Gender-Inclusive Public Transportation System: A Global Trend

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DOI: https://doi.org/10.47772/IJRISS.2026.100800428

Received: 20 August 2026; Accepted: 25 August 2026; Published: 07 September 2026

ABSTRACT

Gender-inclusive public transport has been the focus of scholars because of the growing significance of equitable mobility, accessibility, personal safety, social inclusion, and sustainable urban development. However, this body of literature is scattered among different disciplines, and a systematic study of its intellectual development, thematic organisation, geographical works, and international cooperative relationships is required. This study systematically conducts a comprehensive bibliometric analysis to build a map of the knowledge and development process of gender-inclusive and gender-responsive research related to public transportation from 2016 to August 2026. Bibliographic records were retrieved from the Scopus database, where an advanced search with the words, "Gender-Inclusive" OR "Gender-responsive" at the title level was performed. Through a systematic screening and refinement process, 762 publications were retained for further analysis. Annual publication growth, citation counts, co-occurrence of keywords, geographical contribution, and country-level co-authorship networks were analysed using Scopus Analyser, OpenRefine, and VOSviewer. This shows a substantial rise in the number of publications, from 16 in 2016 to 137 in 2025 and 134 from January to August 2026. The United States was the biggest contributor (209 publications, 2,756 citations, and total co-authorship link strength of 123). The most recurring keyword was "gender-responsive" (136), and gender had the highest total link strength (183), indicating its primary place in the knowledge network. In summary, the results reveal a rapidly expanding, multidisciplinary, and geographically uneven research landscape, highlighting the potential for improving international collaboration, novel research areas, and developing more integrated, gender-responsive, equitable, and sustainable public transportation systems.

Keywords: Gender-inclusive transportation; Gender-responsive transportation; Public transportation; Gender equality; Sustainable mobility.

INTRODUCTION

Understanding a gender-inclusive and sustainable public transport system is not just a mobility service but a key urban institution that impacts environmental performance, economic opportunity, and the ability to access public life. Public transport plays a key role in urban sustainability discussions, as road transport is a critical source of urban air pollution, greenhouse gas emissions, and energy consumption. If public transport is well implemented and widely used, it can contribute to the decongestion of urban areas and more sustainable transportation (Rivero Gutiérrez et al., 2021)(Monteiro et al., 2024) (Sánchez Toledano et al., 2025). In parallel, sustainability in transport is often perceived as multi-dimensional with environmental, economic, social, and governance targets, going beyond the engineering efficiency-only solutions that have traditionally dominated the approach (Fernando et al., 2021) (Romero-Ania et al., 2026) (Fernando et al., 2026). In the case of public transport, this

wider context is particularly relevant, as higher ridership, fleet modernisation, or both have not proven sufficient to ensure an accessible, safe, financially viable, or equitable system for vulnerable populations (Fernando et al., 2026; Romero-Ania et al., 2021). There is also a clear prescription for the international policy focus: sustainable urban transport must put gender at the heart of the sustainability agenda and cannot be treated as a social add-on (Duri et al., 2025; Fernando et al., 2026; Tan et al., 2025).

However, many public transport systems are still built on the assumption that they are not reflective of women and marginalised gender travel patterns. Evidence from different geographies demonstrates that women are more reliant on public transit than men, have less access to private vehicles, and use public transport more for care-related and more complex journeys, as well as often travelling at off-peak times, carrying babies and belongings, beyond the traditional hourly peak commuting role model (Kacharo et al., 2022; Yasar and Basaran, 2025). Such a lens in transport planning reinforces the failure to consider these patterns, leading to transport systems that hinder and limit women's social participation (Tan et al., 2025; Yasar and Basaran, 2025). As demonstrated by experiences across South and Southeast Asia, women's mobility constraints are not solely tied to the quality of the service, but are the result of low levels of transport services, poor data, protection laws, and social beings that systematically ignore or allow harassment and victim-blame as a common social occurrence (Sil et al., 2023). This is paralleled by similar trends in low- and middle-income countries, where the connectivity of women's first and last-mile travel is constrained by the lack of pedestrian safety, pedestrian infrastructure, feeder connectivity, and the norms and patterns of travel, which are gendered, reducing the availability, acceptability, and affordability of travel (Roy et al., 2024). Thus, emissions per vehicle and cost per kilometre cannot be the only criteria for assessing a sustainable transport system, but also the real increase in mobility for those who have to date had limited mobility.

Safety is likely the most apparent intersection between gender inclusion and sustainability. Throughout the literature, harassment, intimidation, psychological abuse, assault, and violence in general in and around public transport are consistently identified as significant challenges for women's mobility, confidence, and equal access to urban life (Araya et al., 2022; Duri et al., 2025; Kacharo et al., 2022). Kacharo et al. (2022) revealed that in Hawassa, over half of women and girls using the public transport system reported having experienced more than one category of violence, indicating that the problem is not isolated but a systemic experience in travelling for many women and girls. In South and Southeast Asia, the situation seems particularly serious, and according to some evidence reviewed, very high percentages of female public transport users experience lifetime exposure to harassment, while sexual harassment is perceived as an overall threat on a daily basis (Sil et al., 2023). These risks are not limited to in-car use. Women feel that people in the transportation sector can take greater steps to make them feel safe and secure while waiting, walking to access a service, or walking through poorly lit and maintained streets, not just steps that can be taken from the inside of the transportation vehicle but the complete journey (Araya et al., 2022; Duri et al., 2025; Roy et al., 2024). Safety perceptions also influence behavioural changes, such as modifying travel routes in real time, avoiding certain areas, changing destinations, travelling less frequently, or self-protective strategies to cope with systems they lack complete trust in (Yasar and Basaran, 2025; Singh and Yadav, 2026; Duri et al., 2025). These changes have social consequences, as they lead to job loss, limited access to education and health care, exclusion, and poor social sustainability of the transport system (Sil et al., 2023; Tan et al., 2025; Yasar and Basaran, 2025).

