

Mapping the literature on free public transport and its social impact: a bibliometric search in Web of Science

Mapeando a literature sobre transporte público gratuito e seu impacto social: um estudo bibliométrico no Web of Science

Análisis de la bibliografía sobre el transporte público gratuito y su impacto social: un estudio bibliométrico en Web of Science

GT04 - Gestão de Cidades Resilientes e Sustentáveis

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ABSTRACT

Public transport plays a crucial role in formulating public policies. It is also an important tool for improving social equity by ensuring that marginalized groups have equal access to modes of locomotion. As free public transport is gaining increased attention from policymakers globally, a bibliometric study can shed light on how the literature is approaching this policy and its social impact. This study uses one of the leading indices for bibliometric examination: Clarivate Analytics *Web of Science*. The database demonstrated an increase in articles and citations related to public transport and equity but also indicated a lack of literature on free public transport. The collaboration network and authors with the most publications, journals with the most articles, intellectual base, and main topics were analyzed. Although not included in the string search, accessibility emerged as a central theme of discussion in the literature. Finally, future research directions have been indicated towards free public transport, which can be classified as a niche theme.

Keywords: free public transport, equity, bibliometrics, intellectual base, future research

RESUMO

O transporte público ocupa um papel crucial na formulação de políticas públicas. Também é uma importante ferramenta para melhoras na equidade social, assegurando que grupos marginalizados tenham igualdade de acesso aos modos de locomoção. Com o aumento da atenção pelos formuladores de políticas públicas sobre questões envolvendo a gratuidade do transporte público, um estudo bibliométrico é útil para demonstrar como a literatura científica tem abordado essa política e qual seu impacto social. Esse estudo utiliza um dos principais índices para uma análise bibliométrica, o Clarivate Analytics *Web of Science*. A base de dados demonstra um aumento na produção de artigos e citações relacionados ao transporte público e equidade, apresentando, no entanto, uma lacuna quanto a literatura sobre transporte público gratuito. Foram analisados também os seguintes tópicos: rede de colaboração, autores com mais publicações, revistas com mais artigos publicados, base intelectual e tópicos principais. Foi observado que mesmo não tendo sido incluído nas palavras buscadas na pesquisa, a palavra acessibilidade despontou como o tema central de discussão na literatura. Por fim, foram indicadas possíveis direções de pesquisa envolvendo o transporte público gratuito, que pode ser classificado como um tema de nicho.

Palavras-chave: transporte público gratuito, equidade, bibliometria, base intelectual, pesquisas futuras



RESUMEN

El transporte público desempeña un papel crucial en la formulación de políticas públicas. También es una herramienta importante para mejorar la equidad social, al garantizar que los grupos marginados tengan igualdad de acceso a los medios de transporte. Dada la creciente atención que prestan los responsables de la formulación de políticas públicas a las cuestiones relacionadas con la gratuidad del transporte público, un estudio bibliométrico resulta útil para demostrar cómo ha abordado la literatura científica esta política y cuál es su impacto social. Este estudio utiliza uno de los principales índices para el análisis bibliométrico: el *Web of Science* de Clarivate Analytics. La base de datos muestra un aumento en la producción de artículos y citas relacionados con el transporte público y la equidad, aunque presenta una laguna en cuanto a la bibliografía sobre el transporte público gratuito. También se analizaron los siguientes aspectos: red de colaboración, autores con más publicaciones, revistas con más artículos publicados, base intelectual y temas principales. Se observó que, aunque no se incluyó entre los términos de búsqueda, la palabra accesibilidad surgió como el tema central de debate en la bibliografía. Por último, se señalaron posibles líneas de investigación relacionadas con el transporte público gratuito, que puede clasificarse como un tema de nicho.

Palabras clave: transporte público gratuito, equidad, bibliometría, base intelectual, investigaciones futuras

1. Introduction

The transport sector plays a key role in social and economic development worldwide and serves as an indicator of equity and social justice. It has also gained more attention owing to the transport footprint in the demand for energy and increased discussions toward a more sustainable path (UNECE, 2015). The urban population has increased by over 70 million annually, with an estimated prediction of reaching 6.5 billion by 2050 (World Bank, 2018). Increased traffic congestion levels and higher demand for users of transport modes negatively impact economic and environmental aspects, requiring transport stakeholders to attractive, reliable and sustainable services. (Cats et al., 2017).

Public transport is a service that reassures access and mobility in cities, reducing barriers to participation in daily life (Allen & Farber, 2020). It is fundamental especially for vulnerable groups that rely on it for locomotion, as it serves as a tool against vulnerability and social exclusion (Štraub & Hess, 2025). However, in a general context, policymakers do not properly consider spatial distribution and the effects of pricing and accessibility of public transport (Wee; Geurs, 2011) and economic data demonstrate shorter investment by governments and rise in inequalities (OECD, 2018).

Academic literature has addressed the question of accessibility, equity and social inclusion in transport for a considerable amount of time, as indicated by the works of (Hansen, 1959), Wachs and Kumagai (1973), Banister (1981). The specific area of fare subsidies is also extensive, researching multiple aspects related to the topic such as optimal price for bus services (Turvey and Mohring 1975), effect of public subsidies on supply and demand (Bly & Oldfield, 1986), redistribution of congestion pricing (Eliasson & Mattsson, 2006), and the effect of compensations supported by the government disadvantaged population (Guzman & Oviedo, 2018).

Although fare-free public transport (FFPT) traces back to the 1970s, it has gained visibility as an increasing number of localities have adopted this policy. For example, Hasselt in Belgium introduced FFPT in 1997 for residents (De Witte et al., 2006), the capital city of Estonia, Tallinn, with almost half a million inhabitants implemented it (Cats et al., 2017), and Luxembourg was the first country to offer an integral FFPT (Carr & Hesse, 2020). Municipalities in Brazil are increasingly opting for zero fares in transport (Fernandes Pereira et al., 2023), the same situation observed in Poland (Štraub et al. 2023) and France (Huré; Passalacqua; Poinso, 2025).

