Factors of e-commerce warehouse location in France

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Research objectives

E-commerce warehouse location

Identify the location of e-commerce warehouses in France

Socioeconomic analysis

Understand location determinants including socioeconomic factors

Identify potential negative externalities of e-commerce warehouses

- This presentation comes from a Master's thesis in Urban Engineering and Habitat conducted within the Logistics City Chair/University Gustave Eiffel and University of Lille completed in September 2024 by Mohammed Younes
- Available (in English) from: https://www.lvmt.fr/wp-content/uploads/2025/01/Final_Thesis_Mohammed_YOUNES_LVMT_depose.pdf

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Theoretical Framework

Logistics sprawl

From city centers to outskirts

Urban growth in suburban areas

Externalities

Traffic and congestion

Spatial inequalities

E-commerce

Key role in local employment

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Method

Recent research uses methods like spatial econometrics and Participatory GIS to improve warehouse analysis

- **Spatial Unit of Analysis**: France functional areas called "areas of city attraction (AAV)" were selected for their strong representation of urban economic influence

- **Data integration**: Combined governmental public databases (SIRENE, SITADEL), OpenStreetMap (OSM) and socioeconomic data from INSEE*

- **Analytical techniques**: Applied statistical methods including Multiple Linear Regression (MLR) and Principal Component Analysis (PCA) to assess socioeconomic and spatial determinants of e-commerce warehouse locations

*INSEE: The French National Institute of Statistics and Economic Studies

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Spatial distribution of e-commerce warehouses

Figure 1. The distribution of e-commerce warehouses in France, M. Younes, 2024

- Identification of **130 facilities**

- Strong concentration around major metropolitan areas, especially (1) in the Paris region and (2) in northern France, with a strong history of mail-order retail, and deindustrialization

- Within urban regions, warehouses tend to locate in peripheral areas

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Socioeconomic factors influencing e-commerce warehouse location

- In terms of economic profiles, e-commerce warehouses are predominantly located in regions characterized by **manufacturing (past or present), lower income levels and higher unemployment rates**

- Regarding urbanization and infrastructure, there is a **significant positive correlation with dense transportation networks, road accessibility, and urban sprawl**

- Key factors such as land availability and cost drive e-commerce warehouses **towards suburban regions**

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Statistical insights – Regression Analysis Results

Positive influences

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

Negative influences

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

E-commerce warehouses appear strategically positioned for **operational efficiency and economic feasibility rather than for socioeconomic equity**

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Statistical insights - Principal Component Analysis (PCA)

Principal Component Analysis showed four significant components explaining e-commerce warehouse location variability:

1. **Urban and economic density**

2. **Industrial land use and employment**

3. **Transportation and accessibility**

4. **Socioeconomic characteristics**

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Figure 2. The clustering of the variables by Principal Component
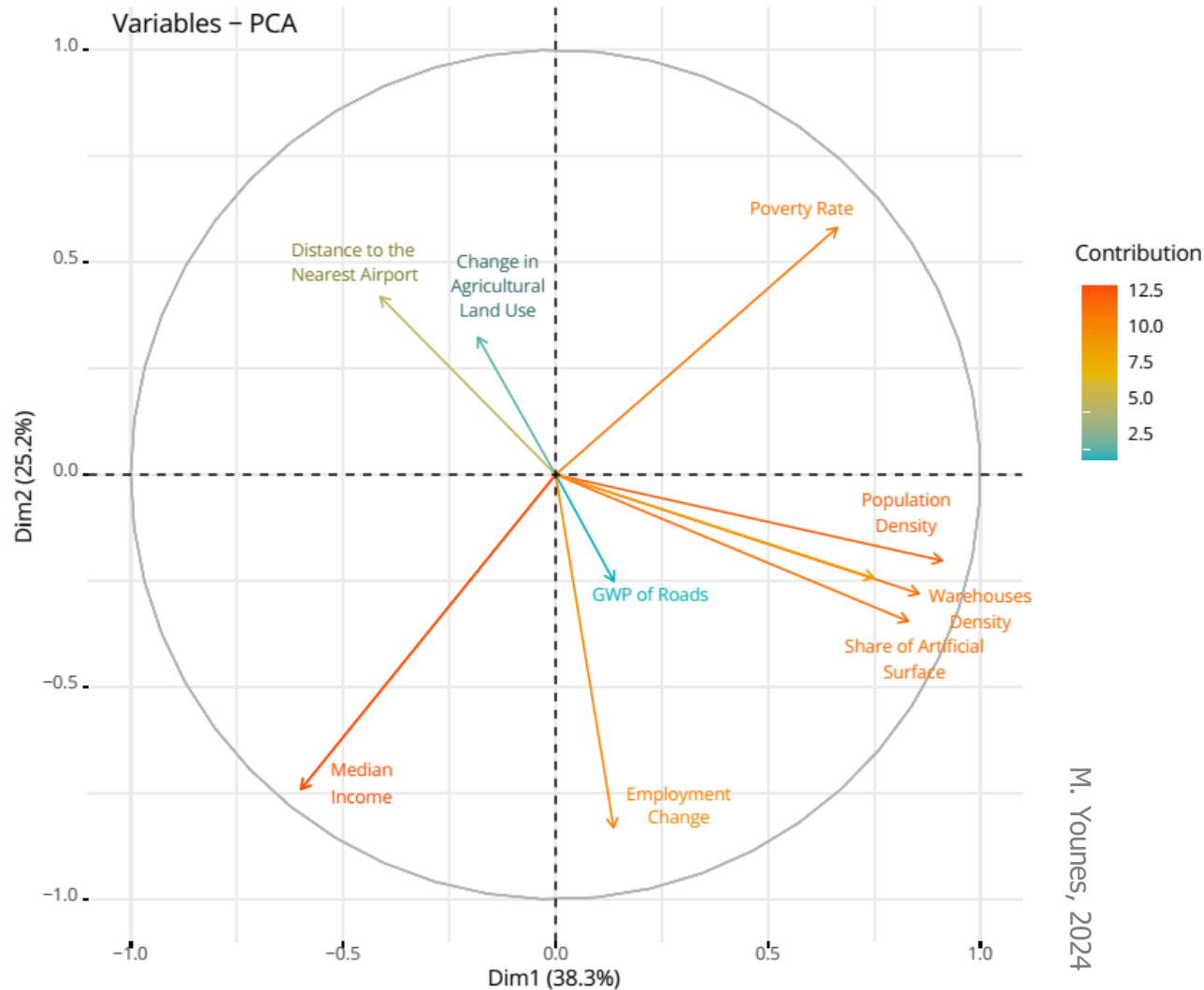
1. Urban and economic density

- **High influence** of urban population density, economic activity levels, and commercial real estate values

- This reflects a **strong attraction** of warehouses to economically vibrant, densely populated areas