The sustainability agenda calls for transport systems that are not only operationally viable and socially just but also environmentally responsible. Urban public transportation studies highlight that vehicle choices directly affect emissions, air quality, fiscal budgets, and long-term policy credibility, while multicriteria methods are progressively used to assess both economic and environmental performance (Fernando et al., 2026; Romero-Ania et al., 2021). In analyses conducted in Madrid, plug-in electric buses emerged as the most environmentally and economically sustainable option; however, gradual replacement plans were preferred because of budget constraints, making phased transition strategies necessary (Rivero Gutierrez et al., 2021; Romero-Ania et al., 2021). Other evidence also indicates that bus and metro systems can show similar efficiency; thus, the question of sustainability cannot solely be addressed by mode choice without considering planning, service design, and context (Sanchez Toledano et al., 2025). Public transport coverage can be extended by first- and last-mile connections, such as shared micromobility, particularly when these are integrated rather than operating as stand-alone services (D'Acierno et al., 2022). Nevertheless, the literature cautions that technological upgrades and smart mobility platforms must be complemented by institutional capacity, subsidies, regulations, and actions

related to affordability, car dependence, and cultural barriers to mode shift (Fernando et al., 2026; Ho and Tirachini, 2023; Monteiro et al., 2024). Therefore, sustainability requires coordinated transformation across vehicles, infrastructure, pricing, and governance.

This must be coupled with a human-centric approach to transportation and design, fair governance, and a focus on the lived experience of citizens if a public transportation system is to be truly gender- and environment-inclusive. Recent research on intelligent transport and Mobility as a Service provides potential for future developments in terms of real-time information, monitoring, flexibility, and features geared towards safety. However, it also highlights that less consistent work is being done in the area of social sustainability and governance compared to environmental and economic performance (Fernando et al., 2026). Across six countries, survey studies have revealed a desire for more security-focused features of MaaS for women, real-time tracking, and customisation of such service bundles (Tan et al., 2025). Participatory street-level interventions also indicate that accessibility, mobility, and safety issues may be solved with inclusive design processes, not just by changing public transport vehicles. Policy research likewise highlights the need for frameworks that establish a fair balance between the financial sustainability and social responsibility of operating a mobility service, planning that leverages data to forecast demand for mobility, and socio-technical models that link human activities to the design of mobility infrastructure, thus aiming for equitable and accessible cities (Eriskin, 2024). Throughout this space of evidence, one consistent finding emerges: for public transport to become truly sustainable, it must reduce emissions and increase access simultaneously, and to become truly gender-inclusive, it must bolster safety, affordability, accessibility, and dignity across the public transport system (including vehicles, stations, streets, data systems, and institutions) (Araya et al., 2022; Fernando et al., 2026; Kacharo et al., 2022; Tan et al., 2025). Therefore, the concept of gender-inclusive and sustainable public transport should not be seen as an exclusive solution for a specific group of users but as a model of how future mobility can be improved for all, cleaner, safer, fairer, and more resilient.

Research Questions

RQ1: How has scholarly research on gender-inclusive public transportation systems evolved in terms of publication output from 2016 to August 2026?

RQ2: Which publications have exerted the greatest scholarly influence on gender-inclusive research relevant to public transportation, as measured by their citation impact?

RQ3: Which countries are the leading contributors to gender-inclusive public transportation research in terms of publication productivity and citation impact?

RQ4: What are the dominant and emerging research themes within gender-inclusive public transportation research, as revealed through a keyword co-occurrence analysis?

RQ5: What patterns of international research collaboration characterise gender-inclusive research relevant to public transportation, as revealed through country-level co-authorship networks?

METHODOLOGY

Bibliometric analysis is a method that systematically collects, organises, and compares bibliographic information retrieved from research publications using numerical parameters in a quantitative approach (Alves et al., 2021; Assyakur and Rosa, 2022; Verbeek et al., 2002).. In addition to common descriptive measures (publication trend, source outlet, and key author), bibliometric approaches can be used to examine the intellectual and conceptual structure of a research field using advanced techniques such as document co-citation analysis (Wu and Wu, 2017). The validity of a bibliometric review depends considerably on the use of a clear and systematic method, which includes steps such as constructing correct search terms, using proper search strategies and databases to retrieve texts, screening and refining commands, controlling text sets, and finally, performing a comprehensive analysis of the literature. Such methodological rigor assists in building a comprehensive and reliable knowledge base and increasing the reproducibility and validity of the findings (Fahimnia et al., 2015).