FFPT faces controversy regarding its applicability, considering that critics in the literature indicate a tendency to reduce the number of pedestrians and bicycle riders that become attracted to motorized transport (Storchmann, 2003), increase the financial burden on municipalities, which could lead to neglecting other important services, while public transport itself may experience a loss of efficiency and progress (Baum, 1973), and might also have a minimal impact on car usage, as it would demand complementary policies (Fearnley, 2013). On the side of those who consider the promising effects of the policy, the literature indicates an increase in mobility and better air quality, a reduced level of traffic congestion (Brown et al., 2001), financial relief for vulnerable groups (Shein, 2010), and the removal of financial obstacles that limit the access of the underprivileged to public transport. (Štraub & Hess, 2025).

In addition to the debate regarding FFPT and its results, the subject does not have a considerable production verifying the impacts of the policy, with an insufficient base of research with a global outlook, demanding further development to reduce the existing gap (Kębłowski, 2020). In that sense, a bibliometric study can help identify the work already produced, what could have more attention directed to, and what are the tendencies of the scopes of the authors in the area. This type of study can serve to inform those academically involved in the theme.

This article intends to conduct a bibliometric study of the existing literature on the implementation of the FFPT and its impact on vulnerable populations, considering aspects such as social justice, inclusion, and equity, aspects that have not been found in any other study, utilizing the database available at Clarivate Analytics' *Web of Science* (WoS). WoS was selected because of the extensive number of articles available and the quality and consistency of the journals included, offering a reliable source for analysis. The terms selected to compose the string search were

divided into three “segments” to obtain optimal results within the theme. The first was FFPT and similar, including terms associated with policies with no cost to users. The second was the public sector, which considered articles relating the study to government initiatives. The third was social impact, as the main objective of this study was to verify how FFPT impacts marginalized groups. Following this introduction, the Research Methodology is presented. The Results and Discussion section presents a bibliometric analysis. The Conclusion addresses the limitations of the study and future research directions.

2. Research Methodology

The methodology used in this study follows the structure developed by Maia et al., (2019), which offers a scientific method for organizing a bibliometric study in any research area. Bibliometric analyses are quantitative statistics that consider the most relevant articles, authors, countries, and institutions in a specific field (Li & Zhao, 2015). It is also an important tool for verifying scientific merit, considering the quality and impact of the work (Roldan-Valadez et al., 2019), while providing a better understanding of the current literature, how it has developed, the most important contributions, and possible areas for future research and contributions (Gurzki & Woisetschlager, 2017).

The work was divided into four stages, with micro stages between them, facilitating the understanding of the process implemented from the planning of the work (1), how the search was decided and conducted (2), and how the data obtained were organized (3). An analysis was conducted using the obtained data, which were then reported (4) (Maia et al., 2019).

2.1 Stage 1

The first stage, plan, consists of demonstrating the relevance of the topic, the absence of a bibliometric study in the area, and the tools and methods to be implemented in the scientific index. As the concept of sustainable development has gained focus in international conferences and reports (McCormick et al., 2013), public transport and its social impact have become highlighted topics in several countries, considering the importance of ensuring accessibility, proper mobility, and adequate environmental conditions (Curtis & Scheurer, 2010). In a preliminary literature review, studies were found all over the world verifying this relationship, showing results obtained and possible solutions for policymakers (Van Heerden et al., 2022; Tiznado-Aitken; Muñoz; Hurtubia, 2018; Lope; Dolgun, 2020; Karou; Hull, 2014). In addition, an initial search in Google Scholar using the terms “free public transport” and “equity” resulted in many documents.

No previous studies were found analyzing the bibliometrics of the topic object of this article, using the terms mentioned previously added and “bibliometric*”, “scientometric*”, “infometric*”, returning no results.

The next step was to determine a tool to facilitate access to the information contained in the *WoS* database, regarding collaboration networks, countries, bibliographic records, co-citations, journals published, and fields of study. The bibliometrix R-package, *biblioshiny*, (Aria & Cuccurullo, 2017) was selected because it offers an open-source for a more complete bibliometric study. *WoS* was selected as the index of articles as it is highly recommended and offers a considerable range of coverage of science and essential metadata for a bibliometric study, consisting of an adequate source for research (Maia et al., 2019).

2.2 Stage 2

In the second stage, search, the queries, operators, and terms were delimited for an advanced search. Subsequently, the articles connected to the theme were selected by a brief reading of the abstracts and added to a marked list. In the third stage, data organization, the marked list was downloaded and imported to a specific software, which provided multiple information that will be analyzed in stage four. The fourth stage, analysis, the database was dissected into production, citations, authors, references, countries collaborations, journals and keywords.

The search was conducted in *WoS* in July 2025, utilizing terms regarding free public transport and similar terms, such as “free public transport”, “free public transit”, “free transportation”, and “public transport”. The Boolean operator “OR” was inserted to delimitate the search to the public sector, including the terms “public policy”, “government”, “public sector”, “public management”, “public organization”, and “public administration”. Another operator “OR” was inserted to include the social impact of the policy, considering the terms “vulnerable populations”, “socially disadvantaged”, “marginalized groups”, “social equity”, “social inclusion”, and “equity”. Subsequently, the articles connected to the theme were selected by a brief reading of the abstracts and added to a marked list. Articles unrelated to the study objective were excluded.

2.3 Stage 3

In the third stage, data organization, the marked list was downloaded and imported to the open-access application, bibliometrix R-package (Aria; Cuccurullo, 2017), which required a conversion of the *RIS-file* format to a *text-file* format using the system import features, providing multiple information that will be analyzed in stage four. *Excel* was used to provide a graphic with the number of articles and citations encountered over the years with no time restriction. *Word* was used to tabulate the results of the study.

