

## PASSENGER RAIL TRANSPORT AND MOBILITY: USER'S VIEW ABOUT SERVICE LEVEL AND SAFETY

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**Purpose:** presents and categorizes the main problems registered by users of urban trains in the state of Rio de Janeiro, and makes an analysis of episodes of violence, crossing this data with the categories of service levels.

**Methodology:** a documentary to verify recorded and reported occurrences on the temporary discontinuation of the users' dissatisfaction service shown in the complaints made in the years 2018 and 2019.

**Findings:** security news refers to stations that are located in admittedly violent neighborhoods in the northern part of the city of Rio de Janeiro. Shootings paralyze the circulation of trains and affect the level of services offered by the concessionaire, as they cause the non-compliance with the programmed frequency, the increase in travel time, the feeling of insecurity in stations, trains and integrations and, consequently, the loss of service reliability. .

**Research Limitation / implication:** The search referred to the period from January 2018 to December 2019, and applying the filters referring to the central theme, 57 valid news items were obtained for categorization and analysis .

**Originality:** contributes to highlight criticisms at the service level and proposes an agenda for studies that contribute to offering safe, comfortable trips, and at acceptable times/costs.

**Keywords:** mobility, sustainable, behavior, quality, management, well-being.

## TRANSPORTE FERROVIÁRIO DE PASSAGEIROS E MOBILIDADE: VISÃO DO USUÁRIO SOBRE NÍVEL DE SERVIÇO E SEGURANÇA

### RESUMO

**Propósito:** apresenta e categoriza os principais problemas registrados pelos usuários de trens urbanos no estado do Rio de Janeiro, e faz uma análise dos episódios de violência, fazendo um cruzamento desses dados com as categorias de níveis de serviço.

**Metodologia:** realizou-se uma análise documental, verificando ocorrências registradas e as noticiadas sobre paralisação temporária do serviço insatisfação dos usuários exibida nas reclamações realizadas nos anos de 2018 e 2019.

**Resultados:** notícias de segurança referem-se a estações que se localizam em bairros reconhecidamente violentos da zona norte da cidade do Rio de Janeiro. Tiroteios paralisam a circulação dos trens e afetam o nível de serviços oferecido pela concessionária, pois causam o descumprimento da frequência programada, a elevação do tempo de deslocamento, a sensação de insegurança nas estações, composições e integrações e consequentemente, a perda de confiabilidade no serviço.

**Limitações:** A busca referiu-se ao período de janeiro de 2018 à dezembro de 2019, e aplicando-se os filtros referentes ao tema central, obteve-se 57 notícias válidas para categorização e análise.

**Originalidade:** contribui para evidenciar criticidades no nível de serviço e propoe agenda de estudos que contribuam para oferecimento de deslocamentos seguros, confortáveis, e em tempos/custos aceitáveis.

**Palavras-chaves:** mobilidade, sustentável, comportamento, qualidade, gerenciamento, bem estar.

## 1 INTRODUCTION

The emphasis of this study is on public passenger transport, more specifically on urban train service in the Metropolitan Region of Rio de Janeiro (RMRJ). This is based both on the need for changes, as cited by Campos (2006), as well as on the patterns of displacements made in the urban space to achieve sustainable mobility and on the importance of a more balanced modal distribution to reduce the emission of greenhouse gases in the atmosphere. It is also based on Cervero & Arrington (2008) and Luan et al. (2020), who cite the structuring public transport network of greater capacity to increase the propensity to use collective modes, to the detriment of the use of automobiles.

Among the various contributions of the increase in the use of high-capacity public transport - train, subway and ferry - and non-motorized modes of transport - walking and cycling - for sustainable mobility are: the reduction of cars on public roads, making them less congested, less polluting and safer, by reducing the number of traffic accidents (Hickman et al., 2010), by the greater potential for inclusion (Farrington & Farrington, 2005) and social justice (Martens, 2016), and for improving the quality of life (Delbosc & Currie, 2011).

