Spatialising Logistics Infrastructure: Researching E-Commerce and Urban Logistics Data

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Spatial Distribution of E-commerce Warehouses

Research Objectives:

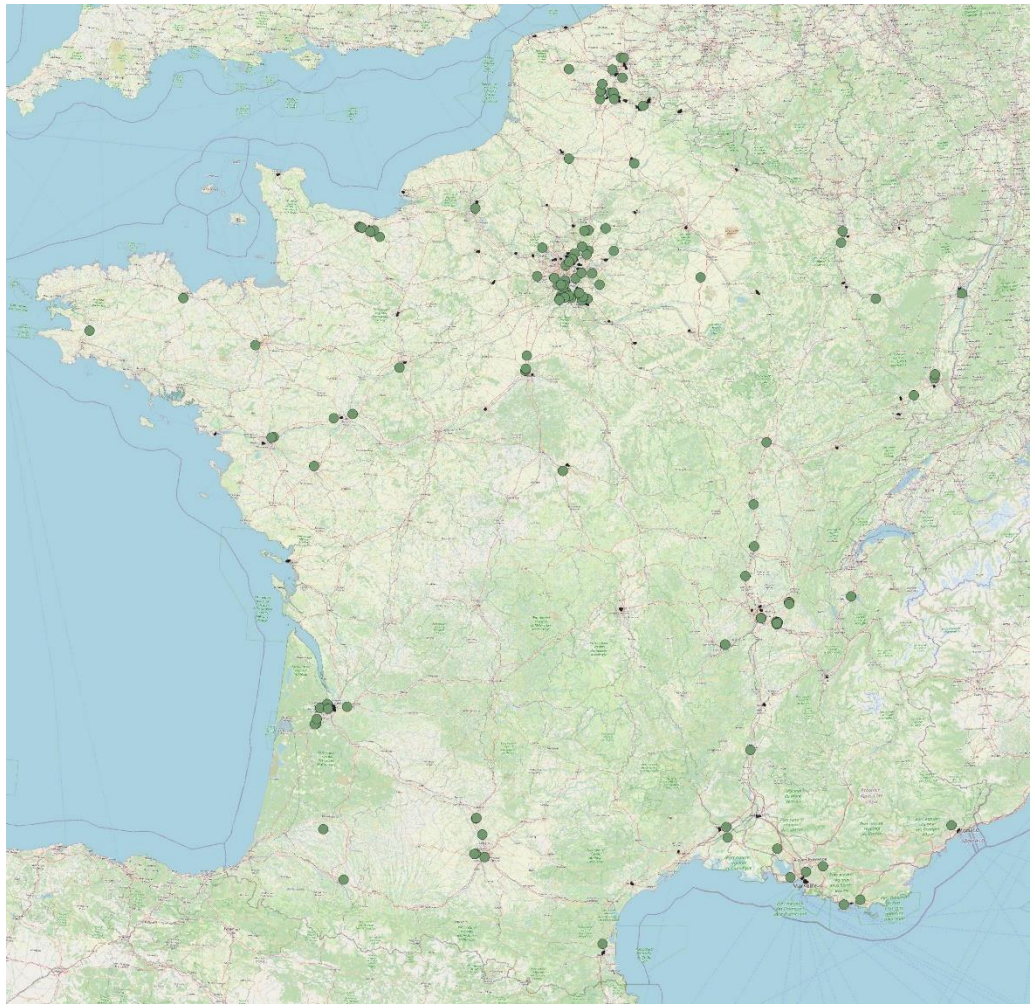
- Map and analyse where e-commerce warehouses are located and how they are spreading in France.

- Identify the main socioeconomic drivers behind warehouse location (urbanisation, infrastructure, regional economy).

- Deliver insights to help planners optimise warehouse siting and reduce urban and environmental impacts.

Spatial Distribution of E-commerce Warehouses

- E-commerce warehouses tend to cluster in industrial areas with **lower incomes** and **higher unemployment.**
- Dense transport networks and urban sprawl **strongly attract** warehouse development.
- Land availability and cost push warehouses **toward suburban locations**.



Spatial Distribution of E-commerce Warehouses

Positive Influences:

- **Proximity to major transport infrastructure** (highways, logistic hubs).
- **Lower land prices** and available development zones.

Negative Influences:

- High-income residential zones consistently show **negative correlations** with warehouse establishment, indicating avoidance of such areas.

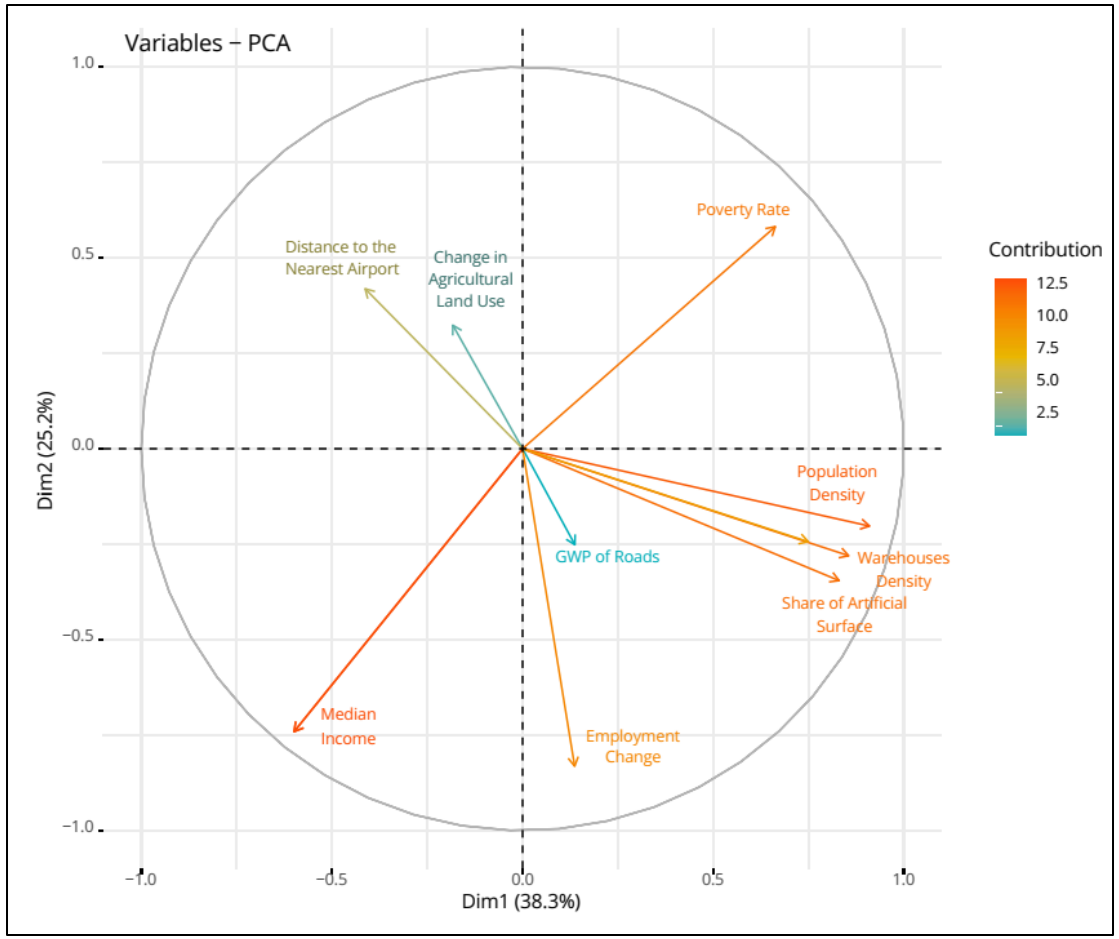
In general, e-commerce warehouses are strategically positioned for **operational efficiency and economic feasibility rather than for socioeconomic equity.**

Spatial Distribution of E-commerce Warehouses

Statistical Insights - Principal Component Analysis (PCA)

1. Urban and Economic Density:

- There seem to be **high influence** (loading) by urban population density, economic activity levels, and commercial real estate values.
- This reflects a **strong attraction** of warehouses to economically vibrant, densely populated areas.

