

The background of the slide is a complex network diagram. It consists of numerous small, light blue circular nodes scattered across the white background. These nodes are interconnected by a dense web of thin, light blue lines, creating a star-like or web-like pattern that fills the entire slide. The density of the connections is higher in the center and fades out towards the edges.

# **WAM – Residence, Work, Mobility**

## **Changing Dynamics and Development**

### **Options for the Munich Metropolitan Region**

**Closing Event 04.02.2016**

**Technical University of Munich**

Department of Architecture  
Chair of Urban Development  
Prof. Dr. Alain Thierstein

Department of Civil, Geo and Environmental Engineering  
Chair of Urban Structure and Transport Planning  
Prof. Dr.-Ing. Gebhard Wulforst

# **Andreas Kemmelmeier**

## First Mayor of Unterföhring

**District Administrator Christoph  
Göbel**  
District of Munich  
Vice Principle EMM e.V.

**Prof. Dr. Roland Pail**  
Dean, Department of Civil, Geo and  
Environmental Engineering  
TUM

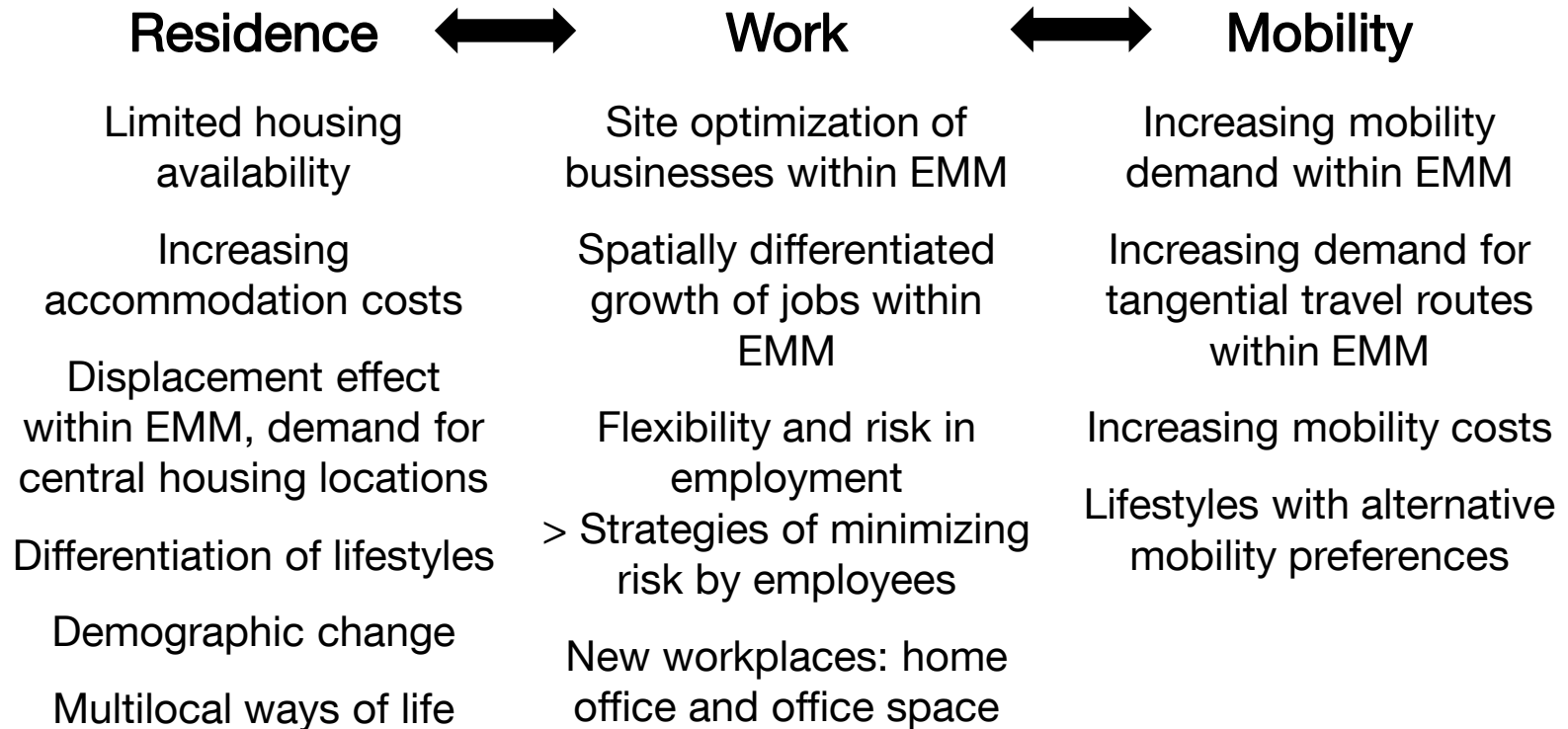


# WAM – Residence, Work, Mobility

## Changing Dynamics and Development Options for the Munich Metropolitan Region



# Trends in Urban Development: Increased Interdependency



# Objective of the Survey

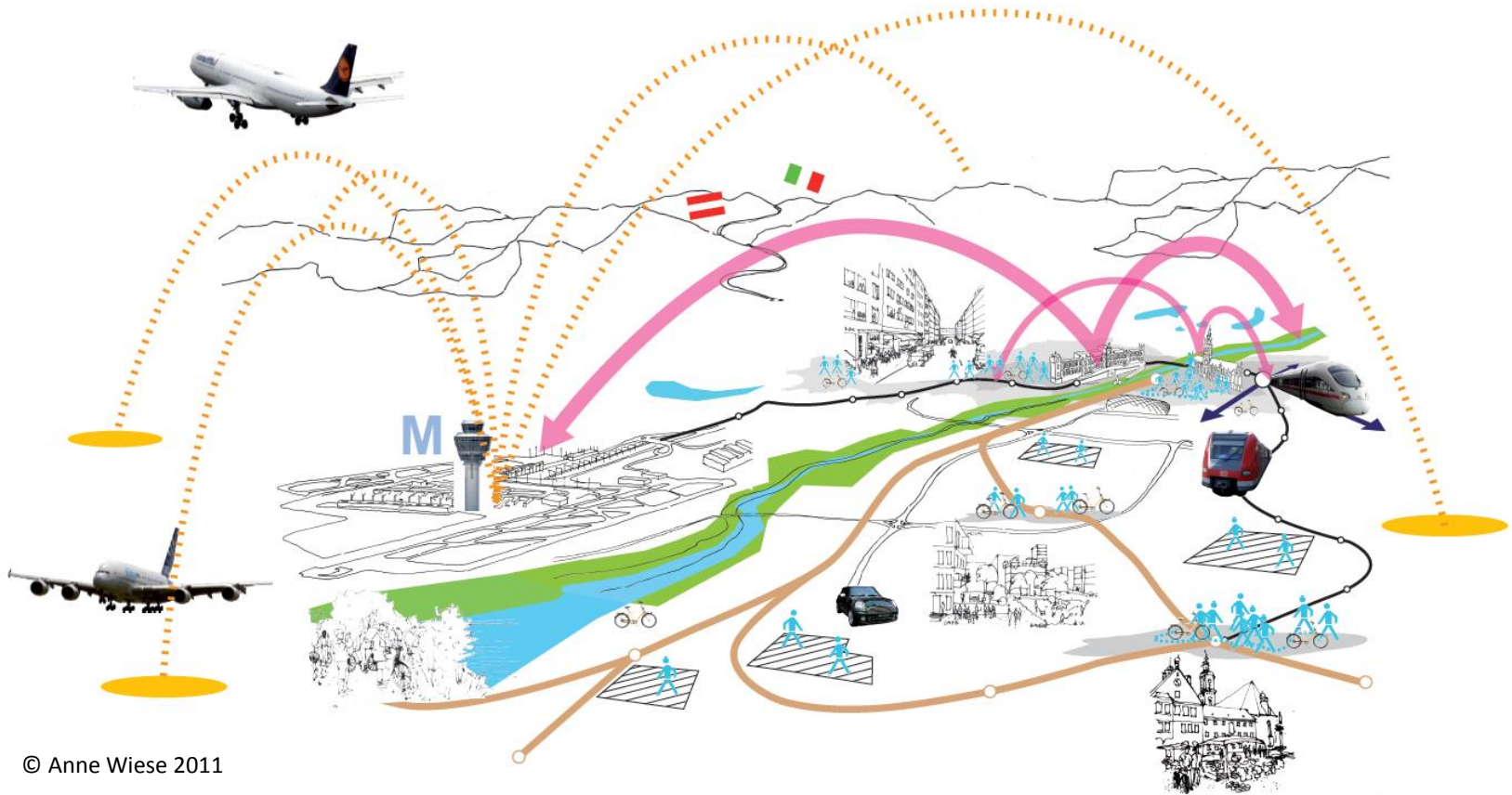
- Examination of the relation of residence and workplace location to mobility behavior
- Presentation of development options for the Munich Metropolitan Region
- Contribution to the discussion of strategic spatial development

# Hypotheses

Three tendencies in urban development:

- **Concentration** in central locations
- **De-concentration** in smaller centers
- **Dispersion** in peripheral areas

# The Metropolitan Region as an Urban System

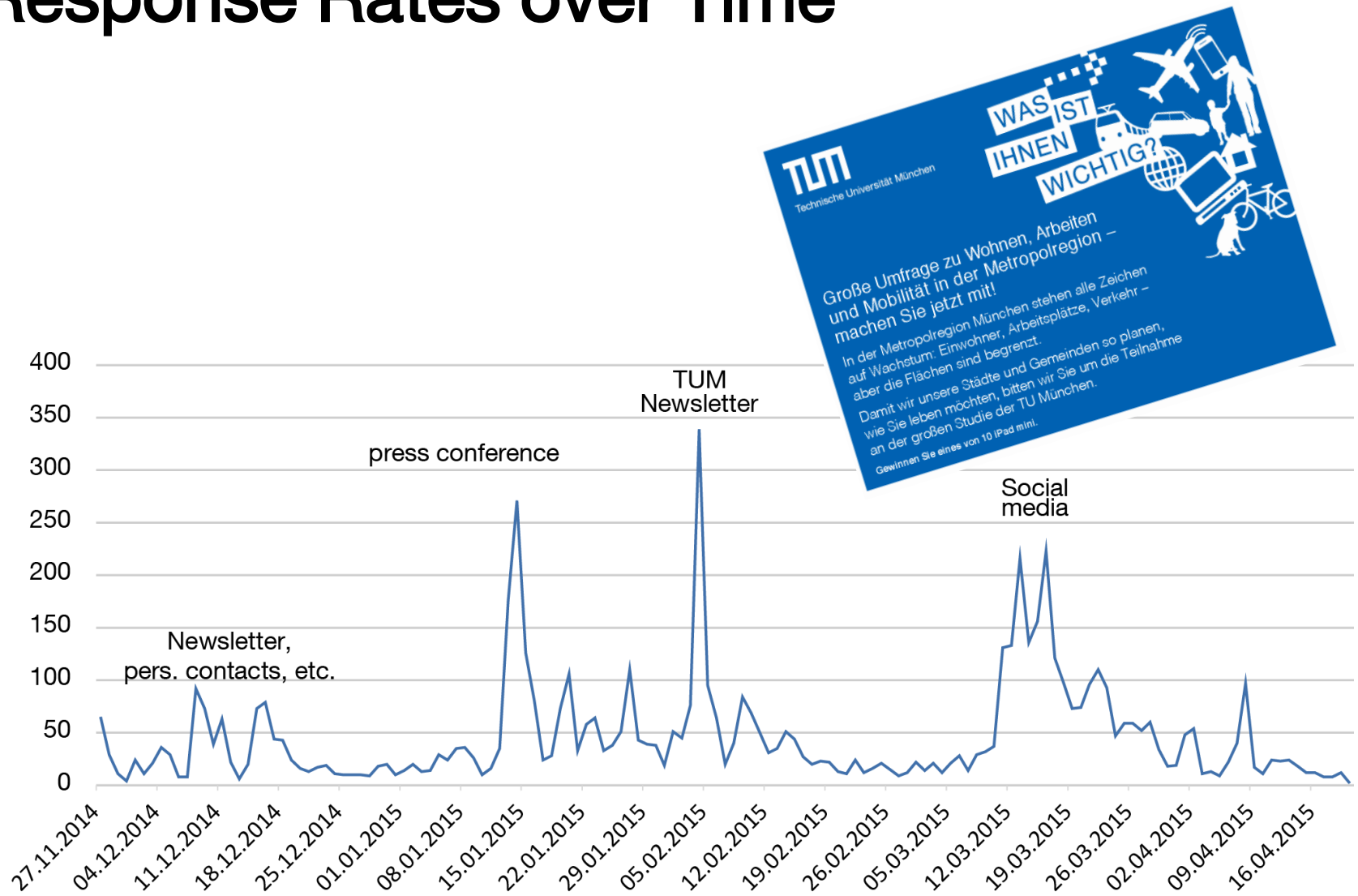


© Anne Wiese 2011

# Overview

- Spatial analysis of the Munich Metropolitan Region
- Web-survey on residence, work, mobility
- Reasons for moving or change of workplace location
- Detecting patterns of spatial usage
- Deriving development options

# Response Rates over Time





# Project Team



Technische Universität München

Department of Architecture  
Chair of Urban Development

**Prof. Dr. Alain Thierstein**

**Dr. Michael Bintlage**  
(project leader)

**Juanjuan Zhao**  
(dissertation)

**Lukas Gilliard**  
(project collaborator)

**Fabian Wenner**  
(project collaborator)

Department of Civil, Geo and  
Environmental Engineering  
Chair of Urban Structure and  
Transport Planning  
**Prof. Dr.-Ing. Gebhard Wulfhorst**

**Dr. Stefan Klug**  
(deputy project leader)

**Lena Sterzer**  
(dissertation)

**Julia Kinigadner**  
(project collaborator)

**Helene Steiner**  
(project collaborator)

# Our Partners

## **Municipalities, municipal associations and administrative districts**

- State Capital Munich
- District of Fürstenfeldbruck
- NordAllianz (8 municipalities north of Munich)
- Joint venture “regional management city and district of Landshut“
- Municipality of Gräfelfing
- District of Munich
- District of Traunstein
- Planning association Munich Outer Economic Area
- City of Kaufbeuren
- City and District of Rosenheim

## **Enterprises**

- Munich Transport Corporation (MVG)
- GWG Städtische Wohnungsgesellschaft München mbH
- Business Campus München : Garching
- DB RegioAG
- Munich Airport GmbH
- Munich Transport and Tariff Association (MVV)

## **Authorities, chambers, associations**

- Principle building authority in the Bavarian Ministry of the Interior for Building and Transport
- IHK Schwaben
- Europäische Metropolregion München e.V.

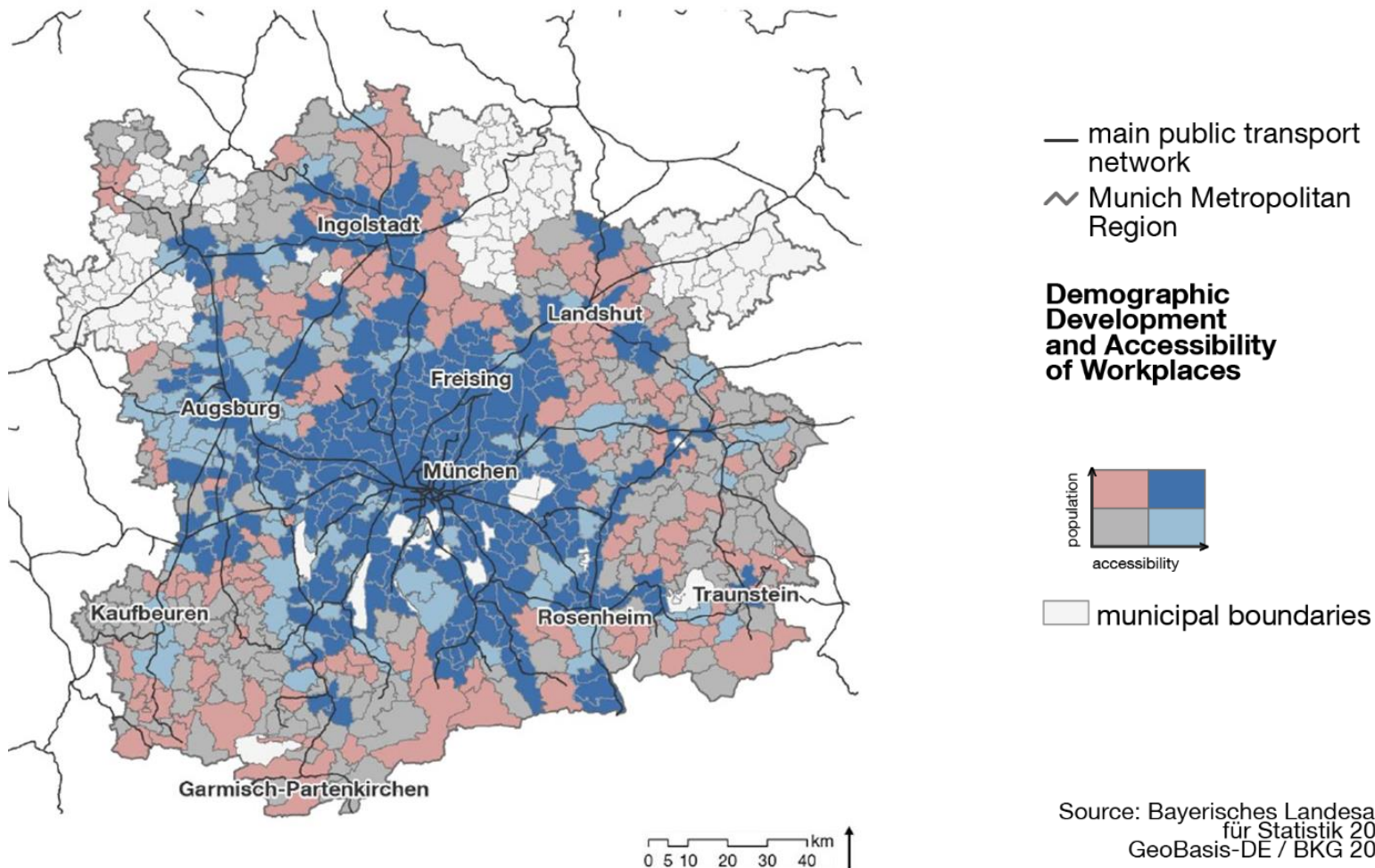
# Spatial Analysis

# Spatial Analysis

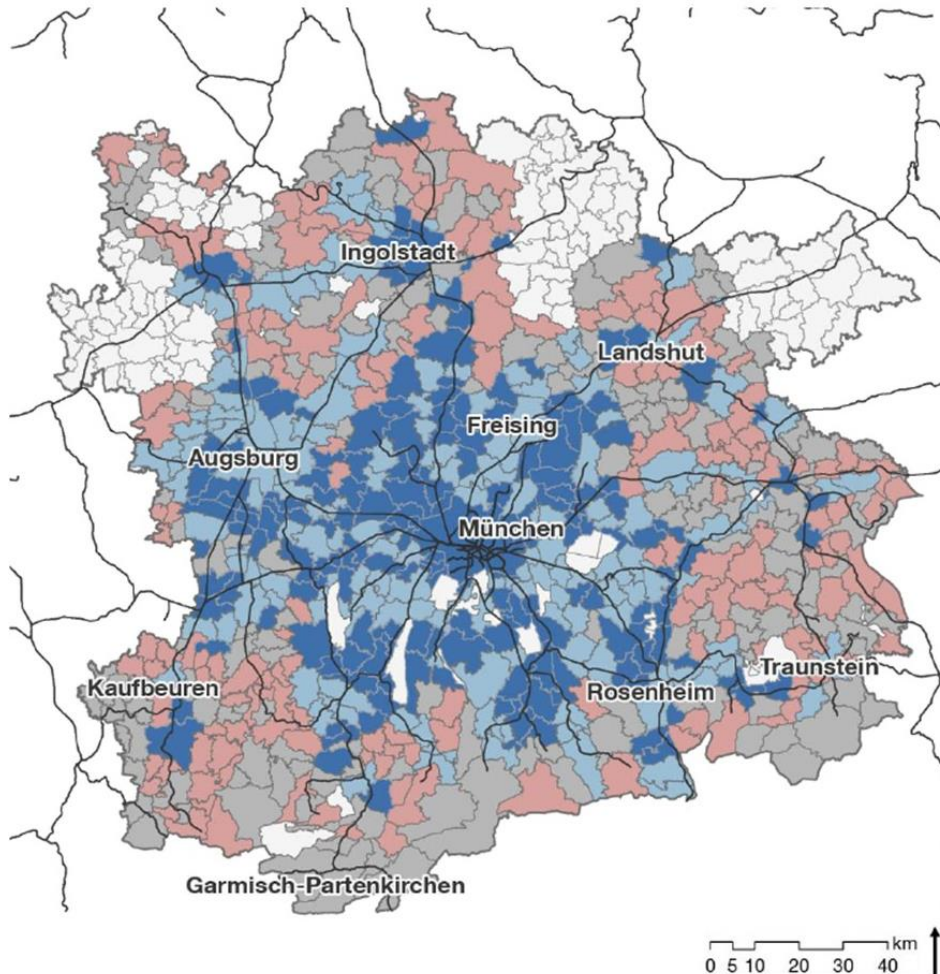
- High **accessibility** in centers
- Dense **urban development** vs. second and holiday homes near the Alps
- **Immigration**, at the same time high **fluctuation**

Municipal organizations in the Munich Metropolitan Region form the basis of consideration. The data is extracted from the official statistics.