In this respect, although rail transport is a fundamental element, there is a significant challenge to promote and leverage travel by this modality, when there is a situation of insecurity and risks in the urban environment, as according to IMTT (2011), so that this contribution, effectively, needs to offer safe, comfortable trips, at acceptable times / costs, in addition to other factors. Joining these issues, the underutilization of the RMRJ rail system (Mello et al., 2020), this study presents and categorizes the main problems registered by users during the past years. And, considering that part of these problems is related to the violence around the stations and the railroad, an analysis of the episodes of violence involving the urban trains is made, crossing this data with the categories of service levels involved in the complaints identified.

To meet these objectives, the article deals with the relationship between sustainable mobility, public transport and security (item 2.1), elements of the service level in passenger transport (item 2.2), of the methodology adopted (item 3), and presents the results this way; urban violence in RMRJ and in the city of RJ (4.1), complaints, news and service level (4.1). And it ends with the research conclusions.

## 2 LITERATURE REVIEW

### 2.1 Sustainable mobility, public transport and security

The prioritization of public transport services over individual transport is part of the measures that can be adopted to make the mobility pattern of a region more sustainable, since among the benefits presented, there is a reduction in greenhouse gas emissions (Nocera, Tonin, and Cavallaro, 2019), air pollution and noise pollution (Mozos-Blanco et al., 2018), and congestion, and the increase in social inclusion and accessibility (Silva, Da Silva Costa and Macedo, 2008).

If the substitution of modes is considered with the involvement of high capacity modalities, rail transport is extremely relevant to the efficiency of several policies related to sustainable mobility, since, according to Litman (2015), it is among the modalities of passenger transport with less generation of negative environmental impact, and when operating efficiently, tends to provide a better quality of service, with lower labor costs, less urban space demand, and less noise and air pollution when compared to buses. And, among the benefits that it can promote to its users, in adequate operating conditions, that according to Mondragón-Ixtlahuac et al. (2017) are,

convenience, the shortest travel time, the lowest cost, the highest reliability and availability of the service.

The security, which is one of the attributes of sustainable urban mobility, configured with one of the essential criteria for the conduct of displacement and is a determining factor in the quality of transport (Beecroft and Pangbourne, 2015) and should be properly considered for the sustainable transport planning (Friman, Lättman and Olsson, 2020). In this context, according to Beecroft and Pangbourne (2015), there is also the perception of personal safety, being influenced by the combination of freedom from the violent behavior of other individuals, the environment and the prevention of accidents. Such perception is fundamental for choosing the modal and the travel route.

Kruger and Landman (2007) recognize the vulnerability of public transport users to crime during their journeys and emphasize that they can become victims of crimes at different times during their displacement. Newton (2004) details that there is a wide range of infractions that can occur in at least three different types of situation involving the use of public transport: (i) travel to, from or between stations and terminals; (ii) waiting at the boarding point facilities; and (iii) on board a specific vehicle such as a bus or train, for example.

This insecurity compromises the quality of the service, making fear of crime and the feeling of personal non-security inhibiting the use of public transport (Newton, 2004). To change this reality, Moore (2011) suggests an open and wide-ranging debate on this issue of security.

## 2.2 Elements of the level of services in passenger transport

The concept of service level has several dimensions and its forms of assessment are closely related to customer satisfaction (Azadpeyma & Kashi, 2019; Mello et al., 2020). Its measurement, according to Palonen & Viri (2019) may involve qualitative characteristics - based on opinions / experiences, such as comfort, ease of use or a sense of security - and/or quantitative - that can be directly measured, such as frequency, operation interval, travel time and/or walking distance to a stop.

