



## **Seeking Solutions to Traffic Congestion in Surco, Lima**

Capstone Document for the Bachelor of Science in Sustainable Built  
Environments Program

Senior Capstone

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TABLE OF CONTENT

ABSTRACT .....	3
1. INTRODUCTION.....	4
2. METHODOLOGY.....	6
3. DATA AND RESULTS.....	7
6.1 PERCEPTION ANALYSIS .....	7
6.2 CASE STUDY.....	14
6.3 SYSTEMATIC LITERATURE REVIEW .....	17
7. DISCUSSION .....	19
8. CONCLUSION.....	20
9. RECOMENDATIONS.....	21
10. REFERENCES .....	23

## ABSTRACT

Traffic congestion in Surco has become a serious issue due to rapid urban growth, limited infrastructure, and insufficient public transportation options. Most residents face daily commutes that take over an hour, causing frustration, lost productivity, and reduced quality of life. The lack of proper bike lanes and well-maintained sidewalks forces many people to rely on private cars for even short trips, worsening traffic jams and increasing pollution. This research examines the main causes of traffic problems and suggests practical solutions to improve mobility and make daily travel more efficient. The main objective of is to propose practical solutions to address traffic congestion on four major avenues in Surco. These solutions focus on encouraging the use of bicycles by developing better bike lanes infrastructure and enhancing public transportation to make it more efficient and accessible. By prioritizing these sustainable modes of transport, the research aims to reduce the reliance on private vehicles, improve mobility, and create a safer and more inclusive urban environment for all residents and commuters.

## 1. INTRODUCTION

Surco, one of the largest and most populated districts in Lima, Peru, acting as a connector between many districts and home to numerous schools and universities, faces a major issue: traffic congestion. As is well known, Peru is highly centralized in Lima, with 1/3 of the country's population living there. Due to a lack of knowledge in the past and poor road infrastructure, the city has become congested after many years. Also, the rapid population growth continues to worsen this problem year after year. The inefficiency of public transportation and urban insecurity forces residents from using any mode of transport other than private cars. This combination results in traffic jams, particularly during peak hours, which disrupt daily routines and waste valuable time for commuters.

According to local reports, traffic congestion in Surco affects both professionals and students, leading to higher stress levels, reduced productivity, and less time spent on important activities (MTC, 2022). The constant flow of vehicles contributes to air pollution, impacting residents' health and the environment. Traffic is not just an inconvenience; it represents a barrier to a higher quality of life for the district's residents. This causes long commutes, heightened stress, and negative health effects. Additionally, the heavy reliance on private cars only worsens pollution and air quality.

The lack of dedicated bus lanes and bike lanes is one of the main contributors to the worsening traffic congestion. Without proper lanes for buses and cyclists, these modes of transportation often have to share the same roads as private cars, causing delays for everyone. This not only leads to longer travel times but also creates more frustration for commuters. In addition, the poor placement of bus stops often results in buses blocking traffic while they pick up or drop off passengers, further contributing to the traffic jam.

Also, the presence of informal transportation, such as unregistered taxis and minibuses, worsens the situation. These vehicles frequently do not follow traffic regulations and can stop abruptly, making the roads more chaotic and unpredictable. All of these factors combine to create a traffic system that is inefficient, overcrowded, and difficult to navigate.

"The worsening of traffic congestion is also the result of the continuous growth of the vehicle fleet in the capital, the lack of investment in road infrastructure projects, and the absence of a comprehensive mass transit system" (Almeida, 2019). Without addressing these underlying issues, the situation will continue to escalate, further complicating the daily commute for many residents and affecting the overall quality of life in the city.

In addition to the structural issues contributing to traffic congestion, driver behavior also plays a significant role in making the situation worse. "There are drivers who show little respect for others with whom they share the roads. In some cities, like Lima, many drivers, trying to save a few seconds of travel time for themselves, try to push their way through intersections, blocking them and creating much greater negative effects for others than their own benefit" (Thomson & Bull, 2012). This kind of reckless driving not only causes bottlenecks at intersections but also increases delays for everyone, making traffic flow even more inefficient. When drivers prioritize their own convenience over the collective well-being of all road users, it leads to gridlocks that affect commuters and add more pressure to the city's already overloaded transportation system.

## 2. METHODOLOGY

This research aims to investigate how public perception and existing knowledge of traffic congestion in Surco, Lima, can help inform effective solutions and support the implementation of sustainable urban mobility practices.

