tumi DATA

Harnessing Data for Sustainable Mobility Planning & Implementation

TUMI Data for Sustainable Development

The untapped potential of data to reshape urban mobility is vast. Through a strategic use of mobility data, cities can undergo a digital transformation that promotes climate-friendly practices and improves the overall livability, inclusivity and sustainability of our cities.

TUMI invites input, comments and potential collaborations.

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With the Transformative Urban Mobility Initiative (TUMI), the German Federal Ministry for Economic Cooperation and Development (BMZ) is supporting climate-friendly, inclusive, safe and affordable Mobility in cities. TUMI is funded by BMZ and implemented by GIZ in collaboration with all TUMI partners.

- www.transformative-mobility.org
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On behalf of
Federal Ministry for Economic Cooperation and Development

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Our Partner
CAF DEVELOPMENT BANK OF LATIN AMERICA

In collaboration with the Banco de Desarrollo de Latin America - CAF, the Transformative Urban Mobility Initiative (TUMI) supported pilot projects across Latin America, showcasing the potential of data-driven solutions in transforming urban mobility in a sustainable way. We present examples from our cooperation with the cities of Cuenca, Fortaleza, Sao Paulo, Bogotá and Mexico City.

Cuenca, Ecuado

Cycling Improvements through Data Insights

Cuenca is striving to be at the forefront of sustainable mobility in Ecuador. In recent years, the municipality has focused on expanding its cycling infrastructure. This includes the creation of cycle paths and the introduction of Cuenca's Public Bike System (STPB), contributing to Cuenca's ongoing efforts to promote sustainability in the sector.

Despite the availability of many public bike stations in the city, their usage remains below the expected levels. To understand the factors contributing to this underutilization, thorough surveys were conducted among past, present, and potential users. The primary aim of the subsequent data analysis was to optimize the operational efficiency of Cuenca's public bicycle system.

To enhance the system, a three-phase approach was implemented. In the "Basic Analysis", limitations in accessing critical information were identified within the STPB database, and historical trip data provided insights into operational characteristics and user profiles.

The second phase, "Collection and Analysis of New Data," involved investigating factors influencing cycling decisions. An online survey revealed key deterrents, with 45% citing the

lack of nearby stations, 38% expressing weather concerns, 24% fearing traffic (with an additional 12% finding bike lanes unsafe), and 20% deeming it too costly. Among users, 70% discontinued due to station proximity issues, while approximately 30% cited bike conditions, and 25% mentioned limited travel time. Safety concerns (16%) underscored the need for improved cycling infrastructure.

Additionally, 36% identified time savings as a key motivation to use the system, with parks and squares (57%), work (50%), and study (50%) being popular destinations.

In the "Support and recommendations" phase, suggestions were outlined for improving key performance indicators (KPIs), increasing user numbers, boosting loyalty, and expanding the system. Recommendations for fleet management, bicycle integration, and system expansion were derived from empirical findings.

With the current system covering 7 square kilometers and 20 stations, expansion plans aim to double station numbers, concentrating on destinations like universities and employment hubs in the first phase. The second phase targets denser urban areas, distributing 13 additional stations across five zones based on census data and population density. Updated household origin-destination data and the population census are crucial for precise station placement, ensuring a continuous bike lane network.

Fortaleza, Brazil

Advancing Sustainable Waste Management

Fortaleza is considered a leading Brazilian city in creating sustainable solutions for mobility, waste collecting and improving recycling services.

Back in 2020 the city, CAF & TUMI first joined hands to undertake the pilot project "Re-Ciclo" to assist waste collectors (catadores) improve their livelihood and work. Building upon this previous work, the collaboration aimed to develop a methodology predicting and calculating a recycling index/indicator. The objective was to design a platform for visualizing and monitoring Fortaleza's recycling efforts.


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A thorough analysis of the city's recycling landscape was carried out, which provided an essential basis for gathering additional information, understanding existing problems and establishing initial guidelines for future action. The analysis focused on waste collection processes, key stakeholders, their responsibilities, existing programs, projects, and policies. Additionally, crucial inputs for developing recycling performance indicators were identified.


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The project established a baseline for the recycling indicator, proposing updates to the recycling strategy. Recommendations further included specifying Terms of Reference for a monitoring platform and proposing instruments for systematic information collection. Urban mobility was integrated into the project, with the Re-Ciclo pilot project contributing significantly to the synergy of social inclusion and environmental sustainability in strategy and indicator proposals.

