Urban Challenges Meeting AI Solutions in Latin America

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ROADMAP

The Urban Landscape in Latin America

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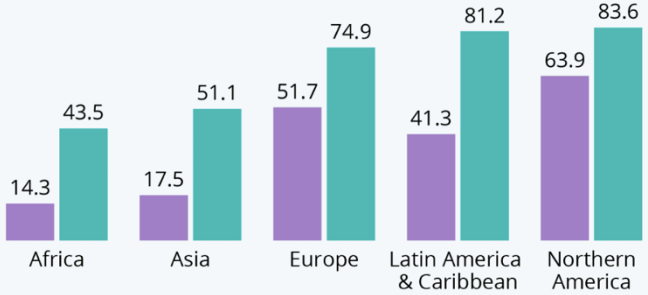
AI Strategies for Cities: Where to Start?

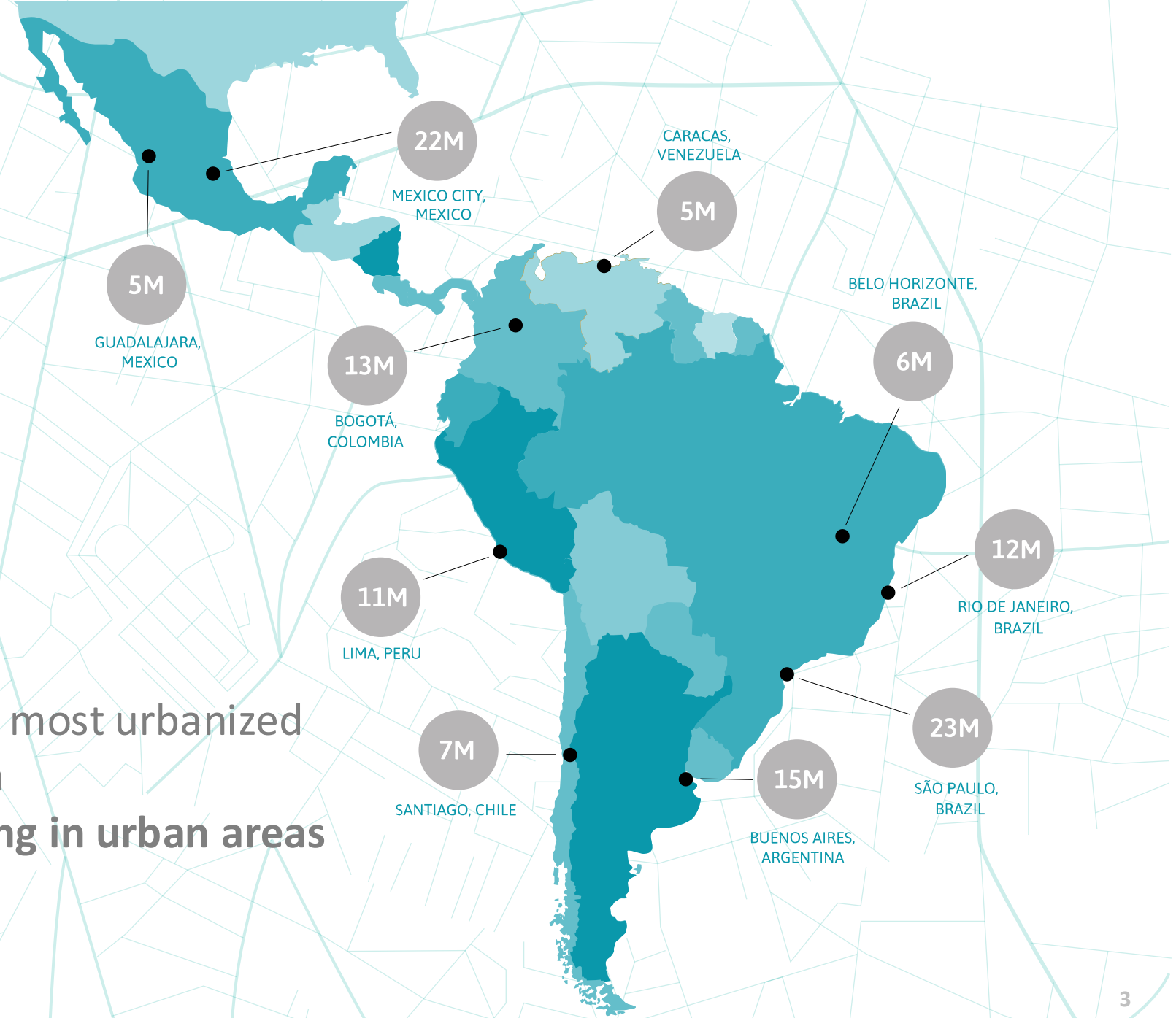
The Urban Landscape in Latin America

Then & Now Urban Population Worldwide

Share of the urban population by continent in 1950 and 2020 (in percent)