By examining the impact of congestion on daily life, economic productivity, and environmental conditions, it seeks to provide actionable insights for urban planners and policymakers. Explore how sustainable transportation options, such as public transit, cycling infrastructure, and integrated mobility solutions, can alleviate congestion. Ultimately, this research aims to propose recommendations that contribute to the creation of a more efficient, sustainable, and inclusive transportation system in Surco, enhancing the overall quality of life for its residents.

For this, the research question is: “How can public perception and current knowledge about traffic congestion nodes inform stakeholders about effective solutions and the implementation of sustainable urbanism practices, in order to enhance resilience, guarantee sustainability, and promote adaptation to future urban mobility challenges?”

The methodologies employed in this research include Perception Analysis, a Case Study, and a Systematic Literature Review, each providing valuable insights into the issue of traffic congestion in Surco, Lima.

- *Perception Analysis*: A survey and interviews were essential to understand the opinions of Surco residents or those who commute through the area. This allowed an analysis of the types of transportation they use, and how these choices influence traffic congestion.

- *Case Study:* Analyzing various intersections along the main avenues in Surco helps to understand traffic flow throughout the day and provides insight into the different zoning types presented, such as commercial, residential, and educational.
- *Literature Review:* Summarizes studies on traffic congestion in Surco and Lima, with a scientific perspective on the issue. These focuses on urbanization, population growth, and infrastructure challenges. Examines the private car use, public transportation limitations, and traffic management systems.

### 3. DATA AND RESULTS

#### 6.1 PERCEPTION ANALYSIS

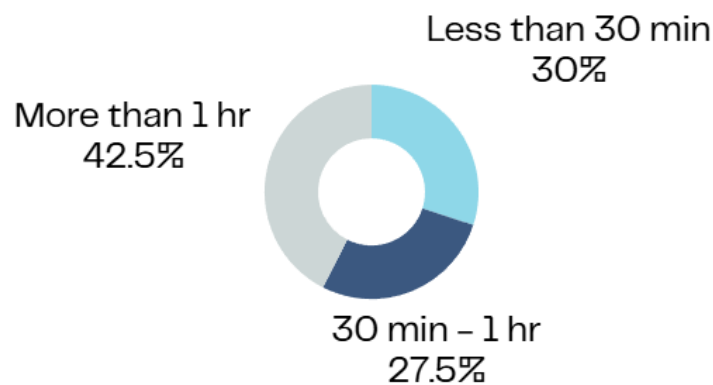
##### *SURVEY*

A survey was distributed to 40 residents in Surco to gain insights into their commuting habits, the selected individuals were family members and neighbors who live in the area and that experiences with traffic congestion, and suggestions for potential improvements. The survey focused on understanding how residents perceive the daily challenges of commuting, including the time spent in traffic, the modes of transportation they rely on, and the impact of congestion on their daily productivity and well-being. Additionally, the survey sought to identify the key factors contributing to congestion in the area and gather ideas from residents on how to improve urban mobility. By collecting this data, the survey aimed to capture the lived experiences of Surco's residents, providing valuable information that could inform traffic management strategies and policies aimed at reducing congestion and enhancing the overall commuting experience. The questions were designed with precision to effectively gather a variety of perspectives using only a limited number of questions. This approach ensured that each question targeted specific

aspects of the issue while allowing respondents to provide insightful and comprehensive answers. These questions were:

- How long does your daily commute take?
- What modes of transportation do you use?
- What do you believe are the main causes of traffic congestion?
- Do you feel your current commute impacts your daily productivity or well-being?

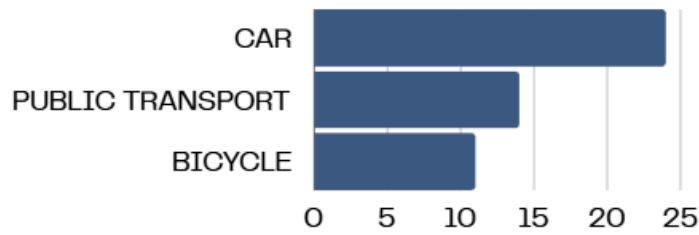
Question 1: How long does your daily commute take?