The recommendations emphasize the need for robust selective waste collection, including effective contracts with waste pickers' associations, centralized management for streamlined data access, and advancements in data acquisition.

While the proposed recycling indicators are straightforward, routine monitoring and centralization are essential for accountability. Although they provide potential benchmarks against other Brazilian municipalities, data gaps underscore the need for improved collection. Collaborative efforts between the government and waste pickers' associations are crucial to enhance data collection, informing more effective public policies in waste management.

Bogotá, Colombia

Travelling together is better: Bogota's Car Sharing Strategy

Travelling together is better is the central message that this pilot spread across social media to encourage the citizens of Bogotá to carpool.

The reason? Carpooling has not yet reached its full potential, as the city is making significant and considerable efforts towards sustainable mobility in the face of challenges such as traffic congestion and air quality.

To improve the understanding of shared mobility, a comprehensive study of barriers and enablers related to car sharing in Bogotá was conducted. A mixed methods approach was used by the technical provider Sensata, utilizing existing data from the Secretaría Distrital de Movilidad - SDM, a virtual survey with 8,151 participants and 25 semi-structured interviews with citizens, carsharing users and institutional actors. For detailed findings and data, *click here*.

On this basis, three user profiles were identified, both for drivers and passengers in order to propose a strategy for the introduc-

tion of car sharing, focusing on the target groups most likely to adopt car sharing. The profiles selected were the 'carsharing ambassadors' and the 'modern pragmatists', i.e. people who are employed, have to drive to a fixed location several days a week, who indicate that they are fully open to carsharing and adapt to possible measures.

Messages for a communication strategy were crafted to boost awareness of carpooling in Bogotá, emphasizing sustainable mobility benefits and reducing apprehensions.

The core message, "traveling together is better," was presented to the SDM in the beginning of 2022 for approval in media campaigns.

Additionally, a 15-year roadmap addressing barriers was developed, proposing actions at various levels to promote shared car adoption and increase private car occupancy.

Simultaneously, the project navigated legal regulations with a specific focus on shared mobility pilots, incorporating a regulatory component that recommended adjustments to both national and local regulations. In close partnership with Bogotá's Mobility Secretariat, these efforts provided valuable insights into Pico & Placa measures and legal strategies for their effective implementation. A thorough examination of regulations, jurisprudence, and public policy documents uncovered competencies, limitations, and opportunities.

The legal strategy identified gaps and proposed improvements, incorporating economic incentives and mandatory mechanisms. The district legal regulations report, aligned with the pilot project, addresses movement restrictions, high occupancy exceptions, congestion charging, and shared mobility regulations.

Mexico City, Mexico

Insights into performance indicators of public transport

In Mexico City, a dynamic web application has been developed to improve the understanding of the operational performance of public transportation.

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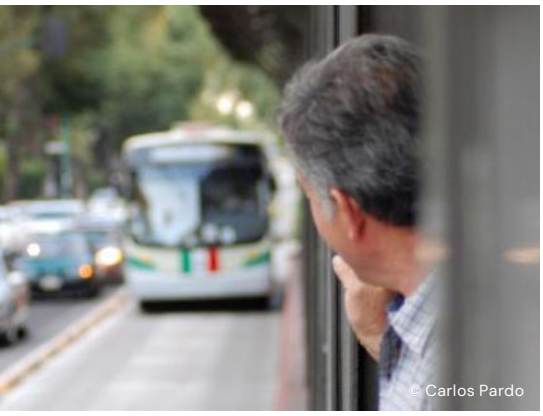
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The main objective of this tool is not only to introduce the application, but also to actively support the city's transport operators in using the application to its maximum potential.

The web application serves as a visual platform for operational indicators of the cities Metrobús network. It covers aspects such as scheduled departures, overall punctuality and regularity of services with data from 2021. After training for the subsequent data entry, the application underwent a thorough review in collaboration with Metrobús and the city's mobility secretariat (SEMOVI).

In addition to visualization, the application has a report generation module that demonstrates its versatility. A working group at Metrobús and SEMOVI ensured a consistent flow of operational data, promoting real-time adaptability.

Extending the collaboration beyond Metrobús, the project also includes the cities trolleybus, light rail system (STE) and Metro. By identifying valuable sources of information for the management of service quality, these findings have been integrated into the mapping and evaluation process. The long-term plan is to integrate these systems into the web platform to increase their overall effectiveness.