The logic behind the performance measurement of passenger rail systems, for Mohammadi et al. (2019), is the modeling of performance aspects related to the operation and the user perspective, including multiple indicators (Eboli et al., 2016) and / or criteria. Among them are the criteria of: accessibility and / or multimodal integration, capacity, comfort, cost / value of the ticket, frequency, information/ticketing systems, reliability, operational security, public security, sustainability, time / speed (Mohammadi et al., 2019), availability (Jasti & Ram, 2016), cleanliness (Wang et al., 2018) and human capital (Eboli et al., 2016).

Participants in the public transport ecosystem (government, operators, customers, industry and civil society) are part of the process of conducting transport system design and evaluation strategies (Souza and Dantas, 2020). In addition to those already mentioned, Macário (2010) is concerned with the capacity of the infrastructure, the organization and management of the network, in addition to the capacity of the network to function efficiently even in the most extreme situations such as in the case of serious interruptions caused by bad conditions weather or other disturbing factor.

## 3 METODOLOGY

This article is based on three main types of information, collected on different sites - from the “Fogo Cruzado” Laboratory, from “Reclame Aqui” complaints, and from a not academic journal named “Jornal Extra” - to analyze the relationship between urban violence and the elements of the

service level of rail transport in the RMRJ most affected. In other words, it is an exploratory study, whose methodological procedure adopted consists of a documentary analysis, gathering and drawing a parallel between two types of main information: the occurrences of urban violence that impacted the functioning of the railway system in the studied region and the types of more recurring complaints to understand whether the latter show such impacts or not.

The information so bre shootings and firearm shots served to understand a little better the dynamics of violence in the region and are available on the website of the Laboratory Crossfire (<https://fogocruzado.org.br>). In addition to this more general picture, to understand possible impacts of this reality on the urban train service, news was collected about problems with this service and occurrences of problems with security in the Extra online news, with the following keywords: “train” and “Rio de Janeiro”. The search referred to the period from January 2018 to December 2019, and applying the filters referring to the central theme, 57 valid news items were obtained for categorization and analysis. Regarding the occurrences related to rail transport, Jornal Extra was chosen as a source of information due to its importance to the public using this type of service, and the strong circulation in the region.

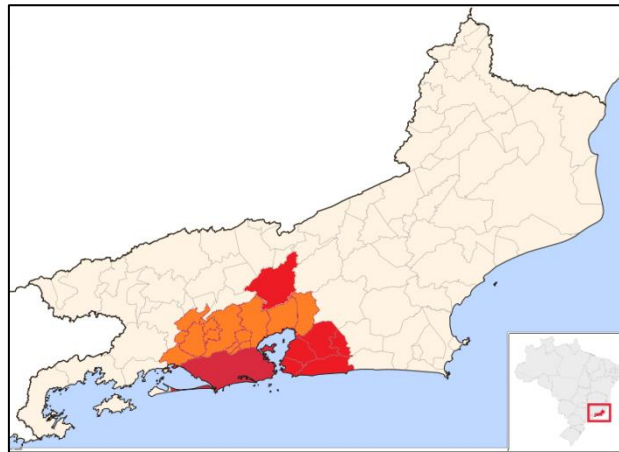
To identify the dissatisfactions expressed by users regarding the urban train service, also considering the same period of analysis, the source used was the website “Reclame Aqui”. In all, 400 complaints were collected, with date and time of publication and title as visible items in all complaints. For the purpose of initial categorization of complaints, the evaluation criteria listed in the literature review were used.

## 4 ANÁLISE DOS RESULTADOS

### 4.1 RMRJ, the Rio de Janeiro city and urban violence

Socioeconomic inequality is one of the outstanding characteristics of the RMRJ (Mello and Portugal, 2017), involving both the availability of basic infrastructure and economic dynamism, with emphasis on the city of Rio de Janeiro, which, despite also having internal discrepancies, is an important employment center for other municipalities.