M. Younes, 2024

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Figure 2. The clustering of the variables by Principal Component
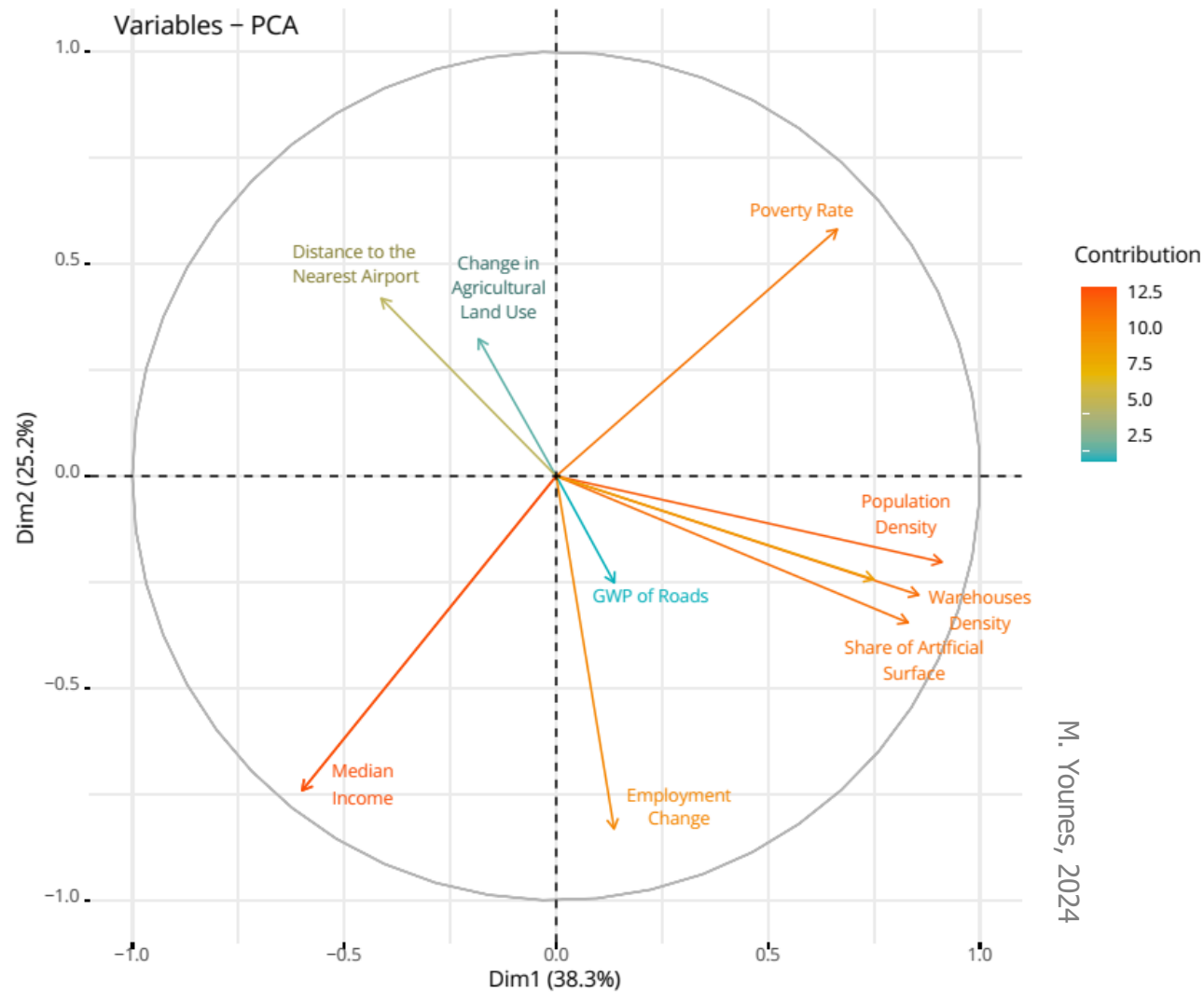
2. Industrial land use and employment

