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## **Evolving existing cities towards sustainability: interventions to promote cycling**

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**This briefing explores interventions to encourage more people to cycle in cities, and how planners can ensure cycling infrastructure offers value for money.**

Survey information in Medellin found that cyclists want to get to their destination by the quickest and most direct route, ideally along dedicated cycle lanes. But how do local authorities calculate the relative benefits of increased cycling against the cost of cycling infrastructure? New models using optimisation techniques can help planners calculate the best return on the investment of public resources to support cycling.

## Urban sustainability in existing cities

Latin America and the Caribbean (LAC) is the second most urbanised region in the world, with 80% of its population living in cities.<sup>1</sup>

But urban population growth in the region is now declining and is expected to grow below the world average over the next decades – limiting the need for development of new urban areas.<sup>2</sup> Many existing cities are characterised by informal settlements, fragile, disaster-prone locations, and poorly planned development. How then can LAC cities become more sustainable?

Research and analysis by EAFIT University's Research in Spatial Economics (RISE) group explores a range of evidence and possible interventions which could evolve infrastructure and services to improve life for citizens and protect the environment in existing cities.

The 'Urban Sustainability' project is supported by the PEAK Urban Programme and informed by a research framework which seeks to predict, plan, and adopt new approaches, to address current and future urban challenges – drawing on expertise from across the disciplines and engaging with policy makers and practitioners at every stage.

This series of policy briefs captures key findings and insights for policy and practice – showing that working with what is there (even where it is not ideal), and making evidence-based interventions can transform cities.

Whilst based on research from Latin America, the briefing will also be of interest to policy makers in other parts of the world as urban redevelopment, improvement, and renovation become the most significant ways that cities change.



<sup>1</sup> <https://www.worldbank.org/en/topic/urbandevelopment/overview#1> (Accessed Jan 2022)

<sup>2</sup> <https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf> (Accessed Jan 2022)

## The challenge

**SDG 11.2: Provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety. SDG 13.2: Integrate climate change measures into national policies, strategies, and planning.**

Medellin is a diverse, hilly urban area where 50% of car journeys are less than 4k. Encouraging more people to switch from motorised transport to cycling could help tackle congestion, reduce air pollution, and bring health benefits for individuals.

But some evidence from Canada and elsewhere has shown that even significant investment in cycling infrastructure (such as dedicated cycle lanes) does not necessarily get people onto bikes. In resource constrained contexts such as Colombia and other cities in the global south it is vital to ensure that any investment in cycling is well-targeted, cost-effective, and achieves its goal.

So what factors are most likely to influence people to cycle rather than drive or take public transport?

## Research and findings

A survey targeted at bicycle commuters and the public was developed with input from local cycling organisations, local authorities, and universities, and distributed online, by telephone, and on the street.

**Research finding 1: Cycling in Medellin is already popular, despite the terrain.**

The survey found that despite the mountainous terrain, cycling was already a popular mode of

transport with all socioeconomic groups. It also found that people were willing to climb slopes of up to 9% and to cycle for journeys of up to 4k.

**Research finding 2: Cyclists want 'connectivity' along the route and 'directness' to their destination.**

The research found that cyclists want continuous and dedicated cycle lanes along the whole length of journey, rather than to have to join traffic on the roads for some part of the route. It also found that, people thought getting to their destination by the most direct route was important, so they do not have to cycle for any longer than necessary.

**"Even though experienced cyclists are used to mixing with traffic, we found that people wanted dedicated cycle lanes or corridors for the whole length of their journey, and not to be forced onto minor or major roads."**

**Juan Pablo Ospina, researcher, RISE group, EAFIT university**



## Implications for policy and practice

### 1. Find out what cyclists want in your context

Ask cyclists and non-cyclists what would encourage them to cycle more, or start cycling, in your context. Local factors may have a significant impact on people's willingness to use bikes so develop surveys or other consultation methods to find out what these are. Use the findings to inform transport and mobility planning.

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## 2. In Medellin, cyclists value 'connectivity' and 'directness'

Whilst the factors that will persuade people to cycle may differ in different cities, connectivity of cycle infrastructure and being able to take the shortest route to their destination, are likely to be important elements.

Unfortunately, the cost of cycling infrastructure is likely to be high, particularly in cities such as Medellin which has challenging terrain and a great deal of unplanned, informal building. Use optimisation techniques to identify the right balance between cost of investment and cycling gains. See Box for an example of how this information was used by the city of Medellin.

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## 3. Use cycling infrastructure as one element in wider strategies to reduce motorised transport

Boosting cycling on its own will not be sufficient to tackle traffic congestion and air pollution in urban areas. Cycling infrastructure, and policies to promote cycling, should be considered along with other measures to manage demand for travel by car and public transport.

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## Support from the RISE group

Planners and policy makers interested in support for exposure risk assessment should contact Juan Carlos Duque and the RISE group at EAFIT University. Contact [juanca.duque@eafit.edu.co](mailto:juanca.duque@eafit.edu.co)

The RiSE group explores solutions to city mobility challenges using quantitative methods such as econometric and optimisation models, contributing to solutions to increase cycling and better understand road accident patterns.

## Policy engagement and impact:

The RISE team developed an optimisation tool that allows cities to design smart bike paths that guarantees connectivity, usability, and an optimal usage of the available resources to develop new cycling infrastructure. The tool, and specific proposals, were shared with the Mobility Office of Medellin City Council, which is keen to boost cycling and walking as modes of transport.

The Mobility Office's working scheme for enhanced cycling paths across Medellin, presented in March 2021 and due for implementation before the end of the Council's term in office in 2023, reflects elements of the research but includes more direct routes and new corridors towards the peripheral areas of the city – a significant investment in non-motorised transportation. Work has now started on the construction of some cycle corridors in the plan.

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## Further information

- Ospina, J. P., Botero-Fernández, V., Duque, J. C., Brussel, M., & Grigolon, A. (2020). Understanding cycling travel distance: The case of Medellin city (Colombia). *Transportation Research Part D: Transport and Environment*, 86, 1-15, 102423. <https://doi.org/10.1016/j.trd.2020.102423>
- Ospina-Zapata, J. P., López-Ríos, V. I., Botero-Fernández, V., & Duque, J. C. (2020). A database to analyze cycling routes in Medellin, Colombia. *Data in Brief*, 32, 106162.

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## About us

The PEAK Urban programme aims to aid decision-making on urban futures by:

1. Generating new research grounded in the logic of urban complexity;
2. Fostering the next generation of leaders that draw on different perspectives and backgrounds to address the greatest urban challenges of the 21st century;
3. Growing the capacity of cities to understand and plan their own futures;

In PEAK Urban, cities are recognized as complex, evolving systems that are characterised by their propensity for innovation and change. Big data and mathematical models will be combined with insights from the social sciences and humanities to analyze three key arenas of metropolitan intervention: city morphologies (built forms and infrastructures) & resilience; city flux (mobility and dynamics) and technological change; as well as health and wellbeing.

## Contact

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## Our framework



The PEAK Urban programme uses a framework with four inter-related components to guide its work.

First, the sciences of **Prediction** are employed to understand how cities evolve using data from often unconventional sources.

Second, **Emergence** captures the essence of the outcome from the confluence of dynamics, peoples, interests, and tools that characterize cities, which lead to change.

Third, **Adoption** signals to the choices made by states, citizens and companies, given the specificities of their places, its resources and the interplay of urban dynamics resulting in changing local power and influence dynamics.

Finally, the **Knowledge** component accounts for the way in which knowledge is exchanged or shared and how it shapes the future of the city.

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