The results reveal that traffic congestion in Surco impacts daily commutes, with a large portion of respondents (42.5%) indicating that their daily commute takes more than one hour. This highlights the severity of traffic issues in the district, particularly during peak hours. Additionally, 27.5% of respondents report commutes lasting between 30 minutes and an hour, while only 30% experience travel times of less than 30 minutes. These findings show that most residents face prolonged travel times, which not only affects their productivity and quality of life but also underscores the need for effective urban mobility solutions to alleviate congestion and improve transportation efficiency.

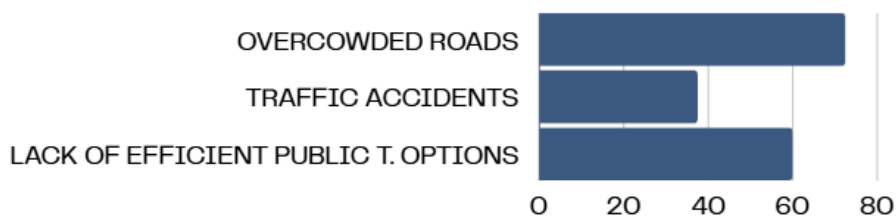


Question 2: What modes of transportation does you use?



The results indicate the three most commonly used types of transportation among the respondents. A mayor portion of respondents (25%) rely on cars for their daily commutes, highlighting the continued dependence on private vehicles despite the challenges posed by traffic congestion. Public transportation is used by 14% of respondents, suggesting that while some individuals opt for more sustainable options, the usage rate remains relatively low compared to private cars. Additionally, 11% of respondents use bicycles, reflecting a smaller but growing interest in eco-friendly and alternative modes of transportation. These findings emphasize the need to promote more sustainable and efficient transportation options in Surco, particularly to reduce traffic congestion and its associated impacts.

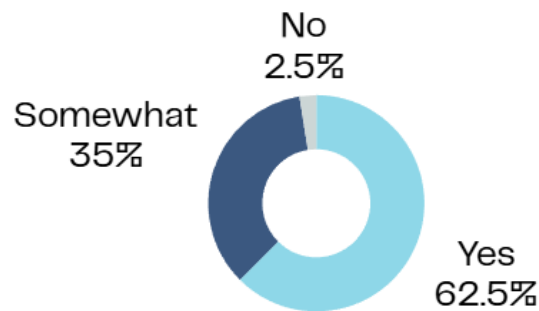
Question 3: What do you believe are the main causes of traffic congestion?



The results indicate that respondents in Surco identify the key factors contributing to traffic congestion. The overwhelming majority (72.5%) believes that overcrowded roads are the primary cause, reflecting concerns about the high volume of vehicles on the streets, particularly during peak hours. A mayor portion (60%) also points to the lack of

efficient public transport options as a major factor, suggesting that inadequate alternatives to private vehicles lead to increased road congestion. Additionally, 37.5% of respondents attribute traffic congestion to traffic accidents, which disrupt traffic flow and contribute to delays.

Question 4: Do you feel your current commute impacts your daily productivity or well-being?



The results show that most respondents in Surco (62.5%) feel that their daily commute negatively impacts their productivity and well-being, highlighting the strain that traffic congestion places on individuals. A smaller group (35%) reports that the impact is somewhat noticeable, suggesting that while they may not experience major disruptions, the commute still affects their day-to-day life to some degree. Only 2.5% of respondents stated that their commute does not affect their productivity or well-being, indicating that for most, traffic congestion is a big concern.

The survey reveals critical issues surrounding commuting in the area. 39 respondents face long daily commutes, of which 25 spending more than an hour traveling to and from work. Most people rely on cars as their primary mode of transportation, followed by those who use public transportation, and a smaller group who walk or bike. The primary causes of traffic congestion, according to respondents, include overcrowded roads, frequent traffic accidents, and road closures. Another major contributing factor is

the lack of efficient public transportation options, which exacerbates the congestion problem, particularly for those who cannot rely on cars.

As a result, the daily commute has a considerable impact on many individuals' productivity and overall well-being. For most, the time spent in traffic and the stress associated with commuting negatively affect their ability to perform well at work and maintain a healthy work-life balance. The long hours spent in transit, combined with the frustration of dealing with congestion, have led to a general sense of dissatisfaction. In many cases, people feel that their commute not only wastes valuable time but also contributes to feelings of burnout and diminished quality of life. Overall, the combination of inefficient transportation infrastructure, long travel times, and congestion presents challenges to residents, affecting both their personal well-being and professional efficiency.

