No case study or theoretical work
		Global South	Case study (ies) on accessibility or equity tested or developed or initiated	Case study (ies) identified or designed (but not implemented yet)	No case study or theoretical work
Relevance	Document's meaningful contribution to the existing knowledge	Global North	Implementation of policy or guideline or indicators or measurements	Mention of policy or guideline or indicators or measurements	Lack/ no mention of policy/ guideline or indicators or measurements
		Global South	Implementation or mention of policy or guideline or indicators or measurements	Acknowledgment of need for policy or guideline etc	No plans for policy or guideline or indicators or measurements

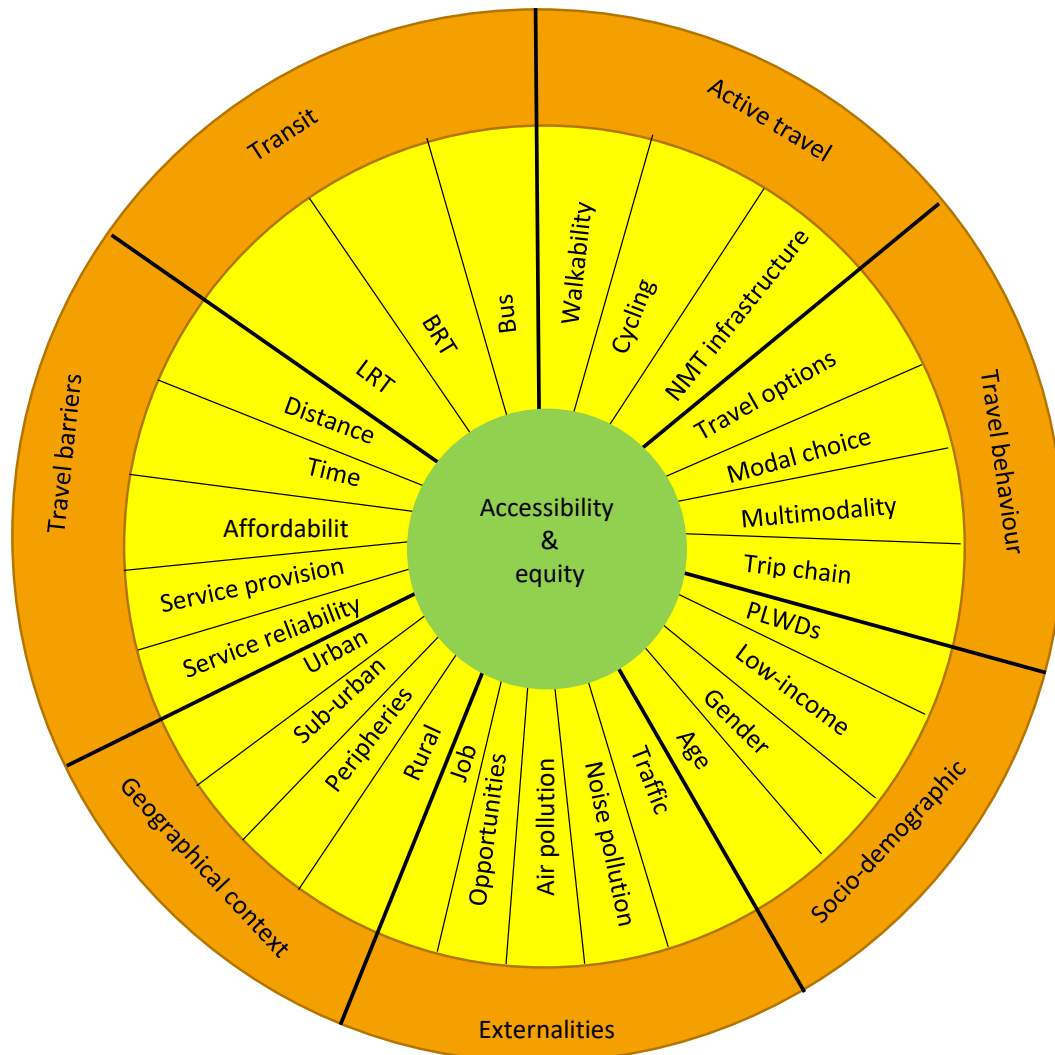


Figure 2: Accessibility and equity features used to assess each article as part of the WoE process

The following definition of accessibility is adopted in this research (PIARC, 2012a): “change in accessibility is defined as the amount of goods, services, employment and possibly the volume of population that someone can have access to from a given point, given the new travel option offered by the new scheme. It is quantified as a function of the travel times”.

2.2. WS2: CASE STUDIES

The case studies of where social equity and social accessibility elements were observed during transportation projects development and implementations were gathered from the PIARC members globally to support the literature and provide an overview of both successes and lessons learned. This was achieved through engaging with various road administrations from both HICs and LMICs, recruited either via PIARC, University of Birmingham (UoB) contacts (e.g., National Road Authorities) or other routes. This was done through a questionnaire (launched on between 21st February and 30th June 2023), one-to-one interviews, and email communications along the activities in WS3.

As the case studies had come from both HICs and LMICs, they provided evidence to differentiate between challenges and approaches to mitigate challenges in the developed and developing countries. The collected case studies were monitored to ensure good balance between HICs and

LMICs. Any imbalance between collected case studies were addressed by collected more data from the underrepresented group, e.g., LIC. Case studies specifically helped to deliver the O1-3 to complement the information collected through the systematic literature review.

2.3. WS3: QUESTIONNAIRE, ONE-TO-ONE INTERVIEWS

As not all the existing approaches associated with equity-based accessibility could be found in the literature, PIARC's members and other sources, available through the UoB's network, were consulted through a questionnaire to provide information on the utilised equity-based accessibility methods. The questionnaire set out the requirements from HICs and LMICs, launched on 20th February 2023, and was designed by incorporating viewpoints and comments from the PIARC and POT. It was available online in three languages, namely, English, French, and Spanish. Ethical review approval was secured from the UoB prior to starting the process.

This questionnaire aimed to capture and analyse the current status quo in terms of how road authorities are currently managing social accessibility through their road infrastructure and services, whilst implementing this in the most possible socially equitable manner. We acknowledged before starting the questionnaire that in many contexts, accessibility and equity considerations and implementations are likely to be limited and diffuse. Hence, the questionnaire was designed to also collect responses that highlight the absence, rather than presence, of such considerations. The nature of social equity and accessibility initiatives also implies that these are, or will be, implemented by a range of organisations and as such the role of road authorities and transport providers may be limited or the sphere or responsibility constrained. As such, partial responses were included in the analysis.

The identified equity-based accessibility frameworks identified through the questionnaire were added to WoE process of to identify the most suitable equity-based accessibility methods (O1-3). A series of One-to-One interviews were conducted to gather more information on the identified potential case study from the questionnaires. Recruitments for one-to-one interviews were initiated by using the questionnaire responses. Further participants were recruited through the UoB and PIARC networks to ensure that 1) voices of different regions, and income categories were heard 2) the balance between various groups, i.e., LICs and HIC & MICs, were maintained.

2.3.1. Questionnaire Methodology

This section outlines the methodology employed to conduct the questionnaire, including details on participant selection, questionnaire instrument design, data collection, and analysis.

1. **Sample Selection:** The target population for the questionnaire consisted of those who were actively involved in the road sector (including: national road administrations, national transport administrations, regional or local road or transport administrations as well as international organisations, universities, and research institutes who support road sector development). A purposive sampling approach was adopted given the broad scope of the research. The questionnaire was distributed through partner organisation networks and communication channels including PIARCs community of practice, the IRF, and the UoB. This approach was adopted to ensure input from a range of countries, both global south and north.
2. **Questionnaire Design:** The instrument used for data collection was a structured questionnaire. The questionnaire was developed based on the research objectives and

contained both closed and open-ended questions. The closed-ended questions included multiple-choice options, while the open-ended questions allowed participants to provide detailed responses.

3. **Data Collection Procedure:** The survey was conducted through an online platform (JISC Online Surveys)¹. The survey was administered over a period of four months. To ensure confidentiality, all responses were anonymised and stored securely².
4. **Sample Size:** The final sample size was 54.
5. **Data Analysis:** Data analysis was conducted using JISC Online Survey functions and Excel. Descriptive statistics were employed to summarise the survey responses.
6. **Limitations:** It is important to note that the questionnaire methodology had certain limitations. The questionnaire relied on self-reported information, which may be subject to response bias. Further to this given the breadth of the research topic, respondents and their responses must be interrogated. Second, the sample was limited to respondents with working knowledge of the road sector, this may restrict the generalisability of the findings and may overlook initiatives that adopt a cross government or multisector approach. Third, the survey was conducted in a specific time frame, and results may not be applicable to other time periods.

2.3.2. Semi-structured Interview Methodology

Semi-structured interviews utilised a qualitative research methodology that involved conducting interviews with participants using a flexible set of questions allowing for more open-ended responses and exploration of topics of interest.

1. **Research Question/objective:** The intention of the semi-structured interview was to analyse the current status quo in terms of how road authorities are currently managing social accessibility through their road infrastructure and services, whilst implementing this in the most possible socially equitable manner. Interviews were intended to complement and deepen findings from the literature review and questionnaire.
2. **Sampling:** Participants were selected based on specific characteristics and expertise. This included recruitment of those with expertise in transport infrastructure development from countries across all income groups. To ascertain country income status and to aid the identification of participants, World Bank classification of country lending groups i.e., High, Upper Middle, Lower Middle, and Low income was used (HIC, UMIC, Lower-MIC & LIC respectively). Note: the acronym LMIC refers to the three levels together UMIC, Lower-MIC and LIC.
3. **Interview Guide Development:** An interview guide was developed that included a set of open-ended topics to cover during the interview. The guide was designed to be flexible, allowing for probing and follow-up questions to delve deeper into participants' responses.

¹ The online survey tool is designed for Academic Research, Education and Public Sector organisations.

² The storage of data by JISC Online Surveys is GDPR compliant and certified to ISO 27001 standard.

4. **Data Collection:** the interviews were conducted either in person, over the phone, or through video conferencing, depending on practical considerations and participant availability. Start each interview by explaining the purpose of the study, obtaining informed consent, and ensuring participant confidentiality. The interviews were conducted in English, French and Spanish based on participants preferences. The interviews were recorded (with participant consent) for accurate transcription and analysis. Notes were taken during the interview to capture non-verbal cues and observations.
5. **Interview Process:** Semi-structured interviews provided an opportunity for participants to share their perspectives and experiences in their own words. The interviewer encouraged participants to elaborate on their responses, asked probing questions, and explored different aspects of the research topic. However, a balance was maintained in the intervention to avoid leading participants or influencing their answers.
6. **Data Analysis:** the recorded interviews were then transcribed, and the data was organized for analysis, using qualitative research methods including thematic analysis. Patterns, themes, and emerging concepts within the data were then identified.
7. **Interpretation and Reporting:** Once the analysis was completed, the findings were interpreted, and conclusions drawn based on the data. A comprehensive and well-structured report that includes direct quotes, thematic summaries, and interpretations was then provided (Section 3.2.2). It was crucial to maintain the confidentiality and anonymity of the participants which was achieved by using pseudonyms and codes in storing and reporting the findings.

The selected semi-structured interviews offered a balance between flexibility and structure, allowing researchers to explore participants' perspectives while maintaining some consistency across interviews. This methodology provided rich and detailed insights into participants' experiences, beliefs, and attitudes, making it valuable for qualitative research in the field.

3. RESULTS

In this section the results of the systematic literature review, questionnaires and interviews are presented in the following subsections, accordingly.

3.1. SYSTEMATIC LITERATURE REVIEW FINDINGS

The review process identified the following themes under accessibility and equity: 1) Vulnerable groups, 2) NMT and Active travel, 3) Public transport, 4) externalities, 5) Road pricing/tolls, and 6) Transport planning/Road building processes/mechanisms. The selected studies, based on the systematic literature review process, are presented in Appendix A, Tables A1-6. The extracted information, i.e., number of covered futures, length of field trial and the achieved results or outcomes, was then used to identify the best cases or practices for each of the themes. One case study for each of Global North and South were identified where it was applicable.

3.1.1. Transport planning/Road building processes/mechanisms

Box 2 Transport planning/Road building processes/mechanisms

Category: Global North

Country/region: France

Project/study description: This project was reported as a case study in PIARC (2012a). It reports a standard framework adopted by French Ministry of Transport since 1995, last revised in 2007, for economic appraisal of major transport infrastructure projects. The framework considers accessibility under non-monetary impacts, while proving quantitative analysis methods.

Key findings: The report identified more than forty major road projects which were appraised using the framework in which a multi-criterion appraisal grid is used for combining various monetary and no-monetary values. The following definition of accessibility was adopted by the framework “the quantity of goods, services, jobs, or the volume of population that an individual may reach from a given point, accounting for the level of road infrastructure offerings, his or her travel behaviour, and the attractiveness of the possible destinations” (PIARC, 2012a). The framework provides an equation for determining accessibility, which incorporates: 1) quantity of goods, services, or jobs, 2) distance, 3) and travel time for an area.

The adaptation of framework for a road section, A7/A9, in the Rhône Valley, France was reported. The study was considering various traffic improvement options, such as widening, which showed that accessibility will be improved more significantly by constructing new road rather than improving the existing one.

Box 3 Transport planning/Road building processes/mechanisms

Category: Global South

Country/region: Iran

Project/study description: A Fuzzy Analytic Hierarchy Process (AHP) approach was used by Azmoodeh et al. (2023) for determining the level of capability. The process was tested for two neighbourhoods in Tehran, Iran, incorporating expert opinion.

Key findings: The process included the following factors: 1) Public Transport Coverage, 2) Catchment Area Population Density, 3) individual and demographical, e.g., age, gender, income, 4) environmental, e.g., noise and air pollutions as well accident rate and disability. Level of capacity was then calculated for two areas in Tehran.

3.1.2. Road pricing/tolls**Box 4 Road pricing/tolls**

Category: Global South

Country/region: Indonesia/ Bandung District

Project/study description: Anas et al. (2017) used the case study in Bandung district, Malaysia, to measure the regional economic impacts of the Cipularang toll road investments using an input - output model. Cipularang toll road (58 km) is an extension road towards the outer ring road of Cikampek, Jakarta, and an alternative short road from Jakarta to Bandung and vice versa. By connecting Jakarta and Bandung, the toll road's operation makes a short latency time, hence significantly increasing the number of trips to and from Bandung district.

Key findings: The *direct impacts* of tolling roads such as reduced travel time, reduced vehicle operating costs and reduced accidents costs were discussed. Also, the *indirect impacts* such as reduced production costs, increased production, and agglomeration and spill over were all highlighted by the case study. Lastly, the Bandung district registered *regional impacts* including increased income, increased new jobs creation, and increased gross domestic product (GDP). For this case study, the accessibility is interpreted from the locational and travel time by the

Box 5 Road pricing/tolls**Category:** Global North**Country/region:** London (UK), Stockholm (Sweden), Singapore (Singapore), and New York (USA)**Project/study description:** Guided by the US National League of Cities the report entitled Making Space - Congestion Pricing in Cities assessed the impacts of tolling roads in the cities of London, Stockholm, Singapore to help design the congestion pricing in New York.**Key findings:**

London - it is the most similar to New York City in terms of population size, and economic and cultural diversity, with multiple transportation options. In 2003, London took a divergent path to fund their dated transportation infrastructure, which required an initial investment of \$214 million. The starting rate of £5 per car in 2003 increased to £11.50 in 2014 — which brought in gross revenue of about \$3.9 billion in 10 years, of which around half funds public transportation. The other half is used for operating costs. The annual net revenue is around \$182 million.

Stockholm - Stockholm is a success story for congestion pricing, with around 18 points of entry and exit in 2007. In 2006, the city launched a seven-month trial and then put congestion pricing to a ballot-referendum as the issue was first seen as “political suicide,” but by 2014 garnered support from over two thirds of the population. The initial investment of \$236.7 million into Stockholm’s congestion charging system was repaid in four years, and now the government sees an annual net profit of \$143.2 million per year.

Singapore - The city of Singapore has the oldest congestion pricing program of any city in the world. The Area Licensing Scheme (ALS) lasted from 1975 to 1998, when it was replaced by the Electronic Road Pricing (ERP) program. ALS was first designed back in 1973 by a ministerial committee, which recommended policies to improve the urban landscape of Singapore. After a year of public comments, the ALS system was implemented to reduce congestion and improve public transportation. The initial cost of the system was \$110 million. The ERP has an annual operating cost of \$18.5 million and a net revenue of \$100 million that is put towards public transportation systems. The ERP contains more than 80 charge points around the city.

Box 5 Road pricing/tolls (continued)

New York - In 2019, New York State passed a budget that authorized the Triborough Bridge and Tunnel Authority (TBTA), an affiliate of New York City’s Metropolitan Transportation Authority, to establish a congestion pricing tolling system for Manhattan’s Central Business District starting in 2021. Advocates are citing the scheme’s emphasis on public investment, focus on climate and potential benefits for low-income New Yorkers without automobiles. Importantly, the congestion pricing program is the last phase of a three-phase rollout recommended by the Fix NYC Advisory Panel in a January 2018 report. Passenger vehicles are tolled once per day, a six-person Traffic Mobility Review Board makes recommendations about toll rates, variable pricing structures and exemptions. revenues are placed in a lock-box fund, used to pay the operating

3.1.3. Public transport

Box 6 Public Transport

Category: Global North

Country/region: USA Guo et al. (2018)

Project/study description: Exploring the equity performance of bike-sharing systems with disaggregated data: A story of southern Tampa, Florida, USA.

Project/study description: Emerging transportation technologies (e.g., connected vehicles) and services (e.g., shared mobility) provide efficient, sustainable, and cost-effective alternatives to traditional travel modes. However, whether these innovative technologies bring benefits to different population groups in an equal and reasonable manner is still an open question. This report aims to tackle this question and is divided into the following two parts: transportation equity literature review and a case study on bike-sharing systems. The first part of the report comprehensively surveys the literature about methodologies for analysing transportation equity for traditional and emerging transportation technologies in terms of economy, environment, and public health. issues in southern Tampa.

Key findings: This study developed a comprehensive equity assessment framework on analysing how the accessibility from a bike-sharing system is distributed in the society with disaggregated data. With the individual travel demand dataset and bike-sharing provision dataset, the framework modelled the individual bike-sharing accessibility by considering the walking-cycling-walking process in a bike-sharing trip and the trip-chaining behaviour in an individual's travel itinerary. The combination of the individual accessibility indicators and sociodemographic dataset helped to carry out a series of equity analyses from both the horizontal and vertical perspective. Apart from traditional analysis methods (geographic mapping analysis, Gini index, distributional comparison, and ANOVA test), a subgroup inequality index was applied to quantify the vertical equity. The proposed methodological framework was applied to the Coast Bike Share System in southern Tampa. The main findings were as follows:

1. From the horizontal perspective, the distribution of bike-sharing accessibility was highly skewed among both the population and the geographic space, with both Gini indexes higher than 0.95. Geographic mapping analysis reveals that the accessibility is concentrated in areas within and around downtown.
2. From the vertical perspective, the bike-sharing accessibility was not evenly distributed among different sociodemographic groups. Overall, the bike-sharing accessibility was higher for whites, Asians, non-Hispanic, male, middle- and upper-income classes, and people aged between 18 and 45 and over 65. However, the distributions change substantially with the accessibility level for some individual attributes, such as race, income level and age.

Box 7 Public Transport**Category:** Global South**Country/region:** Nairobi, Kenya, and Bangladesh**Project/study description:** Fried et al. (2020). Measuring the Sustainable Development Goal (SDG) Transport Target and Accessibility of Nairobi's Matatus.

Key findings: The urban Sustainable Development Goal (SDG) includes the target to provide "access to safe, affordable, accessible, and sustainable transport systems for all" by 2030. However, debate exists around the best indicator to measure this target, and few actual measurements exist. This is in part because basic transit data are missing from many of the world's cities, including in Africa where popular or "informal" systems dominate. This study explored how to make progress in measuring indicators for the SDG transport target using Nairobi's minibus system, matatus, as a case study. SDG indicator was partly measured for the city as currently defined by the UN and then compared the SDG measurement to a location-based accessibility indicator that incorporates income data, travel times, and land-use considerations for Nairobi's highly monocentric spatial urban form. It was found that although the SDG analysis suggests generally favourable transit coverage, it also points to underlying transport inequalities for low-income residents. The more fine-grained location-based accessibility analysis revealed rapidly decreasing accessibility to opportunities as distance increases from the city's central business district. This accessibility-based analysis further highlighted income-based transport inequalities, identifying opportunities for improving integrated transport for residents living on the city's near and far peripheries. Improving non-motorized transport access for those living in low-income areas with high access potential would also be important to improve access. The studies recommendations are that cities start using open-source software and open data to measure a variety of indicators needed for data-driven policy, to meet SDG 11.2 and go further to improve access to opportunities for all residents. Such metrics must involve careful contextual interpretation including consideration of land use, spatial dynamics, and the way existing transit systems work, even if "informal."; which can lead to a more complete picture of interventions with important impacts on creating equitable access for all. The need to scale up efforts to build data as infrastructure for planning and to plug critical holes in our transit, land-use, and population data, especially regarding disaggregated data on vulnerable groups as required by SDG 11.2. Future studies can build upon these findings by incorporating fare and affordability indicators into the accessibility analysis and exploring the impact of alternative transit access modes, like bicycling and motorcycle taxis, to better understand travel mode choice and multimodal connectivity. Finally, more work is needed to support important debates on the best global indicators to reach our goal of "inclusive, safe, resilient, and sustainable cities.

The suitable way of abstracting the impacts with Vanclay Social Impact Assessment was finding the impacts on health and wellbeing; culture; legal, personal, political, property rights, and Equity; community, social networks, and Institutions; peoples' way of living, environment, and convenience; material well-being; and fears and aspiration.

3.1.4. Externalities

Box 8 Externalities

Category: Global North

Country/region: United States of America

Project/study description: Yeganeh et al. (2018). A social equity analysis of the U.S. public transportation system based on job accessibility

Key findings: The study contributed on equity analyses of the U.S. public transportation system by including the 45 largest Metropolitan Statistical Areas (MSAs) in a single analysis. Year-2014 Census demographic data were combined with an existing 2014 dataset of transit job accessibility. Then, transit equality and justice indicators were developed, and a regression analysis was performed to explore trends in transit job accessibility by race and income. The findings suggested that within individual MSAs, low-income populations and minorities had the highest transit job accessibility. However, the overall transit ridership was low, and in certain MSAs with high transit job accessibility both high- and low-income populations had high access levels, but middle-income populations did not. Within individual MSAs, on average, accessibility differences by income were greater than accessibility differences by race. Except in certain MSAs, access to jobs using public transportation was generally higher for low-income and non-White populations, highlighting the attractiveness of public transportation for low-income and minority populations. In large MSAs, such as New York, Washington, DC, Chicago, and Houston, high-income deciles had relatively higher job accessibility levels, this highlighted that with respect to income and distance from the CBD in these specific MSAs the BGs closest to the city centre are often among the wealthiest in the metropolitan area and near low-income BGs. Most other MSAs followed a different pattern in which the high-income populations, who are mostly White and can afford a personal vehicle, tend to move towards suburbs and have lower job accessibility by transit. Our analysis demonstrated that income is an important variable; however, it is useful to include race, the percentage of White populations living in the area, and the percentage with limited English-speaking abilities in transit equity analyses to assess job accessibility patterns among BGs. In some MSAs, within low-income populations, there is a disproportionate difference in accessibility levels between those who live in predominantly White communities and those who live in predominantly non-White communities. Also, those with limited English-speaking ability seem to have significantly lower transit job accessibility in certain MSAs.

Box 9 Externalities**Category:** Global South**Country/region:** Ghana**Project/study description:** Asomani-Boateng et al. (2015). Assessing the socio-economic impacts of rural road improvements in Ghana: A case study of TSPS (II).

Key findings: Roads are the predominant mode of transport in African countries and a critical element for economic development. In Ghana, this reliance has led to major investments in road construction, including an initiative—the Ghana Transport Sector Program Support (TSPS)—that focuses on revitalizing rural economies and reducing poverty by prioritizing the improvement and maintenance of rural feeder roads. This case study approach assesses the socio-economic impacts of rural road improvements in Ghana. The study measured ex ante/ex post changes in household income and expenditures, crop production, the usage of motorized vehicles, access to markets, school and health facilities, and transport charges. The analysis revealed that road improvements led to dramatic growth in these indicators in the initial phase of the program, and slightly declining during the second phase. The change could be due to soaring fuel prices impacting freight and passenger charges. These findings suggest that Ghana should better coordinate road maintenance programs with the development of alternative fuels such as utilization of natural gas reserves of the Jubilee oil field, development of natural gas fuels and alternative fuel vehicles; hence limiting the vulnerability of transport to petroleum market fluctuations. The impacts of road development projects are positive and negative benefits. The positive impacts significantly contribute to economic growth and improvement in the standard of living of beneficiary communities. The negative impacts inhibit economic growth and improvement in living standards. Rural roads in LICs are often seen as the least important in transport system, though providing access for countless rural communities. The poor conditions of rural roads coupled with higher petroleum prices, affect accessibility to education, primary health care, potable water supply, local markets, and other social and economic opportunities. Poor road conditions also penalize households in the cash and food crop farming, non-farm employment opportunities, and access to social services. Road improvements signify progress and must be considered in a holistic fashion, involving decisions within a geographic, economic, and environmental context as well as various facets of government to respond to the needs of its constituents.

3.1.5. Active Travel

Box 10 Active travel

Category: Global North

Country/region: United States of America

Project/study description: Ragland and Orrick (2011) reviewed transport policies and programs in the USA promoting public health. A set of these policies and programs focuses on enhancing community design to promote safe and active transport, resulting not only in increased physical activity, but also in reduction of car use.

Key findings: The review identifies 15 policies grouped in four themes: 1) Provide better connectivity for pedestrians and bicyclists, 2) Increase investments in infrastructure that supports active transportation, 3) Consider the needs of all road users in planning and design standards and 4) Make public transit easier to use for pedestrians and bicyclists.

Box 11 Active travel and NMT infrastructure

Category: Global South

Country/region: Africa

Project/study description: Loo and Siiba (2019) developed a strategic framework to guide national active travel policy formulation and administration in African countries. The framework was used to reviewing existing active travel and non-motorised transport policy strategy in the continent, comprising the following countries: Ghana, Kenya, Malawi, Rwanda, Nigeria, South Africa, and Uganda. The framework is structured according to nine components: 1) policy vision, 2) policy objectives, 3) intended outcomes, 4) action plan, 5) monitoring and evaluation, 6) research and development, 7) quantitative modelling, 8) institutional framework and 9) funding.

Key findings: Results indicate that overall, all seven African countries have taken commendable steps towards active travel improvements both at the urban and rural levels, especially Kenya, Nigeria, and Uganda. On the other end, all countries are struggling in the policy implementation strategic components. Overall, countries with specific active travel policies performed better compared to those with general transport policies covering active travel.

3.1.6. Vulnerable groups

Box 12 Vulnerable groups

Category: Global North

Country/region: United Kingdom

Project/study description: By exploring transport barriers in low-income neighbourhoods in England and Scotland, Crisp et al. (2018) investigated how transport inequalities affect job opportunities in Harpurhey (Manchester), Hattersley (Tameside), Seacroft (Leeds), Dewsbury Moor (Kirklees), Port Glasgow (Inverclyde) and Castlemilk (Glasgow).

Key findings: Transport is identified as one of the major barriers to work and job opportunities because of the associated constraining perceptions of viable commutes, especially due to issues around the availability, reliability, and affordability of public transport. This creates 'cut off commuter zones' in some areas of major cities, due to the reluctance of commuting by public transport. On the other end, the ability to drive or access to private transport can increase commuting options and flexibility, but this is strongly associated with vehicle ownership and affordability to run a car. The report identifies a set of policy recommendations, calling for strategic and coordinated actions in terms of mobility needs of low-income users, more accessible system through technology (for information mainly), spatial planning framework and tools and integration between transport and employment policies.

Box 13 Vulnerable groups

Category: Global South

Country/region: South Africa

Project/study description: Jennings et al. (2022) developed a policy assessment tool for gender mobility, using South Africa as case study. The tool identifies 31 measures grouped into 10 topics: 1) Integrated transport planning and user needs, 2) Gender mainstreaming, 3) Personal security, 4) Road safety, 5) Knowledge sharing and co-ordination, 6) Data collection and analysis, 7) Women as transport workers, 8) Infrastructure and access, 9) Social and environmental impact, and 10) Stakeholder engagement and consultation.

Key findings: Analysis of existing policies led to the identification of five action-based themes to address the gaps in gender and mobility in South Africa: 1) Actively engage and consult women as stakeholders, 2) Institutionalise gender in transport planning and transversal government coordination, 3) Collect gender-response and disaggregated data, 4) Develop gender-responsive infrastructure and operations, 5) Develop gender and mobility indicators and knowledge-sharing protocols.

Box 14 The Kenyan case study on Social Equity and Social Accessibility for People with Disability in Nairobi, Kenya.

Category: Global South

Country/region: Kenya

Description: In order to increase the impact of the PIARC's special project on Social Equity and Social Accessibility in global transport systems, an online workshop was organised specifically for the transport of people living with disabilities (PWDs) in Nairobi, Kenya. The workshop took place on the 25th of July 2023 in collaboration between the University of Birmingham and the Kenya National Highways Authority (KeNHA), with support from PIARC and IRF-Geneva. It also attracted contributions from the Kenya Rural Roads Authority (KeRRA), Kenya Urban Roads Authority (KURA), Nairobi Metropolitan Areas Transport Authority (NaMATA), National Transport Standard Authority (NTSA), NGOs and other stakeholders in the Kenyan transport systems. The workshop attracted 462 registrations from 48 countries from whom 231 participated live in the workshop.

Key findings: The workshop presented the findings of the paper that will be presented in the 27th World Road Congress, in Prague, Czech Republic. These highlighted the main challenges faced by PWDs in Kenyan transport systems, including poor or non-existing bus stations, poor service by transport operators, and generally lack of inclusive transport systems. The main finding was that there exist different social equity and social accessibility issues faced by PWDs in Kenyan roads. These need to be addressed at the levels of transport planning, design, construction, and operations. Furthermore, there is need for advocacy by stakeholders and entire community. To this end, it was recommended to install an inter-institutions committee for PWDs needs on projects in KeNHA, KURA, KeRRA, NaMATA, and NTSA to remove inconsistencies in social equity and social accessibility measures between institutions / rural and urban areas. More effort is needed on policies implementations.

3.2. QUESTIONNAIRE FINDINGS

3.2.1. Sample

The questionnaire was circulated to key stakeholders identified through purposive sampling during a four-month period (20th February and 30th June 2023). A total of 54 participants completed the questionnaire, with representation from 28 countries. Figure 3 provides an overview of geographical representation of participating countries³.

³ Australia, Austria, Belgium, Benin, Brazil, Bulgaria, Canada, China, Croatia, Ethiopia, Gambia, Iran, Italy, Kenya, Mexico, Netherlands, New Zealand, Romania, Sierra Leone, South Africa, South Korea, Spain, Switzerland, Thailand, Turkey, Uganda, United Kingdom, United States.



Figure 3: Survey participant country

To support analysis of findings across country types, the project utilises the World Bank country lending groups classification for the current 2023 fiscal year. According to this classification⁴:

- **Low-income countries** (LICs) are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,085 or less in 2021;
- **Lower middle-income countries** (Lower-MICs) are those with a GNI per capita between \$1,086 and \$4,255;
- **Upper middle-income countries** (UMICs) are those with a GNI per capita between \$4,256 and \$13,205;
- **High-income countries** (HICs) are those with a GNI per capita of \$13,205 or more.

An overview of countries who participated in the questionnaire is provided in footnote 3.

Participants were drawn from a range of organisations to capture the perspectives of different stakeholders engaged in initiatives to support equity and accessibility objectives. Below we provide a list of organisation types, the numbers of respondents drawn from that type and the % of respondents that this represents.

- | | |
|--|-------------------------|
| • National Road Administration | 19 (35% of respondents) |
| • Research institute | 7 (13%) |
| • Regional or local road or transport administration | 6 (11%) |
| • Private engineering or consultant company | 5 (9%) |
| • National Transport Administration | 4 (7%) |
| • University | 4 (7%) |
| • Other private entity | 3 (6%) |
| • Construction company | 2 (4%) |
| • International organisation | 2 (4%) |
| • Other public administration | 2 (4%) |

⁴ For classification see <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

Participant roles in public policy were split across three areas including defining, applying, and reforming public policy with the majority of respondents reporting that they were involved in defining public policy (57%) (Figure 4).

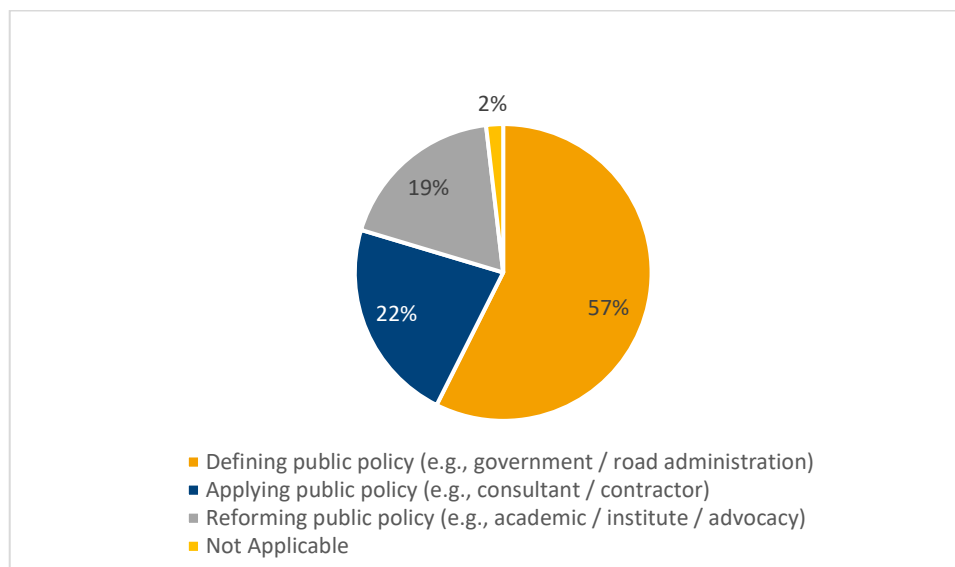


Figure 4: Organisations role in public policy

Questions utilised in the questionnaire were designed to generate illustrative examples and descriptive statistics of how countries at different income levels approach issues of social equity and equity and to draw out indicative similarities and differences.

