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POSVET DRUŠTVA ZA CESTE SEVEROVZHODNE SLOVENIJE

RAZVOJNA IN PROMETNA INFRASTRUKTURA NA KOROŠKEM

## The Koralm Railway – An opportunity for Southern Austria?

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## About the research project

### Introduction

**Chapter 1:** The impact of accessibility – infrastructure, commuting links and the future urban agglomeration Graz-Klagenfurt

**Chapter 2:** Economic dynamics, socio-economic and structural change – demographic development as a challenge

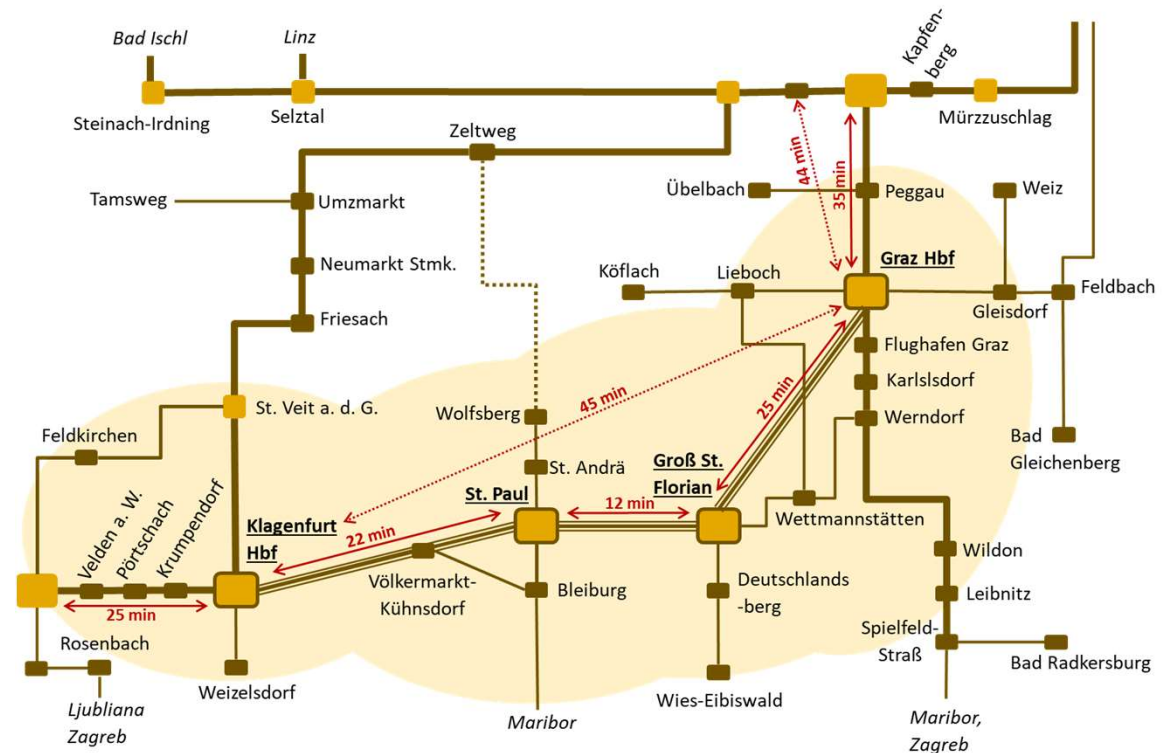
**Chapter 3:** Model estimates – A quantitative estimate of the direct and indirect effects that the opening of the Koralm Railway will have on the regions

**Chapter 4:** Conclusions – Implications for a "new" strategically oriented and equally cross-regional transport and regional policy

**Chapter 5:** Small-scale implications – strengths, weaknesses, opportunities and challenges in the districts along the Koralm Railway

### Recommendations for action

THE INNOVATION COMPANY





## Accessibility as a factor

Carinthia and Styria are among the **highly developed** European **industrial regions** and are in competition with them.

**Growth** – in terms of value added, jobs and population – is **unevenly distributed** across the regions; growth is **concentrated** in the **central** regions.

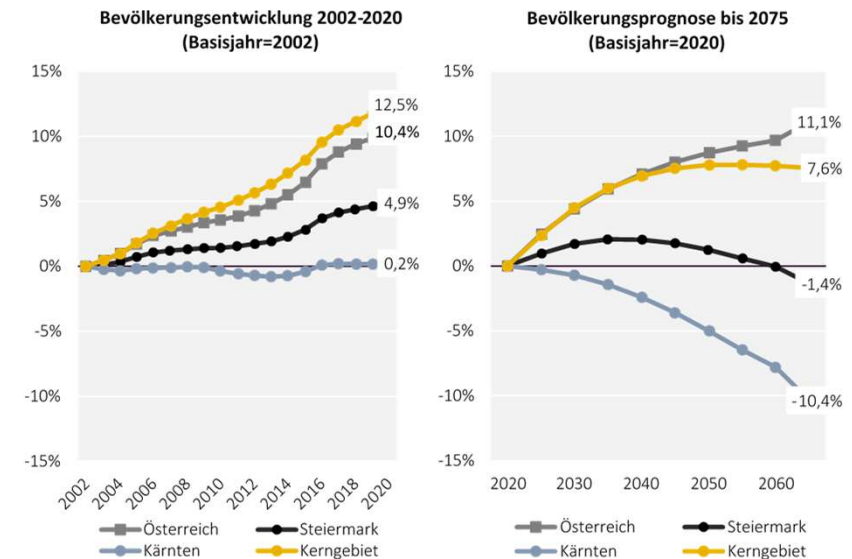
Infrastructure is a necessary prerequisite for further regional growth, as numerous studies have shown.