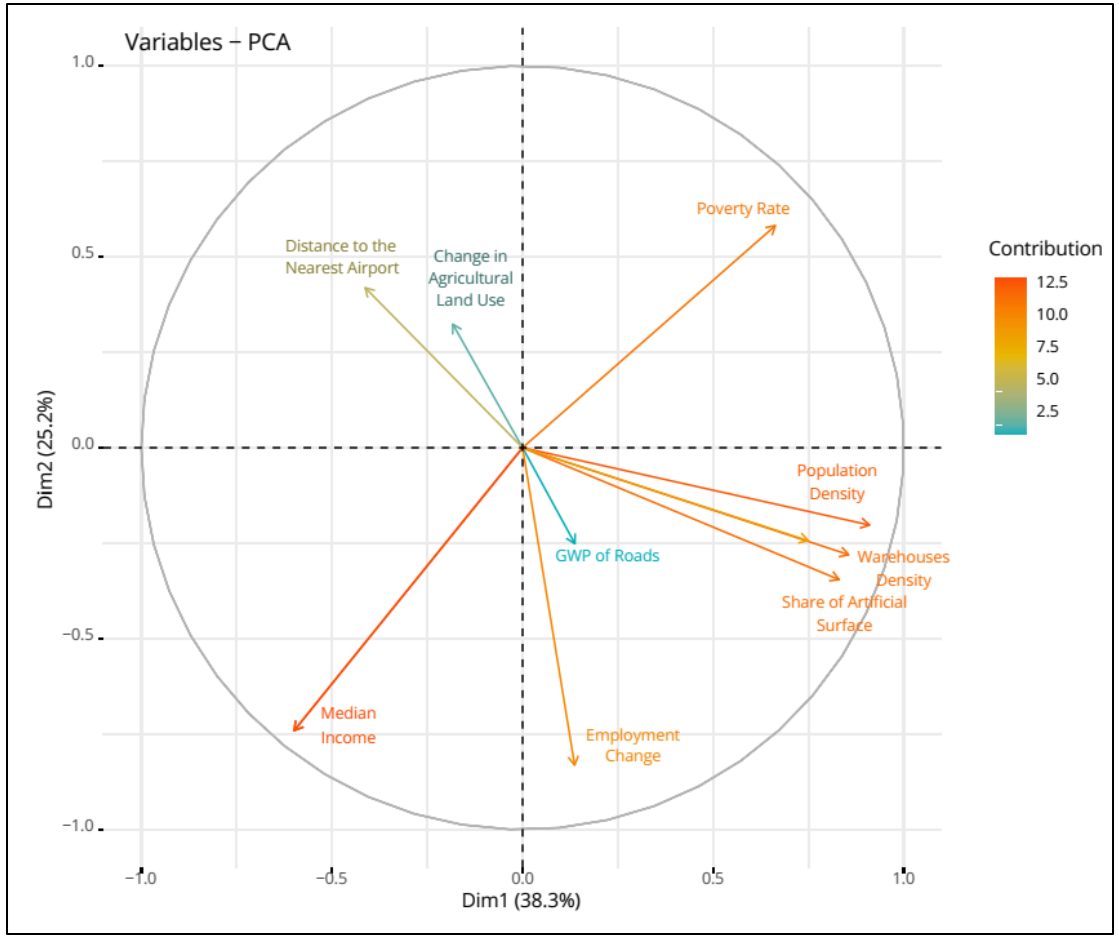


Spatial Distribution of E-commerce Warehouses

Statistical Insights - Principal Component Analysis (PCA)

2. Industrial Landuse and Employment:

- E-commerce warehouse locations are **strongly influenced** by unemployment rates, industrial zones, and historical manufacturing activity.
- This suggests a preference for areas with existing industrial infrastructure and an available workforce.

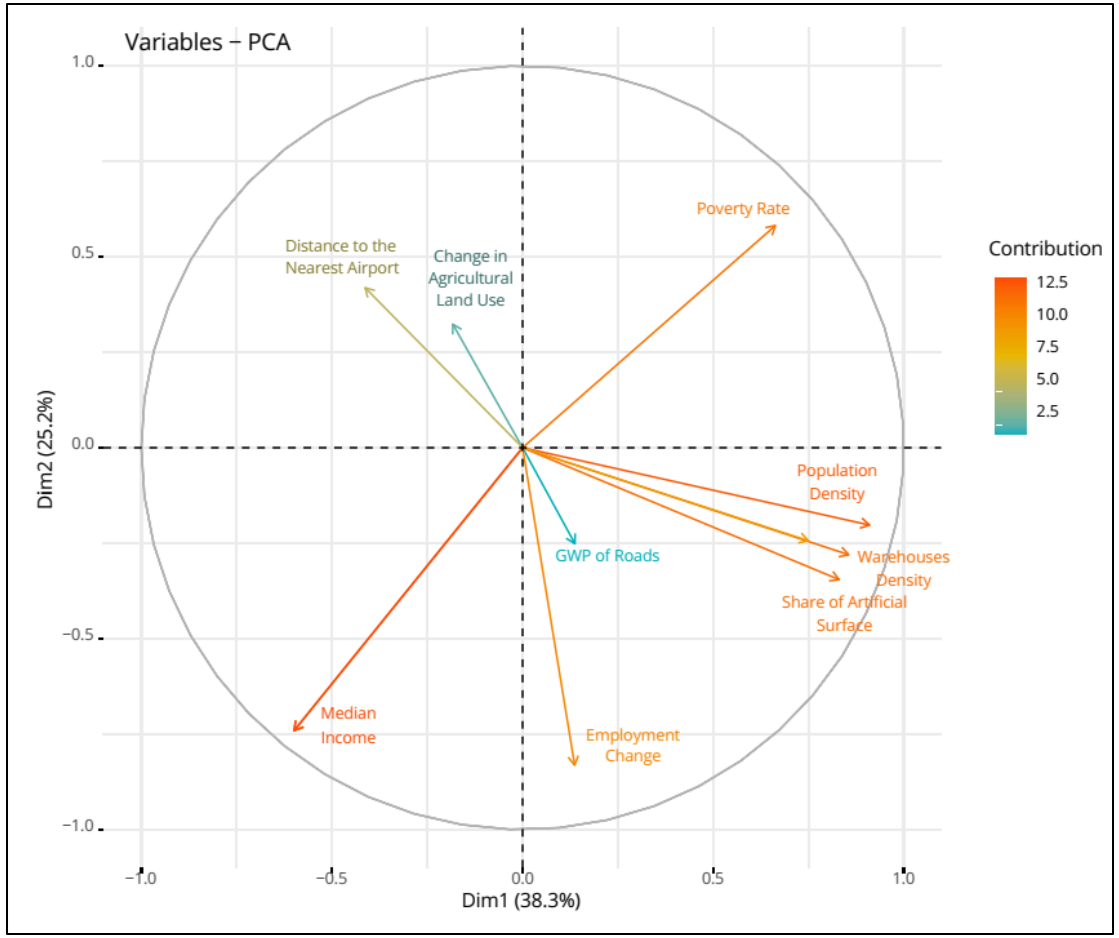


Spatial Distribution of E-commerce Warehouses

Statistical Insights - Principal Component Analysis (PCA)

3. Transportation and Accessibility:

- PCA results indicate a **strong correlation** between warehouse locations and proximity to major transportation infrastructure, highways, and logistics hubs.
- This highlights the importance of transport connectivity for operational efficiency,

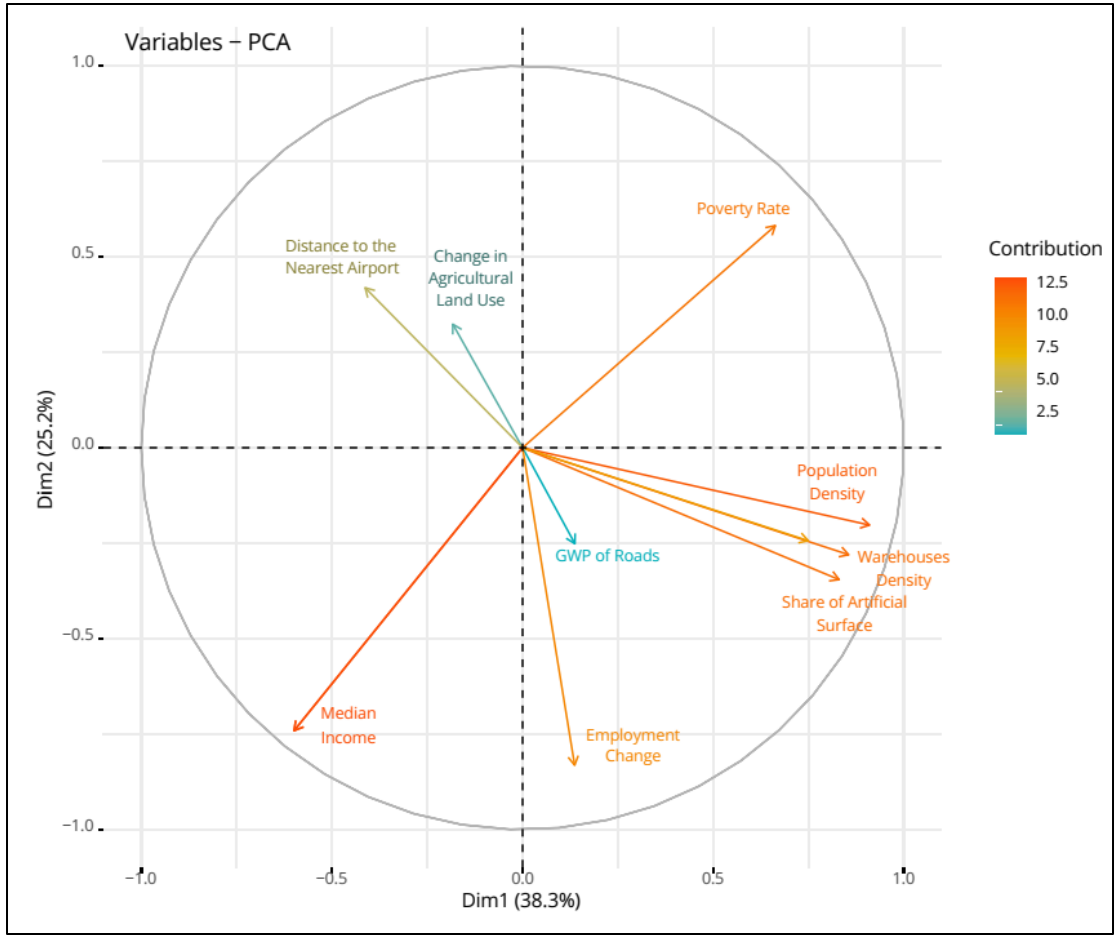


Spatial Distribution of E-commerce Warehouses

Statistical Insights - Principal Component Analysis (PCA)