2.4 Stage 4

In the fourth stage, analysis and report, the database was dissected into production and citations, authors, country collaborations, journals, references, the most cited articles globally, and themes. The first subsection, production and citations, contains statistical information on the number of articles and citations according to the specific year, helping to demonstrate the relevance of this study, as the graphic has an ascending pattern.

The “Authors” subsection contains a figure provided by *Biblioshiny* indicating the collaboration between researchers, highlighting those with the most published articles. Based on the number of articles, a table was developed ranking the authors according to their production, adding the organization to which they are linked. The *H-index* was also included to determine the order when the number of articles was the same, as it provides an indicator of productivity and significance of the researcher’s work (Mondal et al., 2023).

The country collaborations figure was also obtained with *Biblioshiny*, as the lines between countries indicate the contribution of authors based on different countries. The colors of the territories on the map refer to the number of publications. The color tone varies from light blue to dark blue according to the number of articles, with a darker area corresponding to more articles.

The table developed to analyze the sources in which the articles were published ranked the journals based on the number of articles published. The Journal Impact Factor (JIF) and Journal Citation Indicator (JCI) were also included, as they are tools for evaluating the impact of the journal on the academic community, indicating the credibility and reputation of the publication.

Biblioshiny also provided the references figure, identifying the most cited works by the name size of the author, distributing the circles according to the theme object of study, and showing the existing link between them. The order presented in the table follows the number of citations, indicating the relevance of the database obtained. References offer a better understanding of the theoretical basis used by researchers, consisting of an indicator of foundational concepts or methodologies.

Most articles cited globally are listed in a table according to the number of citations. This indicates the relevance of the articles in the searched theme and the direction of scientific production, if any. The distribution figure was created in *Biblioshiny*, offering an overview of the development and relevance areas of study, with four quadrants distributed in Motor, Basic, Emerging and Niche themes. This perspective is aligned with a bibliometric study and provides a reflection on how specific topics stand in the current literature, suggesting subjects that are recent, with a small number of studies, and offer opportunities for future work.

3. Results and discussion

3.1 Output overview

The following figure (Fig. 1) shows the number of articles and citations found in the *WoS* database, demonstrating a constant increase in production and citations in these articles. The first article on the list was published in January 2003 (Gorman et al., 2003), verifying the effects of public transport policies on the health quality of the Edinburgh (Scotland) population. Although this is the first article of the list, only four months later, another article was published that had a greater impact, with 51 *WoS* citations, addressing the influence exerted by the ownership on the cost of bus service provision, considering if the company is private, public, or mixed, and measuring the efficiency and economic aspects with the result obtained (Filippini & Prioni, 2003).

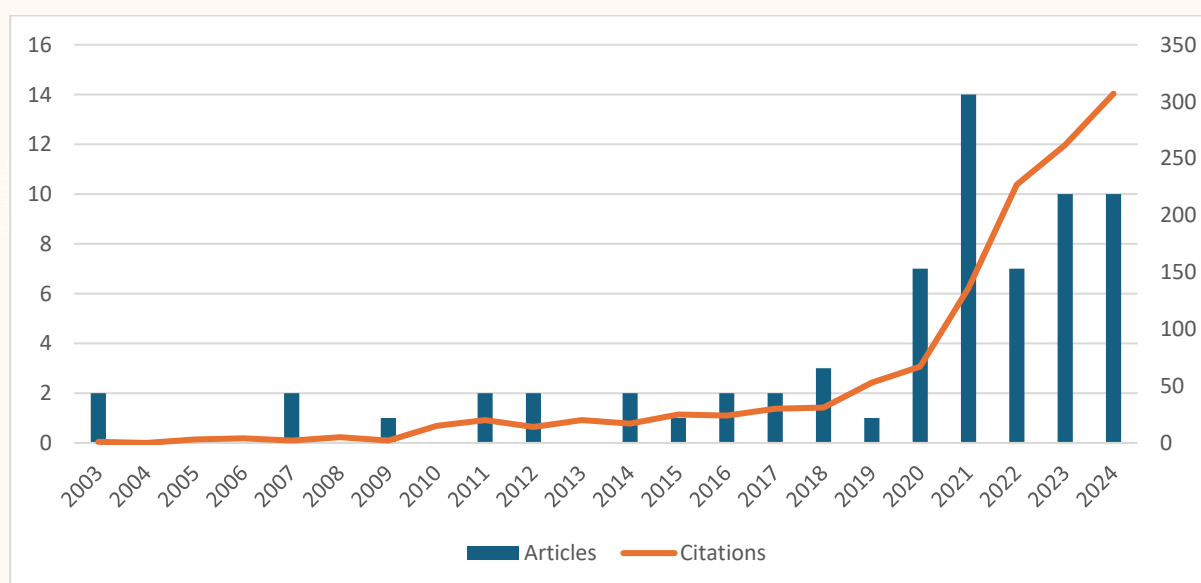


Fig. 1 Evolution of the literature based on Web of Science (2003 to 2024)

After 2003, there was a 4-year gap with no publications (2003-2007). Until 2017 the maximum number of articles published per year was 2 articles per year were published. In 2020, a considerable increase in production was observed, reaching 7 articles, a number that doubled in 2021, with a historic peak of 14. In 2022, 2023, and 2024, the numbers remained above 7 articles per year. The number of citations followed the same trend. After 2020, the mark surpassed 100 citations, whereas in the previous year, there were fewer than 50. In 2021, the number also reached its peak, reaching 300 citations, demonstrating the increasing attention of the subject as a research topic.

It is important to observe that only 2 out of the 70 results in the database approach, specifically the adoption of FFPT, which are: *Fare-free public transport in France: unveiling urban policy challenges* (Huré et al., 2025b) and *Empirical Evidence of the Effect of Fare Subsidies in Transition Economies* (Bočková, 2023). The first was conducted in France, and the second was conducted in Slovenia and the Czech Republic. This result suggests a lack of literature that simultaneously studies FFPT and the social impact of the policy.