Source: U.N. Population Division



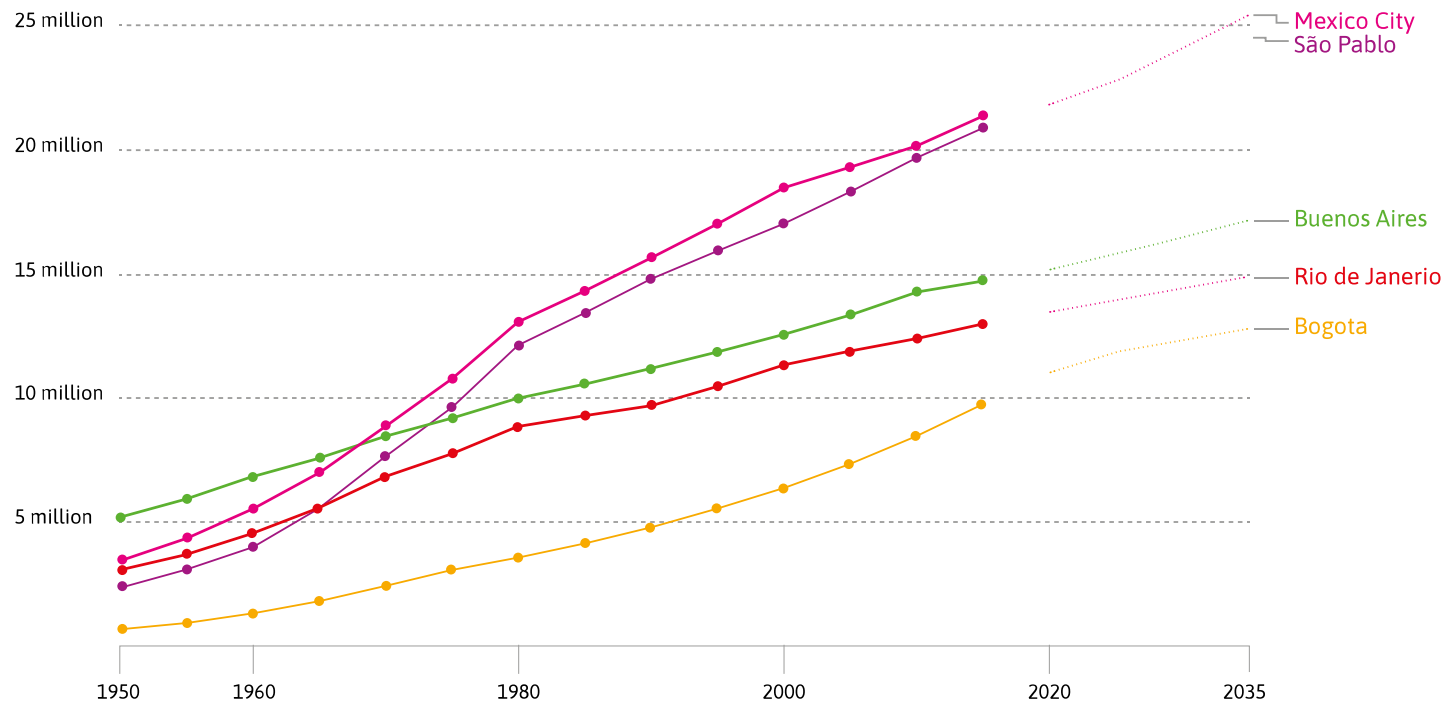
Latin America is one of the most urbanized regions on the planet, with

81% of the population living in urban areas

Cities have grown rapidly, and they will continue to grow.

By 2050, 90% of Latin Americans will live in cities.