4. Environmental and Social Equity Concerns:

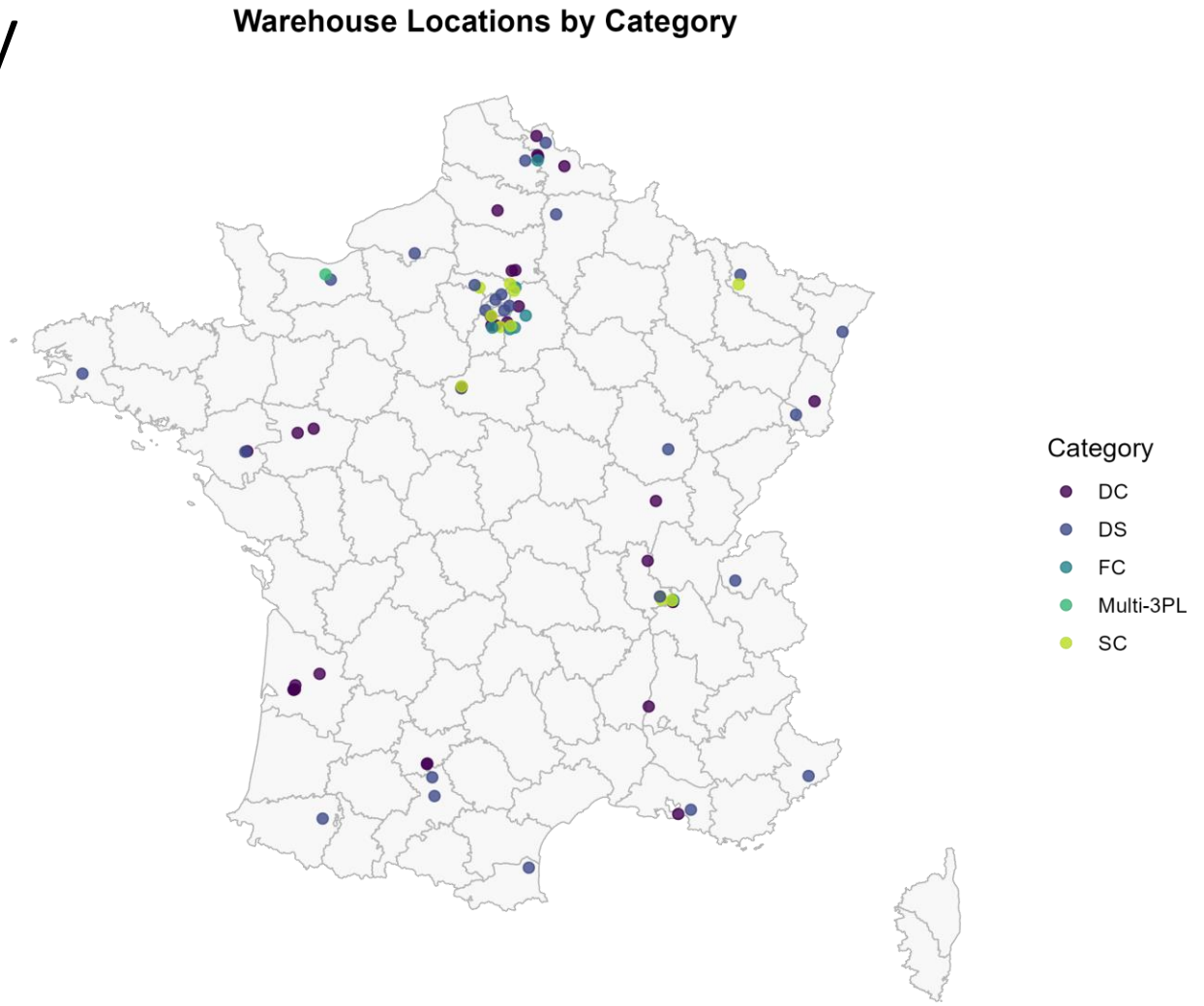
- PCA results reflects **inverse relationship** with high-income residential areas and **positive correlation** with environmentally vulnerable regions.
- It also suggests **socioeconomic** and **environmental equity** challenges linked to e-commerce warehouse location decisions



E-commerce WH Inventory

Warehouse Inventory Update (June 2025)

- 77 Top e-commerce facilities identified (based on 2024 FEVAD ranking)
- Data manually collected and cross-checked with multiple sources, including SIRENE
- Includes both hyper and e-commerce-specific sites
- Facility categories assigned using available reports and online information

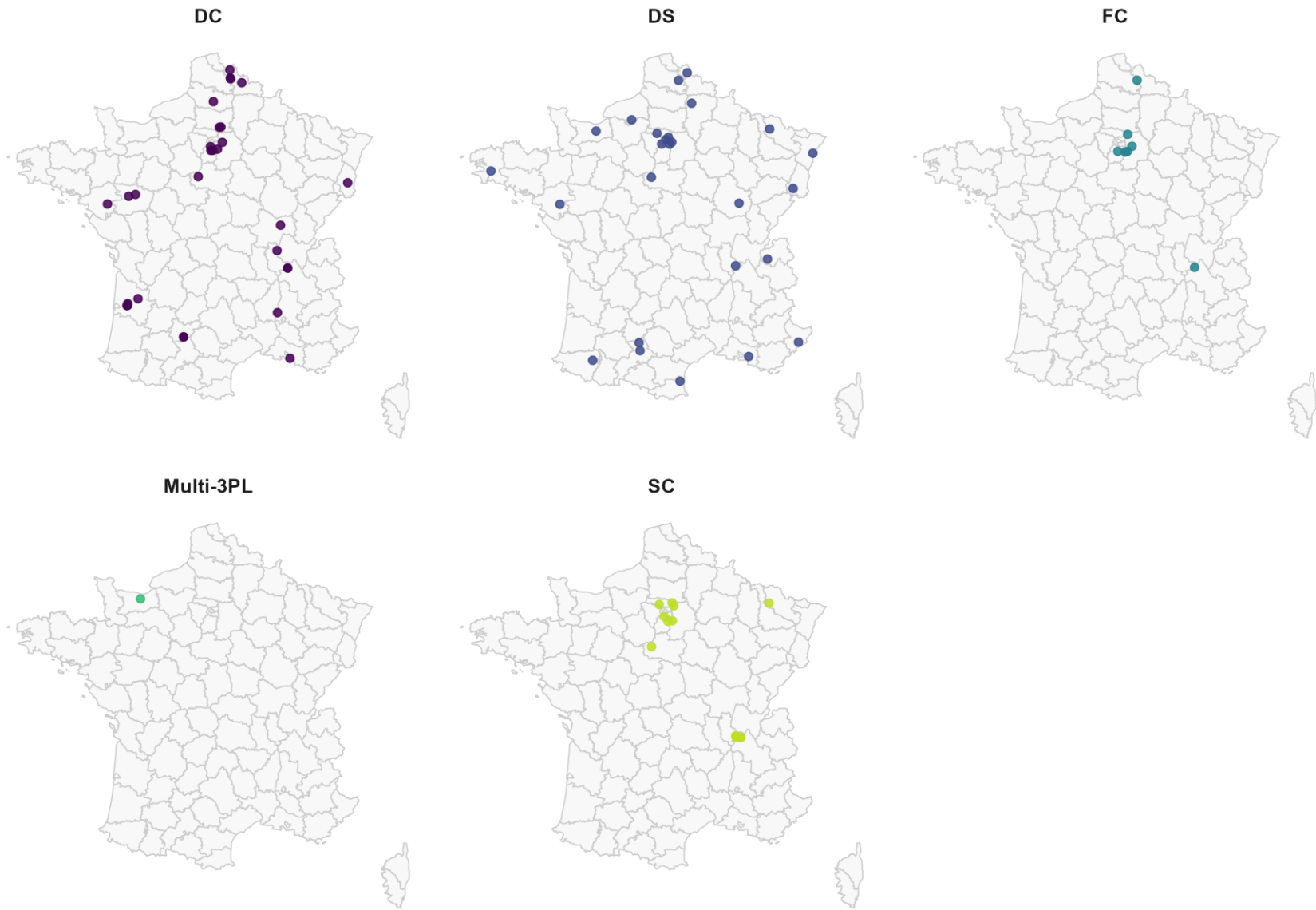


Source: Logistics City Chair – LVMT (2025)