An **improvement in accessibility** can lead to a **stabilization** of the number of inhabitants in a shrinking region, and the same applies to the number of people working in a region.

Outward and inward commuter movements are influenced by the transport infrastructure. An improvement in the transport infrastructure leads to an increase in the availability of human capital in the region.

The **search radius** and thus the chances of finding work are increased, but at the same time competition with neighboring regions increases.

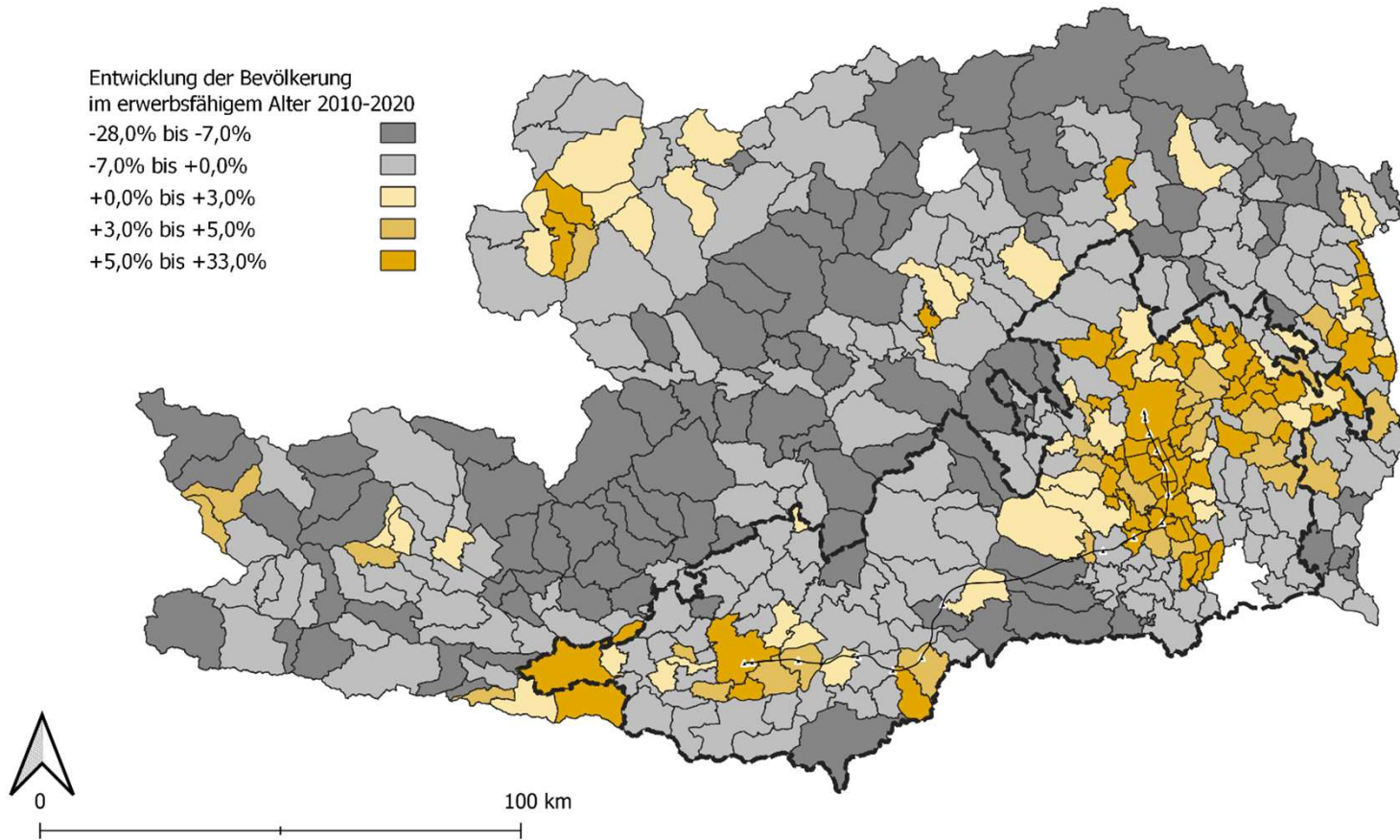
An assessment of intra-regional development differences as a key determinant of regional competitiveness must always take small-scale disparities in economic development into account. It is becoming increasingly important to **allow market forces to work** in the direction of agglomeration and to **rely on (infrastructure-supported) spillover effects** from the centers for the development of peripheral areas.