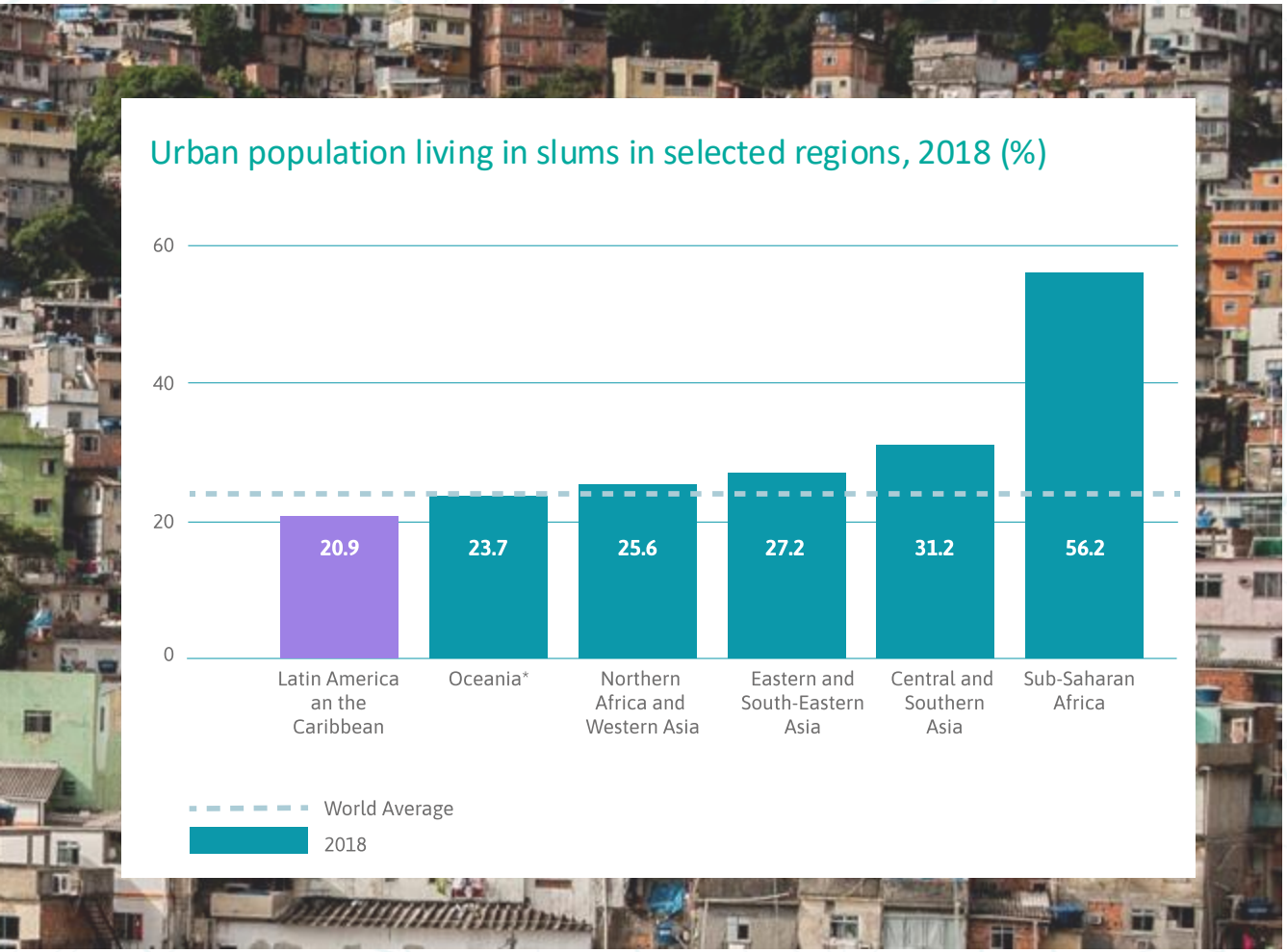
City population



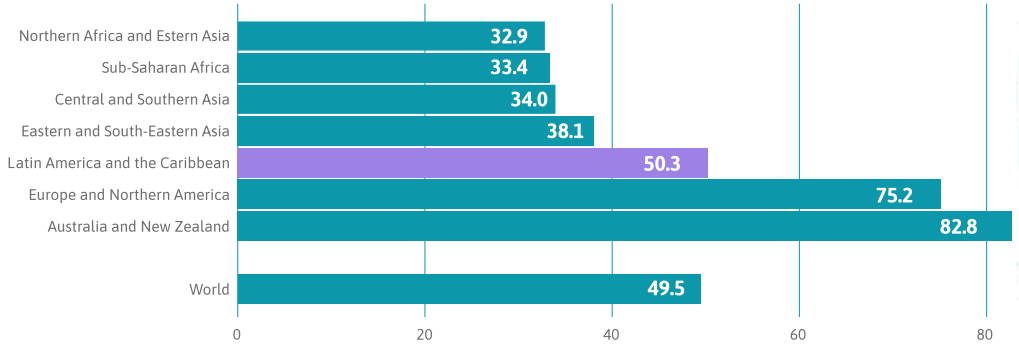
Source: UN World Urbanization Prospects (2018)

Rapid but **unplanned growth** in Latin American cities has led to challenges in public services, mobility, congestion, pollution, housing costs, and crime.