https://rpubs.com/mohammedyounes/ecommerceJUNE25

Warehouse Locations – Faceted by Category

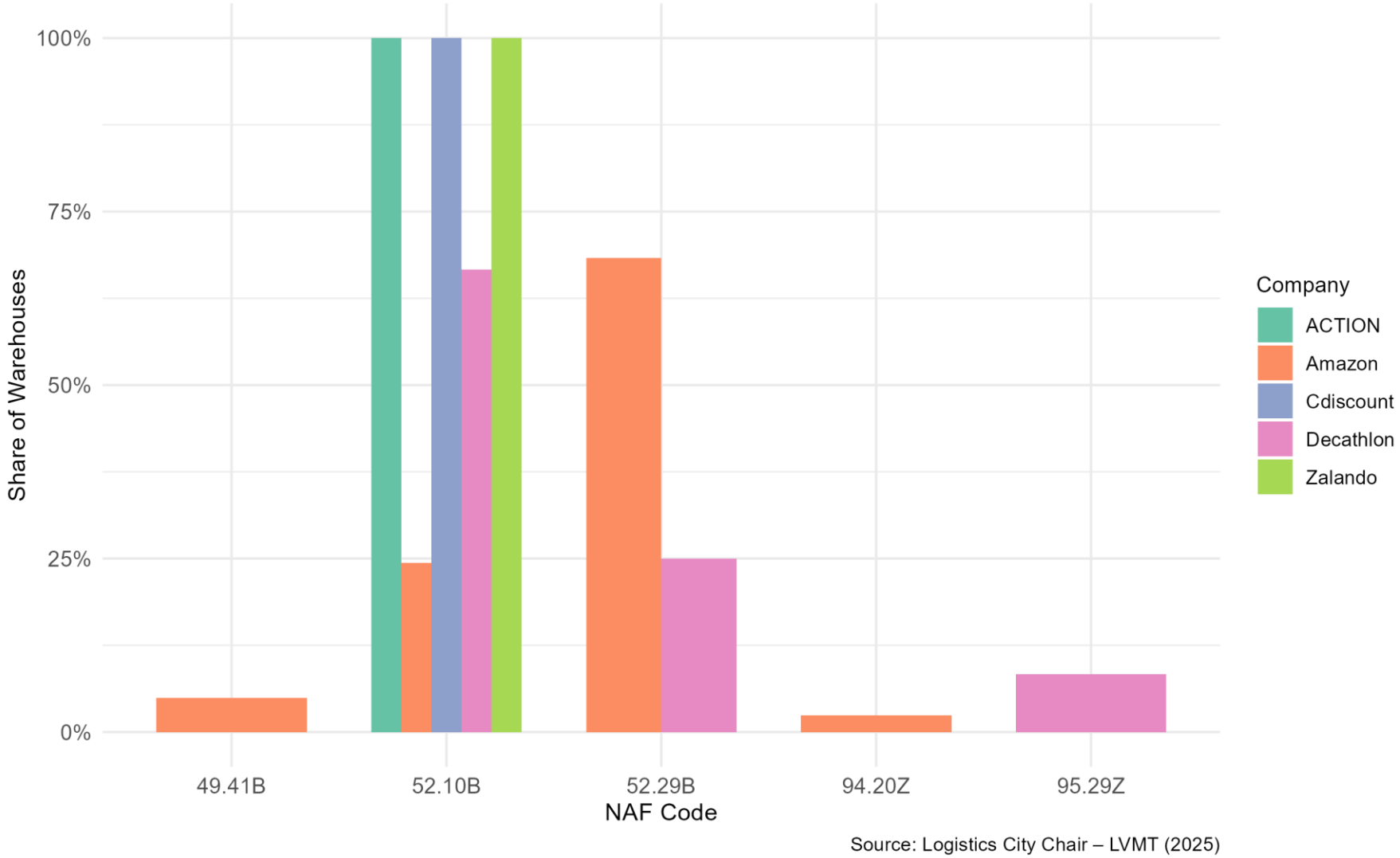
Spatial footprint per category



Source: Logistics City Chair – LVMT (2025)