Quelle: Statistik Austria; eigene Darstellungen JR-POLICIES

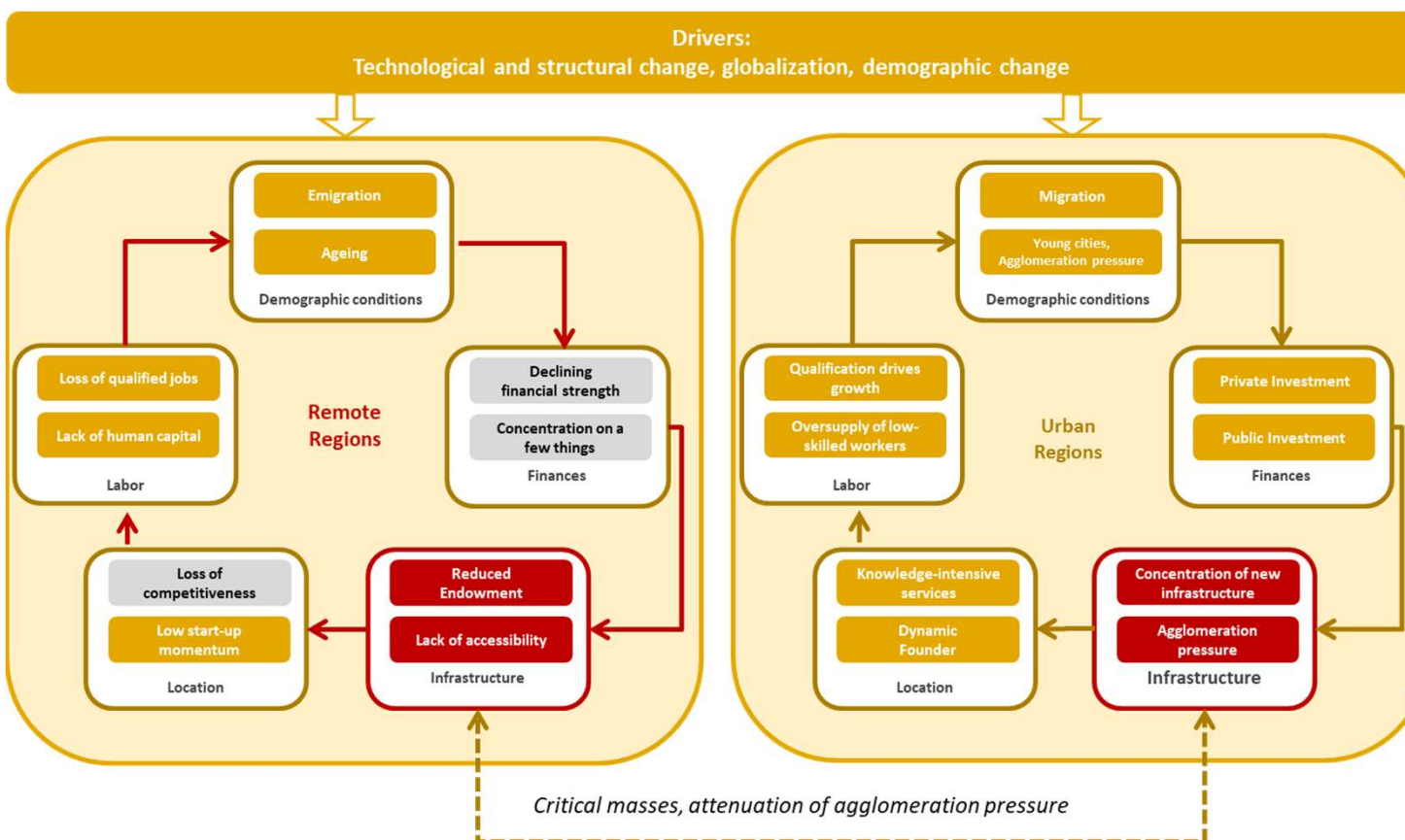
5 **Development of the working-age population**

It is clear that the dynamics (population growth) are concentrated in a few, predominantly urban municipalities. In Styria, these are Graz and regions that are located in the direct catchment area of the provincial capital or are well connected to it. The situation is similar in Carinthia, with only a few municipalities recording positive growth rates (primarily Klagenfurt, Villach and some lakeside municipalities).



## Accessibility as a factor

A **lack of infrastructure** leads a priori to a **locational disadvantage**, regional competitiveness decreases. Jobs are lost and hardly any new jobs are created. It is mainly young people who leave the periphery in order to find jobs, to be able to reconcile family and career, to be able to benefit from an urban environment and consume education, training and qualifications.



**Urban agglomerations benefit** from this structural and demographic change. The dynamic population growth is promoting structural change due to the supply of qualified people, although problems are also arising here – the increasing agglomeration pressure is leading to an increase in the volume of traffic. Rental, housing and living costs are rising. **Better connections between peripheral regions and urban agglomerations have a double effect in this context.**

## Model estimations

We analyze how accessibility or infrastructure and commuting distances (travel/commuting times) affected employment, work and unemployment, population development, etc. in the past and how these determinants influence each other.

Methodologically, two models are applied: a **gravity model** to estimate the implications on commuting behaviour/labour market, and a **dynamic model** to forecast the expected effects on demographic development.