To this end, this study adopted a structured bibliometric approach to identify and examine influential scholarly contributions and the underlying knowledge structure of the research domain. Scopus was selected as the primary database because of its broad coverage of peer-reviewed scholarly literature and its established use in bibliometric research (Al-Khoury et al., 2022; di Stefano et al., 2010; Khiste and Paithankar, 2017). To maintain consistency and scholarly quality, the analysis was restricted to peer-reviewed journal articles, while books, book chapters, lecture notes, and other document types were excluded (Gu et al., 2019). Relevant publications indexed in Elsevier's Scopus database between 2016 and August 2026 were systematically retrieved, screened, and subsequently subjected to bibliometric analysis. This structured search strategy established a standardised dataset for assessing the development, intellectual foundations, and emerging patterns within the research field.

Data search strategy

The data collection process was conducted systematically and sequentially to ensure the transparency, relevance, and reproducibility of the bibliometric analysis. The scope of the study was limited to gender-inclusive public transportation systems, and Scopus was selected as the bibliographic database given its wide multidisciplinary coverage and appropriateness for bibliometric studies. The search was conducted based on the title of the article containing more than one word related to the original search terms: "Gender-Inclusive" OR "Gender-responsive" and articles in English. There were no a priori limitations on the type of source, document, or subject area. The publications covered were from 2016 to 2026, and the bibliographic data were collected on 7 August 2026; therefore, publication data for 2026 are only partial and should be interpreted accordingly. The search strategy returned 915 records, offering a wide body of potentially relevant publications from which to draw future publications for the next stage of eligibility assessment.

Second, all 915 records were systematically reviewed for substantive relevance to gender inclusion and responsiveness in the context of public transportation. Although the initial keywords captured the broader gender-inclusive literature, publications that did not meet the predefined inclusion criteria or were unrelated to the transportation context were excluded during screening. As a result, 153 records (16.7%) were removed due to irrelevance or failure to meet the eligibility criteria, leaving a final dataset of 762 publications (83.3%) for the bibliometric analysis. This screening stage was particularly important given that the concepts of gender-inclusive and gender-responsive are widely applied in other areas such as healthcare, education, agriculture, governance, and social policy. The resulting dataset, therefore, represents a more focused body of scholarship relevant to gender-inclusive public transportation, providing an empirical foundation for examining publication trends, geographical contributions, influential research actors, and the intellectual and thematic development of the field. This structured identification-screening-inclusion procedure reduced the influence of conceptually unrelated publications while establishing a transparent and replicable basis for subsequent bibliometric analysis.

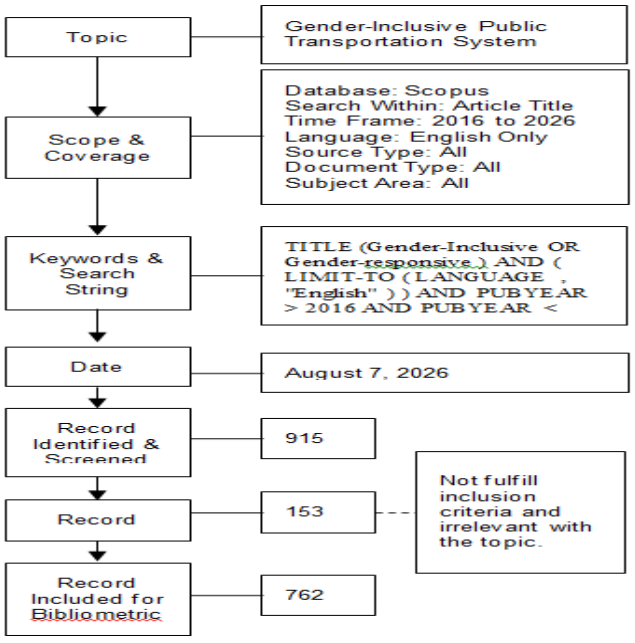


Figure 1. Flow diagram of the search strategy (Page, McKenzie, et al., 2021; Page, Moher, et al., 2021)

Data analysis

Developed by Nees Jan van Eck and Ludo Waltman of Leiden University, the Netherlands, VOSviewer is widely used for bibliometric mapping and visualisation (van Eck and Waltman, 2010, 2017). The software was designed specifically for scientific literature analysis and enables researchers to build and visualise complex bibliometric networks and uncover structural relationships within a body of knowledge. It supports a range of analytical techniques, including co-authorship, co-citation, bibliographic coupling, citation, and keyword co-occurrence analysis, which collectively facilitate the exploration of the social, intellectual, and conceptual structures of a research field. VOSviewer offers three main types of visualisation: network, overlay, and density, through which the strength, proximity, and clustering of bibliometric entities can be systematically examined. Its ability to process large bibliographic datasets and represent complex relationships in interpretable visual structures has led to its widespread use in bibliometric and science mapping research.

One important methodological advantage of VOSviewer is that it displays complex relational data as spatially organised bibliometric maps. In these maps, the nodes denote authors, publications, sources, countries, or keywords (bibliometric entities), and the links between the nodes signify relationships (bibliometric entities may show relationships with each other, individually with the map, or with the other nodes) with their respective node strength (citing or cited frequencies) representing the magnitude of the relationship. The clustering algorithm also creates clumps of strongly associated objects, allowing for the identification of the main research communities, thematic concentrations, and knowledge structures. With the help of co-occurrence analysis of keywords, it is possible to disclose the concept relationship between frequently used words and thus recognise predominant themes and research directions. Complementing these network structures, density visualisation can be used to show areas with a higher density of interconnected items. Together with visualisation and clustering functions, these functions offer an analytically sound way to describe how a research domain is structured, interrelated, and evolves.

