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Lack of Infrastructure Generates Insecurity and Contributes to Reduced Use of the Bicycle Network in the City of Suzano

Falta de Infraestrutura Gera Insegurança e Contribuem para Redução do Uso da Rede Ciclovária na Cidade de Suzano

La falta de infraestructuras genera inseguridad y contribuye a la reducción del uso de la red ciclista en la ciudad de Suzano

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Abstract:

Increasing urbanization and population growth intensify the challenges of urban mobility, highlighting the need for sustainable alternatives. The bicycle emerges as an accessible and sustainable means of transportation, capable of reducing congestion and dependence on motorized transportation. This study aims to analyze users' perceptions of the bike path infrastructure in the city of Suzano. To this end, a structured questionnaire with 20 questions was applied to collect data on the assessment of the infrastructure of the cycling in Suzano city. A total of 116 participants returned the questionnaire, and it was noted that 24% said they used bicycles, although 92% considered cycling to be a sustainable transport option. As for the assessment of Suzano's cycling network, the majority rated it as fair or poor. In addition, safety on the cycle paths was a crucial point, seen as the main barrier, especially for women, due to factors such as inadequate signage and the lack of integration with other modes.

Keywords: Active mobility; Bicycle; Sustainability; Quality of life.

Resumo:

A urbanização crescente e o aumento populacional intensificam os desafios da mobilidade urbana, evidenciando a necessidade de alternativas sustentáveis. A bicicleta emerge como um meio de transporte acessível e sustentável, capaz de diminuir congestionamentos e dependência do transporte motorizado. Este artigo tem como objetivo analisar a percepção dos usuários sobre a infraestrutura de ciclovias na cidade de Suzano. Para tanto aplicou-se um questionário estruturado com 20 questões para levantamento de dados sobre avaliação da infraestrutura da rede ciclovária da cidade de Suzano. Obteve-se um retorno de 116 participantes, e foi observado que 24% afirmaram utilizar a bicicleta, apesar de 92% considerarem a bicicleta uma opção de transporte sustentável. Quanto a avaliação da rede ciclovária



da cidade de Suzano, a maioria avaliou como regular e ruim. Além disso, a segurança nas ciclovias foi um ponto crucial, sendo vista como a principal barreira, especialmente para as mulheres, devido a fatores como sinalização inadequada e a falta de integração com outros modais. Assim, a ampliação e melhoria da rede cicloviária foram destacadas como medidas necessárias para aumentar a adesão da bicicleta na cidade.

Palavras-chave: Mobilidade ativa; Bicicleta; Sustentabilidade; Qualidade de vida.

Resumen:

El crecimiento de la urbanización y la población intensifican los desafíos de la movilidad urbana, lo que pone de manifiesto la necesidad de alternativas sostenibles. La bicicleta surge como un medio de transporte accesible y sostenible, capaz de reducir la congestión y la dependencia del transporte motorizado. Este artículo tiene como objetivo analizar la percepción de los usuarios sobre la infraestructura de los carriles bici en la ciudad de Suzano. Con este fin, se aplicó un cuestionario estructurado con 20 preguntas para recopilar datos sobre la evaluación de la infraestructura de la red ciclista en la ciudad de Suzano. Se obtuvo un retorno de 116 participantes, y se observó que el 24% declaró haber usado la bicicleta, aunque el 92% consideró la bicicleta una opción de transporte sostenible. En cuanto a la evaluación de la red ciclista en la ciudad de Suzano, la mayoría la consideró regular y deficiente. Además, la seguridad en los carriles bici era un punto crucial, ya que se consideraba la principal barrera, especialmente para las mujeres, debido a factores como la señalización inadecuada y la falta de integración con otros modos. Así, la expansión y mejora de la red ciclista se destacó como medidas necesarias para aumentar la adopción de bicicletas en la ciudad.

Palabras clave: Movilidad activa; Bicicleta; Sostenibilidad; Calidad de vida.