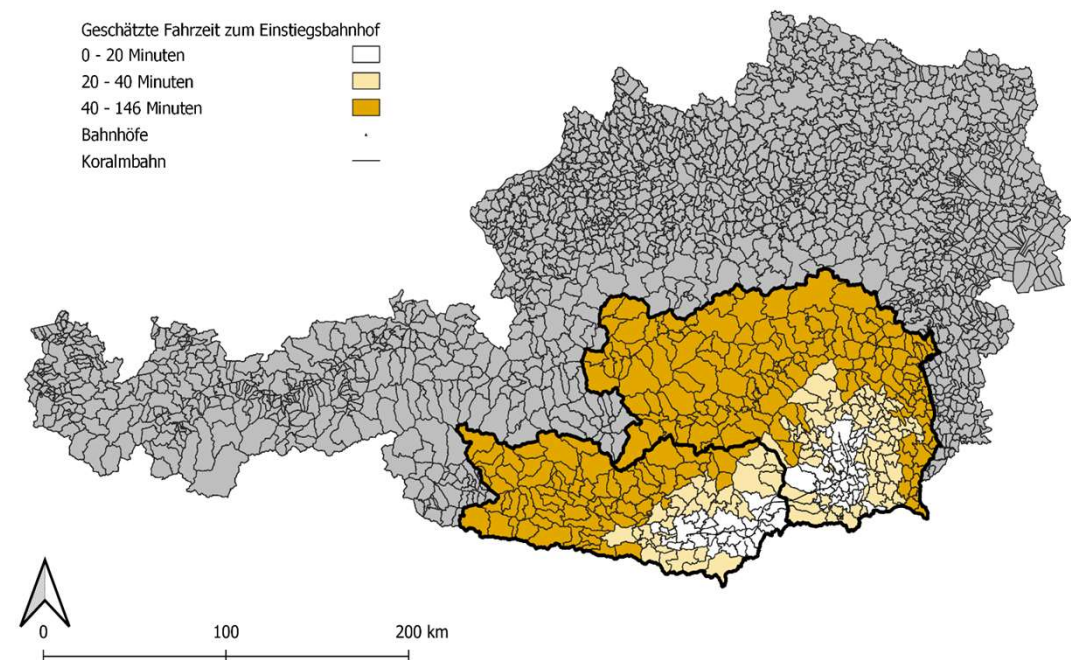
Finally, we ask the following questions:

- How would people's behaviour, unemployment, employment and population development change?
- What small regional differences or implications will arise?

The **aim** of this modeling is to **estimate the effects** of the Koralm Railway on the affected areas:

- commuting behaviour
- population development

The quantitative analyses are based on a distance matrix  $D$ , in which all distances between locations (municipalities) are mapped; each distance and the resulting average travel time between each region is recorded, i.e. the time required to travel from one municipality to any other municipality. A distinction is made between private transport (cars) and public transport (rail connections).



## Gravitation Model - Commuting

This family of models is essentially based on two assumptions: (1) the interregional links between two regions are positively proportional to their size, i.e. the higher the number of inhabitants in the respective municipalities, the higher the commuting movements between them, and (2) an increasing distance (geographical distance or travel times) has a negative effect.

The commuting figures are estimated using a Poisson model. The model in (3) is modified econometrically.

Instead of a single distance measure (travel time by car), additional indicators are used:

- Is there a train station in both municipalities?
- Does the connection lead from 'countryside' to 'city'?
- Does the connection lead to a provincial capital?

Tabelle: Ergebnisse Gravitationsschätzung, ohne Rasterdaten

	(1) baseline	(2) Variante 1	(3) Variante 2
Ursprungsort	1,287***	1,283***	1,279***
Bevölkerung	(0,181)	(0,184)	(0,181)
Zielort Bevölkerung	-0,151 (0,169)	-0,139 (0,170)	-0,128 (0,170)
Land-Stadt		-0,842*** (0,0615)	
Zugverbindung (0/1)	-0,192*** (0,0195)	-0,233*** (0,0247)	-0,0899*** (0,0173)
Zug ⊗ Schienen-km	0,00627*** (0,000471)	0,00162*** (0,000496)	0,00760*** (0,000697)
Zug ⊗ Land-Stadt		0,214*** (0,0331)	
Zug ⊗ Schienen-km, nicht Land-Stadt		0,00547*** (0,000787)	
Zug ⊗ Landeshauptstadt			-0,208*** (0,0319)
Zug ⊗ Schienen-km, Ziel nicht LH			-0,00408*** (0,000782)
Fahrtzeit PKW	-0,105*** (0,0003555)	-0,110*** (0,000391)	-0,110*** (0,000347)
Fahrtzeit ⊗ Land- Stadt		0,0210*** (0,000707)	
Fahrtzeit ⊗ Landeshauptstadt			0,0240*** (0,000826)
Beobachtungen	559.680	559.680	559.680