To properly address this question, another search was made with the terms “fare-free public transport”, “free public transport”, “free public transit”, and “free transportation”, restraining to the title at the advanced search mechanism of *WoS*, while also removing the second segment of the previous search with the terms “public policy”, “government”, “public sector”, “public management”, “public organization”, and “public administration”, as when searched with all three segments, no results were found. As a result of this research, only 7 other articles were found that analyzed the effect of free fare in different areas, reinforcing the lack of literature on the theme. Among these 7 documents, 3 were focused on the capital of Estonia, Tallin (Cats; Susilo; Reimal, 2017; Kębłowski et al., 2019; Sträuli, 2024).

3.2 Authors

The collaboration network figure (Fig. 2) demonstrates that there is no effective contribution from authors in this field of research. A multiple number of authors were shown in the result, and none of them were central researchers or had prominence in the area, as the structure was scattered with different groups formed by as many as 3 authors.

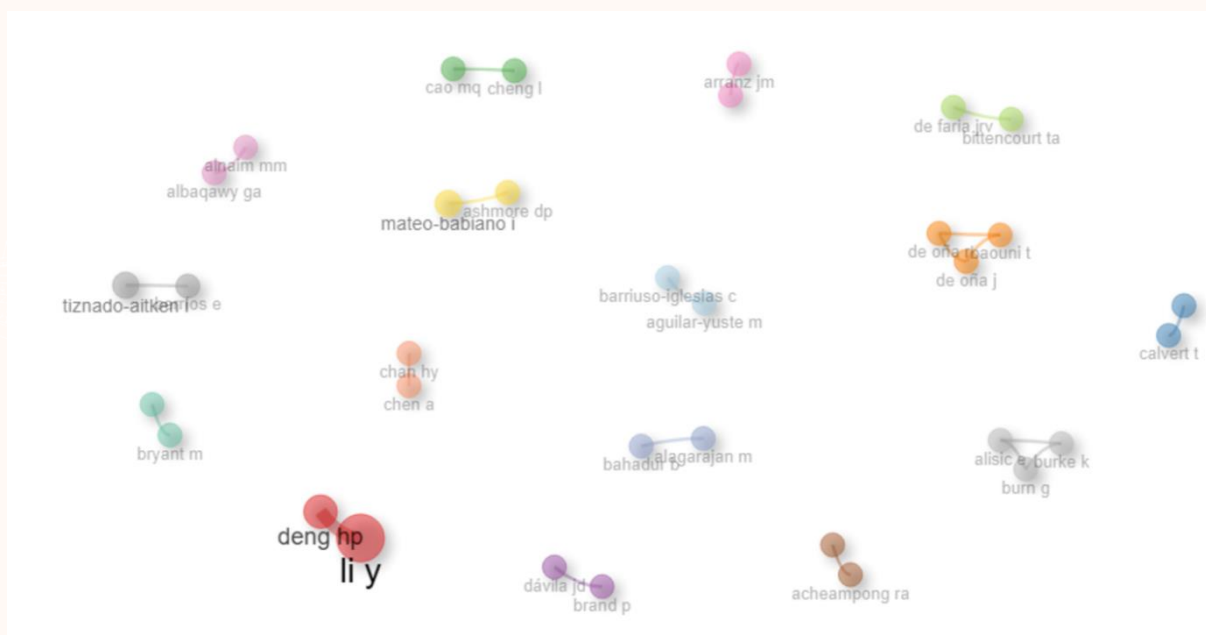


Fig. 2 Collaboration network

The previous figure is ordered in the next table (Table 1), ranked by the number of articles, identifying the author, institution, and *H-Index*. Li is the number 1 ranked with 3 articles and a *H-Index* of 17. He has 61 published articles with 970 citations in the *WoS* database. As a specialist in traffic engineering, most of his work is dedicated to multiple forms of transport, and all 3 articles on the list refer to the assessment of public transport policy in China. One article was written in collaboration with Deng, who also specializes in traffic engineering.

Table 1 The authors with most articles published on *Web of Science*

Author	Nº of articles	Institution	H-Index
Li, Y.	3	Tongji University	17
Deng, HP.	2	Guangzhou Jiaotong University	8
Mateo-Babiano, I.	2	University of Melbourne	16
Tizado-Aitken, I.	2	University of Toronto	15
Acheampong, R	1	University of Manchester	21
Adhvaryu, B.	1	Ahmedabad University	8

Source: By the authors (2025)

The 2 articles published by Mateo-Babiano address the informal public transport sector in the Philippines. It is interesting to observe that the author specializes in Urban Planning; Diversity and Inclusion, the two topics that integrate the scope of the current study. The articles of the fourth-ranked author, Tiznado-Aitken, also focus on the social justice and accessibility that public transport can provide for the population of cities, using Chile as the subject of his studies.

3.3 Countries

The Country Collaboration Map (Figure 3) presents the locations of authors who published articles related to the topics of this study from 2003 to 2024. The lines connecting the countries represent collaboration among the authors. Among the countries with a higher number of articles, Australia stands out with 14 articles. It also has the most collaborations with different countries (8). The links extend to diverse continents, including South America (Chile), Asia (China, Japan, Korea, Pakistan, and Philippines), North America (USA), and Europe (Netherlands).



Fig. 3 Locations of author who published articles with the string themes on *Web of Science* (2003-2024)

The United Kingdom is the second country with the most articles, 11. It has a strong collaboration occurrence, as 9 of the 11 (more than 80%) were published with authors from different countries. China has 8 listed articles, 5 of which were the result of joint work with foreign researchers. Spain ranked fourth in the number of articles with 6, and 50% of them were collaborations.

Countries located in the so-called Global South, referring to regions that are low-income and frequently marginalized in cultural and political terms (Dados & Connell, 2012), occupy 4 of the remaining positions in the top 10 countries with the most publications. South Africa occupies the fifth position with 5 publications, the most by an African country. Latin America has 3 representatives, including Chile with 4, Colombia with 3 and Brazil with 3, and all them collaborates with each other (Chile-Colombia, Brazil-Colombia, and Brazil-Chile).