1. Introduction

Active mobility can be defined as locomotion using only human energy, where the traveler becomes the agent responsible for their movement in time and space (Bastos et al., 2020). Thus, it encompasses both walking and movement mediated by non-motorized mechanical equipment, such as bicycles, which Brazilian legislation defines as "vehicles powered by human propulsion, equipped with two wheels, (...)" (Brazil, 1997).

In the Brazilian urban context, active mobility responds to the challenges of urbanization and automobile dependence by helping people access different parts of the city more equitably and sustainably (Bastos et al., 2020). The author also noted that although infrastructure for active mobility has been integrated in some areas, such as the city of São Paulo, this approach remains limited and faces significant challenges, such as urban segregation and a lack of safety (Bastos et al., 2020).

Specific legislation governing bicycle use, as well as incentives for its use, such as Law 12.587/2012, which establishes guidelines for the National Urban Mobility Policy in Brazil, prioritizes non-motorized modes, public transport, and accessibility (Brazil, 2012). This means cities must plan traffic to ensure everyone has access to safe, efficient transportation options, improving quality of life and reducing congestion. At the same time, Article 58 of the Brazilian Traffic Code defines how and where bicycles should circulate, prioritizing bike paths (Brazil, 1997).

These laws matter because they promote cyclist safety and encourage more sustainable mobility, reducing dependence on motorized vehicles and supporting a healthier environment. For example, the "Reference Guide for the Development of Bicycle Mobility Plans in Cities" helps municipalities create cycling plans integrated with urban transport, promoting sustainable mobility and active mobility (Ministry of Cities, 2007). It identifies the bicycle as a key means of building more inclusive and environmentally responsible cities. This document recommends integrating bicycles with public transport and creating adequate infrastructure (Ministry of Cities, 2007). These efforts aim to reduce dependence on motorized vehicles and improve the quality of urban life.

However, despite recent efforts by governments, particularly in higher-density cities, to encourage active modes of transportation, people still do not feel safe using bicycles, for example, to get around. This reality directly affects the city's structure, with motor vehicles congesting roads and creating heavy traffic, especially during peak hours. This phenomenon has become known as urban (im)mobility, as people spend more time in traffic.

The city of Suzano, located in the Alto Tietê region, faces challenges in its cycling infrastructure due to the growth of its vehicle fleet, which, according to the Brazilian Institute of Geography and Statistics (2024), registered 172,827 vehicles.

Between 2015 and 2018, 13 cyclist deaths were recorded in the city of Suzano (Cabrera, 2018), highlighting the vulnerability of those who use bicycles as a means of transportation. The city currently has 5.64 km of cycle paths and 5.29 km under construction or bidding, along with a cycling plan that aims to create routes to encourage tourism and bicycle use (Suzano City Hall, 2024). However, limited infrastructure and driver disrespect make cycling unsafe, reflecting a common problem in Greater São Paulo, where many cities still lack exclusive bike lanes (Cabrera, 2018).

Given this scenario, this article aims to analyze users' perceptions of bicycle path infrastructure in the city of Suzano to propose improvements.

2. Theoretical Framework

2.1 Impact of bicycle use on the environment and quality of life

Research by Torres-Freire et al. (2018) shows that cycling can have a very positive impact on urban mobility. Encouraging bicycle use with adequate cycle paths helps reduce traffic, a major source of pollution and stress in urban areas. The more people choose to cycle instead of using cars, the less congestion there is and the shorter the travel time for everyone. Fewer cars on the streets also means less pollution, contributing to a healthier environment.

As already mentioned, bike lanes are essential for promoting a more sustainable form of transportation. They offer a viable alternative to driving and help reduce emissions. Studies show that in cities where bike lanes have been well implemented, the number of cyclists has increased, resulting in fewer cars on the streets, improved air quality and reduced congestion, which makes traffic flow more smoothly (Tonobohn, 2016).

Furthermore, bike lanes encourage a more active lifestyle. Cycling is not just transportation; it is also physical exercise that can improve heart health, reduce stress, and support mental health. A 2009 study found that cycling can positively affect psychological health and increase overall well-being (Araújo et al., 2009). Thus, Cichella et al. (2022) found that well-designed bike lanes can encourage more people to use bicycles for transportation. A safe, accessible environment for cyclists may be key to increasing acceptance of bicycles in cities.