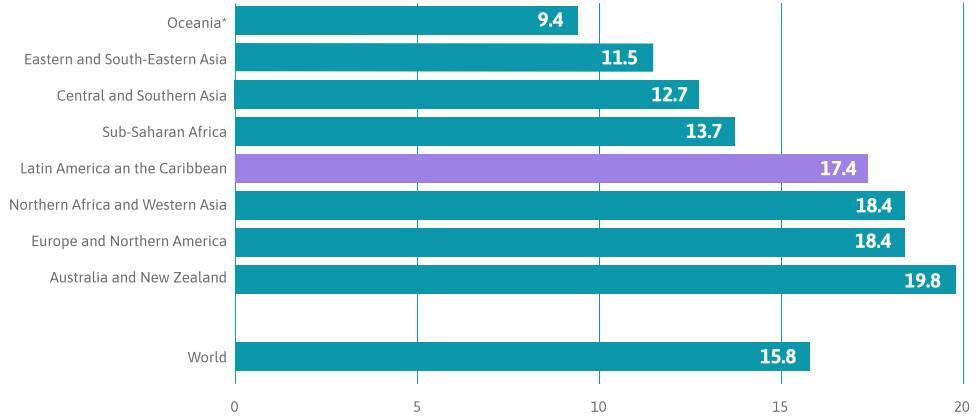
Over **20% of the urban residents in the region live in slums** and only 50% have access to public transport.



Urban population with convenient access to public transport, 2019 (%)



Global urban area allocated to streets and open spaces (%)



Source: Sustainable Development Goal 11 (2021 Report), UN, Department of Economic and Social Affairs.

Infrastructure and transportation issues compound the array of **significant challenges that cities currently face**.

INFRASTRUCTURE

Latin American cities frequently struggle with deteriorating water, road, and bridge infrastructure.

AFFORDABILITY

The expense of living in metropolitan regions is increasing as cities expand, making it harder for many individuals to afford to live there.

TRANSPORTATION

Creating efficient, sustainable, and accessible transportation networks is crucial for the growing urban population.

EQUITY

Urban areas often display stark contrasts, with some neighborhoods enjoying premium facilities, while others struggle without essential services

SAFETY AND SECURITY

As cities become more populated and diverse, urban tensions increase and so do security problems.

CLIMATE CHANGE

Cities need to retrofit their infrastructure to respond to climate change's effects, such as rising sea levels, higher temperatures, and more frequent extreme weather events.

GOVERNANCE AND PUBLIC PARTICIPATION

Cities must engage with communities and stakeholders further to gain a better understanding of their needs and aspirations.

Urban Challenges Meeting AI Solutions in Latin America

Incorporating AI solutions into urban planning and management can lead to more efficient and equitable cities in Latin America.

AI-POWERED MAPPING TOOLS

Utilize satellite imagery and drone data combined with machine learning algorithms to help identify and map informal settlements or open dumps.

3D MODELING FOR URBAN PLANNING

AI can process complex urban data to create 3D models or 'digital twins' of cities. Planners can simulate the effects of different policies or infrastructure changes within these models.

SMART SURVEILLANCE SYSTEMS

AI can be integrated into surveillance systems to enhance public safety through real time monitoring and analysis.

AI CHATBOTS FOR CITIZEN SERVICES

AI-powered chatbots can handle queries from citizens 24/7, providing information on public services, collecting feedback, or even guiding users through bureaucratic processes.

Mapping Informal Settlements with AI in Barranquilla (Colombia)

Source: Can Artificial Intelligence help reduce urban informality? IADB, 2022.

The projected population increase in Colombia will require an additional **280,000 new urban homes annually by 2050**.

- The construction of new housing has not been able to keep up with this demand in the past, and if it continues like this, neither will it in the future.
- In 2021, the National Planning Department, with the support of the Housing and Urban Development Division of the InterAmerican Development Bank and the company GIM, carried out a pilot project to **apply artificial intelligence to generate detailed information about informal housing in Colombian cities.**

Mapping of Informal Settlements based on Artificial Intelligence (MAIIA) is an algorithm that automatically maps informal urban settlements through the analysis of satellite images

Imagen satelital de trama urbana con áreas informales

Identificación humana (especialista)

Identificación por IA

Source: Can Artificial Intelligence help reduce urban informality? IADB, 2022.

- The Mayor's Office of Barranquilla provided high-resolution satellite imagery and detailed **data for algorithm training**.
- The algorithm, when benchmarked against expert-created maps, showed **85% precision, sufficient for targeting policy interventions.**
- The **open-source MAIIA algorithm** was created to assist Colombia's National Planning Department in producing precise informal settlement maps.
- Designed for easy deployment, it aims to **make AI tools accessible for government**, researchers, and other entities for various applications.
- Yet, the **need for expert teams and robust processing infrastructure, poses an obstacle to local governments** adopting such technologies.

