Update March 2020

ECOS4IN WP1: SUMMARY AND RESULTS

ECOS4IN – Department of Management, Ca‘ Foscari University of Venice

INDUSTRY 4.0: DEFINITION

"The integration of information and communication technology into the industrial environment" Schuh et al. (2014)

"The increasing digitization of the entire supply chain, which makes it possible to connect actors, objects and systems based on real-time data exchange" (Dorst et al., 2015; Spath et al., 2013).

Four pillars:

1. **Cyber physical systems** (CPSs) → the "integrations of computation and physical processes. Embedded computers and networks monitor and control the physical processes, usually with feedback loops where physical processes affect computations and vice versa." (Lee, 2008).
2. **Internet of things** (IoTs) → considers "'things' and 'objects', such as RFID, sensors, actuators, mobile phones, which (…) interact with each other and cooperate with their neighboring 'smart' components, to reach common goals" (Giusto et al., 2010)
3. **Smart factories** → combines the notions of IoTs and CPSs and by placing them inside the working space and at the core of operations.
4. **Internet of services** → based on the concept that services are available through the internet so that private users and/or companies can create, combine and offer new kind of value-added services (Hofmann & Rüsch, 2017)

INDUSTRY 4.0: ENABLING TECHNOLOGIES

The Key Technologies of I4.0 (Alcácer & Cruz-Machado, 2019):

1. The Industrial Internet of Things
2. Cloud Computing
3. Big Data and analytics
4. Simulation
5. Augmented Reality
6. Additive Manufacturing (products and process innovations realized through virtual reality simulations)
7. Horizontal and Vertical Systems Integration
8. Autonomous Robots
9. Cybersecurity

WP1 - EXPECTED DELIVERABLES

- Reports on existing **infrastructure** for Industry 4.0 in Europe:
  - **Methods** (Unive)
  - Partners' **reports** (all partners - mapping of economic structure, species, and relevant policies)
- **Regional stakeholder meetings** in all partners regions
- Creation of the **knowledge base**

METHODOLOGY RECAP

ECONOMIC STRUCTURE

Aim:

- Mapping the economic and social structure of the region
- Unpacking data and figures related the current readiness of economic operators in terms of digital transformation and industry 4.0, as well as to the indicators of potential evolution.
- Comparing regional data

SPECIES

Aim:

- Mapping actors / institutions involved industry 4.0 / digital initiatives;
- Focus on universities and education institutions; research centres/labs (private and public); technology transfer entities; consultancy firms, technology providers; public institutions

POLICIES

Aim:

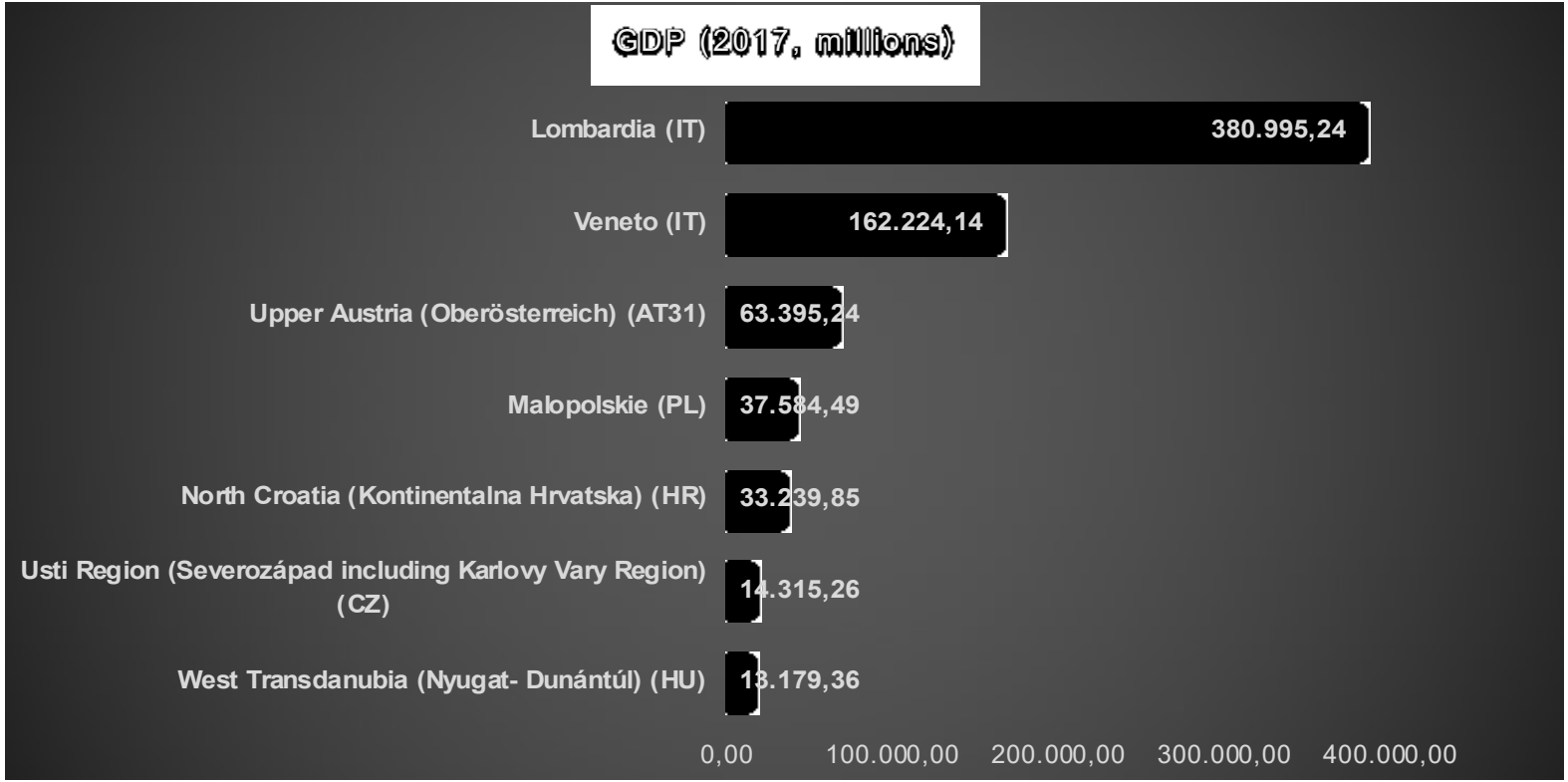
- Unpacking the most relevant policies and initiatives related to Industry 4.0, particularly for (not not limited to) SMEs;
- Understanding the state of implementation of Industry 4.0 in the partners' regions, their receptiveness and narrative around its objectives and importance, and the results achieved.