3.4 Most relevant sources

The next table presents the most relevant sources in the literature on the subject of this article, ranked by the number of articles published. Transport Policy was the journal with the most articles (6). Based in the United States, it focuses on transport policy and strategy analysis, covering a wide range of topics. The journal has the third highest Impact Factor and Citation Indicator on the table (Clarivate Analytics, 2025).

The second highest was the Journal of Transport Geography, based in England, with five articles. The focus of this publication is the geographical dimensions of transport and mobility. The journal has a high Impact Factor and Citation Indicator, covering the areas of transportation, geography, and economics, with the highest evaluation grade (Q1) in all of them (Clarivate Analytics, 2025).

Table 2 Journals with most articles published

ISSN	Journal	JIF	JCI	Nº of articles
0967-070X	Transport Policy	5.3	1.71	6
0966-6923	Journal of Transport Geography	6.3	1.88	5
2071-1050	Sustainability	3.3	0.67	5
2213-624X	Case Studies on Transport Policy	3.3	0.71	4
0264-2751	Cities	6.6	1.96	3
0361-1981	Transportation Research Record	1.8	0.36	3
0739-8859	Research in Transportation Economics	3.4	1.16	2
1037-5783	Road and transport research	0.021	N/A	2
0308-1060	Transportation Planning and Technology	1.8	0.33	2
1886-4805	ACE-Architecture City and Environment	0.8	0.49	1

Source: By the authors (2025)

The journal Sustainability covers different areas than the others in the table that have a special focus on transportation. The areas of study include an approach to the cultural, economic, and social sustainability of human beings, specializing in environmental sciences and studies, green and sustainable science, and technology.

As the name suggests, the journal Case Studies on Transport Policy only accepts articles that suggest solutions for transportation, covering fields such as engineering, law, economics, and sociology. Although focused on effective intervention, the journal has most of its work composed of theoretical and abstract approaches.

The journal with the highest Impact Factor and Citation Indicator in the table is Cities, occupying the fifth position regarding the number of articles (Clarivate Analytics, 2025). The main category addressed is urban studies, particularly urban planning and policy, including transportation as one of the topics within the two main themes.

3.5 Intellectual Base

This subsection contains information about the most cited references among those 70 articles as a result of the implemented search inside *WoS*, as shown in Figure 4 and Table 3. 50% of these were published in the Journal of Transport Geography, the second on the previous table, indicating a central role of this journal in the research field.

Geurs and Van Wee (2004) was the most cited article, with 11 citations. Accessibility was the construct studied by the authors, in a thorough review of the literature to improve land use and transport policy. Although this article is not a pioneer in studying accessibility, as the authors reference previous works such as Song (1996); Handy; Niemeier, (1997), Pirie, (1979); Kwan (1998) and others, it innovates in the area by providing a study with multiple perspectives and a wider range of criteria.

Table 3 Most cited references

Author	Journal	Nº of citations
Geurs; van Wee (2004)	Journal of Transport Geography	11
Lucas, K. (2012)	Transport Policy	8
Delbosc; Currie (2011)	Journal of Transport Geography	7
Hansen (1959)	Journal of the American Institute of Planners	7
Guzman; Oviedo; Rivera (2018)	Journal of Transport Geography	5
Debooser; El-Geneidy; Levinson (2018)	Journal of Transport Geography	4
Delmelle; Casas (2012)	Transport Policy	4
Foth; Manaugh; El-Geneidy (2013)	Journal of Transport Geography	4
Handy; Niemeier (1997)	American Journal of Preventive Medicine	4
Luo; Wang (2003)	Environment and planning B: planning and design	4

Source: By the authors (2025)

The second most cited article, with 8 citations, by Lucas (2012), appears in a specific category in the image. This article examines the relationship between transport and social exclusion, demonstrating that lower income populations tend to experience transport disadvantages and consequently more social exclusion. The author reviews how the topic is addressed globally, proposing its inclusion on the international agenda.

Although included in a different niche in the figure, the third most cited article (Delbosc & Currie, 2011), has a very similar object of study as Lucas, analyzing the combined aspects of transport disadvantage, social exclusion, and well-being, restricted to Victoria, Australia. The correlation is highlighted by the fact that Lucas uses another article by Delbosc and Currie as a reference, and these two authors use Lucas' works as references. One different aspect of Delbosc and Currie's work is that they advocate for the development of regional policies to address the problems of restraints to transportation and improvement of mobility, as the characteristics of urban and regional areas vary considerably between countries and cities.

