

Data and Analytics

Team

Leveraging data for sustainable and efficient mobility

AVERTISSEMENT : Cette présentation a été traduite du français à titre d'information. En cas de divergences, la [version originale](#) prévaut.

Presented by

Hamzeh Alizadeh, Director,
Data and Analytics

Our mission

Put data at the service of sustainable and efficient mobility by developing rigorous analyses, innovative decision-making tools and solid research partnerships, in order to inform the strategic choices of the ARTM and its partners.

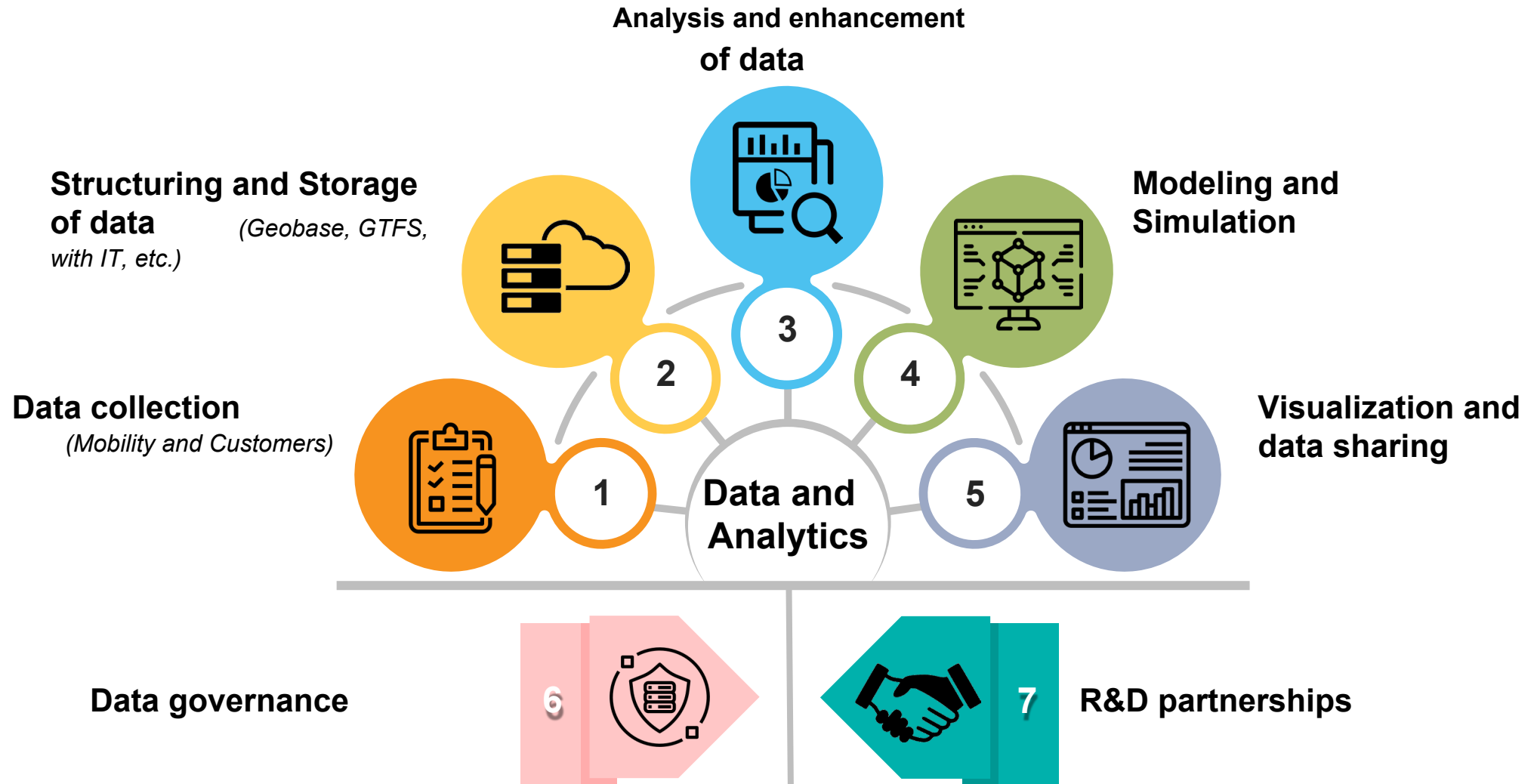




Our vision

To become a reference in transportation data intelligence, by creating an integrated, transparent and collaborative ecosystem that maximizes the impact of data on planning, innovation and customer experience in the greater Montreal area.