### *INTERVIEWS*

This research also incorporates interviews to obtain a clearer perspective into the experiences and opinions of residents regarding traffic congestion in Surco, Lima. Interviews provide an opportunity for participants to share their perspectives in detail, revealing nuances that surveys may not capture. Through open-ended questions, this method seeks to explore the factors contributing to traffic congestion, assess residents' views on the effectiveness of current traffic management strategies, and gather suggestions for improvements. By engaging directly with community members, the research aims to enrich the understanding of local traffic issues and inform potential solutions.

Interviews were conducted with residents to know a more detailed understanding into their experiences. Five individuals were interviewed from companies with offices in the analyzed area, as well as parents with children in nearby schools.

The questions chosen were clear and concise, aiming to quickly and efficiently understand the position of each interviewee. The questions were:

1. Can you describe a typical day regarding traffic in your area?
2. What changes would you suggest to improve traffic conditions?
3. How effective do you find current traffic management strategies?

Interviewee 1:

1. "A typical day for me starts with heavy traffic on my way to work. It can take me over an hour to travel just a few kilometers. Mornings are especially bad with parents dropping off their kids at schools."
2. "I think we need more bike lanes and better public transport options. If more people used buses instead of cars, it would definitely help reduce traffic."
3. "Current traffic management is not very effective. Traffic lights often change too quickly, and there's no coordination between them, which causes unnecessary stops."

Interviewee 2:

1. "Traffic is a nightmare. In the afternoons, I often sit in my car for at least an hour. It's frustrating, especially when I have meetings to attend."
2. "I suggest improving the public transportation system. More buses and better routes would encourage people to leave their cars at home."
3. "I find the traffic management strategies lacking. They need to invest in smarter traffic lights and possibly implement congestion pricing in busy areas."

Interviewee 3:

1. "For me, it's a daily struggle. I have classes in the morning and the traffic makes me late sometimes. The roads are always packed."
2. "Adding more pedestrian zones would help. People need places where they can walk without worrying about cars."
3. "I think they are trying, but there's so much to improve. The current solutions don't seem to address the root causes of the problem."

Interviewee 4:

1. "Traffic has gotten worse over the years. I used to drive, but now I prefer to stay home during peak hours."
2. "I would suggest better communication about road conditions. If we knew which routes were congested, we could plan better."
3. "I feel like they are reactive rather than proactive. They only fix things after problems arise, rather than planning ahead."

Interviewee 5:

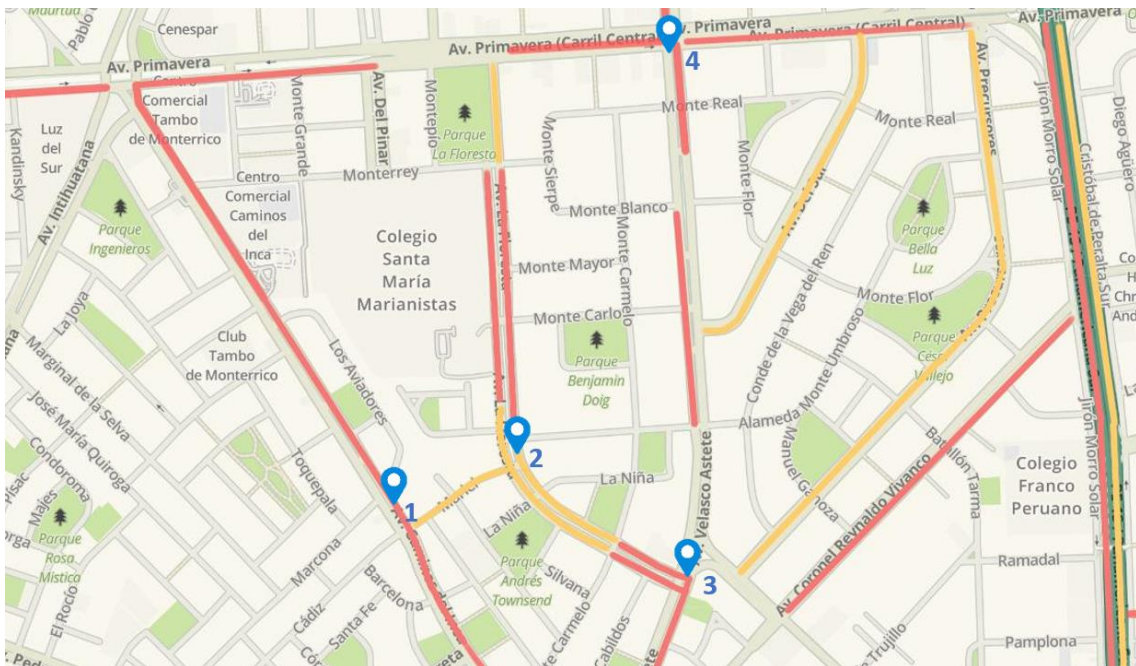
1. "My commute can be anywhere from 40 minutes to over an hour. I often feel stuck in traffic."
2. "They need to make public transport safer and more reliable. That would encourage more people to use it."
3. "I think there's room for improvement. The strategies they have now don't seem to keep up with the increasing number of cars on the road."