Robuste Standardfehler in Klammern

\*\*\* p<0,01; \*\*p<0,05; \*p<0,1

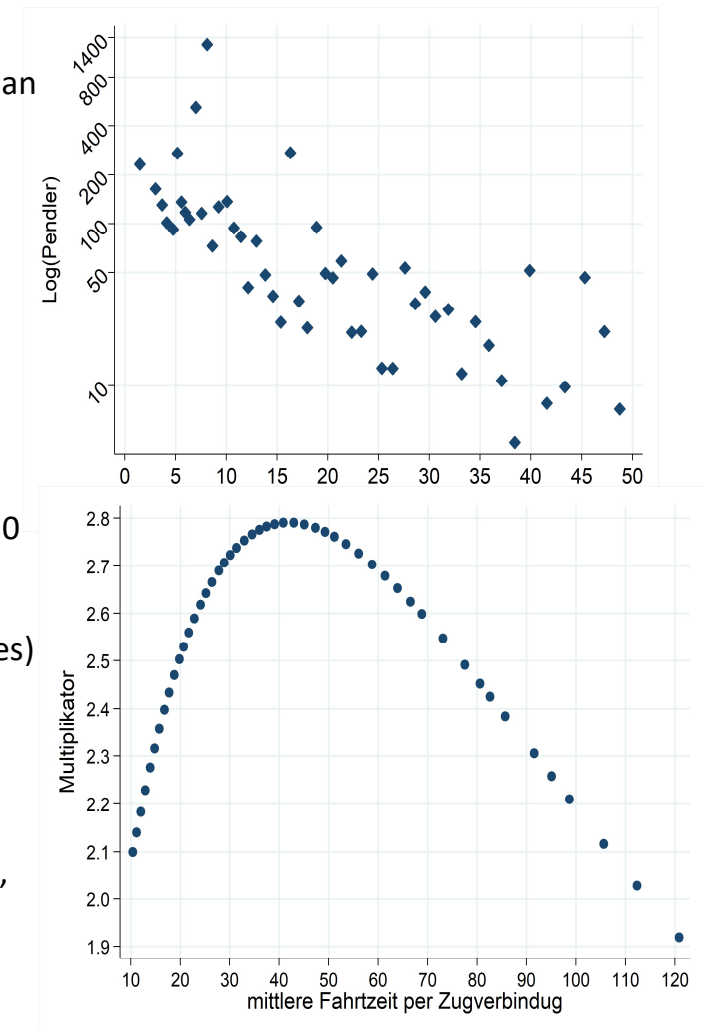


## 9 Gravitation Model - Commuting

The results are highly significant in all variants. For example, if the model is estimated without travel time and only with a 'train connection available' indicator, the estimated mean increase in commuting linkages is just under 35 %.

Even if the full model is specified, the core statement remains the same:

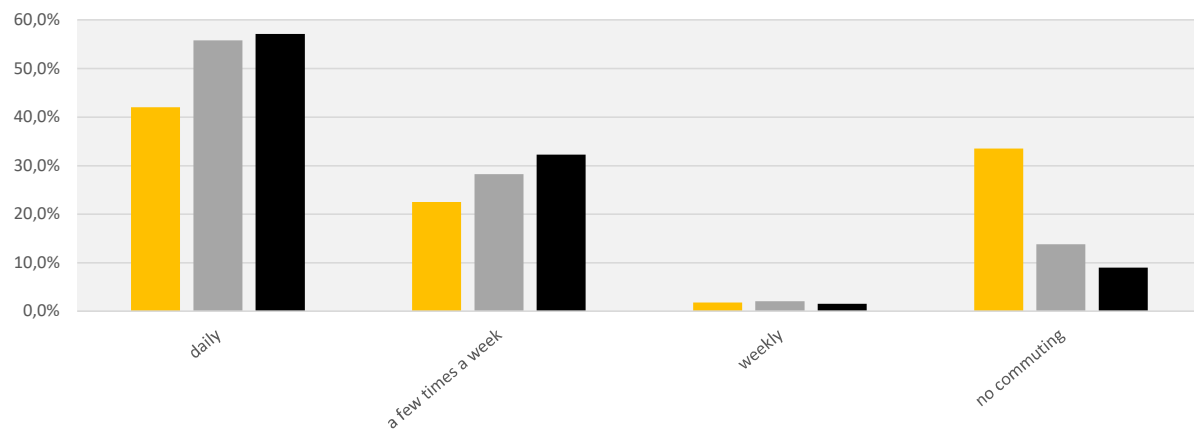
- A train connection has a significant impact on commuter flows (interregional linkages), which decreases with the distance between origin and destination. This is illustrated by the average number of commuters and the distances traveled. The figure to the right shows the negative impact of an increasing distance/travel time; the marginal effect decreases with increasing distance. An increase in journey time of ten minutes for a journey time of 20 minutes has a greater effect than an increase in journey time from 30 to 40 minutes.
- The elasticity can also be interpreted as follows: Commuting flows (interregional linkages) intensify with decreasing distance, and the effects will be highest for travel times up to 40–50 minutes.
- It should be noted that the results indicate that longer travel times are generally more accepted in local public transport than in private transport. The number of connections, frequency and intermodal nodes play a key role in this context.



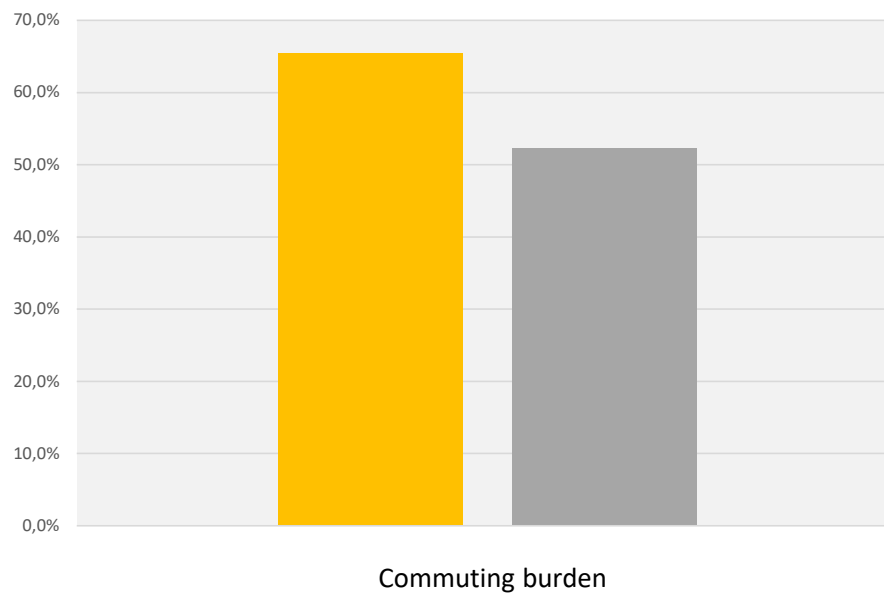
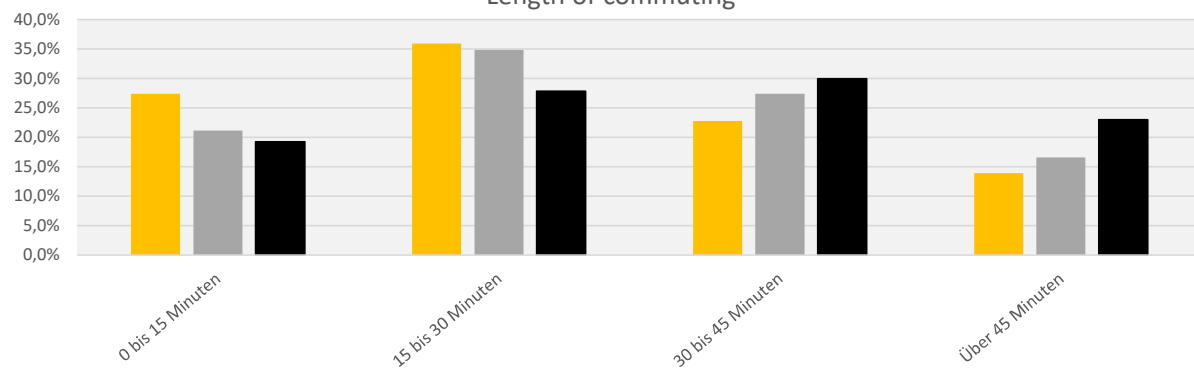
# Burden of distances in commuting