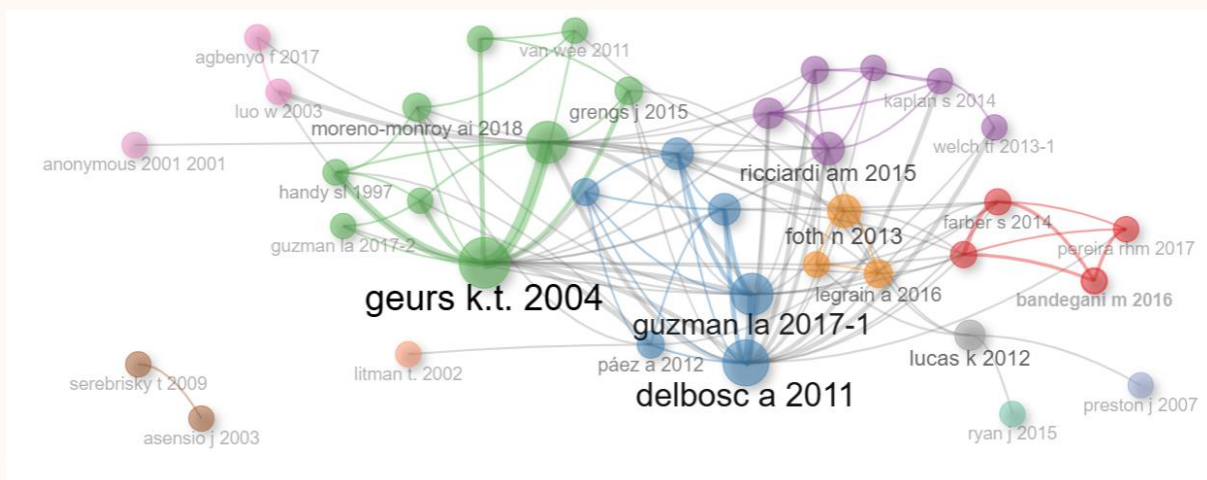


Fig. 4 Most cited references and links between them

The following article on the list (Hansen, 1959), is an empirical examination of land use and accessibility, presenting a method for metropolitan areas and their accessibility patterns. The article has over 2,000 citations on *WoS* and marks one of the earliest works to propose the concept of accessibility, relating the construct to land use (Liu et al., 2020). Hansen is also cited by all the other articles in the table that use the concept of accessibility in their studies (Delmelle; Casas, 2012; Foth; Manaugh; El-Geneidy, 2013; Handy; Niemeier 1997; Luo; Wang, 2003), demonstrating the importance and impact of the work, reaffirmed by the relevance of the subject in the figure.

Accessibility also features in the title of 5 out of 10 articles on the table (Table 4) containing the most cited articles globally in the *WoS* database. The most cited reference studied the impact of COVID-19 on economics, environment, and transport (Nundy et al., 2021). In the transport section, the paper demonstrates the global effects of the restrictions imposed due to the pandemic, listing long-lasting damage to the sector, reduction in oil demand, pollution, accidents, and transport demand. It also showed a statistically significant increase in the number of single-car and bicycle users due to the pandemic. Cycling lanes have been expanded in multiple cities, such as Bogotá, Berlin, Budapest, and Mexico City. Concerns were raised due to the tendency of car owners to use public transport less after the pandemic, which could lead to an increase in traffic congestion and environmental damage. This indicates a possible turning point for public transport policies with a sustainable orientation, such as electric vehicles, and improvement of the service, with fare-free implementation to increase the number of passengers.

Amongst the 9 remaining articles in the table, 8 are empirical investigations conducted in different localities. (Guzman; Oviedo, 2018) assessed the “pro-poor” policy adopted by policymakers in Bogotá, Colombia, which aimed at affordability for vulnerable populations, granting access to public transport, and enabling a system with more equity. This study used the methods developed by Hansen (1959) to measure accessibility. To measure vertical equity, followed the works of Lucas; Van Wee; Maat, (2016) and Delbosc; Currie, (2011b), and used a variation of the Lorenz curve. The study suggests that areas with high job density do not correspond to areas with high population density, meaning that people do not live near their jobs. Areas with a lower average spend more time on public transport than those living in places with a higher average income. The authors found a direct relationship between a decrease in transport fares and better result in public transport accessibility. An improvement in job accessibility within marginalized groups was also demonstrated, promoting spatial equity.

The next article with the most citations provides an overview of how transport and location can affect access to food (Coveney; O'Dwyer, 2009). An analysis was conducted with different groups of families according to the distance between their households and shopping venues, identifying the modes of transport available and their conditions. People who lived in food desert areas, defined by the lack of easy access to cheaper and wider range of food, also faced more difficulties in obtaining healthy food and tended to suffer from diet-related diseases at a

higher rate. According to the authors, access to fresh food, especially fruits and vegetables, requires more awareness, as limitations to these types of products can lead to food insecurity. The article highlights the problem of the dependence on cars as the primary mode of transport and the consequent disadvantage for those who do not own a private vehicle, limiting access to healthier food. One positive indicator of public policies regarding this issue was the support received by those with disabilities or infirmities, ensuring access to food supplies.

Karou and Hull (2014) conducted a case study in Edinburgh, UK, to predict the impact of the construction of a tram network and new transport integration on accessibility and equity, using the Spatial Network Analysis of Public Transport Accessibility (SNAPTA) to measure accessibility to public services and urban activities. Accessibility is defined by this model as the possibility for people to access activities and services by combining cost, time, and ease of access. Activities were divided into six types: central business district, employment, retail opportunities, education opportunities, health opportunities, and leisure and recreation opportunities. Edinburgh adopted actions with the objective of reducing the demand for road travel and inserting recently developed areas. The government considers tram networks a key transport mode for attracting users and integrating the city. The authors identified a probability of increasing job opportunities for those who live in marginal areas with better accessibility to job areas, resulting in potential spatial equity, the same conclusion obtained by Guzman and Oviedo (2018). The aim of the research is to offer a practical tool for policymakers and planners for better management of public transport services and provide an evaluation method to measure accessibility.

A case study was also conducted by Sharma and Patil, (2021) in Greater Mumbai, India, correlating public transit with the equity of access to public healthcare. Accessibility was measured using travel time and the number of transit stops. The Lorenz curve was used to verify special inequity to healthcare services for different population groups, and the Social Vulnerability Index (SVI) ranked accessibility among vulnerable groups, quantified in 5 main areas: Socioeconomic, Demographic, Housing and Hygiene, and Poor and Health Status. A considerable differentiation in equity levels was identified between southern Mumbai and the eastern part of the city (where slums are concentrated). The study demonstrates that the slum population faces difficulties in accessing hospitals, advocating the need to prioritize these areas with the allocation of public healthcare services or to improve the public transport system, thereby improving spatial equity.