The DNP intends to apply this pilot to other cities in Colombia to acquire accurate and pertinent information, and transfer skills to local governments.

- **MAIIA is flexible enough to adapt to local differences in settlements**, and periodic evaluations will be carried out of the effectiveness in the identification and monitoring of informal settlements.
- **Promoting inter-agency cooperation** is vital for enhancing quality, preventing redundant work, and fostering holistic solutions.
- **Comprehensive documentation** and sharing of processes, outcomes, and impacts are fundamental to increase the program's **potential for scaling and replication**.

Drones and GPS Mapping of Open Dumps in Mendoza (Argentina)

In Latin America, approximately one-third of waste ends up in open dumps, and only 10% is recycled

- Open dumps illegally accumulate waste, leading to the deterioration of soil, air, and water quality.
- The increasing waste production coupled with restricted municipal finances, poses great challenges to achieving proper waste management.
- The proximity to open dumps poses significant health risks, especially to the most vulnerable populations.

Source: ONU Medio Ambiente (2018). Perspectiva de la gestión de residuos en América Latina y el Caribe. Programa de las Naciones Unidas para el Medio Ambiente, Oficina para América Latina y el Caribe. Ciudad de Panamá, Panamá.

Controlling the spread of open dumps represents a formidable challenge for both local and national authorities in Latin America.

- Dumps often expand without detection by regulatory bodies.
- This lack of oversight exacerbates the difficulty in making informed choices and establishing impactful policies to mitigate the issue.
- **Digital technology allows us to obtain high-definition satellite images and deploy drones to take on-demand aerial photos.**
- **AI provides the tools to automatically process these images and identify key objects**.

Source: Monitoreando la ciudad con drones: inteligencia artificial al servicio de la gestión ambiental. IADB 2023.

In 2019, the Bunge y Born (ByB) Foundation embarked on a mission to tackle waste management through technology.

- **Affordable AI-enabled approach** to track the expansion of open dumps using satellite and aerial imagery.
- The **Open-Source system** successfully **identifies 95%** of documented waste sites.
- The system's analysis can be completed **within 1 day**.

In 2022, the ByB Foundation partnered with the city of Mendoza to deploy landfill detection technology.

- The city of Mendoza was grappling with the spread of numerous **micro-dumpsites**.
- The methodology was modified to work with **aerial photographs taken by drones**, instead of satellite images.
- The **adaptation allowed the algorithm to detect the predominant material in the garbage dumps** (plastics, construction waste, metals, etc.) given the higher resolution of the images.
- This was key for the city to locate materials that can be recovered, turning garbage into a valuable **input for the local recycling plant**.

The AI-based landfill monitoring system enabled the city of Mendoza to identify over 1500 open dumps.

- The **city enhanced its capabilities** to refine its waste management approaches.
- The granularity of the data gathered has been **instrumental in shaping action plans**, helping to accurately identify the most affected sites where intervention was a priority.

Source: Casos inspiradores: cuidar nuestro planeta con inteligencia artificial. Fundacion Bunge y Born

AI integration in surveillance systems in Curitiba (Brazil)

Source: Curitiba City Hall. Muralha Digital Oficial Website, https://muralha.digital/

Muralha Digital is Curitiba's Technological Shield for Public Safety, a comprehensive security program.

- Real-time intervention capabilities for crime prevention, emergency assistance and public events management.
- Civil Defense's use of imagery for prompt response in situations like flooding.
- Swift and Coordinated Emergency Response by the Secretariats of Social Defense and Traffic and Administration and IT.
- 24/7 vigilance by municipal guards from the Operations and Control Center.

Curitiba's Surveillance Network includes 1,900 cameras in strategic locations for maximum coverage.

- Specialized surveillance including facial recognition and thermal monitoring.
- A 'security siege' monitoring city entrances/exits for irregular or stolen vehicles.

Muralha Digital played a crucial role in overseeing the Curitiba Carnival safety with a 40% crime reduction.