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Commuting behaviour



Length of commuting



■ Total ■ Except Klagenfurt and Villach ■ Remote regions

■ Car ■ Public transport

The population development is estimated using dynamic modeling approaches.

In addition, potential influencing factors, which may also be related to access to the rail network, are included. Control variables are the population at the starting point as well as the unemployment rate, proportion of pensioners, people under 15 and participation rates.

The results can be interpreted as follows:

- The presence of a train station is associated with a 2.86 percentage points higher population growth.
- The supply of jobs and participation in the labour market (approximated by the participation rate of the working-age population) have a significant positive effect.
- These results are particularly important for the districts of Wolfsberg and Völkermarkt, which are facing population decline, but also for Deutschlandsberg.
- We see that better commuting infrastructure can dampen the decline in population.

Tabelle: Modellanalyse Bevölkerungsentwicklung

	(1)	(2)	(3)	(4)	(5)	(6)
Jahre	2002-2018			2009-2018		
Bevt0	0,0279*** (0,00286)					
Bevto/km2		0,0485*** (0,00243)	0,0679*** (0,00846)	0,0306*** (0,00129)	0,0147*** (0,00399)	0,0413*** (0,00433)
ALQt0				-0,171*** (0,0525)	-0,389* (0,232)	-0,392 (0,238)
Partizipationsratet0				0,669*** (0,0725)	0,435** (0,179)	0,435** (0,190)
% Pensionisten t0				0,0239 (0,0591)	-0,279 (0,177)	-0,332* (0,181)
Indikator Bhf			0,0286** (0,0126)		0,0197*** (0,00701)	
Anteil Bev. Umkreisto						0,237** (0,00976)
Bundesland-FE	Ja	ja	ja	ja	ja	ja
Beobachtungen	2.094	2.094	262	2.094	262	262
R2	0,124	0,271	0,390	0,404	0,554	0,552

Robuste Standardfehler in Klammern

\*\*\* p<0,01; \*\*p<0,05; \*p<0,1

Our analyses have clearly shown that the Koralm Railway can have a significant positive impact on economic and demographic development in the core area and in the respective municipalities.

An additional dynamic is induced in the regional labour markets, with employees in the manufacturing sector in particular, but also companies in the production of material goods, having the potential to benefit.

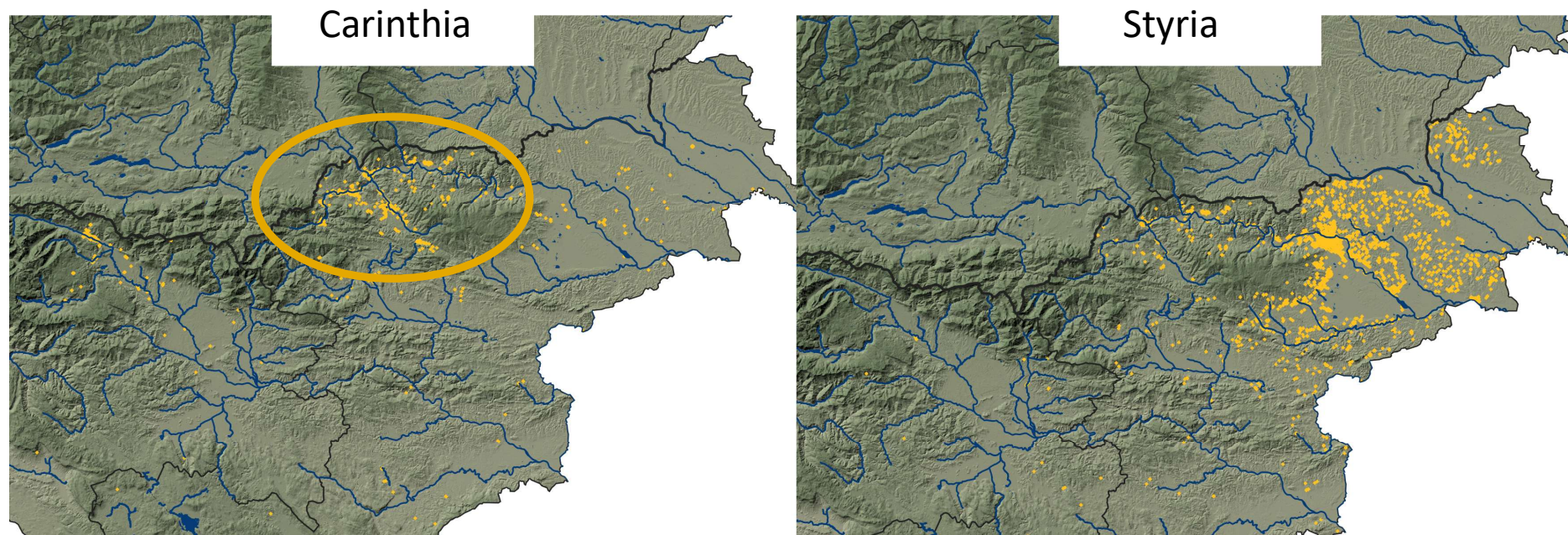
- For employees, the search radius expands – it becomes possible for them to accept new and better jobs in regions that are currently not within their daily commuting distance. The opportunities to find suitable employment increase significantly.
- For companies (especially in Deutschlandsberg and Wolfsberg), the "catchment area" of potential employees expands, which increases the chances of attracting qualified human capital and key employees.