Table 4 Most articles globally cited

Authors	Journal	Nº of citations
Nundy et al. (2021)	Journal of Cleaner Production	179
Guzman; Oviedo (2018)	Transport Policy	149
Coveney; O'Dwyer (2009)	Health & Place	139
Karou; Hull (2014)	Journal of Transport Geography	59
Sharma; Patil (2021)	Journal of Transport Geography	54
Gallagher et al. (2011)	Disability and Rehabilitation	53
Tiznado-Aitken; Muñoz; Hurtubia (2018)	Transportation Research Record	51
Filippini; Prioni (2003)	Applied Economics	51
Zhao; Zhang (2019)	Transport Policy	44
Sourbati; Behrendt (2021)	New Media & Society	42

Source: By the authors (2025)

Gallagher et al. (2011) investigated the levels of mobility and access to public transport available for people with vision impairment in Ireland. The study concluded that access provided to that group is poor and does not have the desired public awareness. This indicates the need for training for the public and transport staff, and a restriction for those with vision impairment to social and medical services. Access to public transport was measured by Tiznado-Aitken, Muñoz, and Hurtubia (2018) in Santiago, Chile, considering the quality of the walking environment. The results demonstrated that peripheral areas had lower access to public transport and worse walking conditions, discouraging the use of this public service and favoring car use.

Transport cost was the subject of analysis in the next two articles on the list. The work of Filippini and Prioni (2003) was previously described, regarding the effects of ownership on the cost of bus services. Zhao and Zhang (2019) followed a reverse path and studied the effects of an increase in metro fare in Beijing, China. As effects of the policy adopted by the Chinese government, reduced transit affordability and consequent decrease in social mobility and social exclusion appeared to be the most relevant. The authors suggest other policies that could benefit equity in public transport for marginalized groups, such as affordable housing construction and the introduction of new companies to provide job opportunities closer to peripheral areas.

The final article on the list by Sourbati and Behrendt (2021) revolves around the concepts of smart mobility and data justice relating to the age of individuals. Datafication, which consists of turning all available information into data as a method of quantification, was introduced in the political debate in the United Kingdom in 2012, providing information on public services. However, the information inserted into the data system can exclude those who do not have access to that information and those whose data were not considered in the analysis, especially groups of older adults. Transport is a sector that relies on data to indicate social exclusion and areas of improvement, and digital discrimination might not consider the needs of an aging society. The article indicates a need to make smart mobility available to an increasingly ageing society and avoid invisibility for older people.

3.6 Topics

Figure 5 shows all the topics on which researchers have been working, facilitating a more thorough view. As a result, an extensive group of clusters was formed with many highlighted topics. “Public transport” and “accessibility” were the central themes of the results and the words with the most occurrences, 25 and 16, respectively, the same tendency observed in Table 3. The cluster associated with these words relates to multiple fields, including environmental aspects such as “sustainability”, “climate change”, and “green space”, and an urban perspective relating to “built environment”, “connectivity”, “land-use”, “urban design”, and “spatial accessibility”. There were also links concerning “travel behavior”, “quality”, “preferences”, “walking”, “inequalities”, and “social inclusion”.

It must be pointed out that “accessibility” was not included in the words added to the search string and still had the second highest number of results. In Figure 6, the term stands with a high degree of relevance, and it is one of the motor themes in the literature when associating terms such as public transport and free-fare with equity and marginalized groups.

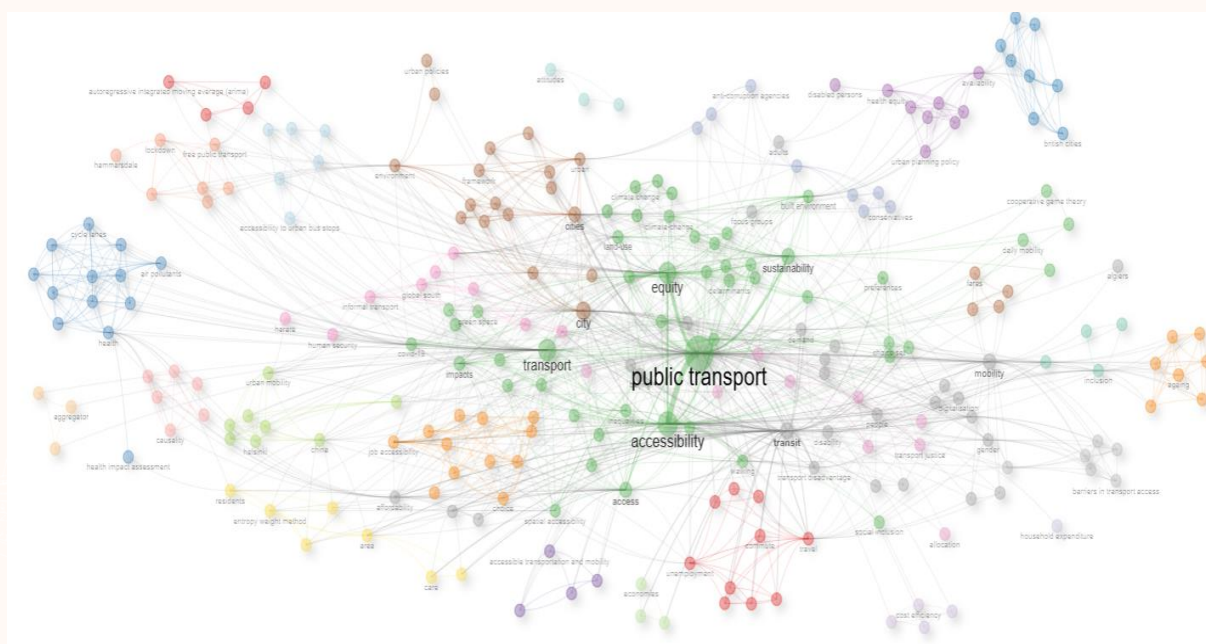


Figure 5 Clusters of topics

“Free public transport” appears with only 2 occurrences, occupying a marginal position on the map. The cluster contains topics “lockdown”, “economic”, “energy”, and “transmission”. This cluster also links to the “equity” one, demonstrating that a correlation between the 2 main areas of this study has already been analyzed together, although it does not have many articles published in the *WoS* database.

“Mobility” had a high number of occurrences, with 8, linking topics associated with the social and economic aspects of individuals data from a public transport user perspective involving “affordability”, “disability”, “gender”, “people”, and “transport equity”. “Travel”, “city”, “transit”, and “cities” are the following words with most frequency, suggesting that the main topic of transport is orientated to urban areas.