- 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

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Figure 2. The clustering of the variables by Principal Component
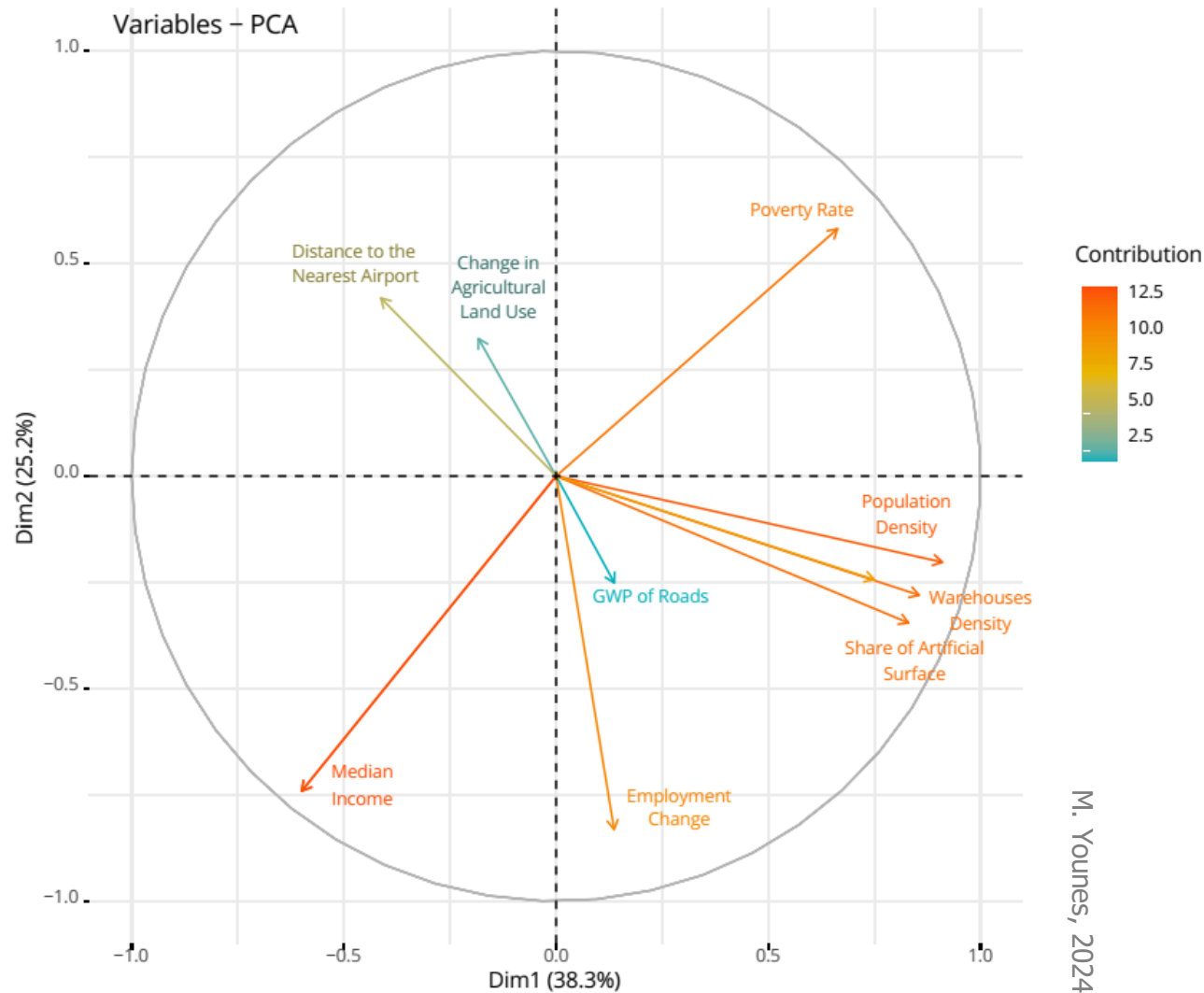
3. Transportation and accessibility

- 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

M. Younes, 2024

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Figure 2. The clustering of the variables by Principal Component