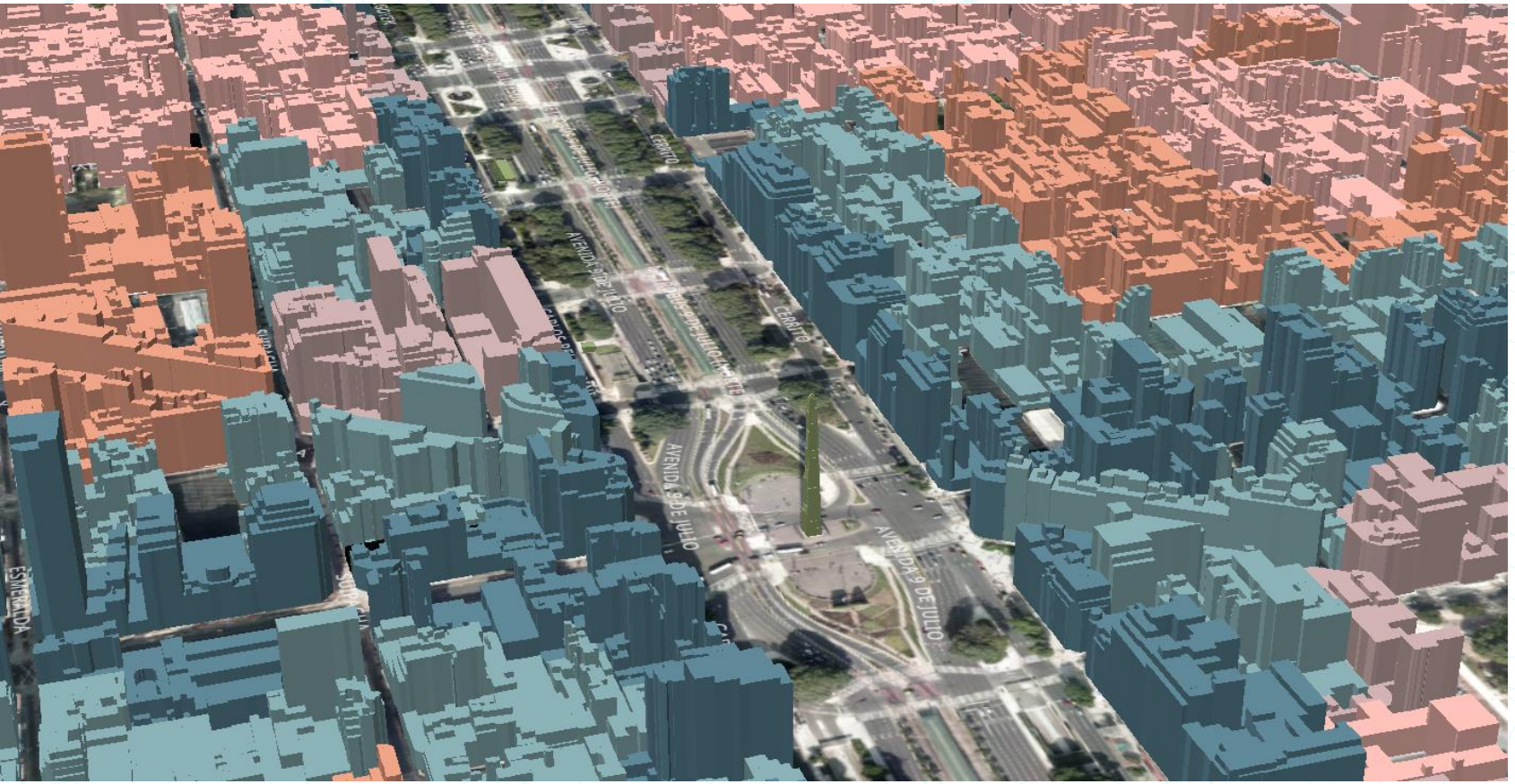
- Integrated security efforts with 420 Municipal Guard personnel deployed for events coverage.

Curitiba must continue to strive for a balance between harnessing AI for public safety and upholding individual rights and freedoms. Challenges ahead include:

- Privacy Concerns
- Data Security
- Bias and Discrimination
- Accountability and Transparency
- Public Trust

Source: Curitiba City Hall. Muralha Digital Oficial Website, https://muralha.digital/

Buenos Aires 3D city (Argentina)



Source: Observatory of Public Sector Innovation. Buenos Aires 3D City (2022)

Buenos Aires 3D City is a three-dimensional visualization platform providing geographic data for each district according to the urban code and infrastructure regulations.

- Accessible Information
- Streamlined Construction Procedures
- Reliable and Codified Data

- **The aim is to turn Buenos Aires 3D City into the official platform to initiate construction procedures by integrating it with the city's remote help desk** (Trámites a Distancia).

The platform is in constant enhancement to provide up-to-date, reliable, and easily navigable information for all users.

- **Collaboration:** Initiated by the Secretariats of Innovation, Digital Transformation, and Urban Development, with input from urban development professionals.
- **Two-Phase Development:** Initial data compilation followed by 2D and 3D visualization offering layered visualizations with various filters.
- **User-Friendly Platform:** addressing user needs and data requirements are key challenges to keep the platform updated.