The interviews reveal frustration with traffic congestion, particularly during peak hours, with many commuters spending over an hour in traffic for short distances. Mornings and afternoons are especially challenging, leading to delays that impact work,

school, and personal schedules. Respondents suggest enhancing bus services with better routes and more frequency, as well as creating more bike lanes and pedestrian zones to encourage alternative modes of transport and reduce car dependence. Despite existing traffic management efforts, most feel that current strategies are ineffective. Common criticisms include poorly coordinated traffic lights that lead to unnecessary stops and a reactive approach to traffic issues, where solutions are only implemented after problems arise.

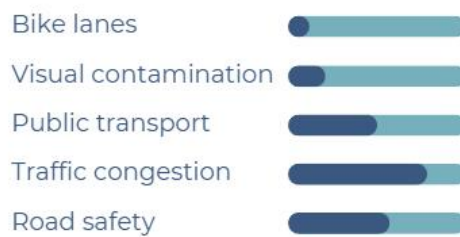
## 6.2 CASE STUDY

The area chosen for the case study was the Chacarilla del Estanque neighborhood, analyzing four intersections with heavy traffic flow: 1. Caminos del Inca Avenue, 2. La Floresta Avenue, 3. Velasco Astete Avenue, and 4. Primavera Avenue.

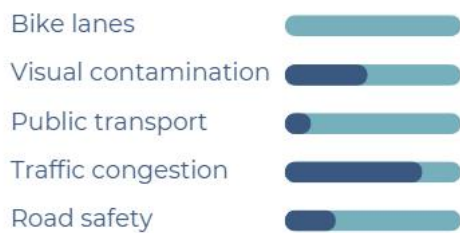


For this case study, five aspects were measured, both positive and negative, which were: bike lanes, visual pollution, public transport, traffic congestion, and road safety. These aspects were analyzed to understand the condition of each intersection mentioned, in order to create a bar chart that shows how well or poorly each intersection meets these criteria.

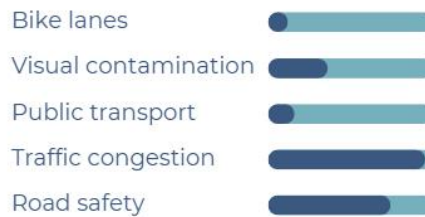
Continuing with the analysis of each intersection, the first one: Caminos del Inca Avenue, it can be observed that there is no bike lane, and the traffic lights are poorly synchronized, which creates congestion due to the short time between light changes. During peak hours, excessive traffic is generated by buses that do not respect intersections, preventing cars from the opposite direction from moving forward. The road has several patches and potholes, making it a dangerous street for both drivers and pedestrians.



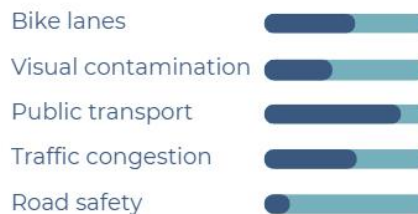
As for the second intersection, La Floresta Avenue, due to the presence of a school on this street, there is heavy traffic in the mornings and afternoons caused by parents dropping off their children and the lack of parking space for them. Additionally, kids who ride bicycles to school risk their lives as there are no bike lanes, and without public transportation options on this avenue, students have no choice but to travel by car or bike. There is also significant visual and noise pollution, as everyone tries to arrive at the same time and sometimes being late, resulting in frequent horn honking.



The third intersection, Velasco Astete Avenue, is one of the main routes in the area to reach higher-traffic avenues like Primavera Avenue or the South Pan-American Highway. Because it is one of the longest and most heavily trafficked avenues, a large amount of traffic is generated throughout the day. It lacks a bike lane and public transportation, which forces residents to rely on cars.