MAPPING RESULTS

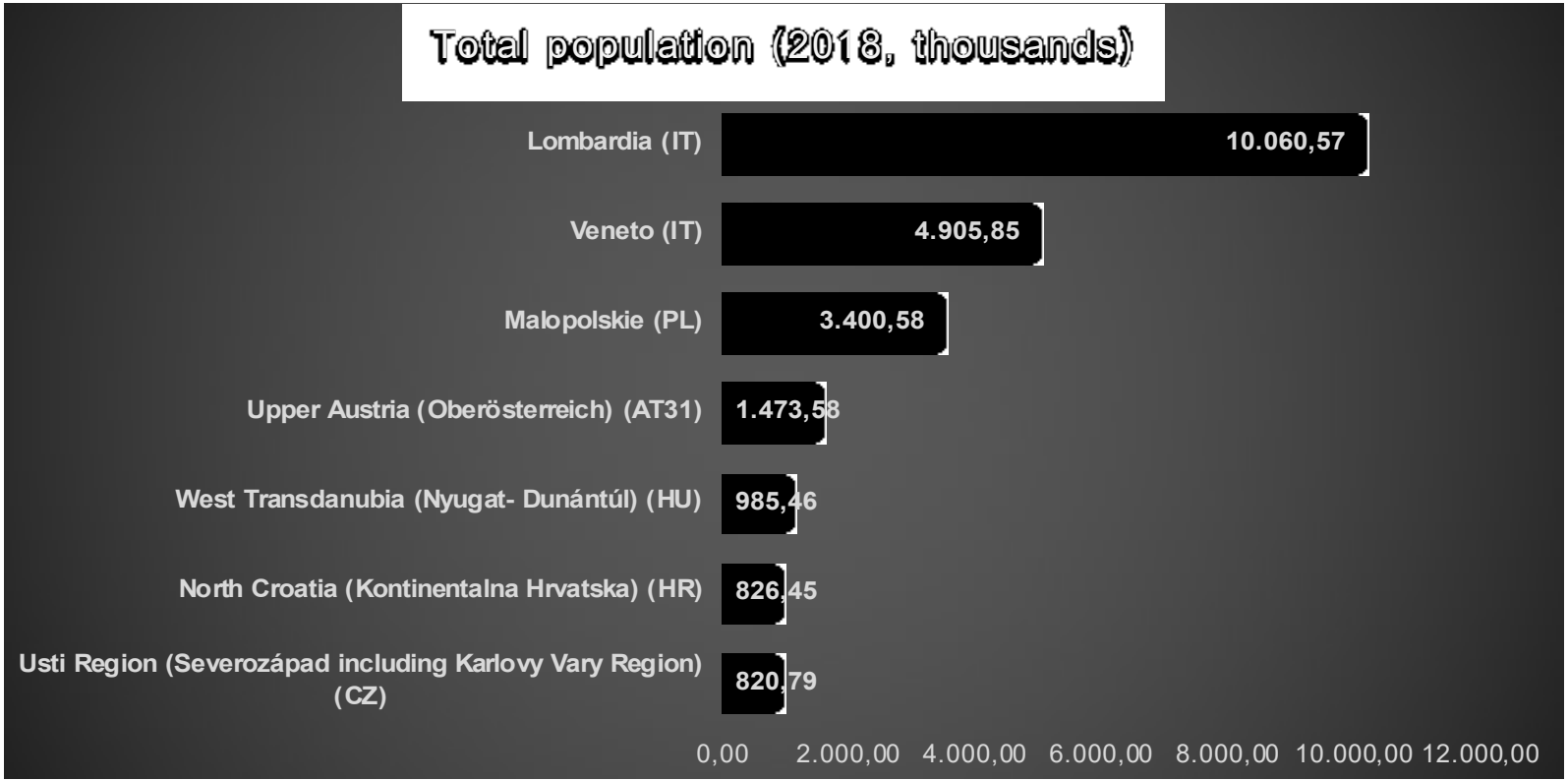
ECONOMIC AND SOCIAL STRUCTURE

ECONOMIC AND DEMOGRAPHIC INDICATORS
(SOURCE: EUROSTAT)

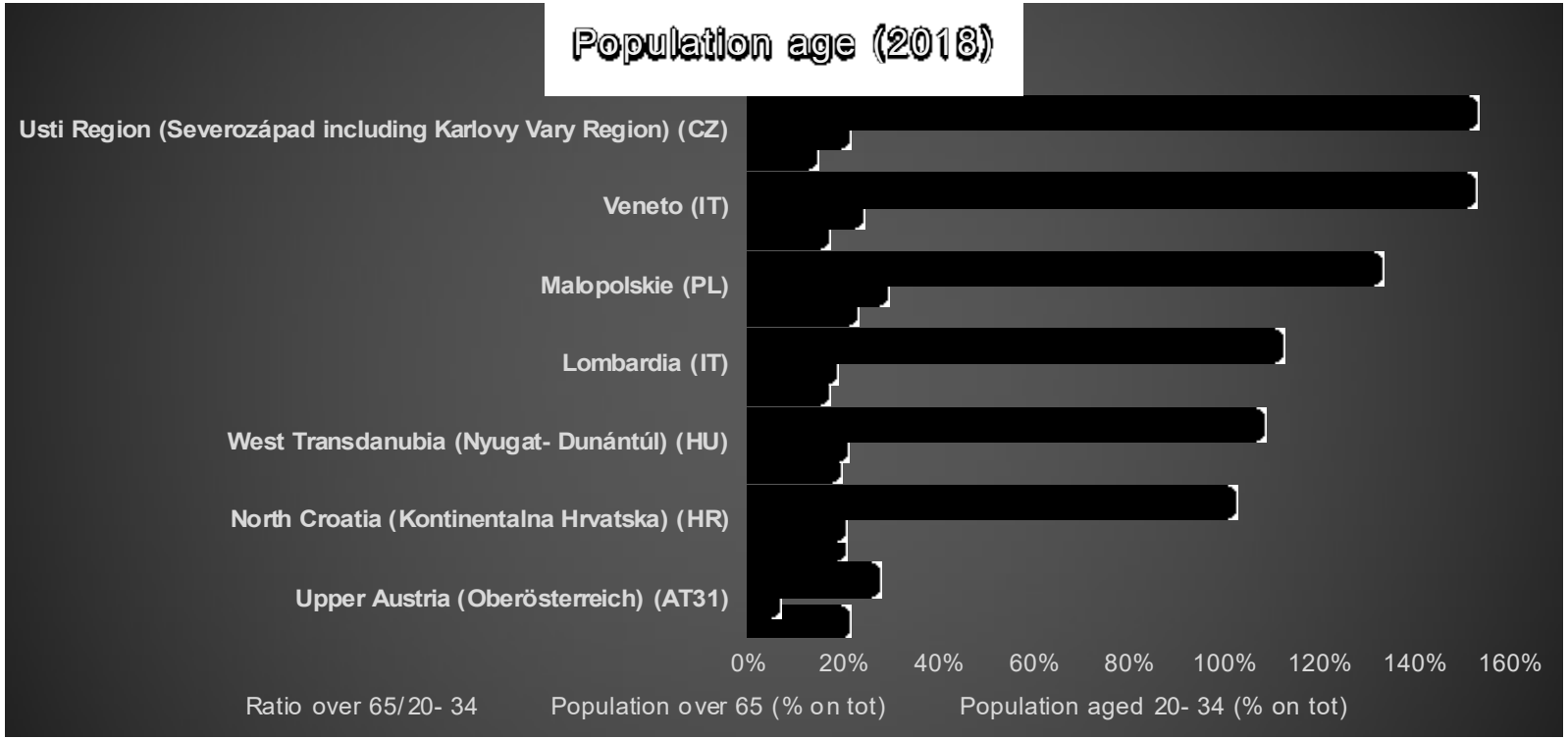
- GDP (2017)
- Total population
- Population aged 20-34 and over 65 (% on tot), ratio over 65/20-34
- (%) Population with tertiary education (ISCED lev. 5-8, 25-64 Y)
- (%) Population with upper secondary and post-secondary (ISCED lev. 3-4, 25-64 Y)
- (%) Employment 25-64 Y
- (%) Unemployment 15-74 Y
- (%) HRST on total employed individuals