# Demographic Development and Accessibility

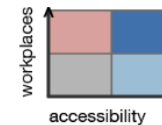


# Workplace Development and Accessibility



- main public transport network
- ~ Munich Metropolitan Region

## Workplace Development and Accessibility to Population



- municipal boundaries

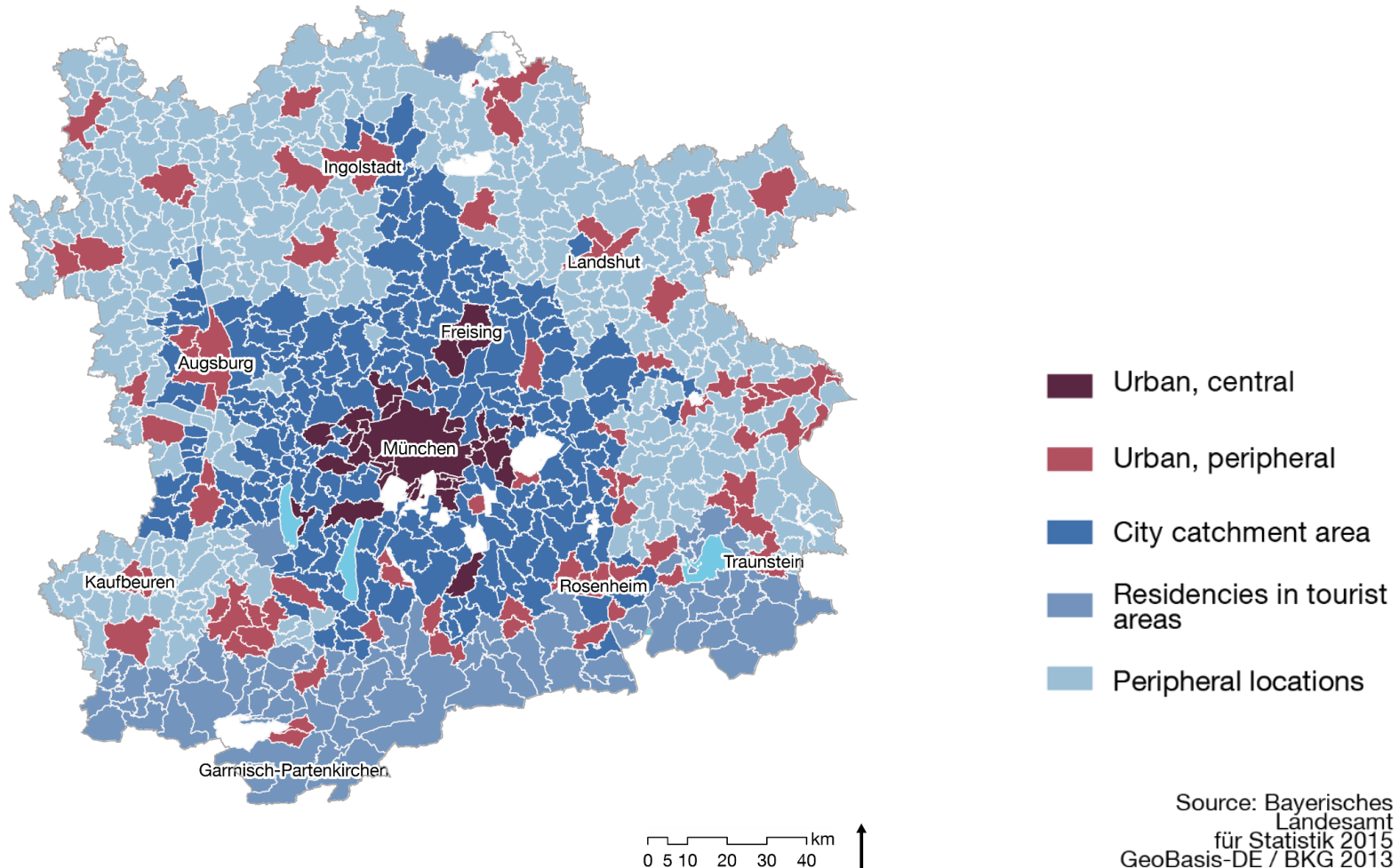
Source: Bayerisches Landesamt  
für Statistik 2015  
GeoBasis-DE / BKG 2013

# Elements of Structural Analysis

- **Accessibility:** MIV, PT, net commuter flow
- **Settlement structure:** population and employment density
- **Amenities:** shopping, recreation, culture, schools
- **Accommodation costs:** rent and buying price
- **Building structure:** detached and semi-detached houses, rent and ownership
- **Tourism:** percentage of holiday homes



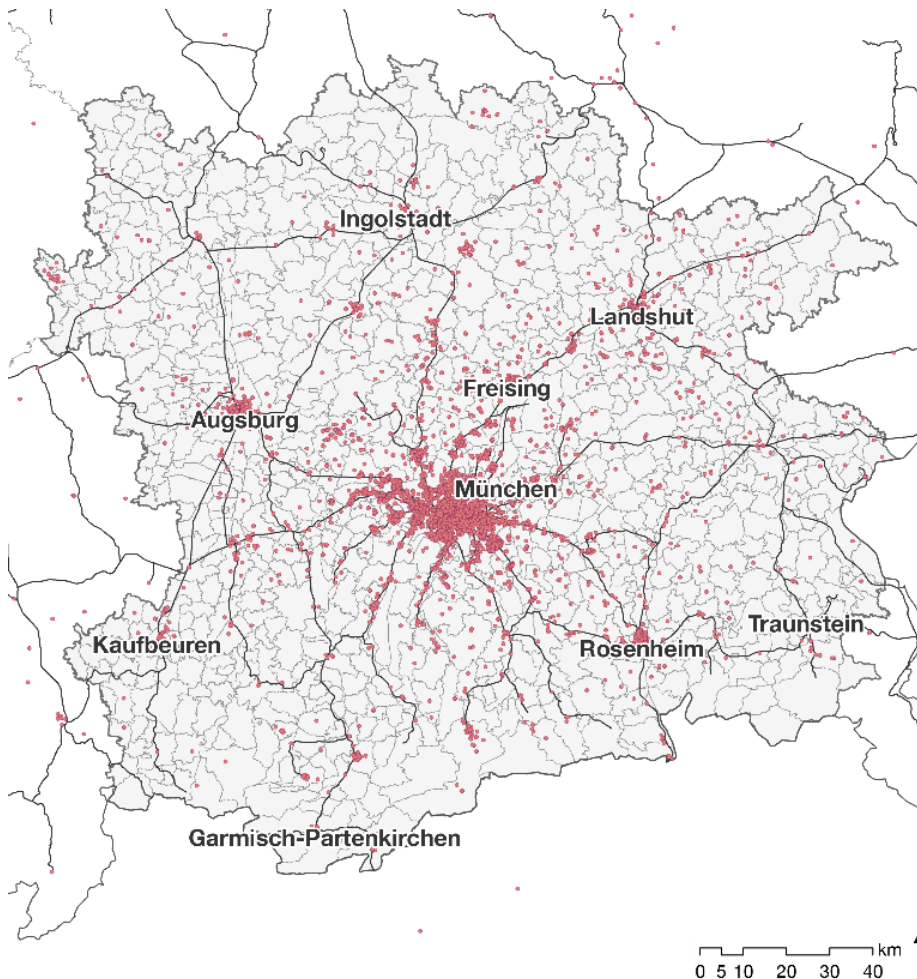
# Spatial Typology of the Munich Metropolitan Region



# **Web-Survey**

## **Residence, Work, Mobility**

# Places of Residence



- main public transport network
- ~ Munich Metropolitan Region

## Places of residence

- Places of residence  
n = 7.302

- municipal boundaries

Source: Bayrische  
Vermessungsverwaltung 2014  
GeoBasis-DE / BKG 2013  
TUM 2015

# Workplaces



- main public transport network
- ~ Munich Metropolitan Region

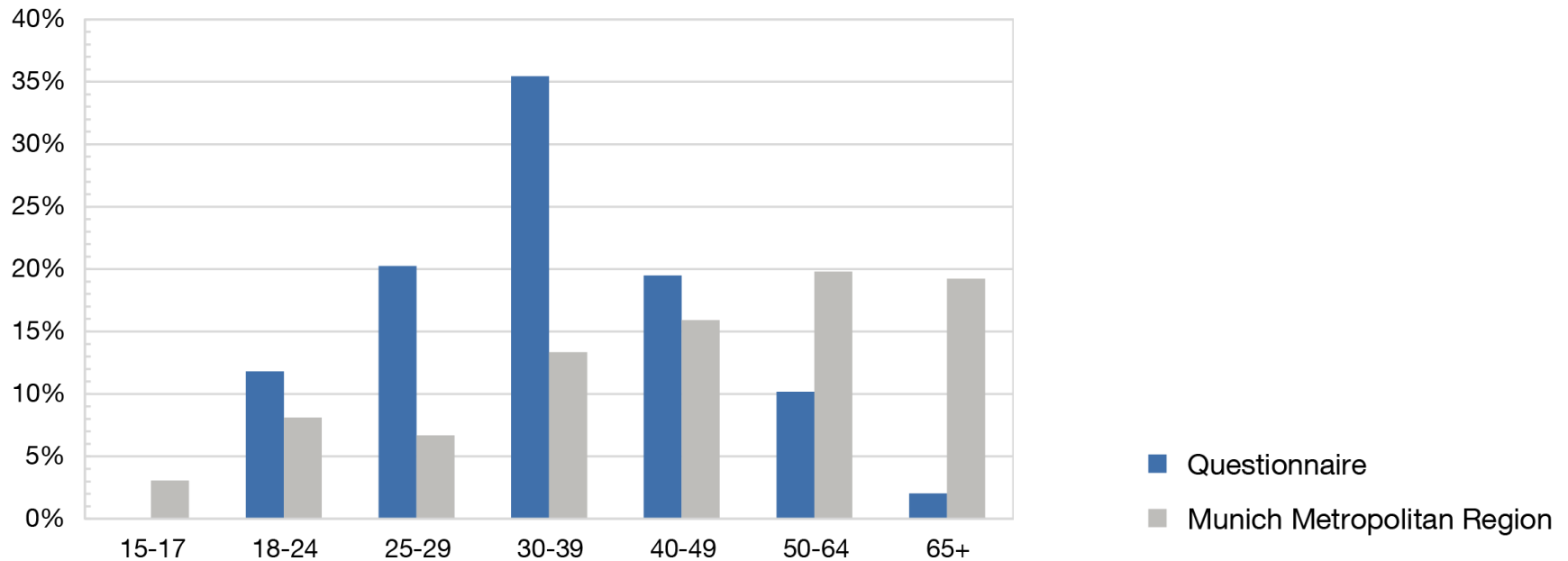
## Workplaces

- Workplaces  $n = 6.982$

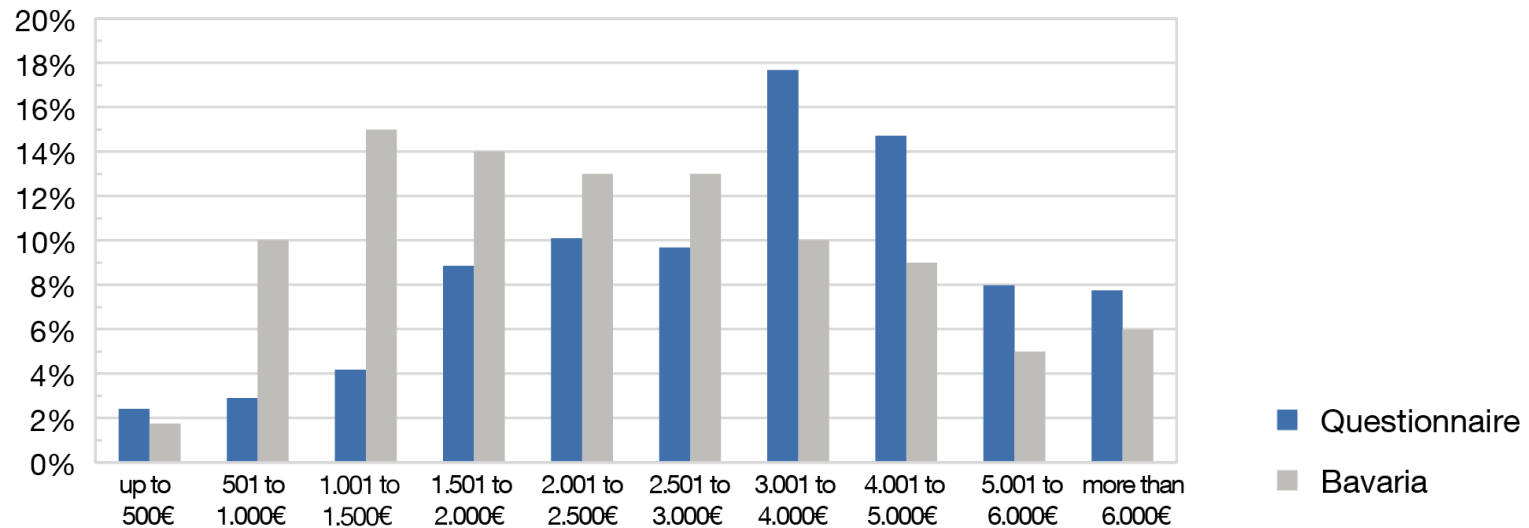
- municipal boundaries

Source: Bayrische  
Vermessungsverwaltung 2014  
GeoBasis-DE / BKG 2013  
TUM 2015

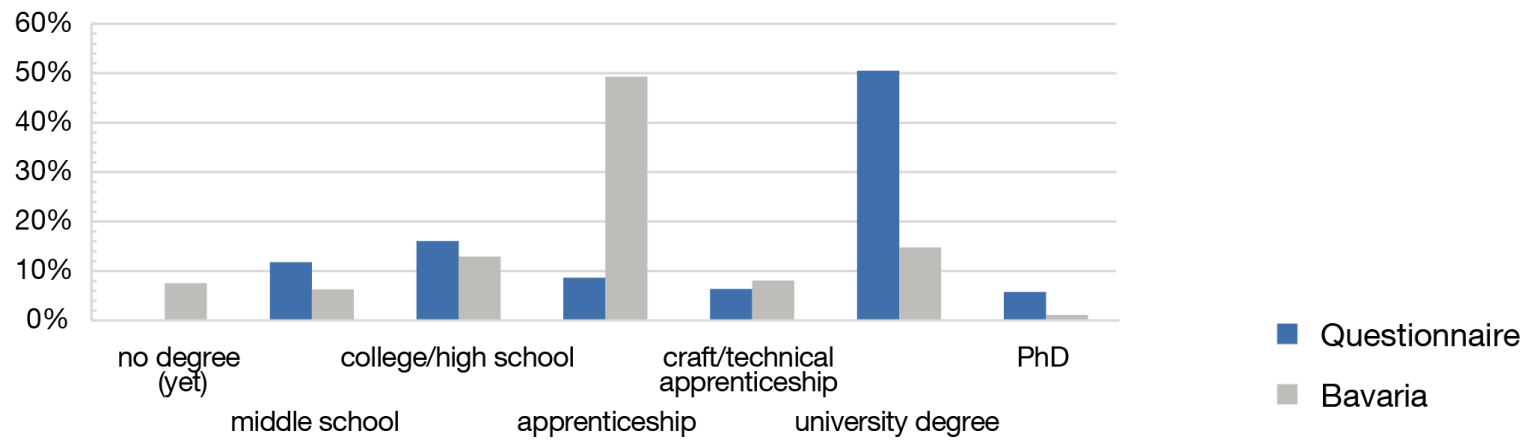
# Age Distribution



# Net Household Income

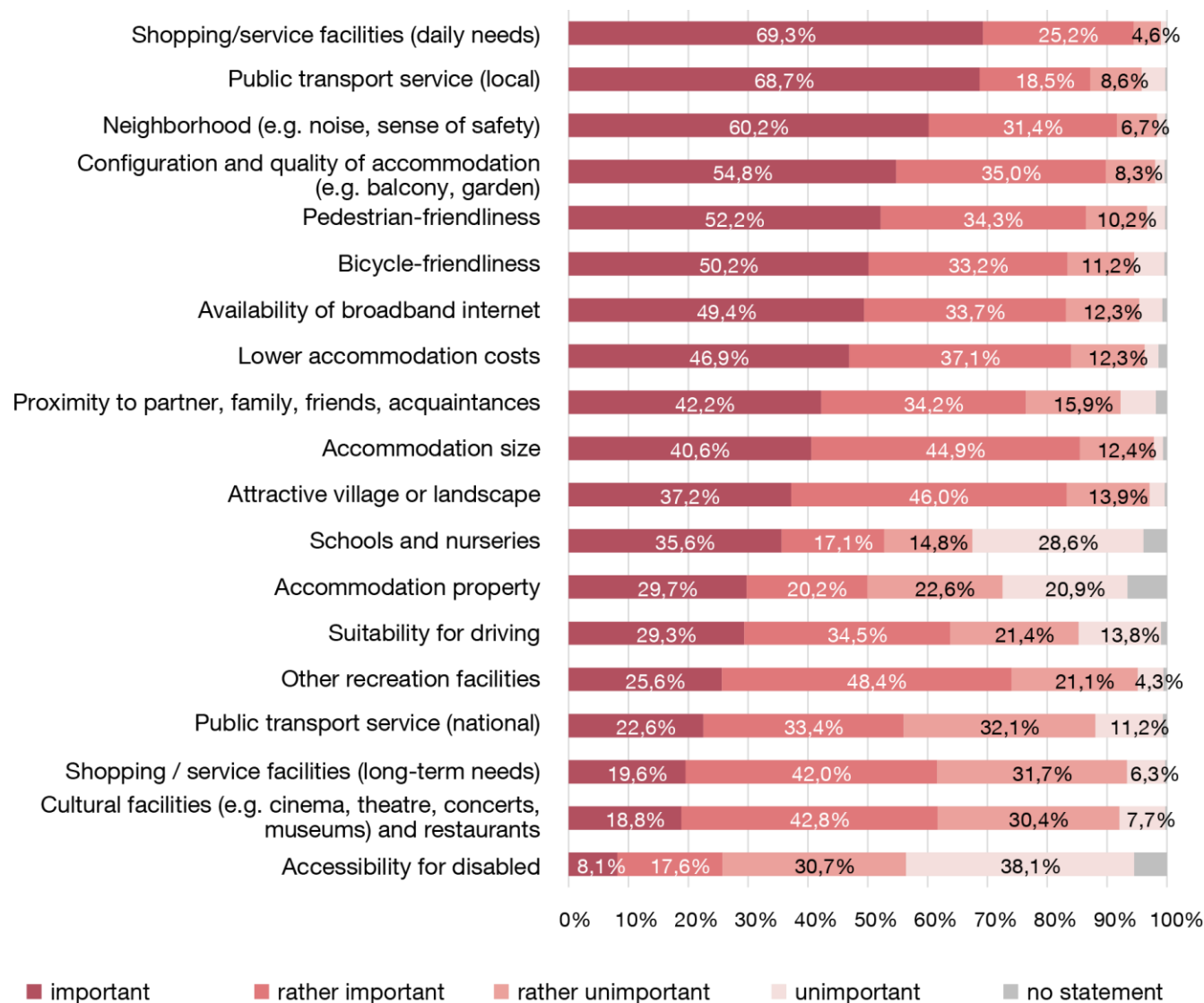


# Level of Education

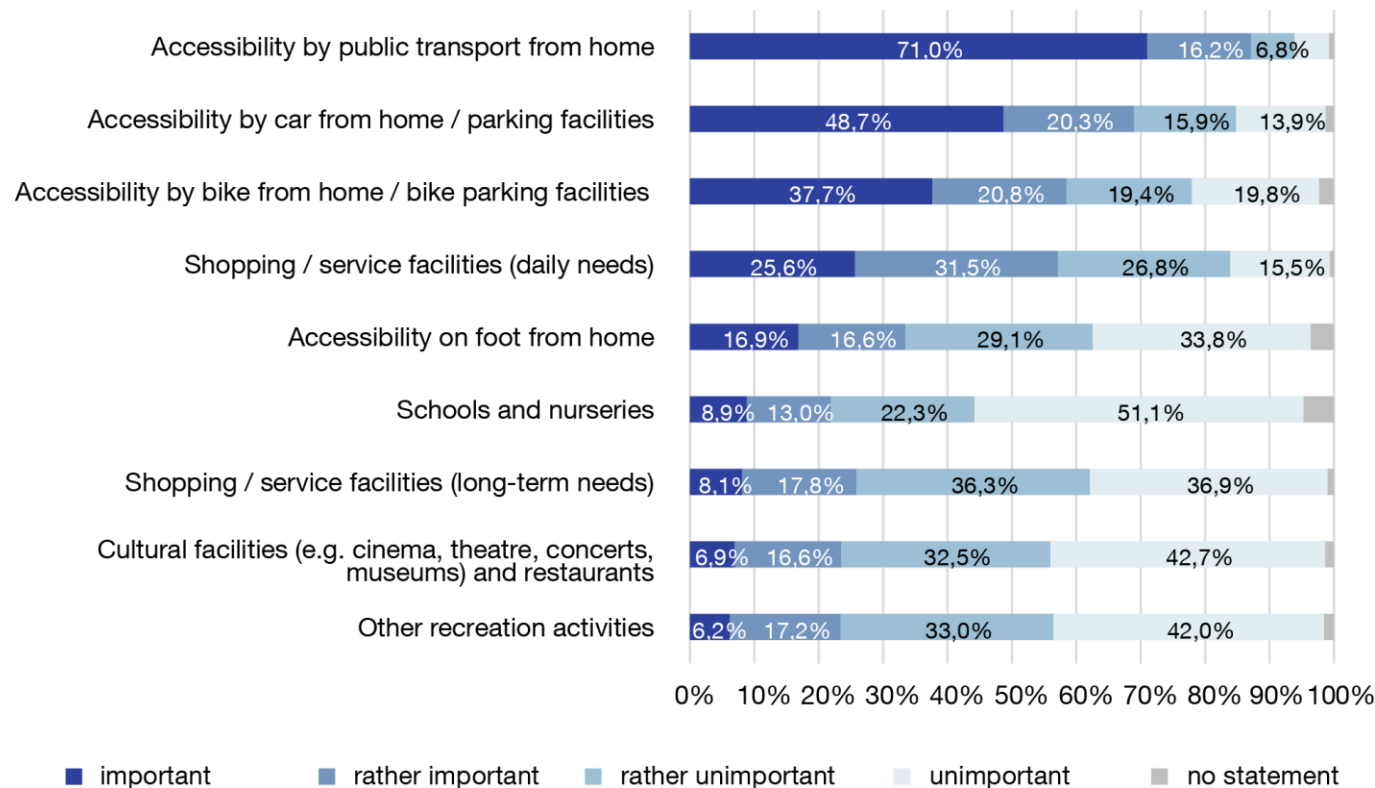




# What Is Important to You about Your Place of Residence?

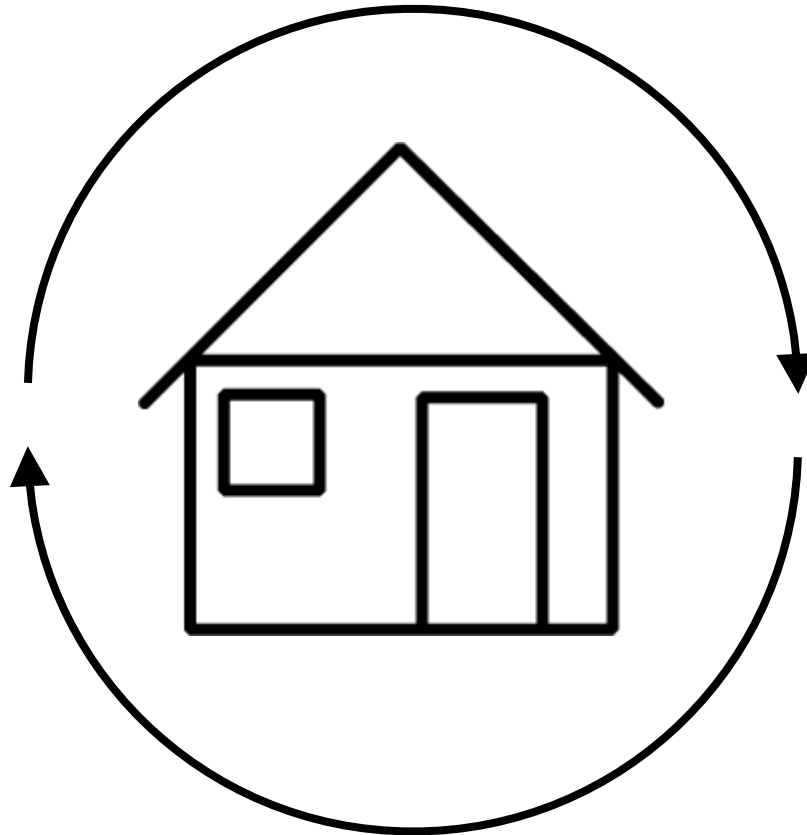


# What Is Important to You about Your Workplace?

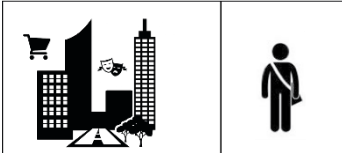


# Results for Patterns of Spatial Usage

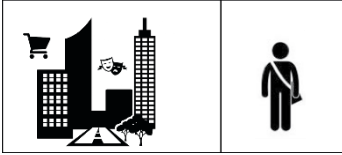
# Relocation of Residence



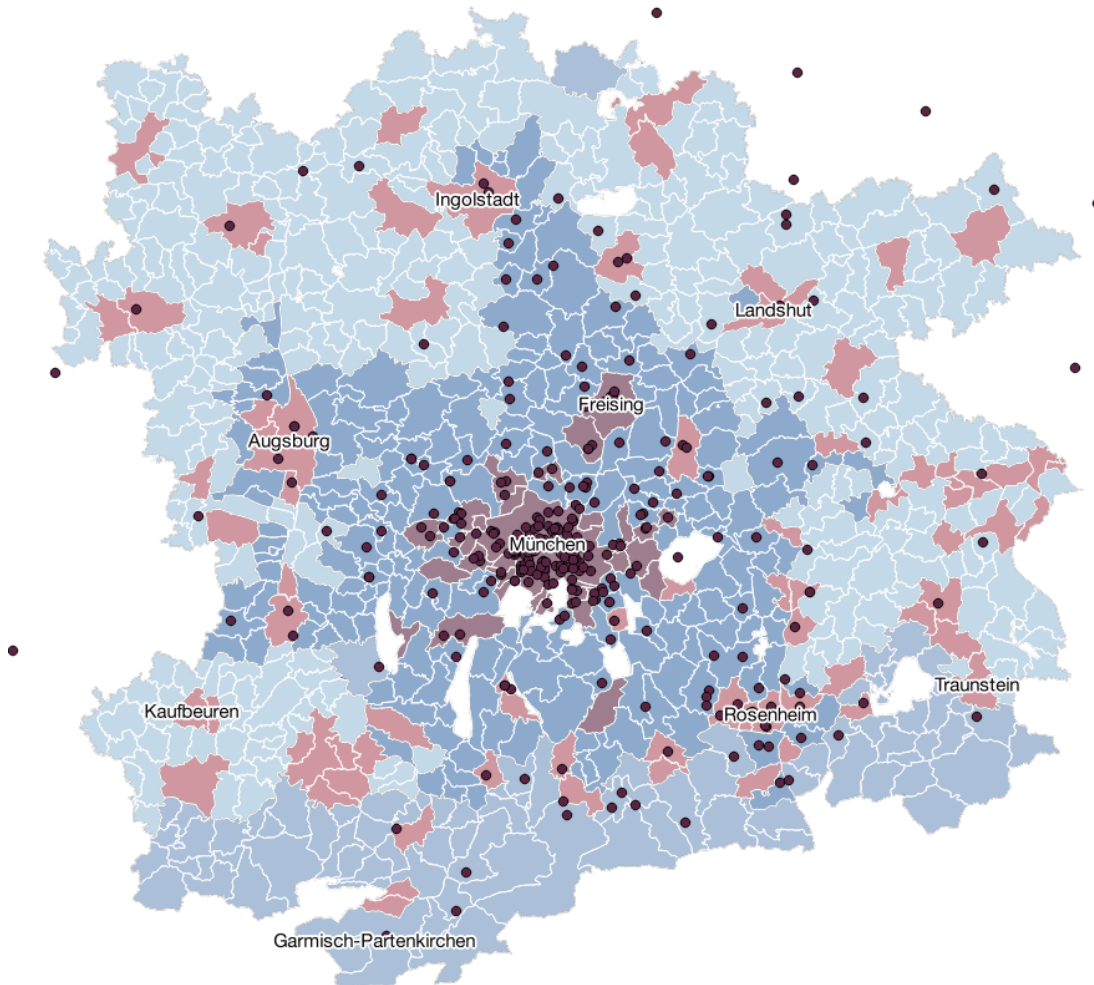
# Clusters of Residence Relocation Reasons