The last intersection, Primavera Avenue, is a major road that does have a bike lane. However, as mentioned earlier, the avenues connecting to this main road lack bike lanes, which results in very few people using it since they have no way of getting there. The main cause of traffic on this avenue is buses, as they do not respect the designated stops and park anywhere, preventing cars from circulating. Additionally, the large number of street vendors under the bridges causes significant visual and noise pollution, as their attempts to sell interfere with pedestrians, and in many cases, pedestrians end up being victims of theft by the vendors themselves.



A major concern across all these locations is the lack of efficient public transportation, which forces more people to rely on private vehicles, exacerbating traffic congestion. In addition, there are no dedicated bike lanes, making these roads less accessible for cyclists and further hindering the overall transportation system's efficiency.



Traffic congestion is a persistent issue in these areas, worsened by poorly functioning traffic lights that cause delays and frustration for commuters. These challenges underscore the need for significant improvements in both infrastructure and public transit to enhance mobility and alleviate traffic-related problems.

The heavy reliance on private cars leads to an overwhelming number of vehicles on the roads, contributing to the ongoing traffic problems. The absence of a well-developed public transportation system and proper bike lanes leaves people with few alternatives but to use their own cars. For many, public transportation is not the preferred choice but rather a necessity due to economic constraints and the lack of other viable options.

### 6.3 SYSTEMATIC LITERATURE REVIEW

The following table provides an overview of key studies and research findings related to traffic congestion, urban mobility, and sustainable transport solutions. This review synthesizes existing literature to identify the most important factors contributing to congestion in urban environments, with a particular focus on public perception and the effectiveness of current traffic management strategies. By examining global case studies, theoretical frameworks, and other researches, the chart highlights a range of solutions explored to address congestion, from infrastructure improvements to alternative transportation methods. This overview serves as the foundation for understanding how existing knowledge can inform the development of tailored, sustainable solutions for urban mobility challenges in Surco, Lima.

In Google Scholar, key words such as "Surco," "traffic congestion," and "traffic in Lima" were searched to generate a list of papers and articles related to the topic. A list of 10 authors was obtained, of which 6 were selected for their strong connections to the

analysis in this research. Additionally, a table was created with 4 important subtopics: urban mobility and traffic management, environmental impact and public health, political will and governance, and economic costs of congestion. These aspects help to understand the topics covered in the papers and articles and whether they provide only arguments (red) or possible solutions (green) to these problems.

Author(s)	Urban Mobility and Traffic Management	Environmental Impact and Public Health	Political Will and Governance	Economic Costs of Congestion
Almeida, A. (2019)	Discusses the increase in traffic and congestion in Lima, the growth of the vehicle fleet, the lack of road infrastructure and mass transportation, and mentions the creation of the Urban Transport Authority of Lima and Callao (ATU) to manage the urban transport system.	It mentions how the increase in traffic congestion affects the physical and mental health of citizens, implying an environmental and public health impact.	The article points out the lack of effective action by the authorities and the delays in launching the ATU, reflecting a lack of political will and adequate governance in transportation management.	The article mentions how traffic consumes part of the country's economy and highlights the negative economic impact of the growing traffic congestion.
Thomson, I. & Bull, A.(2012)	Thoroughly addresses the causes of congestion, such as the increase in car usage and inadequate infrastructure. It also touches on potential solutions for improving urban mobility, although it doesn't delve deeply into specific management strategies.	Although the article does not focus directly on these topics, it mentions the negative consequences of congestion, such as pollution and increased accidents, which are closely related to public health and the environment.	-	The economic impact of congestion is explicitly addressed, mentioning lost efficiency, increased operational costs, and reduced productivity.
Lara, A. (2020)	-	The article touches on the public health aspect by discussing the psychosocial risks faced by public transport workers, which indirectly impacts their health and well-being.	The article addresses governance in the context of managing occupational risks in urban public transport. It highlights the role of policies and the need for strong governance to prevent and address psychosocial risks.	-
Jauregui-Fun, F. (2019)	The paper thoroughly discusses urban mobility in Lima, highlighting the city's reliance on informal transit systems, including buses, minibuses, and paratransit modes. It analyzes the city's mobility structure, transport history, and suggests improvements for sustainable transit.	-	The paper discusses the governance challenges of managing both formal and informal transit sectors. It suggests that better governance, including state support for formal transit and regulation of the informal sector, is crucial for creating a more sustainable transport system.	-
Ospina-Toro, A. (2017)	The paper directly addresses urban mobility by proposing a methodology to identify feeding routes for areas disconnected from the Mass Transit System (MTS). The focus is on improving passenger capacity and connectivity in urban areas with transport deficits.	-	-	While the paper does not directly discuss economic costs of congestion, the proposed solution aims to alleviate inefficiency in urban mobility. By optimizing feeding routes, it may indirectly reduce congestion and improve transport efficiency, which could have economic benefits.
Pastor, J. (2022)	The paper focuses on the high levels of traffic congestion in Lima and discusses its causes, effects, and consequences on the city's transport system, including delays, overconsumption of fuel, and inefficient public transport.	Traffic congestion leads to increased environmental pollution (air and noise), which directly affects the health of the population, contributing to both physical and mental health problems.	Several causes of congestion are linked to poor governance, such as inadequate road infrastructure, unfinished projects, inefficient traffic management, and a lack of coordinated urban planning and traffic light systems.	The paper highlights significant economic costs, including increased fuel consumption, higher operating costs for transport services, loss of time (average of 4 hours daily), and the inefficiency of the transport system, all contributing to a lower quality of life and higher public expenditure.
Frequency	5/6 4/5	4/6 0/4	4/6 2/4	4/6 1/4