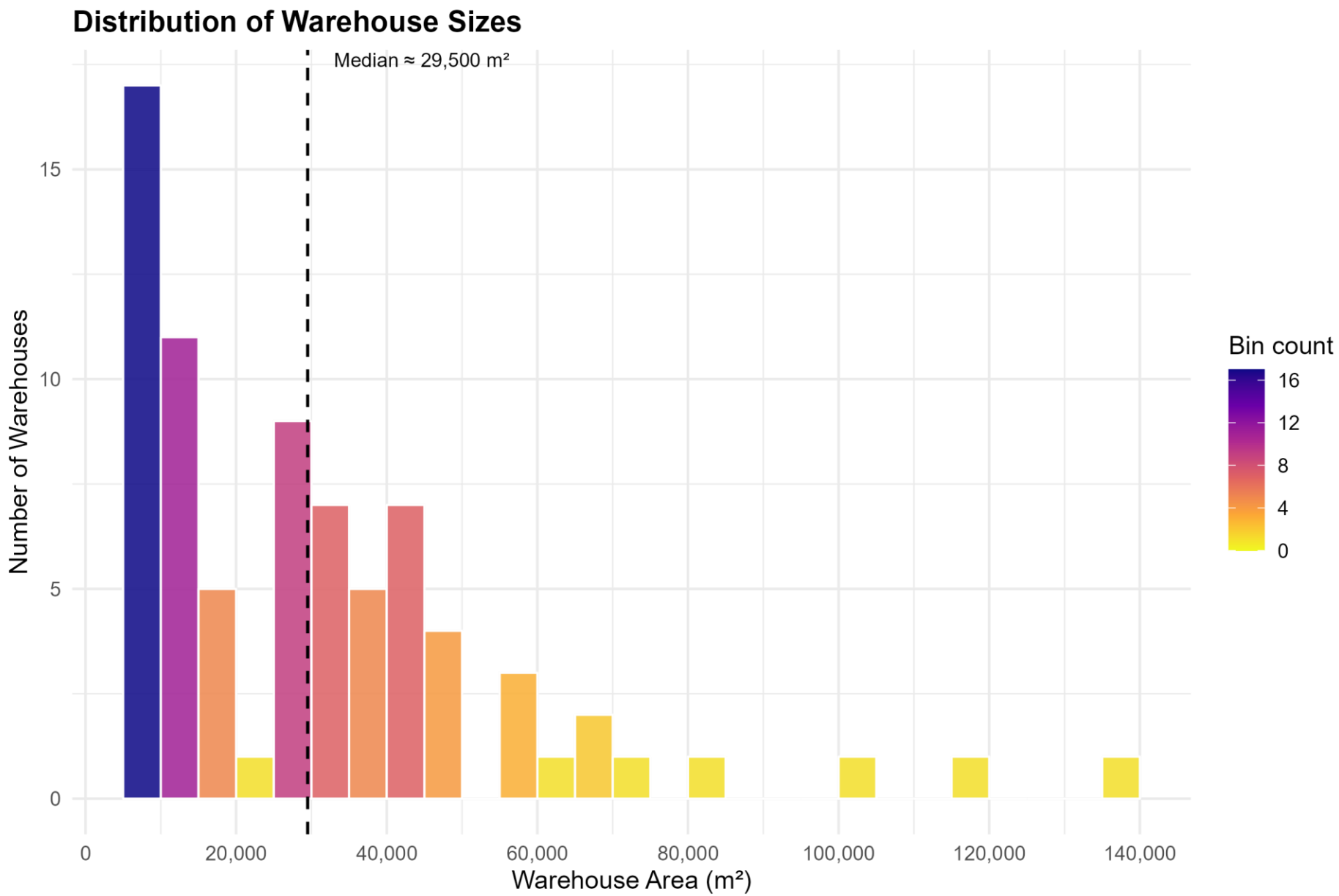
NAF Code Usage among Top-5 Companies

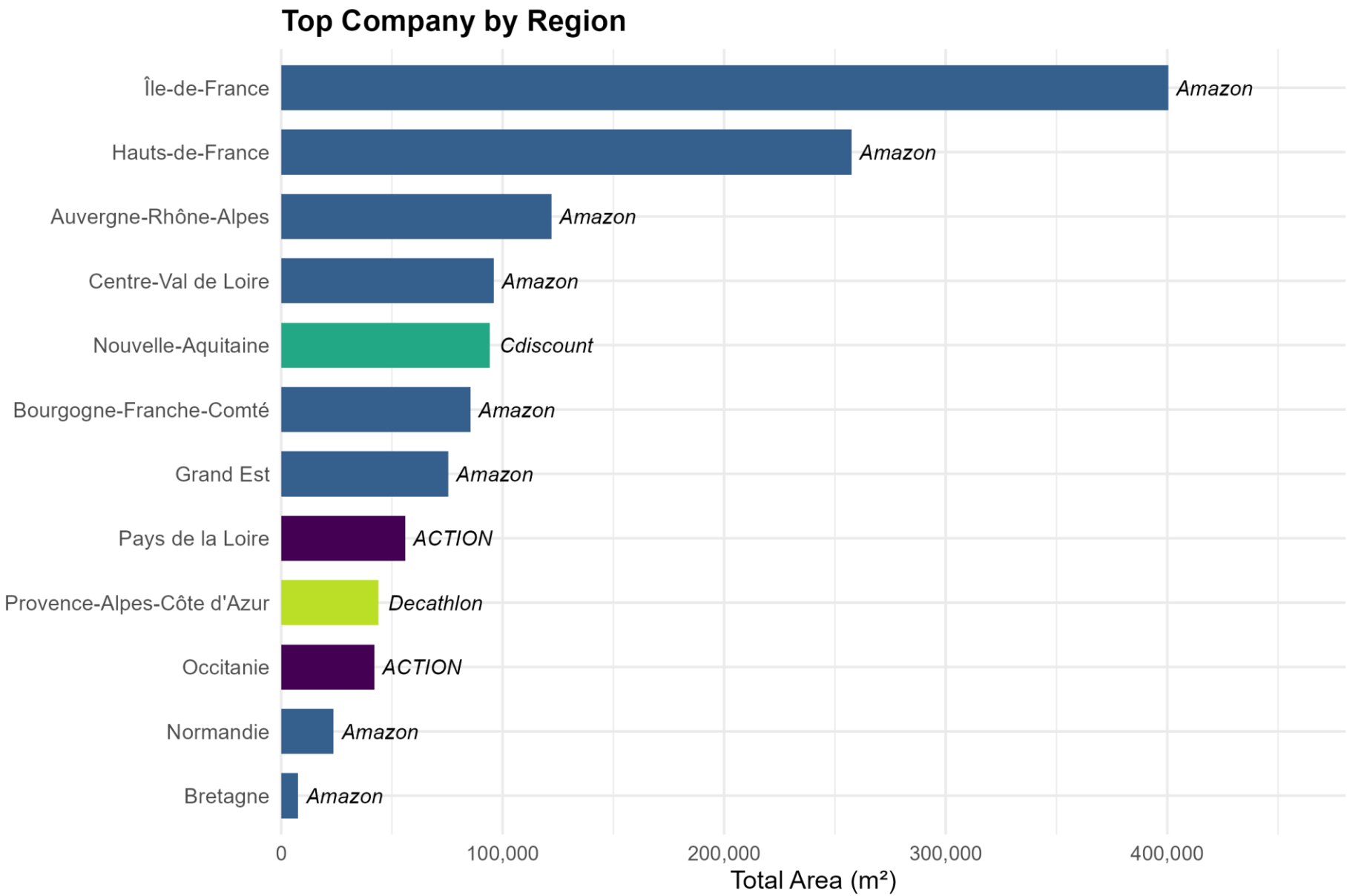
Distribution of activity codes by warehouse count share

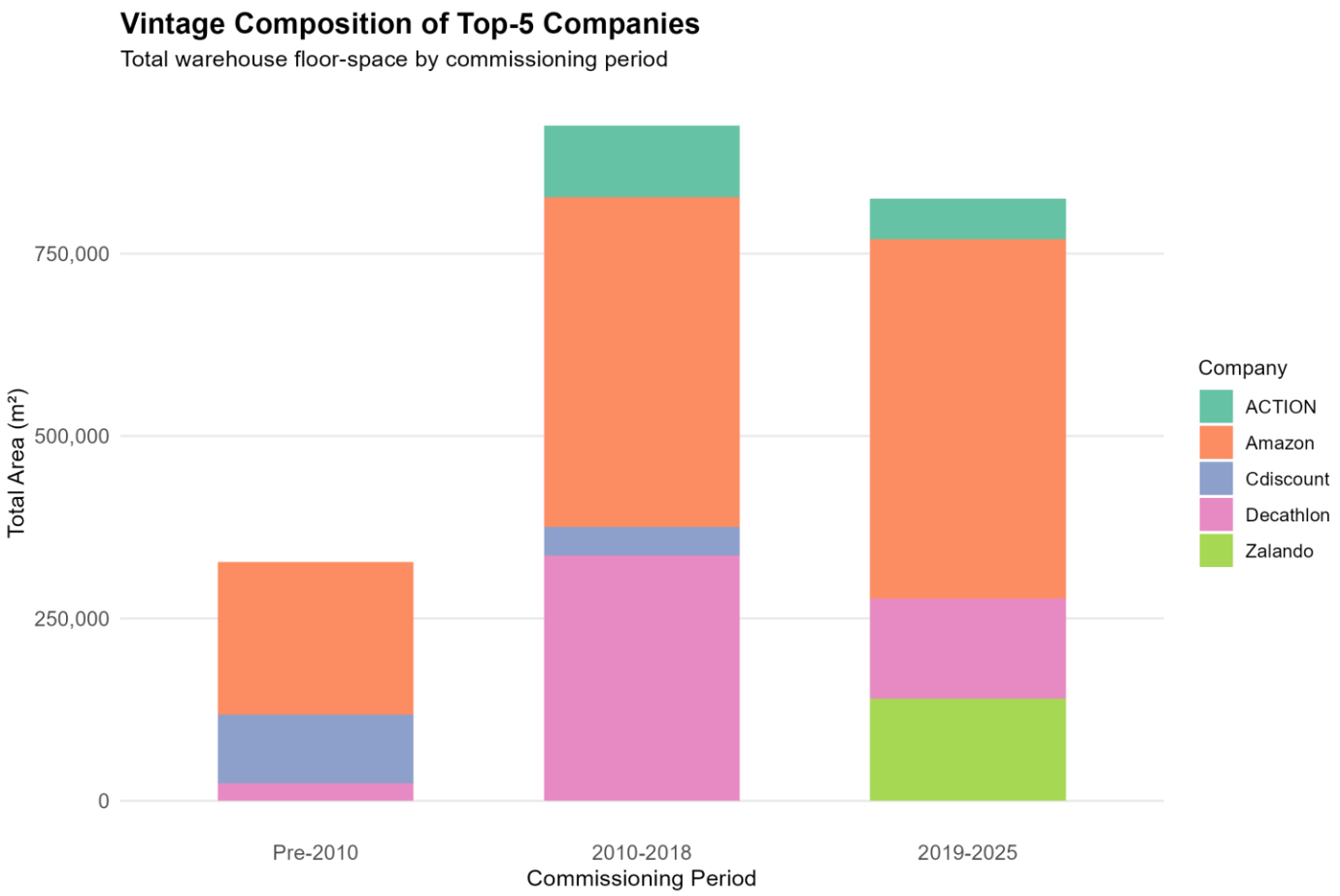


Source: Logistics City Chair – LVMT (2025)

NAF Code	# WH	Share
52.29B	35	49%
52.10B	32	44%
46.17A	2	3%
49.41B	2	3%
51.10B	1	1%


Distribution of Warehouse Sizes
Median ≈ 29,500 m²
Number of Warehouses
0
5
10
15
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Warehouse Area (m²)
Bin count
16
12
8
4
0


Top Company by Region
Île-de-France
Hauts-de-France
Auvergne-Rhône-Alpes
Centre-Val de Loire
Nouvelle-Aquitaine
Bourgogne-Franche-Comté
Grand Est
Pays de la Loire
Provence-Alpes-Côte d'Azur
Occitanie
Normandie
Bretagne
Amazon
Amazon
Amazon
Amazon
Cdiscount
Amazon
Amazon
ACTION
Decathlon
ACTION
Amazon
Amazon
0
100,000
200,000
300,000
400,000
Total Area (m²)



Company	Commissioning Period	Total Area (m²)	Share of Area
ACTION	2010-2018	98,000	64%
ACTION	2019-2025	56,000	36%
Alibaba	2019-2025	60,050	100%
Amazon	Pre-2010	209,100	18%
Amazon	2010-2018	451,650	39%
Amazon	2019-2025	492,500	43%
Cdiscount	Pre-2010	94,300	71%
Cdiscount	2010-2018	39,000	29%
Decathlon	Pre-2010	24,000	5%
Decathlon	2010-2018	336,500	68%
Decathlon	2019-2025	137,000	28%
E.Leclerc	2010-2018	65,600	100%
FNAC	Pre-2010	96,000	100%
Leroy Merlin	Pre-2010	41,000	46%
Leroy Merlin	2010-2018	47,500	54%
Lidl	2010-2018	33,400	100%
Supplyweb Mondeville	2019-2025	13,500	100%
Vinted	2019-2025	6,400	100%
Zalando	2019-2025	140,000	100%