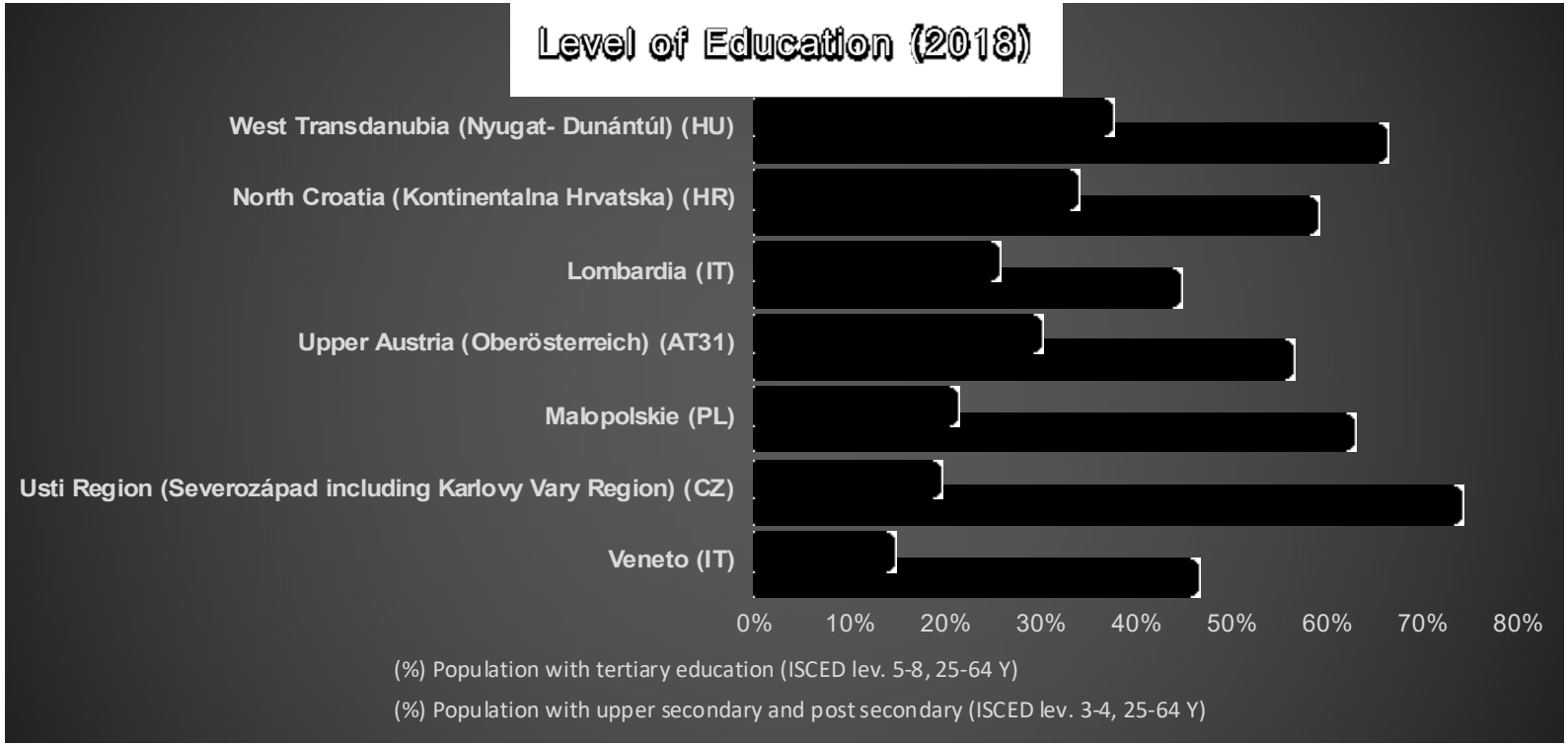
Source: Eurostat



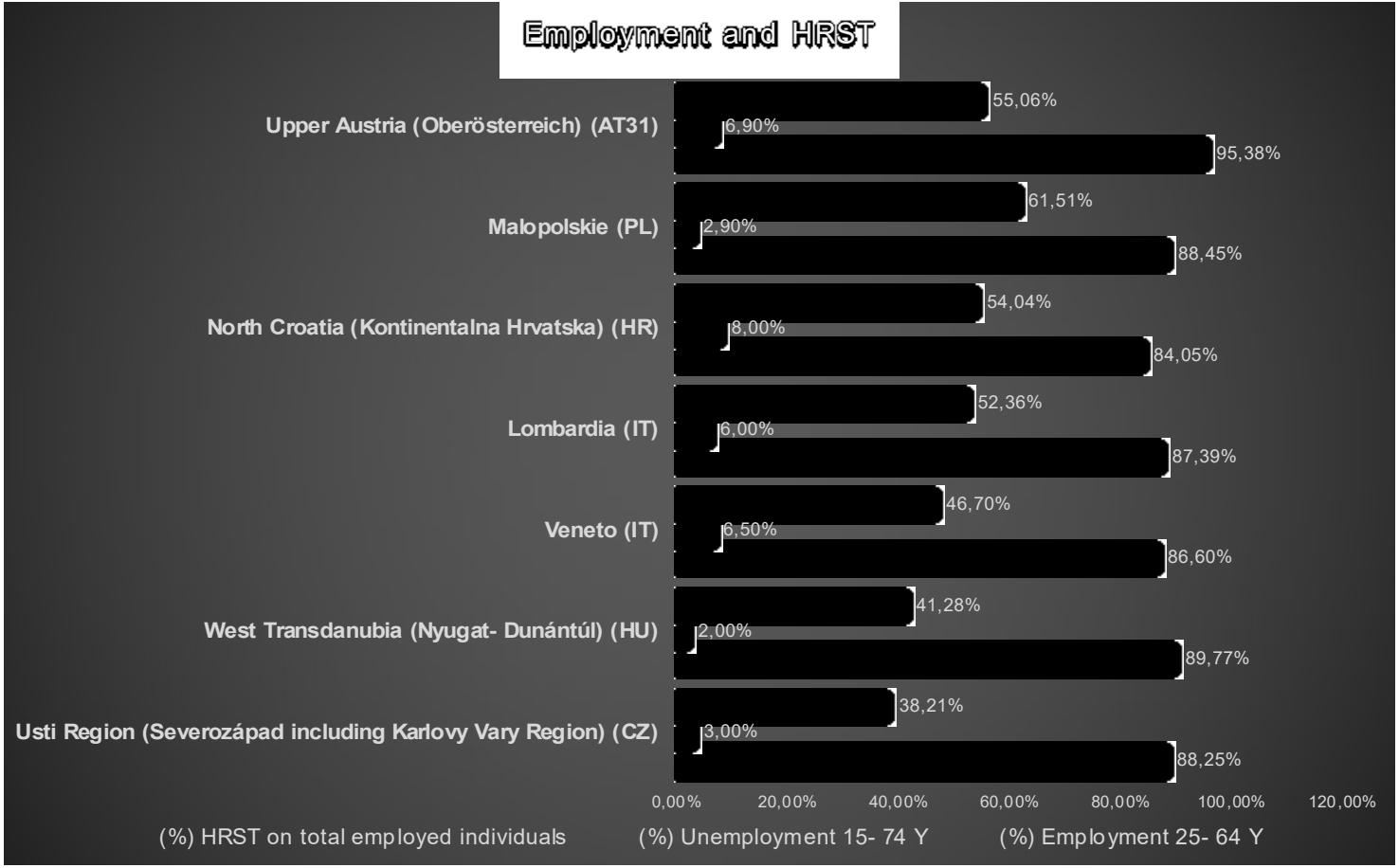
Source: Eurostat



Source: Eurostat



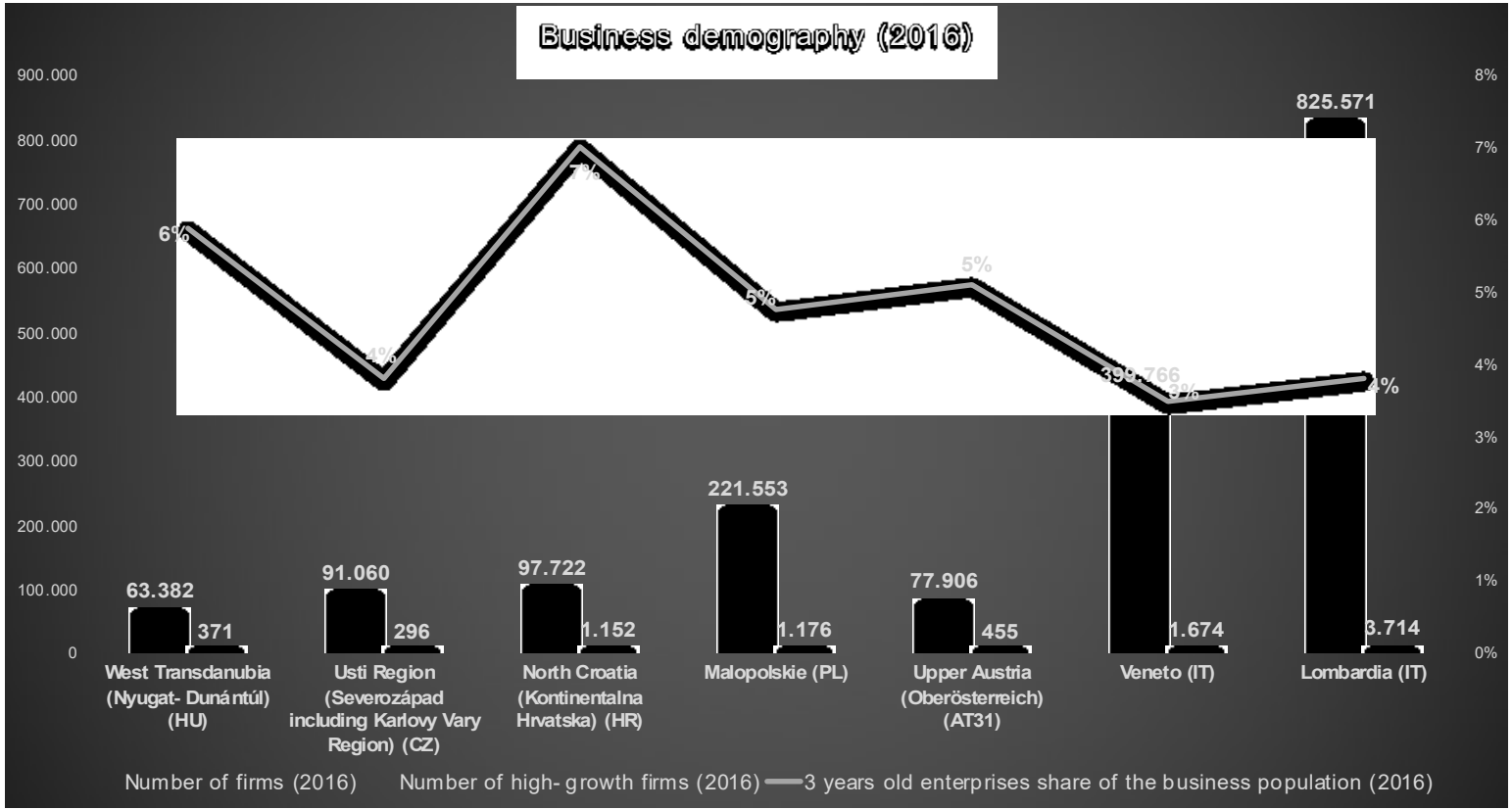
Source: Eurostat, Population aged 25-64 by educational attainment level, sex and NUTS 2 regions (%) [edat_lfse_04]



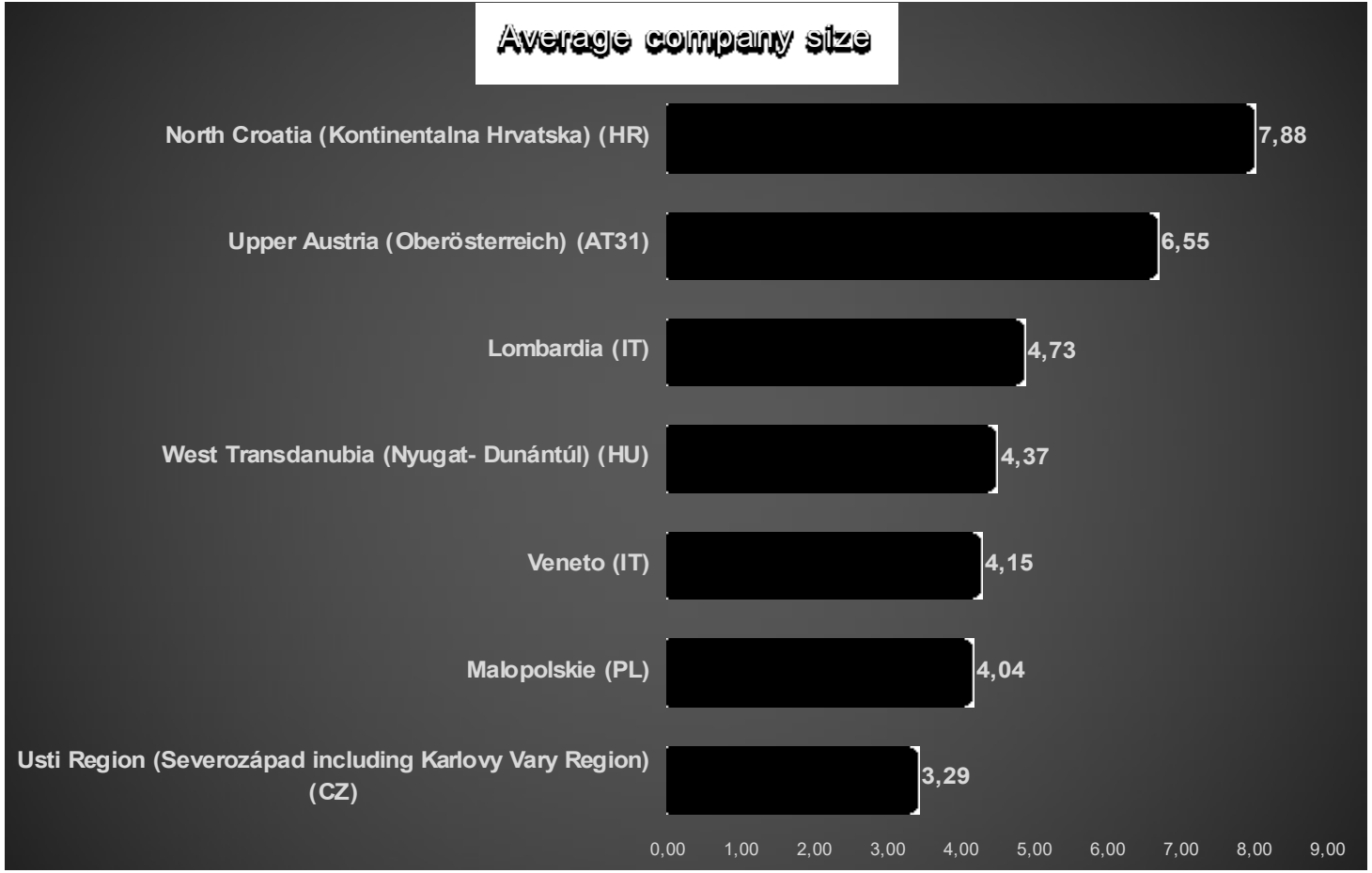
Source: Eurostat, Employment/Unemployment by sex, age, educational attainment level and NUTS 2 regions (1 000), HRST by category and NUTS 2 regions

BUSINESS DEMOGRAPHY
(SOURCE: EUROSTAT)

- Number of firms (2016)
- Number of high-growth firms (2016)
- 3 years old enterprises share of the business population (2016)
- Average company size



Source: Eurostat (Business demography and high growth enterprise by NACE Rev. 2 and NUTS 3 regions)



Source: Eurostat (data as of 2016), calculated as number of employees in sector / number of local units.