After this analysis, it can be seen that traffic congestion in Lima, especially in Surco, is one of the country's main problems. Many papers and articles show that people are aware of this, but being aware of the problem is not enough. Analyzing it from different perspectives demonstrates that this issue impacts the lives of many Peruvians in various ways. Furthermore, few people point out possible solutions, as the collapse of the roads throughout the city makes potential solutions much more complicated.

## 7. DISCUSSION

After this analysis, it is clear that traffic congestion in Surco, is one of the country's most pressing problems. Many studies and articles acknowledge this issue, and while people are aware of it, recognition alone is not enough to bring about change. Looking at the issue from different perspectives highlights how deeply it affects the lives of many Peruvians. However, few have pointed out potential solutions, and the deteriorating state of the city's roads complicates the process of addressing this problem. One of the major concerns in these areas is the lack of efficient public transportation. The absence of reliable, accessible public transit options forces more people to rely on private vehicles, which only worsens traffic congestion.

Additionally, the lack of dedicated bike lanes further limits the efficiency of the transportation system, making the roads unsafe and inconvenient for cyclists. This exacerbates the congestion problem, as it discourages alternative, more sustainable forms of transportation. Furthermore, the ongoing issues with traffic signals contribute to delays, with poorly synchronized lights causing long waits and unnecessary stops. These factors highlight the urgent need for significant improvements in both infrastructure and public transportation to enhance mobility and reduce traffic-related challenges.

The overwhelming reliance on private vehicles results in too many cars on the road, compounding the congestion problem. The absence of a well-developed public transport system and safe cycling routes leaves people with limited alternatives. For many, taking public transportation is not a choice, but rather a last resort due to its inefficiency. Despite existing traffic management efforts, many feel that current strategies are not effective in resolving the issue. Common criticisms include poorly coordinated traffic signals, which cause unnecessary delays, and a reactive approach to managing traffic, where solutions are only put in place after problems have already escalated. This underscores the need for more proactive, comprehensive solutions to improve the overall transportation system.

## 8. CONCLUSION

In conclusion, solving the traffic issues in Surco and other parts of Lima requires a comprehensive and well-thought-out approach. Traffic congestion is a daily problem that affects thousands of people, causing stress and wasting valuable time. It's not just about getting stuck in traffic; its effects go beyond that, impacting people's daily lives in many different ways. From losing precious hours to constant frustration, traffic has become an obstacle to many daily activities. This problem is even more serious in a district like Surco, where both the infrastructure and the number of vehicles are growing steadily, while the solutions to alleviate traffic don't seem to keep up at the same pace.

Traffic not only represents a logistical challenge but also has a significant impact on the mental health of city dwellers. People lose valuable time that could be spent on more productive or recreational activities. Additionally, the stress associated with daily traffic jams has consequences for people's wellbeing. This problem affects not only drivers but also public transport passengers, cyclists, and even pedestrians. In many cases, the lack

of efficient or accessible transport options leads people to rely on their cars, which only increases the number of vehicles on the road.