The Metropolitan Region of Rio de Janeiro was instituted by Complementary Law n°. 20, of July 1/1974, which also determined the merger of the old states of Rio de Janeiro and Guanabara that occurred on March 15 of the following year. With 13.131.590 inhabitants, it is the second largest metropolitan area in Brazil (after Greater São Paulo), the third in South America and the 16th largest in the world (2020). The metropolitan area concentrates more than 70% of the state's population RJ and supplementary law n°. 184 of 27/12/2018 ensured the composition geographic and political metropolitan area. The most populous municipality is Rio de Janeiro, followed by São Gonçalo, Duque de Caxias and Nova Iguaçu. In 2013 and 2018, three municipalities with little connection to the metropolitan core were officially incorporated into the RMRJ (Alerj, 2018): Rio Bonito, Cachoeiras de Macacu (in 2013) and Petrópolis (in 2018). As shown in Figure 1, 22 municipalities are part of the Rio de Janeiro Metropolitan Metro Region, with the orange ones being the most peripheral and called the Baixada Fluminense..

**Figure 1: Territorial division of Rio de Janeiro Cities, RMRJ and Baixada Fluminense.**

Source: Authors

Given the difference in economic dynamism between the capital (Rio de Janeiro) and the municipalities of the Baixada Fluminense, in particular, there is still a strong economic dependence, supporting a relationship between the main employment center and dormitory cities.

In the city of RJ there is also a reflection of its disordered growth, which are the slums that exist throughout the territory, with their own characteristics, depending on the location of the city where they are located. So while the area south, economically privileged area of the city, have a rate of generally low unemployment, the proximity to an affluent neighborhood, the slums of the zone north, with 38% of the city's population and 45% of the population of the favelas (Cavallieri and Vial, 2012), present a predominance of informal employment status. In addition, the favelas of the North Zone, located in the suburbs of the city, are more numerous and are surrounded by an old infrastructure, with a typical neighborhood of workers who face greater distances and travel times on the way to the employment centers, daily.

In recent decades, the "wonderful city" faces an escalation of crime (Arias and Barnes, 2017), which has also been observed in Brazil. One of the causes of this expansion is the trafficking war in a territorial competition for the domain of the drug trade, which produces many conflicts (Dowdney, 2003). The records made available by the application "Fogo Cruzado" show that, in 2018, RMRJ faced almost 10.000 occurrences of shootings and firearms, with a daily average of 26 occurrences, while in 2019, the average was 20 daily shootings, with about 7.000 occurrences. Such a reduction does not diminish the criticality of the situation, since the locations with the worst performance had an increase and not a reduction in the period mentioned, with the exception of the capital.

This reality shows the perpetuation of a known disadvantage. Thus, the historic division between the northern and southern zones in the capital is also reflected in the rates of armed violence. While the first region had nearly 3.000 shootings in 2018, the second had about 540; in 2019, the discrepancy between them remained, presenting a potentially more dangerous situation for the population living in the northern zone.

In the case of RMRJ, although the capital has a higher occurrence rate (59% in 2019), the municipalities of Baixada Fluminense registered 24% of these and in several locations this influenced the dynamics of urban mobility. Public security problems are reproduced around stations and public transport stops in general. In 2019, for example, about 10% (1.003) shootings / firearms occurred in the vicinity of major circulation routes in the RMRJ, within a radius of 100 meters, with 500 related to major highways and 198 in the vicinity of the railroad.



## 4.2 Complaints registered by users and their categorization

Supervia is the private company responsible for the operation of urban passenger rail transport at RMRJ since 1998 and the rail network in which it operates covers 12 municipalities - Rio de Janeiro, Duque de Caxias, Nova Iguaçu, Nilópolis, Mesquita, Queimados, São João de Meriti, Belford Roxo, Japeri, Magé, Paracambi and Guapimirim -, with 5 extensions, 3 extensions, 104 stations and 201 trains ( <https://www.supervia.com.br/pt-br/quem-somos> ).