More than 13,000 users currently use the platform, a 218% increase in monthly consultations.

- 88% decrease in requests for urban planning certificates and 63% in help desk consultations.
- It optimizes resources by reducing the time for approval in construction projects and reduces the bureaucracy and paperwork related to them.

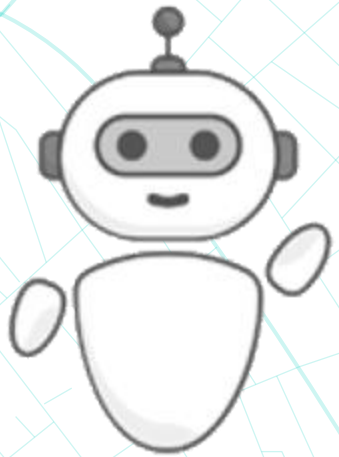
The experience was shared with over 20 cities and 10 companies in Argentina and Latin America.

- Success relies on skilled teams, financial resources, and leadership support.

Source: https://oecd-opsi.org/innovations/buenos-aires-3d-city/

Boti, Buenos Aires City's Chatbot (Argentina)

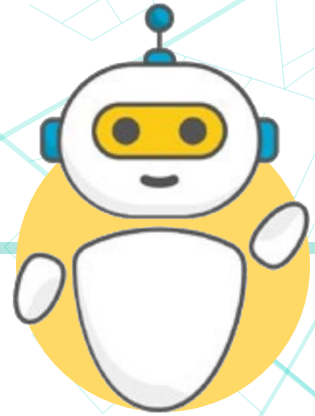
Buenos Aires City Government was the first in the world to use WhatsApp as a channel to talk, inform and answer concerns, requests and queries from its citizens.



"Supported by the conviction that it is the State that has to get closer to the people, and not the other way around, in Buenos Aires we made a great effort to be the first city in the world to develop a WhatsApp bot that meets the demands of citizens (...)"

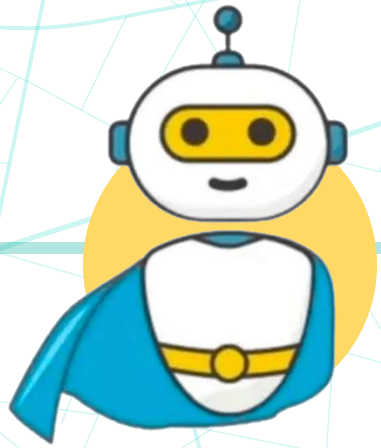
Horacio Rodriguez Larreta, Mayor of Buenos Aires City, 2019-2023.

Source: "Boti case. Buenos Aires City´s chatbot". Secretariat of Innovation and Digital Transformation of the Buenos Aires City Government (2023)



Initially launched in 2012, the platform was designed to assist citizens with hearing disabilities, with a dedicated team managing around 15,000 monthly interactions.

- Buenos Aires residents were able to ask questions about procedures, requests for appointments, and complaints.



In 2019, the city transitioned to WhatsApp, capturing 80% of users from other online channels.

- The city has been incorporating public information into this interactive platform and people can find data about events, parking permits, access to health centers, and much more.

The integration of a Natural Language Understanding engine, powered by AI and Machine Learning, further enhanced and expedited the service.

Source: "Boti case. Buenos Aires City´s chatbot". Secretariat of Innovation and Digital Transformation of the Buenos Aires City Government (2023)

In 2020, Buenos Aires integrated COVID protocols, along with essential health and testing guidelines, to bolster its pandemic response and keep citizens informed.

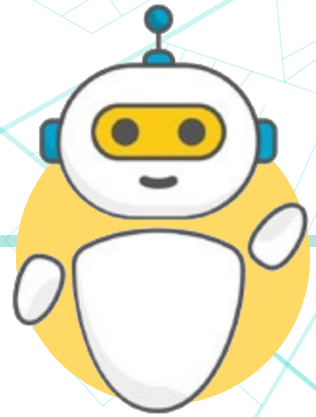
- Boti could handle 3 to 5 inquiries at once, whereas human operators could manage only one inquiry per call.
- Boti aided in monitoring close contacts, symptoms of COVID, and the implementation of the vaccination strategy.

Boti throughout the City

The dissemination of Boti, as the main channel of information regarding COVID-19, was leveraged on a strong communication campaign that included: graphics on public roads, messages on advertising billboards placed on avenues and highways; and guidelines in: television, national newspapers, digital media, Google and social networks.