INNOVATION INDICATORS
(SOURCE: RIS 2019)

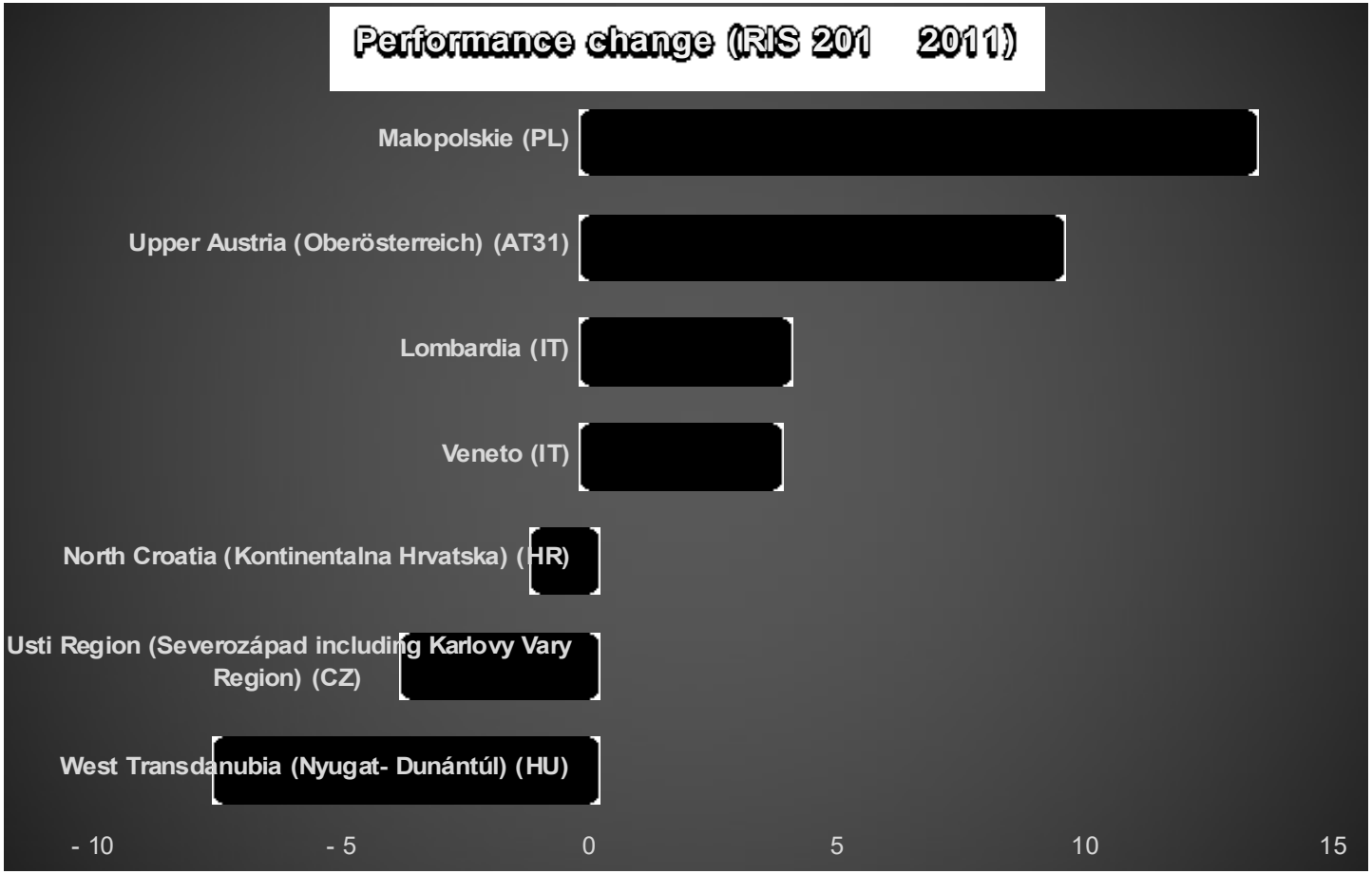
- Overall Innovation Performance (RIS 2019) relative to EU performance
- Innovation performance group (RIS 2019)
- Innovation performance change (RIS 2011-2019)
- Firms' R&D VS non-R&D spending
- R&D spending in public VS business sector
- SMEs innovation activites
- Sales of new-to market and new-to-firm innovations (as % of turnover)
- SMEs collaboration indicators

INNOVATION PERFORMANCE GROUPS (2019)

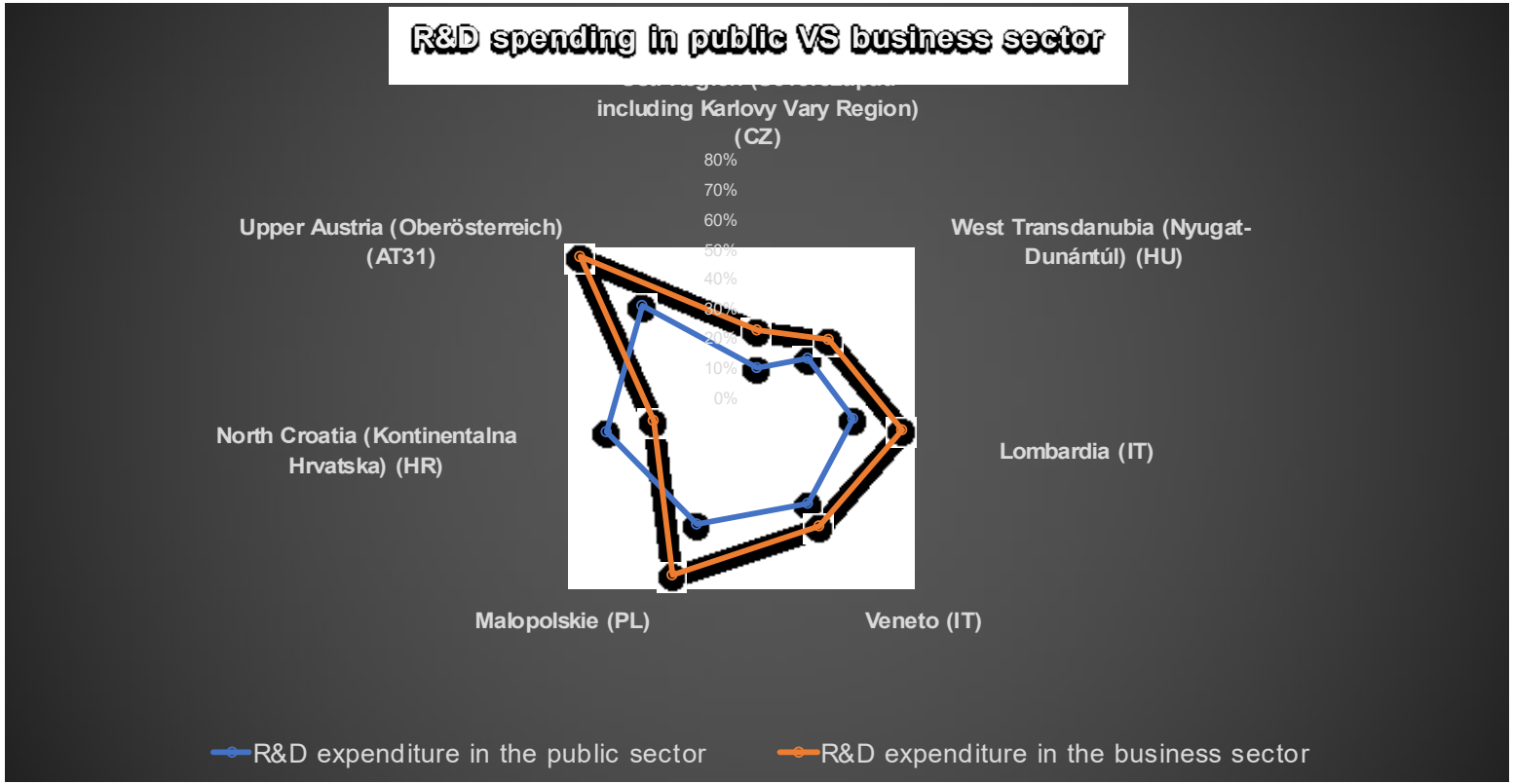
Source: RIS 2019
Definition: grouping based on each region's innovation performance relative the EU average.

- Strong Innovators: performance more than 20% above the EU average and between 90% and 120% of the EU average.
- Moderate Innovators: performance between 50% and 90% of the EU average.