Considering the times when complaints are posted on the website surveyed, most of them occurred during peak hours, that is, at the moment when there is a need for a greater offer of rail transport to meet the concentrated demand of the timetable, between 5 am and 9 am in the morning there were almost 30% of complaints against about 20% referring to the interval between 5 pm and 8 pm. In general, the morning was more critical, totaling 183 of 400 complaints, that is, approximately 46%.

As for the identification of extensions whose occurrences caused complaints, this was not possible in all records, since as it was not mandatory for users, this report was made only in 234 complaints (approximately 59%), while another 39 complaints referred to specifically to the stations (making it impossible to identify the extension). Most complaints involve branches that have a longer extension or that cover a larger number of municipalities and passengers, in the following order of importance: Santa Cruz (27%), Japeri (26%), Saracuruna (21%), Belford Roxo (15%), Deodoro (8%), Vila Inhomirim, Paracambi and Guapimirim together (3%).

Regarding the 400 complaints, the items Comfort, Frequency, Capacity, Reliability, Availability, time / speed and operation safety, suffering, directly or indirectly, the influence of aspects related to Public Security correspond to 60% of the complaints while the s complaints directly related to such aspects made up 13% of the records. In this sense, about 73 % of complaints can be connected, directly or indirectly, to the issue of Public Security in the region, as can be seen in Table 1.

**Table 1 Complaints by selected evaluation criteria**

| <b>Rating criteria</b>                 | <b>Representativeness</b> |
|--|---------------------------|
| Comfort                                | 22%                       |
| Frequency                              | 20%                       |
| Information system / Ticketing         | 14%                       |
| Public security                        | 13%                       |
| Human capital                          | 9%                        |
| Capacity                               | 5%                        |
| Reliability                            | 4%                        |
| Availability                           | 3%                        |
| Time / Speed                           | 3%                        |
| Others                                 | 3%                        |
| Operation security                     | 3%                        |
| Ticket cost / value                    | 1%                        |
| Accessibility / Multimodal Integration | 1%                        |
| <b>Grand total</b>                     | <b>100%</b>               |

Source: Own elaboration

In view of the facts narrated by users of the Supervia services in complaints, the factors that most affect the quality of the trip in their perception were verified (Table 2).

The question of insecurity, designated as feeling of insecurity or fear in relation to travel, appeared both in relation to the interior of the trains (13%), as in the stations and in the access to these (stairs, ramps, ticket offices) and during the integration between extensions or other modes of transport, reaching, together, 19% of complaints. It is important to note that not all insecurities and

fears correspond to the Public Security indicators themselves, since problems such as poor lighting, for example, were categorized under the item comfort, despite creating a greater probability of the occurrence of crime or violence.

**Table 2 - Factors observed by users**

| Observed Factors   | Frequency   |
|--|-------------|
| Lack of punctuality of breaks  | 15%         |
| Feeling of insecurity or fear within the compositions  | 13%         |
| Access conditions the loading and unloading stations   | 11%         |
| Problems with electronic ticketing   | 9%          |
| Temperature problems inside the trains   | 9%          |
| Quality of care by superhighway professionals  | 5%          |
| Waiting time for transport at the station  | 5%          |
| Capacity sufficiency   | 5%          |
| Operation failures related to stops along the way  | 5%          |
| Cancellation of trips / compositions   | 4%          |
| Expression of lack of confidence in the operator's service   | 4%          |
| Availability of information and operation of communication channels with the operator                | 4%          |
| Suggestions  | 3%          |
| Violence practiced by superhighway professionals   | 3%          |
| Feeling of insecurity or fear within the seasons   | 3%          |
| Feeling of insecurity or fear to be able to access the stations                                      | 2%          |
| Dissatisfaction with the cost of the ticket  | 1%          |
| Feeling of insecurity or fear to make the integration between extensions or other modes of transport | 1%          |
| <b>Grand total</b>   | <b>100%</b> |

Source: Own elaboration

The problem of insecurity or fear involving violations of the right of the wagon exclusive to women, and the priority of seats, assaults and thefts, religious demonstrations, illegal trade, acts of vandalism, sexual harassment, undue police approaches and the improper circulation of motorcycles on the access walkways to the stations and these are typified in criminal laws and subject to a fine and / or imprisonment, in addition to also affecting all other levels of service to a degree perceptible by users and by the trips made by the company. Despite being provided by law, with penalties foreseen for their authors, such events disturb the routine of the population of Rio de Janeiro that use this service and are the subject of the daily news.