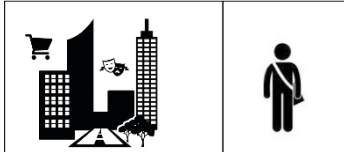
1: “Concentrated & Bundled Amenities”



## 1: “Concentrated & Bundled Amenities”



# Clusters of Residence Relocation Reasons



1: “Concentrated & Bundled Amenities”

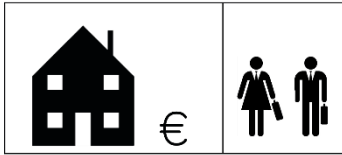


2: “Saving on Commute”

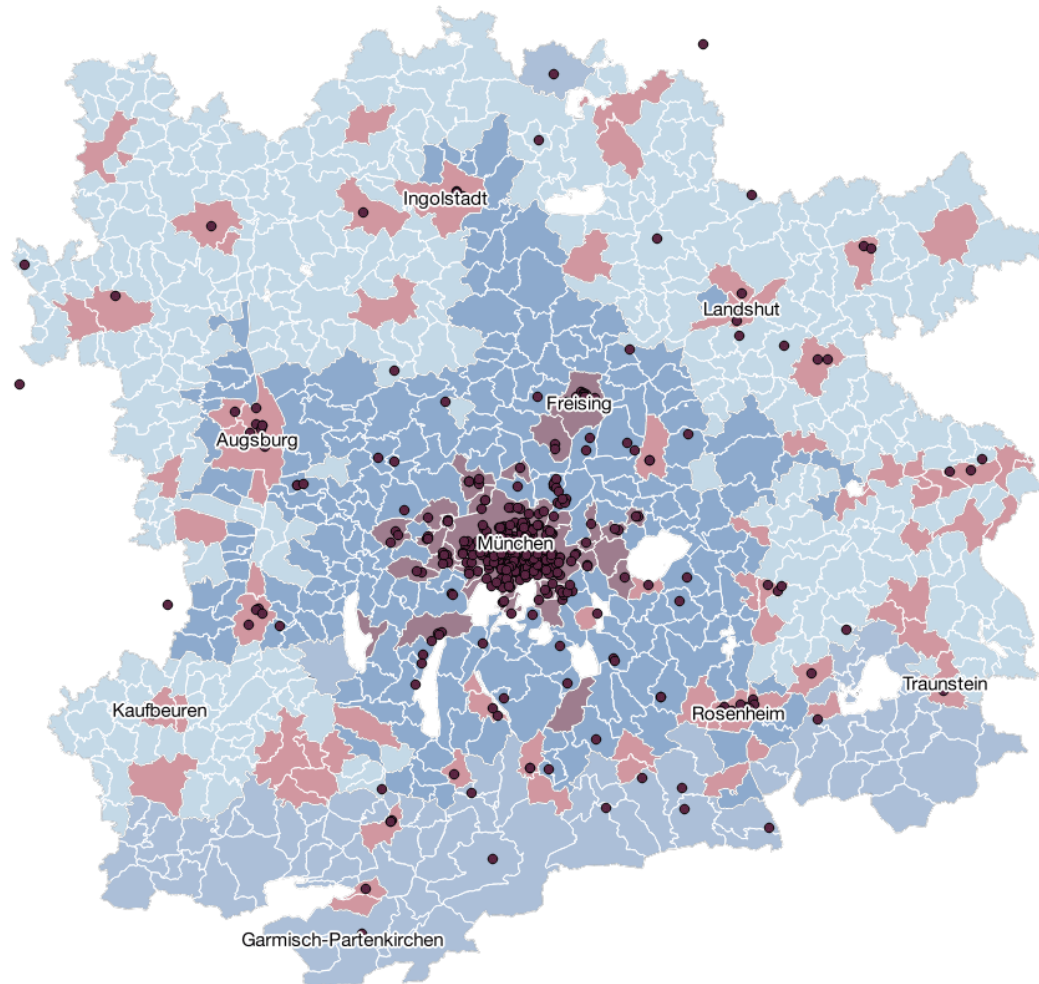


3: “Residing More Comfortably”

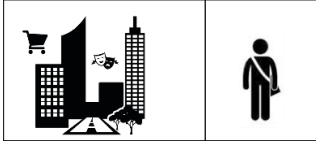




### 3: “Residing More Comfortably”



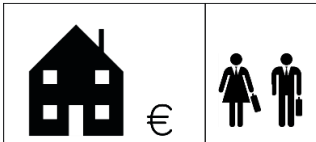
# Clusters of Residence Relocation Reasons



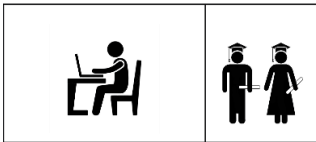
1: “Concentrated & Bundled Amenities”



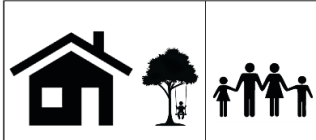
2: “Saving on Commute”



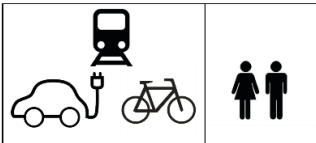
3: “Residing More Comfortably”



4: “Job Makes Mobile”



5: “Acquiring Property”

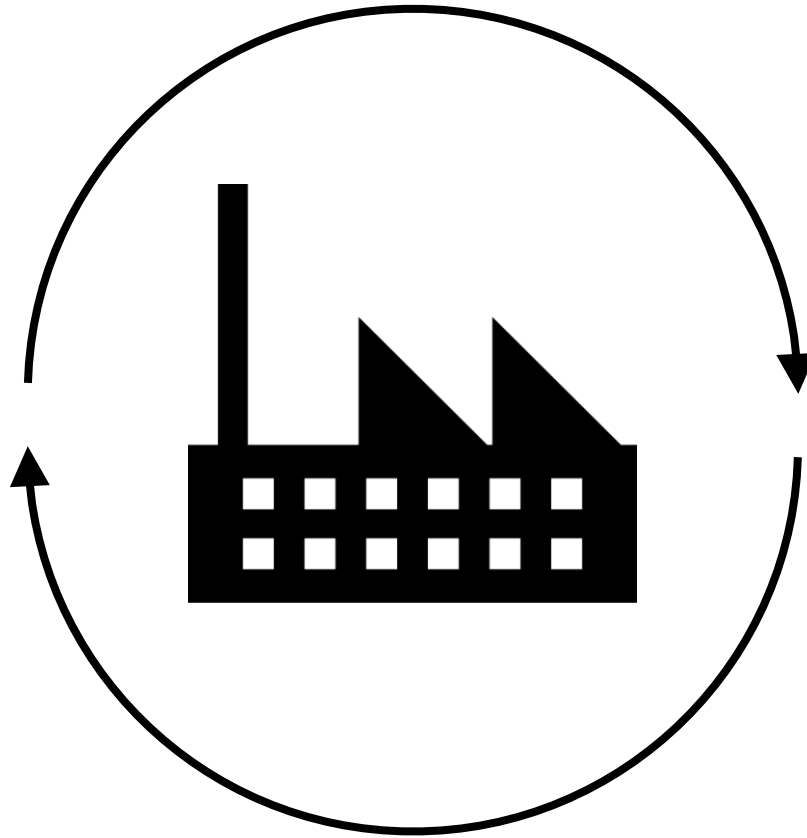


6: “Environmentally Friendly Commute”



7: “Co-Relocators”

# Relocation of Workplace



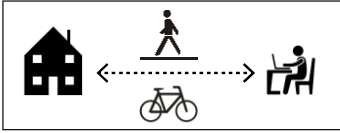
# Clusters of Workplace Relocation Reasons



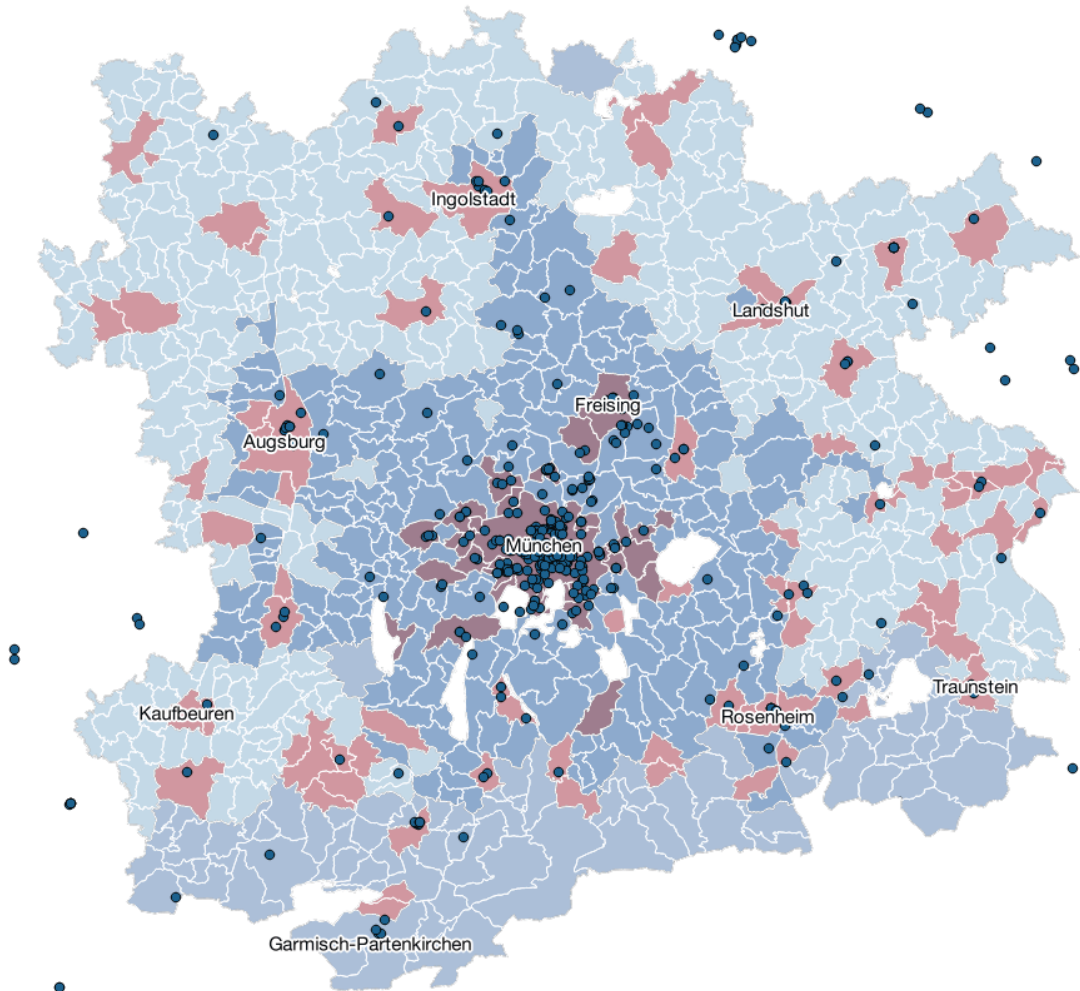
1: “Personal Reasons”



2: “Saving on Commute”



## 2: "Saving on Commute"



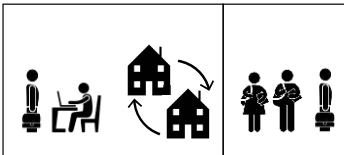
# Clusters of Workplace Relocation Reasons



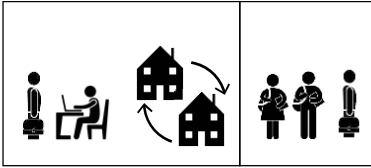
1: “Personal Reasons”



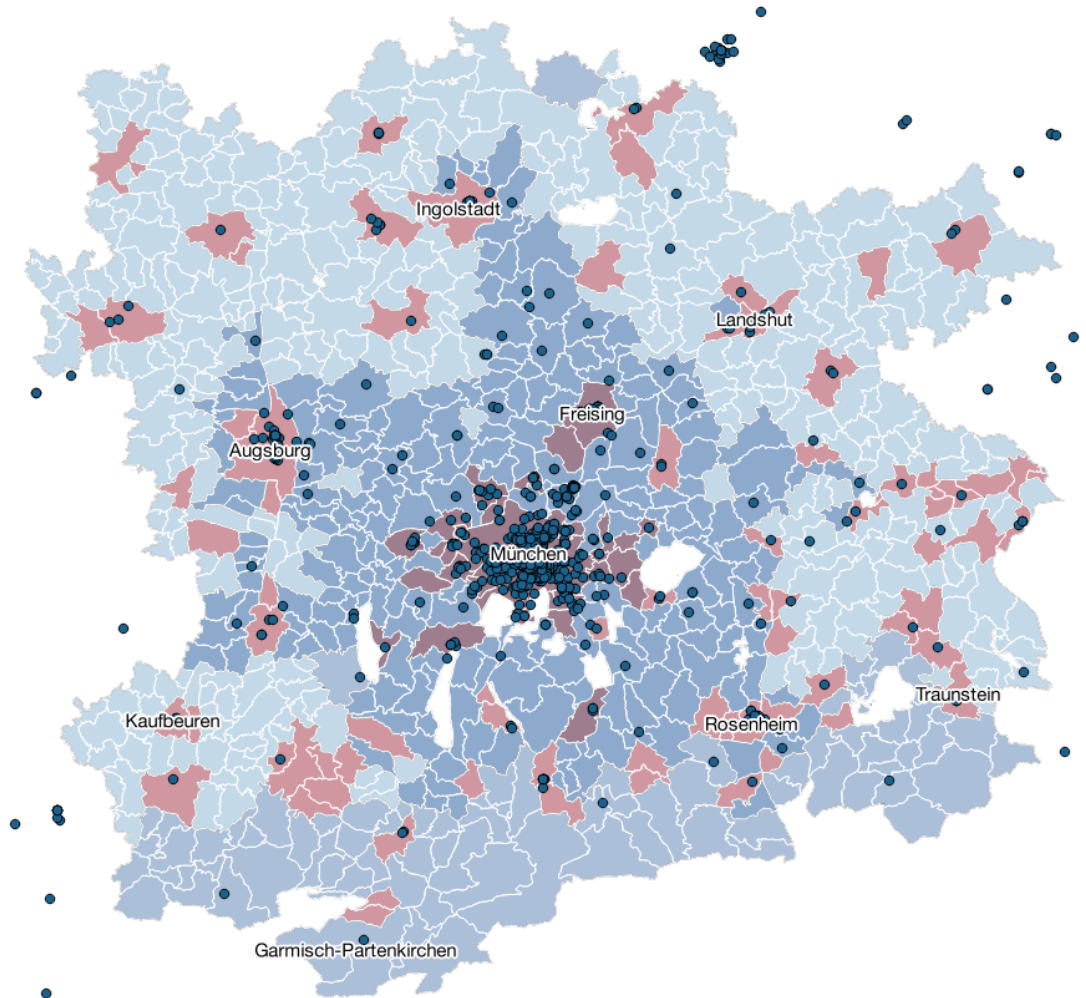
2: “Saving on Commute”



3: “High Flyer”



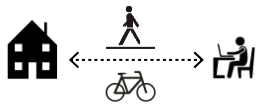
### 3: “High Flyer”



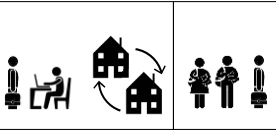
# Clusters of Workplace Relocation Reasons



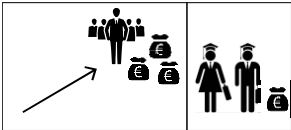
1: “Personal Reasons”



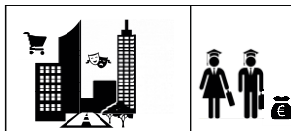
2. “Saving on Commute”



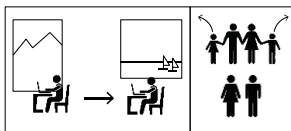
3: “High Flyer”



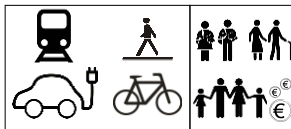
4. “Job Promotion”



5: “Improve Amenities”



6: “Relocation within Enterprise”



7: “Eco-Mobility Modes”



# From Clusters to Patterns of Spatial Usage

Cluster Residence Relocation		Cluster Workplace Relocation		Patterns of Spatial Usage
Co-Relocators	301	High Flyer	1611	Arriving – Job Orientation – Open Future
Job Makes Mobile	2753	Job Promotion	1170	Broadening Job Perspectives – Working Centrally – Longer Commute
		Relocation within Enterprise	616	
Saving on Commute	346	Saving on Commute	531	Shorter and Cheaper Commute – Residing Centrally – Working Decentrally
Environmentally Friendly Commute	209	Eco-Mobility Modes	108	Environmentally Friendly Commute
Concentrated & Bundled Amenities	368	Improve Amenities	234	Reducing Private Space – Using Public Amenities – Environmentally Friendly Commute
Residing More Comfortably	533			Residing More Comfortably – Acquiring Property – Leaving Centers
Acquiring Property	1447			
		Personal Reasons	133	

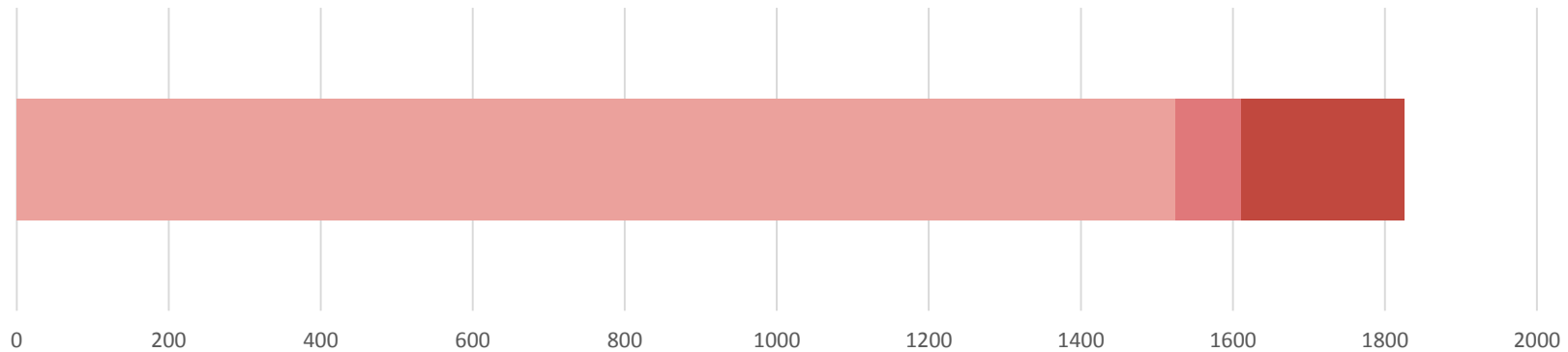
# Which Factors Do I Weigh up Concerning the Choice of Location?

- **Arriving** – Job Orientation – Open Future
- **Broadening Job Perspectives** – Working Centrally – Longer Commute
- **Shorter and Cheaper Commute** – Residing Centrally – Working Decentrally
- **Reducing Private Space** – Using Public Amenities – Environmentally Friendly Commute
- **Residing more Comfortably** – Acquiring Property – Leaving Centers

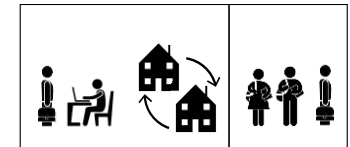
**Arriving –  
Job Orientation –  
Open Future**

# Arriving – Job Orientation – Open Future

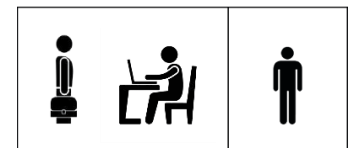
n=1826



■ Reasons for relocation of workplace: 'High Flyer'



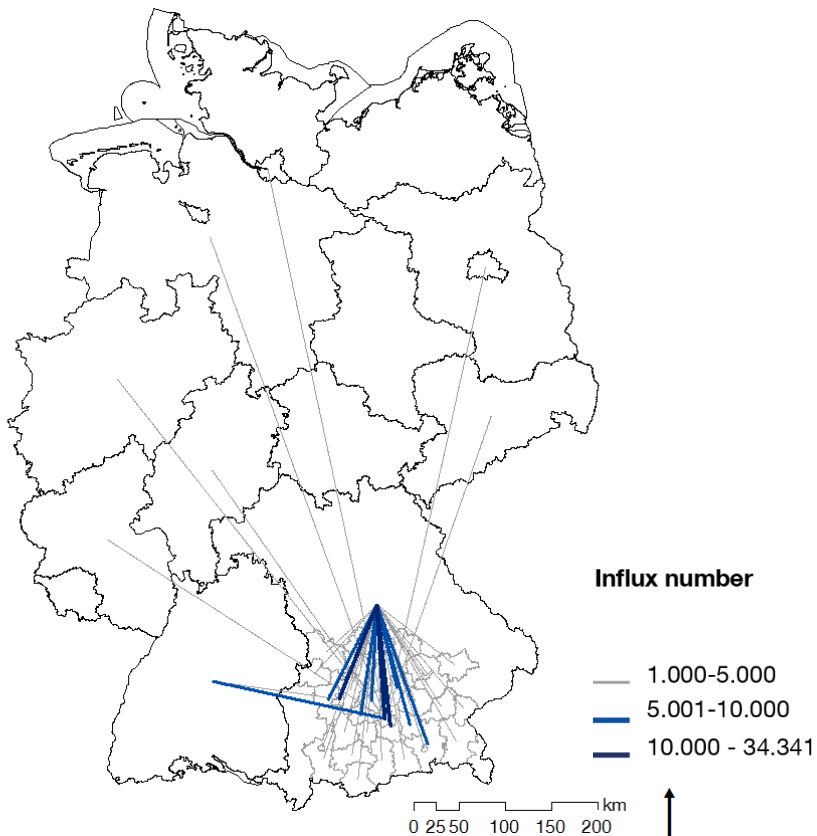
■ Reasons for relocation of residence: 'Co-Relocators'



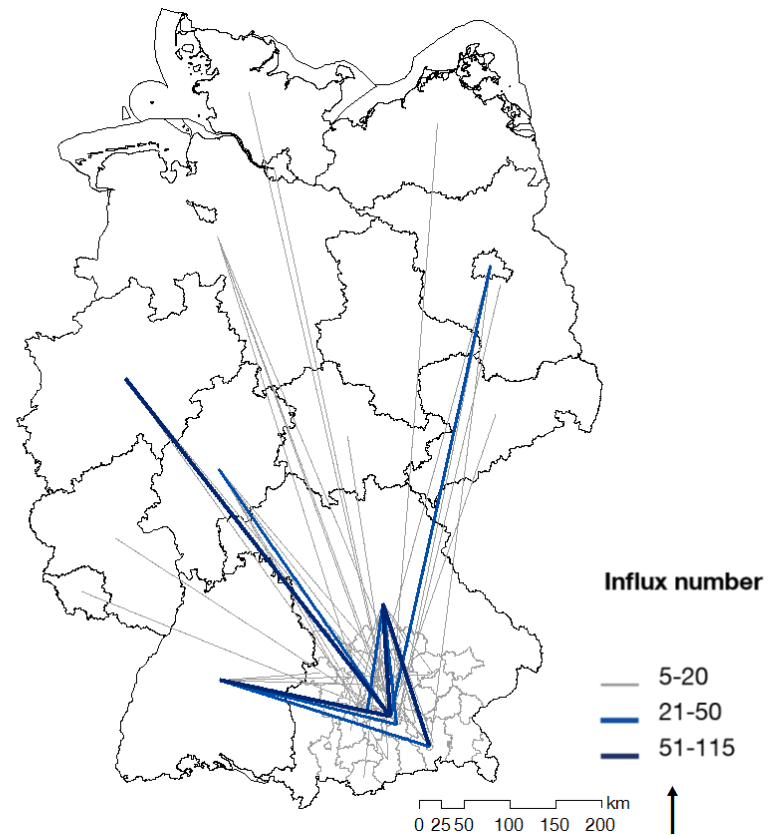
# Young Professionals and Students

- Around 1/4 of participants
  - Especially students and professionals
  - More than half of professionals are career beginners
  - Just under 50% have relocated to the survey area
  - Most common reasons for residence relocation are job-related:
    - Beginning a university course or starting a career
    - Changing of university or employment location (of another person in the household)
  - Most common reasons for job relocation:
    - Beginning a university course or starting a career
    - Relocation of residence
- Conscious decision of altering central location of life

# Influx – Especially from within Germany



n=236.167  
Source: bayerisches  
Landesamt für Statistik  
GeoBasis-DE / BKG 2013.