Our areas of expertise



Our sub-teams



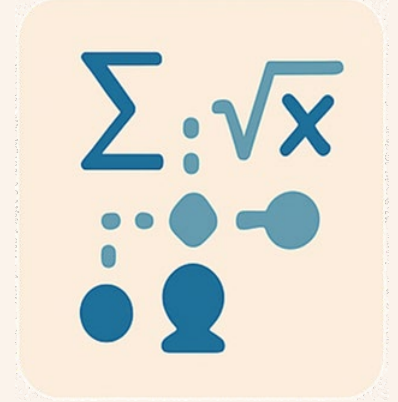
Customer Intelligence



Modeling



Geomatics



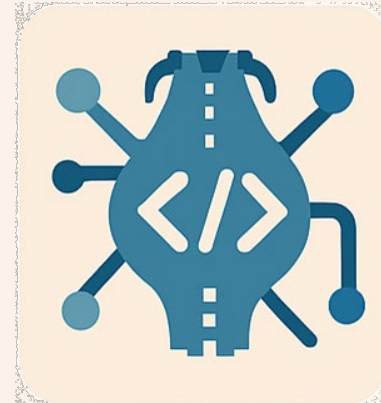
Data Science



Mobility surveys



Business Intelligence

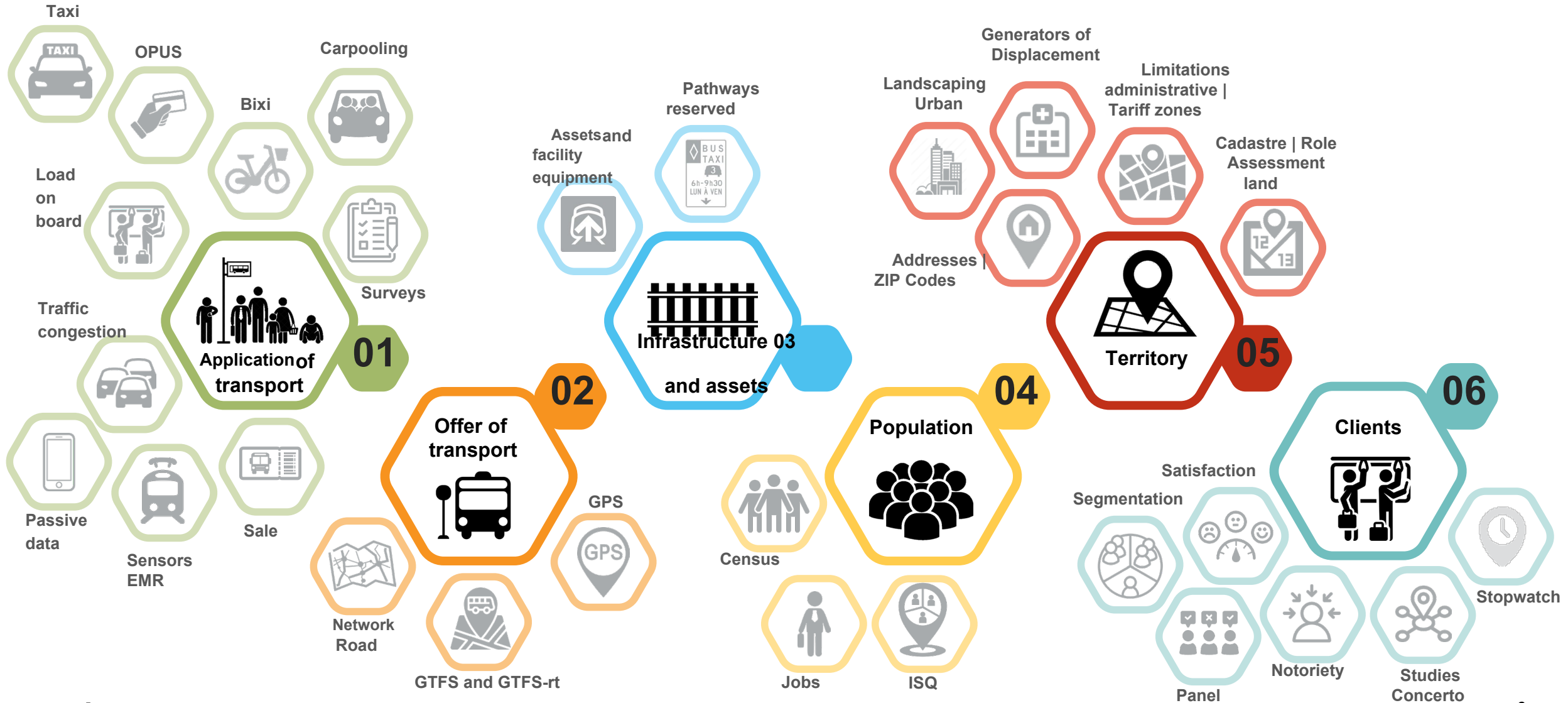


Industrialization

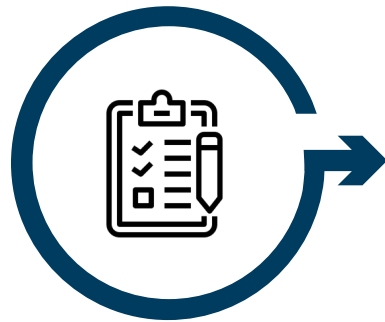


**Governance of
data**

Our databases

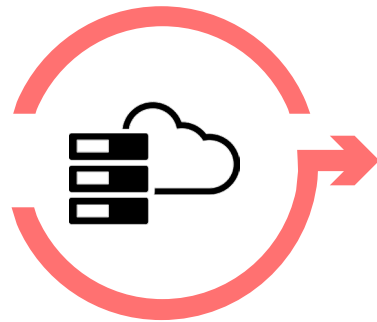


Our tools



Collection

- Brio
- Evolution



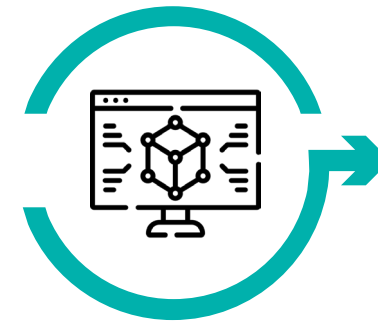
Structuring and Storage

- Geobase



Analysis and enhancement

- Python
- R
- PySpark
- Stata



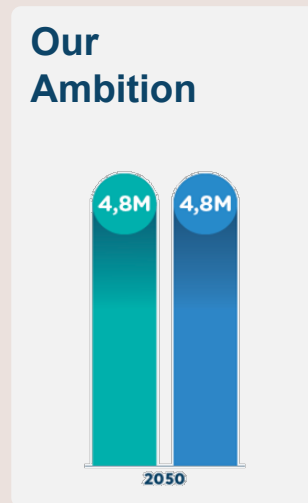
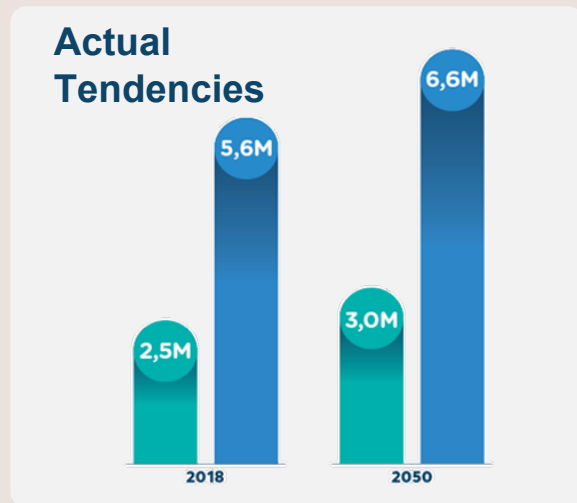
Modeling and simulation View and Share

- Madigas
- PADUM
- AIMSUN
- R5
- FaLoCoRo



- PowerBI
- GeoXplore
- ArcGIS
- QGIS
- ShinyApps

Strategic Planning Framework



■ Public transit and active modes
■ Car



From Data to Decisions



**Data
collection,
management,
and
governance**



**Assess the
current reality**



**Scenario planning
and impact
assessment**

Data collection, management, and governance



- **Data collection:**
Collect the right data to comprehensively capture mobility behaviors and system performance.
- **Data management:**
Ensure data is organized, reliable, and usable across teams and systems.
- **Data governance:**
Establish common rules and responsibilities to ensure data quality, consistency, and security.

Analysis of Current Reality



- Analysis of travel demand and patterns:

Understand how, when, and why people move to inform better planning.

- Accessibility analysis:

Measure how well mass transit connects people to opportunities at the territorial level.

- Equity Analysis:

Ensure equitable access to mobility for all population groups, especially the most vulnerable.