#### 4.3 Occurrences of urban violence in the RMRJ and urban trains in the news

Nowadays, although the physical sale of newspapers is in disuse, the news published on the *Internet* accounts for the population's information needs. Thus, the "Jornal Extra" *website* was selected as a source, both for its relevance of circulation over time and for being an important information vehicle for the public using public transportation, in its majority. The 57 news identified related the circulation of trains to 5 possible categories of phenomena: Shooting, Accident, Climate Phenomenon, Urban Violence and / or Technical Problem, as seen in Table 3 .

**Table 3 Categorized phenomena**

| Perceived categories | Nº News   | Percentage  |
|----------------------|-----------|-------------|
| Shooting             | 23        | 40,4%       |
| Accident             | 11        | 19,3%       |
| Climate Phenomenon   | 8         | 14%         |
| Urban violence       | 8         | 14%         |
| Technical problem    | 7         | 12,3%       |
| <b>Total news</b>    | <b>57</b> | <b>100%</b> |

Source: Own elaboration.

The categories Shooting and Urban Violence, in general, affect the Public Safety service level indicator, adding together 54,4% of the total of the news raised. The Shooting can be considered a form of urban violence, however it was pointed out predominantly and specifically in a considerable part of the analyzed material, deserving, for being one of the main axes of the study, to compose a separate category.

The news related to the Climate Phenomenon (14%) appears as an alert about the operation of trains in the RMRJ after heavy rains and gusts, or reporting the consequences of such climate changes on their circulation. Technical Problems (12,3%) group news about adversities that are entirely the responsibility of SuperVia, generating an impact on the operation's Safety indicator. This indicator is also strongly influenced by the Accident category (19,3%), which represents extreme situations, where technical and / or infrastructure problems pose a risk to the health of service users.

Knowing that a good part of the news referred to shootings, we tried to visualize how the extensions and stations appeared in the whole set of news studied. In most of these the extension was identified, however, in some, only the stations appeared and through these, there was an effort, when possible, to identify the affected extension, with a total of 56 news items where it was feasible to designate the affected extension. The Saracuruna and Belford Roxo branches stand out, with 40% and 32% of the news, respectively. While Deodoro, Japeri and Santa Cruz account for 28%.

The extensions were not observed in the analyzed news and this can be associated with the fact that these pieces of the railroad occupy regions with less flow of people and are located far from large centers. In this way, they have limited operation, with scheduled times, long intervals and in certain periods they are disabled.

The five types of occurrences listed above have an impact on service levels and the news reports showed a great predominance of issues related to Public Security and Operation Security, totaling 81%. While Confiability (14%), Availability (4%) and Human Capital (2%) had less weight among the component elements of the 57 news surveyed.

Even though it is known that reliability and availability are not elements of safety, there is no denying that public safety problems in and around the stations are capable of significantly affecting the functioning of urban trains, promoting temporary stoppage and generating damage to stations, trainsets or any other important element for its perfect functioning. Regarding the relationship between factors associated with the level of service in the news are aired and extensions (Table 4), it is clear that the branches that stand out, once again, are the Saracuruna and Belford Roxo.