The framework conditions must be designed accordingly and synergy effects must be used proactively. Improving accessibility can significantly improve the determinants of regional competitiveness, but this does not happen automatically.

Regions that succeed in taking a strategic approach *ceteris paribus*, that have coordinated spatial and transport planning, education, training and qualification offers that are tailored to the needs of the region, etc. will be the winners of this structural change. In any case, there will be disruptive changes:

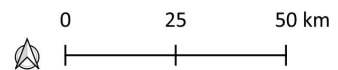
- Companies that already find it rather difficult to attract qualified human capital will find it even harder to compete – as will regions.
- Furthermore, industrial regions in particular will be able to emerge stronger due to the additional supply of labour and the spreading agglomeration effects. They have the potential to attract additional workers and qualified human capital from the entire region.

## Places of residence of Slovenian commuters in Carinthia and Styria



## Legende

- Staatsgrenze
- NUTS 2 Region
- Wohnorte
- Gewässer



Quelle: eigene Berechnungen, [www.worldpop.org](http://www.worldpop.org), [eprstor.gov.si](http://eprstor.gov.si), © OpenStreetMap-Mitwirkende, © European Union, Copernicus Land Monitoring Service 2016, European Environment Agency (EEA), Eurostat (2021)

## Implications for Koroška - Employees living in Slovenia and working in Carinthia

Most employees from Slovenia work in the production sector in Wolfsberg and Völkermarkt. Higher wages in the industrial sector allow for longer commuting times. Topography plays a major role in commuting behaviour.

Origin	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
CZE	4	7	24	62	88	91	97	103	93	102	139	139	104	111	120
GER	68	98	200	250	233	226	181	186	163	166	169	188	197	218	250
HRV	2	3	6	8	10	11	16	30	38	42	59	89	115	252	387
HUN	23	31	90	225	451	497	417	535	641	798	886	936	791	968	1.280
ITA	26	35	62	76	95	105	126	155	173	196	200	205	213	246	281
POL	3	17	90	209	280	258	290	307	321	408	457	577	481	560	761
SVK	1	3	9	36	91	117	110	119	146	205	284	378	337	455	530
SVN	101	99	138	281	612	842	1.077	1.398	1.642	1.756	1.830	1.966	2.007	2.151	2.278
<b>Total</b>	<b>228</b>	<b>293</b>	<b>619</b>	<b>1.148</b>	<b>1.861</b>	<b>2.147</b>	<b>2.315</b>	<b>2.833</b>	<b>3.216</b>	<b>3.673</b>	<b>4.025</b>	<b>4.478</b>	<b>4.244</b>	<b>4.960</b>	<b>5.885</b>