Salon SIMI 2024

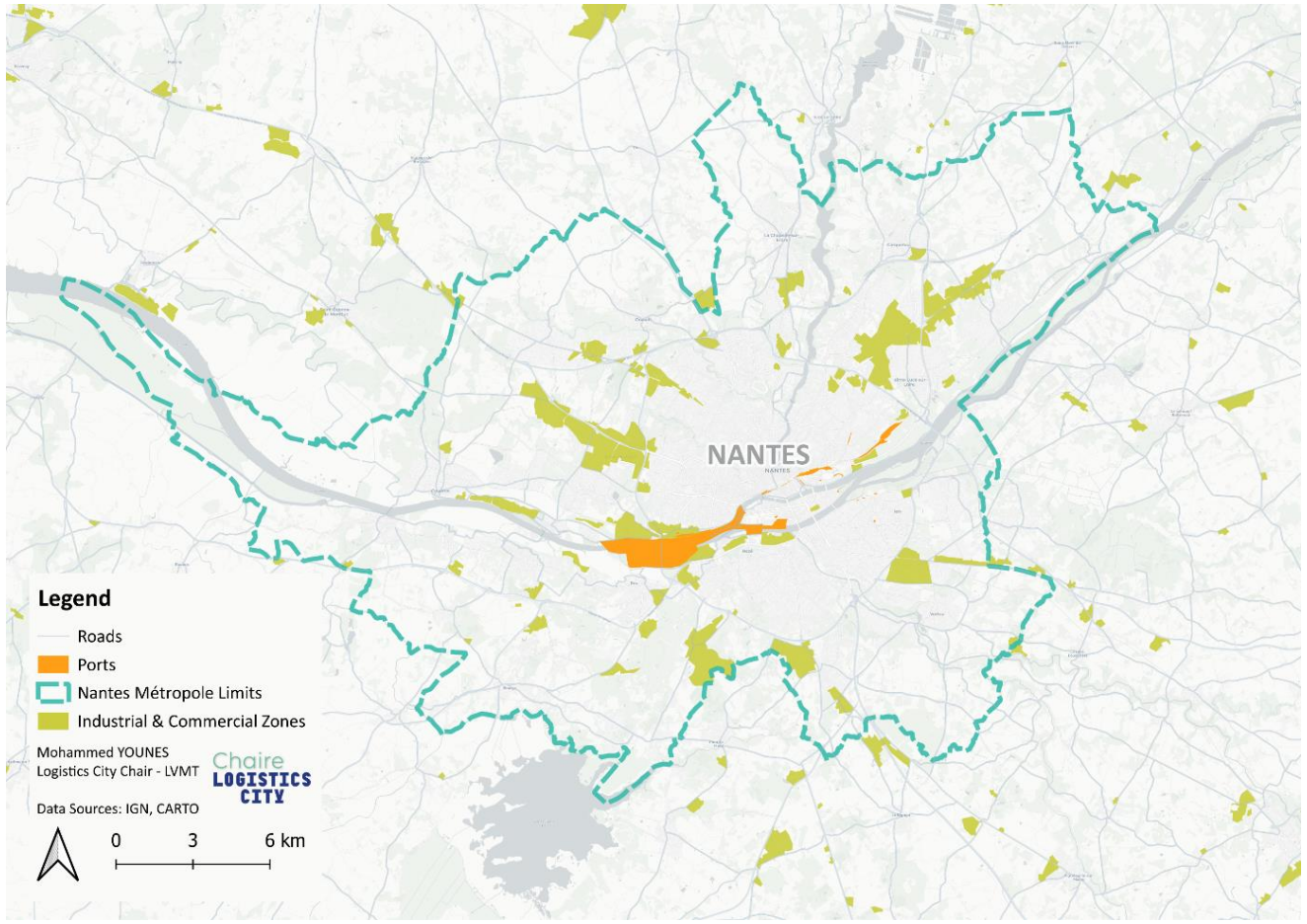
Overall insights

- **Brownfield first**: Redevelop unused sites to save land and speed approvals.
- **Rail & waterways**: Reduce urban truck traffic by prioritizing multimodal logistics.
- **Governance varies**: Structured planning (Toulouse) contrasts with ad-hoc approvals (Reims, Moselle), impacting investment.
- **Border-wage issue**: Moselle guides projects inland to counter Luxembourg wage pull and boost local jobs.
- **Vertical warehousing rising**: Multi-storey logistics buildings gain traction to optimize land use.
- **Innovation hubs**: Toulouse shifts from traditional warehouses to hubs focused on clean mobility, hydrogen, and aerospace.

Salon SIMI 2024

Nantes Métropole

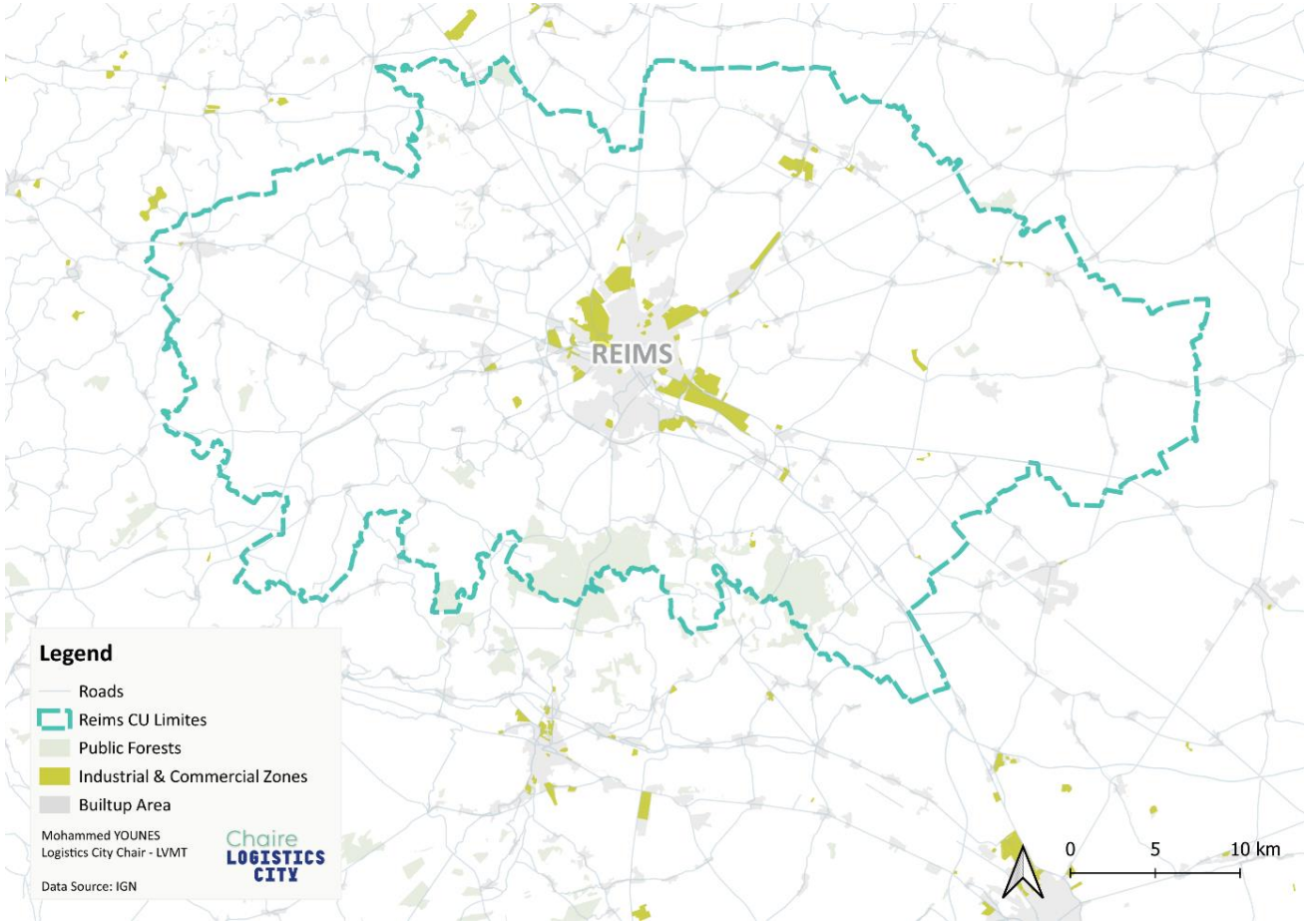
Aspect	Details
Policy stance	Encourages last-mile depots; accepts warehouses near residential zones
Spatial focus	Near waterways & rail; close to city centre
Constraints/drivers	Strict environmental standards