The current study retrieved bibliographic records from the Scopus database covering publications between 2016 and August 2026 and exported them in a plain-text format. The extracted dataset contained essential bibliographic information, including publication year, article title, author names, source titles, citation counts, and keywords. The records were subsequently analysed using VOSviewer version 1.6.21, with VOS mapping and clustering techniques applied to construct and examine bibliometric networks. The VOS mapping approach positions bibliometric items within a low-dimensional space such that the distance between two items reflects their degree of relatedness, with shorter distances indicating stronger relationships (Van Eck and Waltman, 2010). The VOS approach is conceptually similar to multidimensional scaling (MDS) (Appio et al., 2014), but is specifically tailored to represent bibliometric similarity and incorporates normalisation procedures appropriate for co-occurrence data.

More specifically, VOSviewer applies the association strength (AS) normalisation method to determine the relatedness between pairs of items. Following Van Eck and Waltman (2007), the association strength between items i and j can be expressed as:

$$AS_{ij} = \frac{C_{ij}}{w_i w_j}$$

where the numerator denotes the number of observed co-occurrences between items i and j, and the denominator represents the total number of occurrences of the respective items. Thus, the association strength measure evaluates the observed co-occurrence of two items relative to the level expected based on their individual occurrence frequencies (Van Eck and Waltman, 2007). A higher association strength value indicates a comparatively stronger relationship between the two bibliometric entities. By combining association strength normalisation with VOS mapping and clustering, the analysis provides a systematic basis for identifying prominent thematic clusters, relationships among research topics, and the broader intellectual structure of the gender-inclusive public transportation literature.

RESULT AND DISCUSSION

RQ1: How has scholarly research on gender-inclusive public transportation systems evolved in terms of publication output from 2016 to August 2026?

Figure 2: Trend of research in Gender-Inclusive Public Transportation System by years

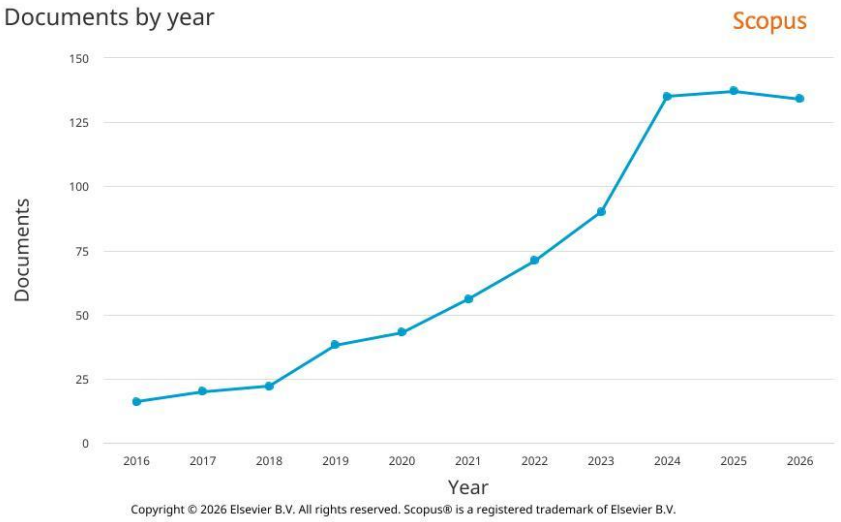


Table 1: Annual Publication Trends in Gender-Inclusive Public Transportation Research (2016–August 2026)

Year	Number of Publications	Percentage
2026	134	17.59%
2025	137	17.98%
2024	135	17.72%
2023	90	11.81%
2022	71	9.32%
2021	56	7.35%
2020	43	5.64%
2019	38	4.99%
2018	22	2.89%
2017	20	2.62%
2016	16	2.10%

The annual trend in publications illustrates the significant and growing amount of research dedicated to gender-inclusive public transport systems between 2016 and August 2026. In the early stage, the output of research publications was relatively small, slightly rising from 16 publications (2.10%) in 2016 to 20 (2.62%) in 2017 and 22 (2.89%) in 2018. A more pronounced upward trajectory emerged from 2019 onwards, with publications rising to 38 (4.99%) in 2019, 43 (5.64%) in 2020, 56 (7.35%) in 2021, 71 (9.32%) in 2022, and 90 (11.81%) in 2023. Therefore, the number of articles published on this topic increased by more than fivefold between 2016 and 2023, indicating that the subject has shifted from a somewhat 'fringe' issue to a more developed research

field in public transportation and studies on sustainable mobility. This growth may be attributed to increasing awareness that transport systems are not experienced equally by both men and women in terms of personal safety, accessibility and affordability, trip patterns related to care responsibilities, first and last mile connectivity, and access to socio-economic opportunities. One correlate to this trend is the renewed interest in transport by city transport researchers, who are increasingly shifting their attention from "old normal" efficiency-focused planning to more socially oriented and inclusive approaches, underpinning SDG 5 (Gender Equality), SDG 10 (Reduced Inequalities), and SDG 11 (Sustainable Cities and Communities).