M. Younes, 2024
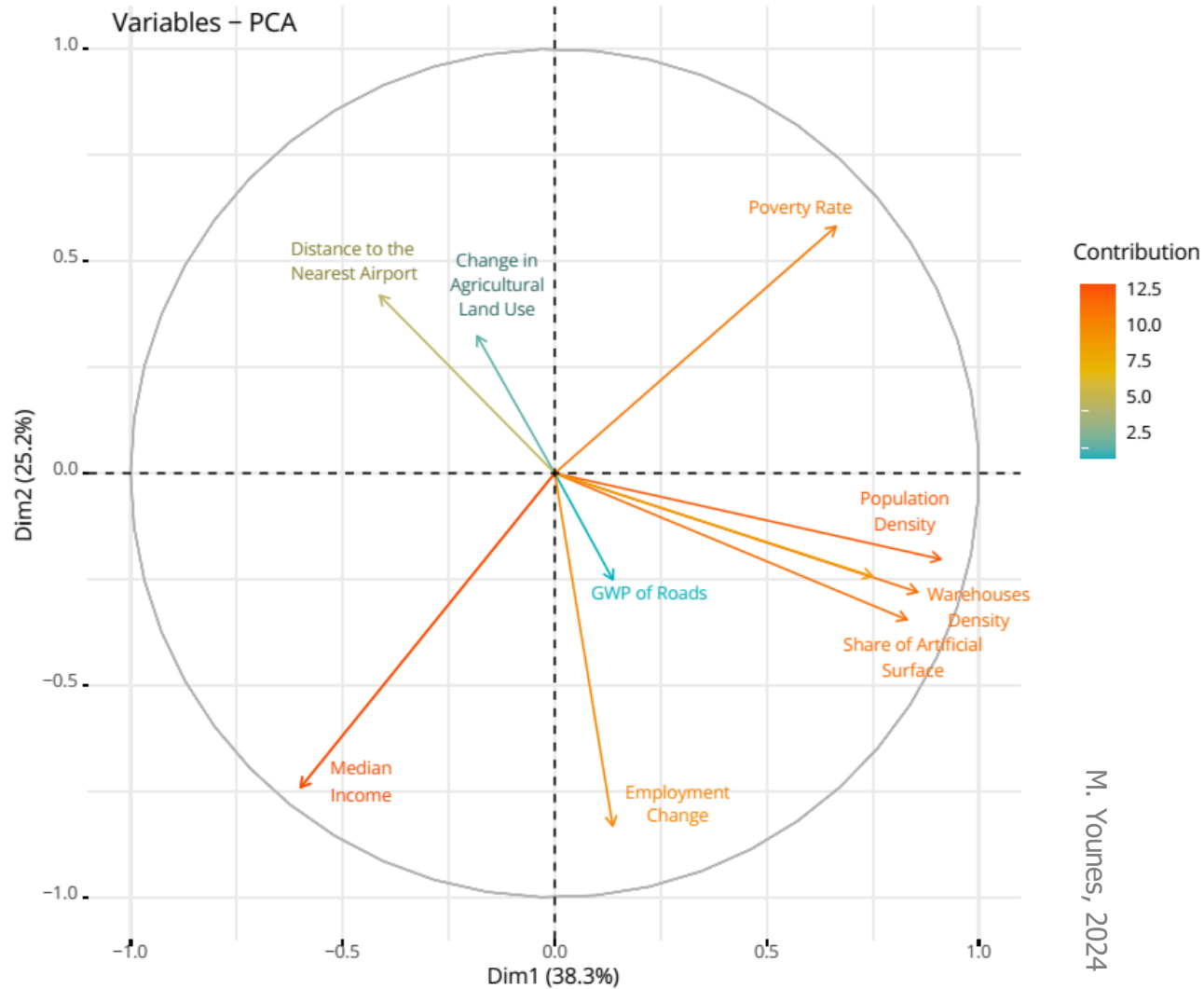
4. Socioeconomic characteristics

- **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

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Summary: main factors

The first two principal components explain 63.5% of the variance, indicating that warehouse distribution **is mainly driven by urban/economic density (PC1 - 38.3%) and industrial infrastructure-employment (PC2 - 25.2%)**