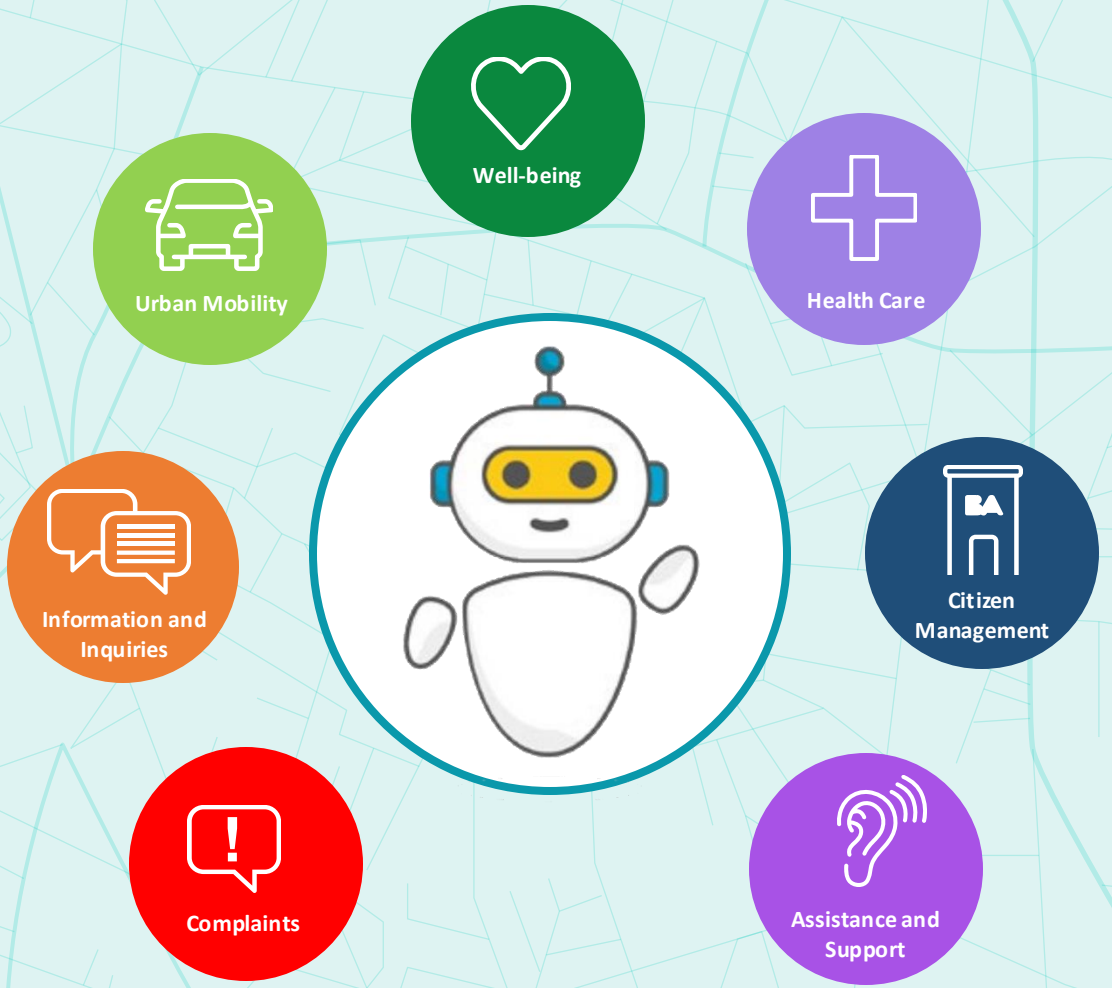
The interesting aspect of the campaign was the combination of graphic and digital resources, including not only Boti's contact telephone number but also a QR code that citizens could scan with their mobile phones to be redirected to a WhatsApp conversation.

Source: "Boti case. Buenos Aires City´s chatbot". Secretariat of Innovation and Digital Transformation of the Buenos Aires City Government (2023)



As of 2023, 90% of the city's administrative processes, inquiries, and bookings were available virtually, offering a straightforward and quick alternative to visiting government offices.

- Access to the top 30 most common procedures through Boti.
- 48 non-essential procedures have been removed, and 97 crucial ones have been streamlined.



Source: "Boti case. Buenos Aires City´s chatbot". Secretariat of Innovation and Digital Transformation of the Buenos Aires City Government (2023)

AI Strategies for Cities: Where to Start?

Diverse roles cities can play on AI

Users & Developers

Procurers

Promoters

Regulators

AI strategies for cities

01
Set clear goals and objectives for AI implementation

02
Define AI Governance

03
Adopt a framework for trustworthy AI

04
Build technical capacity

05
Ensure trust and security in the use of AI

06
Contribute to collaborative AI governance

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