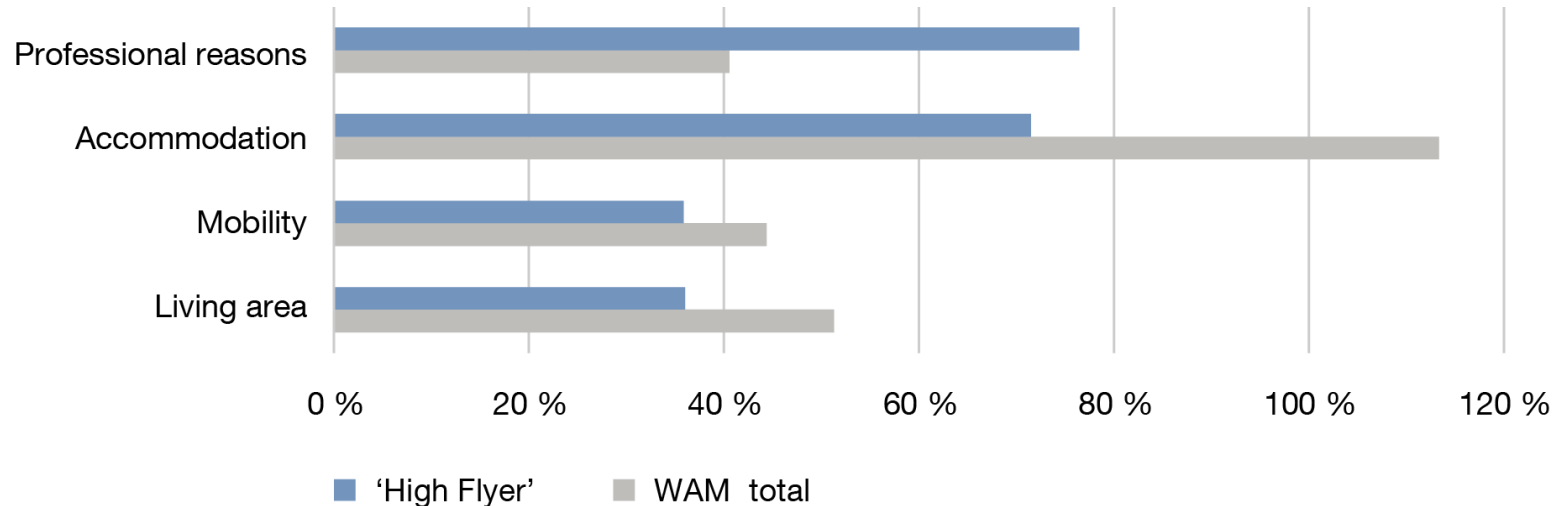
n=1.098  
Source: TUM 2015  
GeoBasis-DE / BKG 2013

# Young Households without Children

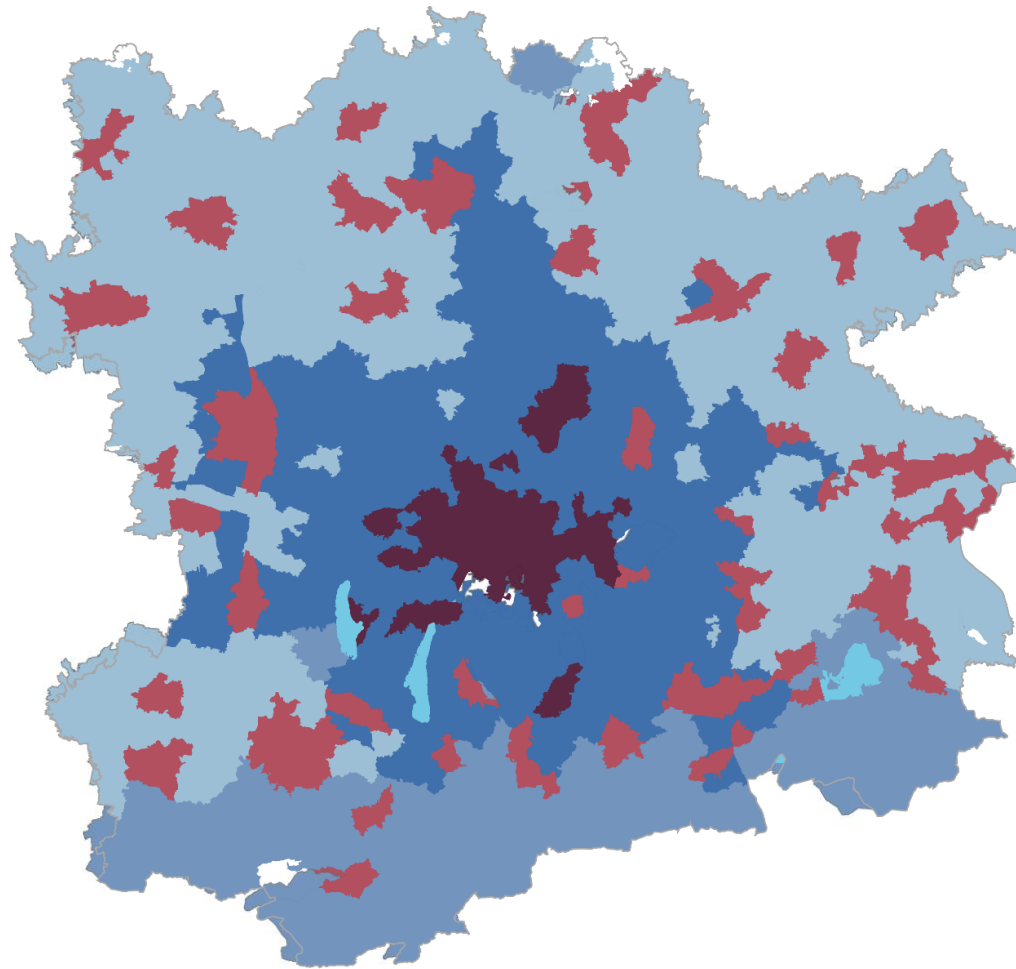


- Low / medium income
- Very young
- Tenants
- Eco-mobility modes

## Reasons for relocation



# Arrival in the Region



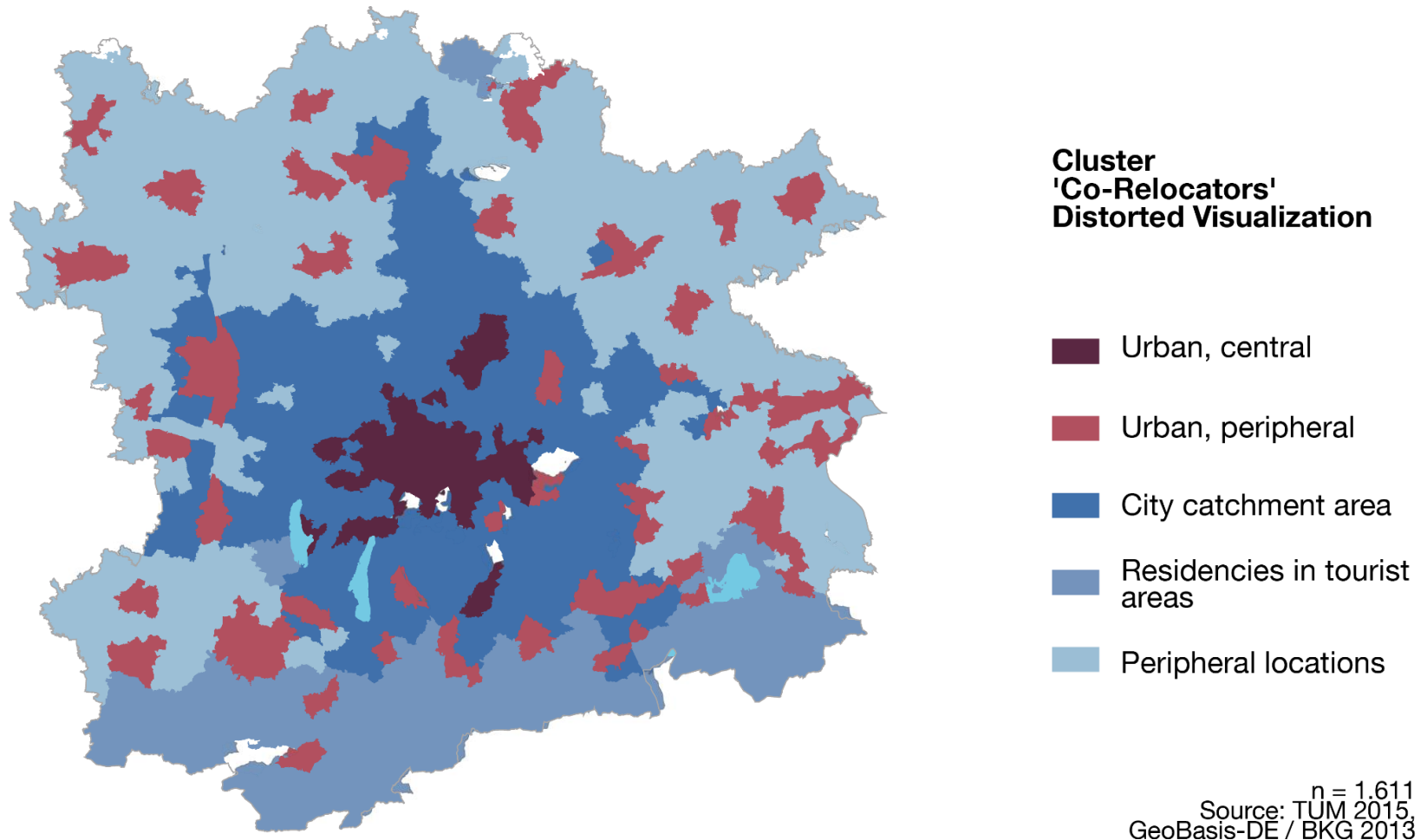
**Cluster 'High Flyer'**  
**Distorted Visualization**

- Urban, central
- Urban, peripheral
- City catchment area
- Residencies in tourist areas
- Peripheral locations

n = 1.611  
Source: TUM 2015,  
GeoBasis-DE / BKG 2013

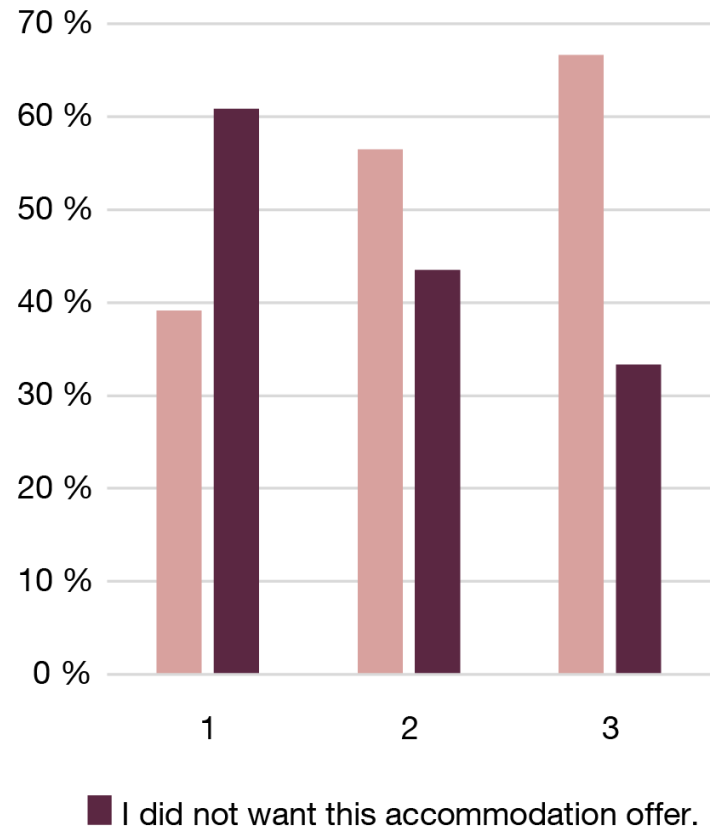
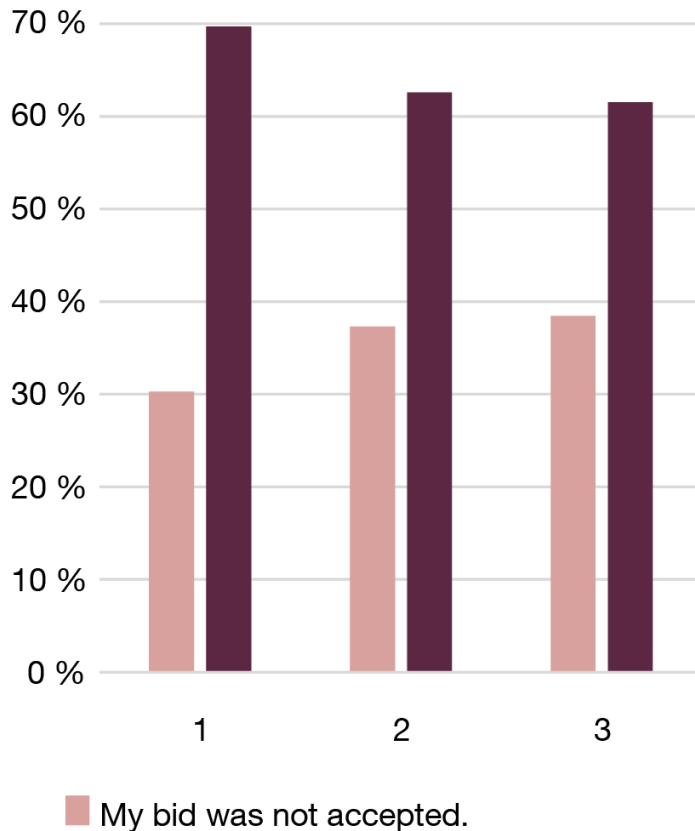


# Arrival in the Region



# Focus: Low-Income Households

Reasons for rejecting alternative accommodation locations



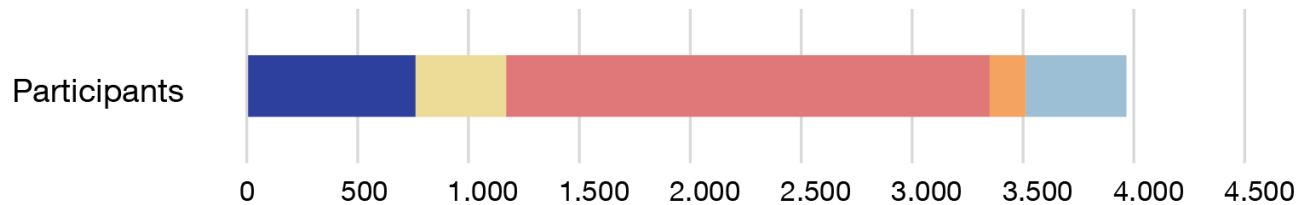
# Arriving - Job Orientation Open Future

- Students and young professionals relocate into the region
- **Professional reasons** are the main factor in the decision of altering center of life
- Tenants, **accommodation costs** as the most important criterion

**Broadening Job Perspectives –  
Working Centrally –  
Longer Commute**

# Relocation Because of Job Promotion or Restructuring within Enterprise

- 54% of participants changed their residence or workplace location for professional reasons (= largest group)
- Ca. 16% changed both their residence and their workplace location



■ 'Job Promotion'

■ overlap

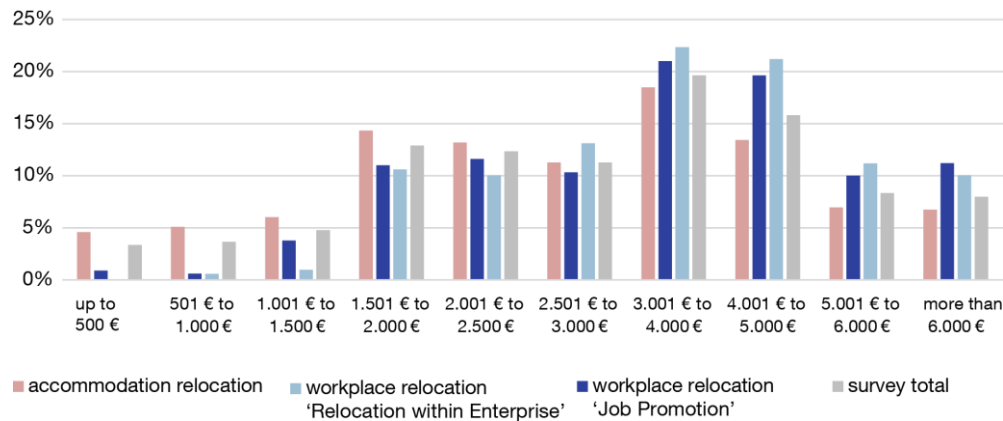
■ 'Job Makes Mobile'

■ overlap

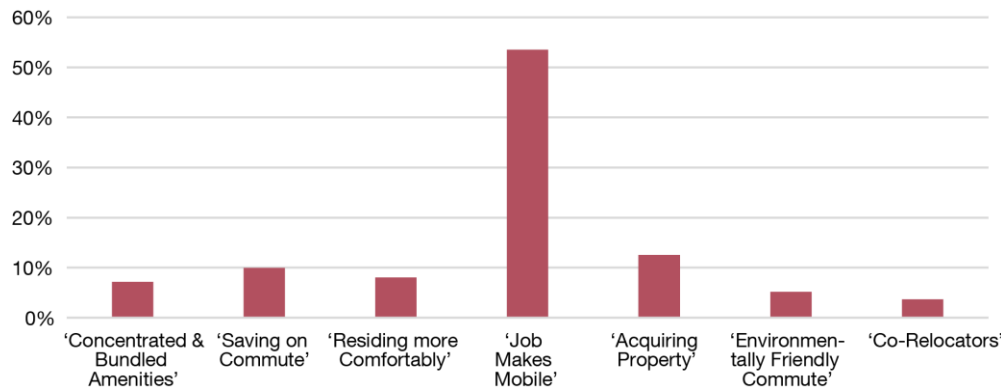
■ 'Relocation within Enterprise'



# The Financially Weak Change Their Living Location, the Better-Off Change Their Workplace Location

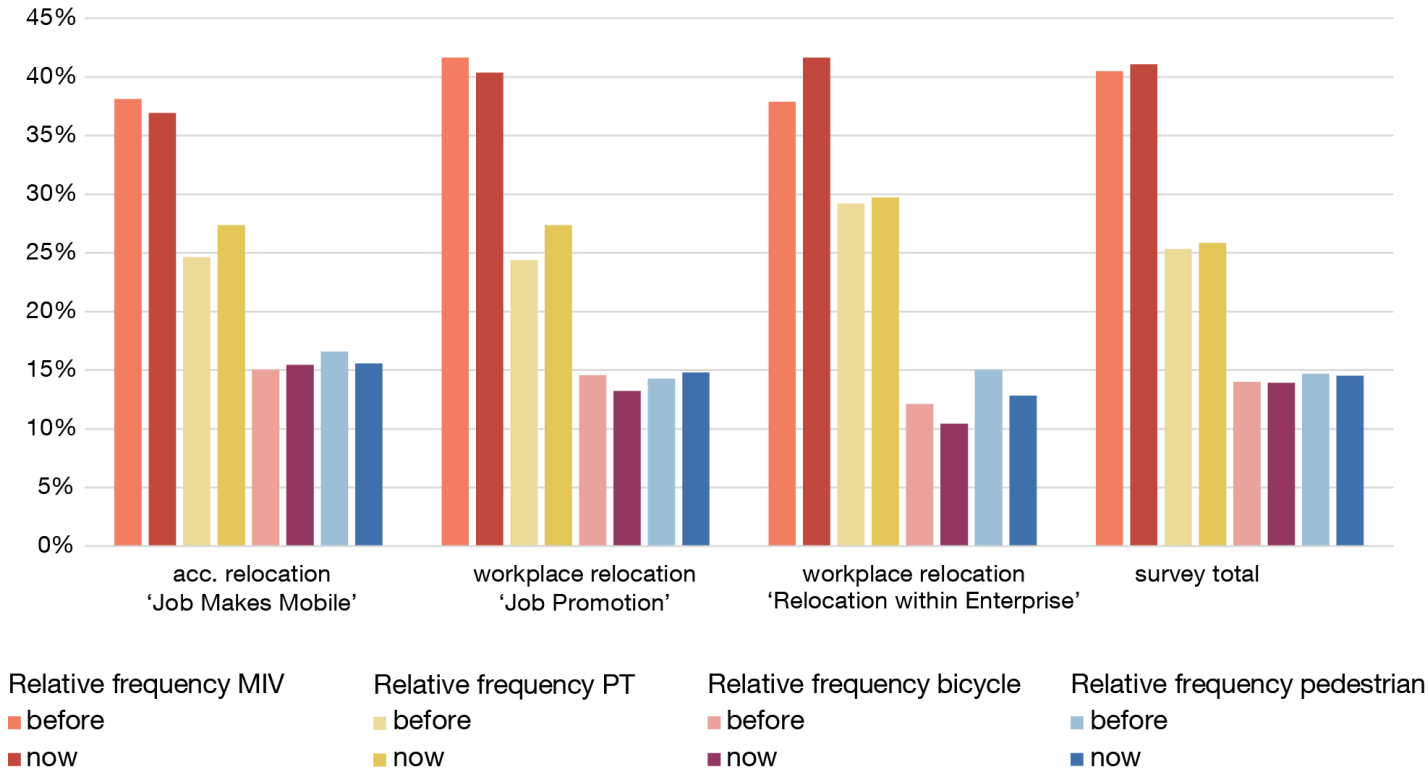


- Especially those who change workplace **acquire property**, particularly ,Relocation within Enterprise‘