The first component reflects warehouse concentration in dense, economically active areas, while the second shows tendency to locate in regions with industrial infrastructure, available labor, and lower land costs
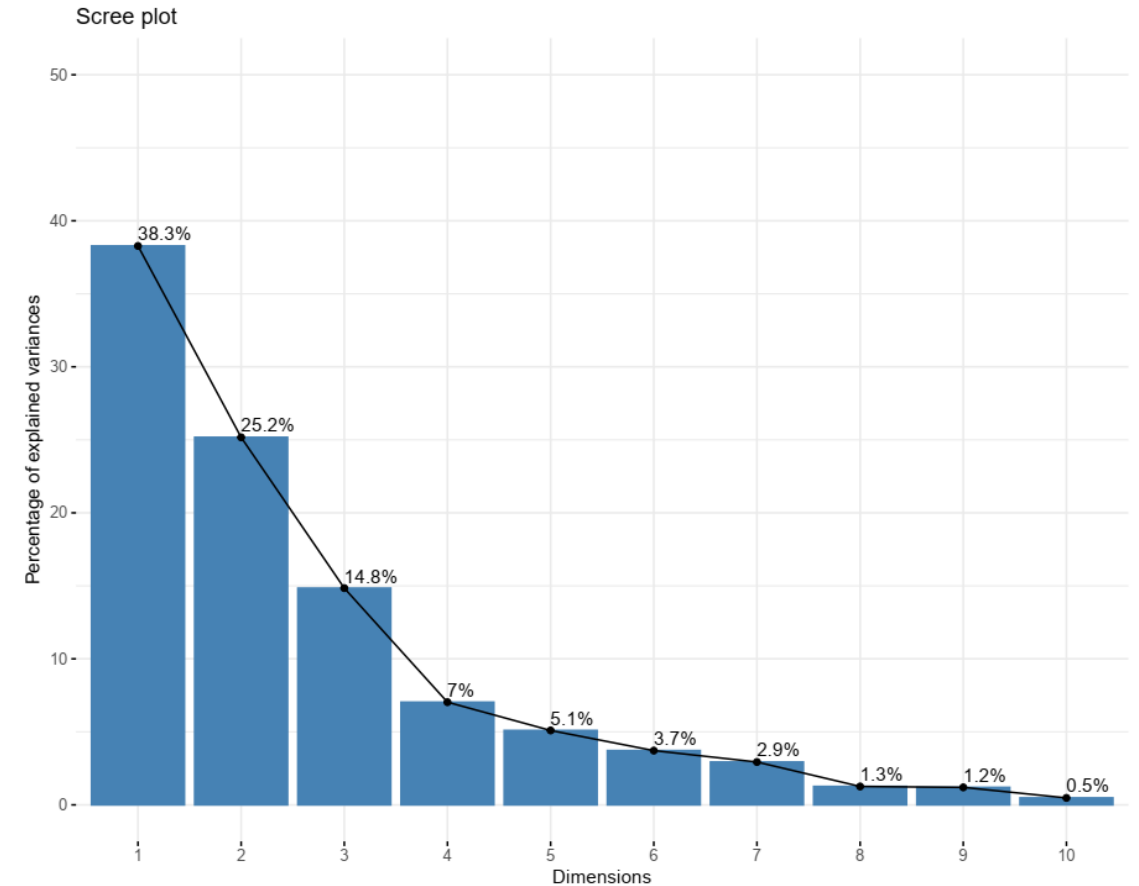

Figure 3. Screen plot illustrating the main factors shaping warehouse distribution patterns, M. Younes, 2024

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Conclusion

- Strategic position of warehouses in relation to economic activity, industrial heritage, transportation accessibility, and low income areas

- Significant positive correlations between warehouse locations and urban density and transport infrastructure (both in the MLR and PCA analysis)

- Warehouses predominantly cluster in suburban zones, influenced heavily by socioeconomic conditions such as regional industrial heritage and income levels

- Strategic location of e-commerce warehouses for operational efficiency and economic feasibility rather than socioeconomic equity

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