## 15 Implications for Koroška - Wolfsberg and Völkermarkt

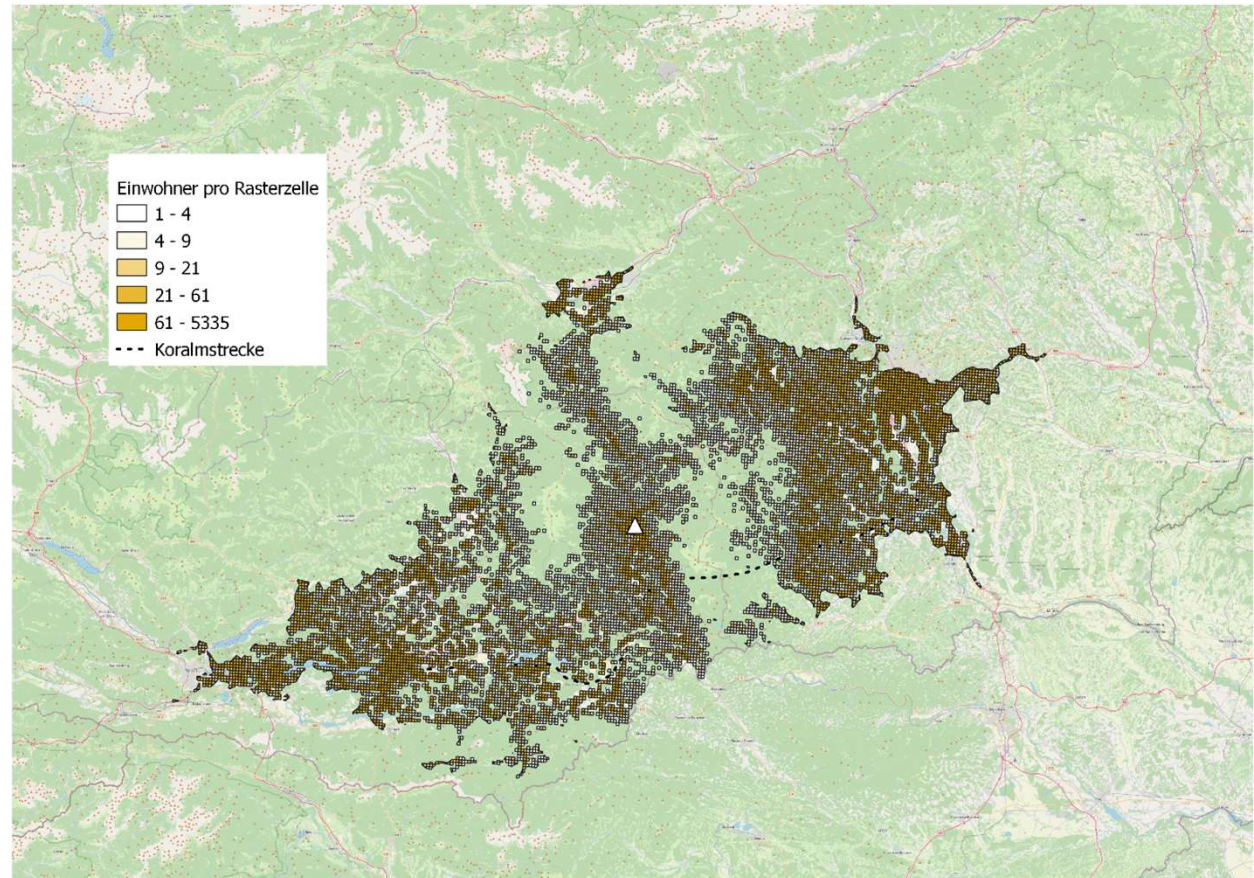
These districts are strongly characterized by the manufacturing sector. Many Slovenians who work in Carinthia are employed in industrial companies at these locations.

On the one hand, it is important to secure the areas near the railroad station or in the direct catchment area of the station and then to manage them strategically. Complementary skills need to be developed in a targeted manner. Simply duplicating existing initiatives, such as the Lakeside Park, will hardly be sufficient.

The construction of the Koralm Railway will bring the Lavanttal railroad station closer to the center, with the district capitals of Wolfsberg and Völkermarkt also being indirectly connected.

Growth in these regions is to be expected and employment opportunities are likely to expand. The caveat is that competition for workers in the region of Koroška is likely to increase.

Increased connectivity can be beneficial (tourism, mobility, etc.), however many industrial employers in Graz are situated to the south of the city where cars will remain competitive in cost and time.



## Regional implications

# SWOT profile

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### STRENGTHS

- Future connection to the central region
- Strong manufacturing sector
- Companies in the region are already attractive employers (centre for commuters)
- Qualification structure corresponds to the economic structure (focus on dual training, educational structure will improve considerably in the medium term)

### OPPORTUNITIES

- Strengthen connections to the public transportation network
- Strengthen scientific/technical services
- Use favourable areas and develop a clear regional positioning
- Develop the St. Paul location in a targeted, long-term and equally strategic manner
- New collaborations with direct neighbors (Deutschlandsberg) and Graz

### WEAKNESSES

- Train station is located away from the regional centres
- Small-scale economic structure (there are only a few large and medium-sized companies)
- Gender differences according to professional orientation of training (and also income differences)
- Demographic development (negative population development, increasing ageing, demographic pressure on the dual system)

### THREATS (if unaddressed)

- Public transport in the region
- Accessibility to city centre partially inadequate
- Strong regional disparities within the districts
- Drive structural change towards greater technology and knowledge intensity
- Technology transfer to SMEs
- Positioning of the St. Paul location within the core region



## Fields of action

### 17 Long-term and strategic management, but quick action to make up for lost time

- **Field of action 1** – Quickly secure and strategically develop areas
- **Field of action 2** – Setting thematic priorities along the areas of strength (quality instead of quantity), developing and promoting joint projects and plans
  - Interregional cooperation is the key to success
- **Field of action 3** – Ensure sufficient regional accessibility; this is a basic criterion for being able to take advantage of the opportunities arising from the opening of the Koralm Railway
  - The individual municipalities must be connected to the supra-regional rail network, this is a public task; Carinthia and Styria must act together and demand corresponding federal funding
- **Field of action 4** – Position Southern Austria as an internationally attractive location: The development of the Klagenfurt/Villach-Graz location must contribute to positioning Southern Austria as an internationally attractive location (strategic development direction)
  - Medium to long-term success largely depends on the availability of a qualified workforce; the individual locations should not be in direct competition in terms of human capital
- **Field of action 5** – Utilization of supra-regional spillover effects: Strategies that subsequently link the location with other regions and centres would be sensible, especially with regard to strategic orientation (use of supra-regional spillover effects)

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