A clear acceleration can be seen after 2023, with the number of publications rising from 90 in 2023 to 135 in 2024 and 137 in 2025, the highest number of publications recorded in a complete year in the dataset. More significantly, 134 publications were recorded by August 2026, which is 17.59% of the total range and just three fewer than the total publications in all the years of 2025. Therefore, the small numerical difference between 2025 and 2026 should not be considered a decrease; the only thing that the number for the first half of 2026 points to is that research activity in 2026 has been exceptionally strong and could end up surpassing yearly levels even with the small gap to 2025. The rapid expansion since 2024 could stem from the synergy between gender-inclusive transportation and the new research interests in smart mobility, transport justice, sustainable cities, and socially inclusive transport policy, universal accessibility, and gender-responsive urban planning. It also shows higher levels of maturity in the field, including a shift from a focus on documenting gender gaps to identifying interventions, from policy to infrastructure, service design, and digital technologies to participatory planning. Overall, publications are clustered in more recent years, reflecting the growing institutionalisation of gender in transportation sector research, but a large number of publications in the first eight months of 2026 suggests that the research field has not yet reached saturation.

RQ2: Which publications have exerted the greatest scholarly influence on gender-inclusive research relevant to public transportation, as measured by citation impact?

Table 2: Leading Authors and Publications by Citation Impact in Gender-Inclusive Research

No	Authors	Title	Year	Source title	Cited by
1	(Dwivedi et al., 2018)	Gender-inclusive gatekeeping: How (mostly male) predecessors influence the success of female CEOs	2018	Academy of Management Journal	204
2	(Ryan & El Ayadi, 2020)	A call for a gender-responsive, intersectional approach to address COVID-19	2020	Global Public Health	132
3	(Cao & Daumé, 2020)	Toward gender-inclusive coreference resolution	2020	Proceedings of the Annual Meeting of the Association for Computational Linguistics	113
4	(Vorvoreanu et al., 2019)	From gender biases to gender-inclusive design: An empirical investigation	2019	Conference on Human Factors in Computing Systems - Proceedings	112
5	(Orser et al., 2019)	Technology adoption and gender-inclusive entrepreneurship education and training	2019	International Journal of Gender and Entrepreneurship	105

6	(Chaney & Sanchez, 2018)	Gender-Inclusive Bathrooms Signal Fairness Across Identity Dimensions	2018	Social Psychological and Personality Science	95
7	(Stumpf et al., 2020)	Gender-inclusive HCI research and design: A conceptual review	2020	Foundations and Trends in Human-Computer Interaction	89
8	(Gumucio et al., 2020)	Gender-responsive rural climate services: a review of the literature	2020	Climate and Development	86
9	(Mittal, 2016)	Role of Mobile Phone-enabled Climate Information Services in Gender-inclusive Agriculture	2016	Gender, Technology and Development	77
10	(Rioux et al., 2022)	Sex and gender terminology: a glossary for gender-inclusive epidemiology	2022	Journal of Epidemiology and Community Health	74

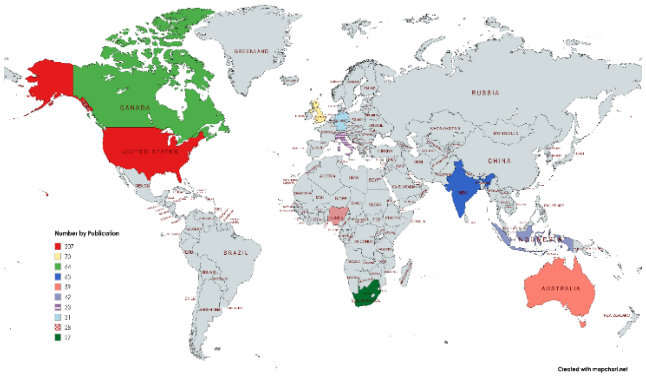
Table 2 shows that the most cited works in the field of gender-inclusive literature are spread across disciplinary fields, which means that gender inclusivity has emerged as a transdisciplinary rather than a discipline-specific research agenda. According to these measures, Dwivedi et al. (2018) had the most citations (204), which greatly outnumbered Ryan and El Ayadi (2020) (132) and Cao and Daumé (2020) (113). The visibility of Dwivedi et al. (2018) is perhaps partly explained by its being a very situated article in both of its themes, gender inequality and organizational governance, combined with its publication in the Academy of Management Journal which covers a wide spectrum of management and organisational studies. The other highly cited studies have diverse themes ranging from public health (Ryan and El Ayadi, 2020), artificial intelligence and natural language processing (Cao and Daumé, 2020), human-computer interaction and inclusive design (Vorvoreanu et al., 2019; Stumpf et al., 2020), entrepreneurship education (Orser et al., 2019), social psychology (Chaney and Sanchez, 2018), climate services (Gumucio et al., 2020), agriculture (Mittal, 2016), and epidemiology (Rioux et al., 2022). From the disciplinary dispersion highlighted here, it becomes clear that issues of gender inclusion have become multi-dimensional research concerns involving not only representation issues, but also institutional practices, technology design, accessibility, service provision, and equitable participation.