For the purpose of this questionnaire, social equity and social accessibility are defined as follows:

- **Social equity** is described as road management practices and policies that ensure a consistent and systematic fair and just road transport system in aspects including fair and just mobility, access to road transport system, and allocation of the costs for road infrastructure and road transport to meet the needs of different road users and citizen.
- **Social accessibility** refers to the attribute of transportation infrastructure systems that enables mobility being able to be reached or obtained with affordable effort in terms of cost and time, and within different users' contexts of physicality, location, economic, social, gender, and age amongst others.

Regarding equity, we consider two different types: 1) Horizontal equity assumes that people with similar needs and abilities should be treated similarly; 2) Vertical equity assumes that disadvantaged people should receive favourable treatments.

3.2.2. Finance

The financing of the road sector varies across country contexts. To explore differences and similarities, participants were asked questions about fuel tax, toll road usage and allocation of funds across urban, peri-urban, and rural areas. These questions were intended to capture broad differences and similarities between country types in terms of approaches to road sector funding and associated debates within country.

To explore how initiatives in the road sector were funded, participants were asked "How are taxes on fuels allocated in your country?" Responses to the question varied across country income groups. In LICs and Lower MICs the majority of respondents reported that "A share of the taxes on

fuels are directly allocated to the road sector” (83% for LICs and 82% for Lower-MICs) (Figure 5). Responses from UMIC and HIC participating countries were more mixed, suggesting a more diversified approach to tax fuel allocation. For UMICs and HICs, responses were as follows “None of the taxes on fuels are directly allocated to the road sector” (23% for UMICs and 44% for HICs), “A share of the taxes on fuels are directly allocated to the road sector” (38% and 33%) and “All the taxes on fuels are directly allocated to road sector” (31% UMICs and 17% for HICs). The remainder of responses reported being unsure as to how taxes on fuels were allocated (8% for UMICs and 6% for HICs).

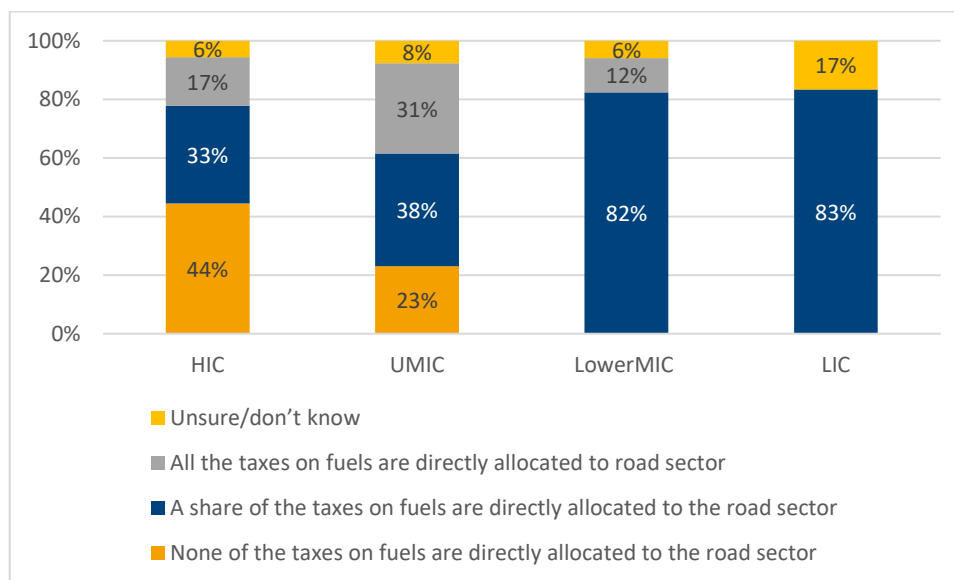


Figure 5: How are taxes on fuels allocated in your country?

To explore whether there existed debates regarding the use of road taxes to fund non road sectors initiatives, participants were asked “Is there any debate in your country about the equity of road users funding through taxes on fuels your country needs outside the road sector?” Across all responses 61% of participants reported that there was no debate and 39% that there was. When findings are disaggregated according to income status, findings suggest that there was more likely to be some debate in LICs and HICs (50% of respondents in LICs and 56% in HICs reported there was debate). In contrast 77% of responses from UMICs and 71% from Lower-MICs reported that there was no debate in their countries of operation (Figure 6).

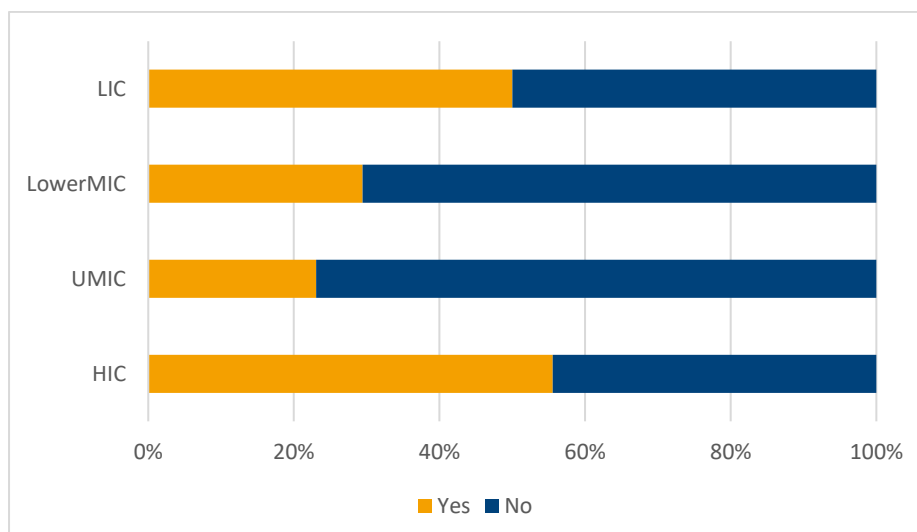


Figure 6: Is there any debate in your country about the equity of road users funding through taxes on fuels your country needs outside the road sector?

The use of toll roads to finance road initiatives was explored via two questions. Firstly, “Are the inter-urban expressways of your country toll roads paid by the user?” Responses are presented in Figure 7. Responses suggest that toll roads were less prevalent in HICs and LICs than in UMICs and Lower-MICs. According to responses, 61% of HIC and 67% of LIC participants reported that either none or a minority of inter-urban express ways were toll roads. This can be contrasted with responses from UMICs (77%) and Lower-MIC (82%) that reported that most or all expressways were toll roads. Secondly, participants were asked, “Does your country use shadow toll roads (paid by the government to private concessionaire, not by the user) or roads paid by the country on availability of service to the concessionaire country (free for the road user)?” Responses are presented in Figure 8. Across all responses 76% of respondents reported that shadow toll roads were not used compared to 24% who said they were. Findings suggest that whilst uncommon, the use of shadow toll roads is more likely to be found in HICs (45% of respondents from HICs reported yes) and UMICs (46%).

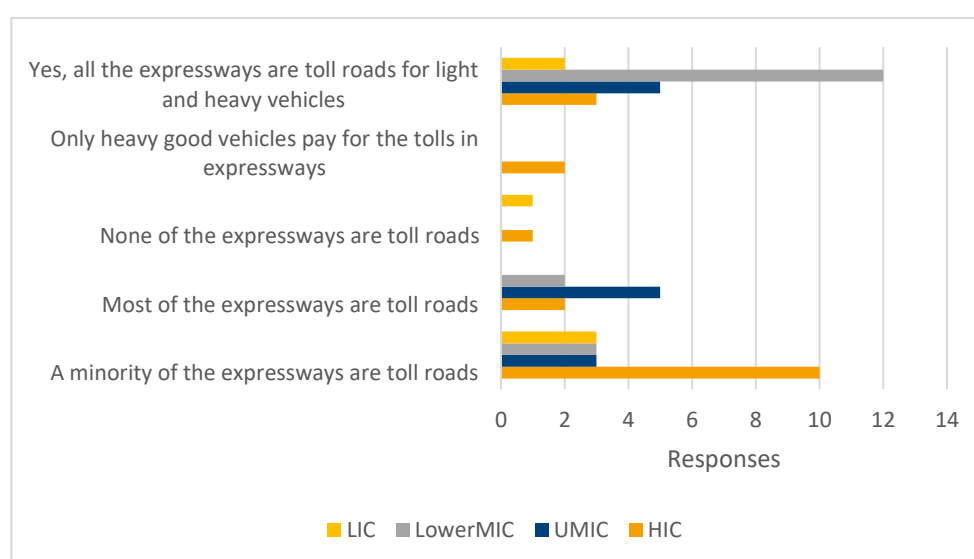


Figure 7: Are the inter-urban expressways of your country toll roads paid by the user? (LEFT) & does your country use shadow toll roads, or roads paid by the country on availability of service to the concessionaire country?

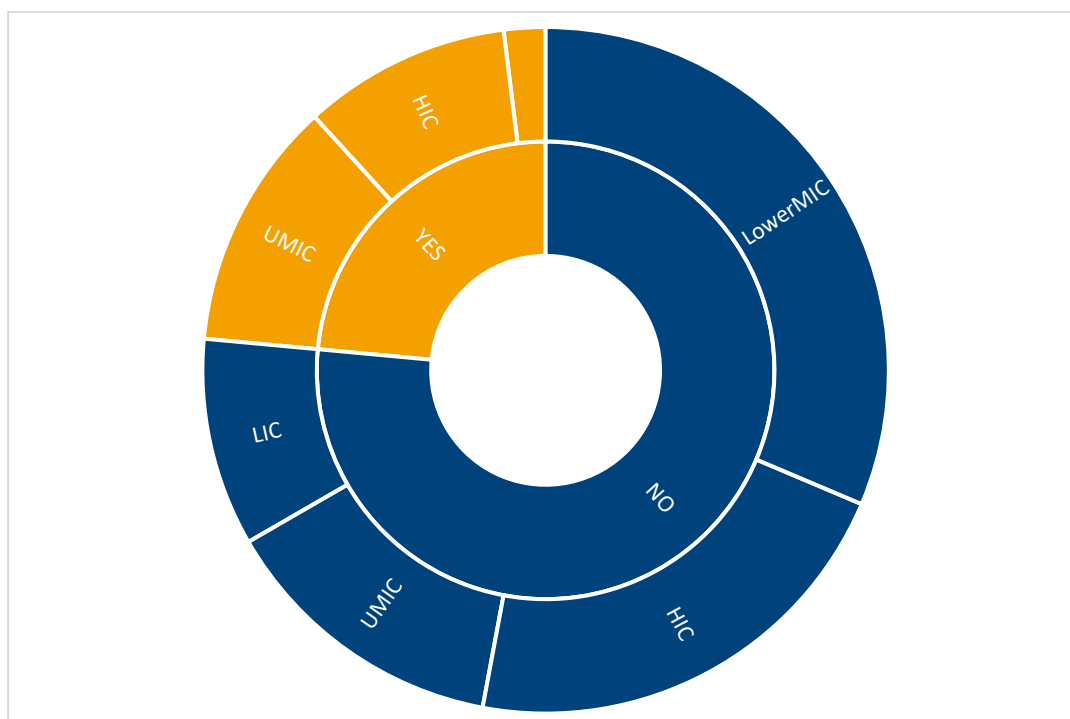


Figure 8: Does your country use shadow toll roads or roads paid by the country on availability of service to the concessionaire country?

To further explore the financing of the road sector, participants were asked, “Does your country fund the road sector via sources of income other than fuel taxes or tolls?” Respondents from across all country income groups reported affirmatively (93%), with 39% reporting “yes, through annual tax on each vehicle (euro-vignette or similar)” and 54%, “yes (other)” (Figure 9).

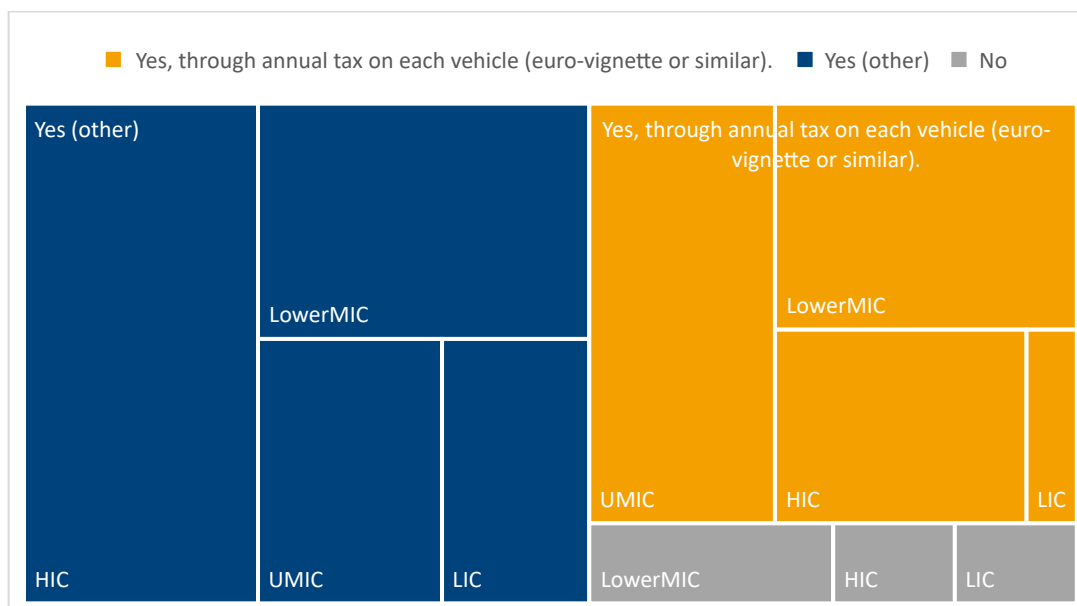


Figure 9: Does your country fund the road sector via sources of income other than fuel taxes or tolls?

Finally, to ascertain how mobility needs are funded across urban, peri-urban, and rural domains, respondents were asked to reflect on the following statement, “In most countries, urban transport is heavily subsidised, while rural mobility and peri-urban mobility (excluding access to city centres) relies mostly on road use through private cars. Is there any equity debate in your country about

land use and transport in urban areas, peri-urban areas, and rural areas?." Across all responses, 37% reported yes and 63% no. Debate was more commonly reported in HICs (50% of responses) and UMICs (38%), where as in Lower-MICs (24%) and LICs (33%) debate was less common (Figure 10).

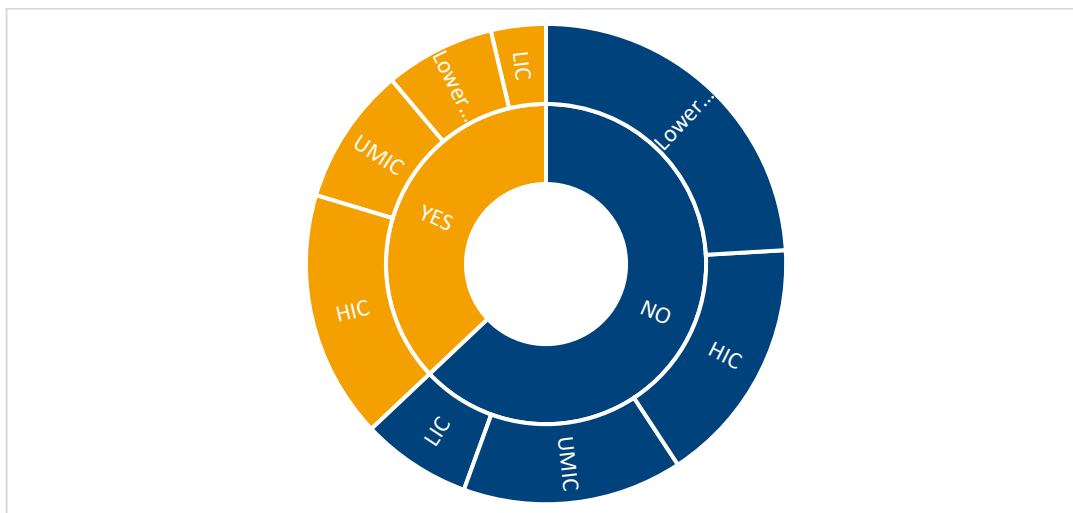


Figure 10: Is there any equity debate in your country about land use and transport in urban areas, peri-urban areas, and rural areas?

3.2.3. Organisational context

Lack of transport, or inability to afford costs can limit access to services and markets. To explore this issue, respondents were asked, "Does your organisation identify and categorise communities or social categories that may be negatively impacted by equity and access issues?" Responses across all participants were mixed, 49% commented yes and 51% no. In terms of income country groups, 50% of HICs, 69% of UMICs, 19% of Lower-MICs and 83% of LICs responded yes (Figure 11).

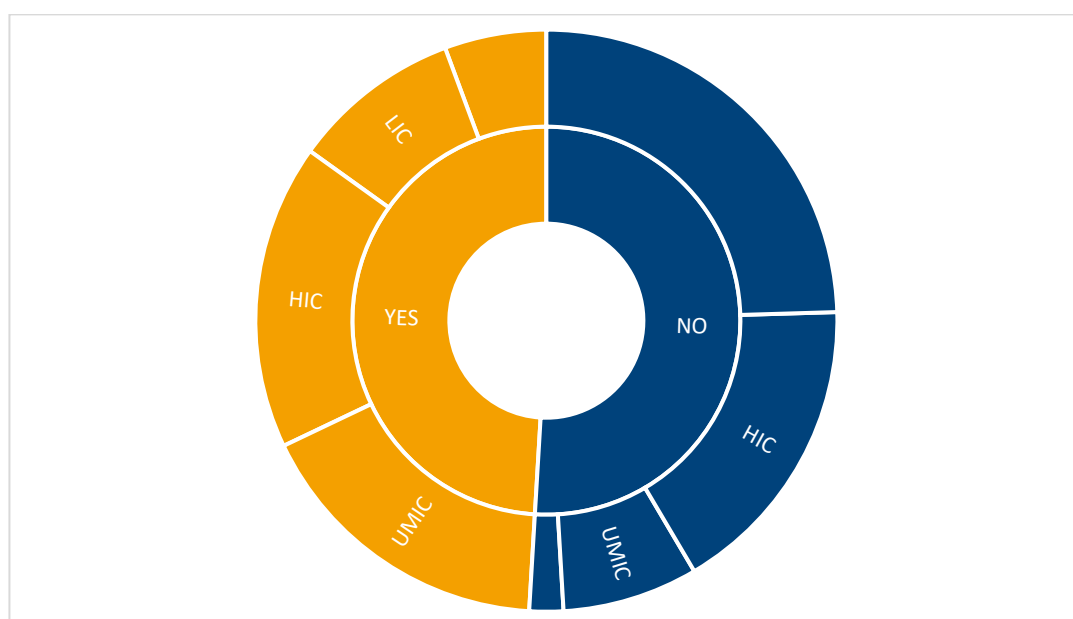


Figure 11: Does your organisation identify and categorise communities or social categories that may be negatively impacted by equity and access issues?

More specifically, participants involved in the questionnaire were asked “Does your organisation have policies that improve access to affordable modes of transport and or subsidise low-income travellers?” Of the questionnaire respondents, only 32% responded yes. Interestingly, participants from LICs were the most likely to report that policies had been developed to improve access with 67% reporting yes. In contrast, responses of yes for HICs (39%), UMICs (38%) and Lower-MICs (6%) were low (Figure 12).

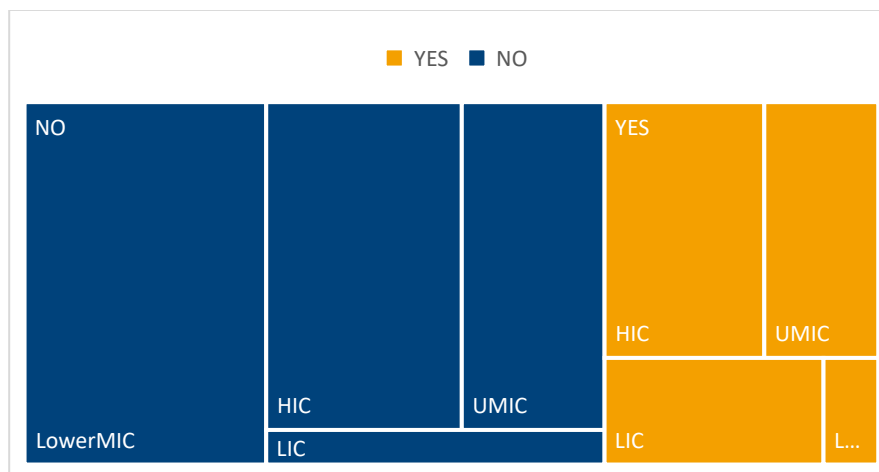


Figure 12: Does your organisation have policies that improve access to affordable modes of transport and or subsidise low-income travellers?

To ascertain whether there was an active debate regarding transportation costs and conditions of commuters in respondent countries, participants were asked, “Is there any debate in your country about the transportation costs and conditions of commuters?” The majority of respondents reported that there was a debate, 61% of responses including 72% of responses by participants from HICs, 62% from UMICs and 83% from LICs. Of participants from Lower-MICs, only 41% reported an active debate (Figure 13). To probe this issue more specifically, participants were asked, “Is there any debate in your country about the transportation costs and conditions specifically of low-income commuters?” Responses to this question were equally split with 50% indicating yes and no. Of those that reported that there was an active debate, this included 61% of responses by participants from HICs (46% from UMICs and 66% from LICs). Of participants from Lower-MICs, only 35% reported an active debate (Figure 14).

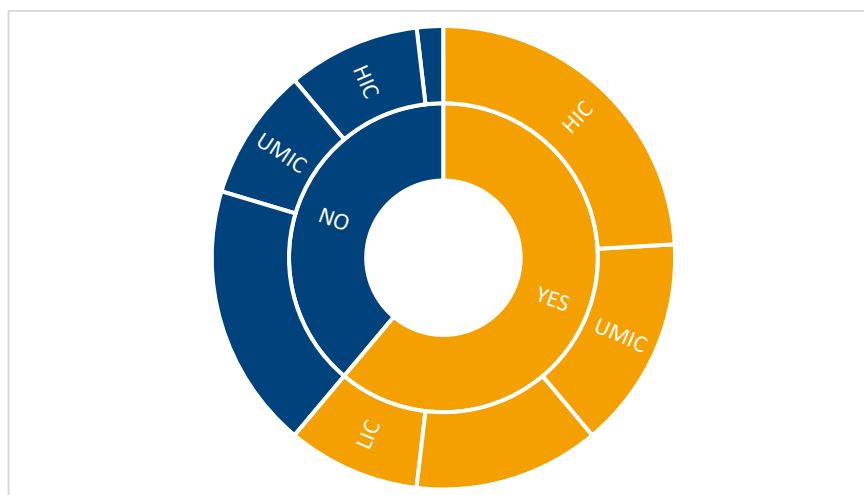


Figure 13: Is there any debate in your country about the transportation costs and conditions of commuters?

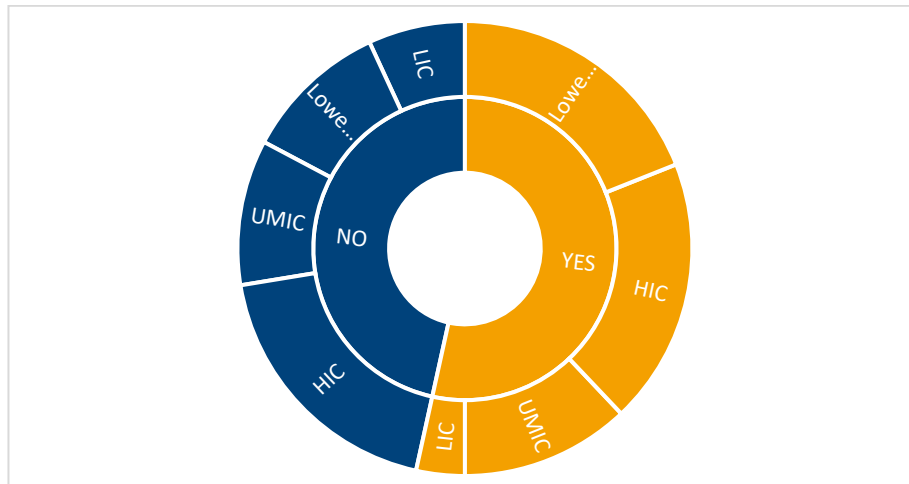


Figure 14: Is there any debate in your country about the transportation costs and conditions specifically of low-income commuters?

3.2.4. Approaches to social equity and accessibility

To explore approaches to social equity and accessibility, a series of questions were posed to explore various aspects of these broad themes. These were based on an acknowledgement that there are various types of equity.

Horizontal equity (HE) assumes that people with similar needs and abilities should be treated similarly.

- **A fair share of resources (also called fairness or equality).** It concerns public resource allocation and implies that people should generally “get what they pay for and pay for what they get.”
- **External costs.** Costs that travel activities impose on other people, such as the delay, risk, and pollution, are unfair. Fairness requires minimizing or compensating for such impacts.
- **External benefits.** Benefits of transport infrastructure or services offered to the population and economy in exchange of a public investment or a direct cost to the road users or taxpayers.

Vertical equity (VE) assumes that disadvantaged people should receive favourable treatments:

- **Inclusivity - vertical equity with regard to need and ability.** This considers how transportation systems serve people with disabilities, youths and seniors, and other special mobility needs. It justifies multimodal planning and universal design requirements.
- **Affordability - vertical equity with regard to income.** This considers how transportation systems affect lower-income people. Policies that favour lower-income people are called progressive and those that favour higher-income people are called regressive. It justifies policies that improve affordable modes and subsidize low-income travellers.
- **Social justice.** This considers how transportation systems serve disadvantaged and underserved groups and address structural injustices such as racism and sexism.
- **Local subsidies.** Subsidies to certain communities deserved solely by a toll road or transport service paid by the user.

To provide a sense of how approaches to vertical and horizontal equity differ across country income groups, participants were asked to reflect on “Whether their organisation consider any of the

following types of vertical and horizontal transportation equity in road planning processes?” Responses are presented as radar charts, Figures 15-19, to visually illustrate where approaches were clustered.

- For HICs, the dominant focus was on vertical equity – inclusivity.
- For UMICs, the dominant focus was on horizontal equity – external costs.
- For Lower-MICs, the dominant focus was on horizontal equity – external benefits.
- For LICs, the dominant focus was on horizontal equity – external benefits.

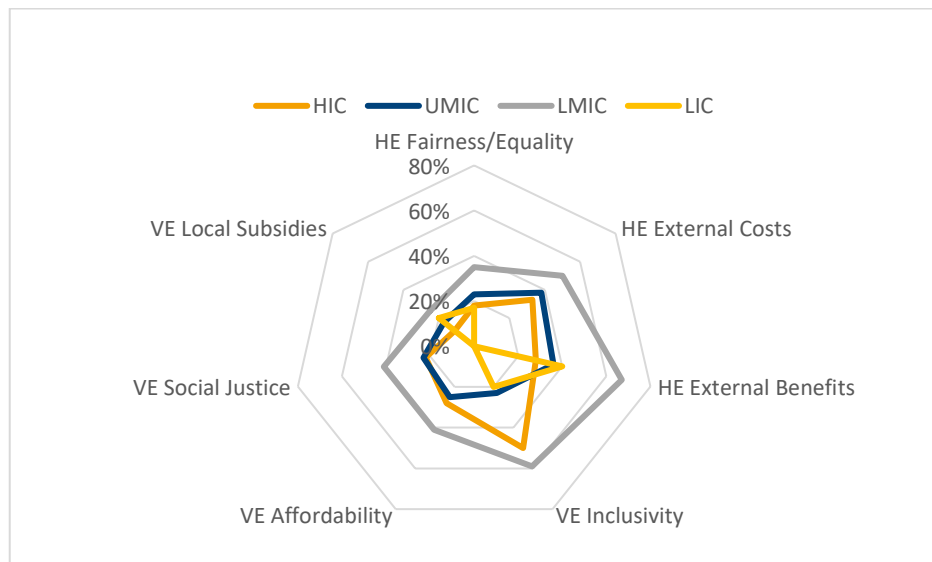


Figure 15: Approaches to social equity

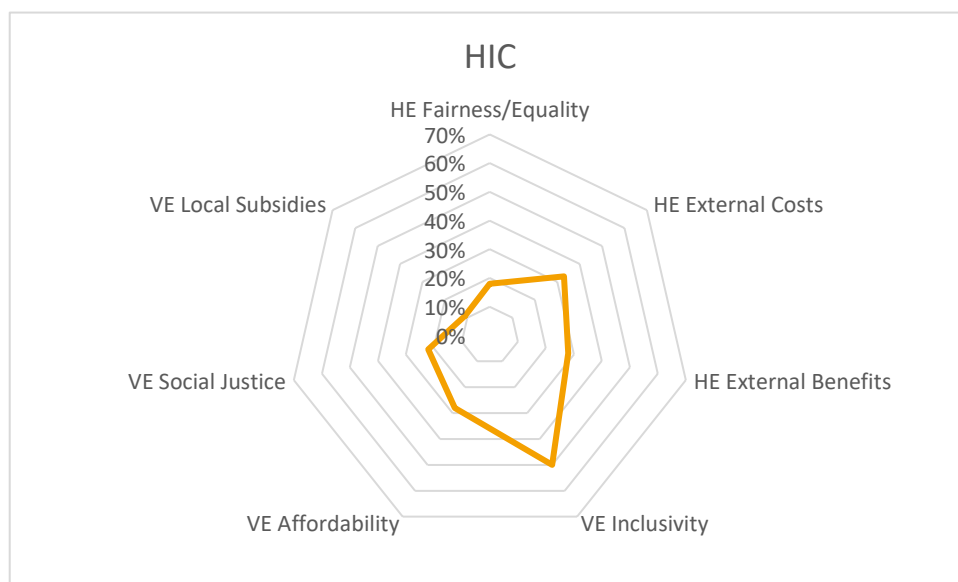


Figure 16: HIC- HE Fairness/Equality

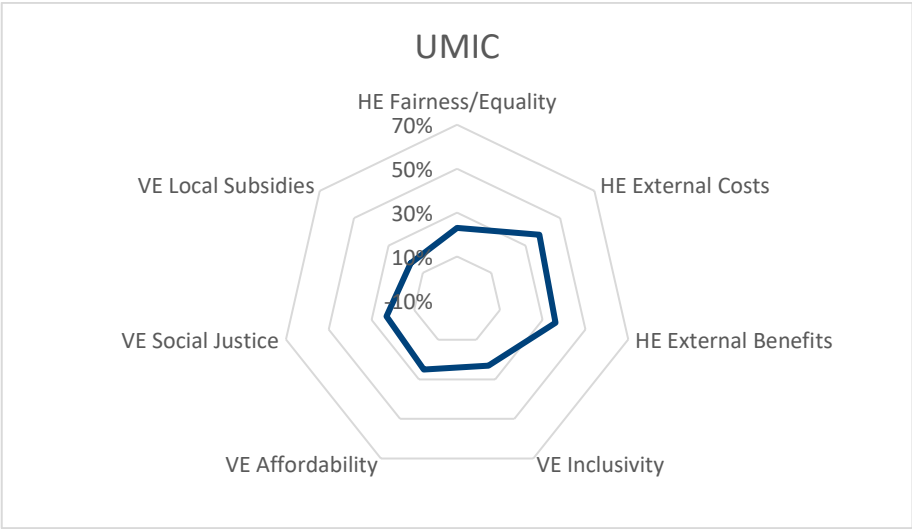


Figure 17: UMIC- HE Fairness/Equality

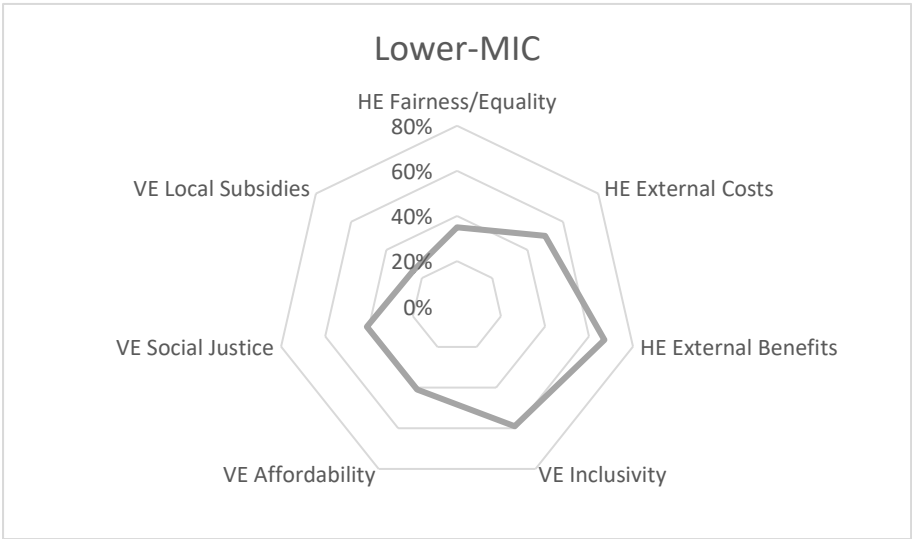


Figure 18: Lower-MIC- HE Fairness/Equality

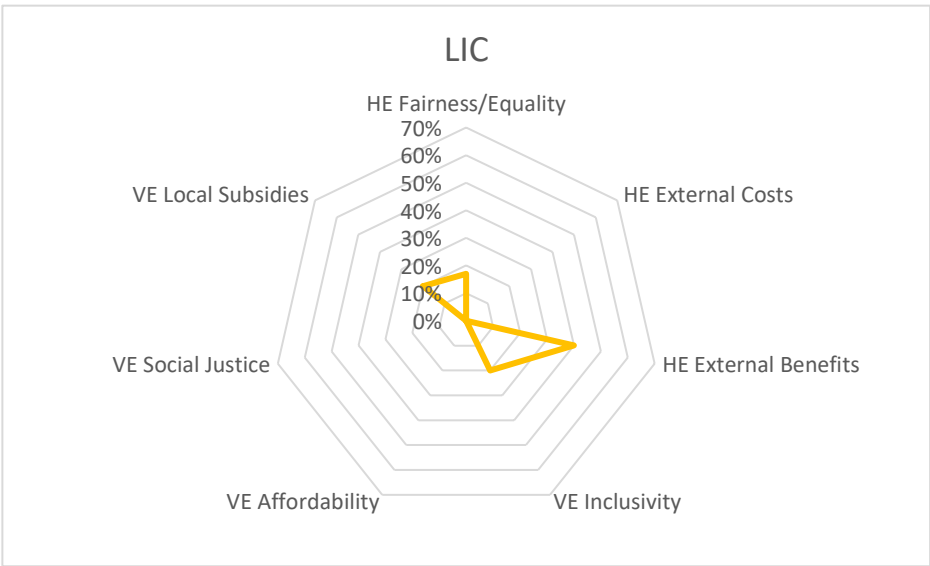


Figure 19: LIC- HE Fairness/Equality

3.2.5. Funding of equity and accessibility objectives

To explore approaches to financing equity in transport policy, participants were asked to reflect on the following question “Does your organization consider how the transport system is funded and how it should be funded, in terms or taxes, allocation of taxes, establishment of toll roads, etc?” Interestingly, such considerations were more prevalent in LICs (60% of respondents indicated yes) and Lower-MICs (47%) compared to UMICs (31%) and HICs (22%) (Figure 20).