- Performance analysis:

Monitor and improve the quality, reliability, and efficiency of mass transit services.

- Financial and economic analysis:

Balancing costs, revenues, and benefits to support and optimize transit investments.



Scenario planning and impact assessment



- **Robust modeling capability:**
Develop and maintain credible, calibrated, and validated simulation and forecasting tools.
- **Scenario and Policy Analysis:**
Exploring alternative futures and assessing the impacts of public policy choices.
- **Multidimensional impact evaluation:**
Go beyond traffic and assess the economic, social, environmental, and equity benefits of the scenarios.
- **Integration with land use planning and public policies:**
Align transport scenarios with design, housing, and climate goals.

Key challenges



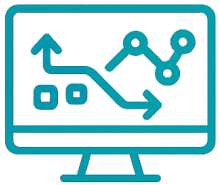
Data fragmentation and reliability

Ensure fragmented data from multiple stakeholders are reliable, consistent, and provide a coherent metropolitan view.



Methodological complexity versus usability

Balancing methodological rigor with clear, actionable indicators for decision-makers and partners.



Model flexibility for scenario analysis

Develop flexible and credible models that can adapt to uncertainty and assess the impacts of policy choices.



Enquête métropolitaine 2023

Perspectives mobilité



Participez à l'enquête Perspectives mobilité et courez la chance de gagner une tablette électronique ou une montre intelligente!

Le Bureau des enquêtes sur la mobilité, piloté par l'Autorité régionale de transport métropolitain (ARTM), invite la population de la région métropolitaine de Montréal à faire connaître leurs habitudes de déplacement.