3.7 Future Research directions

Accessibility and equity are motor themes in the area with a high level of importance, as identified previously by the table with the most referenced articles (Table 3) and the table with the most citations globally (Table 4), indicating leading topics for future research. Environment, health, and jobs can be identified as themes related to the impact of public transport as they appear more than once in the figure within different contexts, such as “environment” and “air pollution”, “health” and “health equity”, and “job accessibility” and “unemployment”. Concerns with the Global South and developing countries suggest an interest in understanding the existing relationship between inequalities and public transport.

As demonstrated by the themes figure distributed into quadrants (Figure 6) and confirmed by Figure 5, free public transport does not have prominent relevance in studies and is inserted into niche topics, even though it has a high degree of development. This data indicates a gap in the literature, as identified by Kębłowski (2020), at a time when fare-free transport is experiencing an increased global expansion, with over 300 localities worldwide (Štraub & Hess, 2025).

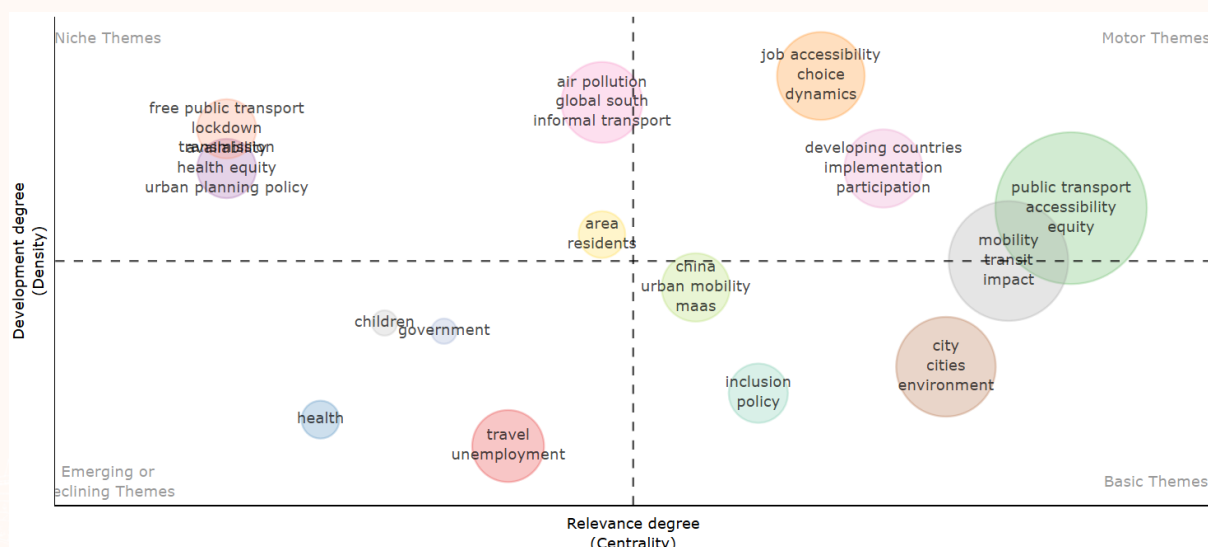


Figure 6 Themes quadrants

Studies on free public transport have mainly focused on the economic and technical aspects of the policy or possible impacts on sustainable mobility (Kębłowski, 2020), as the potential effects of social transformation were only found on a local basis and directed to specific locations (Cats; Susilo; Reimal, 2017; Volinski, 2012; Kębłowski et al., 2019) rather than a wider and more global overview.

A connection to accessibility seems like an opportunity to bring free public transport to a different line of research, and it could produce fruitful studies, considering the well-established literature foundation of the first theme and the amount of work already developed. Another aspect indicated by Figure 6 as a potential area to be studied is the policy aspect of fare-free implementation, to better understand the political, social, and economic context that led to the option of an integral fare subsidy.

Conclusion

This study offers a bibliometric review of the literature on the implementation of free public transport and its impact verified on vulnerable populations, considering aspects such as social justice, inclusion, and equity. The study indicates that the literature addressing free public transport and its social impact is lacking, even though other themes, such as accessibility, tend to sustain continuous growth in the upcoming years. The database obtained allowed a better analytical view of citations and articles from different countries, what journals were most used for publications, authors more relevant to the area of study, intellectual base with most cited references and most cited works, and the main topics of discussion.

Although the first articles on the results were published in 2003, a significant growth in the number of articles and citations was observed only in 2020. Regarding the geographical origins of the articles, Australia has a leading role with most publications and collaborations with other countries, followed by the UK, China, and Spain. Although there are a considerable number of articles written in collaboration between different countries, there is no group of researchers.

It was possible to identify that there is no leading group of authors in this subject of study, suggesting that a better network could be formed among researchers, improving the trade of information. The journals with the most publications were *Transport Policy* and *Journal of Transport Geography*, with the highest Impact Factor and Citation Indicator being *Cities*. As expected, the predominant topic of the journals is transport, as only one of those on the list specializes in another theme, *Sustainability*.

The intellectual base and the topics that resulted from the search identified a relevant theme in accessibility related to public transport, as this term featured in most of the most-cited references and articles with most citations. A possible correlation between accessibility and fare-free public transport may provide an interesting avenue for future research. These two topics are strongly connected because fare costs have a direct impact on the number of public transport users, and accessibility evaluation methods can better verify the social impact of zero-cost transportation modes.

This study has some limitations that must be addressed. The only index used for the search was *WoS*, a factor that imposes limits on the bibliography available and might exclude other articles that could impact the results. Another limitation is that the research only used the English language and was limited to specific terms, such as “free public transport”, “free public transit”, “free transportation”, and “public transport”. Considering that the policy of free transport can be treated with different names within different countries, it could cause a misrepresentation of the theme. Therefore, future studies should expand the scope of databases and include other terms and languages in the scope of search.

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