According to Castro et al. (2022), cyclist safety is fundamental to encouraging bicycle use. A literature review shows that inadequate infrastructure, such as poorly designed cycle paths and a lack of signage, increases accident risk. Furthermore, education and awareness among drivers and cyclists are essential, as many are unaware of rules for sharing the road.

Unfavorable weather conditions and low visibility also increase cyclists' vulnerability. To improve cyclist safety, an integrated approach that includes urban planning, safe infrastructure, and educational campaigns is needed.

Investing in a safe environment not only reduces accidents but also encourages more people to use bicycles, promoting more sustainable and healthy transportation.

Another important point to mention is that integrating cycle paths with public transport expands cyclists' access to bus, train and metro stations, so that this connection allows people to use bicycles to travel short distances to public transport stops, facilitating commuting, therefore, the connected cycle path network to increase the adoption of bicycle use as a means of transport complementary to public transport as mentioned by Lourenço et al., (2019).

Building bike lanes is an important step toward promoting sustainable urban mobility, with direct benefits for people's health and reduced traffic. However, for bike lanes to be truly effective, public policies must not only build them but also encourage their use. A UFRJ study showed that educational campaigns and events promoting bicycle use are essential to increase people's adoption of this mode of transport (Marins, 2017). When people see the bicycle as a viable option, it can positively change their behavior.

However, implementing bike lanes is often unfair. Cities that lack adequate cycling infrastructure often leave more vulnerable communities without access to these improvements. According to an analysis of the Brazilian cycling system, significant gaps remain in the coverage and quality of bike lanes, which often fail to meet everyone's needs, especially those in peripheral areas (Soares, 2023). Furthermore, Coelho Filho and Saccaro Junior (2017) note that implementing bike lanes in Brazil faces several challenges that hinder bicycle use as a means of transportation.

One major obstacle is a car-centric culture that prioritizes cars and devalues bicycles. Many people do not see bicycles as a viable and safe option for getting around cities. Another problem is the lack of adequate infrastructure; many bike lanes are poorly designed, poorly signposted, or located in areas that do not provide access to important places, such as schools and workplaces, making cyclists feel unsafe and unprotected on the streets. Furthermore, conflicts between cyclists, drivers, and pedestrians further increase insecurity and hinder harmonious coexistence between different modes of transportation.

According to the Institute for Transportation and Development Policy (ITDP, 2020), its annual study on bicycle infrastructure in Brazil highlighted the importance of knowing how many people live near bike lanes and cycle paths. This data, called PNB (People Near Bike Lanes), helps assess whether policies that encourage bicycle use are working by showing how many people live within 300 meters of these areas (ITDP, 2020).

Although cycling is an efficient, economical, and healthy form of transportation, its use in Brazil is still limited. A study by Transporte Ativo (2018) showed that improving cycling infrastructure and increasing safety are fundamental to encouraging more people to use bicycles. In 2019, research found that four out

of five people in capital cities live far from bike lanes, and only 13% of people earning below one minimum wage live near them. In contrast, 30% of people who earn more than three minimum wages live within 300 meters of a bike lane (ITDP, 2020).

2.2 The city of Suzano and its bicycle path network

According to the IBGE census (2022), Suzano has approximately 307,429 inhabitants and a population density of 1,490.67 inhabitants per square kilometer. The city has an urbanized area of 56.12 km², which can affect infrastructure for active mobility, such as bicycle use. The context of urbanization and demographic characteristics suggests a need for urban planning that encourages active transportation, such as bicycles, to promote more sustainable mobility in the city.

The situation of bike lanes and cycle paths in Suzano is worrying, especially given the growing number of vehicles in the city and the lack of safe infrastructure for cyclists. Cabrera (2018) cited data from Infosiga, between 2015 and 2018, which recorded 13 cyclist deaths in the city of Suzano, highlighting the vulnerability of those who use bicycles as a means of transportation.