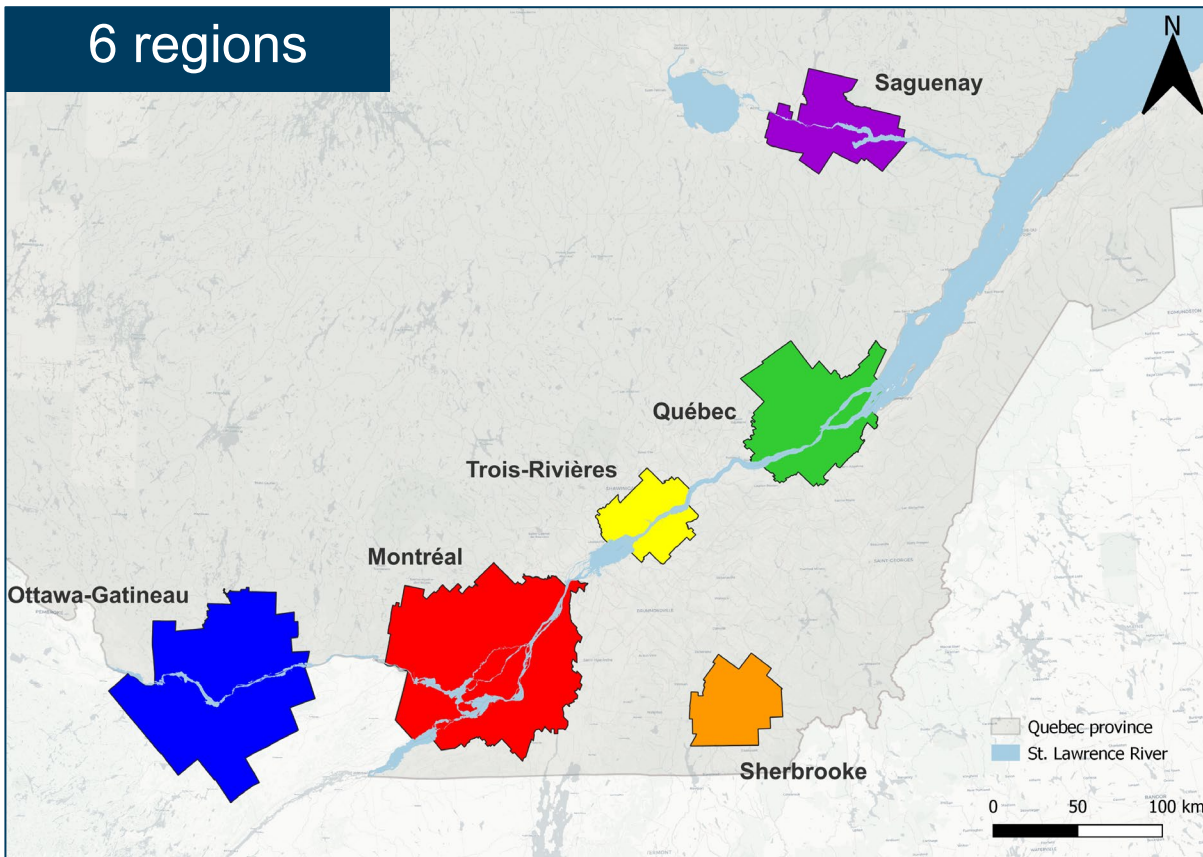
La date limite pour participer est le 16 décembre 2023.

Mobility data collection

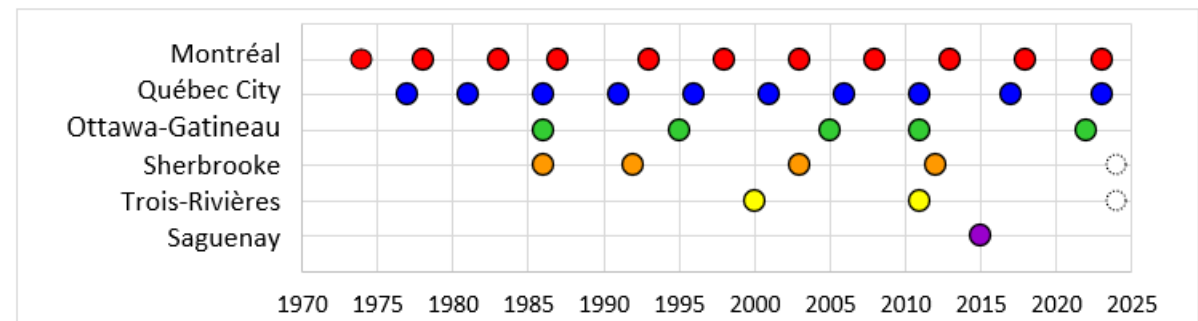
ARTM

Traditional household surveys

Regional Experience



Region	Last survey	Sample size of households
• Montreal	2018	3.9%
• Quebec	2017	9.3%
• Ottawa-Gatineau	2022	5%
• Sherbrooke	2012	11%
• Trois-Rivières	2011	13%
• Saguenay	2015	11%

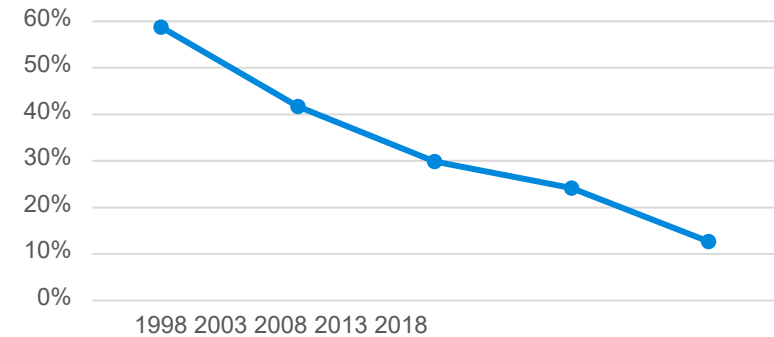


Traditional household surveys

Key Issues

- Telephone recruitment
 - Decreasing response rates,
 - Demographic biases,
 - Difficulty in setting up an investigation floor;
 - Soft refusal
 - Very lengthy investigation (high burden)
 - Date of survey