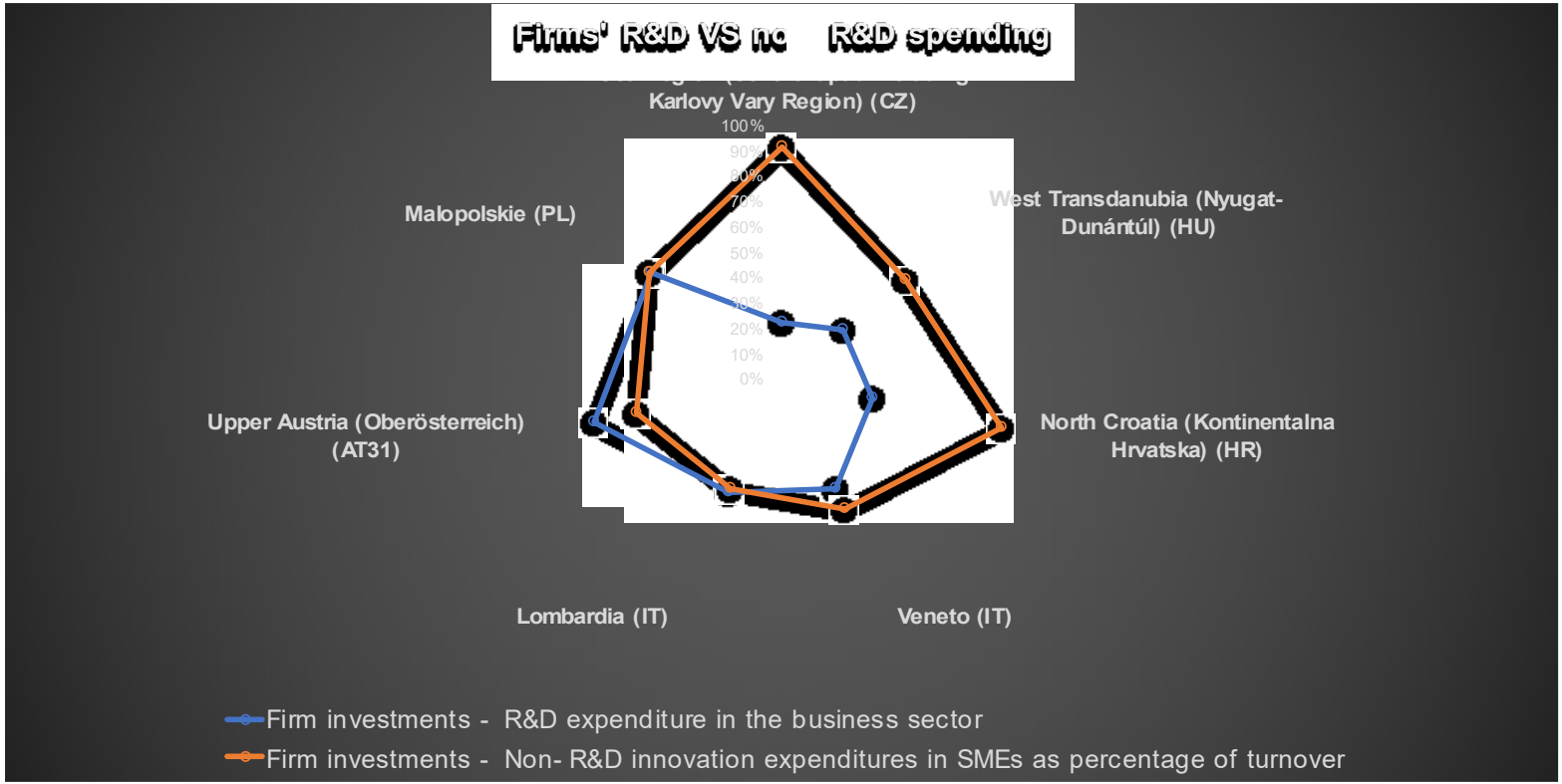
Strong +	Upper Austria (Oberösterreich) (AT)
Moderate +	Lombardia (IT) Veneto (IT)
Moderate	Malopolskie (PL) North Croatia (Kontinentalna Hrvatska) (HR)
Moderate -	Usti Region (Severozápad including Karlovy Vary Region) (CZ) West Transdanubia (Nyugat-Dunántúl) (HU)



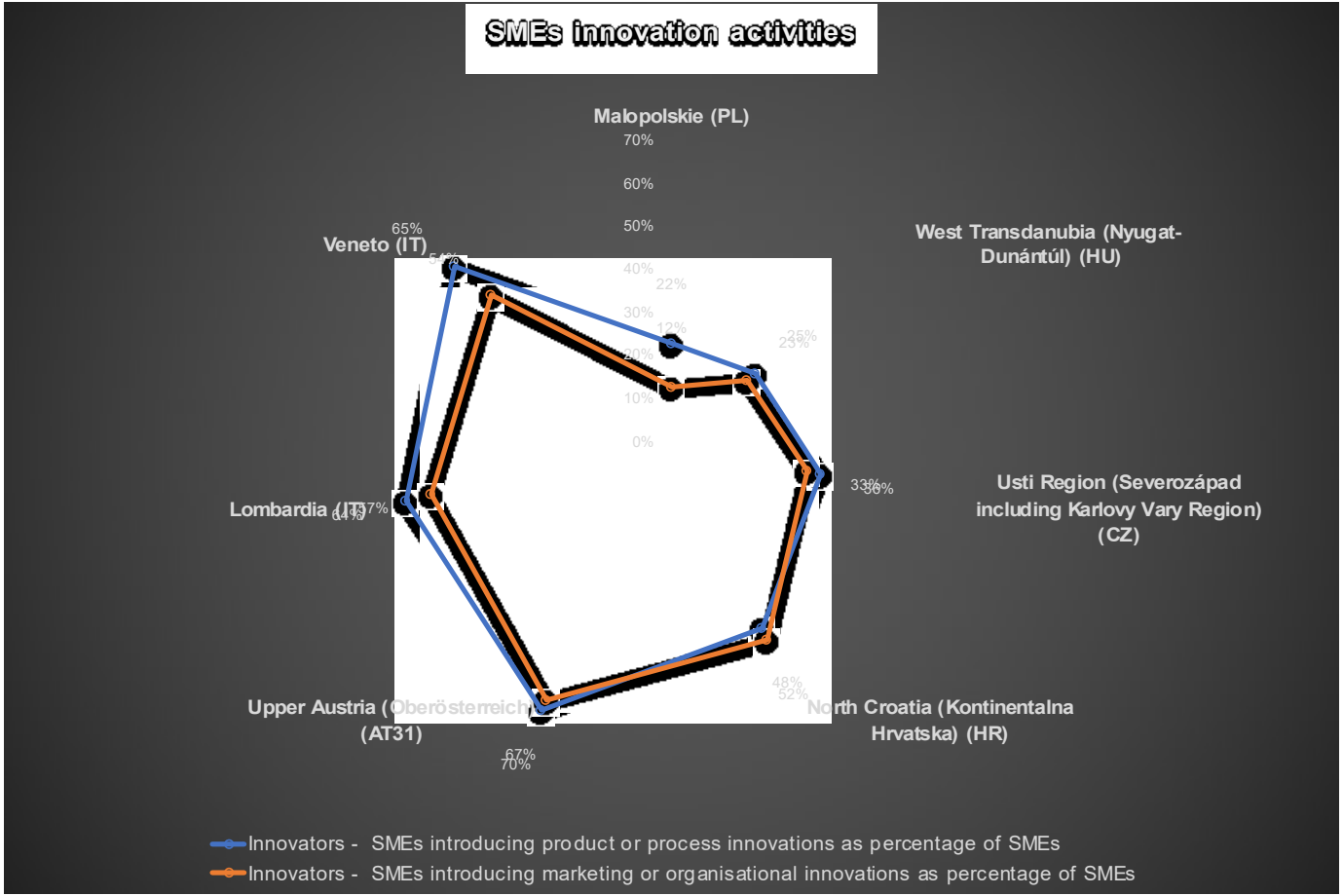
Source: RIS 2019, definition: the RII indicates the performance in 2019 relative to that of 2011.