Based on these needs, the Suzano Cycling and Active Mobility Plan was developed, beginning with a survey of mobility conditions in the city and an analysis of urban space, the population, and the laws, which is fundamental to understanding the needs and creating guidelines that support bicycle mobility planning. The proposal includes building 108 km of cycle paths integrated with urban infrastructure, along with educational actions to promote this use (Suzano City Hall, 2024).

Since safety is a priority, ideally bike paths should offer safe routes for cyclists of all ages and abilities, free of obstacles. The paths should also be high quality, with smooth surfaces and green areas, making the journey more pleasant. To achieve this, the bike path network must be continuous, allowing cyclists to move easily between neighborhoods and connect different points in the city.

Currently, Suzano has 5.64 km of bike paths in place and 5.29 km under construction or in the bidding process. The plan suggests creating a bike path route that connects the city to natural areas, such as the Caminho do Sal Route, which will promote tourism and further encourage bicycle use (Suzano City Hall, 2024).

The city of São Paulo is an example of a city that has invested in cycling infrastructure, which earned it an international award for cycle paths and exclusive lanes, being chosen as one of the winners of the 10th edition of the Sustainable Transportation Award for the implementation of 150 km of cycle paths and more than 460 km of exclusive bus lanes (Rosa, 2015). Therefore, São Paulo currently has a network of 767.7 km of roads with permanent cycling

infrastructure, including 734.0 km of cycle paths/cycle lanes and 33.7 km of cycle routes. Furthermore, cyclists have access to 7,411 spaces in 72 bicycle parking facilities and 1,221 spaces in 51 locations with bicycle racks, integrated into the city's public transport system (CET, 2025). With this growth in the cycling network and the implementation of new projects, such as the development of tourist routes and the creation of new connections between areas of cultural and natural interest, the city of São Paulo is moving towards becoming an increasingly cyclist-friendly city, thus contributing to a more sustainable and healthy future.

Another model city is the capital of Paraná, long known for its urban planning. With an estimated population of 1.8 million inhabitants and an area of 435.277 km², Curitiba is internationally known for its urban management model and concern for sustainability, prioritizing health and the environment, especially with its cycle paths, possessing an extensive cycling network with more than 200 km of infrastructure, facilitating the daily lives of pedestrians and cyclists throughout the city (Curitiba City Hall, 2025). Furthermore, there is a movement called "Women Who Cycle," leading an important change in mobility, because in addition to using bicycles as a means of transport, many also participate in groups and events that promote women's cycling, allowing them to share experiences, promoting inclusion, and encouraging more women to cycle (Saragiotto, 2022). Another city that stands out for its active mobility is Jaraguá do Sul, located in the Itapocu Valley, in the northeastern region of Santa Catarina, with an approximate population of 183,000 inhabitants, according to IBGE data (2022).

The Diário de Jaraguá newspaper states that the city invests significantly in cycling infrastructure, with approximately 105 kilometers of roads dedicated to bicycle traffic, distributed in cycle paths and cycle lanes (Tallini, 2024). This results in an average of 57.69 kilometers of infrastructure per 100,000 inhabitants, exceeding the averages of capitals such as Florianópolis (Tallini, 2024). The municipality has one of the highest governance indexes in the country, and this is the third consecutive time that the city has received the Excellent Cities Award, granted by the Aquila Institute, Grupo Bandeirante and Grupo Barriga Verde (TV Barriga Verde, 2023).

3. Method

To achieve the proposed objectives, the study adopted a mixed-methods approach, combining qualitative and quantitative research. First, the study conducted a literature review to understand the evolution of active mobility, the history of cycle paths, and relevant legislation.

Subsequently, the study deepened the analysis by examining cities that have successfully implemented bicycle path networks, such as São Paulo, Curitiba, and Jaraguá do Sul. This comparison helped identify best practices and effective public policies that Suzano can adapt. Furthermore, the study analyzed urban

indicators related to traffic, pollution, and public transport use using data from official bodies such as the Brazilian Institute of Geography and Statistics (IBGE), the Traffic Engineering Company (CET), and others. This analysis helped clarify the impact of bicycle paths in Suzano's urban context.

Next, a field survey was conducted using questionnaires for people aged 18 or older who reside in Suzano. This step was important for collecting information about residents' perceptions of bike paths, their experiences using them, and the barriers they face. The questions addressed topics such as safety, health benefits, and integration with public transportation.