Response rate, latest mobility surveys in the Greater Montreal Area



	Pop. Référence (2016)	Pop. échantillon (EnqOD 18)	Écart (OD18 - Rec.16)	%Écart (OD18 - Rec.16)
Population totale	4 474 598	100%	-	-
Hommes	48.89%	48.88%	0.0%	0.0%
00-19 ans	11.3%	10.6%	-0.7%	-6.0%
20-34 ans	9.8%	6.6%	-3.1%	-32.2%
35-49 ans	10.2%	9.3%	-0.9%	-8.6%
50-64 ans	10.3%	12.3%	2.0%	19.5%
65 ans et +	7.3%	10.0%	2.7%	36.8%
Femmes	51.1%	51.1%	0.0%	0.0%
00-19 ans	10.9%	10.0%	-0.9%	-8.2%
20-34 ans	9.9%	6.6%	-3.3%	-33.3%
35-49 ans	10.3%	9.9%	-0.4%	-4.3%
50-64 ans	10.6%	13.2%	2.6%	24.4%
65 ans et +	9.4%	11.5%	2.1%	21.9%
Ratio H/F	0.956	0.956	0.0%	0.0%

Modernization of household surveys

Enhancements



Questionnaire

- Full review
- Adapted to the post-covid reality
- Reduced length
- Partial sample



Recruitment

- Postal invitations
- Revision of letters of invitation
- Login without account creation
- Improvement of the address database
- Reduced length



Data Entry Interface

- Web interface
- User-friendly tool
- Random order of travel logs



Interface de Validation

- Real-time tracking of responses
- Relaunching of incomplete surveys
- Smooth and fast validation

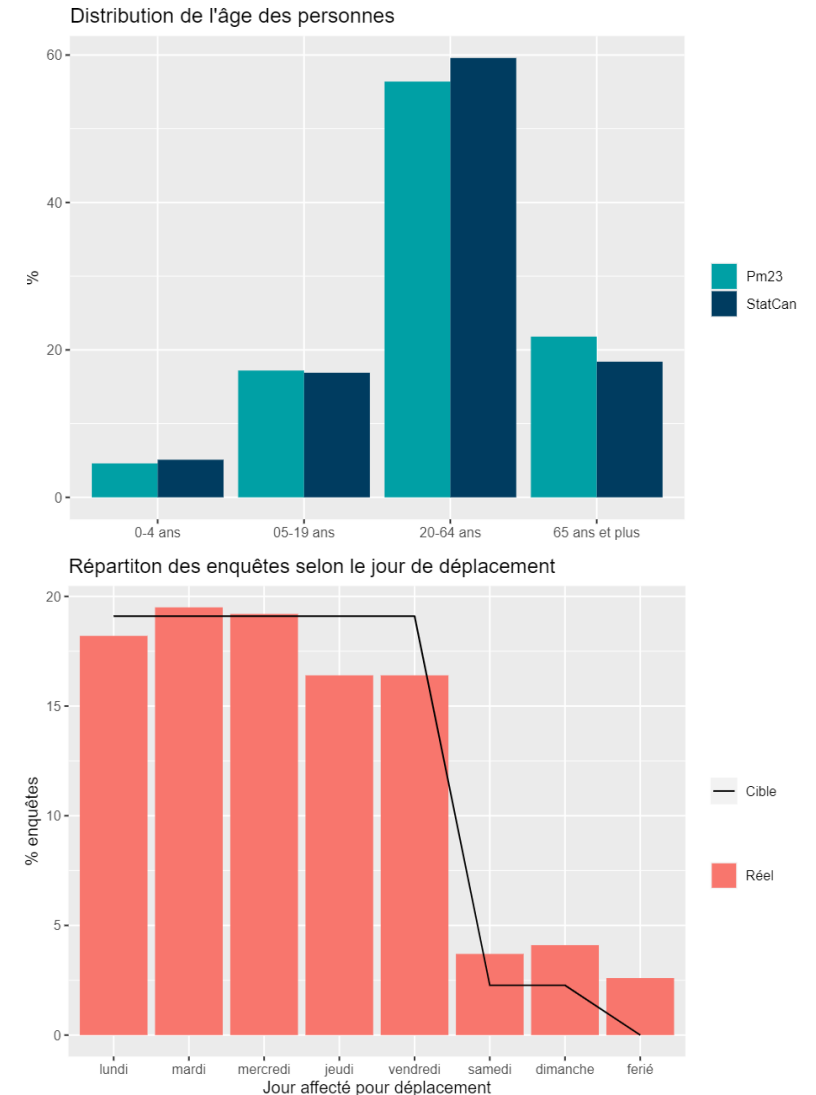
Modernization of household surveys

Perspectives Mobility Surveys: Metropolitan Survey 2023

- From September 4 to December 15
- Lens: 76K responses
- +13% have started the survey
- +10% completed the survey
- Origin of the answers:
 - 95% web
 - 3% incoming call
 - 2% outgoing call
- Percentage of complete surveys: 76.6%
- Lower median survey duration: 17 min
- Higher rate of mobility



[Modernizing Montréal's household travel survey: adapting to evolving travel trends and technological shifts](#)