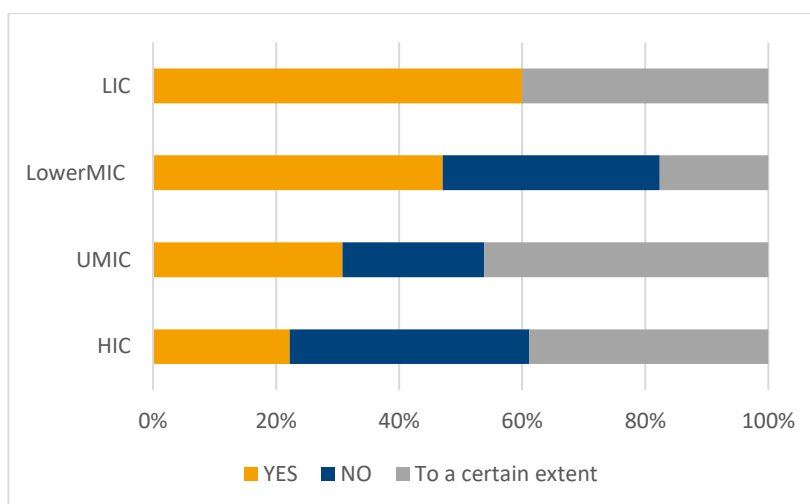


Figure 20: Does your organisation consider how the transport system is funded and how it should be funded?

To explore how access and equity objectives are funded, participants were asked, “Does your organisation consider social equity or accessibility objectives as an element of capital expenditure (CAPEX) assessments?” And “Does your organisation consider social equity or accessibility objectives as an element of operational expenditure (OPEX) assessments?” Across all income groups, 67% of respondents stated that their organisation **DID NOT** consider social equity or accessibility objectives as an element of capital expenditure (CAPEX) assessments. In terms of country income groups, only 39% of respondents from HICs, 31% from UMICs, 24% from Lower-MICs and 50% from LICs reported that they **DID** consider social equity or accessibility objectives as an element of CAPEX assessments (Figure 21).

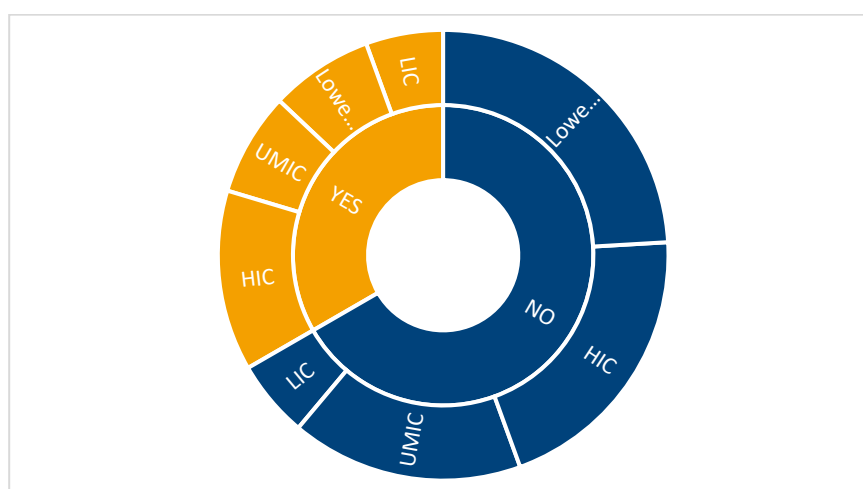


Figure 21: Does your organisation consider social equity or accessibility objectives as an element of CAPEX assessments?

In response to the question, “Does your organisation consider social equity or accessibility objectives as an element of operational expenditure (OPEX) assessments?” Across all income groups, 72% of respondents stated that their organisation DID NOT consider social equity or accessibility objectives as an element of operational expenditure (OPEX) assessments. In terms of country income groups, 28% of respondents from HICs, 23% from UMICs, 24% from Lower-MICs and 50% from LICs reported that they DID consider social equity or accessibility objectives as an element of OPEX assessments (Figure 22).

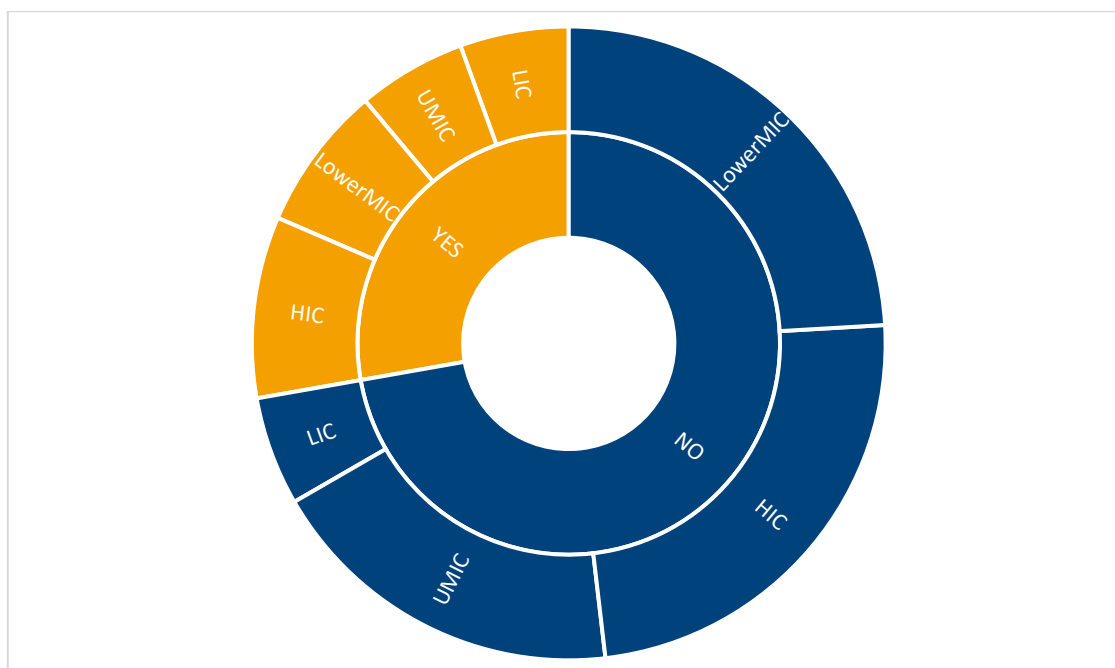


Figure 22: Does your organisation consider social equity or accessibility objectives as an element of OPEX assessments?

3.2.6. Planning processes for equity and accessibility

To better understand how social equity and accessibility objectives are incorporated into organisational planning processes, a series of questions were asked regarding impacts, metrics, and groups.

Equity analysis can consider various, impacts, this can include the following broad areas:

- **Facilities and Services:** Funding and subsidies; Planning and design; Involvement in planning.
- **User benefits and costs:** Costs and affordability; Service quality (convenience, comfort, speed, safety); Fares, fees, and taxes.
- **External Impacts:** Congestion delays; Crash risk; Noise and air pollution.
- **Economic Impacts:** Economic opportunities; Job and business impacts.
- **Regulation and Enforcement:** Regulations and enforcement.

Respondents were asked, “When assessing equity, does your organisation consider any of the following impacts in your planning processes?” (Figure 23).

For HICs the primary focus according to respondents was on external impacts, reported by 56% of HIC respondents followed by facilities and services (44%).

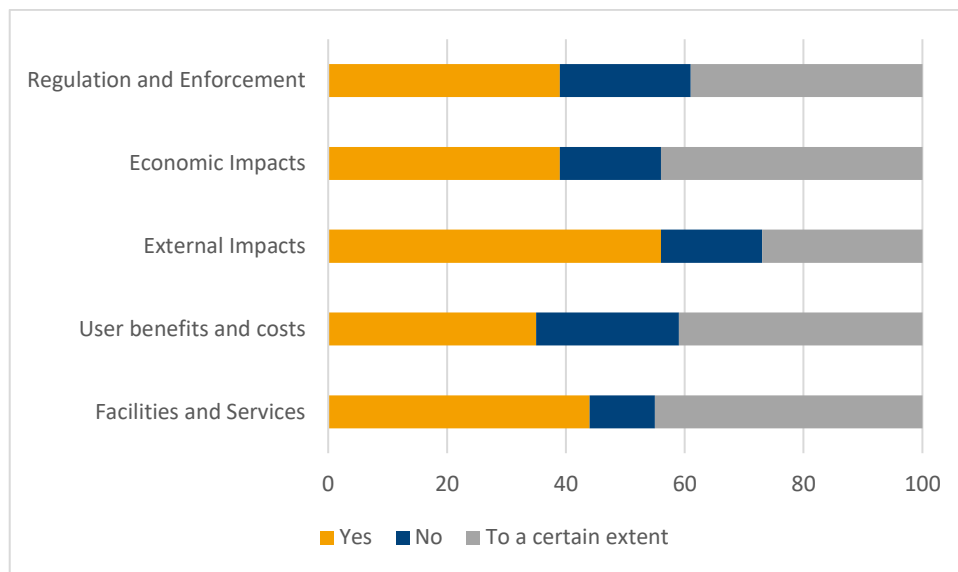


Figure 23: When assessing equity does your organisation consider any of the following impacts in your planning processes (HIC)

For UMICs the focus according to respondents was mixed with economic impacts reported by 50% of UMIC respondents followed by facilities and services, regulation, and enforcement (both with 46%) (Figure 24).

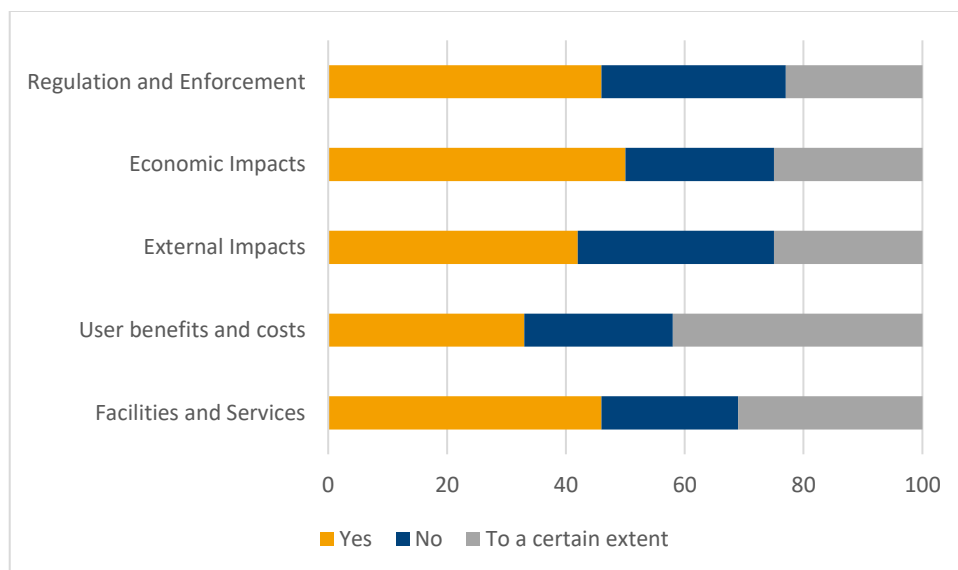


Figure 24: When assessing equity does your organisation consider any of the following impacts in your planning processes (UMIC)

For Lower-MICs the primary focus according to respondents was on regulation and enforcement reported by 76% of Lower-MIC respondents followed by economic impacts (71%) (Figure 25).

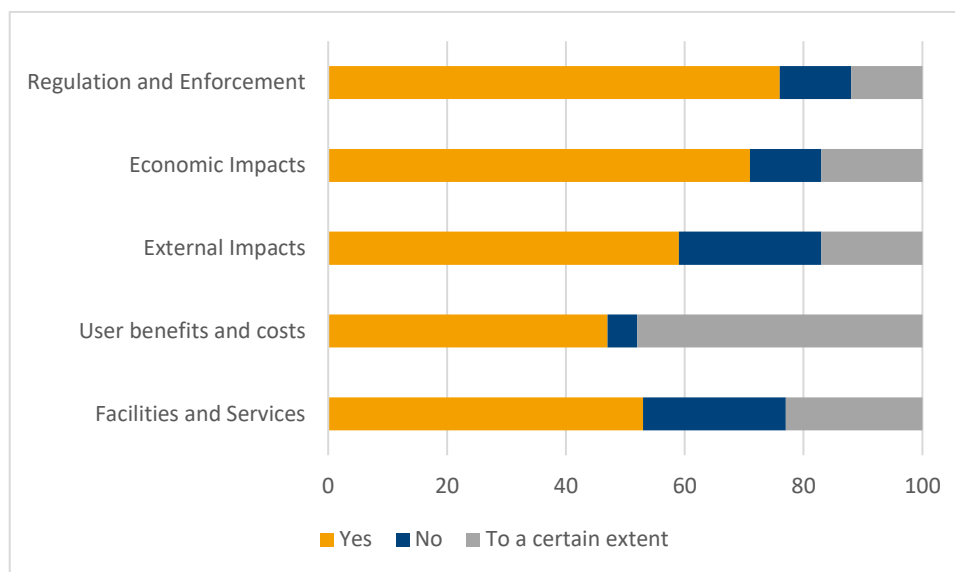


Figure 25: When assessing equity does your organisation consider any of the following impacts in your planning processes (Lower-MIC)

For LICs the primary focus according to respondents was on economic impacts reported by 100% of LIC respondents followed by external impacts (80%) (Figure 26).

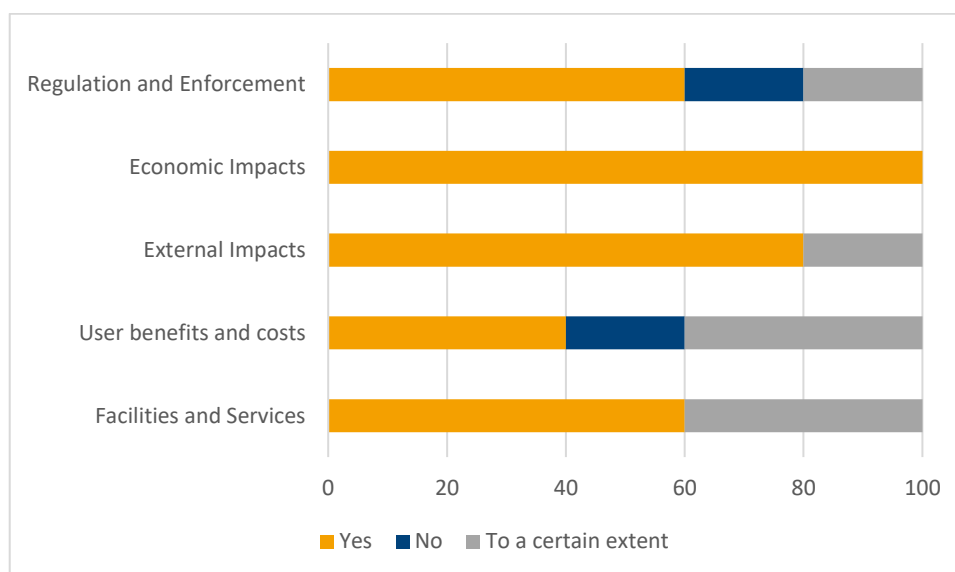


Figure 26: When assessing equity does your organisation consider any of the following impacts in your planning processes (LIC)

Equity analysis can consider various metrics. This can include the following broad areas:

- **Level of Impacts:** Inputs (funding, road space, etc.); Outputs (amount of mobility and accessibility); Outcomes (destinations accessed, cost burdens, crash casualties, etc.).
- **Units of People:** Per person, household, commuter, or peak-period travel.
- **Units of travel Per vehicle-mile/km:** Per passenger-mile/km. Per trip (by type).
- **Financial Per dollar:** Subsidies. Cost recovery.

For HICs the primary focus according to respondents was on level of impacts reported by 69% of HIC respondents followed by units of people (63%) (Figure 27).

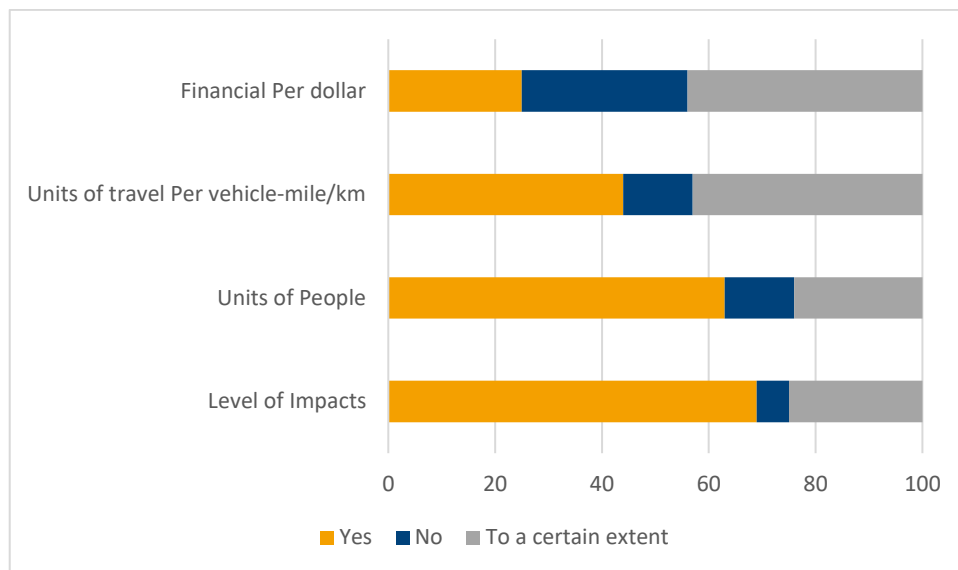


Figure 27: When assessing equity does your organisation consider any of the following metrics in your planning processes (HIC)

For UMICs the primary focus according to respondents was on units of travel per vehicle-mile/km reported by 54% of UMIC respondents followed by financial per dollar (50%) (Figure 28).

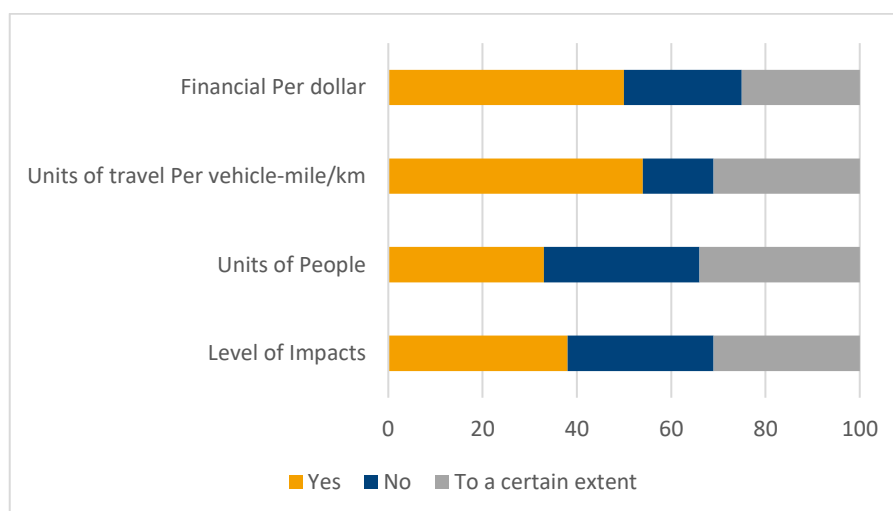


Figure 28: When assessing equity does your organisation consider any of the following metrics in your planning processes (UMIC)

For Lower-MICs the primary focus according to respondents was on level of impacts reported by 71% of Lower-MIC respondents followed by units of travel per vehicle-mile/km (47%) (Figure 29).

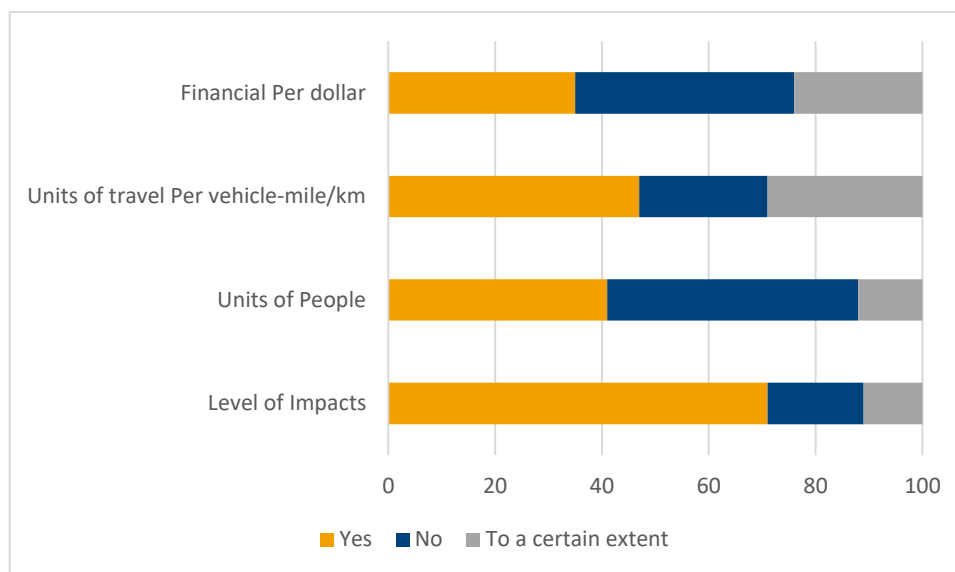


Figure 29: When assessing equity does your organisation consider any of the following metrics in your planning processes (Lower-MIC)

For LICs the primary focus according to respondents was on units of travel per vehicle-mile/km reported by 60% of LIC respondents followed by level of impacts and units of people (both 40%) (Figure 30).

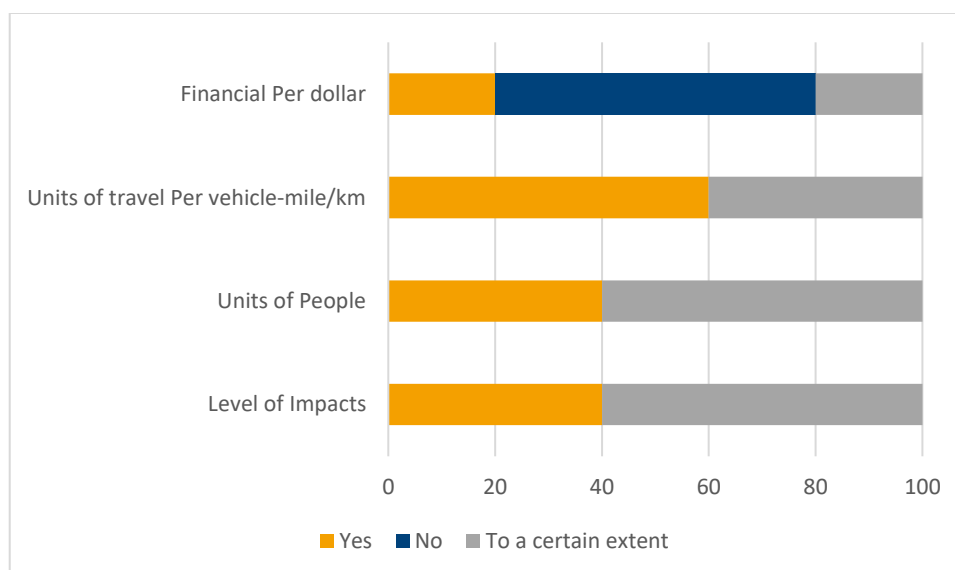


Figure 30: When assessing equity does your organisation consider any of the following metrics in your planning processes (LIC)

Equity analysis can consider various groups. This can include the following broad areas:

- **Demographics:** Age and household type. Physical and cognitive ability. Income and poverty. Race and ethnicity.
- **Location:** Jurisdiction and neighbourhood. Urban/suburban/rural.
- **Mode:** Active (walking & bicycling). Vehicle ownership & licensure. Transit user/dependent.
- **Industries:** Equipment/service providers. Shippers and Employees.
- **Trip type:** Commutes and errands. Commercial/freight. Recreational/tourist.

For HICs the primary focus according to respondents was on location, mode and trip type reported by 53% of HIC respondents followed by industries (47%) (Figure 31).

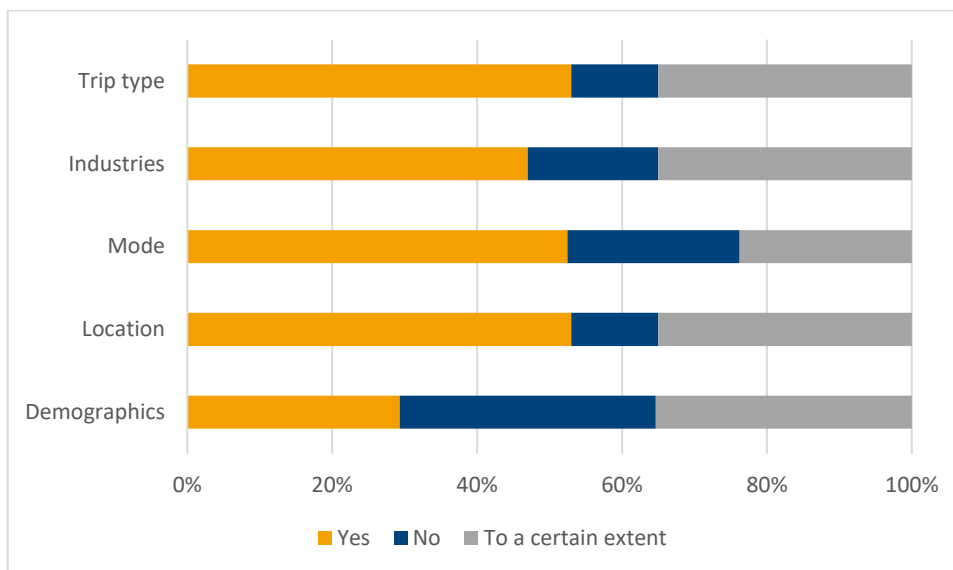


Figure 31: When assessing equity does your organisation consider any of the following groups in your planning processes (HIC)

For UMICs the primary focus according to respondents was on trip type by 50% of UMIC respondents followed by location (46%) (Figure 32).

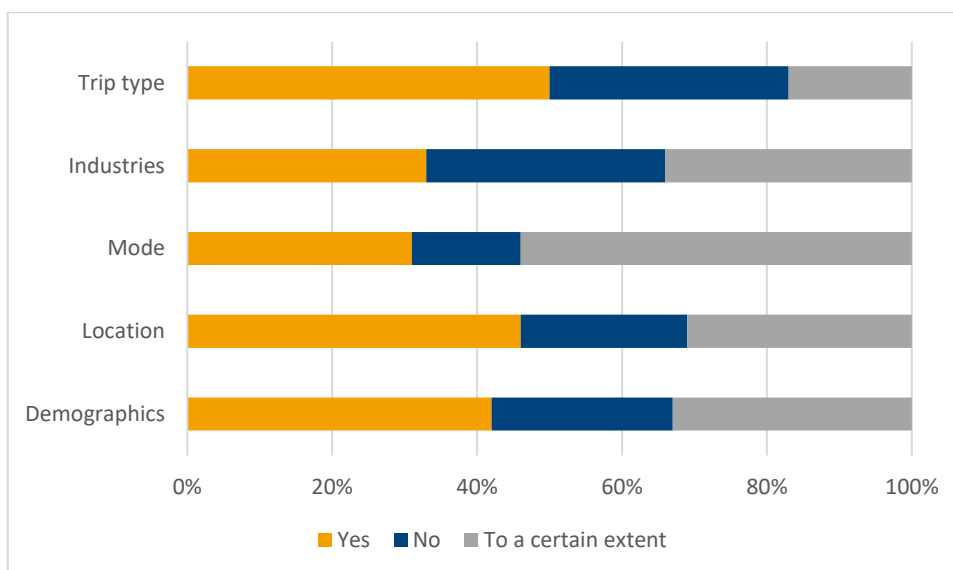


Figure 32: When assessing equity does your organisation consider any of the following groups in your planning processes (UMIC)

For Lower-MICs the primary focus according to respondents was on location 59% of Lower-MIC respondents followed by mode (53%) (Figure 33).

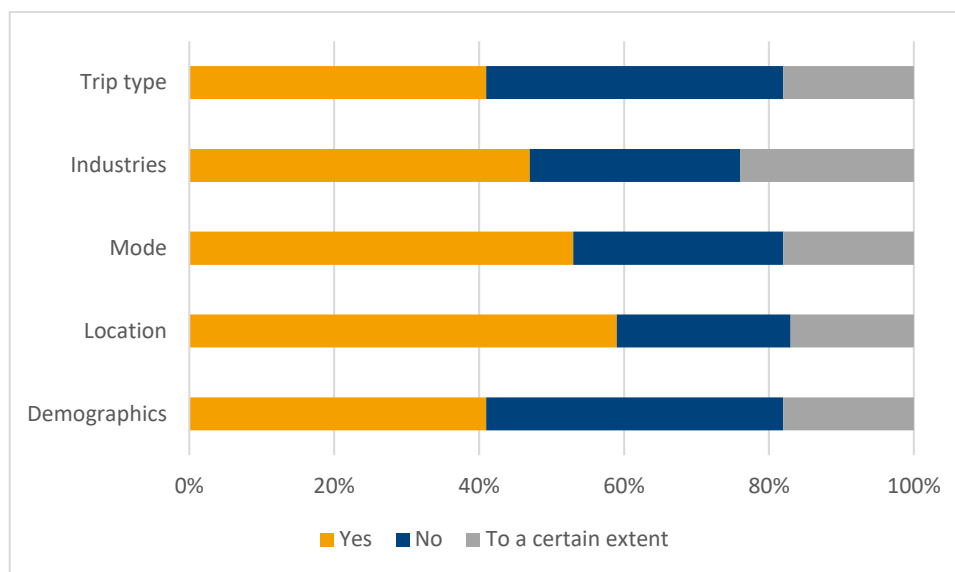


Figure 33: When assessing equity does your organisation consider any of the following groups in your planning processes (Lower-MIC)

For LICs the primary focus according to respondents was on demographics and locations both reported by 60% of LIC respondents followed by mode and trip type (both 40%) (Figure 34).

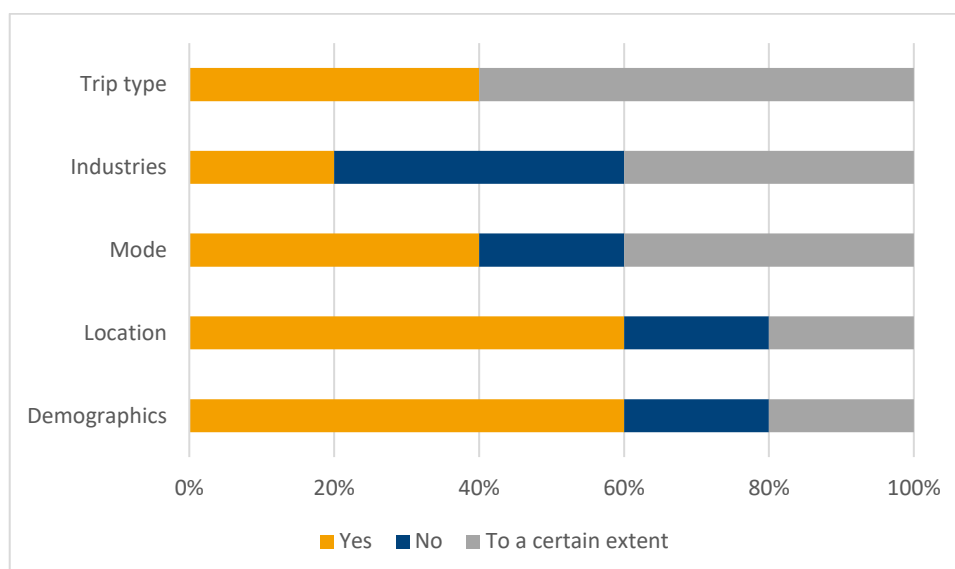


Figure 34: When assessing equity does your organisation consider any of the following groups in your planning processes (LIC)

In a typical community, 20-40% of travellers cannot, should not, or prefer not to drive and most people benefit from the availability of non-auto modes in their community. To probe this area, respondents were asked, “Does your organisation assess or quantify transport demand for the following groups?”

- Seniors who do not or should not drive;
- People living with disabilities;
- Adolescents (12-20 years);
- Drivers who share vehicles;
- Drivers who temporarily lack a vehicle;

- Low-income households who spend more than affordable for vehicles;
- Tourists and visitors;
- People who want to walk and bike;
- Motorists who want better travel options for other travellers.

To provide a sense of how approaches to quantifying transport demand differ across country income groups, participants were asked to reflect on the following question, “Does your organisation assess or quantify transport demand for the following groups?” Responses are presented as radar charts to visually illustrate where approaches were clustered (Figure 35-39).