**Table 4 Distribution of news by Service Levels and Extensions**

| Level of Service   | Extensions |              |         |        |            |
|--------------------|------------|--------------|---------|--------|------------|
|                    | Saracuruna | Belford Roxo | Deodoro | Japeri | Santa Cruz |
| Public security    | 14         | 12           | 1       | 2      | 3          |
| Operation security | 2          | 3            | 6       | 2      | 1          |
| Reliability        | 3          | 3            | 2       | 0      | 0          |
| Availability       | 0          | 0            | 1       | 1      | 0          |

Source: Own elaboration.

The two most mentioned branches, Saracuruna and Belford Roxo, are those that include peripheral locations and have a large number of shootings and episodes of urban violence, thus affecting the reality faced by users of urban train services in the region. Thus, it can be seen in Table 4 that, endorsing this situation, regarding the service level indicators, there is also a predominance of events related to Public Security in these extensions.

The Saracuruna branch line passes through stations in the northern zone of Rio that are located in neighborhoods with high levels of violence such as Manguinhos, involved in 10 (71%)



shootings in the 14 public security events recorded for the branch. The Belford Roxo branch, on the other hand, has the Jacarezinho station as its critical point, responsible for 5 (42%) occurrences out of a total of 12. Both locations are largely occupied by the favelas in the northern zone.

Problems related to the safety of the operation are less concentrated as to the extensions, although they appear more in news related to the Deodoro extension. These are less significant, as well as those of reliability, but are more frequent in Saracuruna, Belford Roxo and Deodoro. As for availability, only two news items are recorded, one located on the Deodoro branch and the other on the Japeri branch.

#### 4.4 Occurrences, news, complaints and elements of the service level of urban trains

The public security problem is critical in the RMRJ and has an impact on the circulation of public transport in general. Of the firearm shootings and firings that took place in 2019, about 10% (1.003) were around major RMRJ circulation routes, within a radius of 100 meters and 198 in the vicinity of the railroad. The branches most affected by these occurrences were Belford Roxo, Saracuruna and Japeri, which connect cities dependent on the capital's economic dynamics.

It was identified that the categories “Shooting” and “Urban Violence” related to the railway system were the most frequent, reaching almost 55% of the news published in 2018 and 2019, and with a higher number of occurrences. Once again, the most affected branches were those connecting the Baixada Fluminense (peripheral municipalities of RMRJ) with the city of Rio de Janeiro and passing through slums in the north of Rio, whose violence rate is high - Saracuruna (meets to the municipality of Duque de Caxias) and Belford Roxo (serves the municipality of Belford Roxo).

With regard to complaints, there is not the same predominance as in the occurrences, since there are a greater number of those that involve extensions that serve a greater extent or that cover a greater number of municipalities and passengers. In this case, Santa Cruz and Japeri stand out, followed by Saracuruna and Belford Roxo. These last two, together, are covered in 36% of complaints, which is no small feat.

The question of insecurity appeared in different ways, covering both the interior of the compositions as well as their surroundings and integration, reaching 19% of complaints. As not all complaints provide detailed information on the composition or station to which they refer, it was not possible to make this distinction, which would be quite enlightening, as of the 72 complaints of this type, 23 did not identify. About the 49 identified, 20 referred to Ramal Japeri (41%), which was little affected compared to Saracuruna and Belford Roxo, due to public security problems. Santa Cruz was also an outstanding extension, with 24% of complaints of this type. Belford Roxo and Saracuruna, together, reached 15% of complaints.

In the case of the connection between the occurrences of shooting and urban violence with the service levels of urban trains, the potential for damage from the occurrences on the reliability, frequency, safety of operation, public safety and time is perceived (total 43% of complaints). The interruptions in the movement of trains for an indefinite period affect the entire daily life of the citizens who depend on this means of transport. The very feeling of insecurity involves 65% of complaints when it is considered to be related to the comfort provided by lighting, cleanliness of the environment, frequency, reliability, public safety and time. Such results are similar to what Palonen & Viri (2019) mentions as a measurement that may involve qualitative characteristics - based on opinions / experiences. And with that Mohammadi et al. (2019) cite performance aspects related to the operation and the user's perspective, including multiple indicators (Eboli et al., 2016) and / or criteria that can bring reliability to the system.