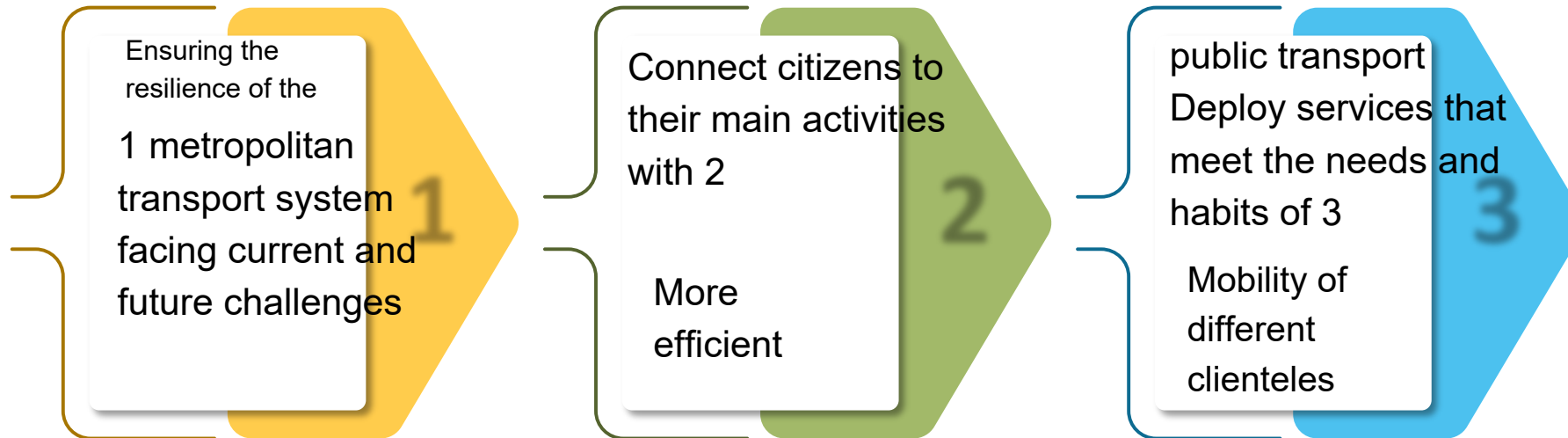
Indicator development

ARTM



Indicator development

3 Strategic Directions

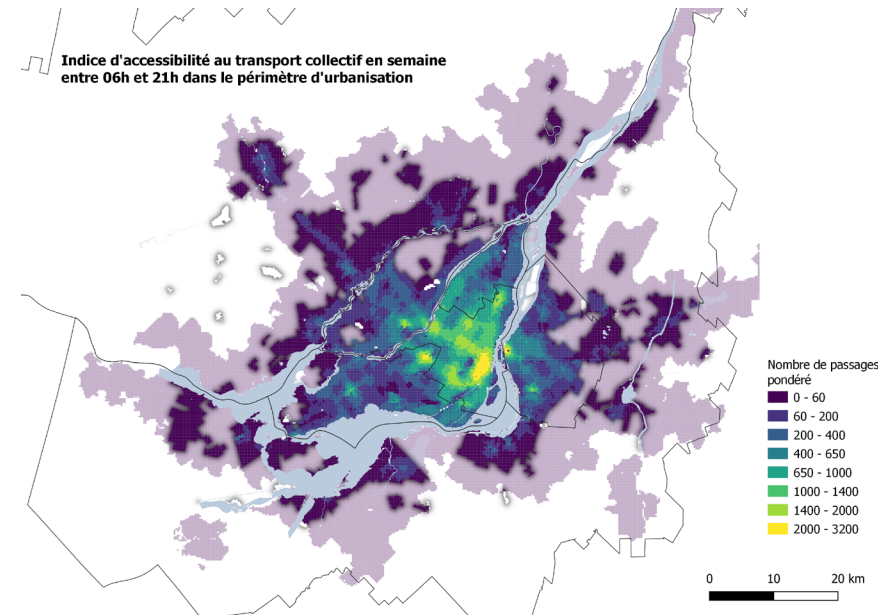


15 indicators

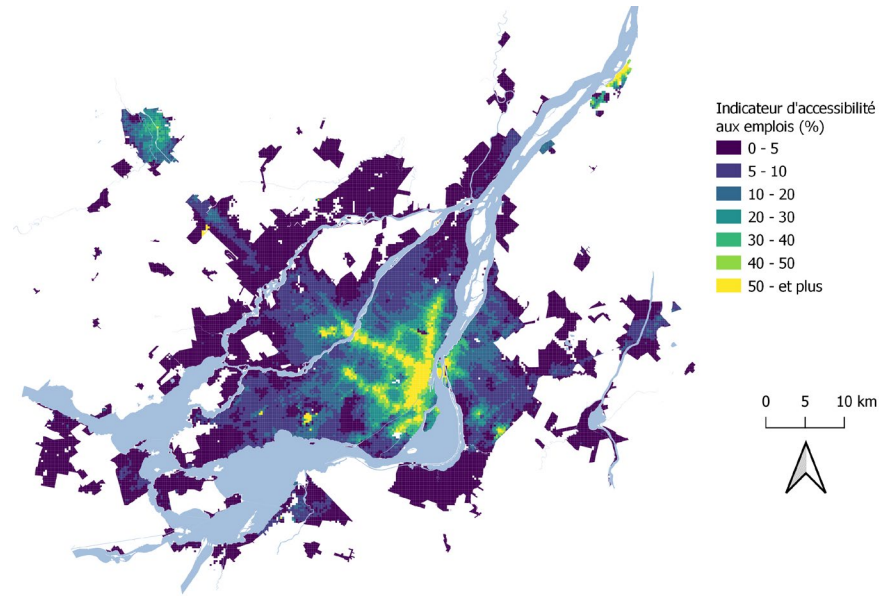
- ...
- **Accessibility to jobs**
- **Accessibility to public transit**
- ...