- For HICs, the dominant focus was on people who want to walk and bike.
- For UMICs, the dominant focus was on people with disabilities, tourists, and visitors.
- For Lower-MICs, the dominant focus was on people with disabilities.
- For LICs, the dominant focus was balanced across categories excluding seniors and drivers who temporarily lack a vehicle.

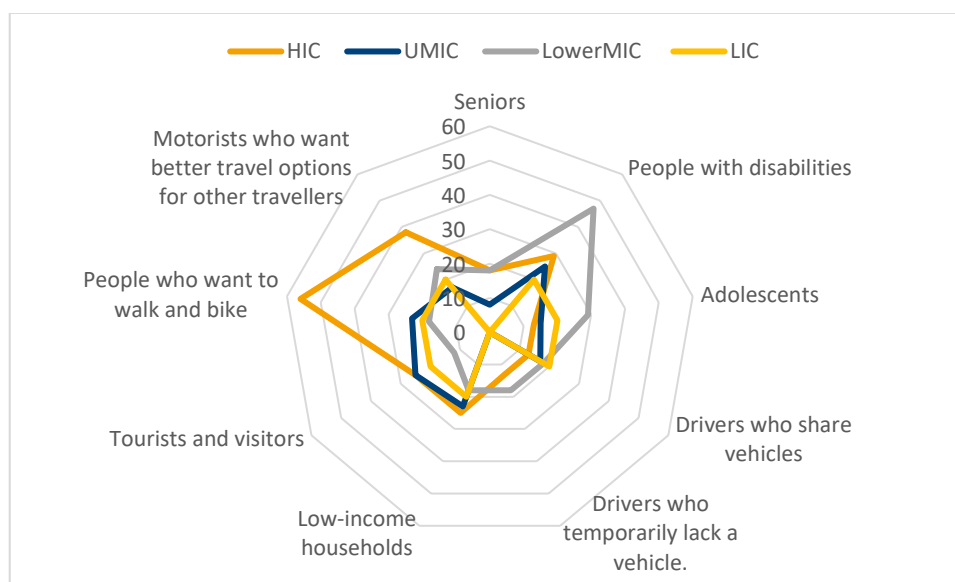


Figure 35: Does your organisation assess or quantify transport demand for the following groups?

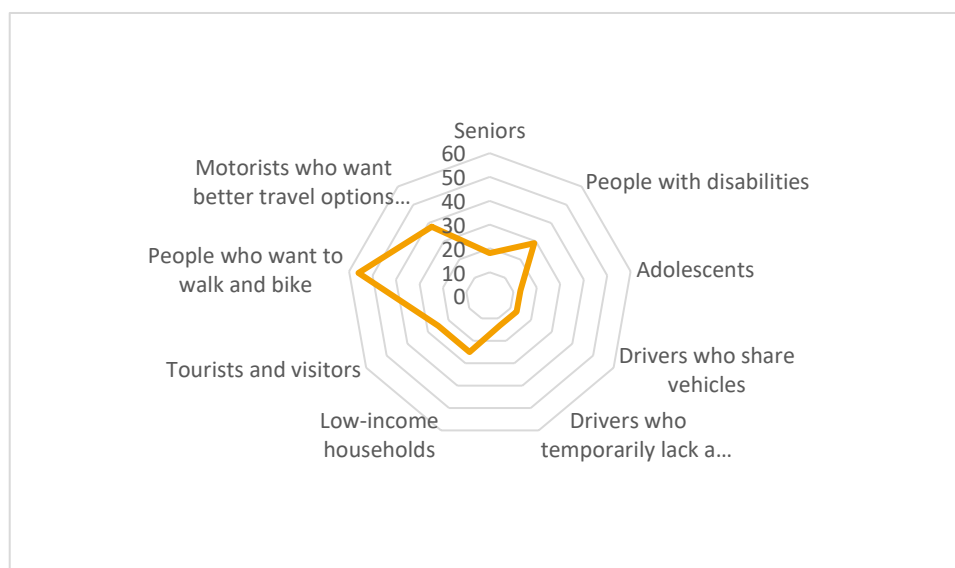


Figure 36: Does your organisation assess or quantify transport demand for the following groups? (HIC)

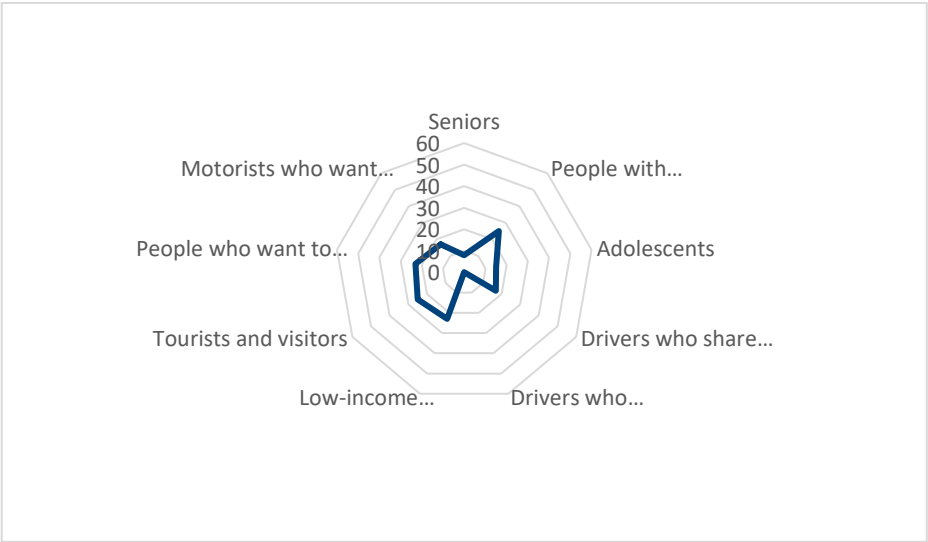


Figure 37: Does your organisation assess or quantify transport demand for the following groups? (UMIC)

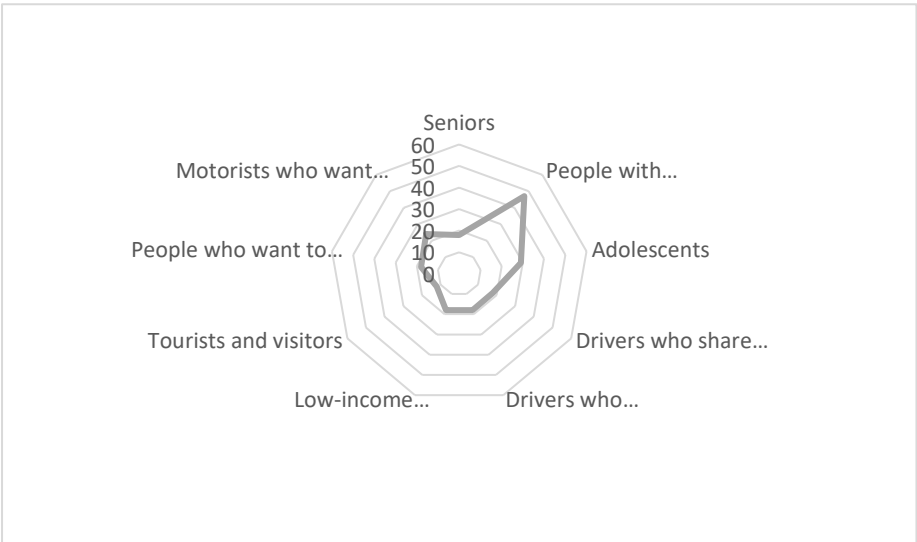


Figure 38: Does your organisation assess or quantify transport demand for the following groups? (Lower-MIC)



Figure 39: Does your organisation assess or quantify transport demand for the following groups? (LIC)

A planning process can evaluate specific policies and planning decisions based on whether they support or contradict them. Respondents were asked “When considering planning processes are the following measurable horizontal equity objectives assessed?”

- **Fair share** - Everybody contributes to and receives comparable shares of public resources.
- **Fair share** - Planning serves nondrivers as well as drivers
- **Fair share** - Affected people are involved in planning.
- **External costs** - Minimize external costs.
- **External costs** - Favour resource efficient modes that impose less congestion, risk, and pollution on other people
- **External costs** - Compensate for external costs

For HICs the primary focus according to respondents was on external costs (i.e., approaches that favour resource efficient modes that impose less congestion, risk, and pollution on other people) reported by 64% of HIC respondents (Figure 40).

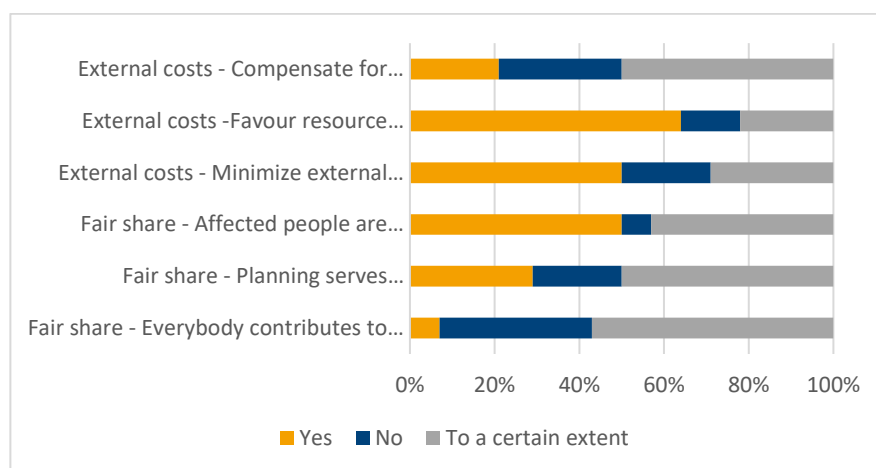


Figure 40: When considering planning processes are the following measurable horizontal equity objectives assessed? (HIC)

For UMICs the primary focus according to respondents was on external costs (i.e., approaches that minimise external costs) reported by 45% of UMIC respondents (Figure 41).

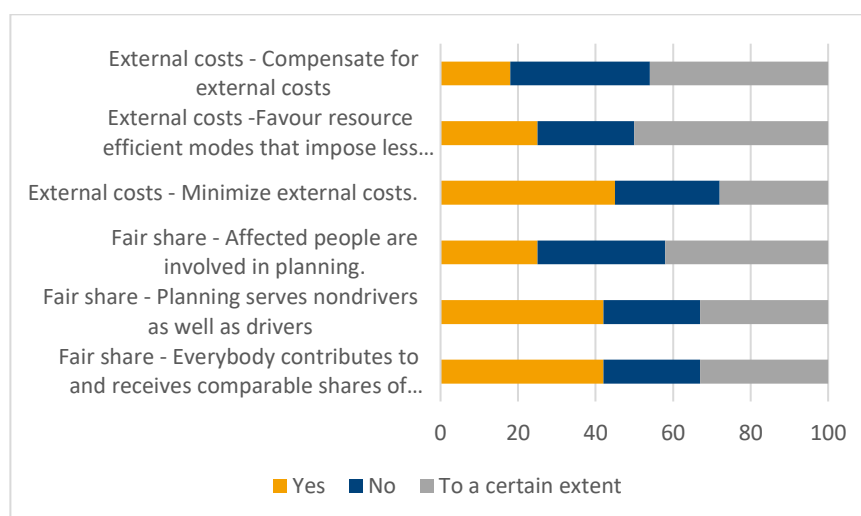


Figure 41: When considering planning processes are the following measurable horizontal equity objectives assessed? (UMIC)

For Lower-MICs the primary focus according to respondents was on external costs (i.e., approaches that minimise external costs) reported by 67% of Lower-MIC respondents (Figure 42).

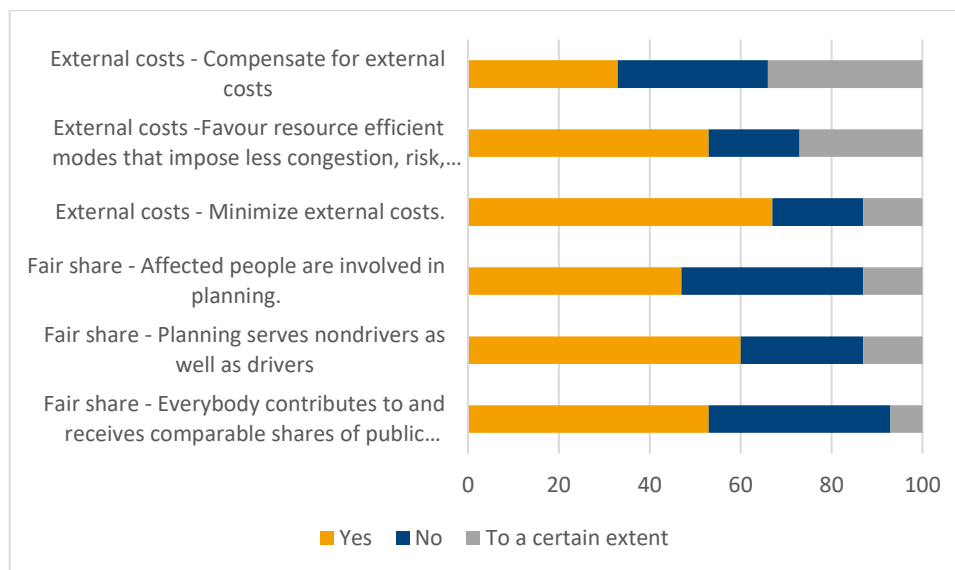


Figure 42: When considering planning processes are the following measurable horizontal equity objectives assessed? (Lower-MIC)

For LICs the primary focus according to respondents was on fair share (i.e., approaches whereby affected people are involved in planning) reported by 60% of LIC respondents (Figure 43).

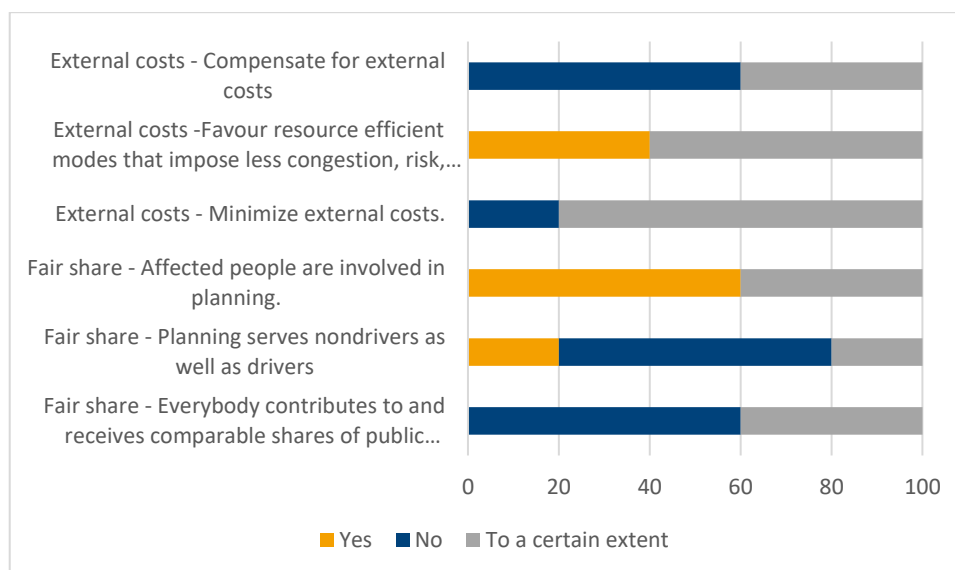


Figure 43: When considering planning processes are the following measurable horizontal equity objectives assessed? (LIC)

A planning process can evaluate specific policies and planning decisions based on whether they support or contradict them. When considering planning processes respondents were asked “Are the following measurable vertical equity objectives assessed?”

- **Inclusivity** - Accommodate people with disabilities and other special needs;
- **Inclusivity** - Basic access (ensure that everybody can reach essential services and activities);
- **Affordability** - Favour affordable modes;
- **Affordability** - Provide discounts and exemptions for lower-income users;

- **Affordability** - Provide affordable housing in high accessibility neighbourhoods;
- **Social justice** - Protect and support disadvantaged groups (women, youths, minorities, low-income, etc.);
- **Social justice** - Affirmative action policies and programs;
- **Social justice** - Correct for past injustices;

For HICs the primary focus according to respondents was on inclusivity - Basic access (i.e., ensuring that everybody can reach essential services and activities) reported by 50% of HIC respondents (Figure 44).

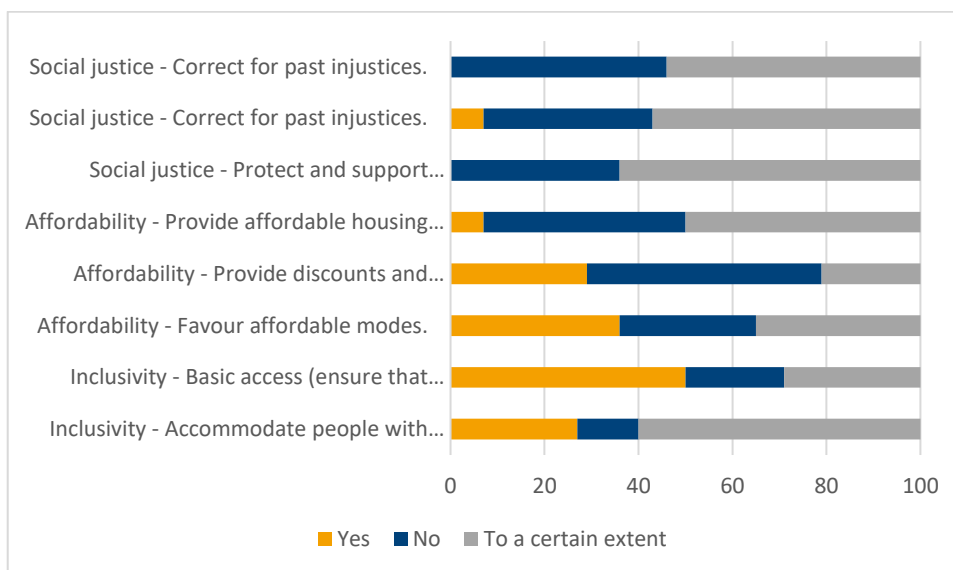


Figure 44: When considering planning processes are the following measurable vertical equity objectives assessed? (HIC)

For UMICs the primary focus according to respondents was on affordability - favour affordable modes reported by 45% of UMIC respondents (Figure 45).

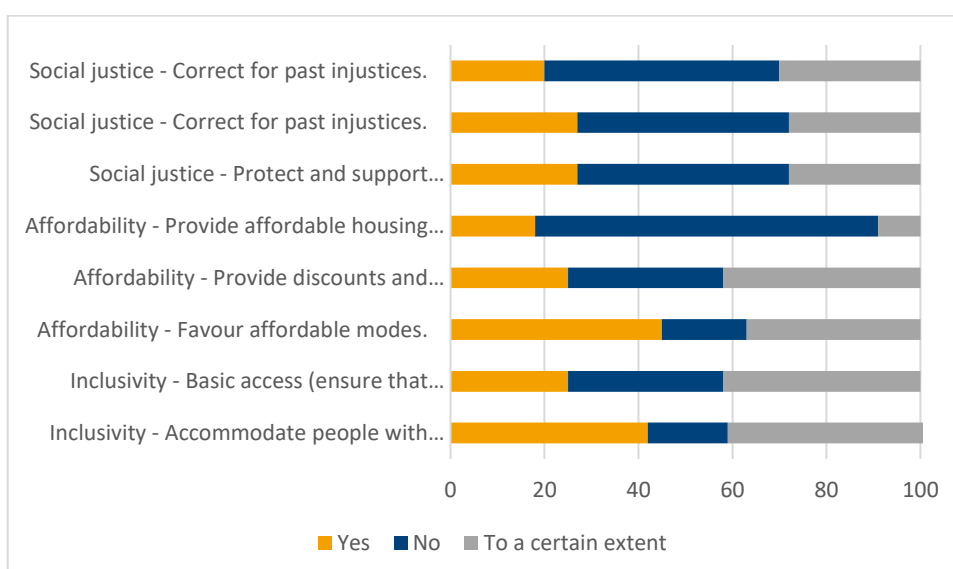


Figure 45: When considering planning processes are the following measurable vertical equity objectives assessed? (UMIC)

For Lower-MICs the primary focus according to respondents was on inclusivity - basic access (i.e., ensuring that everybody can reach essential services and activities) reported by 67% of Lower-MIC respondents (Figure 46).

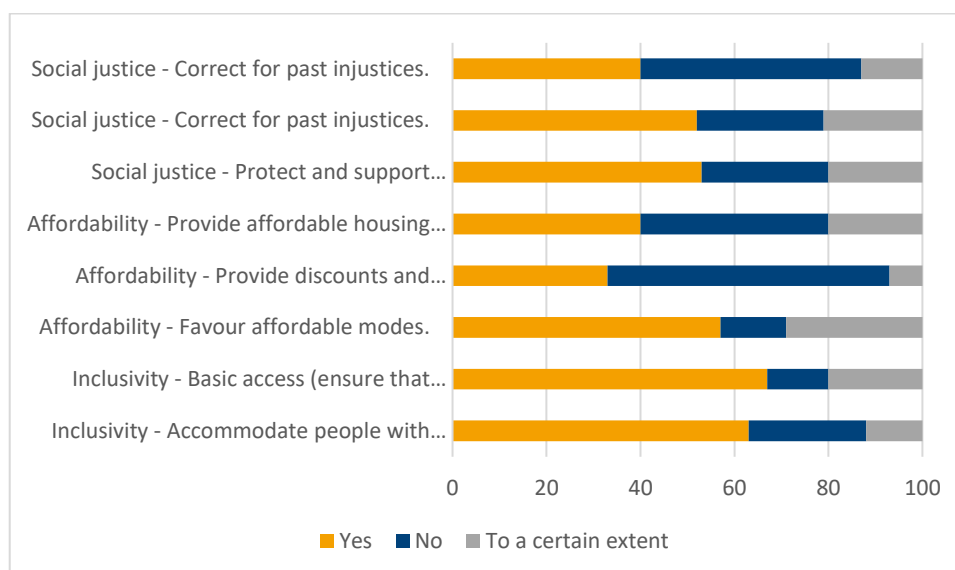


Figure 46: When considering planning processes are the following measurable vertical equity objectives assessed? (Lower-MIC)

For LICs the focus according to respondents was split between inclusivity - accommodate people with disabilities and other special needs; social justice - protect and support disadvantaged groups (women, youths, minorities, low-income, etc.) and social justice - correct for past injustices reported by 40% of LIC respondents (Figure 47).

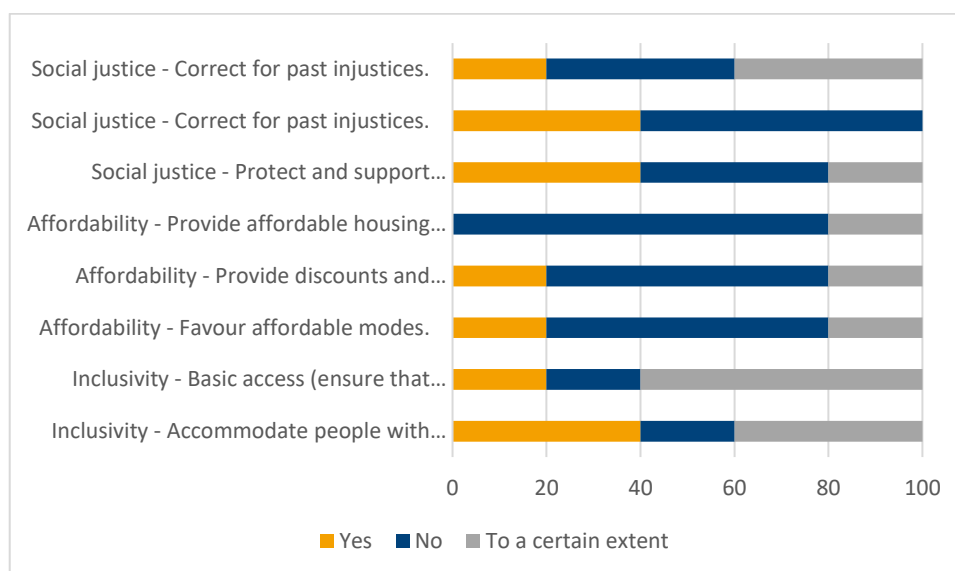


Figure 47: When considering planning processes are the following measurable vertical equity objectives assessed? (LIC)

3.2.7. Strategies to address equity and accessibility objectives

There are two general types of equity strategies. Programmatic (or categorical) strategies that provide special benefits to designated groups. These include, for example, universal design standards and special mobility services for people with disabilities, senior transit fare discounts,

and affirmative action programs. Structural (or functional) strategies reform planning practices to create more inclusive, affordable, and resource-efficient transportation systems. These include multimodal planning, pricing reforms to internalise external costs, and development policy changes to increase affordable housing options in multimodal neighbourhoods.

To gauge how equity strategies vary across country income groups, participants were asked the following question “Reflecting on transportation equity strategies, does your organisation undertake any of the following?.”

For HICs the top three responses were as follows (Figure 48):

- Multimodal planning (79% of HIC respondents)
- Improve public engagement (64%)
- Smart growth policies (57%)

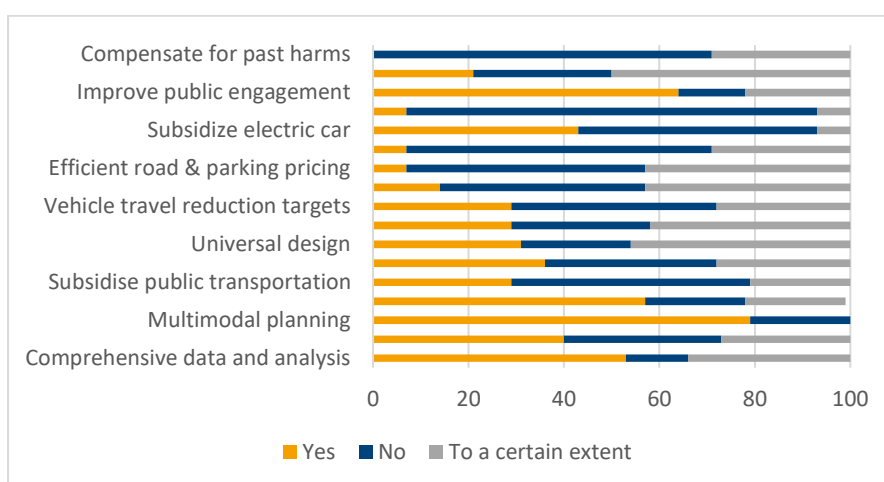


Figure 48: Reflecting on transportation equity strategies, does your organisation undertake any of the following (HIC)?

For UMICs the top three responses were as follows (Figure 49):

- Comprehensive data and analysis (50% of UMIC respondents)
- Accessibility-based analysis (42%)
- Smart growth policies and improve public engagement (36%)

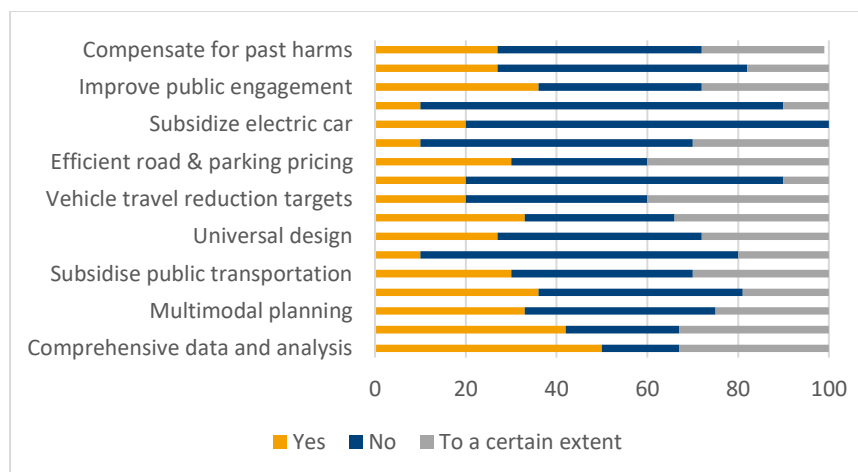


Figure 49: Reflecting on transportation equity strategies, does your organisation undertake any of the following (UMIC)?

For Lower-MICs the top three responses were as follows (Figure 50):

- Prioritize affordable-efficient modes (67% of Lower-MIC respondents)
- Comprehensive data and analysis (63%)
- Accessibility-based analysis and Smart growth policies (53%)

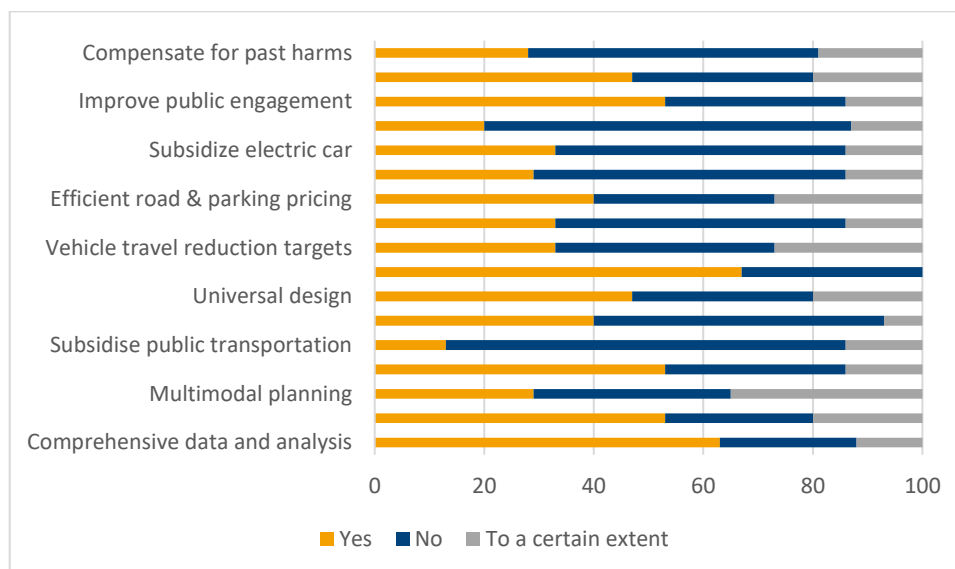


Figure 50: Reflecting on transportation equity strategies, does your organisation undertake any of the following (Lower-MIC)?

For LICs the top three responses were as follows (Figure 51):

- Comprehensive data and analysis (80% of LIC respondents)
- Improve public engagement (80%)
- Multimodal planning (60%)

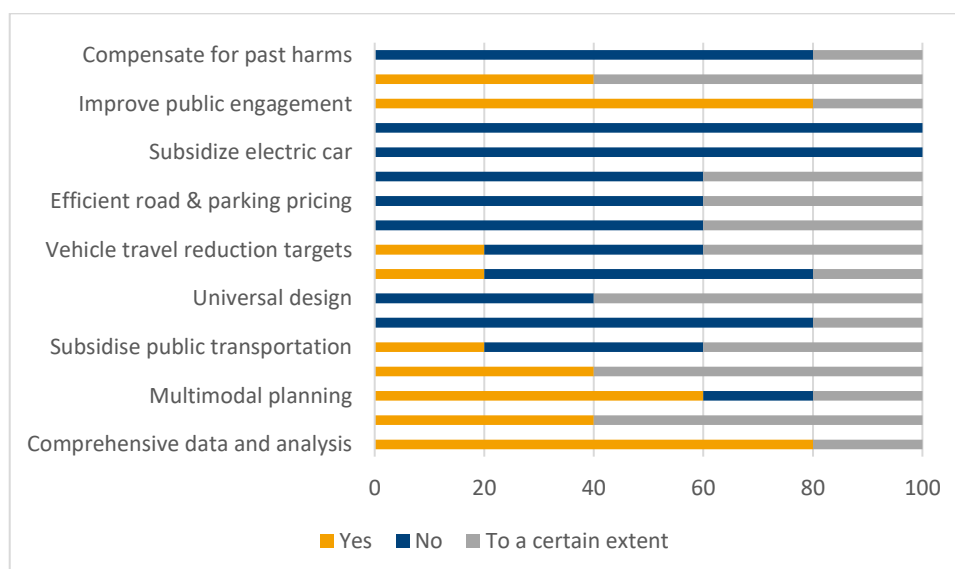


Figure 51: Reflecting on transportation equity strategies, does your organisation undertake any of the following (LIC)?

The options below summarize analysis and optimisation strategies for the five equity types. New tools can help with equity evaluations. They require detailed data on travel demands, the quality

of various modes, user and external costs, public spending, equity programs and planning engagement by various groups.

To provide an overarching assessment of how approaches to equity may vary across respondents, participants were asked “Does your organisation consider the following transportation equity types, ways to measure them, and optimisation strategies?”

Type: **Horizontal Fair Share** Description: Each person receives a fair share of public resources Metrics: Per capita share of public resources (money, road space, etc.). Optimisation Strategies: Multimodal transport planning. Least-cost funding. Efficient pricing.” (Figure 52).

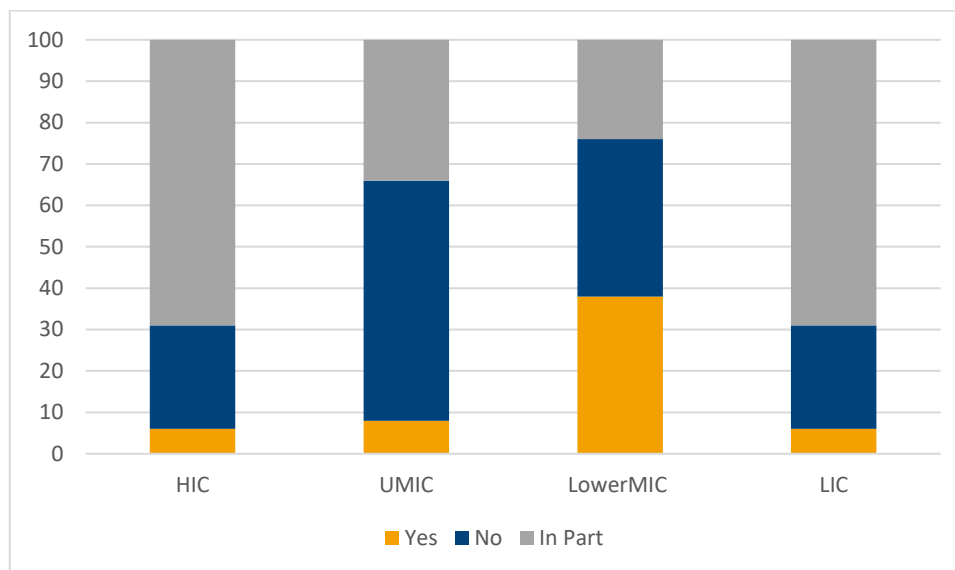


Figure 52: Horizontal Fair Share

Type: **Horizontal – External costs** Description: Travellers minimize and compensate for external costs. Metrics: Infrastructure costs, congestion, crash risk, and pollution that travellers impose on other people Optimisation Strategies: Minimize and compensate for external costs. Favour resource efficient modes (Figure 53).