The closed-ended questionnaire was designed considering the following structure:

1. Socioeconomic characteristics: gender, age, level of education, family income;
2. Use of transportation: frequency, purpose, main mode used, main schedules, and travel time; and
3. Bicycle users' perceptions: main purpose of use, frequency, infrastructure assessment, and safety assessment.

The questionnaire was administered electronically using Google Forms. The participation link was sent via social media (WhatsApp, Instagram, Facebook, LinkedIn, and the researchers' email groups) between December 2024 and January 2025. Finally, the collected data were tabulated and analyzed using graphs, cross-tabulations, and proportionality analysis to understand the data distribution and identify trends.

4. Results and Discussion

Of the 250 invitations sent to participate in the survey, 118 responses were received; however, two responses were excluded due to incomplete data, leaving 116 valid responses, representing 46.4% participation.

Analysis of participants' characteristics showed that approximately 63% were between 18 and 35 years, 22.5% between 36 and 45 years, and 14.5% over 46 years. Sixty-seven percent of participants identified as biologically female and 33% as male, an interesting finding, as the research may not have attracted male participants.

Regarding education level, about 45% of participants reported completing high school, 37% completed higher education, 12% completed postgraduate studies, 3.5% are still pursuing higher education, 1% completed postdoctoral research, and 1.5% completed elementary school or did not respond. As for family income, the majority earn between 3 and 4 minimum wages (41.5%), followed by participants who earn up to 2 minimum wages (25%), between 5 and 7 minimum

wages (16.5%), 12% earn more than 8 minimum wages, and 5% preferred not to answer.

Of the total respondents, approximately 90% are residents of the city of Suzano, and 10% are not, but work or study in the city of Suzano.

4.1 Purpose, frequency and main modes of transportation in the city of Suzano

Analysis of participants' trip characteristics in the city of Suzano showed that approximately 25% cited work as the purpose, followed by 24% leisure (outings, visits to relatives/friends), 20% shopping, among others. The combined purpose (work, leisure, and shopping) represents approximately 70% of the purposes of the trips made. The results obtained were similar to those recorded by the 2018 Cyclist Profile Survey, with different proportions, as indicated by the fact that the main destinations include work (75.8%), leisure (61.9%), shopping (55.7%), and schools or colleges (25.4%) (Active Transport, 2018). Thus, the importance of trips for these purposes is evident, reinforcing the need for investments in cycling infrastructure, such as expanding cycle paths and lanes, to ensure safety and accessibility for cyclists.

Table 1 confirms, as expected, that the main mode of transport for commuting is public transport (52.6%), followed by car travel (34.5%); for bicycle use, approximately 8% use it as their main mode of transport. Regarding transport-use frequency, most travel 7 days a week (approximately 58%), followed by Monday to Friday (21.5%) and 2 to 3 times a week (16.5%), among others.

By mode of transport, most participants reported travel times of up to 30 minutes by car and 31 minutes to 1 hour by public transport (Table 2). For bicycle use as the main mode of transport, approximately 67% of participants reported travel times of up to 30 minutes. This result may indicate an incentive to use bicycles for trips between points of interest of up to 30 minutes.

Table 1 – Most frequently used modes of transport for commutes, by frequency of use.

Frequency of travel	On foot	Bicycle	Public transport	Uber or taxi	Own/shared car	Own/shared motorcycle	Value %
Daily (7 days a week)	2	7	33	2	22	1	57.76
Monday to Friday		1	17		7		21.55
Usually 2 to 3 times a week.		1	9		8	1	16.38
Weekends only			1		2		2.59
Rarely			1		1		1.72
Value %	1.72	7.76	52.59	1.72	34.48	1.72	

Source: Authors (2025)

Table 2 – Most used modes of transport by travel time

Travel time	On foot	Bicycle	Public transport	Uber or taxi	Own/shared car	Own/shared motorcycle	Value %
Up to 30 minutes		6	11	1	27	1	39.66
From 31 minutes to 1 hour	1	2	30	1	9	1	37.93
Between 1.1 hours and 1.5 hours	1		13		2		13.79
Between 1.6 hours and 2 hours			5		1		5.17
Above 2 hours		1	2		1		3.45