The solution to this problem is not simple, but with proper planning and the implementation of effective measures, significant changes can be achieved. It is crucial for authorities to recognize the magnitude of this situation and prioritize a more efficient and accessible transportation system for everyone. If this issue is not addressed, the negative effects on the quality of life in Surco will only continue to grow, impacting both residents and workers who have to navigate the city every day. In the long term, if nothing is done to tackle traffic, the city could face even greater problems in terms of pollution, productivity, and public health.

## 9. RECOMENDATIONS

Improving the transportation system in Surco requires a multifaceted approach. Enhancing public transportation should be a priority. If buses and trains were more reliable, frequent, and comfortable, more people would choose public transport over driving, reducing congestion on the roads. Additionally, optimizing traffic signals is essential to improving traffic flow; by implementing smarter systems that adjust based on real-time traffic conditions, long waiting times and traffic jams could be minimized. Another effective measure would be the addition of bike lanes, which would not only help reduce traffic but also promote healthier and more sustainable modes of transportation. For cycling to become a viable alternative to driving, it's crucial to ensure that bike lanes are safe and well-integrated into the district's transport network. Equally important is involving the local community in the planning process, as residents of Surco have firsthand experience with the area's traffic issues.

Combining these strategies improved public transport, optimized traffic management, safe bike lanes, and community involvement could create a more efficient, sustainable, and user friendly transportation system for Surco, ultimately making the district easier to navigate for everyone.

## 10. REFERENCES

- Almeida, A. (2019). Lima, el tercer peor tráfico del mundo. [https://repositorio.ulima.edu.pe/bitstream/handle/20.500.12724/9249/Almeida\\_trafico\\_automotriz\\_Lima.pdf?sequence=4&isAllowed=y](https://repositorio.ulima.edu.pe/bitstream/handle/20.500.12724/9249/Almeida_trafico_automotriz_Lima.pdf?sequence=4&isAllowed=y)
- Thomson, I. & Bull, A. (2012). La congestión del tránsito urbano: causas y consecuencias económicas y sociales. <https://repositorio.cepal.org/server/api/core/bitstreams/4ce5c839-1acd-4642-9ca9-c92439af2328/content#page=113>
- Lara Satán, A. (2020). Organización y gestión en la prevención de riesgos psicosociales laborales en el transporte público urbano. *Revista Universidad y Sociedad*. <http://scielo.sld.cu/pdf/rus/v12n4/2218-3620-rus-12-04-355.pdf>
- Jauregui-Fun, F. (2019). Anatomy of an Informal Transit City: Mobility Analysis of the Metropolitan Area of Lima. <https://www.mdpi.com/2413-8851/3/3/67>
- Ospina-Toro, A. (2017). A methodology for creating feeding routes in mass transit systems. <https://revistas.uptc.edu.co/index.php/ingenieria/article/view/6052>
- Pastor, J. (2022). Congestión vehicular y la autoridad de transporte urbano de Lima y Callao. [https://alicia.concytec.gob.pe/vufind/Record/RULI\\_3b90286a8f51f607809dd41e194d0d7f](https://alicia.concytec.gob.pe/vufind/Record/RULI_3b90286a8f51f607809dd41e194d0d7f)
- Pérez, D., & Córdova, E. (2022). \*Environmental Impact of Traffic Congestion in Lima: A Public Health Perspective\*. *Environmental Science & Policy*.

- Ramírez, F., Salazar, J., & Castañeda, L. (2021). \*The Economic Costs of Traffic Congestion in Lima: A Quantitative Analysis\*. Economic Development Quarterly.
- Vásquez, M. (2020). \*Public Transportation and Traffic Flow in Lima\*. Transport Research Review.
- Newman, P., & Kenworthy, J. (1999). \*Sustainability and cities: Overcoming automobile dependence\*. Island Press.
- Rodrigue, J. P. (2017). \*The geography of transport systems\* (4th ed.). Routledge.
- Pérez, D., Navarro, P., & Salazar, M. (2018). \*The Impact of Traffic Congestion on Urban Mobility in Lima: A Case Study\*. Journal of Urban Transportation Studies, 12(3), 45-56.
- Chavez, L. (2017). \*Urban Traffic Problems in Lima: Solutions and Challenges\*. Transportation Review, 39(2), 99-110.