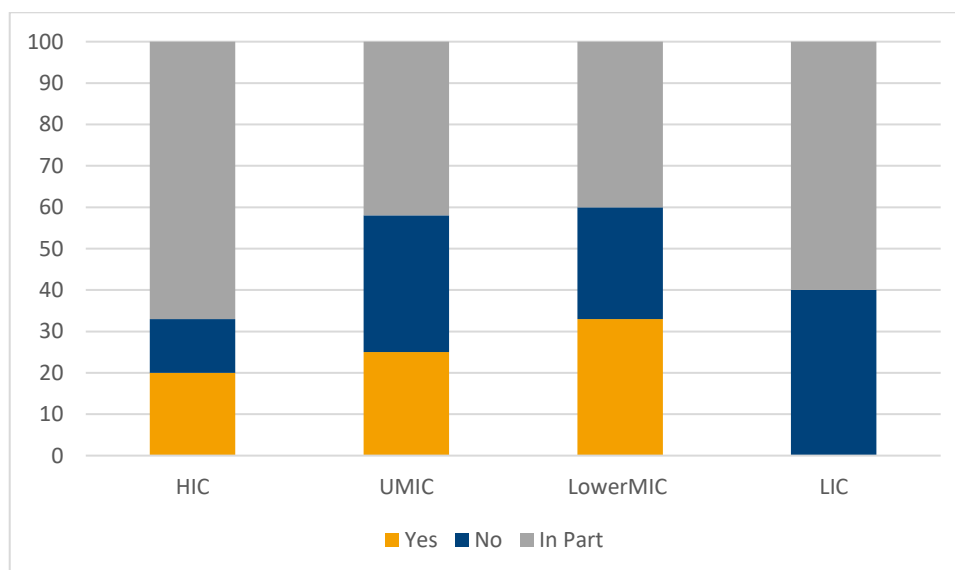


Figure 53: Horizontal External costs

Type: **Vertical – Inclusivity** Description: Transportation systems provide basic mobility to disadvantaged groups. Metrics: Quality of travel for people with disabilities and other special needs. Disparities between groups Optimisation Strategies: Favour inclusive modes and accessible community development (Figure 54).

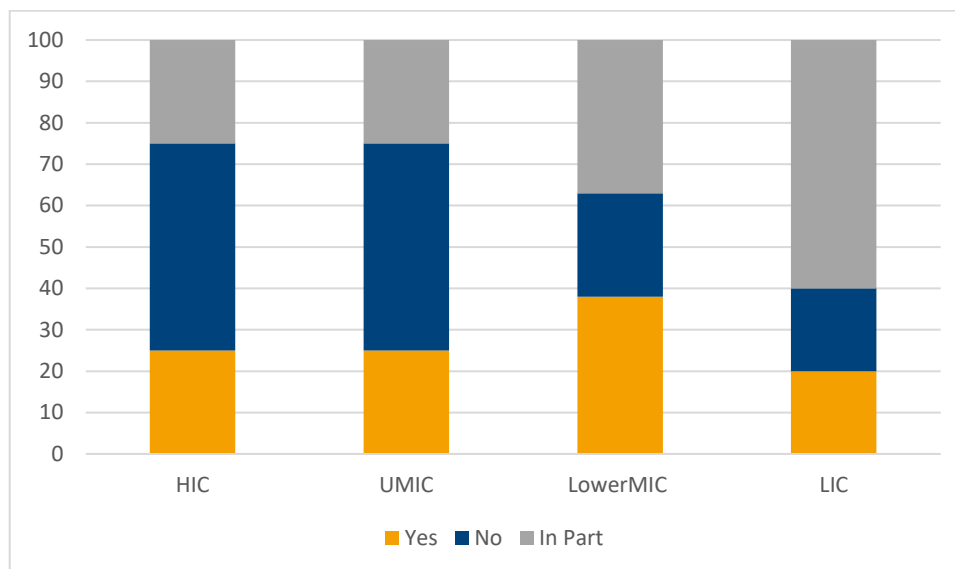


Figure 54: Vertical Inclusivity

Type: **Vertical – Affordability** Description: Lower-income households can afford basic mobility. Metrics: Transportation costs relative to incomes. Quality of affordable modes. Optimisation Strategies: Favour affordable modes and housing in high-access areas (Figure 55).

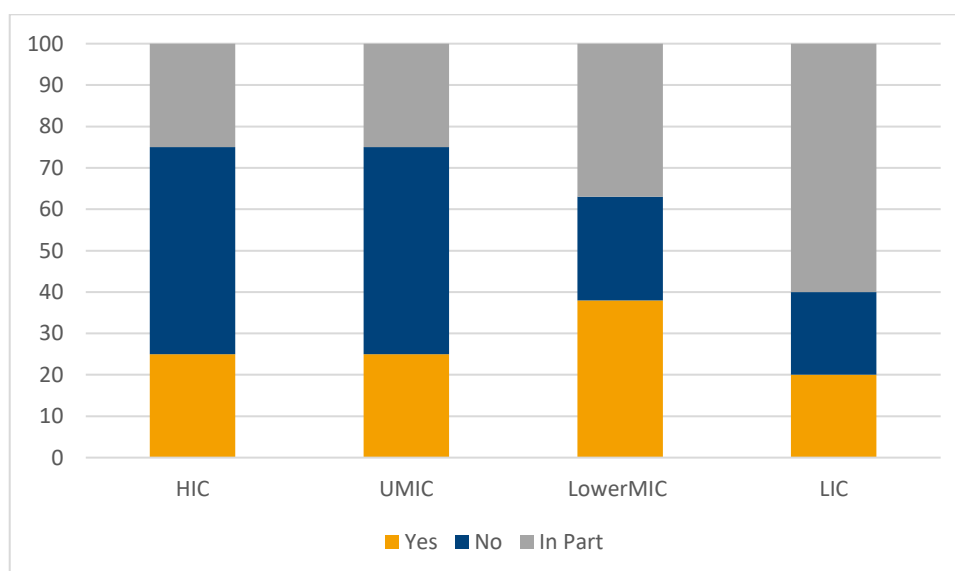


Figure 55: Vertical Affordability

Type: **Social justice** Description: Policies address structural inequities. Metrics: Whether organizations address inequities such as racism and classism Optimisation Strategies: Identify and correct structural inequities, affirmative action (Figure 56).

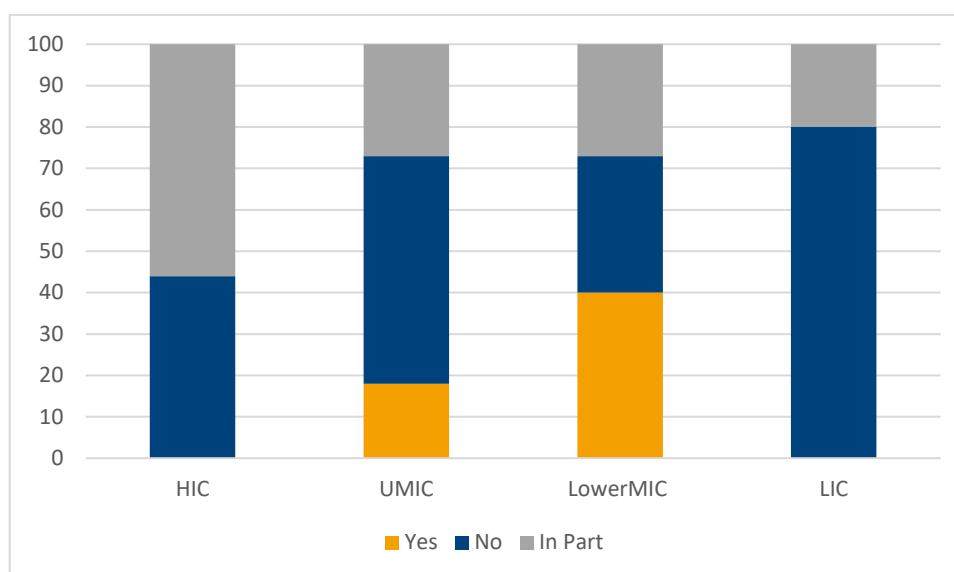


Figure 56: Social justice

3.3. SEMI-STRUCTURED INTERVIEW FINDINGS

To complement questionnaire and literature review findings and to probe key themes further, a series of stakeholder interviews were executed. Participants were identified to ensure coverage of country income status (HIC, UMIC, Lower-MIC and LIC) as well as geographic regions (Americas, Europe, Africa, and Asia) (Table 2).

Table 2: Interview participant's background

HIC	UMIC	Lower-MIC	LIC
Australia	China	Benin	Ethiopia
Italy	Mexico	Kenya	Sierra Leone

For each income group, key themes are identified and explored. Text boxes are judiciously used to explore elements that emerged during the discussions.

3.3.1. HICs (Australia and Italy)

Participants involved in the HIC stakeholder interviews were drawn from Australia (a statutory authority of state Government responsible for implementing the state policies on road access and main roads) and Italy (an Italian state-owned company deputed to the construction and maintenance of Italian motorways and state highways under the supervision of the Italian Ministry of Sustainable Infrastructures and Mobility).

The below word cloud (Figure 57) provides an overview of key words mentioned during interviews with HIC participants. A word cloud is a collection, or cluster, of words depicted in different sizes. The bigger and bolder the word appears, the more often it was mentioned within a given text and the more important it is considered to be.



Figure 57: An overview of key words mentioned during interviews with HIC participants

Framing of equity and accessibility: In terms of how equity and accessibility are framed, for the Australian participant, equity was explicitly associated with equity of access. In particular, there was a focus in Australia on access for people who are disabled or otherwise abled, and to ensure that First Nations people have access for remote communities whilst acknowledging that they may live nomadic lifestyles.

For the Italian participant, equity was understood broadly in terms of the right of mobility. In terms of accessibility, this was related to the needs of different transport users.

The importance of context: Interviews with representatives from Australia and Italy referenced the extent to which context shaped approaches to delivering transport equity and accessibility objectives. For example, it was noted that Australia was unique in the sense that of the population, almost 86% live in urban areas with the remaining 14%, scattered across Australia's vast rural areas. Approaches to equity and accessibility must therefore be attuned to the needs of different groups and the geographic scale at which these needs are to be addressed.

In the Italian context, governance frameworks were seen to frame approach. Specifically, each level of governance is delegated responsibility for articulating equity as well as setting priorities and drivers in terms of investment decisions, or more precisely, investment proposals.

In the Italian context, transport planning tools and modelling parameters i.e., traffic flows and time savings etc. are used to assess potential projects to be financed, a parameter related to accessibility to hospitals, schools, and other core social hubs has been included.

In both contexts, historic disparities were referenced as presenting issues associated with equity and accessibility. In Australia, this was framed around the unique challenges of First Nations communities. In Italy, regional disparity between north and south of the country in terms of infrastructure gaps was alluded to.

Legislation driving action: In many HIC contexts, legislation has been enacted to ensure action on equity and accessibility issues. For example, in Australia, it is a legislative requirement that government agencies have a disability access and inclusion plan. For transport providers, this entails

that people who are disabled are able to access sidewalks, shared paths and to utilise traffic signals etc. The participant flagged that this became more challenging to deliver in more remote areas where the number of people that organisations are attempting to meet the needs of, diminishes significantly whereas the geographic scale of activities increases.

The participant from Australia developed this point further by commenting that legislation is useful and helpful and nudges movement in certain direction. But within that legislation, there needs to be a nuanced acceptance that one-size-fits-all approaches do not work, and you have to provide flexibility and space for innovation.

In contrast, the Italian participant flagged that the absence of legislation and frameworks for addressing equity and accessibility issues entailed more discretion in terms of how such issues were addressed. For example, it was noted that approaches were dependent on who was assessing access or social rights or undertaking social impact analysis and with what purpose. The Italian participant concluded that the country did not as such have a national or regional or local framework for equity related to roads.

Systemic approaches: In Australia, approaches to equity and accessibility are framed by national objectives around closing the gap for example, for First Nations people, this is complemented by decision making processes at state level. Such decisions are often framed by discussions about equitable, sustainable, safe, and efficient access to the road transport system.

The Australian participant noted that infrastructure funding and associated projects have been deployed in the Australian context as a mechanism to address social outcomes and have been identified as contributing to the creation of, for example, sustainable businesses for First Nations people.

In the Italian context, reference was made to a planning masterplan and the prioritisation of infrastructure development according to certain aims. Specifically, the participant referenced this objective to complete or improve road networks in certain regions. Here the systemic approach was intended to address specific gaps in terms of infrastructure rather than those of equity needs.

Targets, indicators, and audits: In the Australian context, targets have been established to drive a focus on objectives. For example, a certain percentage of work is allocated to First Nations peoples for the transport portfolio. This includes targets to spend a specified amount of Australian Dollars with First Nations businesses and to allocate a specified number of hours of work for First Nations Peoples in their businesses in a way that is sustainable.

As with the above theme, this was associated with a systemic approach whereby communities are involved in delivering works, and then moving on from this, projects feed into other community related initiatives in a sustainable manner.

Further to government set targets, independent audits, or ratings of infrastructure (including transport) projects, provide a mechanism to appraise the social impact of initiatives. In the Australian context, the [Infrastructure Sustainability Council Infrastructure Rating Scheme](#) assesses projects for compliance with a range of criteria, which are then independently audited and

assessed, to generate a rating. Such schemes were considered a means for driving behaviours and the skill sets across organisations (See Box 15).

Box 15 Australia and New Zealand's rating system for evaluating economic, social, and environmental performance of infrastructure

The IS rating scheme evaluates sustainability initiatives and potential environmental, social, and economic impacts of infrastructure projects and assets. It is intended for use by stakeholders, including proponents, designers, construction, and operation-project team members, as a guide for sustainable design, procurement, construction and operation for infrastructure projects and assets. The scheme assesses the following domains:

- **Governance:** Context; Leadership & Management; Sustainable Procurement; Resilience; Innovation
- **Economic:** Options Assessment & Business Case; Benefits
- **Environmental:** Energy & Carbon; Green Infrastructure; Environmental Impacts; Resource Efficiency; Water; Ecology
- **Social:** Stakeholder Engagement; Legacy; Heritage; Workforce Sustainability

Source: Infrastructure Sustainability Council of Australia (ISCA) (2018). Infrastructure Sustainability Rating Tool Version 2.0: Technical Manual. ISCA

In the Italian context, the Ministry of Sustainable Infrastructures and Mobility is responsible for setting priorities in social terms and identifying investments to be prioritised. In particular, this focusses on filling or addressing specific gaps in terms of infrastructure. Whilst equity and accessibility are considered, a focus of such decisions was identified as being on sustainability which was seen to include mobility considerations. Tools used include those for transport planning and modelling i.e., to understand traffic flows and time savings etc. As part of this process, a parameter has been introduced related to accessibility to hospitals, schools, and other core social hubs. These parameters are appraised and form the basis of infrastructure investment decisions.

Political commitment: The importance of political commitment to accessibility and equity was evident during discussions including the importance of vision and leadership.

In Australia, the interviewee flagged that a leadership emerged in the early 2000s who was concerned with legacy and the importance of moving beyond the view of transport infrastructure purely as a means of getting people from one location to another. It is about a wider range of issues including economic, social, and environmental considerations.

In the Italian context, governments over the past decade were noted as being in favour of significant infrastructure investment. Investment in transport infrastructure was seen as a tool for balancing different opportunities through multiplier effects associated with infrastructure building.

Challenges

Budgetary constraints: Across both settings (Australia and Italy), respondents noted that there exists tension in achieving goals associated with social equity and accessibility, namely that they come at a cost. These costs do not relate to the delivery of the road network but are rather a broader social benefit. In the Australian context, the participant reflected that the government (both national and state) is prepared to accept these additional costs and acknowledges that with

these mandates that are in place to achieve certain levels of sustainability outcomes of, for example, First Nations people in terms of engagement and participation additional cost is expected.

Mobilising public support: A challenge alluded to in both contexts was mobilising public support. This was framed as a question *“How do you activate the people who are passively supportive of what it is you're doing for social equity or accessibility?”* The Australian participant stated that whilst, no one is against such initiatives, you do come up against some barriers. He stated that *“Whilst there's no one against it, there's no one actively helping us to achieve that as well.”*

Consultation and engagement: Whilst both participants flagged the importance of consultation, the time considerations were raised as an issue. In Australia, the participant flagged that extensive engagement and consultation is undertaken with key groups (for example, First Nations groups). In this context, it was reflected that First Nations culture is not written or documented. It is an oral tradition based on family connections. This poses challenges for government actors who have set rules, procedures, and processes to work with. In particular, ensuring that you are engaging the relevant groups can be a challenge. Both sets of interviews referenced the challenge associated with ensuring that approaches are wholly inclusive in terms of the engagement.

Lack of innovation: A key challenge identified in the Italian context was the issue of innovation, in particular, there was an identified lack of public private partnerships (PPP). Whilst some tenders have been launched and even awarded, they often require adjudication in the courts. This process takes time and may stifle innovative approaches.

3.3.2. UMICs (China and Mexico)

Participants involved in the UMIC stakeholder interviews were drawn from China (a scientific research institution under the Ministry of Transport. It conducts public welfare research, technical consultation, and service work for the government authorities and the transportation industry) and Mexico (a research and technological development centre under the Ministry of Communications).

The below word cloud (Figure 58) provides an overview of key words mentioned during interviews with UMIC participants.



Figure 58: an overview of key words mentioned during interviews with UMIC participants

Framing of equity and accessibility: In the Chinese context, social Equity or social equity in transport is considered to an element of societies basic needs. This is framed by a broad notion of “basic travel and transport assurances.” The basic travel and transport assurances is the basic public service that government should provide to the people. Whether the people get such basic travel and transport assurances is directly related to the issue of social equity. The notion of accessibility was considered to refer to safe and easily accessible transport to get to or from a specified place within a certain time range. The two terms were considered to be closely related.

In the Mexican context, when framing notions of equity and accessibility, the participant highlighted the difference between providing an ‘equal’ treatment and the implementation of ‘equity.’ They emphasised the need to evaluate the specific circumstances, challenges, and barriers of a person/community to access a service/opportunity and proposing measures to guarantee access to the provision of that service/opportunity. The Mexican participant also flagged the importance of feedback received after the implementation of the equity measures.

Connectivity contributing to prosperity: Across both contexts, good roads were considered as a key element of delivering national prosperity in all sectors. The Chinese participant commented on the aim to build high-quality rural roads that are properly built, operated, managed, and maintained. More specifically, China was reported to have created a safe and easily accessible transport network that links villages, towns and townships in impoverished areas and connects them with other parts of the country. These initiatives were seen to have improved passenger and freight transport services in urban and rural areas and expanded bus services to more villages. As such, the Chinese participant commented that the backward nature of transport in poor areas had gone through a complete transformation.

In both contexts, inadequate transport infrastructure was considered one of the most formidable challenges confronting poverty-stricken areas. As such a focus of activities was on establishing a comprehensive transport network in poor areas. In the Chinese context, to resolve this challenge, the central government subsidised the upgrading of 17,000 km of national expressways and 53,000 km of national highways, and the building of 2,365 km of inland waterways from 2016 to 2019. The

China’s approach to addressing equity and accessibility issues is thus focussed on implementing a rural revitalisation strategy. Implementing policies to promote social equity and accessibility of transportation, such as the development of rural roads, are seen to be a driver of economic development in towns and villages and, concomitantly, a means to address a broader framing of equity and accessibility objectives.

Reducing regional disparities: Linked to, but separate from the above theme, efforts to address equity and accessibility objectives were an element of addressing and reducing regional disparities. In China, it was noted that the development of the eastern and western regions was markedly different. Through sustained efforts to develop a comprehensive transport network, the gap between regions is shrinking.

In Mexico, the interviewee explained that his organisation has in place approaches to equity starting with the assessment of the circumstances of the local communities to access to resources, identifying the obstacles limiting access and utilising this information to propose measures to enhance the access to road infrastructure and services requiring the use of road infrastructure.

In the Mexican context, the role of national organisations was framed as one of helping local and regional communities to identify challenges of access to services. Once identified measures are

proposed to the local and regional governments, these have the capabilities of evaluate and implement them.

Whilst two contrasting approaches, they both illustrate the role infrastructure development plays in addressing regional disparities and how in certain contexts, it is aligned with efforts to address equity and accessibility objectives.

Data driven decision making: The importance of information (data more broadly) to inform decision making was referenced in both contexts though in slightly different ways. In the Chinese context, the participant noted that projects are presented to the central government who develop projects listings and allocate funds.

Information platforms are utilised to compile a detailed project database that store information regarding these projects. Through this information platform, the Chinese government can effectively manage and supervise local governments as they implement projects.

In the Mexican context, as noted above, assessments of circumstance, access to resources, identification of obstacles are undertaken. This data is collated to propose measures to enhance the access to road infrastructures and services requiring the use of road infrastructure.

Central government as an enabler: The role of central government in enabling local government to address equity and accessibility objectives was alluded to in both contexts but in markedly different ways.

In the Chinese context, transportation equity and accessibility issues are largely formulated by the central government (namely the Ministry of Transport). For example, the Chinese participant highlighted that village access to good quality roads and construction and maintenance of rural roads in remote mountainous areas were identified as mechanisms to address equity and accessibility issues. These policies are formulated by the central government and implemented by all levels of local government.

A key element of the implementation process involves the central government conducting research and proposing general standards, the local government in turn determines the specific scope of the projects according to the standards designed by the central government. Using information platform to establish detail projects databases, central government can effectively manage and supervise local governments.

In Mexico, central government's role involved working with local and regional partners to identify road infrastructure related challenges to access, to services and/or opportunities. The Mexican participant highlighted that this approach to working in close relationship with local and regional political institutions was a central plank of the Mexican approach. It was argued that this allowed local actors to inform policy makers and develop approaches that addressed identified challenges. Specific examples included the success of obtaining permits for educational transport to circulate via rural roads enabling the access of communities to schools and information centres and the contribution to planning the access to local roads.

In the Mexican context, the successful implementation of equity measures is influenced by the relationship with local authorities. These local authorities have the competency to approve or reject suggested measures. Through a concerted effort, robust communication channels with local authorities have been established that are seen to facilitate efforts to address equity and accessibility objectives.

Challenges

Budgetary constraints: As in other contexts, resource constraints were referenced in both UMIC contexts. The Chinese participant flagged that global factors were impacting on funds which had not returned to pre-COVID 19 levels. Pressure on budgets had led to increased competition between projects looking to be implemented and a renewed focus on ensuring maximum impact of available funds with Central government utilising rankings to determine allocation. In the Mexican context, the importance of budget and resources was raised. This was associated with the need for resources to ensure the recruitment of adequately trained and equipped personnel at all levels of government, empowered to assess and address accessibility and equity issues.

Geographic scale: In the Chinese context, the geographic scale over which accessibility and equity objectives needed to be addressed poses challenges. In particular the need to address disparities between the East and the West was a focus.

Political cycles and change: A challenge alluded to in the Mexican context was the influence of political change on efforts to implement a co-ordinated approach to addressing equity and accessibility challenges. Frequent changes in the local and regional governments (in some cases as frequent as six months) and associated changes in priorities at times may lead to the reversal of decision to implement measures.

3.3.3. Lower-MICs (Benin and Kenya)

Participants involved in the Lower-MIC stakeholder interviews were drawn from Benin (the Ministry responsible for design, implementation, monitoring and evaluation of transport and public works) and Kenya (an autonomous road agency responsible for the management, development, rehabilitation, and maintenance of roads).

The below word cloud provides (Figure 59) an overview of key words mentioned during interviews with Lower-MIC participants.



Figure 59: an overview of key words mentioned during interviews with Lower-MIC participants

Framing of equity and accessibility: For the participant from Benin social equity was framed around ensuring that the entire community can have access to roads, including rural roads, at the same cost. This included understanding how the whole country, even remote areas, can be made accessible. They clarified that in practice, this meant ensuring the presence of a road, either national or rural, that helps to access even the most remote areas of Benin.

For the Kenyan stakeholder, social equity, was about all social classes ability to access transport provision or facilities. The Kenyan participant commented that it is not referenced as social equity or social accessibility in policy. As such, the concept is understood rather than specifically outlined.

National objectives: In Benin, the participant flagged that approaches to equity and accessibility are framed by the mandate of the Ministry responsible, namely to design, implement, monitor, and evaluate the national transport. A priority in terms of social equity and accessibility is on expanding road networks throughout the country as well as roads connecting the country with neighbouring countries.

Similarly in Kenya, a focus was identified on expanding the road network in areas where connectivity is limited. National objectives thus influence approaches to equity and accessibility which are framed as an element of delivering these.

Equal costs for all: In both contexts, notions of equity of access were viewed through the lens of cost. Both participants commented that for social equity, it is primarily about ensuring that all citizens pay the same cost for transport services irrespective of income. This is viewed as a means of ensuring that all can easily travel one destination to another for the same cost. Such an approach represents a universal, rather than targeted approach to ensuring equity and access objectives.

Advocacy and public participation: In Lower-MIC contexts, the importance of advocacy (both formal and informal) was seen to be driving change, albeit slowly, around these issues. In the Benin context, the participant commented that people with disabilities (PWD) are raising issues associated with equitable access on daily basis. Advocacy is associated with campaigns for improved consideration by public infrastructure, by public transport. Similarly in Kenya, attention was drawn to efforts across civil society to improve equitable access to infrastructure and transport by PWDs but also low-income groups. However, both respondents flagged that whilst there was a broad commitment to addressing issues around equity and accessibility, unfortunately such issues remain challenging to address.

Public participation was considered an important element of approaches to delivering more equitable and accessible transport to the public in both Kenya and Benin. The participant from Kenya noted that public participation is provided for in law. It is required that before implementation of any project, the public are provided opportunities to provide feedback and suggestions via public participation forums. In these forums, several issues are raised, some may highlight accessibility issues, others extension of link roads.

Public participation is thus part and parcel of policy in certain settings and can provide a mechanism to identify and address issues associated with equity and accessibility. Public forums can potentially operate as a mechanism to convene groups, particularly project affected persons, and seek to better understand how to address equity and accessibility issues.

Design phase: A recurrent theme in both interviews was the need to consider equity and accessibility concerns during the design phase of public infrastructure and to do this in a more

inclusive and to consider a range of needs. Whilst both participants were aware of the importance of this area, both flagged that there currently existed a deficit with respect to social equity and social accessibility inclusive designs.

Political debate: The presence of democracy in both Benin and Kenya entails that investment decisions and delivery of transport infrastructure services are appraised and debated. In both contexts, participants flagged that members of parliament are asked to provide oral explanations about why certain populations do not have access to roads and to fair transport services. Political debate is driven by both popular demands and due to pressure from civil society who request that government explain issues related to transport infrastructure and services in terms of social accessibility and social equity.

Aid conditionality: The importance of international funding was highlighted by both interviewees. They reference the conditions attached to funding awards as a driver of focus on social equity and accessibility objectives. The participant from Benin highlighted that a new road connecting Cotonou and Porto-Novo has been developed with international funding. This road was particularly inclusive regarding enabling access to PWDs. The project was funded by the European Union.

Vision: In Kenya, the participant identified organisational change and the desire to deliver internal capacity and capability. The strategic vision of the organisation is now focused on both internal capacity enhancement and identification of areas of improvement.

Cross Ministry/sectoral working: In Benin, the participant flagged that importance of cross-sectoral and cross-Ministry working. The participant gave the example of work between the Ministries of Transport and Social Affairs who were collaborating to plan more inclusive projects. The Ministry of Social affairs was, for example, implementing projects that improve the capacity of PWDs to pay for transport services. It was noted that inputs from sectorial programmes can be fed into the wider strategic plans for inclusive transport systems in terms of equity and accessibility.

Challenges

Budgetary constraints: In both contexts, participants flagged that budgetary constraints influenced decision making and meant that often only basic elements of transport provision are addressed. This principally means that the focus is on ensuring that transport is possible between point A and B. Both participants flagged a need to focus more clearly on the diversity of transport users for example considering the needs of PWDs and people with reduced mobility. In Kenya, the interviewee flagged that the need for more money to maintain the network than we currently have, this leads to prioritisation. If you evaluate what the priority is, it is a smooth road with no potholes.

Limited knowledge: In both contexts, there was an explicitly stated need for support for knowledge, development and planning tools adequate for developing equitable and accessible transport projects. Means to achieve this were flagged as supporting access to education and training opportunities and international exchange and learning.

Need for specific focus: In the Benin context, and to a certain extent that of Kenya, it was referenced that issues associated with social equity and accessibility needed more specific focus during project delivery and transport operations. A comparison was made to environmental aspects which were reportedly considered in almost every project.

Guidance documents and tools: Both interviews highlighted the need for guidance documents that are tailored to national contexts and target efforts where they can have most impact. This included

an explicit need for design criteria to guide infrastructure development. Where these are adopted from other contexts, they need to be refined for Lower-MICs.

Better data collection: The importance of data collection and its use in decision making process was repeatedly referenced during interviews. The Kenyan participant commented that there exists a need to collect more and better data and that when this data is collected to ensure that this data is used to support implementation efforts.

3.3.4. LICs (Ethiopia and Sierra Leone)

Participants involved in the LIC stakeholder interviews were drawn from Ethiopia (a national Roads Administration responsible for administering the federal road network system) and Sierra Leone (an agency responsible for the control, development, maintenance, and efficient and reliable management of the national road network).

The below word cloud (Figure 60) provides an overview of key words mentioned during interviews with LIC participants.



Figure 60: an overview of key words mentioned during interviews with LIC participants

Framing of equity and accessibility: In the Ethiopian context, equity is understood to mean fairness on the provision of road facility for the community or for the citizens. In the case of accessibility, the Ethiopian participant understand that to refer to the ability to access roads by the community or different levels of the society.

In Sierra Leone, the participant noted that approaches to equity were associated with ensuring that persons or individuals at various parts of the country, can easily have access to roads and without having to go through to many challenges. This is to say that there is a fair determined strategy.

National objectives: For the Ethiopian participant, road infrastructure development was understood as inextricably linked to the basic socio-economic development of the nation. In this regard, the Government of Ethiopia had been implementing the road sector development programmes (RSDP) since 1997, the government had also established a universal Road access

programme to connect all Kebele (the lowest level of government administration). For the Ethiopian government approaches to equity and accessibility were linked to achieving cross cutting government goals around economic development, social uplift, and rural development (Box 16).

Box 16: The Ethiopian Roads Authority Road Sector Development Programme: 23 Years

The Government of Ethiopia has well recognized that limited road network coverage and poor condition of the existing road network has been an impediment to economic recovery and economic growth. Therefore, to address the problems in the road sector; the Government has launched the Road Sector Development Program (RSDP) in 1997. Since then, five phases of RSDP were implemented over the period of 1997 – 2020.

- RSDP I -From July 1997 to June 2002 (5 years plan)
- RSDP II -From July 2002 to June 2007 (5 years plan)
- RSDP III -From July 2007 to June 2010 (3 years plan)
- RSDP IV -From July 2010 to June 2015 (5 years plan)
- RSDP V - From July 2015 to June 2020 (5 years plan)

Since its inception in 1997, the RSDP has focused on rehabilitation and expansion of the main paved and unpaved roads and important regional roads. The total road network has expanded from about 26,550 km at the beginning of the RSDP to its current **144,027.8** km including Woreda and municipality roads, increasing the road density from 24.1 to 130.9 km per 1000 sq. km area and from 0.46 to 1.41 km per 1000 population in 2019/20.

The Rural Access Index, RAI, measures the number of rural people who live within two kilometres (typically equivalent to a walk of 15-20 minutes) of an all-season road as a proportion of the total rural population.

The average RAI for the whole country is currently around 60%, a significant improvement compared to the situation at the outset of the RSDP. In 1997, the RAI was 13%.

Despite significant stride towards improving access through road infrastructure investments; welfare indicators that can be used for informed decision and policy making are inadequately documented.

Source: ERA (2021). Road Sector Development Program 23 Years Performance Assessment Report. ERA.

Sierra Leone presented a unique context, having emerged from civil war 1991-2002. Conflict damaged much existing road infrastructure. As the country emerged from conflict, this provided both opportunities and challenges in addressing equity and accessibility issues. The participant from Sierra Leone noted that the national approach had focused on redeveloping high end sections which had economic value and would drive national development.

Leadership, political commitment, and accountability: The importance of leadership and political commitment to road infrastructure development was alluded to in both contexts. In Sierra Leone, the interviewee commented that one of the key things that is helping the drive for equity and

accessibility is the national political context and that the country is enjoying a very fair democracy. Democracy ensures that the government is held accountable for its decisions.

The participant continued that from the president and his ministers in his cabinet through all levels of government, must answer to the people regarding what is promised (for examples in manifestos) and what is delivered. As a result of this, central government applies pressure on implementing organisations to ensure (no matter how small the resources available) delivery of activities across the board in different areas in different localities in different cities and in different rural communities. The participant continued that the current government had decided to focus on rural areas. In terms of equity of access, they had committed to implementing 2000 kilometres of gravel road rehabilitation. Associated with this, implementers were compelled to undertake extensive consultation to ascertain what proportion of the 2000 kilometre were to be attributed to every local government and within a local government district, what percentage will be attributed to every Chieftain and within them what percentage will go to certain rulers. Crosscutting all these considerations were balanced alongside ensuring connectivity of new and redeveloped roads to the existing network. As such there was political will to address equity and access objectives driven by the current (and past) presidents as part of a broader drive to rehabilitate national road infrastructure.

In a similar vein, the Ethiopian participant identified the RSDP as a political priority of the Ethiopian government marking their sustained commitment to addressing infrastructure deficits across the country. This political commitment had led to a significant focus on addressing disparities between regions.