- 54% of the financially weak are in the cluster ,Job Makes Mobile‘, that is 19.4% in this cluster alone

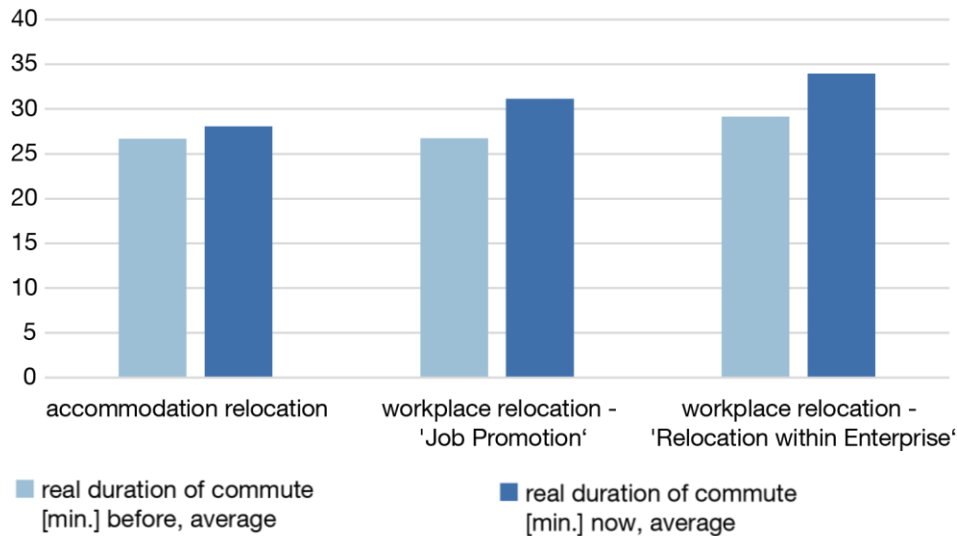
# MIV Still the Main Means of Transport



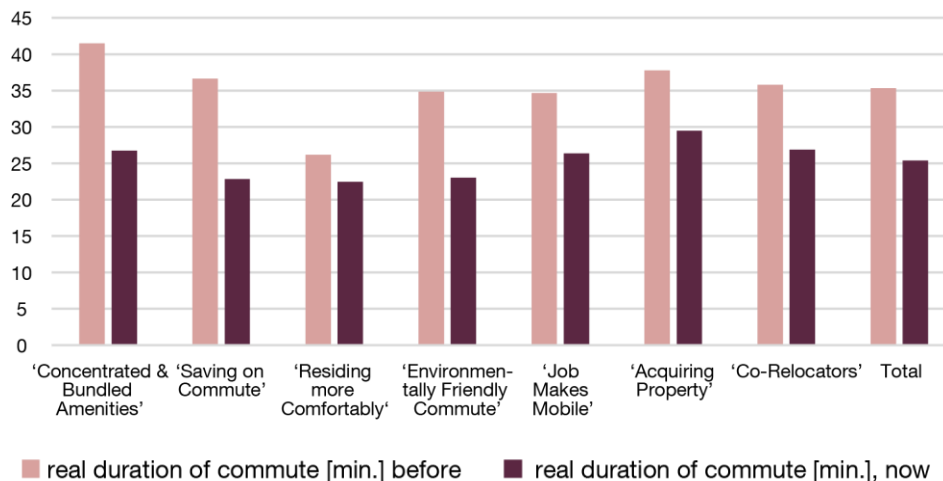
More MIV after relocation within enterprise

More PT after relocation for professional reasons or job promotion

# Longer Commute to Workplace, Yet Shorter If Desired



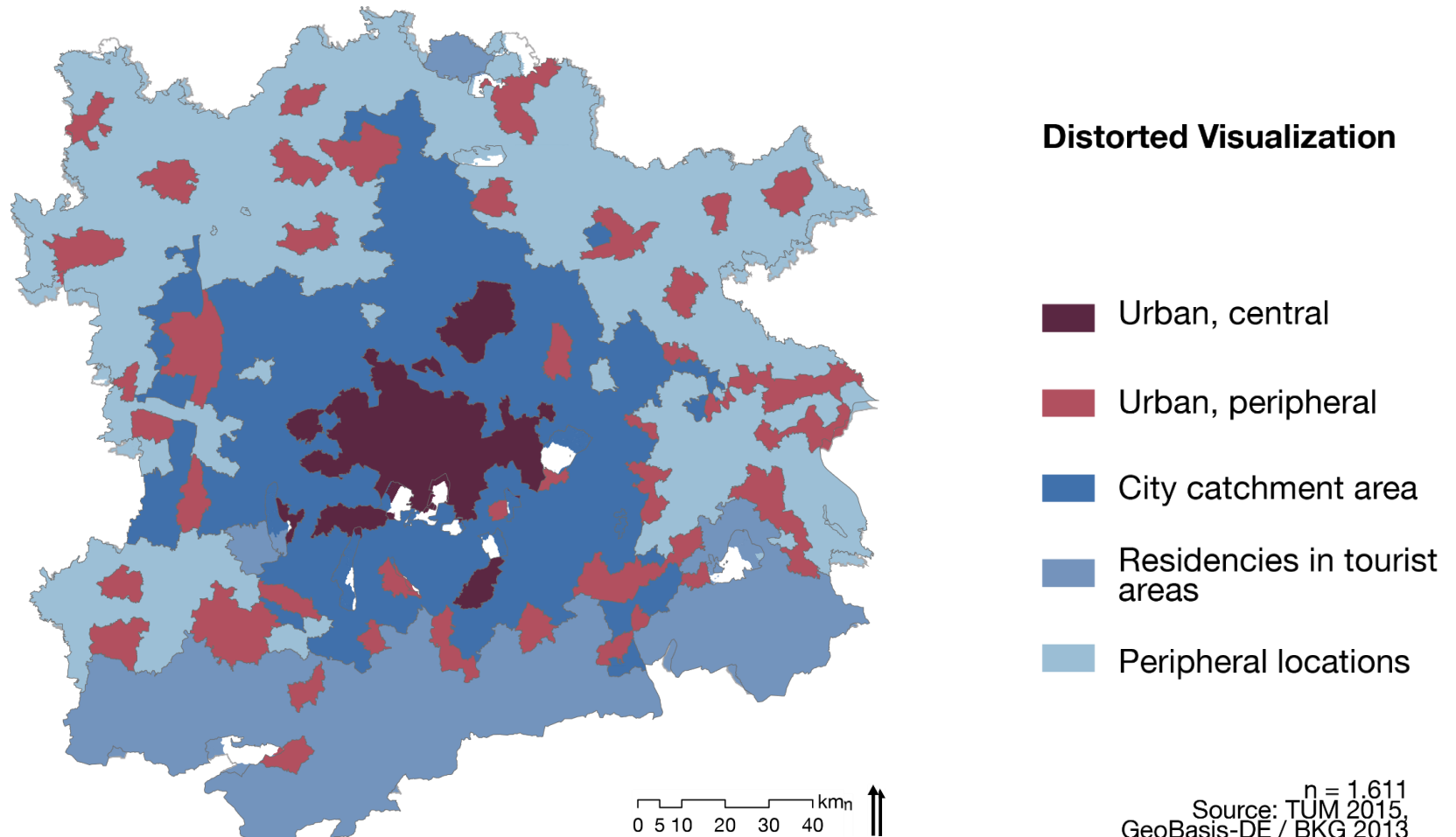
- Generally longer commute



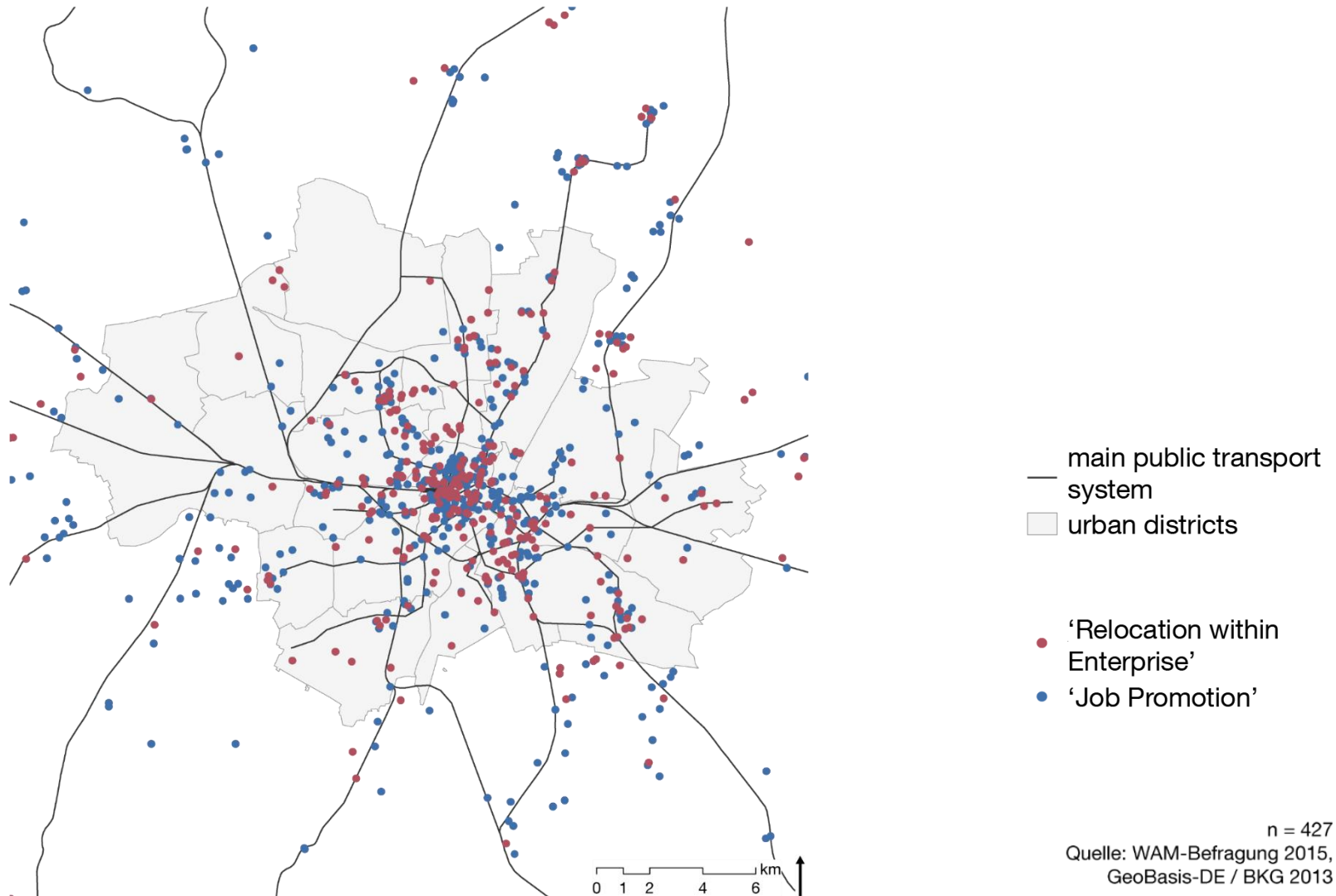
- Is shorter when relocation reason "commute too far" applies



# Knowledge Workers Remain in Same Urban Structure even after Relocation



# Central Workplace Location - Munich



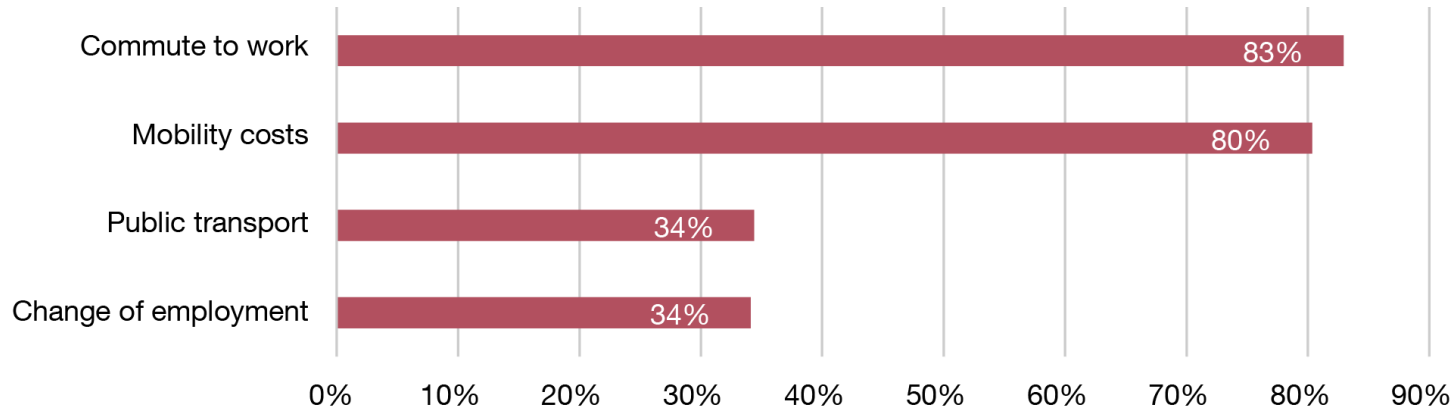
# Broadening Job Perspectives – Working Centrally – Longer Commute

- Two contrasting trends: predominantly young, single and first-time employees are relocating
- Predominantly double earners and buyers on the property market relocate workplace
- The car remains the main means of transport

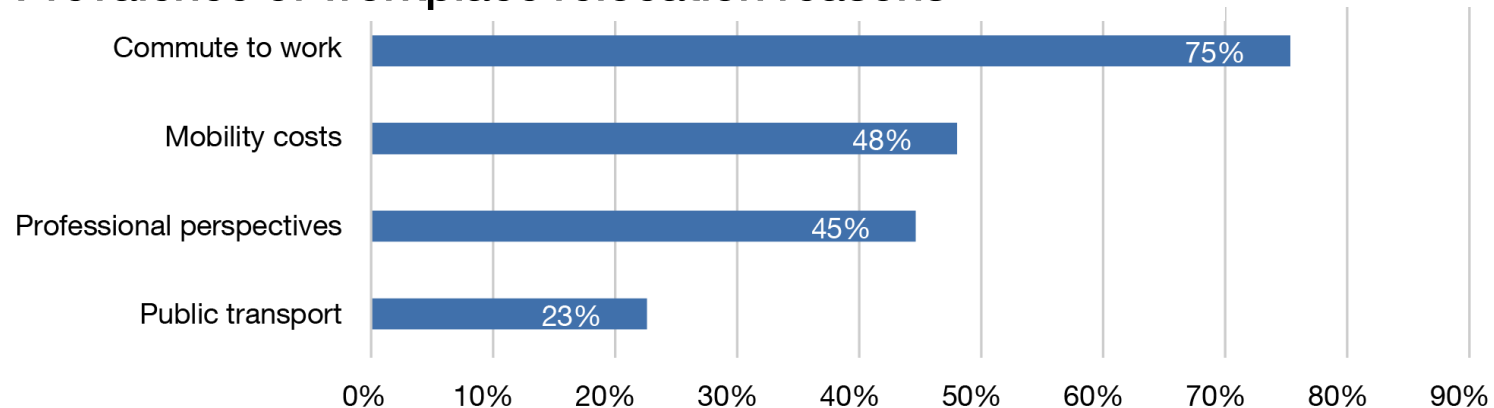
**Shorter and Cheaper Commute –  
Residing Centrally –  
Working Decentrally**

# Commute Too Long and Mobility Costs Too High

## Prevalence of residence relocation reasons

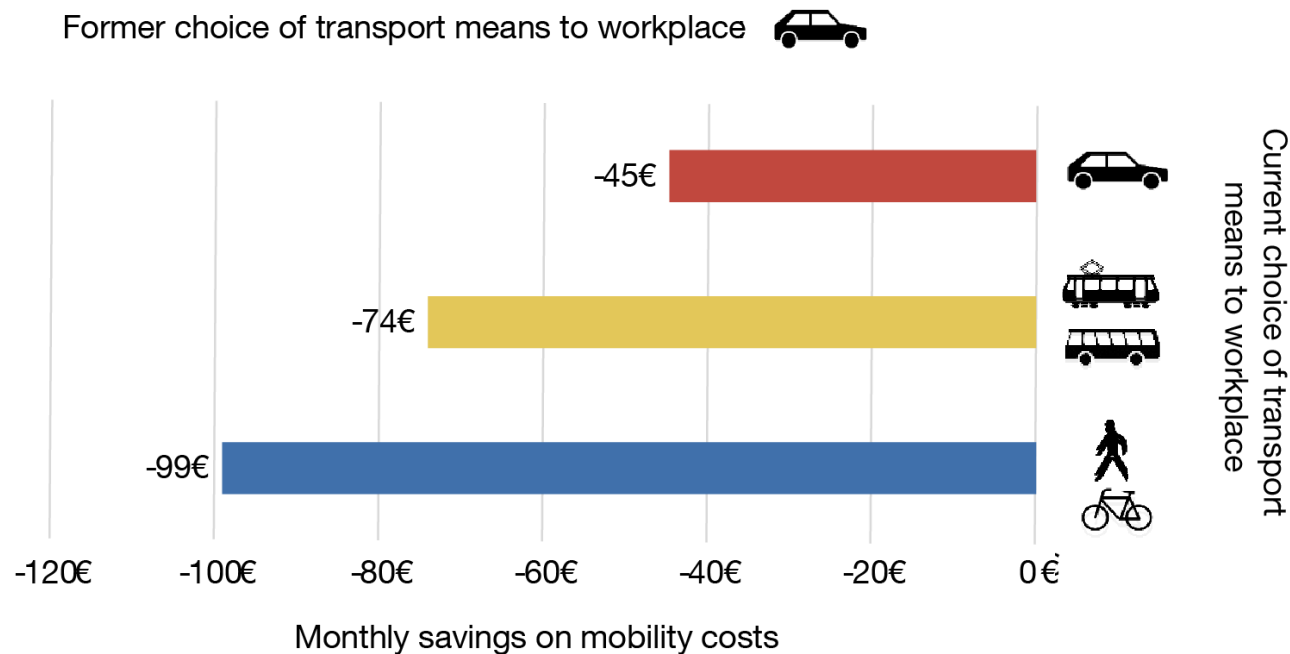


## Prevalence of workplace relocation reasons

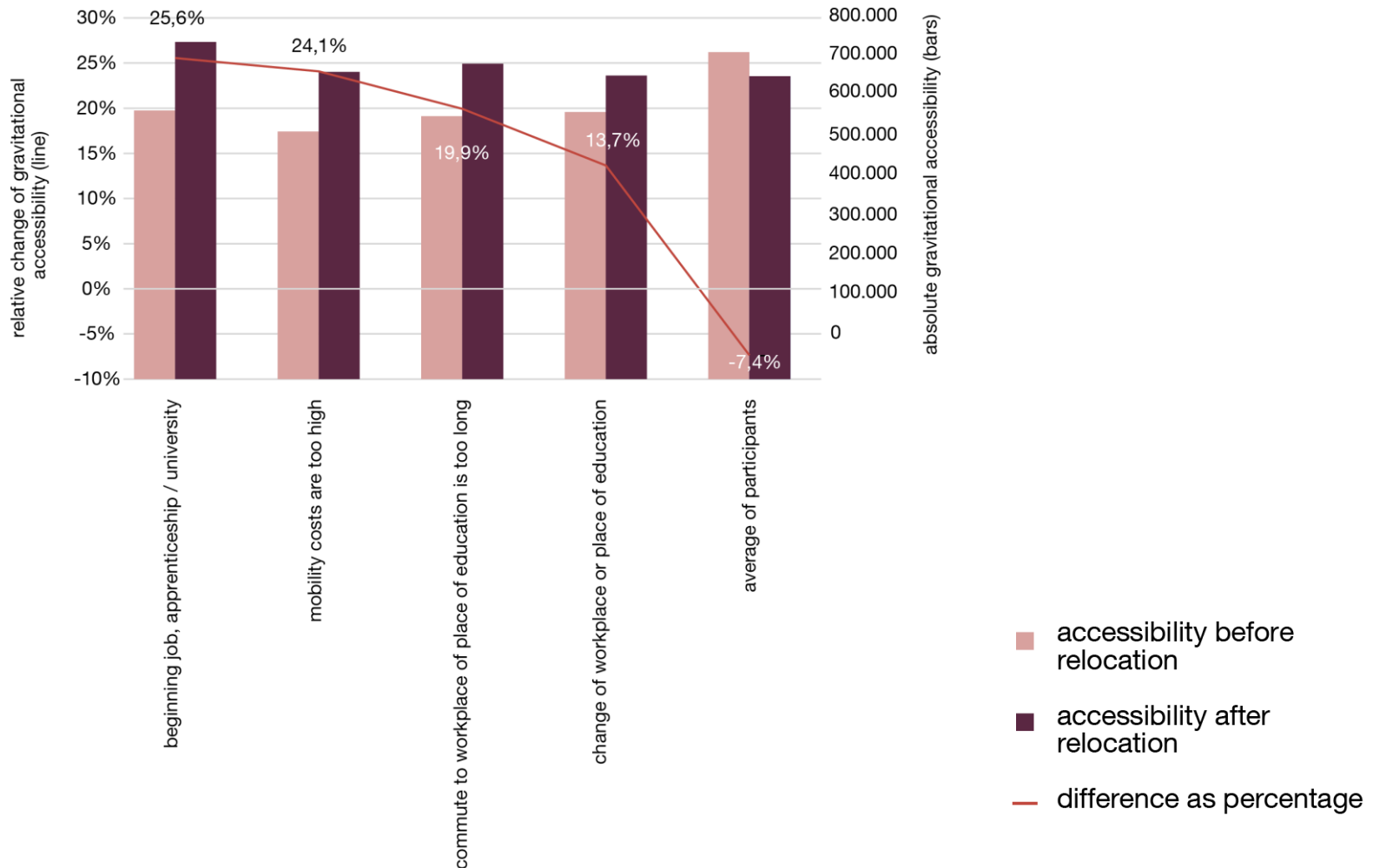


# Significant Savings on Duration and Costs of Commute

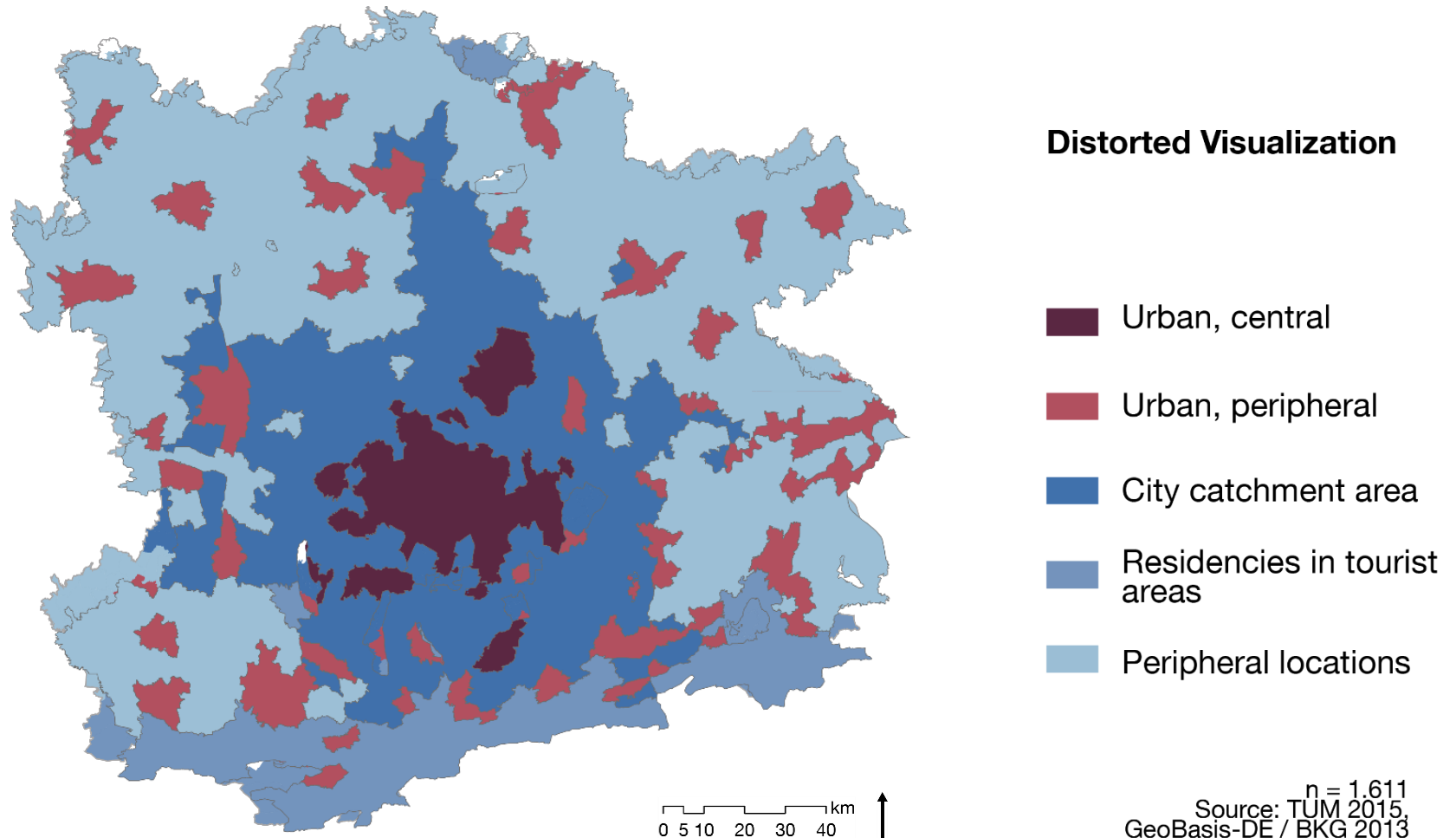
- Change of duration - 33%
- Change of mobility costs: - 25%