Indicator development

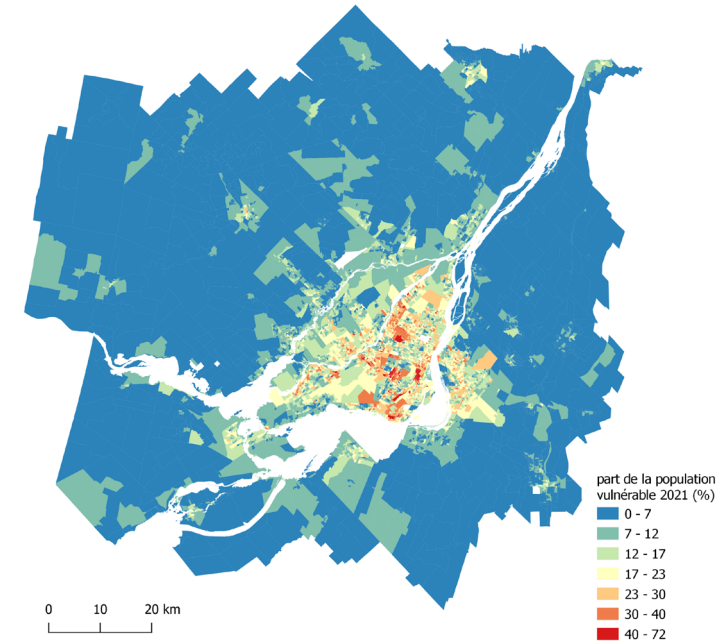
Indicator development – accessibility and equity



Accessibility to public transport services



Accessibility to jobs



By of the vulnerable population



Towards fair transit: a toolbox for equity diagnostics in spatial accessibility

scientific **data**

A synthetic vulnerable population dataset for fine scale geographical equity analysis and urban planning