Source: Authors (2025)

One of the main advantages of using a bicycle is its efficiency over short distances, as it can significantly reduce travel time. For example, a journey that would take 30 minutes on foot can be done in just 10 minutes by bicycle (ITDP, 2016). However, bicycle use must be carried out observing safety issues, such as the safety equipment required by law (Brazil, 1997) and also issues related to the cyclist's physical condition; for example, people with chronic problems or undergoing treatment should avoid cycling without clearance from a healthcare professional (Ghorayeb, 2015).

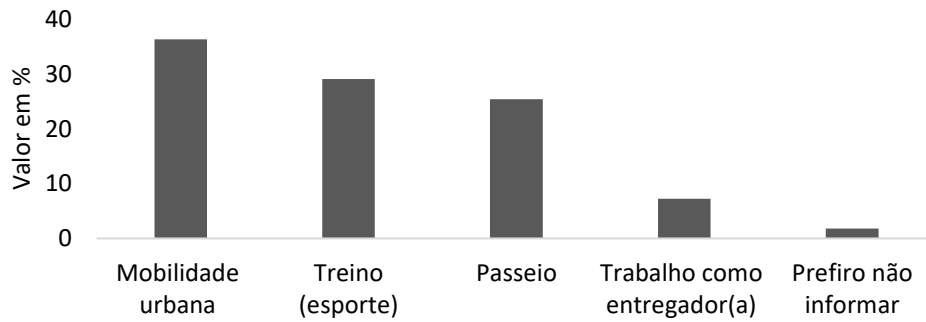
Therefore, the bicycle is an efficient alternative for short trips, contributing to more sustainable and healthy cities. Expanding bike lanes and integrating them with other modes of transport are fundamental to encouraging use, making urban travel more accessible, safe, and agile.

4.2 Evaluation of the bicycle path system in the Municipality of Suzano

Of the 116 participants, approximately 24% stated they use bicycles, compared to 76% who stated they do not. This sub-item focuses on analyzing participants who use bicycles as a mode of transportation. The stratified profile showed that most bicycle users are male, unlike the general stratum. Also, approximately 78.5% are over 26 years old.

The results showed that 41% of participants reported using their bicycles daily for commuting, focusing on urban mobility and training; 38% use them two to three times a week; 11% rarely use them, but when they do, it is mostly for urban mobility; 7% use them more on weekends for leisure rides; and 2% use them from Monday to Friday, also for urban mobility. Figure 1 shows the distribution of data by main reason for bicycle use.

Figure 1 – Main purpose of bicycle use in the city of Suzano



Source: Authors (2025)

Regarding travel time by bicycle, the results showed that approximately 68% fall between 16 and 60 minutes (Table 3).

Table 3 – Average travel time by bicycle and frequency of use

Frequency of bicycle use	Between 10 and 15 minutes	Between 16 and 30 minutes	Between 31 and 60 minutes	More than 60 minutes	Value %
Daily	3	4	1	2	35.71
Monday to Friday			1		3.57
Two to three times a week.		3	4	2	32.14
Weekends	1		1	1	10.71
Rarely		2	3		17.86
Value %	14.29	32.14	35.71	17.86	

Source: Authors (2025)

Regarding the evaluation of the cycling network in the city of Suzano, the results indicated that approximately 43% of participants rated the bike paths as "fair," 32% as "poor," 18% as "very poor," and only 7% as "excellent." When asked about the integration of the cycling network with other modes of transportation, 47% of participants said there is no integration, 39% said there is partial integration, and 14% said there is complete integration.

Participants were also encouraged to answer what they consider most important when using the cycle path network. The result was: safety (25%), followed by infrastructure (integration with other modes, paving, width of cycle paths) (21%), adequate signage (20%), sustainable transport (12.5%), maintenance (cleaning, conservation) (12.5%) and landscape and environment (cycle paths, cycle lanes in wooded areas, etc.) (9%). This result was consistent with the results obtained on how safe the participant felt when using the cycle path in the city of Suzano; thus, it was found that 39.5% indicated that they "sometimes" feel safe, 21.5%

responded that they rarely feel safe and 7% of the participants reported never feeling safe, compared to 21.5% who mostly feel safe and 7% who feel safe when using the cycle path.