Salon SIMI 2024

Grand Reims CU

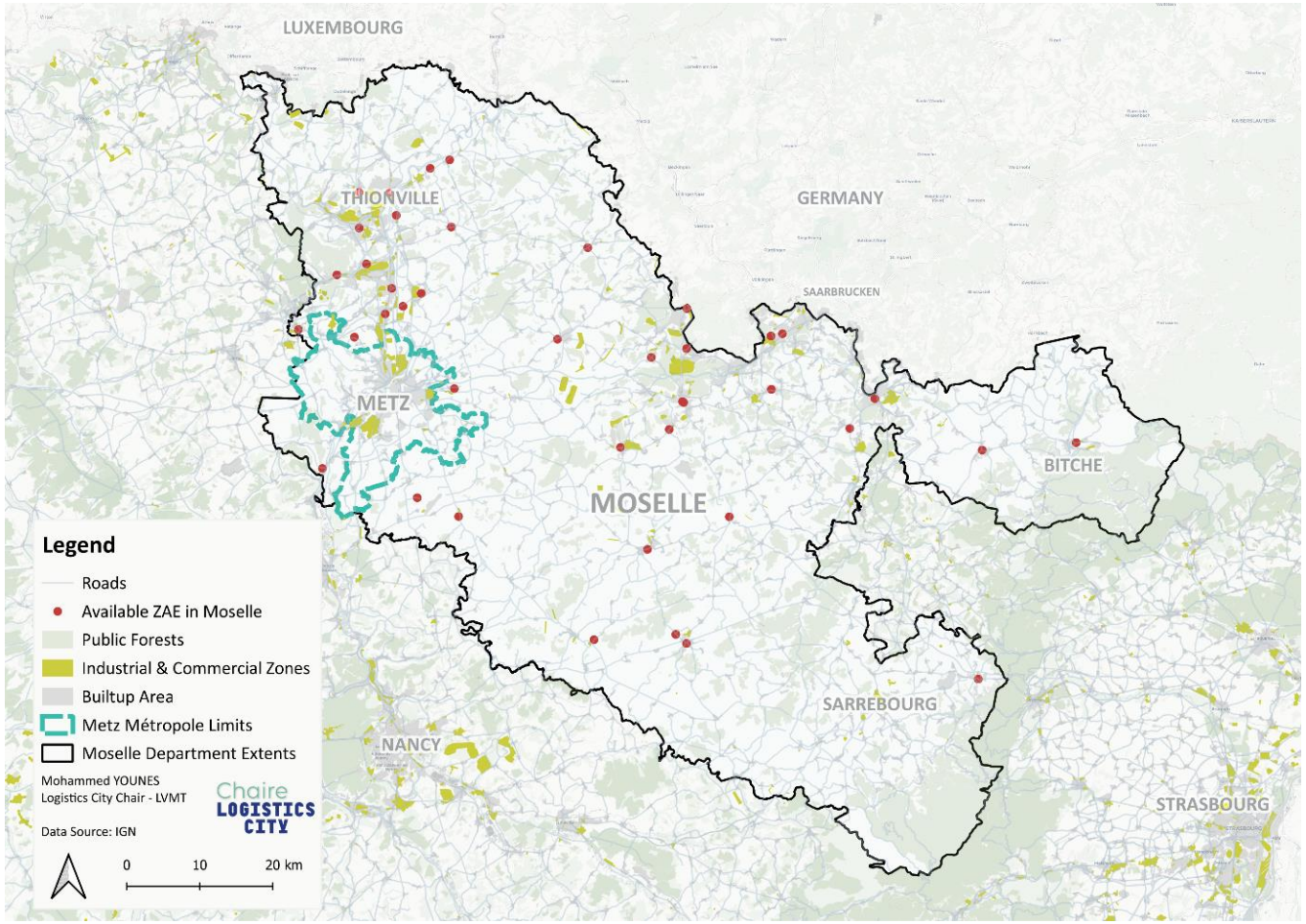
Aspect	Details
Policy stance	Discourages large logistics hubs; supports smaller sites for job creation
Spatial focus	No formal spatial strategy; case-by-case decisions
Constraints/drivers	Traffic congestion risks harming Champagne tourism



Salon SIMI 2024

Moselle département

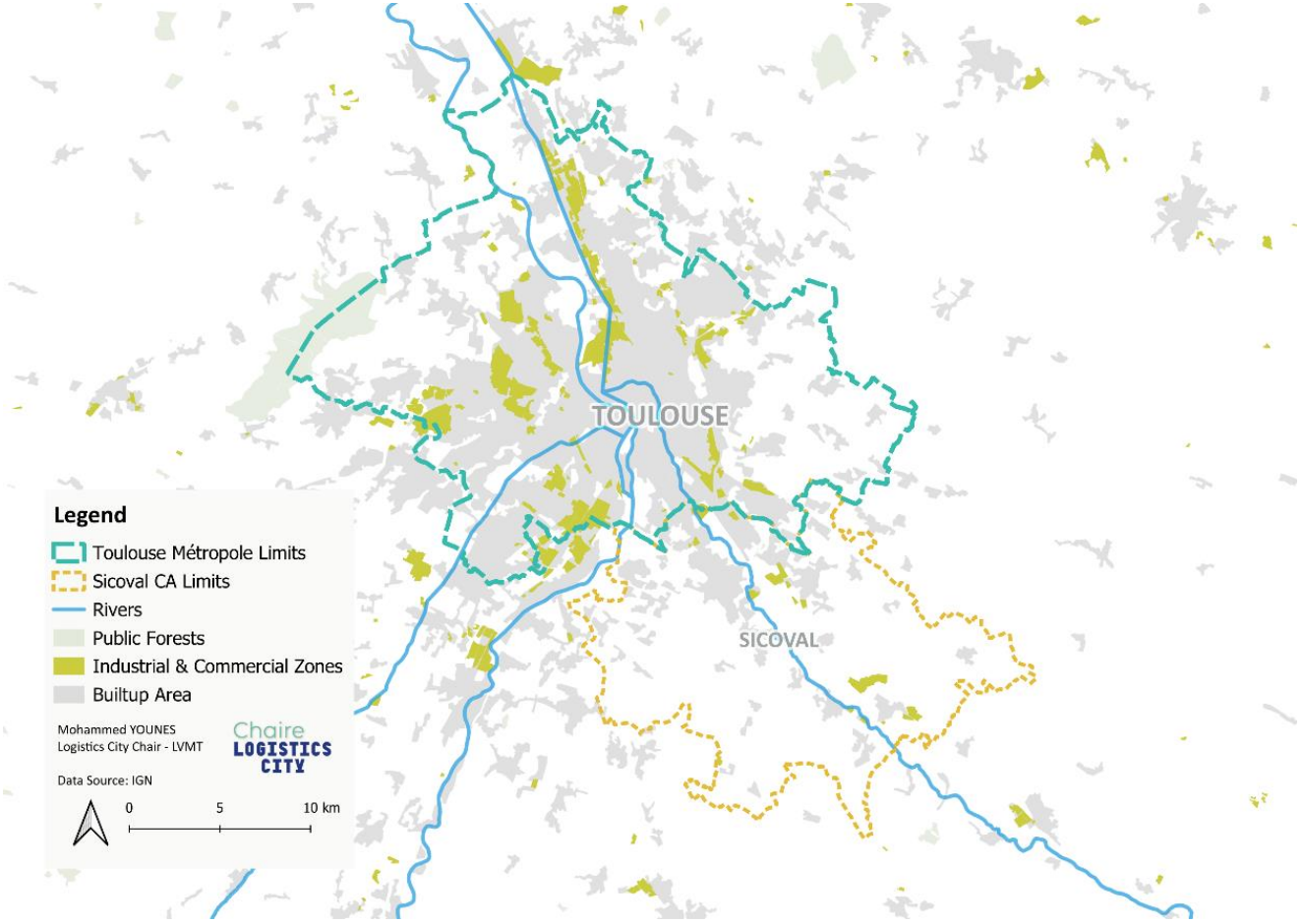
Aspect	Details
Policy stance	Selective; favours multi-storey logistics sites inland
Spatial focus	Parcels chosen via “Panorama” surveys; avoids Luxembourg border area
Constraints/drivers	Maximizing local employment; establishment of training school