When crossing the information, interestingly, the extensions for which there is a higher signal of occurrences of problems with security are not those for which there is a higher rate of complaints in this regard. A possibility that exists would be naturalization and routinization of violence in the living environment of citizens. In this way, it ceases to generate indignation and,

consequently, solutions are not sought, and the less-assisted population naturally lives with these problems. For those who can, avoid this type of service, leaving the reach of a mobility standard linked to less impacting modes to the environment, as the service level is not satisfactory, a negative assessment that under the vision of Azadpeyma & Kashi (2019) can make it an unattractive transport mode. It is not by chance that urban trains in RMRJ fall short of running with adequate use of their capacity, outside peak hours.

The adoption of integrated intersectoral policies would be a necessary way so that sustainable mobility could be minimally achieved, including the forgotten population of the peripheries through safe displacements and with the use of more environmentally friendly transport, a point cited by Macário (2010) in which refers to the best dimensioning of the infrastructure capacity, the organization and management of the network, in addition to the network's ability to function efficiently. Therefore, policies intersectoral could improve attributes that enhance the safety, enabling a sustainable urban mobility, which sets up with one of the essential criteria for the conduct of displacement and is a determining factor in the quality of transport as cited by (Beecroft and Pangbourne, 2015), and be an induction factor to be considered for planning sustainable transport (Friman, Lättman and Olsson, 2020).

## 5 CONCLUSIONS

In this preliminary, exploratory study, it was identified that the problem of urban violence invades the dynamics of the daily commuting of RMRJ citizens, especially in the city of Rio de Janeiro. Despite the criticality of the public security situation, complaints from users of the railway system do not reflect this to a large extent, when viewed in isolation, although this prevails in the news compared to other factors capable of affecting its functioning.

Much of the security news refers to stations located in neighborhoods known to be violent in the northern part of the city, such as Mangueiros and Jacarezinho, whose stations serve the Saracuruna and Belford Roxo branches, respectively, connecting the Baixada Fluminense with the capital.

Complaints regarding the sense of insecurity show problems in Japeri extensions and Santa Cruz, whose volume of users is significantly higher, which may explain this finding despite the news points r mainly for extensions of Saracuruna and Belford Roxo as problematic. Shootings paralyze the circulation of urban trains and affect the level of services offered by the concessionaire SuperVia, as they cause the non-compliance with the programmed frequency, the increase in travel time, the feeling of insecurity in stations, trains and integrations and, consequently, the loss of reliability in service. Due to the establishment of constructs, such factor and categories identified should be tested by statistical modeling techniques, such as structural equation modeling.

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## DECLARATION OF CONTRIBUTIONS TO THE ARTICLE – Credit

| ROLE  | AMello | COliveira | LSilva | AMenezes |
|---|--------|-----------|--------|----------|
| Conceptualization – Ideas; formulation or evolution of overarching research goals and aims.   | X      |           |        |          |
| Data curation – Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.           |        | X         | X      | X        |
| Formal analysis – Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.  | X      | X         | X      |          |
| Funding acquisition - Acquisition of the financial support for the project leading to this publication.   |        |           |        |          |
| Investigation – Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.  | X      |           |        |          |
| Methodology – Development or design of methodology; creation of models.   | X      |           |        |          |
| Project administration – Management and coordination responsibility for the research activity planning and execution.   | X      |           |        |          |
| Resources – Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.  |        |           |        |          |
| Software – Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.  |        |           |        |          |
| Supervision – Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.   | X      |           |        |          |
| Validation – Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.   | X      |           |        |          |
| Visualization – Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.  | X      | X         | X      | X        |
| Writing – original draft – Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).   | X      | X         | X      | X        |
| Writing – review & editing – Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages. | X      | X         | X      | X        |