Most participants were women, which may influence these perceptions of safety, since women cycle less than men. The main reason given is the perception of insecurity, which is aggravated by the idea that women are more vulnerable in the urban environment, making cycling more intimidating, as shown by data from the 2024 Brazilian Cyclist Profile, which indicates that women in Brazil cycle 37% less than men, with 44.6% of women reporting harassment while cycling, and in São Paulo specifically this number is even higher at 65.7%, thus becoming a crucial factor in this difference (Transporte Ativo, 2024).

According to Lacerda (2014) and Lemos (2017, pp. 86-87), another factor is the difficulty of fitting cycling into daily life, especially the need to be "presentable" for work, which also becomes a significant obstacle. Social pressure to maintain an impeccable appearance hinders cycling, mainly due to the heat and sweat involved, which can discourage many women from this practice. Another factor contributing to lower female participation in cycling is the lack of bicycles suited to female body types and daily needs, such as transporting children or cargo, making cycling less attractive to women. Furthermore, a historical cultural reason also weighs in: the idea that cycling is a "masculine" activity has limited women's participation over time.

According to Lacerda (2014) and Lemos (2017, pp. 86-87), practical issues, such as the lack of changing rooms or restrooms in workplaces, also create barriers for many women, who consider cycling inappropriate for work-related travel. Thus, practical and cultural difficulties together lead many women to view cycling as a less viable option. Additionally, the family situation, where women frequently assume responsibility for childcare and household chores, directly impacts bicycle use, as they often feel unsafe cycling with their children due to inadequate traffic infrastructure. These barriers highlight the need for major changes in safety conditions, infrastructure, and transportation products to encourage more women to use bicycles.

Ninety percent of participants who use the cycling system believe that the existence of bike lanes in the city definitely contributes to the use of bicycles as an alternative mode of transport to motorized transport, compared to 10% who partially agree, since for them it does not depend solely on the existence of bike lanes, but on other factors, such as expanding the cycling system for better integration, increasing safety, and expanding the bike-sharing program.

One hundred percent of participants agree that the main factor encouraging the community to use the bike path is improving bike path infrastructure, followed by increased safety, events and awareness campaigns, among others (Table 4).

Table 4 – Main factors that encourage the use of the cycle path according to participants' perceptions.

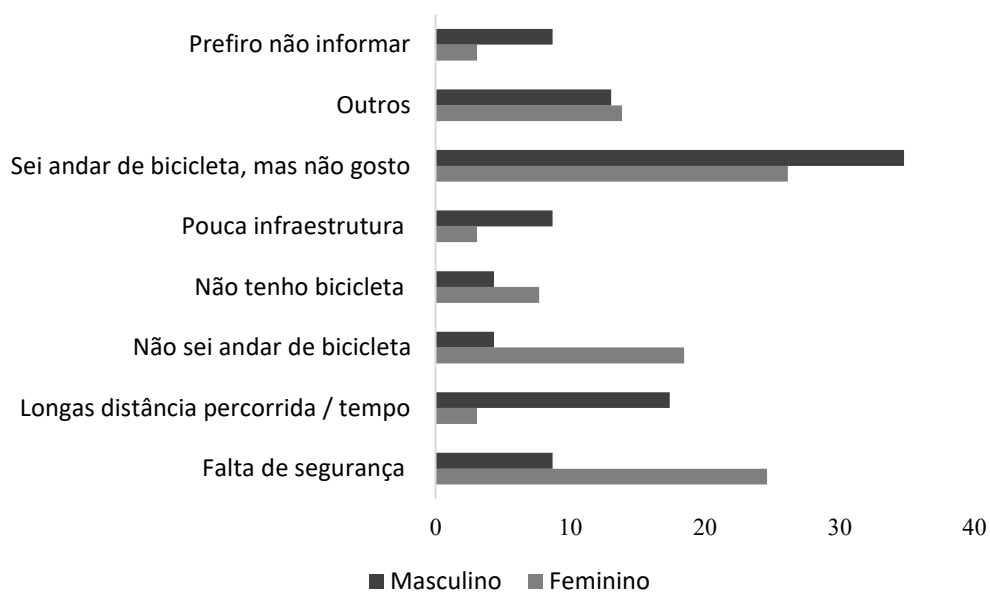
Factors influencing the use of the cycle path	n	Value %
Infrastructure improvements for bicycle paths.	28	100.00
Increased security	23	82.14
Events and awareness campaigns	12	42.86
Financial incentives (subsidies, promotions)	11	39.29
Increase in the availability of shared bicycles.	10	35.71