Salon SIMI 2024

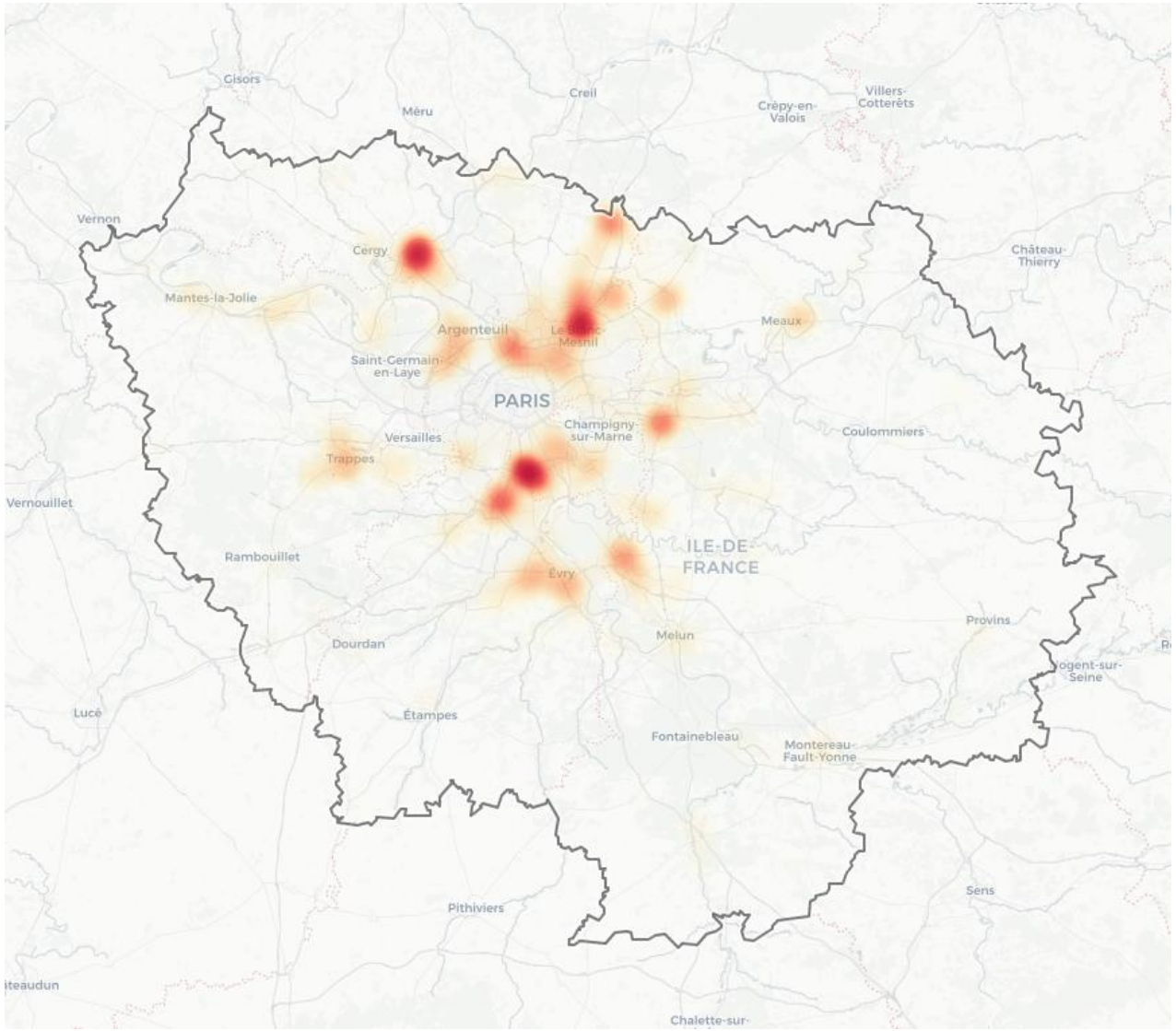
Toulouse Métropole + Sicoval CA

Aspect	Details
Policy stance	Shift from large-scale logistics to innovation and multimodality
Spatial focus	North-south logistics corridor; Francazal clean mobility hub
Constraints/drivers	Future DACCL integrated into SCoT framework



Warehousing Facilities Database

- Exploring different approaches for a public data-based warehouses data collection.
- Extracted all building outlines in Île-de-France from OpenStreetMap, filtered to industrial/commercial zones (IGN BD TOPO, CORINE Land Cover).
- Retained only structures >5,000 m², reducing candidates from 65,000 to ~3,430.
- Applied a multi-stage decision workflow using **semantic**, **geometric**, and **contextual data** to classify buildings as KEEP, REJECT, or REVIEW.
- Used brand names and land-use info; ambiguous cases flagged for manual review.
- Large Language Models (LLMs) supported brand identification, with results manually checked.
- 2,114 structures provisionally accepted; further refinement and validation ongoing.



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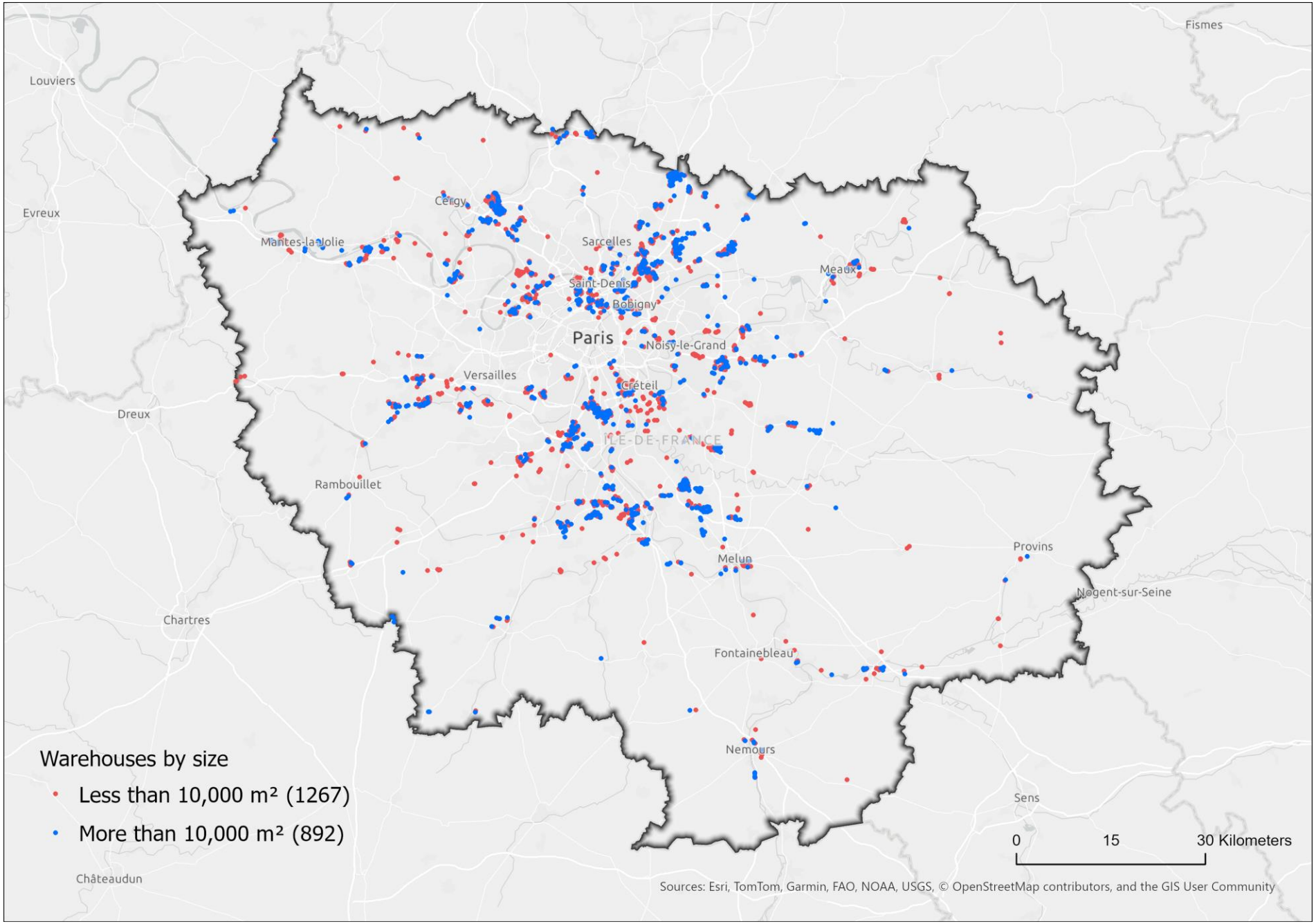
Fismes
Louviers
Evreux
Cergy
Mantes-la-Jolie
Sarcelles
Meaux
Saint-Denis
Bobigny
Paris
Noisy-le-Grand
Versailles
Créteil
Dreux
ÎLE-DE-FRANCE
Rambouillet
Provins
Melun
Nogent-sur-Seine
Chartres
Fontainebleau
Nemours
Sens
Châteaudun
Warehouses by size
Less than 10,000 m² (1267)
More than 10,000 m² (892)
0
15
30 Kilometers
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

PhD Proposal: Smart City Logistics Public Data Governance

- Gap: French cities lack dedicated data governance frameworks for urban freight, limiting effective logistics planning.
- Goal: Develop and validate a data governance framework for urban freight in European cities (starting with Paris and Lyon).
- Approach: Standardize, curate, and securely share urban logistics data across stakeholders.
- Method: Iterative design, public data mapping, dashboard development, and stakeholder validation.
- Impact: Supports sustainable logistics, provides open-source tools, and guides city policy on digital transition.