# Higher PT-Accessibility with Relocation Reasons Connected to Workplace and Mobility



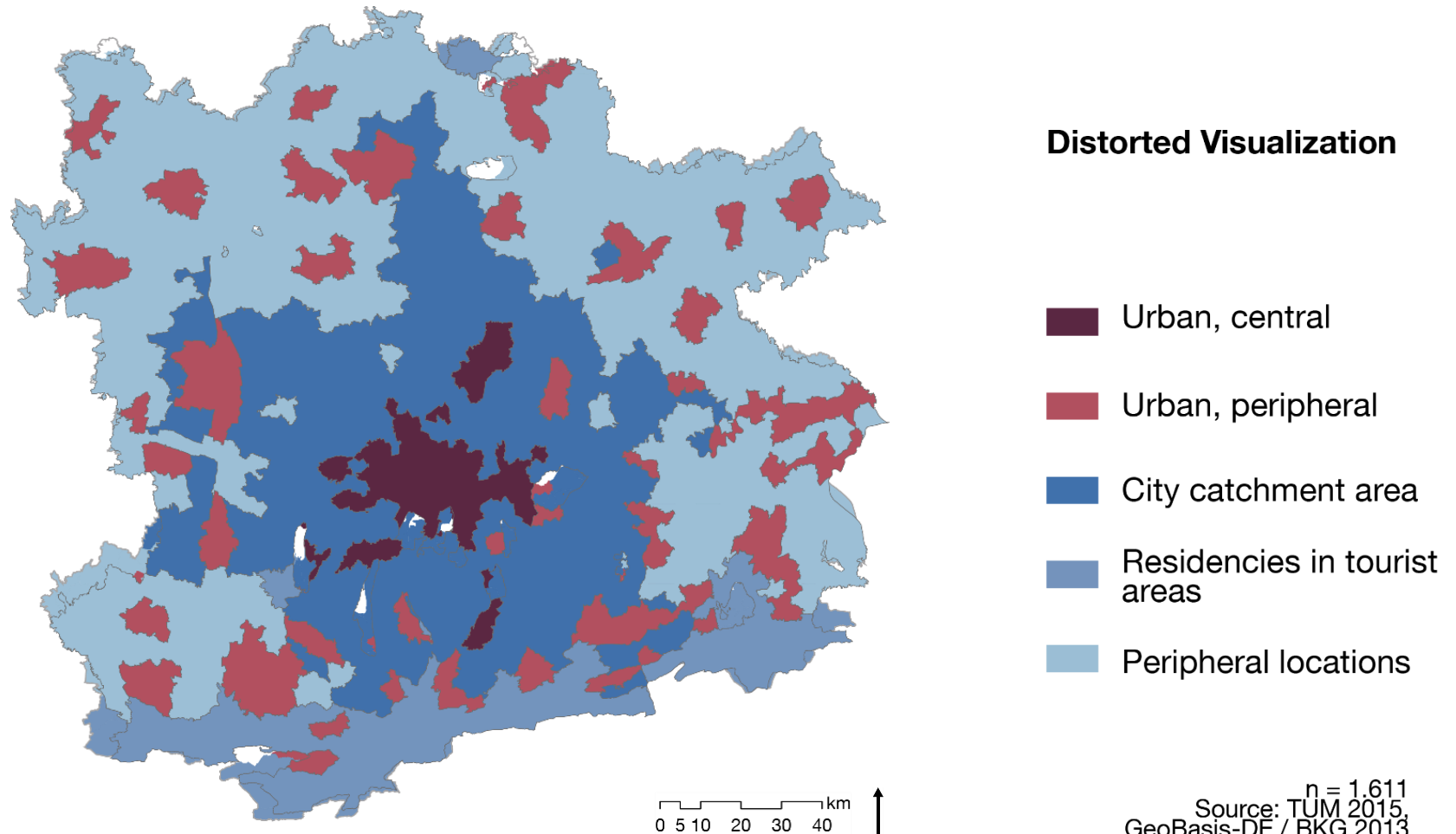
# Residence Relocations in More Central Areas



n = 1.611  
Source: TUM 2015,  
GeoBasis-DE / BKG 2013

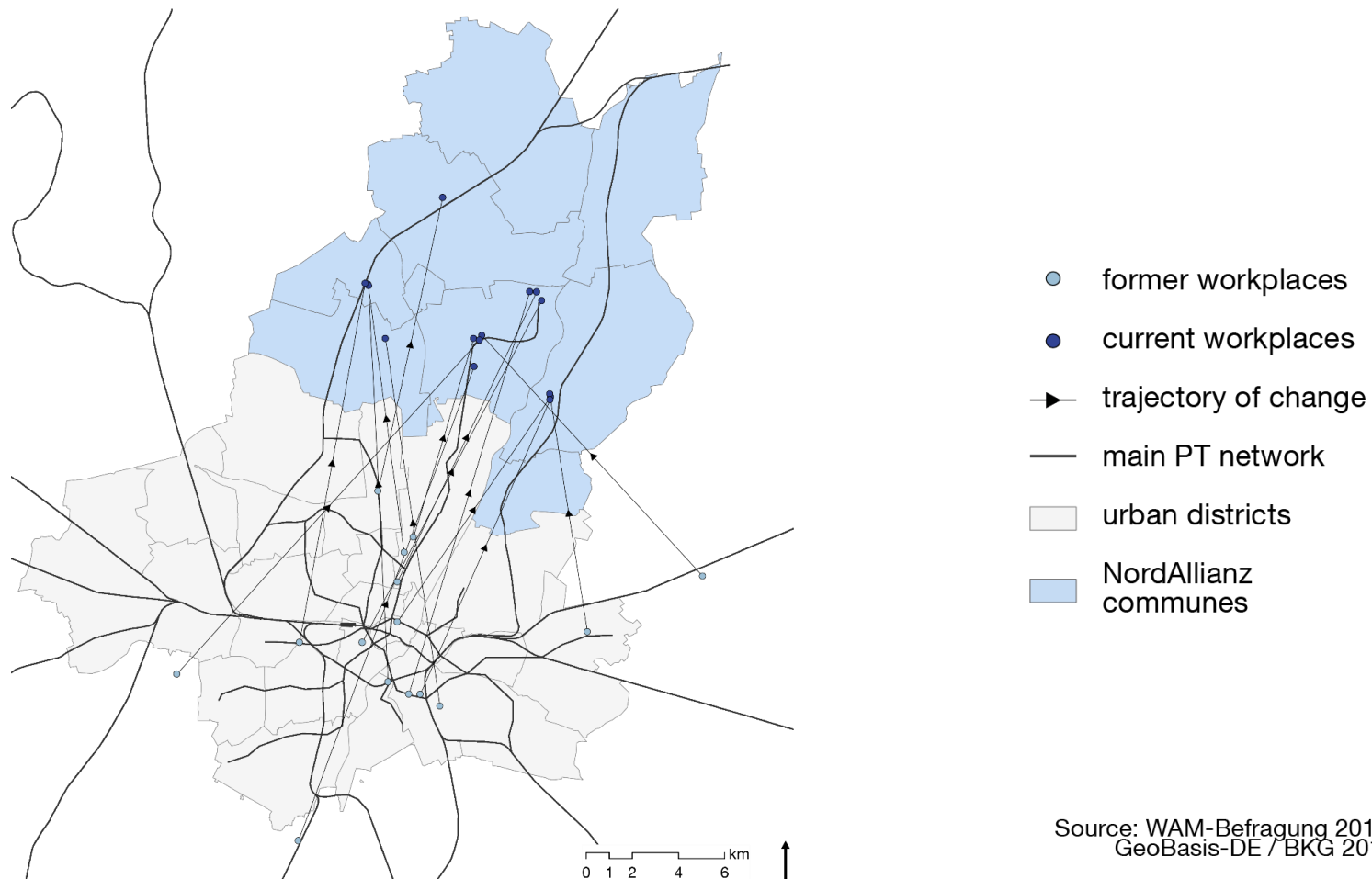


# Workplace Relocations in More Peripheral Areas



n = 1.611  
Source: TUM 2015,  
GeoBasis-DE / BKG 2013

# NordAllianz: Residing Centrally – Working Decentrally



Source: WAM-Befragung 2015,  
GeoBasis-DE / BKG 2013

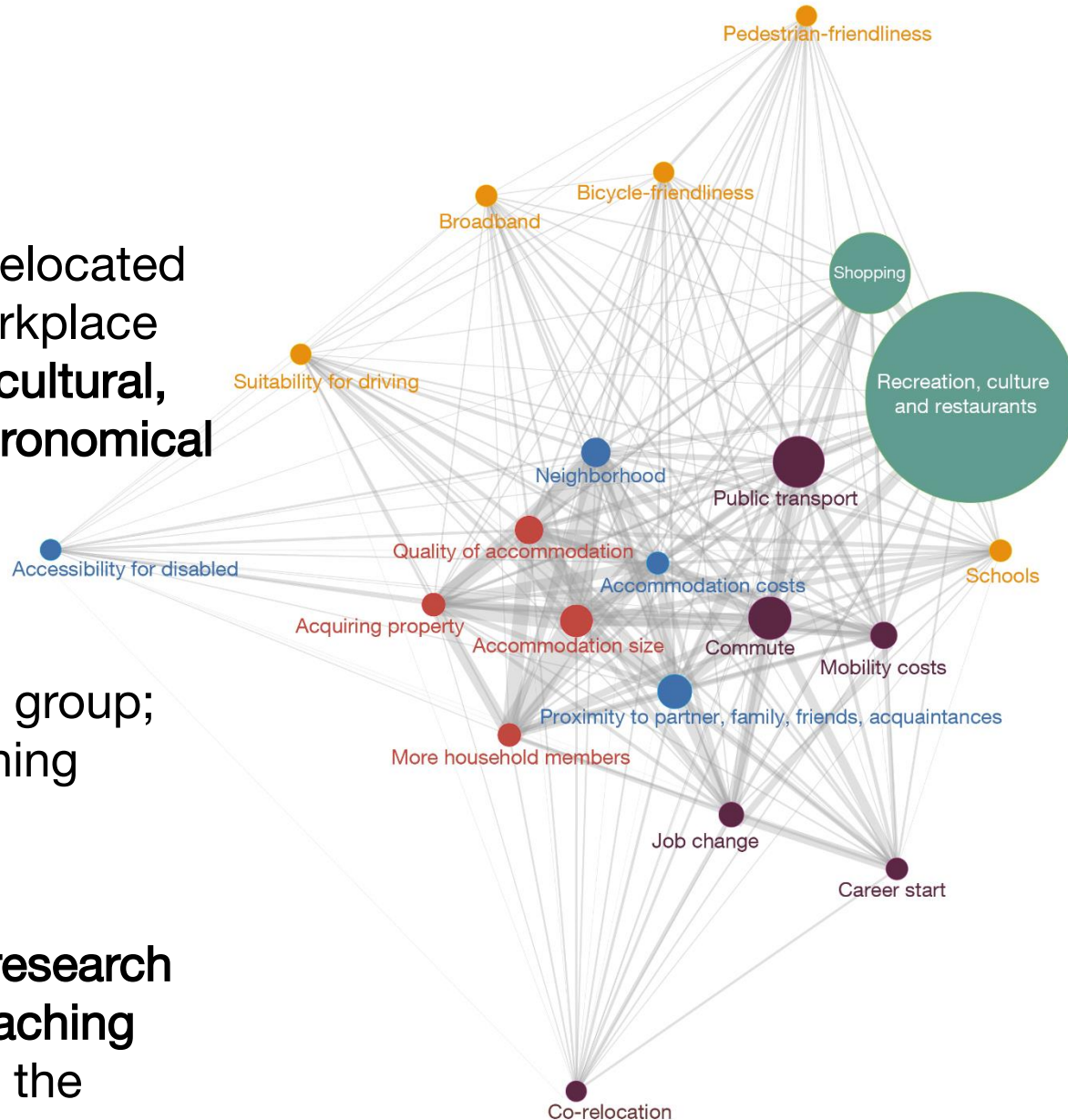
# Shorter and Cheaper Commute – Residing Centrally – Working Decentrally

- Shorter commuting distances require **spatial approximation** of residence and workplace location
- **Concentration** of residence locations
  - Increased PT availability
  - Less dependent on cars, more non-motorized mobility
  - Lower mobility costs, higher accommodation costs
- **Deconcentration** of workplace locations
  - Lower PT availability
  - More non-motorized mobility due to shorter distances
  - Low mobility costs despite car use

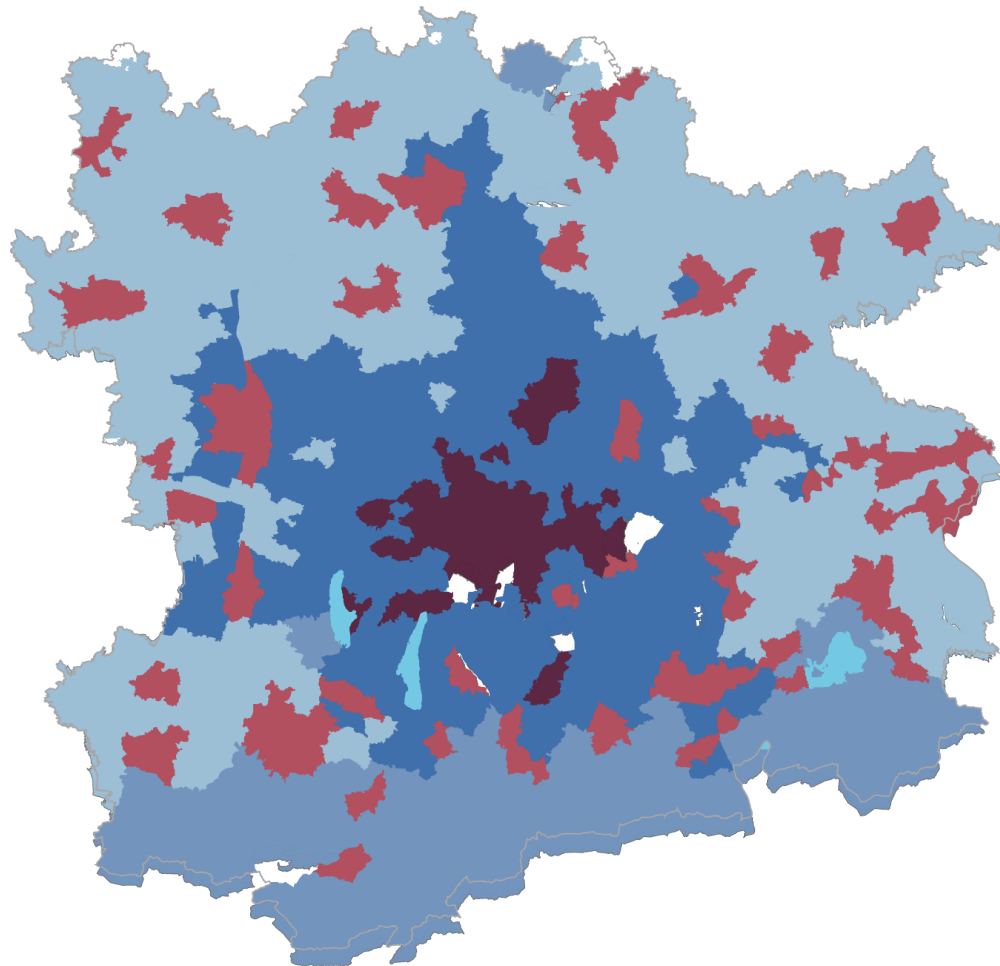
**Reducing Private Space –  
Using Public Amenities –  
Environmentally Friendly Commute**

# A Question of Lifestyle

- 10% of participants relocated their residence or workplace because of a lack of **cultural, recreational** and **gastronomical** amenities
- Unspecific social demographics of this group; **lifestyle** is the combining element
- Participants work in **research** and development, **teaching** and education and in the **creative** industry



# Improve Amenities

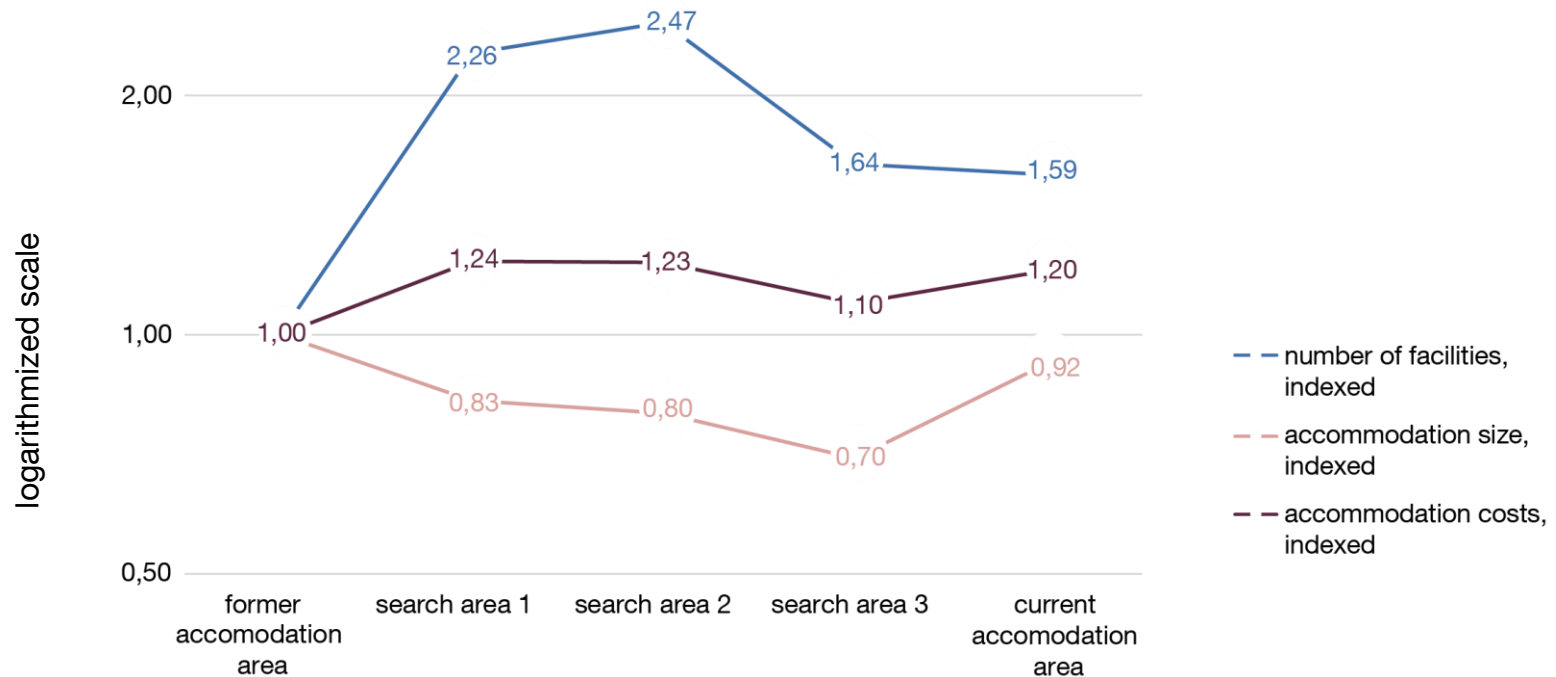


## Distorted Visualization

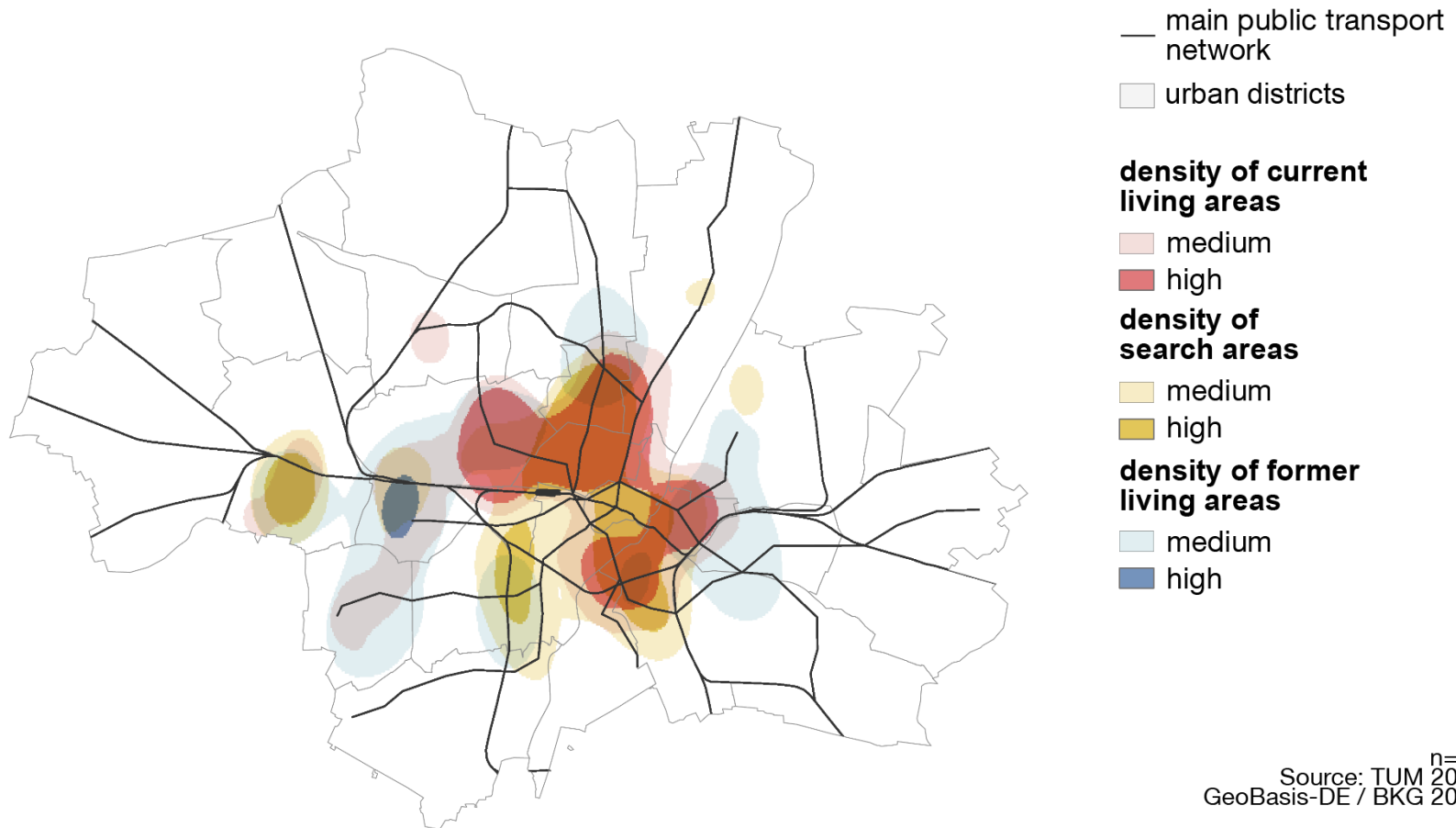
- Urban, central
- Urban, peripheral
- City catchment area
- Residencies in tourist areas
- Peripheral locations