The participant continued those strategies, policies and even programmes are established by the central government and cascaded to the regions. In terms of a strategic vision to establish connectivity across the country, these were outlined in Ethiopia's five-year development programmes or development strategies. Under these, each element of road sector development is defined including the accessibility, equity, and mobility of.

Aid conditionality: In LIC contexts, the pivotal role played by international partners was highlighted. In Sierra Leone, the participant commented that development partners had played a major role in the development of infrastructure. Whilst this had historically involved traditional development partners, the participant flagged the emergent role of Chinese investment over the last 10 to 15 years.

They developed this point, flagging that if you consider the government of China, World Bank, Africa Development Bank, European Union or even UK funding, if it is a loan or a grant a condition of funding will be on ensuring fair accessibility or equity for the community. Alongside this, they will also focus on the minimisation of impact on the environment there, in these aspects, conditions of funding can be stringent. In contrast, the Sierra Leonian participant flagged that a core element of public private partnership was the demand to have a return on investment.

Conditionality was a theme repeatedly flagged in the Sierra Leonian context. They noted that different agencies have different focuses. For example, the European Union has programmes that are geared towards supporting aspects of the network that foster equity and accessibility for low-income groups. Funds come with conditionalities and guidelines to ensure that they are invested strictly and solely on those aspects. This is guided by targets or certain deliverables (see for example box #).

In the Ethiopian context, the participant flagged that road development initiatives were explicitly linked to meeting international objectives, for example as part of enabling attainment of the Millennium Development Goals (MDGs).

A key driver of equity and accessibility initiatives in terms of the provision of road services in both countries was that donor agencies, the EU the World Bank etc. have attached conditions to funding that are linked to achieving these objectives.

Targets and indicators: Both contexts flagged the importance of targets and indicators in supporting the monitoring and evaluation of efforts to address equity and accessibility issues. As noted above, the MDGs and latterly the SDGs have both, to a certain extent focussed attention more broadly on equity and accessibility issues.

At the national level, in the Ethiopian context, a system has been developed to prioritise projects. Ethiopian implementers undertake feasibility studies, especially for the major road infrastructure, which incorporate assessment parameters including technical, economic, financial, climate, social and political aspects.

More broadly, the Ethiopian approach employs key performance indicators (KPIs), used since the commencement of this RSDP, to drive attention on key areas. Here, data on social demand or the impact of the road on the social development, especially for having services for school, hospital and others is collected and appraised.

In Sierra Leone, approaches such as the Free Town urban mobility project where guided by air conditionality and the development of project related KPIs (Box 17).

Box 17 Integrated and Resilient Urban Mobility Project Free Town, Sierra Leone

The project supports World Bank's twin goal, ending poverty by improving access to jobs and services and shared prosperity by including the concept of equity and inclusion in the intervention prioritization. The project aims to reduce barriers, particularly for poor and vulnerable groups who depend on transport and walking, to access jobs and services in a safe and clean environment. The prioritization framework of interventions identifies those interventions that will benefit the poorest, women and people with disabilities.

Poor people's inability to access jobs and services is an important element of social exclusion that defines urban poverty. Organized public transport is inaccessible to a vast number of the poor because of their remote location, poor road network and highly irregular services. As a result, the bottom 20 percent depend on paratransit (2 and 3 wheelers).

Access to transport services is even more challenging for women and persons with disabilities than men in Freetown due to their transport different characteristics. Safety and security constitute a major concern for women in influencing choice of mode, time, and place of travel. Available evidence suggests that around 18 percent of women have suffered sexual harassment in public transportation¹ in the past. This number grows to almost 30 percent for boda-bodas (minibuses) users. Persons with disabilities (PWD) are other vulnerable groups that experiences barriers to access opportunities. Yet there have been limited efforts to address the specific needs of PWD, who constitute about 1.3 per cent of the country's total population¹.

The proposed project brings an integrated approach to respond to the challenges in the urban transport sector. The proposed project aims to foster changes in the way the city is growing from a congested vehicle-oriented city to a resilient people-oriented city, where walking and public transport are at the core of the metropolitan vision. The project aims to improve quality of life and reduce cost of doing business in Greater Freetown by enhancing access to economic and social opportunities, improving private sector participation, tackling road safety, increasing climate resilience, and building human capital, with a focus on vulnerable groups, such as low-income, women and people with disabilities. The project includes three components that respond to the main challenges in the sector:

- Component 1. Modernization and professionalization of the public transport services, including informal private operators.
- Component 2. Strategic, Safe and Resilient Mobility Investments.
- Component 3. Building human capital and institutional capacity.

Challenges

Scale of the challenge: A key issue in the Ethiopian context, was the scale of the challenge in meeting transport needs across a vast geographic area, further challenged by the state of the economy, and limited available funds.

Budget constraints: In both contexts, issues associated with constrained finance were cited. There was referenced to be a variance between available budgets, expectations from central [-0o,lgovernments and requirements in terms of maintenance and development of existing networks.

Limited technical capability: Across both contexts and the sectors involved in the road sector limited technical capability was identified as an issue. For example, in the Ethiopian context the participant mentioned a low level of capability in the construction industry in terms of contractors, consultants and other technical staff. This was especially an issue outside of urban centres. Whilst there had been some improvement via training initiatives, this was not considered to be at the level that could meet the demand of the nation.

Community awareness: In both contexts, there was perceived to be limited public awareness (or more broadly) about the importance of equity and accessibility and how such objectives can be delivered.

Shocks: Wider national and international shocks were considered to challenge efforts to deliver on equity and accessibility objectives. Specifically in Sierra Leone, conflict negatively impacted on the asset condition, especially the maintainability of existing assets. Subsequent challenges associated with Ebola have impacted nationally. At the international level, the impact of COVID-19, the conflict in Ukraine and associated cost of living challenges impact on the context in which efforts to address equity and accessibility are implemented.

The Ethiopian participant flagged that there has been significant stress placed on the central government system by recurrent shocks. This has broadly influenced the amount of resource made available to asset managers. This has entailed the need to prioritise investment.

4. CONCLUSIONS AND RECOMMENDATIONS

The objectives of this research were achieved by:

O1. To identify the most appropriate existing practices in measuring accessibility and its components. Boxes 7-9, and 13, as well the Italia and Benin Kenya cases explained in Sections 3.3.1 and 3.3.3, respectively, are the identified practices in measuring accessibility.

O2. To identify the most appropriate existing frameworks and approaches for combining accessibility and equity, equity-based accessibility, and its components. Boxes 2, 3, 6, and 116, as well Italian case study Section 3.3.1 are the identified frameworks in combining accessibility and equity.

O3. To identify the most appropriate current practices and means of collecting stakeholders' needs/claims associated with equity-based accessibility, and its components. Boxes 4, 5, 10, 12, and 14 are the identified practices on collecting stakeholders' needs/claims.

O4. Through the analysis process, identify significant observations and develop a best practice guideline based on these observations. These are described in the remaining of the section.

The findings from this report highlights the need for different requirements of H-, LICs when dealing with equity and accessibility issues in the transportation sector. This has been mostly related to the levels of standards desired by different countries as far as equity and accessibility are concerned, but also the affordability of these levels by countries considering available human and economic resources. By the means of different data collection approaches, comprising review of the literature, case studies, survey questionnaires and interviews, this report identifies and tackles the following issues:

- The diversity of approaches across the globe in terms of what data is usually needed when discussing equity questions, how such data is collected, how it is analysed, what type of measures are put in place by road and transport administrations, and what dialogue mechanisms are put in place at the national level, among others.
- Some common approaches that have been used in HI and/or LMI countries.
- Possible recommendations for PIARC members (e.g., "equity is an important issue, and it is recommended that all pay attention").
- Possible recommendations for PIARC itself (e.g., "PIARC could usefully assign those topics to one of its committees in the next Strategic Plan").

For HIC (or global north) approaches to equity can be broadly framed as adopting a vertical equity approach (i.e., more targeted - though there are of course variations). For Lower-MICs and LICs the approach was predominantly one of Horizontal equity (i.e., more universal). The case of UMICs is more variable with some elements of Horizontal and Vertical. One reason to the differences could be that, perhaps, HICs have – to a large extent ensured Universal access to transport infrastructure and the attention has now focused on targeting those who remain "left behind." In LICs and Lower-MICs the attention seems to remain on ensuring Universal access. However, an interesting point has been that of international aid conditionality in LICs and Lower-MICs often encourages more targeted approaches. This is often included as a condition of funding, for example to ensure a focus on gender, PLWDs or low-income groups. Another interesting point has been that those countries with more constrained budgets (i.e., LICs and Lower-MICs) may struggle to have the technical,

human, or financial resources to truly appraise or cater for equity or accessibility assessments (e.g., one person being responsible, challenges in identifying, targeting, and monitoring etc.) whilst HICs with more resources may be able to better do this. Finally, there are several challenges and unusual activities that are often associated with available resources. In contexts where resources are limited compromises are often made such as prioritising a smooth road (i.e., no potholes) over everything else.

The report identifies five key thematic areas for road sector stakeholders to better assess, embed and develop social equity and accessibility in their practices, namely finance, context, approaches, planning processes and strategies:

- **Finance:** Financing social equity and accessibility objectives can be challenging, requiring discussion, debate, and the development of a comprehensive approach. Strategies and mechanisms used to secure funding for such initiatives identified by this project include government funding; public private partnerships; grants and loans; income from taxation and aid funding. The questionnaire findings highlight that there exist a range of approaches to funding equity and accessibility objectives. The questionnaire suggests that more diversified funding models exist in HICs and UMICs compared to Lower-MICs and LICs. The latter being more reliant on central government funding and international development aid to support equity and accessibility objectives. It was also suggested that there was more debate regarding land use and transport in urban, peri-urban, and rural areas in HICs and UMICs than in Lower-MICs and LICs. This may be suggestive that in contexts where the transport system is more developed, debate regarding its function may be more common. In contrast, in contexts where transport infrastructure is more limited, debate may be curtailed, or rather there exists more desire for transport infrastructure development.
- **Context:** Across all settings, context was identified as playing a significant role in shaping the implementation and effectiveness of social equity and accessibility initiatives. Different social, economic, cultural, and political contexts were identified, each exerting an impact on how objectives are perceived, prioritised, and achieved. Contextual factors that were seen to influence approaches to equity and accessibility include socio-cultural norms; economic disparities, legal and policy frameworks, infrastructure, and geographic factors; awareness, political will etc. Participants in the key stakeholder interviews commented that recognising and understanding the influence of context is crucial for designing effective interventions that address social equity and accessibility issues. Respondents flagged that approaches to equity and accessibility are influenced by, and in turn, must be attuned to the needs of different groups and the geographic scale at which these needs are to be addressed. Geographic scale was alluded to in the Australian and Ethiopian interviews where ambitions related to equity and accessibility agendas was mediated by the requirement of implementing initiatives over significant scales. Political context and nature of political system was viewed as an important determinant of approaches across all contexts. In Australia, Italy, Mexico, Kenya, Benin, and Sierra Leone the delegation of responsibility to lower levels of government was significant, with these lower levels of regional or state governments identifying priority interventions. In China and Ethiopia, the determining role of central government in setting the agenda for intervention was identified. enabling local government to address equity and accessibility objectives was alluded to in both contexts but in markedly different ways. The nature of debate in a country also influenced the extent to which decision makers were held to account for interventions.

Interestingly debate regarding the costs and conditions of commuters were most reported, according to the questionnaire, in HICs and LICs. Historic disparities between regions or populations were referenced. In Australia, for example, the unique challenges of first nations communities were commented on. In Italy, regional disparity between north and south in terms of infrastructure was referenced. Efforts to reduce regional disparities were considered a key element of equity and accessibility objectives in several contexts, were. In Italy and China, it was noted that the development of the northern and southern (Italy) and eastern and western (China) regions were markedly different. In the Mexican context, approaches sought to identify obstacles limiting access to road infrastructure and services requiring the use of road infrastructure. **Political commitment, vision and leadership** was influencing both the nature of interventions and their ambition. In Australia, the notion of legacy and the importance of moving beyond the view of transport infrastructure purely as a means of getting people from one location to another framed efforts. In Italy, investment in transport infrastructure was seen as a tool for balancing different opportunities through multiplier effects associated to infrastructure building. In China, Kenya, Benin, Ethiopia, and Sierra Leone political will was seen to be driving action, whether to deliver national prosperity or to contribute to nation building goals. The Ethiopian participant identified the RSDP as a political priority of the Ethiopian government marking their sustained commitment to addressing infrastructure deficits across the country. **Aid conditionality** and the importance of international funding was highlighted by both Lower-MIC and LIC countries. In particular, the conditions attached to funding awards were seen as a driver of focus on social equity and accessibility objectives. This may explain in part why, according to the questionnaire LIC countries were found to be most likely to identify and categorise communities or social categories that may be negatively impacted by equity and access issues. Similarly, it was in LICs that participants reported having policies in place that aimed to improve access to affordable modes of transport and or subsidise low-income travellers.

- **Approaches:** Questionnaire and interview findings highlight that achieving equity and accessibility objectives requires a multifaceted and comprehensive approach that addresses the underlying causes of disparities and barriers. Approaches may include policy and legislation; universal design; community engagement; data collection and monitoring; capacity building; targeted interventions; awareness and sensitisation initiatives; learning and improvement. Interview findings suggest that it is through a combination of approaches and strategies that stakeholders can work towards creating a more inclusive society that promotes social equity and ensures equal opportunities and access for all individuals, regardless of their background or abilities. It was also commenting that promoting equity and accessibility is an ongoing and evolving process that requires dedication, collaboration, and a commitment to social justice. Interesting differences were identified in terms of approaches across income groups. In HIC countries, a predominant focus was on issues of vertical equity, in particular those associated with inclusivity. For UMICs, the dominant focus was on horizontal equity and external costs. For Lower-MICs, and LICs the dominant focus was on horizontal equity and external benefits. Legislation has been enacted in many HIC contexts to ensure action on equity and accessibility issues. For example, in Australia, it is a legislative requirement that government agencies have a disability access and inclusion plan. In contrast, the Italian participant flagged that the absence of legislation and frameworks for addressing equity and accessibility issues entailed more discretion in terms of how such issues were addressed. Data collection and the importance of

information to inform decision making was referenced in all contexts. In China, information platforms are utilised to compile a detailed project database that store detailed information regarding projects. In the Mexican context, data is collated to propose measures to enhance the access to road infrastructures and services. Awareness and advocacy In Lower-MIC contexts, the importance of advocacy (both formal and informal) was seen to be driving changes, albeit slowly, around these issues. In the Benin context, the participant commented that people with disabilities (PLWD) are raising issues associated with equitable access on daily basis. Advocacy is associated with campaigns for improved consideration by public infrastructure, by public transport. Similarly in Kenya, attention was drawn to efforts across civil society to improve equitable access to infrastructure and transport by PWDs but also low-income groups. However, both respondents flagged that whilst there was a broad commitment to addressing issues around equity and accessibility, unfortunately such issues remain challenging to address. Targeted versus Universal interventions were identified as two approaches to addressing equity and accessibility objectives. In Kenya and Benin for example notions of equity of access were viewed through the lens of cost. Both participants commented that interventions were primarily about ensuring that all citizens pay the same cost for transport services irrespective of income. Such an approach represents a universal, rather than targeted approach. This can be contrasted with Australia and to a certain extent Mexico where a focus is on those that face most challenges in accessing transport (e.g., first nations peoples or people with disabilities). As the questionnaire findings suggest, targeted approaches that make transport more inclusive tend to be associated with HICs were as more universal approaches focussed on expanding transport provisions are more prevalent at lower income country groupings. International funding and conditionality also influence approaches to addressing such issues. Lower-MIC and LIC participants identified that different agencies have different focuses. For example, the European Union focused on fostering equity and accessibility for low-income groups. Whilst international funding has historically involved traditional development partners, participants flagged the emergent role of Chinese investment over the last 10 to 15 years.

- **Planning processes:** Planning processes for equity and accessibility initiatives may involve systematic and inclusive approaches to identify needs, set goals, and develop strategies to promote social inclusion and equal access to opportunities. Key steps and considerations often include understanding context; stakeholder engagement; needs assessment; goal setting; identifying strategies and interventions; budget and resource allocation; legal and policy framework; capacity building; monitoring and evaluation; communication and advocacy; long term planning. Planning and modelling tools were identified to assess context and understand how best to develop interventions i.e., to understand traffic flows and time savings etc. These tools evolve to include additional focus areas, for example in Italy, the participant flagged that parameters have been introduced related to accessibility to hospitals, schools, and other core social hubs. These parameters are appraised and form the basis of infrastructure investment decisions. In the Ethiopian context, a system has been developed to prioritise projects supported by feasibility studies, especially for the major road infrastructure, which incorporate assessment parameters including technical, economic, financial, climate, social and political aspects. In terms of planning processes, questionnaire findings suggested that consideration of equity objectives in terms of impacts, metrics and groups was more balanced across identified themes in HICs and UMICs than in Lower-MICs and LICs. This may suggest that equity and

accessibility objectives are more mainstreamed in HIC and UMIC contexts than Lower-MIC and LIC. In terms of specific focus groups,

- For HICs, the dominant focus was on people who want to walk and bike.
- For UMICs, the dominant focus was on people with disabilities, tourists, and visitors.
- For Lower-MICs, the dominant focus was on people with disabilities.
- For LICs, the dominant focus was balanced across categories excluding seniors and drivers who temporarily lack a vehicle.

Objectives identified during the planning process are a means to guide and appraise interventions. In Australia, approaches to equity and accessibility are framed by national objectives around closing the gap for example, for First Nations people. In China, a focus was on ensuring national prosperity and reducing regional disparities. In Lower-MICs and LICs the provision of transport was excitably linked to nation building objectives. According to questionnaire findings:

- For HICs the primary focus according to respondents was on external costs (i.e., approaches that favour resource efficient modes that impose less congestion, risk, and pollution on other people).
- For UMICs the primary focus was on external costs (i.e., approaches that minimise external costs).
- For Lower-MICs the primary focus according to respondents was on external costs (i.e., approaches that minimise external costs).
- For LICs the primary focus according to respondents was on fair share (i.e., approaches whereby affected people are involved in planning).

Targets or indicators associated with equity and access have been identified in a number of contexts, emerging as a means of guiding activities. In the Australian context, targets have been established to drive a focus, for example, a certain percentage of work is allocated to First Nations peoples for the transport portfolio. This includes targets to spend a specified amount of Australian Dollars with First Nations businesses and to allocate a specified number of hours of work for First Nations Peoples in their businesses in a way that is sustainable. In Lower-MIC and LIC contexts targets and indicators associated with the MDGs and latterly the SDGs have both, to a certain extent focussed attention more broadly on equity and accessibility issues. Design consideration was a recurrent theme identified during the interviews, principally to do this in a more inclusive way to consider a range of needs. Whilst this was acknowledged as an important consideration across all income groupings, in Lower-MIC and LIC settings it was acknowledged that there currently existed a deficit with respect to social equity and social accessibility inclusive designs.

- **Strategies:** strategies for achieving social equity and accessibility objectives aim to address systemic barriers, promote inclusion, and ensure equal opportunities for all individuals. A variety of strategies are available to decision makers, and these vary across country groupings. Questionnaire findings suggest a range of strategies associated with delivering on equity and accessibility objectives. These were listed as follows:
 - For HICs the top three responses were as follows: Multimodal planning; Improve public engagement and Smart growth policies.

- For UMICs the top three responses were as follows: Comprehensive data and analysis; Accessibility based analysis; Smart growth policies and improve public engagement.
- For Lower-MICs the top three responses were as follows: Prioritize affordable-efficient modes; Comprehensive data and analysis and Accessibility-based analysis and Smart growth policies.
- For LICs the top three responses were as follows: Comprehensive data and analysis; Improve public engagement (80%) and Multimodal planning (60%).

Systemic interventions were referenced across country groups. Such approaches were at times framed as addressing specific gaps in terms of infrastructure rather than on equity needs. More broadly, UMIC, good roads were considered as a key element of drives toward national prosperity in all sectors. In Kenya, the participant identified organisational change and the desire to deliver internal capacity and capability. The strategic vision of the organisation is now focused on both internal capacity enhancement and identification of areas of improvement. Cross Ministry/sectoral working linked to the above was also alluded to, for example in Benin, the participant flagged that importance of cross-sectoral and cross-Ministry working as a means of delivering on objectives. The participant gave the example of work between the Ministries of Transport and Social Affairs who were collaborating to plan more inclusive projects. National strategies were referenced in a number of contexts, for example the Government of Ethiopia had been implementing the road sector development programmes since 1997 intending to connect all levels of government administration. For the Ethiopian government approaches to equity and accessibility were linked to achieving cross cutting government goals around economic development, social uplift, and rural development. In the Sierra Leonean context, the national approach had focused on redeveloping high end sections which had economic value and would drive national development.

As part of maximising the impact of this PIARC's special project on Social Equity and Social Accessibility in global transport systems, an online workshop was organised specifically for the transport of people living with disabilities (PWDs) in Nairobi, Kenya, on the 25th of July 2023. It was in collaboration between the University of Birmingham and the Kenya National Highways Authority (KeNHA), with support from PIARC and International Road Federation (IRF). The Kenya Rural Roads Authority (KeRRA), Kenya Urban Roads Authority (KURA), Nairobi Metropolitan Areas Transport Authority (NaMATA), Kenya's National Transport Standard Authority (NTSA), Nongovernment Organisations (NGOs) and other stakeholders in the Kenyan transport systems participated and contributed to the workshop. In total, there were 462 registrations from 48 countries among whom 231 participated live in the workshop. The workshop presented the findings of the paper that will be presented in the 27th World Road Congress, in Prague, Czech Republic. The title and abstract of the paper are shown in the appendices whilst the link to the workshop can be accessed at IRF's website: [Workshop: Assessing Social Equity and Social Accessibility of Transport Systems for PWDs in Nairobi, Kenya - International Road Federation \(IRF \) \(irfnet.ch\)](https://www.irfnet.ch/en/workshop/assessing-social-equity-and-social-accessibility-of-transport-systems-for-pwds-in-nairobi-kenya). It has been highlighted that the main challenges faced by PWDs in Kenyan transport systems, and probably this is the same scenario in many low-income countries, include poor or non-existing bus stations, poor service by transport operators, and lack of inclusive transport systems. However, what could be more worrying is the lack of open debate on challenges faced by PWDs in transport systems. Based on the discussions with Kenyan transport officials who contributed to the workshop, there are also palpable efforts that the government of Kenya is making in this regard, such as establishment of rules and regulations and follow up during projects implementations. The workshop also opened a platform

for debate for the future. The main recommendation has been the need to address the PWDs challenges at the levels of transport planning, design, construction, and operations. Also, to improve advocacy by stakeholders and entire community rather than leaving the issue on the shoulders of PWDs alone. Finally, it was recommended to install an inter-institutions committee for PWDs needs on projects in KeNHA, KURA, KeRRA, NaMATA, and NTSA to remove inconsistencies in social equity and social accessibility measures between institutions as well as whether transport systems are in rural or urban areas. There is also need for more effort at the level of policies implementation.

Finally, the authors recommend that PIARC reviews its current definition of accessibility to include explicitly principles of social equity and social accessibility based on the findings and experiences emerged from this project. The definition currently states that: “change in accessibility is defined as the amount of goods, services, employment and possibly the volume of population that someone can have access to from a given point, given the new travel option offered by the new scheme. It is quantified as a function of the travel times” (PIARC, 2012a).

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6. APPENDIX A

Table A-1: Transport planning/Road building processes/mechanisms

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Akpan and Morimoto (2022)	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	A case study was conducted in Akwa Ibom State, Nigeria. Historical data and literature were used to prioritize rural roads to improve rural accessibility. Improving rural accessibility (+)
Anyanwu John and Erhijakpor Andrew (2003)	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	Data collected through a questionnaire distributed to the PIARC Committee. The study was on “Social Acceptance of Road Infrastructure

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Projects" which show accessibility during the construction as a negative (-) impact, the results also show public not seeing increased road network as solution for accessibility problem (-) while a 'flexible' approach deems positive (+)
Ao et al. (2020)	-	✓	✓	✓	✓	✓	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	Combined on-site measurement , GIS, and activity diary survey to obtain data regarding the environment and the rural residents' activities

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Results showed positive correlation between building density and private car trips. Increased road density increased travel frequency of electric bicycles and motorcycles. Accessibility perception and preferences positively (+) affect walking probability.
Aparicio (2018)	✓	-	✓	✓	-	✓	-	-	-	-	✓	-	✓	-	✓	-	-	✓	✓	✓	-	-	✓	-	-	✓	✓	-	-	-	Two European Union's initiatives: the Trans-European Networks for Transport, and the CIVITAS

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															initiative. It was concluded that while transport is relevant to justice it is a secondary tool in public policy. Identified some barriers to overcome.
Arellana et al. (2021)	-	✓	✓	-	✓	✓	✓	-	-	-	-	-	✓	✓	✓	-	-	✓	✓	-	-	-	✓	-	✓	-	-	-	✓	-	Conducted a comparative assessment of inequalities in accessibility in two Colombian cities, Bogota, and Barranquilla. The assessment showed that wealthier neighbourhoods benefit from better transport coverage, proximity to

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															opportunities while the poorer areas struggle with affordability and spatial segregation (-). The analysis revealed the effects of long-term decision-making in the number of opportunities associated with different transport modes and population segments (+). Results also suggested that public transport-policies can contribute to redefining urban trajectories (+).

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Armenia (2017)	-	✓	✓	-	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	✓	✓	-	The study assessed the impact of rural connectivity on poverty, access to basic services, and income in Armenia. The study used a blend of qualitative and quantitative methods using primary and secondary data. A qualitative assessment was conducted in 10 project communities April -May 2017 Households access to markets, education, and health facilities, was

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															assessed, using Market Accessibility Index. The results suggested that around 86% of the population is within 45 minutes of the largest 30 towns/cities and everyone in the country is within an hour of health and education facilities (+). Road condition issue was reported with negative impact on accessibility (-). As a result of investments improvement in access to medical and university education services (+)

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															were reported. Also, easier, faster, and safer access to nearby cities and towns for employment, shopping, or social purposes (+)
Arsenio et al. (2016)	✓	-	✓	✓	✓	✓	-	-	-	-	✓	-	-	✓	✓	✓	-	-	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	The paper is a review of voluntary adaptation of EU Sustainable Urban Mobility Plans in Portugal by considering 40 case studies focusing on climate change adaptation. Improved public transport via flexible Systems, including

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															nonmotorized transport (+), Improved public space (+), given priority to pedestrians (+), Improved walking and cycling infrastructure (+)
Asomani-Boateng et al. (2015)	-	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	-	✓	-	-	✓	-	-	-	✓	✓	✓	-	-	A case study was used to assess the impacts of rural road improvements in three northern regions of Ghana, considering various socio-economic factors. The study shows improvements in (+) in household income and expenditures, crop

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															production, the usage of motorized vehicles, access to markets, school and health facilities, and transport charges. But in second phase a negative impact (-) was observed due to fuel prices.
Azmoodeh et al. (2023)		✓	✓	✓	-	✓	✓	-	-	-	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	✓	✓	✓	A case study in two neighbourhoods in Tehran, Iran to assess the number of people participating in activities as 'social justice' using a fuzzy approach. Results showed central

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															business districts were advantaged compared to peripheries (-), while disability was not also covered in the considered districts (-)
Bocarejo and Oviedo (2012)	-	✓	✓	-	-	✓	✓	-	-	✓	-	-	✓	✓	✓	-	-	✓	✓	-	-	-	✓	-	✓	-	✓	-	✓	-	A tool was developed for identifying mobility needs and evaluating of transport investments to tackle transport accessibility and social inequities. The tool was tested for Bogota's, Columbia, new BRT line. The case study results showed that depending on

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															population density and location residents purchasing power, "the impact of a redistributive fare with respect to accessibility to the labour market can be greater than the expansion and improvement of the public transport network (+)."
Bryceson et al. (2008)		✓	✓	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	Survey data was used from Ethiopia, Zambia, and Vietnam to assess rural road development impacts on mobility and social-service accessibility. The study

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															showed that, in remote areas, road improvements may accelerate the growth of social-service provision, as evidenced in Ethiopia (+). However, lack of motor vehicles and ability to pay for public transport, were identified as barriers.
Bryceson et al. (2003)	-	✓	✓	✓	✓	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	✓	-	✓	✓	-	Three case studies on Vietnam, Zambia, and Ethiopia, for four months from 2003 – 2004, to “1) analysing the social benefits and costs of rural road improvement

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															s 2) Examining differentiation in the experience of social benefits and costs 3) Testing techniques for rapid appraisal of rural people's perceptions and preferences vis-à-vis rural road development relative to other investments" The study showed interdependencies between economic growth and rural road mobility (+/-). Rural road investment can increase purchasing

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															power of rural residents. "Deepen rural households' modal choice" was suggested for Ethiopia to improve accessibility (+). Importance of NMT for optimising use of rural roads was highlighted (+). The case studies showed the following observations: "Variation in rural road contexts Variation in rural mobility and travel patterns Social aspects of rural mobility and road usage Social welfare outcomes of

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															rural travel, road access and usage Meso and macro consideration s regarding rural roads"
Caulfield et al. (2022)	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	-	✓	-	Data from household EV charging points installed between 2018–20 in Ireland was used to assess the equity impacts of government subsidies for electric vehicles. The findings showed that urban areas are more probable to have greater concentration s of EV ownership, and there is

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																															income and equity gap between those that have adapted electric mobility
Charnav alau et al. (2022)	✓	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	-	-	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	-	-	✓	A questionnaire was used on the issue of transport exclusion in Biala County, composed of seventeen communes and two cities. Results showed insufficient/lack of number of connections (-). Transport exclusion was reported for people living in small towns, the elderly, the disadvantaged, and the disabled with

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															issues in accessing the labour market (-). Also issue of air pollution due to increased number of private cars in the absence of appropriate public transport leading to more traffic jams and accidents (-) and depopulation of certain localities (-).
Chen et al. (2022)	✓	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	Three perception-based transportation disadvantages were assessed, namely: high costs or efforts, limited,

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															physical abilities, and opportunity inaccessibility , using online panel data South Carolina, USA. Hotspot analysis was used which showed no statistically significant spatial relationships between the three considered disadvantages. Link was found between perception-based disadvantages and the built environment and minority, poverty, and aging population. It also showed that higher

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															residential density is associated with less physical disability and less opportunity inaccessibility. Multimodal network density was identified with a negative correlation with cost/effort disadvantages. The ratio of transportation costs to household income was found positively associated with physical disabilities. Minority areas perceive more physical and accessibility

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															disadvantages.
Creger et al. (2018)	✓	-	✓	-	-	-	✓	-	-	-	-		✓	✓	✓		✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓	✓	To develop a Mobility Equity Framework, surveys were conducted, and experts were interviewed in California, USA. The framework consists of 12 equity indicators
Curtis et al. (2019)	✓	-	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	-	-	-	✓	✓	-	-	-	✓	✓	✓	✓	✓	-	✓	-	Public transport accessibility was measured for Gothenburg, Sweden region. Results showed areas with high and low public accessibility
Davis and	✓	-	✓	✓	-	✓	-	-	✓	-	✓	-	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓	-	✓	✓	-	-	✓	The study focused on Scotland

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
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Whyte (2022)																															through holding a workshop on the need for further actions regarding co-benefits of active travel. The identified actions were: "closing down the roads programme and shifting funding to sustainable transport, reducing the need for travel, and a major shift to active travel for journeys under 3 km."
Dirain (2012)	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	✓	✓	-	-	✓	-	-	✓	-	-	-	✓	-	✓	✓	-	One rural road project in Netherlands was used case study to investigate the integration of

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															distributional and equity analysis into the appraisal of rural roads. The study emphasised the usefulness of integrating distributional and equity analysis.
European Union (2020)	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	The report assessed the long-term impacts of a bypass road in Malaga, Spain, 5 years after its construction, by reviewing relevant reports and interviewing stakeholders. A positive economic return was observed by reducing travel time

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															(+), vehicle operating costs, air, and noise pollution (+). However, there were increase in number of accidents and emissions (-). Other improvements were reported but not measured, including accessibility for businesses and residents.
Holderne ss and Stander (2008)	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	-	✓	-	-	✓	-	-	✓	✓	✓	✓	✓	-	-	-	-	A re-evaluation of the Port Elizabeth, South Africa, road access management guidelines. Adjustments to the

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															guideline was introduced.
Hook and Howe (2005)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	-	✓	-	-	-	✓	✓		✓	✓		✓	✓	-	This report reviewed relevant UN document and approaches concerning connection between road investments, poverty alleviation, and economic growth.
Kamaludin and Qibthiyah (2022)	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	-	-	✓	-	-	-	✓	-	-	-	-	An empirical study in Indonesia investigated the impact of rural road quality and accessibility on rural economic transformation. It showed that improving "road surface and accessibility for four-

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																															wheeled vehicles significantly increased the probability of village economic transformation (+)."
McDonagh (2006)	✓	-	✓	✓	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	-	✓	Using Ireland as a case study the article investigated how rural development policies had been undermined by other policy instruments (specifically transport) The study showed that undermining rural road policies in Ireland resulted in a "contradictory impact and rather than

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															relieve rural disadvantage, further compound the exclusion of some sectors of rural society" (-)
Odeck et al. (2010)	✓	-	✓	✓	-	✓	-	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	Three projects in Sweden were used as case studies to show how costs and benefits should be considered in a Universal Design. The case studies showed that a Universal Design could achieve profitable socioeconomic results.
Pavón and Rizzi Luis (2019)	✓	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	-	✓	-	✓	-	✓	✓	✓	✓	-	-	-	-	-	✓	-	A simulation was conducted to understand the impact of

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transport pricing, transport service provision, cost recovery, on equity. Santiago de Chile situation was simulated in the study. The simulation showed that: 1. "infrastructure provision is lower when adequately priced through user charges, with car speeds in the peak period increasing very close to free-flow speeds." 2. "If user charges are designed to achieve cost recovery of

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															road investments, public bus transport ridership will increase." 3. "Welfare redistribution through transport market interventions is limited". 4. "if car use is subsidised, most of the benefits of subsidising public transport are undone". 5. "if road pricing was to be implemented in actual urban contexts, reallocation of road space away from private vehicles (even road closure) could

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															become a reality, especially in denser parts of cities."
PIARC (2008)	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	-	The project focused on 1) financial procurement strategies, 2) cost management for long term investment 3) public private partnerships (PPP) through review of the literature and questionnaires from 70 countries. Successful PPP programmes were linked to equity, incorporating affordability. Equity 'norms' for justifying a PPP were reported to

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															be linked with public perception. Affordability and financial viability were discussed which could be contradicting factors when considering "who will pay how much."
PIARC (2012a)	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	-	The aim of this study was to review the existing evaluation techniques for social impacts of road development and usage, focusing on project level. Information was collected on systematic approaches used in ex ante evaluation.