Additionally, the citation pattern reveals the nature of the intellectual home of gender-inclusive public transportation research. Notably, even if the number of citations ranges from 74 to 204, none of the ten most cited papers deal specifically with public transport, indicating that the most significant conceptual underpinnings for gender-inclusive scholarship lie outside the transport sector. This gap in the research highlights the need for theoretical integration. In line with existing highly cited studies, conceptions of gender inclusivity relate to a set of intertwined structural, technological, institutional, and service-based mechanisms, which are all readily applicable to public transport, where women's mobility experiences might be influenced by service design, accessibility, safety, institutional responsiveness, and information provision, as well as intersectional differences. Additionally, seven of the ten most-cited publications were published between 2018 and 2020, reflecting increased interest in research on transdisciplinary gender-responsive and inclusive approaches. The influence of the most important studies, including Ryan and El Ayadi (2020), further reinforces that the COVID-19 crisis acted as a significant trigger of gender-specific vulnerabilities within the context of major societal disruptions. Taken together, these findings suggest that the field of gender-inclusive public transportation is still an interdisciplinary research frontier and that there is ample opportunity to borrow from existing theories, frameworks, and measures of gendered aspects of other research fields, but also to invent additional theories, measures, and policy interventions tailored to the impact of public transport.

RQ3: Which countries are the leading contributors to gender-inclusive research relevant to public transportation in terms of publication productivity and citation impact?

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VIII August 2026

Figure 3 : Top 10 Countries/Territories by Number of Publications on Gender-Inclusive Public Transportation



The results of the geographical distribution indicated that research on gender-inclusive public transportation systems is driven mainly by publications from the United States (207 publications, 27.17%), followed by the United Kingdom (70 publications, 9.19%), Canada (64 publications, 8.40%), India (63 publications, 8.27%), and Australia (59 publications, 7.74%). American dominance suggests a strong institutional and scholarly focus on transportation, gender, social equity, accessibility, and urban mobility. This can be explained by the widespread research capacity in the country, the strong presence of research institutions working on transportation, the availability of mobility and demographic data, and the growing policy concerns about transportation equity and disadvantaged populations. Likewise, the heavy participation of the United Kingdom, Canada, and Australia might be due to their more advanced public transportation laboratories and increasing policy focus on inclusivity, urban planning, personal safety, and equity in transportation. These five countries together represent 463 publications, which is approximately 60.8% of the dataset, indicating a high geographical concentration of knowledge production. India's ranking at fourth is especially noteworthy because it reveals that gender-inclusive transportation can also be a policy research focus in a middle/far less-developed economy than those of the West. The adoption of gender-responsive transportation is significant in terms of the research problem and practical development optimisation because the size of India's contribution may be correlated with the high rates of urbanisation, reliance on public transportation over a large area, and gender disparities in mobility opportunities in high population density cities, as well as lingering concerns about women's safety and accessibility.

Additionally, the presence of Indonesia (42 publications; 5.51%), Nigeria (28; 3.67%), and South Africa (27; 3.54%) among the ten most productive countries highlights the growing relevance of gender-inclusive mobility in emerging and developing economies, while Italy (33; 4.33%) and Germany (31; 4.07%) reflect continued European engagement with sustainable and socially inclusive transportation. The participation of countries from North America, Europe, Asia, Africa, and Oceania indicates that gender inequality in transportation is a geographically widespread concern, although the underlying research motivations are likely to differ across the national contexts. Research on transport equity, universal accessibility, sustainable mobility, inclusive infrastructure, and embedding gender in existing transportation systems may become increasingly relevant in higher-income economies. In emerging economies, rapid urbanisation, infrastructure limitations, affordability, accessibility, safety, informal transportation, and unequal access to employment and essential services may shape the research agenda more strongly. The representation of Nigeria and South Africa indicates a growing awareness of gender and mobility challenges within African transportation scholarship, although the limited representation of many other developing countries points to a continuing geographical research gaps. Overall, the findings suggest that the literature is becoming more globally diversified but remains disproportionately shaped by a relatively small number of research-intensive countries. This imbalance justifies further comparative and cross-country research, particularly in underrepresented developing contexts, where gender-responsive strategies developed in higher-income settings may not be directly applicable, given the different socioeconomic, cultural, institutional, and infrastructural conditions, as well as varying women's mobility behaviours.

RQ4: What are the dominant and emerging research themes within gender-inclusive public transportation research, as revealed through keyword co-occurrence analysis?