n = 1.611  
Source: TUM 2015,  
GeoBasis-DE / BKG 2013

# More Amenities, Less Living Space

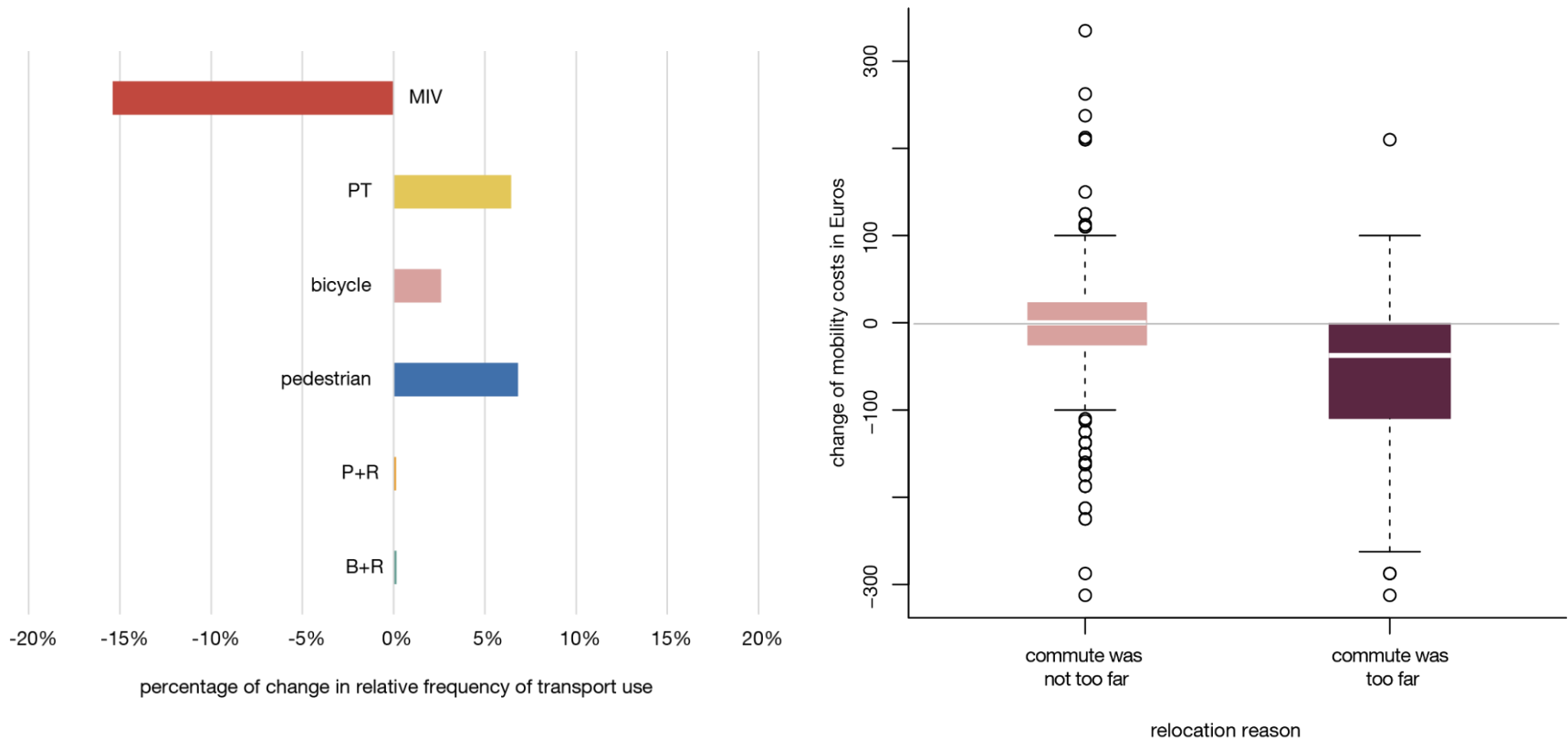


# Highly Popular Vibrant Urban Districts of Munich





# Residing Close to Amenities Determines Environmentally Friendly Mobility



# Reducing Private Space – Using Public Amenities – Environmentally Friendly Commute

Central driving forces of the **concentration of residence and workplace**

- **Functional diversity** and amount of gastronomical and cultural facilities
- Amenity value of **public space**
- **Pedestrian- and bicycle-friendly** environment
- Job perspectives in **knowledge-intensive sectors**

**Residing More Comfortably –  
Acquiring Property –  
Leaving Centers**

# Comfort of Living as Largest Driving Force of Spatial Dispersion

**Acquiring property and comfort of living  
as important relocation reason for 27% of participants**

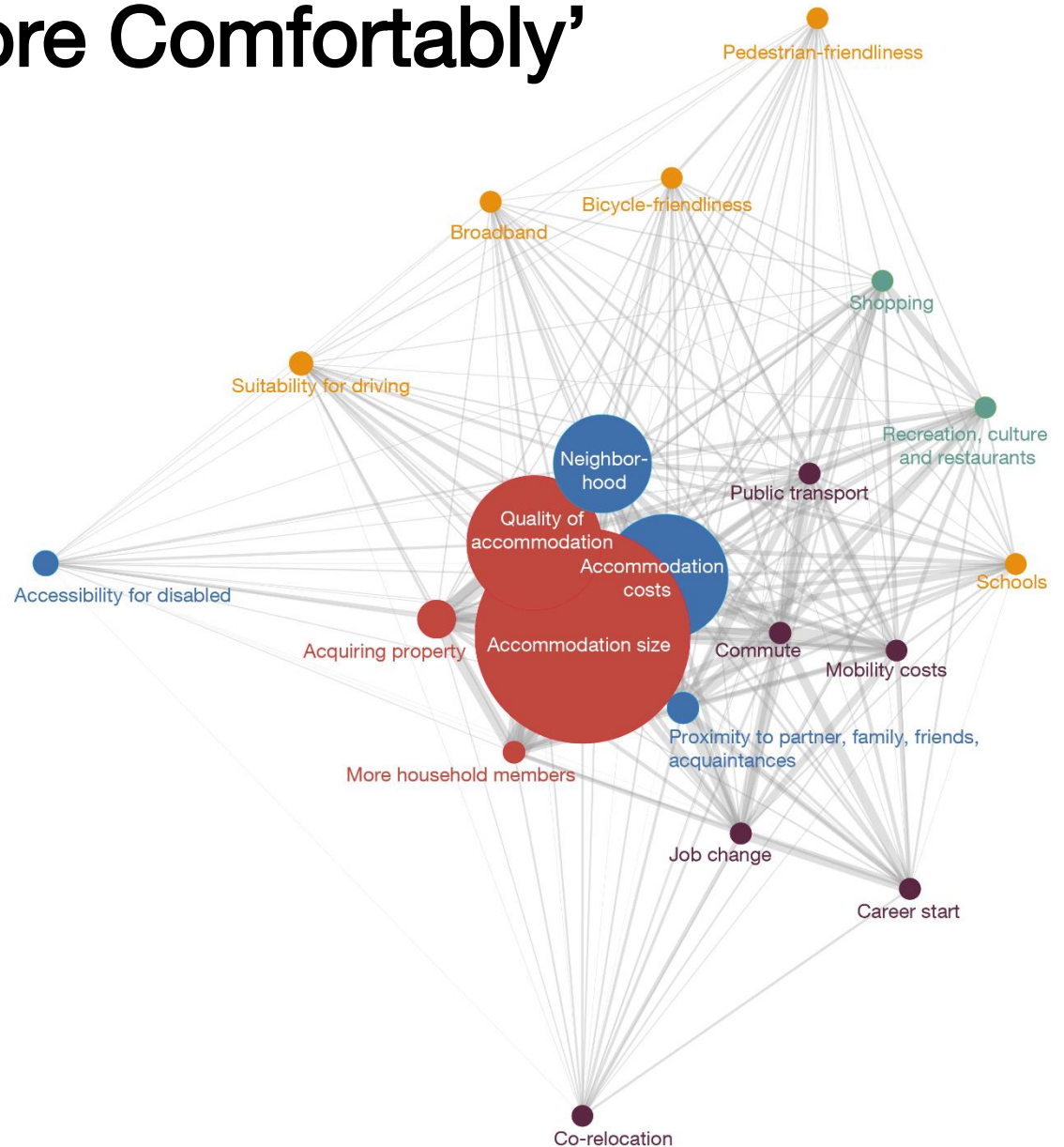
- Slightly less than the structural data of the official statistics imply
- Households in phase of starting families, head of household 30-49 years, above average income

**No other groups have as strong a tendency to leave compact centers**

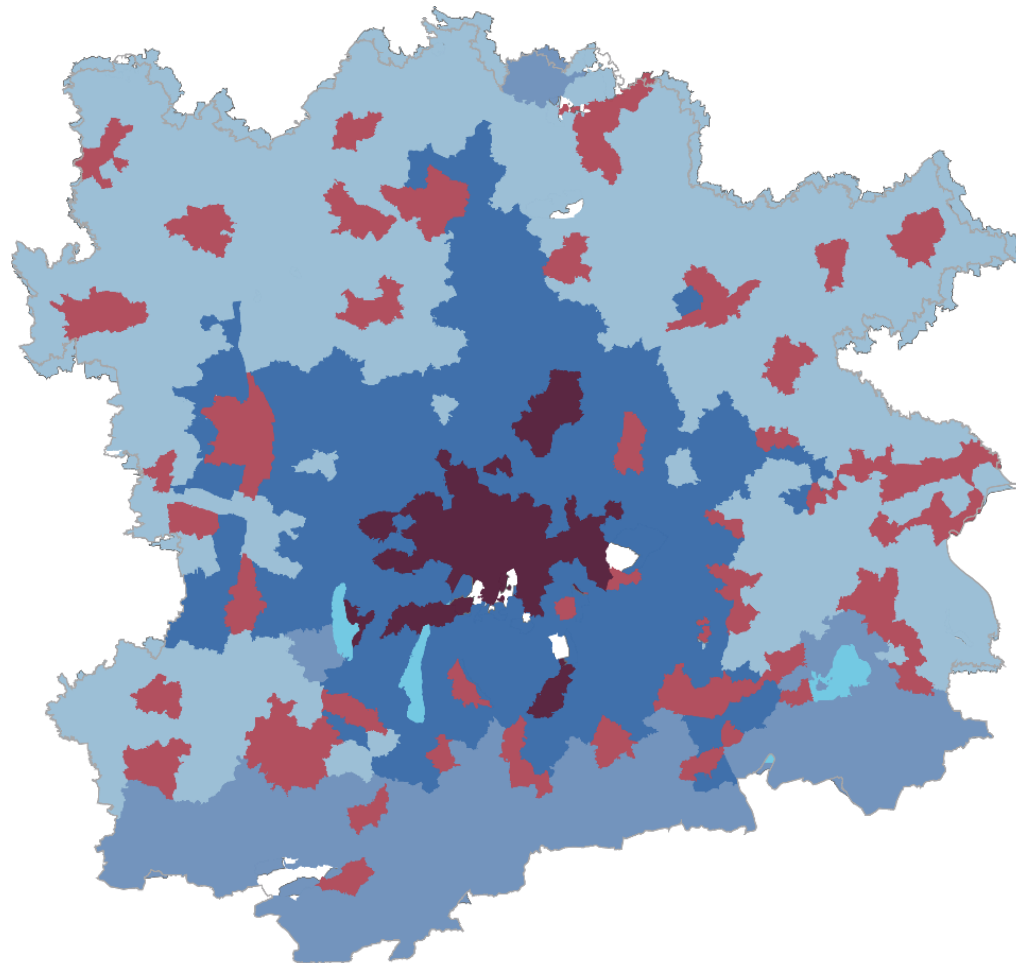
However, improving accommodation results in unwanted loss in other areas (“trade-off”)

- The stated preference of pedestrian accessibility of service amenities, shopping facilities is as high as in other groups
- High car usage even before relocation

# ‘Residing More Comfortably’



# ‘Residing More Comfortably’

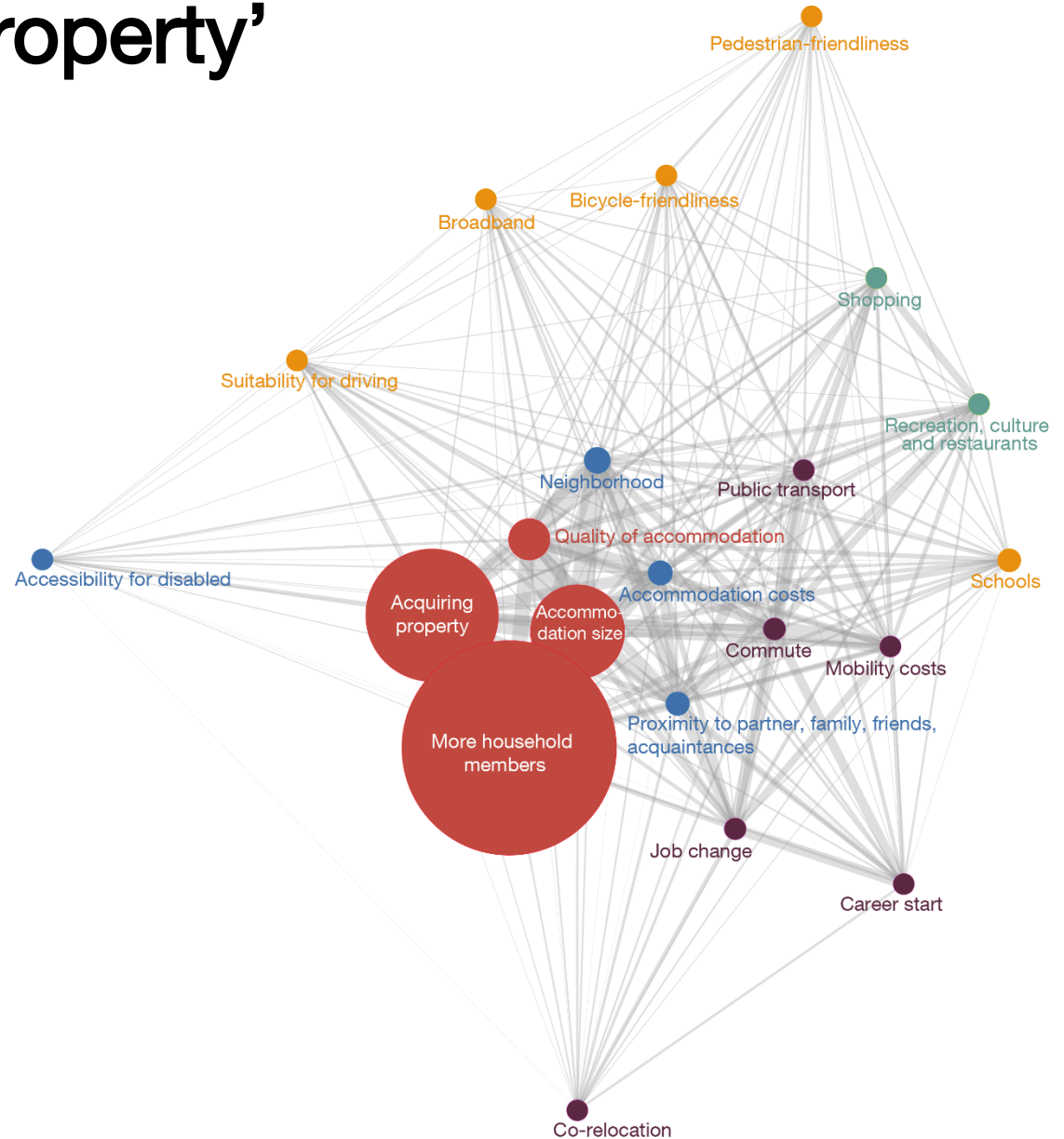


## Distorted Visualization

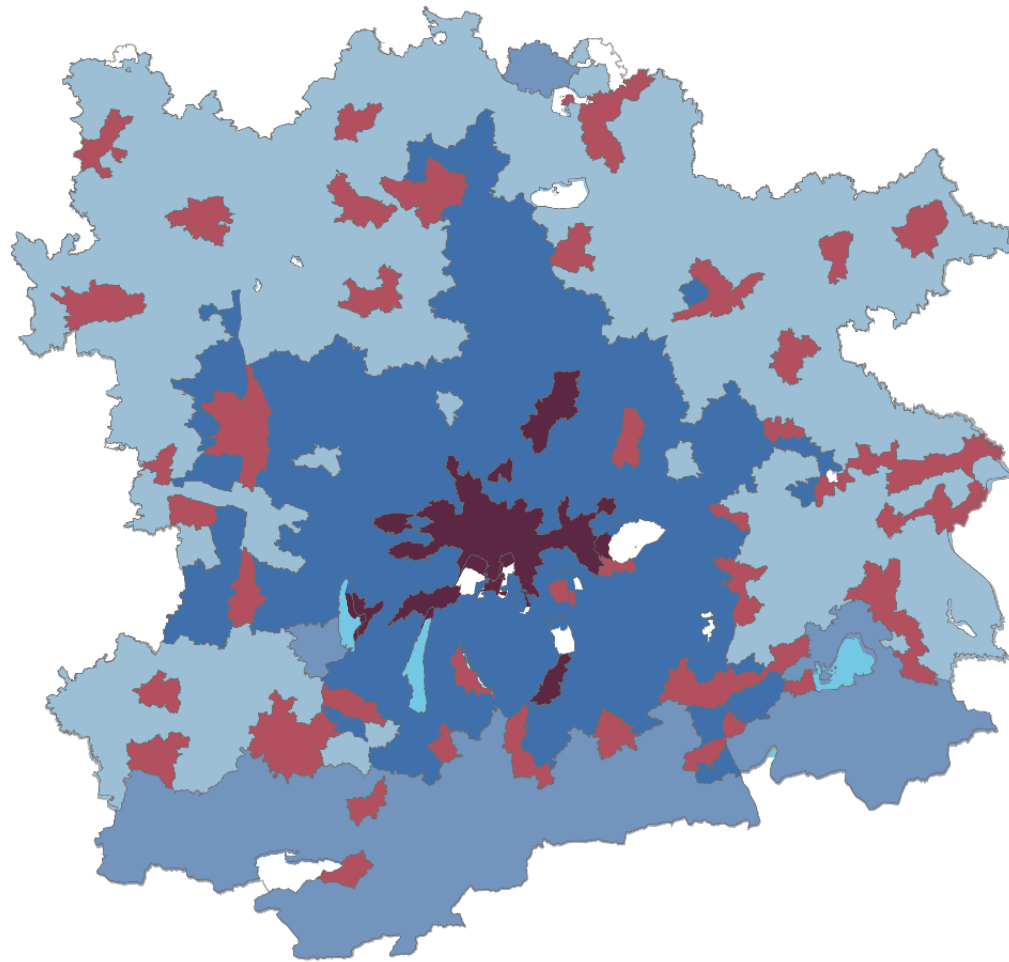
- Urban, central
- Urban, peripheral
- City catchment area
- Residencies in tourist areas
- Peripheral locations

n = 1,611  
Source: TUM 2015,  
GeoBasis-DE / BKG 2013

# ‘Acquiring Property’



# ‘Acquiring Property’



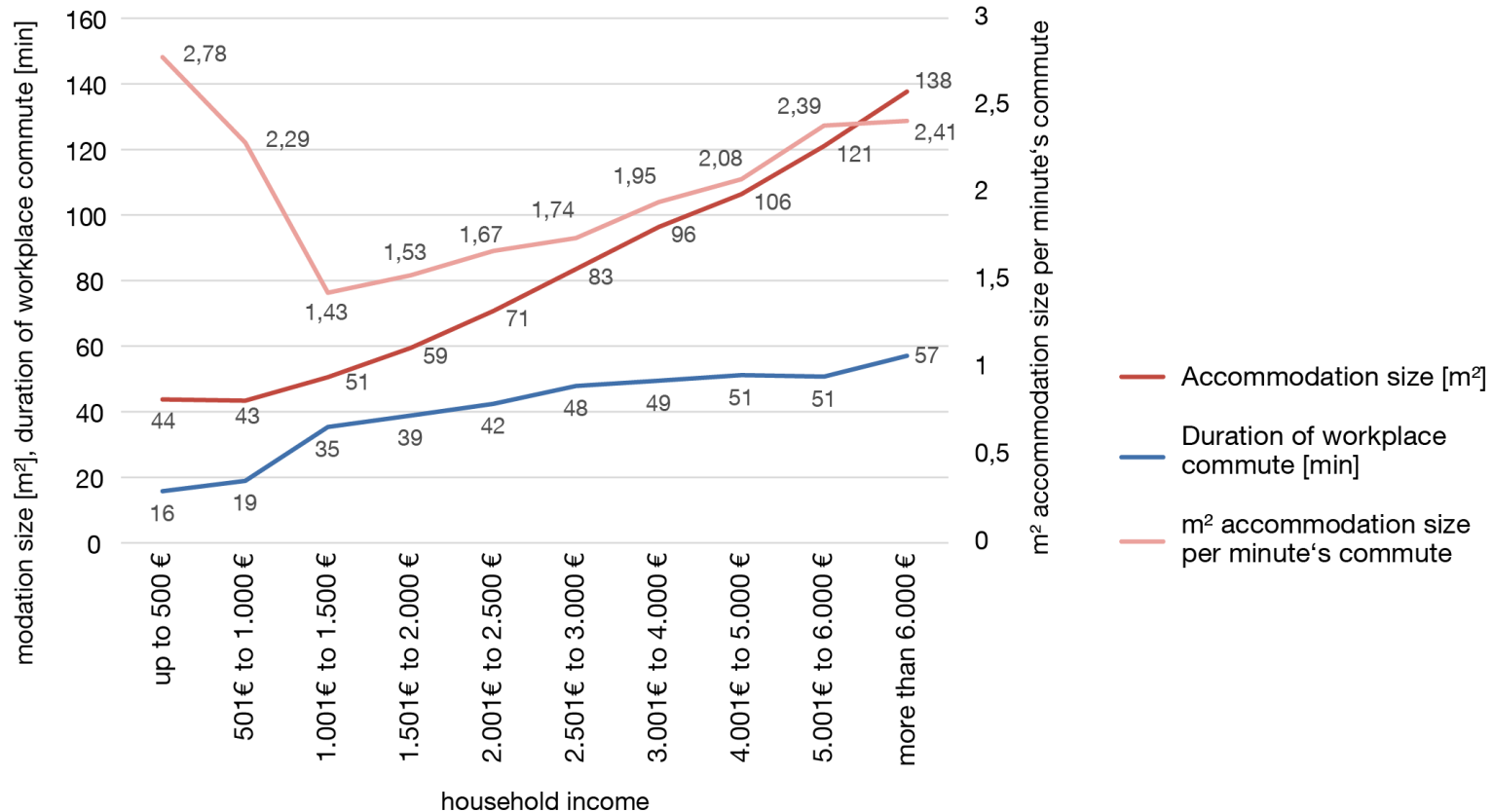
## Distorted Visualization

- Urban, central
- Urban, peripheral
- City catchment area
- Residencies in tourist areas
- Peripheral locations