Sao Paulo, Brazil

An Innovative Approach to Bicycle Tracking

The project aimed to assist the city of Sao Paulo, specifically the Municipal Transportation Department (SMT) and Traffic Engineering Company (CET), in establishing an annual monitoring system for bicycle trips.

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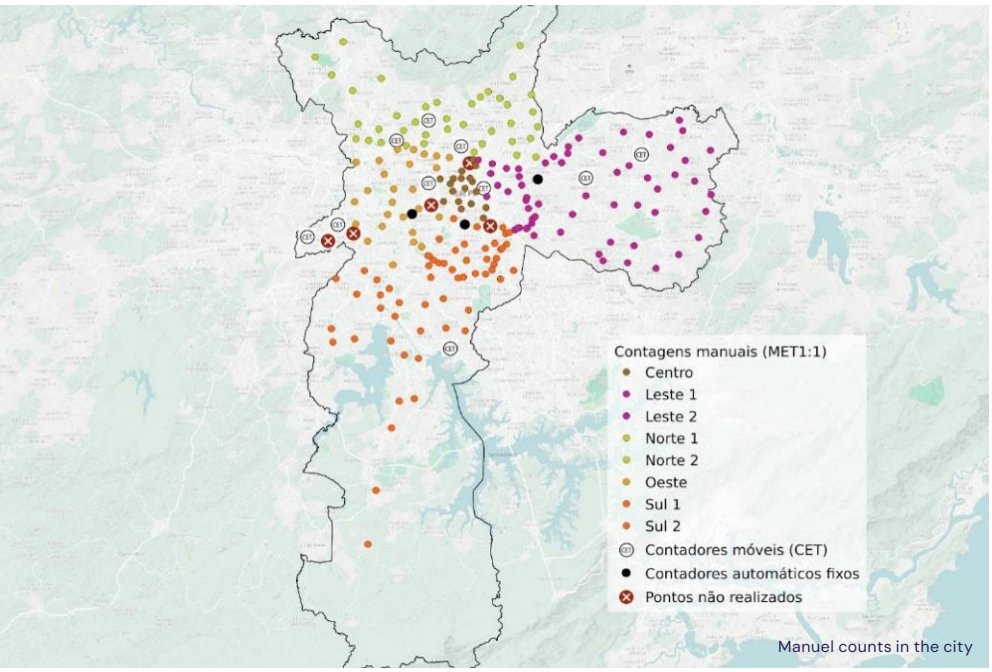
This involves creating baseline data, improving the spatial distribution, and refining local characteristics of bicycle trip counts, following the methodology developed by Ciclocidade. The overarching goal is to gather more accurate data on cycling patterns, enhancing the effectiveness of bicycle policies within the city.

Situated within the larger context of developing a municipal bicycle travel monitoring system, the project addresses a critical question: Is the number of bicycle trips in São Paulo increasing? This holds significance in achieving the city's target of having 4% of all trips made by bicycle by 2030, as outlined in the 2020-2050 São Paulo Climate Action Plan (PlanClima 2021). This objective aligns with strategic planning documents, including the São Paulo Mobility Plan (PlanMob/SP 2015), São Paulo Municipal Bicycle Plan (2020), and the Municipal Agenda 2030 (2021).

Commencing with an open consultation involving various bicycle stakeholders, 160 responses were obtained to identify specific points for manual counts. A hybrid methodology, combining automatic counters with manual counts, was devised by CET and Ciclocidade to reinforce challenging locations. Supervisors underwent training by CET, subsequently imparting this knowledge to field staff. The counts yielded a tabulated database presenting key findings.

Following field counts at 210 locations, an update to the city's bicycle models revealed a new limitation: Strava data concentration hindered valid estimates for the entire city. However, this method proves highly reliable within the municipal vehicle rotation area, covering the Central region and significant portions of the West, East 1, and South 1 regions.



Manuel counts in the city

Utilizing Strava Metro data, field counts, and permanent counts within the defined territorial limit, the tool enables estimating cyclist numbers with satisfactory confidence intervals. Consequently, the SMT and CET monitoring team can focus on non-central areas where data scarcity prohibits reliable modeling, in line with research findings.

All R code used for statistical modeling and generating maps and graphics is openly available under the GNU General Public License on the Ciclocidade *GitLab platform*