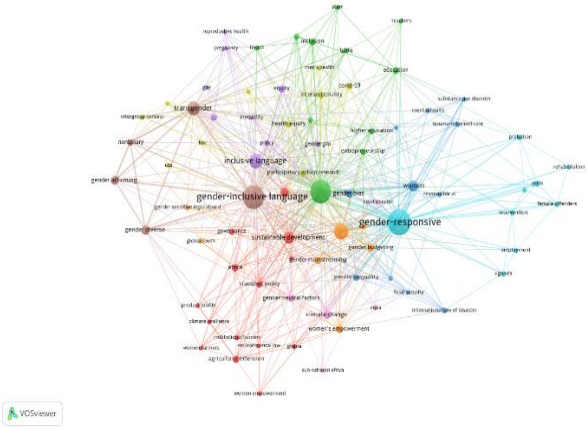


Figure 4: Network visualization map of keywords' co-occurrence

The network based on keyword co-occurrence shows a highly clustered knowledge space that is simultaneously very diverse, with "gender-responsive" as the strongest keyword by number of occurrences (136) and total link strength (TLS = 179), as shown in Figure 4. The most connected word, "gender" was used in 111 cases and had a TLS of 183, indicating that it serves as the primary conceptual link between otherwise more divided thematic areas. The terms inclusive language "Inclusive language" (45; TLS = 76), "transgender" (40; TLS = 84), "gender-inclusive language" (115; TLS = 109) and "gender equality" (54; TLS = 78) also show that there is significant literature around inclusive language, identity recognition, equality, and representation. Finally, it is important to note that network connectivity and frequency of occurrence are not necessarily correlated: in the case of the two words "gender" and "gender-responsive," "gender" has a slightly higher TLS, despite the fact that it is less common than "gender-responsive." This means that "gender" is more likely to be linked to a wider range of topics than it is within the network, while "gender-responsive" has a lower TLS despite its higher frequency. In addition to identity and language, the network expanded to sustainable development (29; TLS = 49), women (25; TLS = 50), climate change (14; TLS = 26), women empowerment (13; TLS = 29), and gender mainstreaming (12; TLS = 19). This indicates a trend towards gender inclusivity being perceived not just as a representational concern, but as one of integrating gender concerns into policies, services, governance structures, and development interventions as a whole, and is part of a broader institutional and sustainable-development agenda.

Figure 4 indicates that transport-related scholarship occupies a comparatively peripheral position within this broader gender-inclusive knowledge network, which is especially relevant to this study. "Transport policy" has been mentioned only nine times but has a relatively high TLS of 25, suggesting that even if it is less cited than large themes such as gender equality or inclusive language, it has more meaningful links with other concepts. For instance, compared to several other similar or even more frequently occurring keywords, it has a stronger TLS-to-occurrence relationship, such as "gender mainstreaming" (12; TLS = 19), "gender identity" (12; TLS = 16) or "governance" (8; TLS = 14). This means that the transport policy does not have to be conceptually disembodied; it could actually be the new application domain for a range of issues involving equality, inclusion, governance, sustainability, and intersectionality. However, the leading keywords lack prominent words in the transport field, indicating a substantive fragmentation in the literature, such as public transportation, mobility, accessibility, safety, service quality, and transport infrastructure. This discovery advances the need to create a more integrated research agenda on gender-inclusive public transport, one that brings together gender responsiveness with transport policy, sustainable development, intersectionality, institutional barriers, and women's lived mobility experiences. The network thus shows a fairly well-knit conceptual base for gender inclusivity and a partially underdeveloped transport-specific implementation which provides a clear reason to scale up the gender-inclusive scholarship approach to the design, governance, and evaluation of public transport.

RQ5: What patterns of international research collaboration characterize gender-inclusive research relevant to public transportation, as revealed through country-level co-authorship networks?

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue VIII August 2026

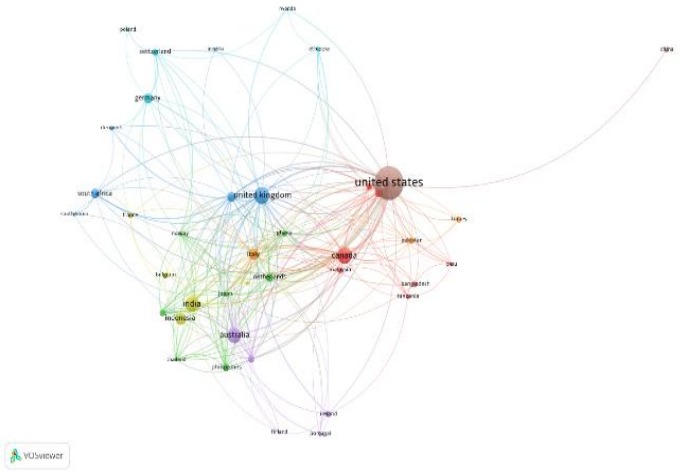


Figure 5: Country-Level Co-Authorship Network in Gender-Inclusive Research

The country-level co-authorship network shows a geographically concentrated yet internationally connected structure of gender-inclusive research, as illustrated in figure 5. The United States occupies the most dominant position, contributing 209 documents, 2,756 citations, and the largest total link strength (TLS = 123), which suggests that United States researchers not only publish more research than any other country and have a significant influence on the research field, but they also collaborate most closely with international scientists. The next major collaborative hubs are the United Kingdom (70 documents, 670 citations, TLS = 90) and Canada (65, 781, TLS = 83), which are predominantly English-speaking countries and indicate a major influence on the development and dissemination of gender-inclusive scholarship. However, a higher number of publications does not necessarily indicate better international collaboration. For example, India published 63 documents with a TLS of 46, whereas Italy (with approximately half that number, 33) had a TLS of 53. Likewise, 28 documents were produced in Nigeria, but the appreciably high TLS was 58. These differences indicate that the structure of the field is not just a function of the research productivity of the countries but also of the willingness of countries to participate in the cross-border production of knowledge. The representation of the USA, United Kingdom, Canada, and Australia could also be due to their well-developed research frameworks, institutional support for research on gender and equality, competitive research funding, and international academic networks.