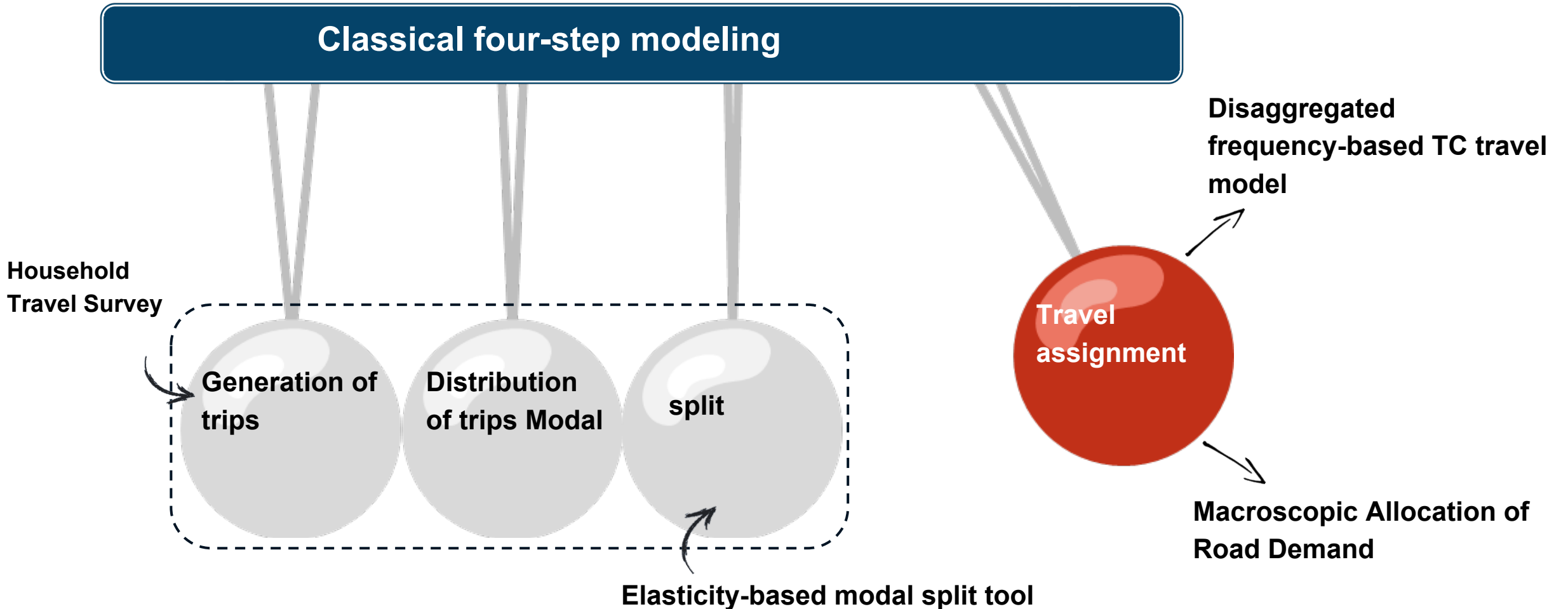
Modeling Framework

ARJM



Modeling framework

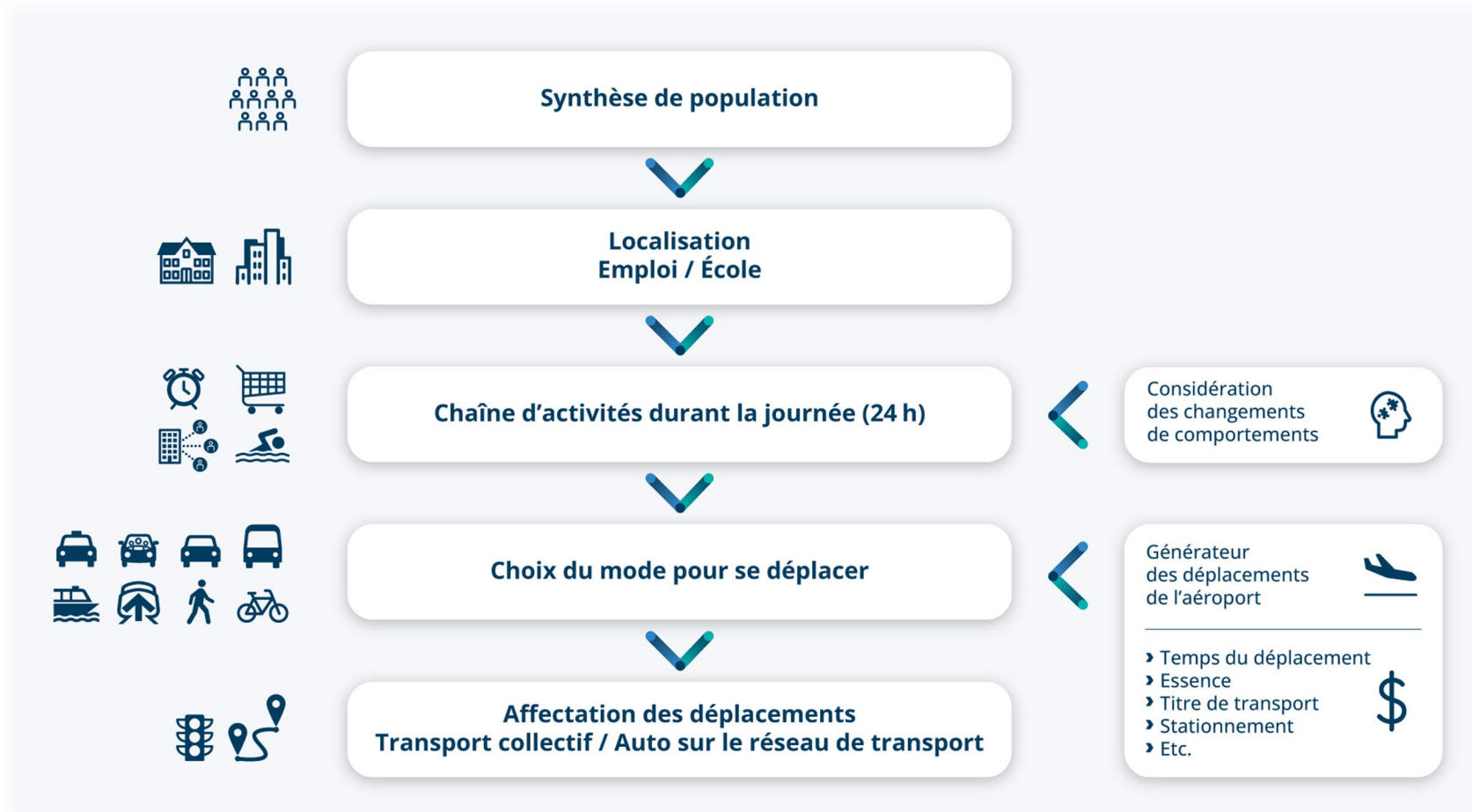
Current Framework



Modeling framework

The new framework – under development

Activity-based model



R&D Partners



Data sharing

ARJM



Mobile Data Hub

Be the regional access point for mobility data.

- Open and restricted data dissemination
- Generate networking opportunities
- Data standardization
- Knowledge sharing
- Support for academic research

Bienvenue sur le pôle de données en mobilité

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[Tous les jeux de données](#)



Effectuer une recherche

[Tous les contenus](#)

Mise à jours de jeux de données récents

[Titre du jeux de données](#)
Dernière mise à jour: il y a X jours

[Titre du jeux de données](#)
Dernière mise à jour: il y a X jours

[Titre du jeux de données](#)
Dernière mise à jour: il y a X jours

Les catégories de jeux de données

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[Tous les jeux de données](#)

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Thank you!

ARTM

Autorité régionale
de transport métropolitain
artm.quebec

1001 Robert Bourassa Boulevard,
Suite 400 Montreal, Quebec H3B
4L4