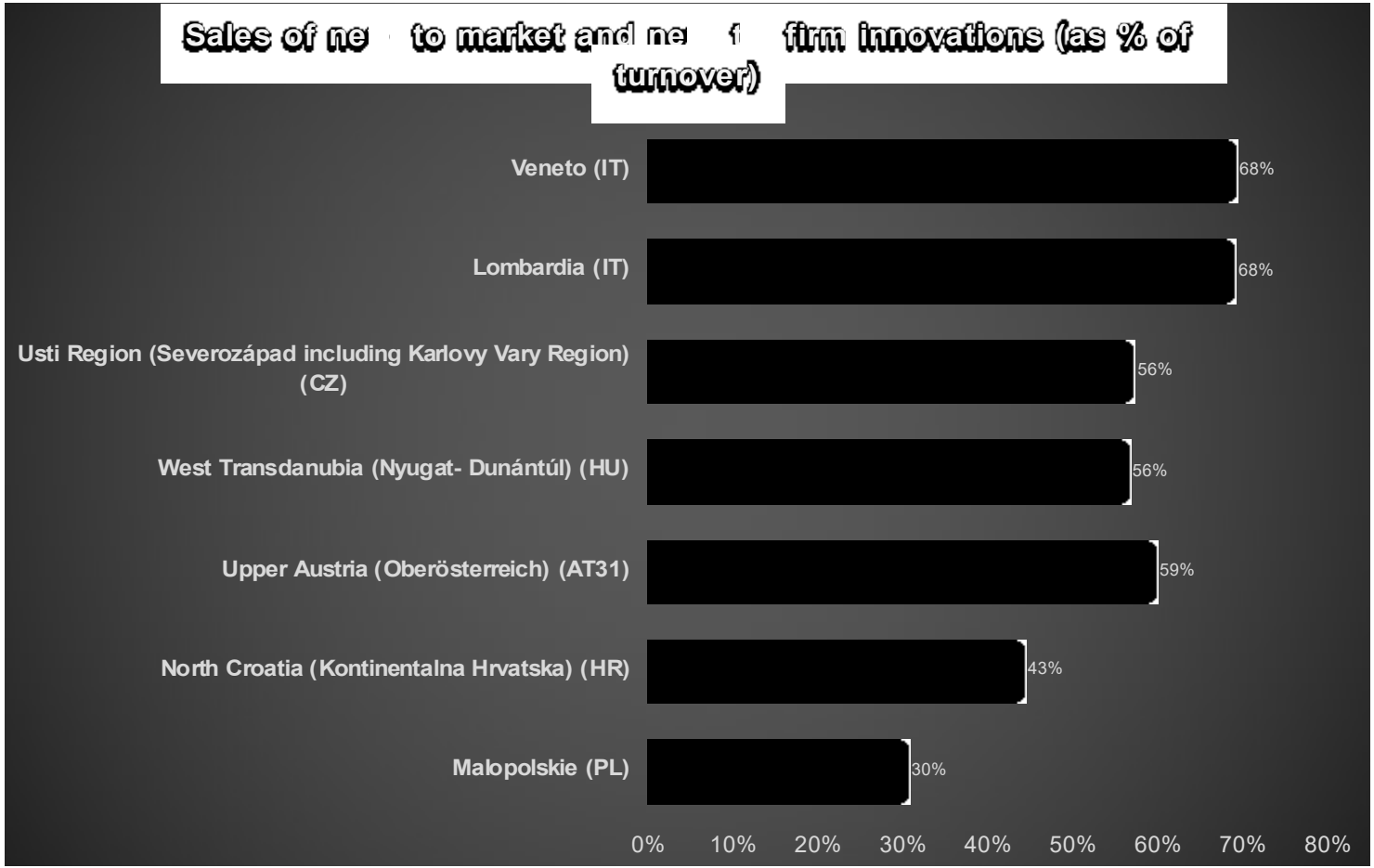
Data as of 2019. Source: RIS. (Numerator: Sum of R&D OR total innovation expenditure for SMEs, excluding intramural and extramural R&D expenditures / Denominator: Total turnover for SMEs.)



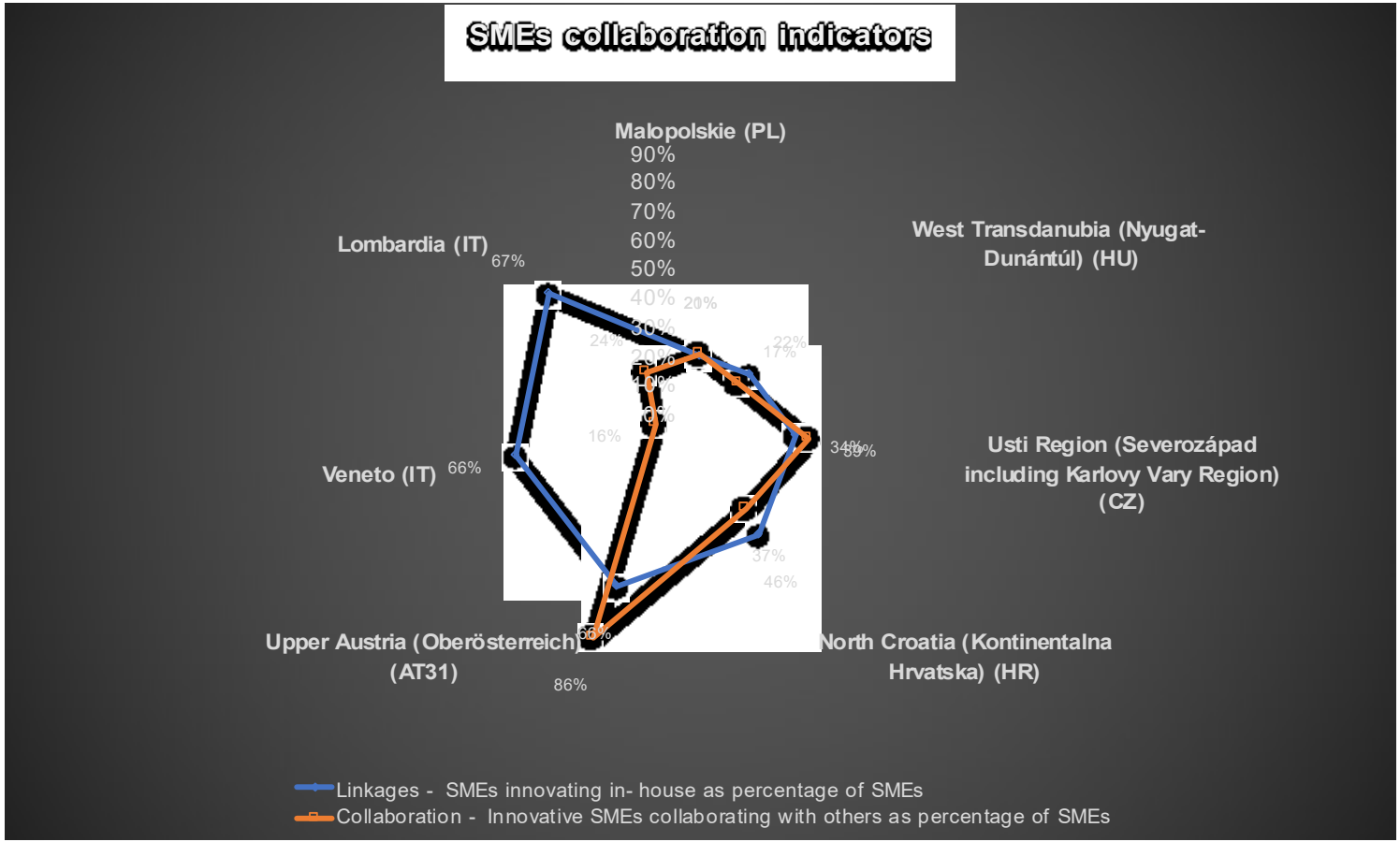
Data as of 2019. Source: RIS. (Numerator: All R&D expenditures in the government sector and the higher education sector (HERD) OR in the business sector / Denominator: Regional Gross Domestic Product.)



Data as of 2019. Source: RIS. (Numerator: Number of SMEs that introduced a new product/process/market/organizational innovation to one of their markets / Denominator: Total number of SMEs.)