Reference	Global		Active travel			Transit		Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income		PLWDs
																															The study did find a distinction of “social impacts” from other impacts. It was found that some developed countries use innovative methods to capture social impact while in developing countries it is only done when international funder are asking for it to be done. The review found that accessibility is normally qualitatively assessed. The study came up with two definitions of accessibility. Factors to be considered in

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															equity assessments were also identified.
Ranhagen (2021)	-	✓	✓	✓	-	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	✓	-	✓	-	-	✓	✓	-	✓	-	✓	✓	✓	-	The South African cities were involved in this study on investigating the role of transport in creating inequity and injustice. Recommendations: 'Transport justice' approach was linked with accessibility through providing a minimum level for every user, regardless of their income, gender, age, spatial location, or any other characteristic.

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Transport interventions should be prioritised for low-income areas, while wealthy areas should be self-financing for improving their infrastructure . Existing and new transportation systems should be planned and implemented in parallel with mixed-use and accessible urban developments , close to transportation nodes, including a multitude of commercial, social, and cultural services. A rail system,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															with its important capacity to restructure cities, is a key tool in counteracting inequality and access inequity in the long term."
Rye and Hrelja (2020)	✓	-	✓	✓	-	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	Local transport policy documents from 13 cities in 4 countries were reviewed based on policy problematisation as an analytical framework to investigate problematisations of cars and car use which led to novel solutions. The reviewed

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															strategies were referring to poor accessibility as the main problem, compromising economic growth; with adverse impacts of traffic air and noise pollution; and road safety. The proposed solution was reducing private cars in urban areas, while increasing green and public space. However, the review found that in many cities this solution was only implemented in the central city, using

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															parking management.
Vecchio et al. (2020)	-	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	-	✓	-	✓	✓	✓	A conceptual framework was proposed that considers accessibility and implications for planning and policy for Latin America
Veen et al. (2020)	✓	-	✓	✓	-	-	-	-	✓	✓	-	-	✓	✓	-	-	-	✓	✓	-	-	✓	✓	-	-	-	✓	✓	✓	-	A case study was developed in Rotterdam, Netherlands to identify and quantify equity issues in transportation. Data availability was highlighted.
Venter et al. (2014)	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	An assessment of operators' decisions about vehicle selection, route

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															frequency, network organisation, and pricing, was developed and tested in three rural districts in South Africa. Results showed impact of rural roads condition on quantity and quality of provided public transport services, and user costs.
Weghmann (2019)	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	This report discusses "financing strategies for public transport using 10 international case studies". Accessibility was not the focus of this

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															report. "Fare-free public transport increases usage and reduces private car journeys (+). It can increase tax income for municipalities .

Table A-2: Road pricing/tolls

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Anas et al. (2017)	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	-	-	-	✓	✓	✓	✓	-	-	✓	-	A cases study in Indonesia for Bandung district's Cipularang toll road. It led to positive economic impacts such as costs savings (+), added value to the processing industry (+), increased household income (+) and employability (+).
Andani et al. (2020)	-	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-	✓	✓	✓	✓	-	-	✓	-	It was found that toll roads

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															affect residential location choice, and the influence varies with the distance to the toll gate, as well as among population groups in various income groups, municipalities, and housing types.
Ardiyono et al. (2018)	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	-	A case study of Cipali toll road in West Java, Indonesia has shown positive impacts on

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															accessibility through smooth traffic (+), trades (+), and SMEs (+).	
Attard and Ison (2008)	-	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	The case study of policy transfer with respect to road pricing schemes, Valetta, Malta. The importance of the economic, social, political, and ideological contexts.
Attard and Enoch (2011)	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	A comparison of road pricing between

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															London, Durham, Edinburgh, and Stockholm
Baharudin and Kagaya (2009)	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	-	-	A case study of road pricing in the UK, Norway, and Singapore. Other comparisons and experiences around the world.
Basbas and Politis (2008)	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	✓	✓	-	-	-	Elaborated on road pricing, sustainable transportation systems, transportation demand management

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Bayen et al. (2019)	✓	-	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	-	✓	✓	✓	✓	-	-	-	-	California's case study for Road Charge Pilot Program demonstrates a quantitative example for a blended long haul/last mile approach using a parametric mileage-based user fee (MBUF), the case investigates distributional cost burdens under different pricing

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															calibration scenarios.
Bonsall and Kelly (2005)	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	✓	The study focused on road user charges and social exclusions.
Bray and Tisato (1998)	✓	-	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	Road pricing debate: awareness of the role of road pricing in influencing travel demand, congestion, improving economic efficiency, reducing environmental costs, and meeting the cost of providing roads. Political

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and financial influences were also considered.
Bureau and Glachant (2008)	✓	-	✓	✓	-	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	Distributional effects of road pricing in Paris – lessons from nine scenarios. Distributional pattern across income groups depends crucially on the level of traffic reduction (+) induced by tolling. Stringent tolls are more favourable to low-

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															income motorists. Success of the London congestion charging scheme.
Cohen and Hoffman (2019)	✓	-	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Inequities in transportation system (-). Vulnerable communities such as low-income households, people of colour, and those disadvantaged due to ability, age, or other factors—have long borne the brunt of negative transportation

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															on impacts while paying a proportionally larger share of their income to get where they need to go.
Commonwealth of Australia (2017)	✓	-	-	-	✓	✓	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	An insight in toll roads practices in Australia, USA, Canada, Wales, France, Germany, Italy, China, Japan, and Spain. Tolls to finance roads. Tolls vary widely between cities and countries

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibilit y
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and are associated with several other variables.
Craik (2022)	✓	-	-	-	-	✓	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	Congestion pricing, equity, and transport justice.
De Palma et al. (2006)	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	Design of urban road pricing schemes, and- their spatial and temporal impacts. Case studies of Paris, Oslo, Brussels, Helsinki, and Stockholm.
Di Ciommo and Lucas (2014)	✓	-	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	Road pricing, social and spatial

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															equity, urban context.
DuPuis et al. (2019)	✓	-	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	Case studies of London, Stockholm, Singapore, and New York.
Eastern Transportation Coalition (2022)	✓	✓	-	-	-	✓	-	-	✓	-	-	✓	✓	✓	✓	-	-	✓	-	-	-	✓	✓	✓	✓	✓	-	-	✓	-	Tolling, HICs and LICs, integrating mileage-based user fee into tolling.
France and Currie (2019)	✓	-	✓	✓	✓	✓	✓	-	-	✓	-	-	✓	-	✓	-	-	✓	✓	-	-	✓	✓	-	-	-	-	-	-	-	Impacts of road pricing in Melbourne. Lessons from case studies in London, Stockholm, Oregon, New York, Hong Kong,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and Edinburgh.
Hilbers et al. (2007)	✓	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	Road pricing and its impacts on accessibility in Netherlands
Holguín-Veras et al. (2020)	✓	✓	-	-	-	✓	✓	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	✓	✓	✓	-	Time – of-day road pricing approach
Ieromonac hou et al. (2005)	✓	-	-	-	-	✓	✓	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	London, Duram, Rome, and Genoa case studies used to provide comparisons.
Ieromonac hou and Warren (2008)	✓	-	-	-	-	✓	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	Urban road pricing as a demand management policy that is often

[illegible]

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Council (2011)																															pricing experiences
Naudé (2011)	✓	-	-	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	-	✓	✓	-	-	-	-	-	-	-	High occupancy toll (HOT) and road pricing.
Peters and Kramar (2012)	✓	-	-	✓	✓	✓	✓	-	-	✓	-	-	-	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	Vertical equity impacts on congestion
PIARC (2009)	✓	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	Road pricing, road financing, regulation, and equity
PIARC (2012b)	✓	-	-	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	Case studies of road pricing in different cities and countries.
Snellen et al. (2010)	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	-	-	✓	-	✓	-	✓	✓	-	-	-	-	-	-	-	Spatial planning, public transport

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															planning and road pricing influences on travels.
Suvanto and Moilanen (2011)	✓	-	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	Helsinki case study for road pricing and congestion discouragement
Swan and Belzer (2010)	✓	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	Road pricing and public–private partnerships, trucking, safety, infrastructure finance
Taylor and Kalauskas (2010)	✓	-	-	-	✓	-	-	-	✓	✓	✓	-	✓	✓	-	-	-	✓	-	-	-	✓	✓	✓	-	-	-	-	-	-	The road pricing holds the promise of reducing (+) congestion, emissions, and fuel

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															while raising needed revenues, but the growth in toll programs and projects can be halting and falls short of a groundswell.
Tenenboim et al. (2023)	✓	-	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	Travel time savings and travel behavior modelling, subjective time, time estimates, toll road, shopping trips (+).
Venter and Joubert (2014)	-	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	Tolling in South Africa's

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Gauteng Province.
Victoria Infrastructure (2016)	✓	-	-	-	-	✓	✓	-	✓	-	-	✓	✓	✓	✓	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	Objectives and benefits of road pricing; case studies from London, Milan, Oregon, Singapore, and Stockholm.
von Wright et al. (2022)	✓	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	-	Carbon emissions allowance in urban mobility
Weinreich (2021)	✓	-	-	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	Toll road data over 10 years, to understand how revenue was spent. About 60

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															toll roads across 20 US states were selected based on their governance structure, centreline miles, and rate of toll increase since 2007.

Table A-3: Public transport

Referenc e	Global		Active travel			Transit		Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income		PLWDs
Agyema ng (2015)	-	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Influencing factors in unsuccessful lunch of Ghana’s first bus rapid transit system was investigated in this paper using interviews and questionnaires and travel time data. The results revealed that “recurring traffic congestion, passengers’ inadequate comfort and personal security, resistance from existing public transport operators, lack of legal status for a BRT system, and limited advertising led to the collapse of the pilot system”

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Alotaibi and Potoglou (2017)	-	✓	✓	-	-	✓	-	-	✓	-	-	-	-	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	✓	✓	-	✓	The study evaluated city of Riyadh, Saudi Arabia, existing public transport infrastructure before proposing new infrastructure to reduce traffic congestion and relay on private vehicles. Seventeen semi-structured interviews were conducted which showed "considerable support for reshaping the existing travel demand management policies and measures along with introducing a public transport system. Improving infrastructure to enhance accessibility to

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and from transit stations, selecting appropriate transit-oriented development sites, parking charges, separate carriages for families, and promoting the safety of public transport facilities are perceived as the most effective strategies."
Australia Productivity Commission (2021)	✓	-	✓	✓	-	✓	-	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	Pricing for more public transport with its effectiveness based on the influence of peak periods, modal pricing, and distance pricing. Effects of pricing on congestion reductions, and on social and equity and equity goals.

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															The recommended infrastructure pricing principles are – all modes, routes, and parking; all costs; provision of choices; different prices, different products in different markets; and equity.
Freiberg et al. (2022)	-	✓	✓	✓	-	✓	✓	-	-	-	-	-	✓	✓	-	-	-	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	✓	-	The study evaluated the transport plannings adopted in Sao Paulo for accessibility and reducing inequalities. The results showed the use of measurable indicators in the city in the last two decade had positive (+) impact to shorten the

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															iniquity gap in transportation.
Berg and Ihlström (2019)	✓	-	-	-	-	✓	-	-	✓	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	Discussed the public transport use, mobility, rural areas, mode choice, time geography. The car is the dominant transport mode in rural areas in Sweden. it offers a flexibility that public transport or ridesharing cannot compete with. Several space-time restrictions exist that limit the ability to travel by public transport: public transport is not adapted to times when people want to travel; school buses are not open to the public; administrative borders make it

Referenc e	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															time-consuming or too expensive to travel between counties; no public transport connections between places which the individual need to travel; and locations of bus stops are often too dangerous for children to wait for the bus.	
Bhandari et al. (2008)	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	Identifying the mobility needs associated with access to different urban facilities in a rapidly developing mega-city, Delhi. Examining the mobility benefits due to the introduction of the Mass Rapid Transit System (MRTS) in Delhi. Mobility

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and its implications on equity and accessibility.
Bocarejo et al. (2016)	-	✓	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	✓	✓	✓	-	-	✓	-	✓	-	Focused on accessibility, public transport, transport inequalities and policy, and transport evaluation. Accessibility defined as the ease of reaching desired destinations given several available opportunities and the intrinsic impedance of the resources used to travel. Three main elements are determinant to define accessibility in a comprehensive manner: land use, transport,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and individual characteristics.
Bocarejo and Urrego (2022)	-	✓	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	-	Discussed accessibility, equity, transit, externalities, and generalized travel cost. In developing cities, accessibility to opportunities is one of the key factors to improve social equity. This could be affected by the quality and coverage of transit, the patterns of urban growth, low-income settlement location, and road congestion. In terms of equity, transportation has an additional role related to

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															externalities impacting on health, where LIC populations are the most exposed.
Busco et al. (2023)	-	✓	-	-	-	✓	-	-	✓	✓	✓	-	✓	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	✓	✓	-	-	The research studied the relationship between transportation and social exclusion by observing the disadvantages faced by riders on the public bus transit system in Santiago, Chile. The study based on 8 dimensions namely - safety, service quality, bus stops' infrastructure, accessibility, information, drivers' behavior, improvement in buses and harassment.

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Camporeale et al. (2019)	✓	-	-	-	-	✓	-	-	✓	✓	✓	-	✓	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	Social inclusion, equity indicator, network design, public transport, route set generation procedure and strategic planning
Carney (2020)	✓	-	-	-	-	-	-	-	✓	✓	-	✓	-	✓	✓	-	-	✓	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	Transport facilities are often built around efficiency and meeting the needs of the commuting population. These can struggle to provide services suited to some of the most vulnerable members of society. To achieve an inclusive transport system, it is vital that transport authorities have access to

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															detailed insights into the mobility needs and demands of different groups of the population.
Chakwizi et al. (2020)	-	✓	-	-	-	✓	-	✓	-	-	-	-	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	The challenges and opportunities in respect for local level transportation constraints and opportunities in the study area. Making use of place making integrated mobility and accessibility paradigm of analysis, the study advances ways of reducing the local level transportation travel challenges in King Sabata Dalindyebo.
Colmeneiro-	-	✓	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	-	-	-	✓	-	-	-	✓	✓	-	-	-	-	✓	✓	✓	Urban mobility makes

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Fonseca et al. (2021)																															incorporate new perspectives that make it possible to question and problematize the way in which social links and relations between city dwellers are shaped. In this way, mobility constitutes an increasingly massive, recurrent, and complex social practice, strongly conditioned by the existing levels of inequality and particularly those that entail processes of social exclusion
Curl et al. (2020)	✓	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	✓	✓	This report considers the social and distributional impacts of mode

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															shift policies. Describes the potential impact of policy levers to encourage people to change modes from an equity perspective. Provides an assessment of the impact on people with different income levels and geographical/residential distribution. Outlines what, if any, primary research is required for determining the social impact assessment of mode shift and the most appropriate method for this.
Currie and Delbosc (2011)	✓	-	-	-	-	-	✓	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	Focused on the BRT, ridership, service levels and public

Referenc e	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transport infrastructure.
Deb (2021)	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	✓	✓	✓	-	✓	✓	-	-	✓	-	-	✓	-	Examination of the potentially restrictive nature of ride- hailing for residents in LI neighbourhoods in Bogotá, Colombia. First, do residents of LI neighbourhoods in Bogotá experience lower access to and are excluded from different opportunities in Bogotá? If so, to what extent and in what way does ride-hailing affect the same? Second, how do the socio- economic characteristics and other urban dynamics related to this group, like

Referenc e	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															location and surrounding built environments, influence their interaction with ride-hailing?
Epting (2017)	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	The city of Bogota strives to promote social equity through bicycle lanes, improved sidewalks, and a world-famous Bus Rapid Transit (BRT) system. By examining the planning principles, a starting point for socially just transit systems could be freshened up. Different measures can alleviate several harms that transit systems cause but may rest on an incomplete

Referenc e	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															foundation due to their top-down nature. A restorative justice approach to transportation democracy is suggested for other cities.
Fan et al. (2022)	✓	-	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	-	-	✓	✓	✓	✓	✓	Delivery travel satisfaction Electric two-wheeler Food delivery Built environment Structural equation modelling. Besides, safety and accessibility, environmental comfort, delivery convenience, policy acceptance, and perceived stress positively affect delivery travel satisfaction, while delivery punishment has a negative effect.

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Farber et al. (2014)	✓	-	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	✓	-	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓	✓	Distance based fares, social equity, transit, spatial expansion, ordinal/continuous modelling. The method was applied to a case study in the Wasatch Front, Utah, where the Utah Transit Authority is exploring a switch to a distance-based fare structure. The analysis reveals that overall distance-based fares benefit low-income, elderly, and non-white populations. However, the effect is geographically uneven, and may be negative for members of these groups

Reference	Global		Active travel		Transit		Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility		
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender		Low-income	PLWDs
																															living on the urban fringe.
Fried et al. (2020)	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	✓	✓	-	-	-	✓	✓	-	✓	-	-	-	-	✓	-	✓	✓	✓	This paper explores how to make progress in measuring indicators for the SDG transport target using Nairobi’s minibus system, matatus, as a case study and elaborated on the associated impacts.
Gonzales et al. (2019)	✓	-	✓	✓	-	✓	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	✓	-	✓	✓	✓	-	-	-	-	-	-	This study evaluates the potential to reduce greenhouse gas (GHG) emissions by expanding express commuter bus services in Greater Boston. The model consists of socioeconomic factors. "Results show that bus-on-shoulder

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															running on existing feasible shoulders can improve bus travel times by up to 4 minutes, leading to double the reduction in GHG emissions associated with new commuter bus services compared to mixed traffic operations. Bus stop placement within a town can affect ridership by a factor of three, primarily by affecting walk accessibility, and make the difference between a route causing a net reduction in GHG emissions or not."

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Guo et al. (2018)	✓	-	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	-	✓	✓	-	-	-	✓	✓	✓	✓	This report evaluated efficiency, sustainability, and cost viability of emerging transportation technologies (e.g., connected vehicles) and services (e.g., shared mobility) over traditional travel modes to improve equity literature review with a case study on bike-sharing systems. An equity assessment framework on bike sharing accessibility was developed. "The results justify the importance of using disaggregated tour data, also reveal some equity issues in

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															southern Tampa."
Herszenhut et al. (2022)	-	✓	✓	✓	-	✓	✓	-	-	✓	-	-	✓	✓	✓	-	-	✓	✓	-	-	-	✓	-	✓	-	-	-	✓	-	"This paper examines how and to what extent simultaneously incorporating both time and monetary costs into accessibility measures may impact transport inequality assessment." Job accessibility by transit was calculated in Rio de Janeiro, Brazil, "using cumulative opportunity measures under distinct combinations of temporal and monetary thresholds and compare how inequality levels vary across different scenarios." The

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															paper highlighted "that conclusions and policy recommendations derived from transport inequality analyses can be affected in non-intuitive ways by the interplay between temporal and monetary constraints."
Hertel et al. (2016)	✓	-	✓	✓	-	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	The study provided a perspective on the inputs and outcomes of delivering public transit infrastructure and services in the Greater Toronto and Hamilton, Canada. The data collection was conducted between 2014-15. The results

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
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																															showed that, "transit equity is impacted by planning and investment decisions in three main areas: 1. The network, being where the routes and lines go; 2. The service, including access to stations and the frequency/quality of the trip; and 3. The price people pay (if they pay) and how they pay.
Jaramillo et al. (2012)	-	✓	✓	✓	-	✓	✓	-	-	-	-	-	✓	✓	-	✓	-	✓	✓	-	-	-	✓	-	✓	-	-	-	✓	✓	A BRT system has been operational in Santiago de Cali, Colombia, since 2009. This study examined the relationship between social exclusion and transport and demonstrates

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															that there is still room for improvement in aspects of spatial coverage and for a greater focus on the factors which explain the social need for transport which are not usually considered within planning." "The results indicate that the BRT system can improve its services by implementing specific measures which take into account the socio-economic factors that largely explain the social transport needs of Santiago de Cali."

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Jenkins et al. (2020)	-	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-	✓	-	-	-	✓	✓	✓	-	-	The study uses "a technographic frame to describe and assess the socio-economic and technical impact of upgrading inter-village footpaths to render them usable by motorcycle taxis in off-road rural northern Liberia. Baseline data and post-intervention impact data was obtained over a three-year period in villages benefitting from the intervention and in control villages. The study found that upgrading rural footpaths to motorcycle taxi accessible tracks promotes market integration (+),

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															improves access to education and health facilities (+), and creates jobs for rural youth (+), with few negative consequences.
Joseph et al. (2020) Joseph et al. (2021)	-	✓	✓	-	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	✓	✓	✓	-	✓	✓	✓	✓	This study investigated correlation between participation in out-of-home activities with users' perceptions toward informal public transport (IPT) and BRT in supporting these activities. It was conducted in a before and after BRT opening in 2016 phases, and encompasses focus group discussions, participatory geographical information

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
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																															systems, and questionnaires carried out in two study zones: one close to a BRT corridor and the other in a peri-urban location". The findings show "that in both periods, the demand for IPT use remained dominant, driven by a low fare, connectivity within a neighbourhood and outside the major road, flexibility, and the possibility to commute with goods. The use of BRT was mainly attributed by relief in traffic congestion (when only considering in-bus time) and a

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																															lack of options along the corridor. Surprisingly, BRT users also experienced several mobility difficulties after implementation: long waiting time, overcrowding (in-bus and stations), and difficulties to commute with goods, and a lack of safety and security. Peri-urban individuals continued to experience more travel difficulties with both transport systems than individuals in areas adjacent to the BRT because of limited connectivity, congestion, and

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																															unpaved local roads.” , and unpaved local roads. The findings show that IPT was used to support participation in daily activities like work, education, shopping, and social matters; and was perceived to be flexible in providing access to both high- and low-density unplanned settlements. The BRT was viewed to benefit specific groups of people, especially individuals working in permanent offices in and around the city centre, particularly

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															professional workers.”
Layard (2022)	✓	-	✓	✓	-	✓	-	-	✓	-	-	-	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	-	-	-	✓	-	✓	✓	This study investigated the impact of a bus project The Bus Project (2018–2021) in Bristol, UK, “which found showed that children living in some of the most deprived streets in England cannot afford to visit the centre of their city. Empirically, the article demonstrates that the causes of bus immobility – cost, fear of the unknown, unfamiliarity, and unreliability – have clear detrimental effects on children’s ability to access leisure

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																															and civic opportunities, independent travel, and education of choice. Theoretically, it argues that discrimination and equality law – the dominant legal paradigms for addressing inequality – have limitations in this setting when they do not explicitly provide for socio-economic inequality. This could be the consequence of a series of policy choices in bus governance. There is need for a concept of advancement or mechanism enabling to address socio-economic inequality as a

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															'vehicle for justice,' just as buses are vehicles capable of facilitating spatial justice in practical terms.
Lyons (2019)	✓	-	-	-	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓	-	✓	✓	-	-	✓	✓	-	-	-	✓	✓	✓	✓	The dissertation explored social equity as it applies to public transportation. The study "found that higher quality transit service and compactness are associated with lower levels of unemployment, poverty, and income inequality." Interviews were held with "transit agency planners to understand the way that agencies consider equity, to determine

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																															how equity considerations are shaped by agency and federal policy." By comparing the interview results the study found that "while academic efforts. Transit has been considered a tool to alleviate inequity by limiting the effects of spatial mismatch and providing access to opportunity to disadvantaged populations. Efforts have focused primarily on accessibility as the most important facet of equity in transit service, but transit agency planners think of equity in

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															a more holistic manner.”
Matricardi (2006)	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓	-	-	-	-	✓	✓	Bus system in Los Angeles, USA was reviewed relevant to equity and justice by considering historical changes in fares and the environmental issues. City infrastructure and adequacy to provide appropriate transport services
Idrees and Sarwar (2022)	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	Evaluation of a Lahore, Pakistan light rail train. Also evaluated users of other means of transport and suggested measures. The cost of light train system was identified as the

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																															main barrier for users. Rapid urbanization and migration towards Lahore are causing inadequacy in the public transport. The Lahore Orange Line Metro Train (OLMT) is the first light rail mass transit project of Pakistan to cater the need of growing population of Lahore. The study is based on the ex-post evaluation by exploring the multiple accessibility benefits, willingness to pay of the passengers and social inclusion. The study

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																															develops a case for accessibility improvement by identifying the gaps that may create hurdle for users or discourage non-users. Another concern is heavy subsidization which is an undue burden on government resources.
Das Neves et al. (2023)	✓	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	Focused on accessibility, attitudes, ableism, intersectionality, and public transport. In the built environment, accessibility is established in transport research but attitudinal, behavioural, and communication barriers experienced by

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender		Low-income	PLWDs
																															transport users remain largely overlooked. It was reported that some bus drivers demonstrated ableist attitudes, discriminatory behaviour, and communication methods.
Sajib (2020)	-	✓	-	-	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	The study assessed the social impacts of inadequate transport facilities in Dhaka using a qualitative analysis method. Interviews with 1800 respondents were carried out. Inadequate transport facilities were identified causing issues for the low and middle-income communities.

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															A case study assessing the social impacts of inadequate transport facilities on the people of the city of Dhaka using the qualitative content analysis method. From livelihood to the urban communities' mobility, all life-related matters are directly or indirectly related to public transport. However, the transport system in this city is one of the worst in the world. Hence, there is an absolute necessity to examine the inadequate transport facilities of the present transit

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															system and their social effects on the people living in this city. In depth interviews with 1800 respondents were carried out to know about the social impacts of insufficient public transport facilities. The social impacts of inadequate transport facilities create problematic conditions specifically for the low and middle-income communities of Dhaka, aggravating traffic danger, absence of protection and safety, social isolation, reduced mobilities, loss of social capital,

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																															cultural deprivation, absence of social interaction, family estrangement, travel cost, deficiency of transport accessibility. In the future, it will have serious repercussions for its residents.
Salon and Gulyani (2019)	-	✓	✓	✓	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	-	-	✓	✓	✓	✓	"In Kenya's capital city, Nairobi, streets are regularly gridlocked. Roads are congested at peak hours, commuters experiencing congestion and commute times are less known. So are commuting patterns. New evidence on commuting from a survey of

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															14,580 households, conducted in 15 Kenyan cities in 2013 is shown. Walking and matatus—privately-operated paratransit—account for 89% of all adult commuting in urban Kenya. As cities increase in size, the proportion relying on walking falls and matatu use increases. Within a city, commuters with higher income and education, and those living further from the city centre, are more likely to use matatus rather than walk. Commute times are surprisingly

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																															short. In smaller Kenyan cities the median commute time is just 20 min. In Nairobi, the median commute time is 30 min, and only 5% of those surveyed reported commuting an hour or longer. These data paint a remarkably sustainable picture of urban travel patterns in Kenya. As incomes, education levels, and demand for motorized travel rise, the challenge will be to expand and improve the system while maintaining its sustainability"
Straub (2020)	✓	✓	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	-	-	-	✓	✓	✓	✓	A fare-free public transport

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															policy in Frýdek-Místek, Czechia was investigated through surveying residents and other stakeholders. The study showed that the policy led to an increase in public transport usage. Focussed on fare-free public transport policy (FFPT), mobility, and public transport planning. The FFPT, the characteristic feature of which is abolishing fares in public transport, influences the transport system in favour of one means of transport. The study elucidates

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																															the effects of the FFPT on overall mobility strategies and on the dynamics of the transport system where the policy is implemented. Through interviews and analysis, it was found that the FFPT influences mobility strategies and dynamics in the given transport system, which imprints in an increased use of public transport. However, the FFPT does not represent a universal tool of urban and transport planning and its implementation into practice should take place in synergy with other

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transport incentives.
Vasconcellos (2018)	-	✓	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	-	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	This paper analyses urban mobility conditions in Brazil and the possibilities for change towards a more equitable mobility system. Traditional transport studies, which were originally integrated within field of engineering area, have been limited to analysing vehicle congestion levels as an argument to support proposals for road investments. Conversely, this paper takes a social and political

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															approach, inspired by fundamental works on the use of time and space and more recent literature on mobility and social rights. The analysis also uses the "mobility metabolism" methodology that investigates the main mobility consumptions (space, time, and energy) and their negative externalities on exclusion, pollution, and road safety. Such conditions concern the different roles people play while circulating in urban areas and the social and political characteristics of

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															different social groups, their needs, and interests.	
Venter et al. (2014)	-	✓	-	- ✓	-	✓	-	-	- ✓	- ✓	-	-	✓	✓	✓	-	-	- ✓	-	-	-	-	✓ ✓	- ✓	✓ ✓	- ✓	✓	- ✓	- ✓	- ✓	- ✓	The study showed the impact of road condition on public transport availability and fare prices in urban South Africa. The study highlighted the need to invest in road infrastructure. Informal paratransit operators using a range of vehicle types are a major provider of mobility in LICs rural areas. Mixed method examined such operators’ decisions about vehicle deployment, route frequency, network

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																															organisation, and pricing in three rural districts in South Africa. New evidence is presented showing that the condition of rural roads affects the quantity and quality of public transport services provided, as well as the fares charged to passengers. This strengthens the case for judicious infrastructure investment as a way of improving rural access and livelihoods and suggests how this might happen by way of leveraging better private sector

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	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															responses. We also describe the emergence of a differentiated service hierarchy involving a variety of vehicle types suited to different operating conditions and based on intentional coordination among operators of minibuses and pickup truck services.
Voukas and Palmer (2012)	-	✓	- ✓	-	✓	- ✓	✓	-	-	✓ -	-	✓	- ✓	✓	-	-	✓ -	-	-	-	-	✓	✓	-	-	-	-	- --	✓	-	Construction of 7 BRT and two LRT, NMT and pedestrian infrastructure and routes in Addis Ababa, Ethiopia was reported in the study. However, the focus was on one BRT line which was

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															evaluated by considering "accessibility, road safety, operational efficiency, traffic and parking management, and integration of non-motorized transport." The study revealed the need for more appropriate design and budget allocation to fully implement the BRT system focuses on Bus Rapid Transit in Addis Ababa, sustainable transportation, bus operations, and demonstration corridor. To face Addis Ababa's increasing population and transport issues,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															it was planned to include the construction of seven BRT (Bus Rapid Transit) and two LRT (Light Rail Transport) corridors, as well as improvements in pedestrian facilities, non-motorized transport, and parking management.
Wu and Roberts (2022)	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	The study evaluated the community impact of a forthcoming LRT in Prince George's County, USA. "Results show that despite mindful planning the Purple light rail train is subject to 'Transit Orientated

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Development' idealism, which can propagate focuses on transportation justice, transit injustices, induced gentrification, transit-oriented development, natural experiment, neoliberal and urbanization. Transit-oriented developments are increasingly important. They address many modern urban environment problems such as urban sprawl, pollution, and rising rates of non-communicable diseases. This qualitative study highlights the disconnect between this idealism and

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															practice. It explicitly identifies the most vulnerable of transit users and highlights how neoliberal urbanism contributes to health inequities in Transit Orientated Development practice."
Yeganeh et al. (2018)	✓	-	-	-	-	✓	-	-	✓	✓	✓	-	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	"Access to quality public transportation is critical for employment, especially for low-income and minority populations. This study contributes to previous work on is a contribution to equity analyses of the U.S. public transportation system by

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															including the 45 largest Metropolitan Statistical Areas (MSAs) in a single analysis. Year-2014 Census demographic data were combined with an existing 2014 dataset of transit job accessibility. Then, transit equality and justice indicators were developed, and a regression analysis was performed to explore trends in transit job accessibility by race and income. The findings suggest that within individual MSAs, low-income populations and minorities have the highest

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transit job accessibility. However, the overall transit ridership is low, and in certain MSAs with high transit job accessibility both high- and low-income populations have high access levels, but middle-income populations do not. Within individual MSAs, on average, accessibility differences by income are greater than accessibility differences by race." The differences by race are greater among low-income populations. Accessibility-related equality and justice

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															indicators are one of many issues for discussion of equity.