Source: Authors (2025)

4.3 Non-use of the bicycle path system in the Municipality of Suzano

Of the participants who do not use bicycles, approximately 74% are biologically female. Among the main reasons given by the participants, 26% stated that they do not like riding a bicycle, approximately 25% like it but do not feel safe, 18.5% do not know how to ride a bicycle, and 14% cited other reasons such as economic issues due to the high cost of acquiring bicycles, having suffered an accident while using a bicycle and being unable to return to using it, or having disabled relatives who need a car as a means of transportation (Figure 2).

Figure 2 – Factors contributing to not using a bicycle



Source: Authors (2025)

Regarding male participants, the following points stand out: approximately 35% also indicated that they do not like using bicycles as a means of transportation, 17.5% due to distance and travel time issues that make bicycle use unfeasible, 13% cited other factors such as having had their bicycle stolen and deciding not to buy another one, because using a bicycle for transportation is tiring (physical

effort) and would require infrastructure at the workplace and school to recover, approximately 9% cited infrastructure issues and another 9% cited security issues, unlike the perception of females.

Regarding the evaluation of Suzano's cycling infrastructure by people who do not use bicycles, 33% rated it as "Regular," followed by 25% who rated it as "Poor," 21% as "Very Poor," among others. Evaluations of the cycle paths by people who do not use them were similar to those of cycle path users, suggesting that public authorities need to rethink the city's cycling infrastructure.

Although users stated that they do not use bicycles as a mode of transportation, approximately 92% consider bicycles a more sustainable mode of transportation than others, and 93% consider them a healthy mode of transportation that contributes to an individual's health.

5. Final Considerations

Based on the results, bicycle use as a means of transportation in the city of Suzano remains limited, with only a small portion of the population adopting it. The frequency of bicycle use varies among participants, with a significant portion using them daily for urban commutes and training. However, a substantial group also uses bicycles sporadically, either for weekend leisure or occasional commutes. Furthermore, integration with other modes of transport is still perceived as deficient, which may discourage bicycles as a viable alternative to motorized transport. These data already indicate a widespread negative perception of the existing infrastructure, suggesting that current conditions do not fully meet users' needs.

Safety was one of the aspects cyclists highlighted most, as a crucial factor in increasing bicycle adoption. Many participants reported feeling unsafe when using bike lanes, which may be related to inadequate infrastructure, poor signage, and the behavior of other road users. The perception of insecurity is even more pronounced among women, reflecting a trend already pointed out in studies on bicycle use in Brazil, in which harassment and vulnerability in traffic are cited as significant barriers.

Despite these challenges, participants agree that expanding and improving bicycle lane infrastructure, increasing safety, awareness campaigns, and financial incentives could stimulate bicycle use in the city. Bicycle lanes are seen as a positive factor for urban mobility. Still, effective adoption of this mode of transport depends on integrated measures that make cycling more accessible and safe for everyone. Essential measures include expanding the bicycle network, ensuring strategic connections to central areas and more distant neighborhoods; implementing safety measures, such as improved signage, enforcement, and public lighting; and creating policies that encourage bicycle use, such as awareness campaigns and bike-sharing programs.

Thus, this study highlights the importance of public policies that improve cycling infrastructure, promote traffic safety, and raise public awareness of the benefits of cycling. These actions can help build a more sustainable city with greater inclusion in active transportation.

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