However, it is more significant to observe the increasing number of countries from the Global South becoming part of the collaboration network, with notable differences in their positions in the network. African countries, particularly Nigeria (TLS = 58), Kenya (TLS = 41), and Ghana (TLS = 40), display important international connections and have relatively strong collaborative relationships, although they publish fewer papers than various developed economies. Kenya is especially noteworthy, as its 25 publications attracted 309 citations, exceeding countries with much higher publication volumes, such as Italy, Germany, and Indonesia, suggesting that research influence cannot be inferred from publication volume alone. In contrast, Indonesia had a fairly large number of publications (42) and few citations (92) and TLS (9), which represent low integration into the global co-authorship network. For China (10 documents; 4 citations; TLS = 2), on the other hand, a smaller number of contributors shows a disproportionately reasonable international connectedness, while smaller contributors like Sweden (17 documents; TLS = 48), the Netherlands (20; TLS = 53), and Norway (7; TLS = 32) show a disproportionately high international connectedness. Malaysia is still relatively on the sidelines with 11 documents, 57 citations, and a TLS of 10, suggesting significant potential for enhancing research collaboration across nations. Overall, these trends show that while scholarship is becoming geographically diversified and gender inclusive, knowledge is still not evenly produced globally. Opportunities to build partnerships between institutions and centres already engaged in research and new actors, especially in Asian and African contexts and other parts of the Global South, could therefore improve comparative evidence and promote the emergence of gender responsivity in policies and practices that respond to diverse institutional, cultural, and socioeconomic contexts.

CONCLUSION

This study was designed to systematically describe and map the development and knowledge landscape of research on gender-inclusive public transport from 2016 to August 2026. The bibliometric facets analysed were growth of publication production, geographical distribution, citation impact, main and emerging research fields, and international co-authorship patterns. A total of 915 potentially relevant documents were screened, and 762 publications identified as relevant were used as the empirical foundation to assess the evolution and relevance of gender-inclusive and gender-responsive knowledge of public transport scholarship and its connection with the public transport field.

The results show a growing interest in scholarship during the period under investigation. This increased from 16 publications in 2016 to 137 publications in 2025, and 134 publications had already been achieved by August 2026. This increase following 2023 shows that greater attention is being paid to gender inclusion in current research agendas. In a geographic sense, although contributions from Indonesia, Nigeria, and South Africa, as well as other developing economies, suggest that there are signs of diversification in the research picture, the United States as a geographic source was by far the largest, followed by the United Kingdom, Canada, India, and Australia. It was also found that the most influential publications were mostly from outside transportation-related fields, such as management, public health, artificial intelligence, human–computer interaction, entrepreneurship, climate studies, and epidemiology. This multidisciplinary citation pattern suggests that incorporating gender in public transport is a recently developed research field, whose research conceptualisation is permanently borrowed from neighbouring disciplines instead of the current, well-established transport knowledge.

Other evidence of this interdisciplinary structure is provided by network analyses. Network analysis using keywords revealed a total strength of 136 occurrences of "gender-responsive", and a total link strength of 183 for "gender". Other prevailing topics included women, gender equality, inclusive language, transgender issues, sustainable development, women's empowerment, and gender equity. In contrast, "transport policy" never occurred more than nine times, but had a total link strength of 25, showing that it was indeed entangled with the general knowledge network. Overall, it seems that there is a lack of consolidation when it comes to the integration of gender-inclusive thinking in transportation research: the concepts of public transportation, mobility, accessibility, safety, service quality, and transport infrastructure hold relatively limited visibility. The co-authorship analysis at the country level also showed an imbalanced collaboration network. International collaboration hubs were the United States, the United Kingdom, and Canada, and several African countries clustered together with relatively high levels of collaboration but few publications. In contrast, other productive Asian countries exhibited fewer international linkages, pointing to the potential for more extensive cross-regional knowledge sharing.

The results advance the knowledge domain by locating transportation access and gender into an interdisciplinary body of growing literature and by developing an understanding of the need for greater interdisciplinary theoretical and empirical integration. In practical terms, there is a need to adopt a comprehensive understanding of gender-responsive transportation, going beyond single safety interventions and incorporating accessibility, affordability, infrastructure, first- and last-mile connections, service provision, information systems, institutional arrangements, and representation in transport planning. Therefore, transport agencies, urban planners, policymakers, and service providers may gain from considering gender in the planning, implementation, and evaluation of transport systems instead of as a separate policy element. Deeper integration of transportation researchers and scholars from disciplines such as gender equality, sustainable development, governance, technology, public health, and social inclusion may also help enable broader thinking around transport policy and design of transport services. As identified through the geographical imbalance in the analysis, this also reinforces the need to lift up under-represented geographies, particularly those contexts that affect women's mobility in varying ways due to differential cultural, socioeconomic, institutional, and infrastructural circumstances.

Nevertheless, this study has several limitations. The analysis relied on Scopus and English-language publications, which means that relevant research indexed in other databases or published in other languages may not have been captured. The use of "Gender-Inclusive" OR "Gender-responsive" as the principal title-search

terms may have led to the exclusion of transport studies using alternative terminology, while simultaneously capturing a broad multidisciplinary body of gender-related research requiring relevance screening. In addition, citation counts tend to favour older publications, as they have had more time to accumulate citations, while the 2026 publication data represent only the period available up to August. Future studies should combine multiple bibliographic databases, broaden and validate transport-specific search terms, conduct comparative regional analyses, and integrate bibliometric mapping with systematic or qualitative content analyses. Particular attention should be directed toward the intersections of gender with transport safety, accessibility, affordability, service quality, digital mobility, first- and last-mile travel, intersectionality, and transport governance. Overall, bibliometric evidence indicates that gender-inclusive public transportation is gaining scholarly importance but has not yet developed into a fully consolidated research domain. Strengthening its transport-specific theoretical foundation and expanding international and interdisciplinary collaboration will be key to translating the growing knowledge base into transportation systems that are more equitable, responsive, accessible, and sustainable.

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