Table A-4: Externalities

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Álvarez-Herranz and Martínez-Ruiz (2012)	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	-	-	✓	✓	-	-	✓	-	-	-	-	This research assessed the economic impact of Spanish government regional development t Infrastructure and Transport Plan, 2005–2020, on high-capacity

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															road networks. Findings from the study provide a valuable tool for economic, geographic, and territorial assessments of policies implemented in the field of transport and infrastructure, whilst also pointing to guidelines for the design and development of further proposals and actions. The results showed that the investments

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															have had positive impacts on national accessibility .
Anciaes (2013)	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	✓	✓	-	-	-	-	This report proposed "indicators for measuring community severance based on the lost population-interaction potential and considering alternative definitions of restrictions to pedestrian mobility. These include the barrier effect of motorways and

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																																railways, the dynamic severance of traffic on busy roads, and the cumulative effect of transport infrastructure located near other pedestrian-unfriendly environments.” The indicators were used in two case studies “in the Lisbon Metropolitan Area, evaluating the severance effects of a recently implemented road project and the overall effects of

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the transport infrastructure projects implemented during a 10-year period.”
Asomani-Boateng et al. (2015)	-	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	-	✓	-	-	✓	-	-	-	✓	✓	✓	-	-	A case study was used to assess the impacts of rural road improvements in three northern regions of Ghana, considering various socio-economic factors. The study shows improvements in (+) in household income and expenditures, crop production,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the usage of motorized vehicles, access to markets, school and health facilities, and transport charges. But in second phase a negative impact (-) was observed due to fuel prices.
Attard (2020)	✓	-	✓	✓	-	✓	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	The study evaluated Malta's transport system development using socio-political approaches, to "frame the issues

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															of equity and social sustainability within the island's policy context." The study considered household income, accidents, urban area distribution and exclusion. The results showed the issues of the current policies of investing in roads to benefit private cars while lacking investments in other forms of transport.
Barnes et al. (2019)	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	✓	-	✓	-	This paper presented

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															"spatial analyses identifying substantial discrepancies in traffic-related emissions generation and exposure by socioeconomic and demographic groups." "Using 2011 UK pollution and emissions data with 2011 UK Census socioeconomic and demographic data based on small area census geographies, this paper demonstrated a

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															stronger relationship between age, poverty, road NOx emissions and exposure to NO2 concentrations. Areas with the highest proportions of under-fives and young adults, and poorer households, have the highest concentrations of traffic-related pollution. Areal analysis against Census-based socioecono

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															mic characterist ics identified that households in the poorest areas emit the least NOx and PM, whilst the least poor areas emitted the highest, per km, vehicle emissions per household through having higher vehicle ownership, owning more diesel vehicles, and driving further.”
Carrier et al. (2016)	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	✓	-	✓	✓	The aim of this paper was to

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															determine whether “the 15 years of age, those aged 65 and over, visible minorities and low-income individuals located in a portion of Montreal by having among the highest levels of transportation-related air pollutants. The results show that low-income individuals and, to a lesser extent, visible minorities, are significantly

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															overrepresented in city blocks characterized by the higher levels of NO2 and road traffic noise in dB(A)."
Chamseddine and Ait Boubkr (2020)	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	-	✓	-	-	-	-	✓	✓	✓	Incorporation of social impact, including wellbeing and equity, in decision making in Casablanca was reviewed which showed poor practices.
Charnava laou et al. (2022)	✓	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	-	-	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	-	-	✓	A questionnaire was used on the issue of transport exclusion in Biala

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															County, composed of seventeen communes and two cities. Results showed insufficient/ lack of number of connections (-). Transport exclusion was reported for people living in small towns, the elderly, the disadvantaged, and the disabled with issues in accessing the labour market (-). Also issue of air pollution due to

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															increased number of private cars in the absence of appropriate public transport leading to more traffic jams and accidents (−) and depopulation of certain localities (−).
Delbosc and Currie (2011)	✓	−	−	−	−	✓	−	−	−	−	−	−	−	✓	−	−	✓	−	−	−	−	−	✓	✓	−	✓	✓	−	✓	✓	This paper explored the effects “of transport disadvantage and social exclusion on well-being using an empirical analysis of data from a travel and disadvantage survey in

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															Victoria, Australia.” A questionnaire survey was used with 539 responses.	
Fan and Huang (2011)	✓	-	✓	✓	-	✓	✓	✓	-	-	✓	-	-	✓	✓	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	In this project, a contextualized transportation affordability analysis framework was proposed that differentiates population groups based upon their socio-demographics, the built environment, and the policy environment. The necessity of

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															such a context-sensitive framework was demonstrated via a case study of the Twin Cities metropolitan area, which showed heterogeneity among different population groups in terms of their transportation needs and resource availability.
Fitzgerald (2012)	✓	-	✓	✓	-	✓	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-	✓	✓	This research investigated “poor access to land transport in

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															New Zealand rural communities and its social consequences in order to inform and enhance planning for sustainable communities." "The research combined analysis of data from the New Zealand Household Travel Survey and the Census of Population and Dwellings, consultation with sector stakeholders," The negative

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															impacts were identified and discussed.
Frank et al. (2022)	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	✓	The study "analysed relationships between walkability and park availability with physical activity, obesity, and diabetes, using self-reported data from a large cross-sectional survey in British Columbia, Canada (n = 22,418)". The results were validated "with an independen

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															t cohort (n = 11,972) in a subset of the analyses.” Results showed “walkable neighbourhoods and areas with greater park availability were associated with lower rates of diabetes.”	
Grengs (2015)	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	This study proposed “a method for deriving nonwork accessibility indicators and evaluates how nonwork accessibility varies among

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															social groups in the Detroit metropolitan region.” It found “that vulnerable social groups—including African Americans, Hispanics, low-income households, and households in poverty—experience an advantage in physical accessibility over more privileged groups for several trip purposes, including convenience stores, childcare facilities, religious

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															organisations, and hospitals.”
Guzman et al. (2017)	-	✓	-	-	-	✓	✓	-	-	✓	-	-	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	✓	-	This research explored “levels of equity in accessibility to employment and education in the city-region of Bogotá, Colombia.” The results showed “strong distributional effects of the socio-spatial and economic structure of the city-region, its transport infrastructure and services, and the

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															effect of current transport and land-use policies for citizens of different income groups.”
Guzman et al. (2021)	-	✓	✓	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	-	-	-	✓	✓	-	-	-	✓	-	✓	-	-	-	✓	-	This paper explored “the relationships between mode share, street space distribution, and those spaces’ construction costs.” Based on justice principles, the paper discussed “a fair distribution of street space in Bogotá, where

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															injustices are apparent. We find imbalances in the prioritization of space for specific street users, with an accent on space for private motorization despite a visible change in investment in other spaces for urban mobility in recent years. "
Lucas et al. (2016)	✓	-	✓	✓	-	✓	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓	✓	✓	"The study modelled the travel behaviour of socially disadvantaged population

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															segments in the UK using the data from the UK National Travel Survey 2002–2010. This was achieved by introducing additional socioeconomic variables into a standard national-level trip end model. The models demonstrated important differences in travel behaviours according to household income, presence of children in

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the household, possession of a driver's licence and belonging to a vulnerable population group, such as being disabled, non-white or having single parent household status."
Millonig et al. (2022)	✓	-	✓	✓	-	✓	✓	-	-	✓	-	-	✓	✓	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	-	-	-	-	"The paper addressed the potential of introducing individual mobility budgets to achieve transport-related climate goals while reducing inequalities

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															in mobility. The proposed was based on a combination of qualitative and quantitative impact assessment methods including a stakeholder involvement process and transport modelling based on different data sources.”
Mindell et al. (2017)	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	“This paper reported the development of a suite of tools to measure and value community

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															severance, undertaken as a part of the Street Mobility and Network Accessibility research project.” The tool was tested on a street in London, UK	
Popoola et al. (2022)	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	“This study seeks the relationship between dimensions of transport poverty and life satisfaction. The argument put forward in this study is that transport poverty predicts life satisfaction

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															that is a vital aspect of subjective wellbeing. The study utilised an exploratory, comparative design that enabled the comparison of dimensions of Transport Poverty in Ibadan, Nigeria, and Durban, South Africa. Data were collected through an online survey method. The hypothesis that spatial exclusion mediates

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the relationship between service availability and satisfaction with life, transport disadvantaged and satisfaction with life, and transport reliability and satisfaction with life were tested through mediation analysis. Results: For the first hypothesis, partial mediation existed; for the second hypothesis, no mediation existed; for

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the third hypothesis, total mediation existed. Lastly, spatial exclusion varied between the two countries. Conclusion: The study concluded that a transport network that is not reliable leads to spatial exclusion, which in turns affects satisfaction with life."
Schrock et al. (2015)	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-					-	✓	-	-	-	-	-	✓	-	Reviewed various Local Climate and Sustainabili

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															ty Plans in US Cities to identify the ones which also concluded equity. "Only a minority of cities in the reviewed sample made equity a prominent theme in their climate and sustainability plans. While nearly 90 percent of the plans reviewed had at least some discussion of equity—either as a goal, as a problem to be addressed,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															or in terms of specific action items"
Shiftan et al. (2008)	-	✓	-	-	-	✓	-	✓	-	-	✓	-	-	✓	✓	-	✓	-	-	✓	✓	✓	✓	-	-	-	✓	-	✓	-	A recently introduced transportation project appraisal to incorporate equity and accessibility in Israel was reviewed in the paper. "It was shown that benefits are usually overestimated by use of the fixed demand assumption."
Singh and Sarkar (2023)	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	The study investigated the correlation between transport

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and education accessibility. The study showed 1) a positive correlation between proximity to educational institutes and transit (including bicycle) and attendance. Potential gap in rural communities attending higher education caused by inaccessibility (-).
Wudad et al. (2021)	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-	✓	-	The study assessed the impact of improved road networks on marketing

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															of vegetables and households' income in Dedo district in Ethiopia. While accessibility nor equity were directly discussed in the paper, household income could be translated to equity improvement.
Yeganeh et al. (2018)	✓	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	“This study contributes to previous work on equity analyses of the U.S. public transportation system by including

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the 45 largest Metropolitan Statistical Areas (MSAs) in a single analysis. Year-2014 Census demographic data were combined with an existing 2014 dataset of transit job accessibility . Then, transit equality and justice indicators were developed, and a regression analysis was performed to explore trends in transit job

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (−) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															accessibility by race and income. The findings suggest that within individual MSAs, low-income populations and minorities have the highest transit job accessibility . However, the overall transit ridership is low, and in certain MSAs with high transit job accessibility both high- and low-income populations have high access levels, but middle-

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															income populations do not. Within individual MSAs, on average, accessibility differences by income are greater than accessibility differences by race."

Table A-5: Active Travel

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Agarwal et	-	✓	-	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	-	-	-	-	-	-	-	Case study in Patna (India)

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
al. (2020)																															with a simulation of a bicycle superhighway new development. Three policy model scenarios are considered for the simulation. Results show the potential for increasing bike usage from 32% to 48% (+) with users switching from motorcycle and public transport to cycling. Emissions modelling tools are also used to evaluate the benefits of the superhighway, showing reductions in emissions and increase in accessibility, especially in the

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															central part of urban area (+).
Aldred et al. (2021)	✓	-	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	✓	-	✓	✓	-	-	-	-	-	✓	✓	Case study in London (UK) to assess the equity in the development of 72 Low Traffic Neighbourhoods (LTN) during COVID-19. A spatial equity approach revealed that LTNs have been broadly equitable as a whole (+). Differences in LTNs implementation at district level created inequalities especially for low-income household without access to private car living in areas predominantly car-dependent and with limited access to public

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															transport in the area (-).	
Anciaes and Jones (2016)	✓	-	✓	-	✓	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	Case study in London (UK) to test interventions to reduce barriers to walking through changes in layouts of local street network and redesign of road with addition of crossing facilities, speed limits and reallocation of road space for pedestrians. All implementations improved the walking environment overall (+). Changes in street layout reduce delays and improve the walking environment (+), but potentially

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															increase trip distance and risk of collisions (-). Addition of crossing facilities reduced risks (+) but did not decrease delay (-). Reduction of vehicle lanes reduced distance and delay (+) but increased risk.
Anciae s and Jones (2018)	✓	-	✓	-	✓	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	-	-	Case study in London (UK) exploring pedestrians' preferences regarding types of crossing facilities based on safety, convenience, time, accessibility, and personal security. Footbridges and underpasses were systematically reported in a

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															negative way due to lack of accessibility and concern over personal security (-). Participants were also willing to walk more distances and time to avoid such facilities (-), but also to use straight signalised crossing.
Arellana et al. (2020)	-	✓	-	✓	✓	-	-	-	-	✓	-	-	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	-	-	-	-	-	✓	-	Case study in Barraquilla (Colombia) to test a Bikeability Index (BI) tool to assess and prioritise NMT infrastructure investments and improve accessibility for cyclists, with specific focus on Global South context. Factors for the BI comprise directness and

Reference	Global		Active travel		Transit		Travel behaviour				Travel barriers				Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility			
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age		Gender	Low-income	PLWDs
																															coherence, comfort and attractiveness, traffic safety, security, climate, presence of cycling infrastructure, cost of the trip. Safety emerged as critical for cyclist commuting and shopping (-), while presence of cycling infrastructure for sport activities (+). BI tool can be useful to understand investment allocation and reduce transport inequalities, especially among vulnerable groups that are forced into captive mobility (+).
Becker (2011)	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	✓	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	Case study with key informant

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															interviews investigating barriers for NMT infrastructure development in Nairobi (Kenya). Although existing policies stress the benefits of active travel, transport infrastructure development in Nairobi is focused on private motorized transport (-). Several themes emerged from the interviews, including land-use planning; institutional setup and stakeholder role; integration of transport policies; economic implications of transport strategies; transport; social

Refere nce	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															issues and poverty; road safety; environmental pollution; NMT in existing projects; design manuals; drivers’ behaviour. The author stresses the needs for increased awareness and education programmes for all groups of society to better understand the role of NMT and its benefits (+).	
Braun et al. (2019)	✓	-	-	✓	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	Study exploring social equity access to cycling infrastructure in 22 large US cities using data from the American Community Survey. Criteria explored include presence of bike lines, average

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															length, coverage, reach and distance to nearest cycle lane, in addition to socio-demographic characteristics. Findings indicate evidence of disparities in access to bike lanes by race, ethnicity, and socioeconomic status (SES) at the block level group (-). Lower educational attainment was associated with a reduced likelihood of having bike lanes, lower bike lane coverage and proximity (-). Policy implications from the study comprise creating strategies for improving equity

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															goals in planning development and understand the role of cycling for disadvantaged groups to access opportunities (+).
Caggiani et al. (2020)	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	Study proposing a model simulation for bike-sharing systems (BSS) station location based on an equity lens. The Theil index is used in the model to calculate equity. Results indicate the model can be an effective tool to provide multimodal BSS-public transit accessibility (+) and the potential to improve accessibility to other modes

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															such as LTRs and metro.
Cunha and Silva (2023)	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	✓	-	Case study in Lisbon (Portugal) to test the tool for addressing relative equity impacts of bicycle planning (TIRE). The tool provides micro-scale assessment of cycle network allocation on the accessibility level of different socioeconomics groups. TIRE enabled the identification of hotspots where equity distributions of cycling networks and accessibility levels were below the municipality average (+). The tool helped practitioners to identify areas of

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the city that require specific attention and develop equity-oriented strategies for cycling infrastructure allocation (+).
Curl et al. (2020)	✓	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	✓	✓	✓	This report considers the social and distributional impacts of mode shift policies. Describes the potential impact of policy levers to encourage people to change modes from an equity perspective. Provides an assessment of the impact on people with different income levels and geographical/residential distribution. Outlines what, if

Refere nce	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															any, primary research is required for determining the social impact assessment of mode shift and the most appropriate method for this.
Doran et al. (2019)	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓	✓	-	-	-	✓	-	Study looking at cycling equity by evaluating if and how transport plans in Canada are addressing equity and the ways in which planning practice can more effectively provide for it. 25 Plans were assessed according to socio-spatial network analysis, consideration of equity in projects and priorities, equity- oriented funding

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																																mechanisms and accessibility, design, and safety. Findings indicate that despite some successful examples, most plans make limited or no efforts to address and operationalize equity (-.) To advance the pursuit of cycling equity, effective methods of analysis must be employed, together with locally tailored engagement and decision-making processes addressing the needs residents, especially the most disadvantaged ones (+).
Fast and	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	Evaluated sidewalk width in

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Guo (2021)																															the City of Calgary, Canada. Provided suggestions for improving accessibility.
Goodman et al. (2014)	✓	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	-	-	-	-	-	-	-	Study looking at impacts in terms of increased physical activity linked with walking and cycling infrastructure development. Findings provide evidence that improved, high-quality, traffic-free routes for walking and cycling can lead to help to increase overall physical activity levels in the local population (+).
Gori et al. (2014)	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	"This paper presented an analysis of walking indicators related to the

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															structure of the road network, differentiated by measures of the quality, connectivity, and proximity of the road network. These measures were computed for various zones of the city of Rome and for the historical centre of Lucca and Venice in Italy"
Guzman et al. (2020)	-	✓	✓	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	✓	-	"This paper developed an econometric trip length model that correlates socioeconomic characteristics and built environment conditions with walking travel distances in the city of Bogotá, Colombia."

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Jenkins et al. (2020)	-	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-	✓	-	-	-	✓	✓	✓	-	-	The study uses "a technographic frame to describe and assess the socio-economic and technical impact of upgrading inter-village footpaths to render them usable by motorcycle taxis in off-road rural northern Liberia. Baseline data and post-intervention impact data was obtained over a three-year period in villages benefitting from the intervention and in control villages. The study found that upgrading rural footpaths to motorcycle taxi accessible tracks promotes market integration (+), improves access

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															to education and health facilities (+), and creates jobs for rural youth (+), with few negative consequences.
Kent (2017)	✓	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	✓	✓	An MSc thesis which assessed "the performance of the existing and proposed network in city of Baltimore, USA, in terms of accessibility and equity.
Kent and Karner (2019)	✓	-	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	Study proposing new methodology to assess reductions in Bicycle Level of Traffic Stress (LTS) and integrate evaluation of project prioritization criteria, accessibility to everyday

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															destinations and social equity. Six accessibility performance measures are developed and evaluated in a case study with 278 neighbourhoods in Baltimore (USA), used in combination with four demographic indicators.
Ledsham et al. (2022)	✓	-	-	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	✓	-	Case study in Toronto (Canada) focusing on understanding factors influencing utilitarian and recreational cycling in low-income sub-urban contexts. Findings indicate that frequency of recreational cycling was a strong predictor

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															for utilitarian cycling. Interventions to increase cycling in sub-urban areas, especially from a utilitarian point of view, should focus on groups rides, access to bikes and repairs, and ways to meet people that cycle.
Loo and Siiba (2019)	-	✓	✓	✓	✓	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Study proposing a strategic framework to guide national active travel policy formulation and administration. A case study is used to test the framework focusing on reviewing active travel policy strategy in seven African countries (Ghana, Kenya, Malawi, Rwanda,

Refere nce	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Nigeria, South Africa, and Uganda). The framework comprises of nine components: policy vision, policy objectives, intended outcomes, action plan, monitoring and evaluation, research and development, quantitative modelling, institutional framework, and funding. Results indicate that countries with specific active travel policies performed better compared to those with general transport policies covering active travel.

Refere nce	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Mahmo udi (2022)	✓	-	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	Study exploring the impacts of NMT on examining self- assessed health status. The study uses data from the 2017 US National Household Travel Survey. Findings suggest that more effective policies to promote individuals’ health through changes in travel behaviour and built environment design can encourage more active travel, more active lifestyle and increased level of public transport accessibility, land use density and reduced use of private motorised

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transport through decreased levels of car-friendly street networks.
Márquez et al. (2021)	-	✓	-	✓	✓	-	✓	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	Case study in Bogota (Colombia) looking at safety perception of bike lines and the intention of using cycling as a feeder mode to BRT. A set of scenarios are explored based on buffers with planters, buffers with safe-hit plastic posts attached to the street surface and painted/non-painted buffers. Findings indicate that providing painted and coloured pavement, buffers with planters or

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															buffers with safe hit posts increase both the safety perception and the potential demand of the bicycles as a feeder mode to BRT (+).
Nimegeer et al. (2018)	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	In this paper, outcomes related to social connectivity and active travel have been attributed to a new road, a five-mile (8 km) extension to the M74 motorway in Glasgow, but in more complex ways than previously described. "Findings suggested that a number of factors influenced the active travel of residents, some

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															of which resonate with current understandings of severance, although many were not related to the motorway.”	
Ragland and Orrick (2011)	✓	-	✓	✓	✓	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	“The study reviewed and assessed various policies in the USA on active transportation. “Policy 1: Encourage block size limits that are conducive to walking Policy 2: Encourage appropriate location of key community destinations to increase active transportation Policy 3: Incentivize land use patterns that are conducive to active transportation.

Refere nce	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															References to various relevant policies are provided throughout the report.”
Risimat i et al. (2021)	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	Study exploring the extent of the spatial integration of NMT and urban public transport infrastructure in Johannesburg (South Africa). Findings show that cycling activities are separated from urban public transport infrastructure, the city transport system shows spatially fragmented commuting and cycling operations, due to limited/ no sharing of infrastructure. Most public

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transport stations are not easily accessible for NMT and have inadequate cycling facilities, making it impossible to cycling for the first/last mile trips (-). Authors suggest the identification of urban public transportation catchment area is essential for Johannesburg, and this can be used as a tool for planning infrastructural upgrades and predicting potential public transport ridership while also assessing the impacts of investments in transit planning (+).

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Salon and Gulyani (2019)	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	✓	✓	✓	-	Study investigating commuting patterns in different cities in Kenya. Findings shows that Kenyans predominantly walk or use matatus (minibuses) for commuting. Walk commuters have relatively short commute times but are often subject to dangerous travel conditions during their journeys, mainly due to safety issue and trains and lack basic infrastructure such as sidewalks and crosswalks (-). Findings highlight the needs to interventions focused on

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															investments on NMT infrastructure such as sidewalks and footpaths, lighting, and safe crosswalks, notably absent in much of urban Kenya today.

Table A-6: Vulnerable groups

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Adhvaryu et al. (2019)	-	✓	✓	-	-	✓	✓	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	✓	✓	Public Transport Accessibility Level (PTAL) was used in the study "to measure accessibility at various location in

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															the Surat city, India and spatially visualised it." A comparison was conducted with City of Ahmedabad.
Agarwal et al. (2010)	-	✓	✓	-	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	✓	-	-	-	✓	-	-	-	✓	-	-	✓	Study focusing on how barriers experienced by children living with disabilities reduce access to facilities and services. Main issues include structural barriers, unauthorised objects on pavements and unintended hazards (-). Guidelines are provided to improve

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															accessibility of this group, including better signage, universal accessibility and traffic management, school buses and safe movements of children (+).
Al-Mansour (2010)	-	✓	✓	-	-	✓	-	-	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	Study focusing of guidelines, technical manuals, and policies to improve accessibility to transport and public spaces of PLWDs and older people in UAE (+). Documentation produced through transportation

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															n through the cooperation of key stakeholders including PLWDs, professionals, officials and decision-makers from ministries and other government departments (+).
Al-Rashid et al. (2020)	-	✓	-	-	-	✓	-	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	Gender-focused study exploring travel experiences and challenges of women in Saudi Arabia. Results indicate there is a need for more gender-responsive design and infrastructure

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															(-). Women rely significantly on taxis due to poor public transport service provision (-), although experiencing issues related to privacy and a sense of insecurity when traveling alone or with their children. The study provides a gender audit prototype framework for a more inclusive and gender-responsive public transport system (-).

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Allen and Farber (2019)	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	✓	-	The study explores vertical inequalities in access to employment in Canadian cities to estimate the link with of transport poverty. Recommendations to reduce inequalities in transit accessibility include focusing transit investments in areas with high concentrations of low-income households and low levels of transit accessibility, upgrading bus levels of

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															service, intensification and diversity of land-use and subsidizing ridesharing and demand-responsive transit (+).
Allen and Farber (2020)	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	✓	-	Study tests a framework in the Greater Toronto and Hamilton Area (GTHA) to explore the links between public transit accessibility and the risk of social exclusion (+). Neighbourhoods with high concentrations of low-income and zero-car households distant from

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															major transit corridors at the most at risk of social exclusion (-).
Anyache belu (2019)	-	✓	-	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	-	✓	✓	-	✓	-	-	-	✓	-	-	-	-	-	✓	-	Case study in the Valley of Aburra, Medellin (Colombia), showing the impacts of the Sistema Integrado del Valle de Aburra (SITVA), comprising LRT, Buses, Metro cable and cycling infrastructure (+). The network was developed through participatory planning mechanisms, allowing alignment between desires of

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															residents, the municipality, and partnerships with the private sector (+).
Castro et al. (2022)	-	✓	-	-	-	✓	✓	-	-	✓	-	✓	-	✓	✓	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	✓	-	Case study in Lagos (Nigeria) to explore how travel time and costs lead to transport-related social exclusion in suburban low-income communities. Poor public transport associated with high opportunity costs translate into barriers to accessing public amenities for basic needs

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															and to improve life opportunities (-).
Cao et al. (2019)	-	✓	✓	-	✓	-	-	-	✓	-	-	-	✓	-	✓	✓	-	-	✓	-	-	✓	✓	-	-	-	✓	-	-	-	Walk-along interviews used to explore out-of-home accessibility barriers experienced by older people in Singapore in terms of access to facilities, public transit, walking infrastructure, road and personal safety, wayfinding, affordability, and maintenance (-). Findings stress the needs for universal design

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															approach for infrastructure development (+).
Chakwizi et al. (2010)	-	✓	✓	-	-	✓	-	-	✓	✓	-	-	-	-	✓	✓	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	✓	PLWDs in rural South Africa face similar challenges to those living in urban environment, i.e., service provision and reliability, costs, stigma, and lack of awareness of their mobility needs, comfort on board (-), while travel information was found to be not an issue. The findings outline the need for more user-friendly

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															inclusive design methodology tailored to rural travel and mobility constraints (and not copy and pasted from urban settings) and opportunities for PWDs.
Chen et al. (2022)	✓	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	Three perception-based transportation disadvantages were assessed, namely: high costs or efforts, limited, physical abilities, and opportunity inaccessibility, using online panel data South

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Carolina, USA. Hotspot analysis was used which showed no statistically significant spatial relationships between the three considered disadvantages. Link was found between perception-based disadvantages and the built environment and minority, poverty, and aging population. It also showed that higher residential density is associated with less physical disability and

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															less opportunity inaccessibility . Multimodal network density was identified with a negative correlation with cost/effort disadvantages. The ratio of transportation costs to household income was found positively associated with physical disabilities. Minority areas perceive more physical and accessibility disadvantages.

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
Crisp et al. (2018)	✓	-	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	Case study looking on how transport barriers affect job opportunities in low-income neighbourhoods in the UK. Public transport affordability, service provision and reliability seen as a barrier (-) especially in connection with nature and location of employment (-). The study provides policy recommendations, with a strong focus on strategic and

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															coordinated actions in terms of mobility needs of low-income users, more accessible system through technology (for information mainly), spatial planning framework and tools and integration between transport and employment policies (+).
Oviedo Hernandez and Titheridge (2016)	-	✓	✓	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-	✓	✓	✓	A case study was carried out in Soacha (Colombia) to explore travel strategies of low-income and physically

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															segregated community through a transport-related social exclusion framework (+). Results show that travel strategies are shaped by limited travel choices due to institutional and geographical dislocation through trade-offs between costs, time, comfort, and security (-). Participants increased their accessibility by relying on informal supply and transactions for accessing

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transport and opportunities (+).
Iqbal et al. (2020)	-	✓	-	-	-	✓	-	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	✓	✓	-	Case study on gender transport poverty on Karachi (Pakistan). Women in Karachi face significant inequalities due to reduced transport options and issues on public transport such as lack of seats, poor service provision, affordability, and harassment (-). These issues translate into strong mobility, accessibility,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															time, and affordability poverty (-). Findings from the study highlight the needs for gender-inclusive transport policies, with better understanding of gender-based mobility needs and social dimension of transport, especially for personal safety and security while travelling (+).
Jahangir et al. (2022)	-	✓	✓	-	✓	✓	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	-	✓	✓	✓	-	Barriers experienced by older people in Dhaka (Bangladesh) while using

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															public transport include boarding/alighting due to overcrowd and busy roads, onboard comfort, ageist behaviours from both operators and passengers (-). These barriers affect older people ability to access work and social opportunities , contributing to their social exclusion (-). Findings stress the need for more inclusive transport policies.

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															Suggestions include "older people-only buses" or "women-only buses," implementation of short-distance services through rickshaws and improved walkability according to age-friendly cities guidelines (+).
Jennings et al. (2022)	-	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	Study proposing a gender and mobility assessment tool using South Africa as pilot country (+). The tool identifies 31 measures grouped into

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															10 topics: Integrated transport planning and user needs, Gender mainstreaming, Personal security, Road safety, Knowledge sharing and co-ordination, Data collection and analysis, Women as transport workers, Infrastructure and access, Social and environmental impact, Stakeholder engagement and consultation (+).	
Lucas (2010)	-	✓	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	Study focusing on role of

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															transport for social exclusion of low-income people in South Africa. Main issues are linked with high costs of transport in relation to income, poor availability of public transport services, crime and safety, access to employment, healthcare and education, and social activities (-). Policy recommendations include reduce/subsidising cost of travelling by public transport,

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															improve service provision, regulate structure of minibuses, improve conditions at waiting areas and provide affordable housing in proximity to employment and other key activities (+).
Mejia-Dorantes (2017)	-	✓	✓	✓	-	-	✓	-	✓	✓	-	-	-	✓	✓	✓	-	✓	✓	-	-	-	-	-	-	-	-	✓	✓	-	Project explores gender-related transport disadvantages experienced in Mexico City including insecurity, travel costs, time poverty, reduced access to job opportunities

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															(-). Findings address the need for inclusive transport policies and infrastructure development (+).
Mogaji and Nguyen (2021)	-	✓	✓	-	✓	✓	-	-	✓	✓	-	-	✓	-	-	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-	-	✓	Study looking at travel satisfaction of PLWDs in urban and rural Nigeria. Participants experienced anxiety issues linked with the experience of travelling with public transport due to stress of getting to the bus stop, struggle to get a sit and poor attitude of other passengers and bus

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															drivers (-). Transport operators and transport/urban planners need to recognise needs of PLWDs and meet their mobility needs. Service providers could explore the potential to offer specialised transport services. Organization working with PLWDs can provide training to raise awareness of on available options and resources (+).

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
Nogués and González - González (2022)	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	✓	✓	"This study aimed to assess the existence of different types of areas inside peripheral regions that respond differently to the construction of new high-capacity roads, conditioning the achievement of cohesion goals. These disparities were explored through a detailed intraregional analysis of the peripheral Spanish Northwest Area over a 25-year

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															period, through the identification of spatial categories that group homogenous areas in attention to three criteria: socio-economic development, spatial dynamics of urbanization and accessibility improvements." The results showed that "with accessibility improvements regressive areas decreased and dynamic ones increased over time, but this

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility	
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs		
																															transformation did not translate into an improvement in socio-economic intraregional cohesion.”	
Ugboma (2019)	-	✓	✓	-	✓	✓	✓	-	✓	✓	-	-	-	-	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	Study looking at accessibility to public transport of PLWDs in Nigeria. Public transport lacks design, facilities, and assistance for PLWDs needs, making them excluded from independent access to employment, education, healthcare, social contact, and

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															recreational facilities (-). Additional issues include poor walking infrastructure and poor attitude of drivers and other passenger (-). Universal design approaches for bus design and built environment are identified as crucial to reduce transport inequalities of PLWDs (+)
Ruvolo (2020)	✓	-	✓	✓	✓	-	-	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	Study exploring transport needs and barriers of PLWDs in San Francisco

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															(USA) in relation to ride hailing. Participants reported barriers related to physical and sensory inaccessibility linked with presence of improperly parked scooters and shared bikes on pathways (-). Poorly maintained walking infrastructure also affect their mobility needs (-). Recommendations include advocating for more effective wheelchair accessible vehicles, address the issue of

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															scooters and bikes on sidewalks and build a safer transport infrastructure to reduce conflicts between transport modes (+).
Tanzarn et al. (2014)	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	-	✓	-	-	Review of legal and institutional frameworks in place in Uganda to understand gender-related issues in the transport sector. Findings show limited knowledge of national gender policies, low representation of women among

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															engineering graduates, challenges in promoting gender equality and empowerment (-). Policy recommendations provided include more inclusive transport policies and gender criteria in road projects, promotion of gender equality in labour-based road works and focus on differences between the urban and rural context (+).
Ureta (2008)	-	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	-	-	-	✓	-	Case study looking at the

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (–) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															relationship between mobility, accessibility, and social exclusion of low-income population in Santiago (Chile). Geographical location, distance, time, job, and education opportunities are identified as main barriers leading to social exclusion (-).
Ugboma (2019)	-	✓	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	“PWDs make up about 10% of the world’s population of which 20% of global population living in poverty is

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															associated with disability. Despite the commitment of the UN to the rights of PWDs and the immediate need for PWDs exercise their rights without discrimination, disability was largely invisible in the implementation, monitoring and evaluation of the MDGs. PWDs are vulnerable, most deprived and fall outside the reach of social services

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															provided by the government. Faced with a growing PWDs populations, the Lagos State in Nigeria has a task in ensuring that the public transportation system is inclusive. In analysing the interviews from some disabled commuters and evaluating the existing public transport infrastructures on ground, this study elaborates on areas that will help transport policymakers

Reference	Global		Active travel			Transit			Travel behaviour				Travel barriers					Externalities					Geographical context				Socio-demographic				Description & Outcome: positive (+) or negative (-) accessibility
	North	South	Walkability	Cycling	NMT infrastructure	Bus	BRT	LRT	Travel options	Modal choice	Multimodality	Trip chain	Distance	Time	Affordability	Service provision	Service reliability	Job	Opportunities	Air pollution	Noise pollution	Traffic	Urban	Sub-urban	Peripheries	Rural	Age	Gender	Low-income	PLWDs	
																															in providing adequate urban mobility and accessible transportation for people living with disabilities."

7. APPENDIX B

The paper to be presented in the 27th World Road Congress in Prague, Czech Republic, October 2023.

Assessing social equity and accessibility of transport systems for people with disability in Kenya

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Abstract – Social equity can be associated with all road practices and policies that ensure fair and just transport in terms of mobility, access and costs allocated to the transport infrastructure. Equally, social accessibility reflects the attribute of transportation infrastructure and systems that enables affordable and accessible mobility for different users' context. The implementation of these two aspects could be challenging in transport systems, particularly in the low- and middle-income countries (LMICs) due to the limitations associated with costs and policing. In this paper, we assess social equity and social accessibility provided to people with disabilities (PWDs) in transport systems of Nairobi, Kenya. To achieve this, a mixed-method approach was employed, comprising three set of data collection: (a) a systematic literature review of the current practices was undertaken, (b) a set of questionnaires involving roads authorities and service providers; and (c) Key-informant-interviews (KIIs) with decision makers in road and transport authorities, service providers and bus designers and manufacturers, as well as with PWDs associations and NGOs advocating for fair and inclusive transport. The study assessed current practices and challenges in transport of PWDs, with the aim of informing relevant stakeholders in a planned workshop. The findings show that social equity and accessibility provided to PWDs in transport systems of Nairobi could be improved significantly. The systematic literature shows that challenges faced by PWDs in transport systems of Kenya are less known, with limited rigorous research around the topic. Data collected from the questionnaires highlight that good policies are available at the level of public institutions, but these policies have not been fully implemented. Finally, findings from the KIIs indicate that there is palpable lack of coordination on programmes that should improve inclusivity in the Kenyan transport systems and alleviate the heavy burden on the PWDs shoulders.

Key words: Road transportation, social equity, social accessibility, mobility, PWDs, policy, LMICs.



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