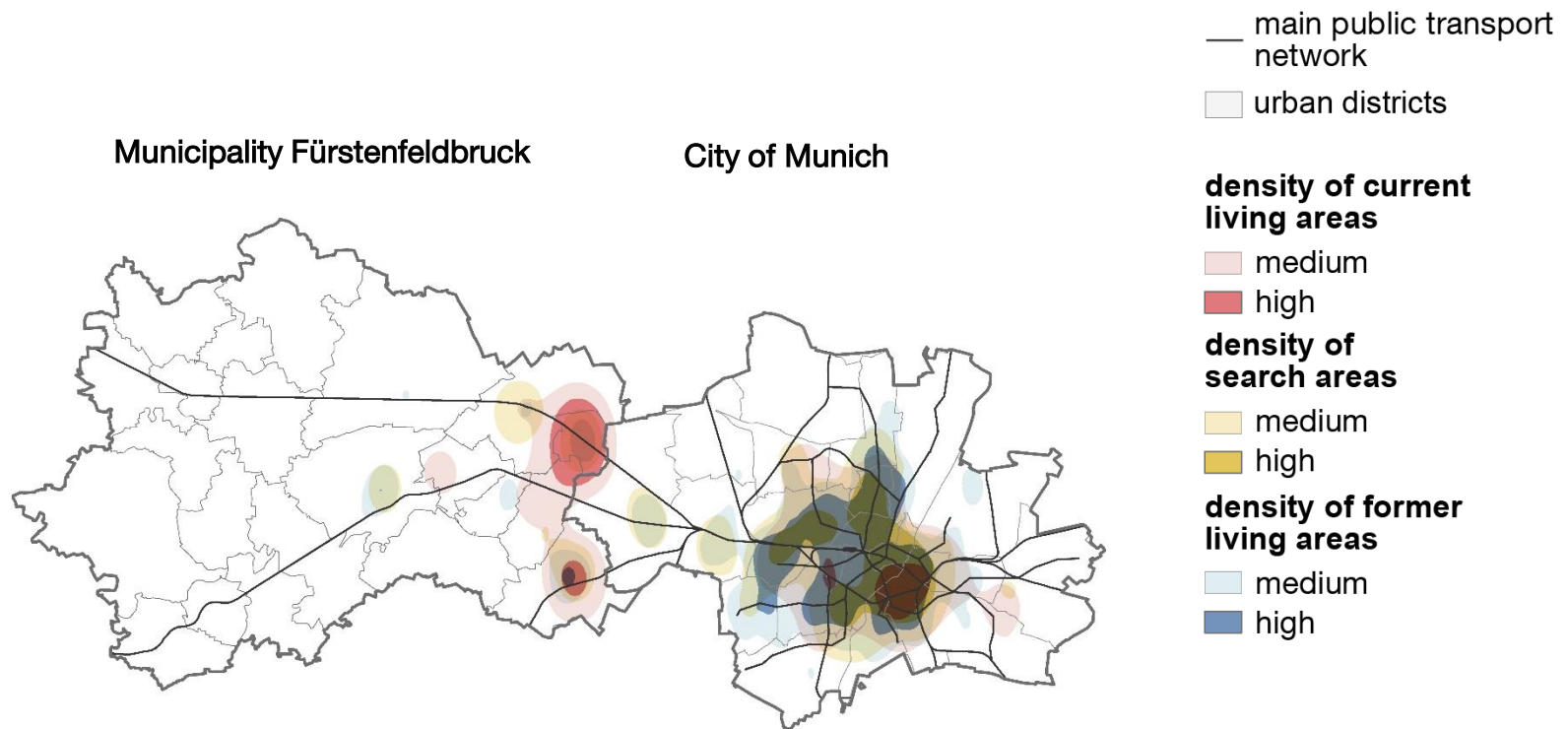
n = 1,611  
Source: TUM 2015,  
GeoBasis-DE / BKG 2013



# Commuting Distance Is Not Desirable, But Accommodation Size Is More Important



# Municipality Fürstenfeldbruck



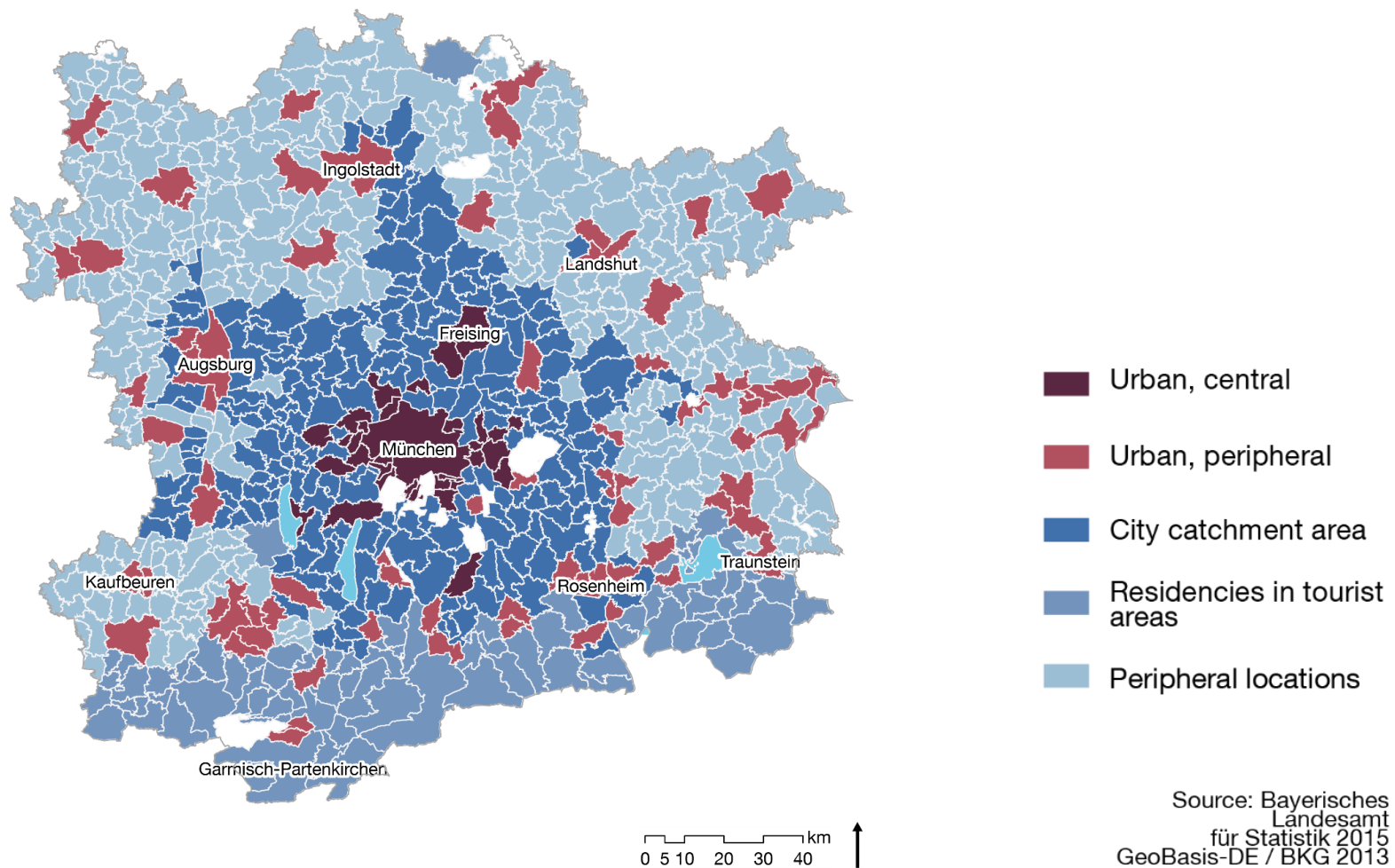
n=1.113  
Source: TUM 2015  
GeoBasis-DE / BKG 2013

# Residing More Comfortably – Acquiring Property – Leaving Centers

- In the Munich Metropolitan Area, instead of a trend „back to urban center“ there is a complex **simultaneity** of suburbanization and re-urbanization
- **Young couples and families** are leaving the core cities and moving to the city catchment areas
- **Proximity to shopping facilities and public transport** are still unanimously important
- Commuting distance to workplace and accommodation size increase with **household income**
- Households with **average income** have the **worst relation of m<sup>2</sup> living space to duration of commute**

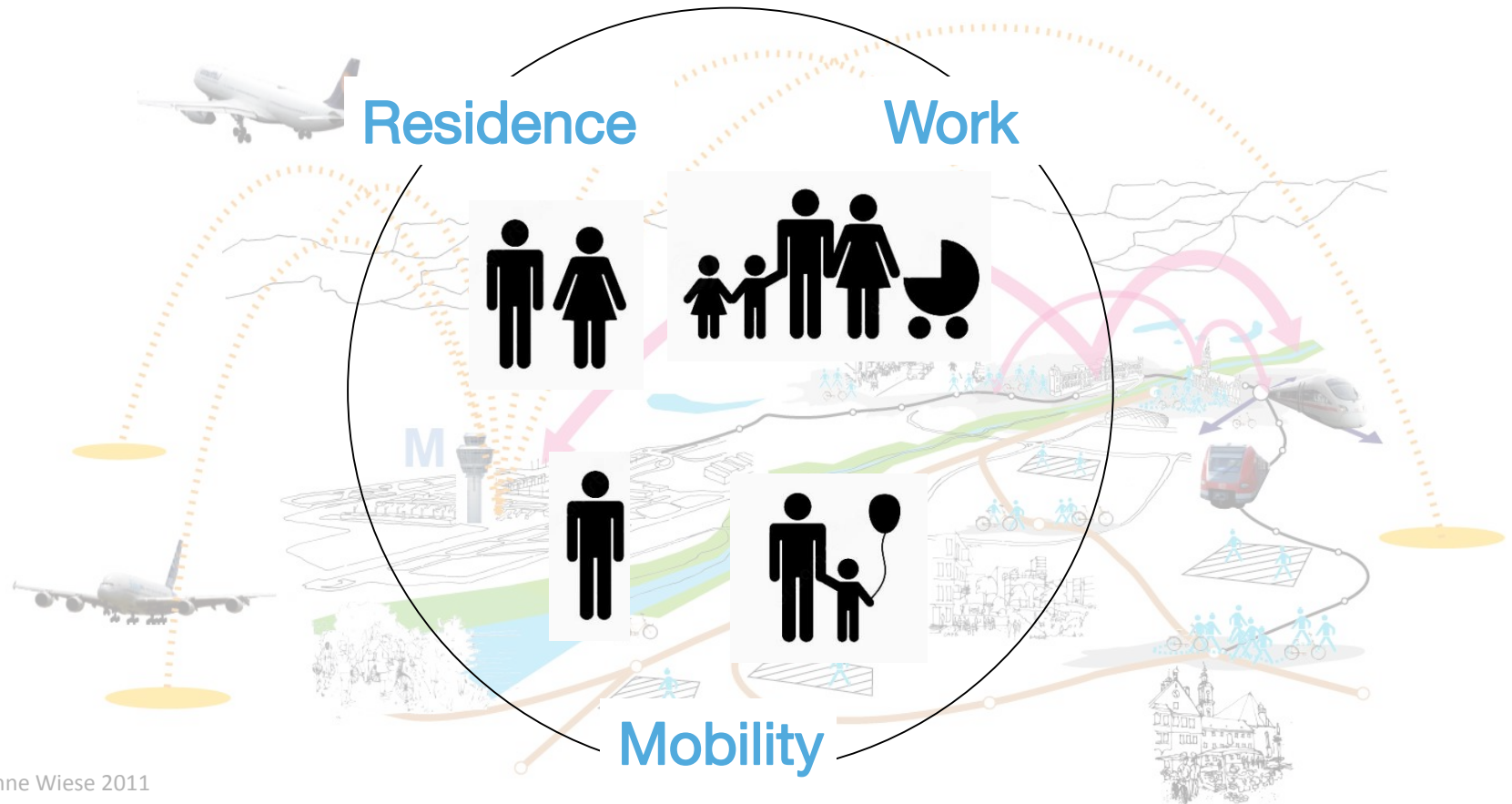
# Fields of Action and Development Options

# Fields of Action



Source: Bayerisches  
Landesamt  
für Statistik 2015  
GeoBasis-DE / BKG 2013

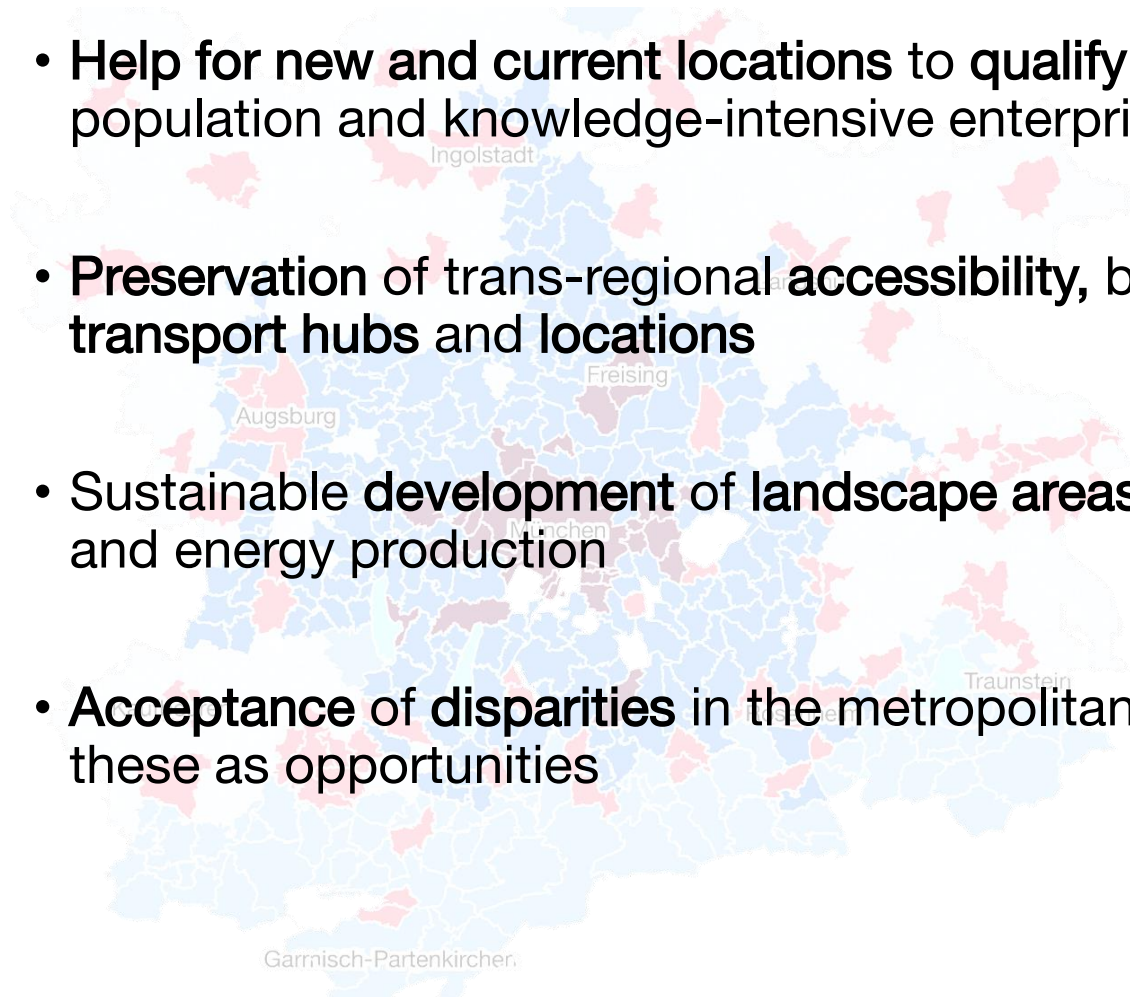
# Fields of Action



# Development Options

## Preserving Development in the Region

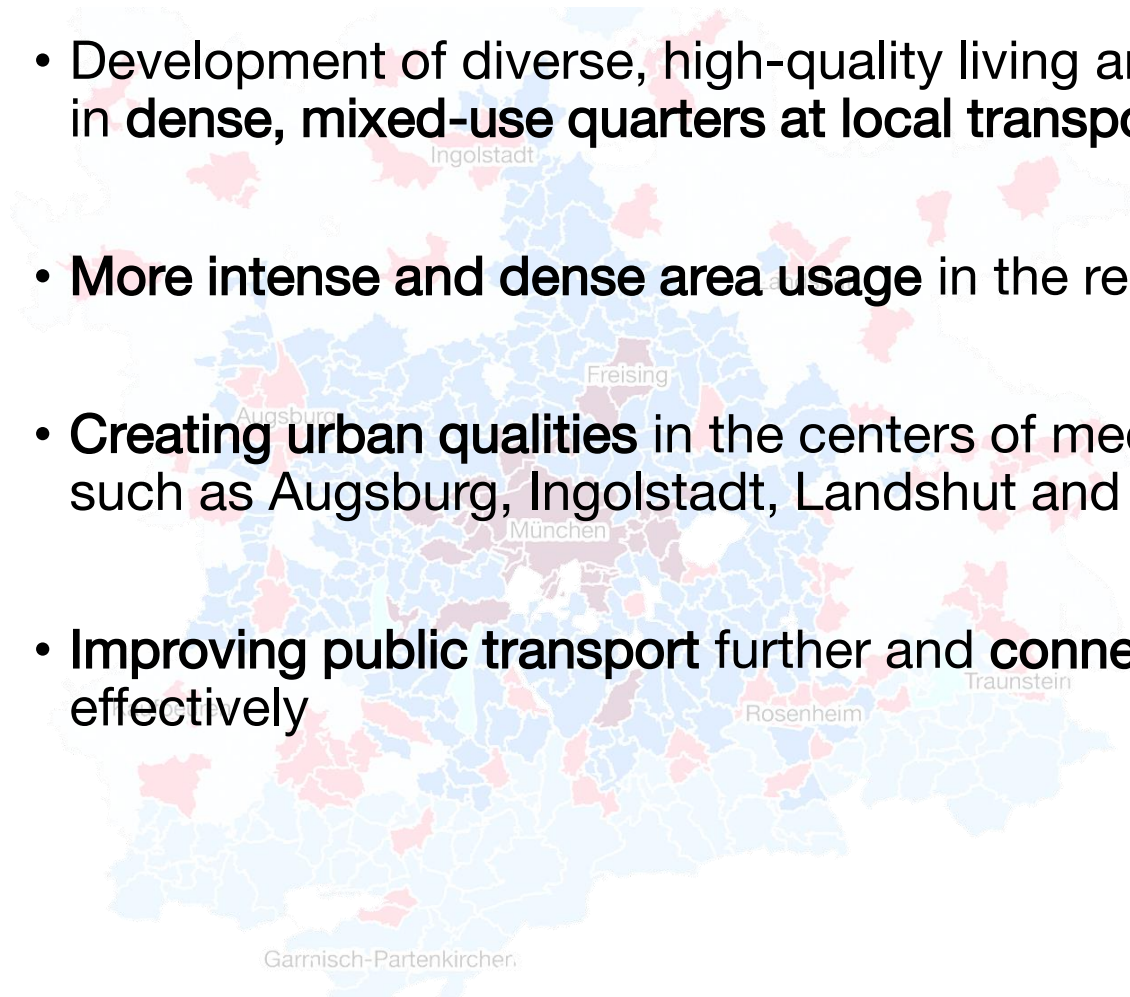
- **Help for new and current locations to qualify** for growing population and knowledge-intensive enterprises
- **Preservation of trans-regional accessibility, better connection of transport hubs and locations**
- Sustainable **development of landscape areas** for recreation, health and energy production
- **Acceptance of disparities** in the metropolitan region and regarding these as opportunities



# Development Options

## Developing High-Quality Growth Regions

- Development of diverse, high-quality living and working facilities in **dense, mixed-use quarters at local transport hubs**
- **More intense and dense area usage** in the region's core
- **Creating urban qualities** in the centers of medium-sized cities such as Augsburg, Ingolstadt, Landshut and Rosenheim
- **Improving public transport further and connecting** centers more effectively

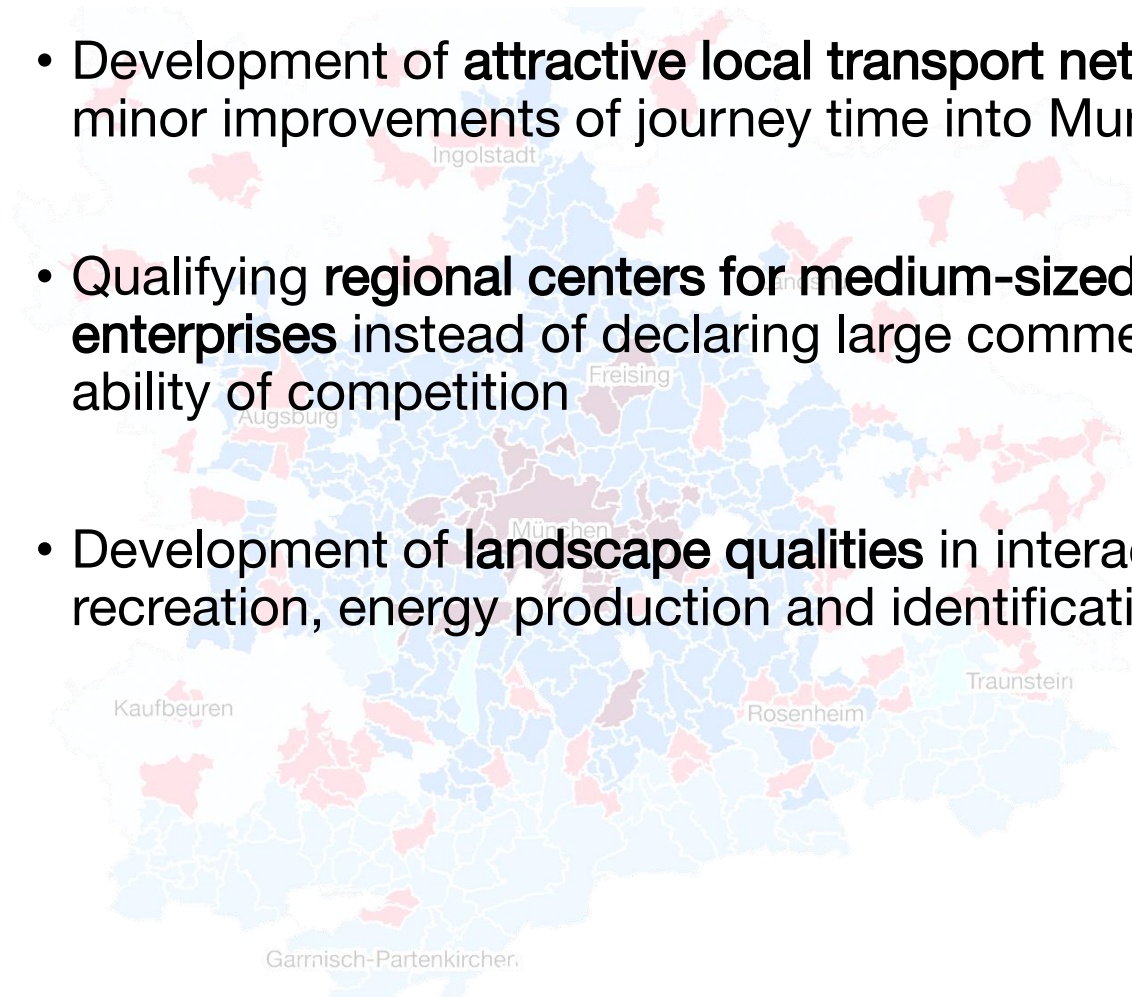




# Development Options

## Landscape Preservation, Reinforcing Regional Centers

- Development of **attractive local transport networks** instead of minor improvements of journey time into Munich
- Qualifying **regional centers for medium-sized and smaller enterprises** instead of declaring large commercial areas without ability of competition
- Development of **landscape qualities** in interaction with local recreation, energy production and identification



# Development Options

## Variable Geometries for the Metropolitan Region

- **Coordination** of urban structure, land use policy and transport services on **different spatial scales**
- **Negotiating benefits and burdens** fairly between sub-units
- Founding of more **small-scale regional networks** which are competent to face locally specific challenges complementary to EMM e.V.
- Allowing **cooperation beyond the boundaries** of the metropolitan region including multiple memberships