Data as of 2019. Source: RIS. (Numerator: Sum of total turnover of new or significantly improved products for SMEs / Denominator: Total turnover for SMEs)

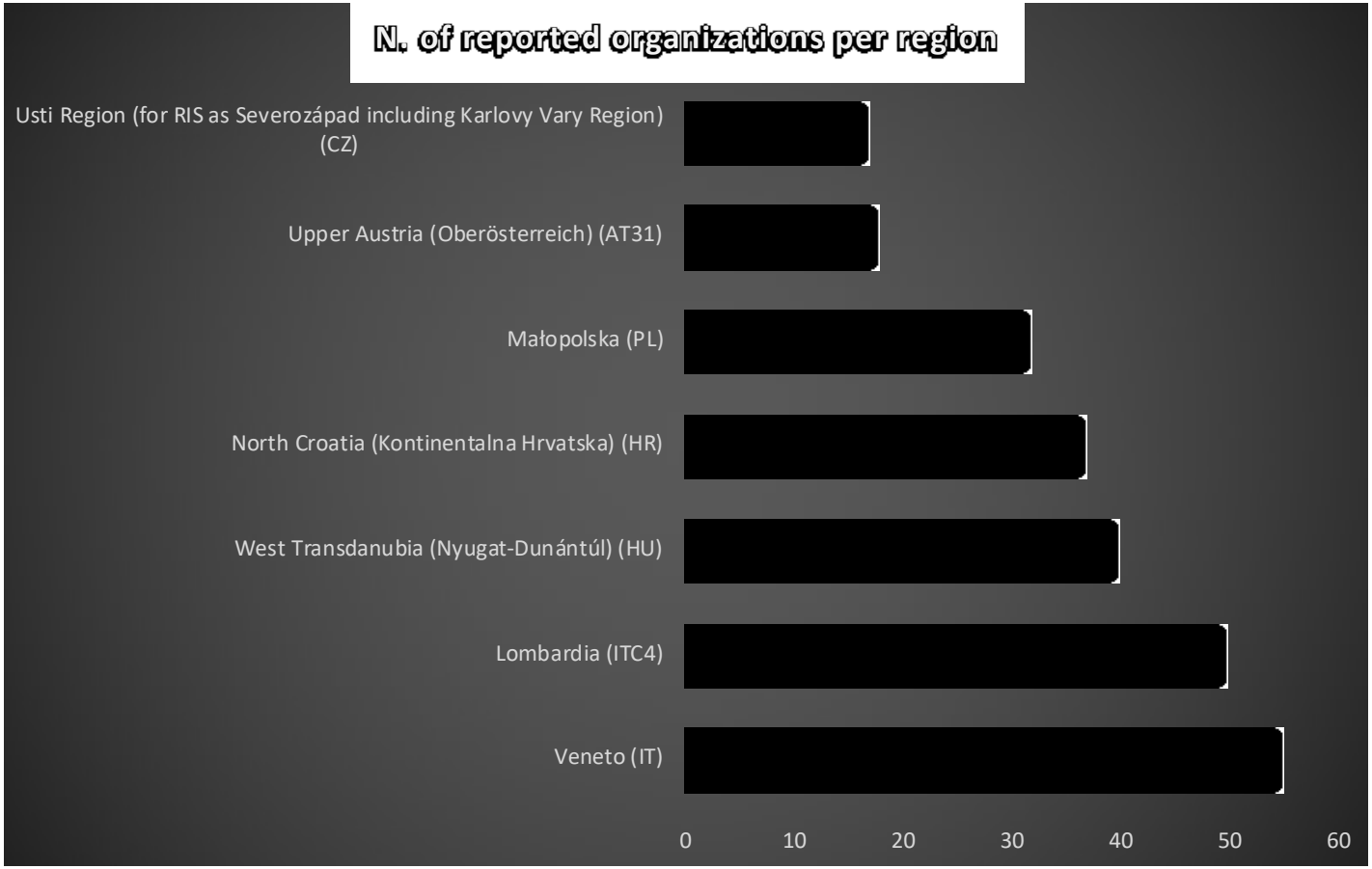


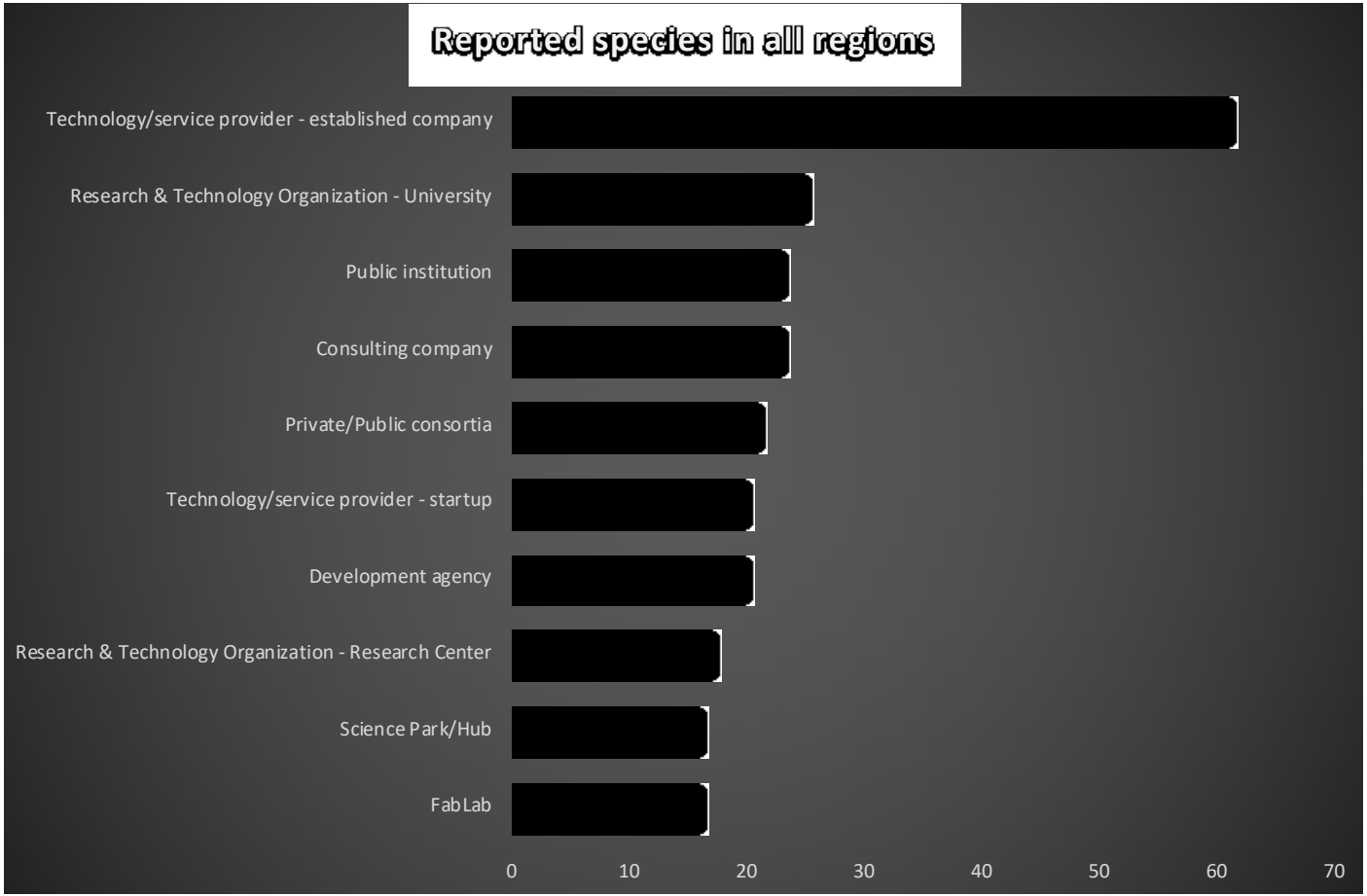
Data as of 2019. Source: RIS. (Numerator: Number of SMEs that have had any cooperation agreements on innovation activities with other enterprises or institutions OR that developed a new product or process in-house or with other firms / Denominator: Total number of SMEs)

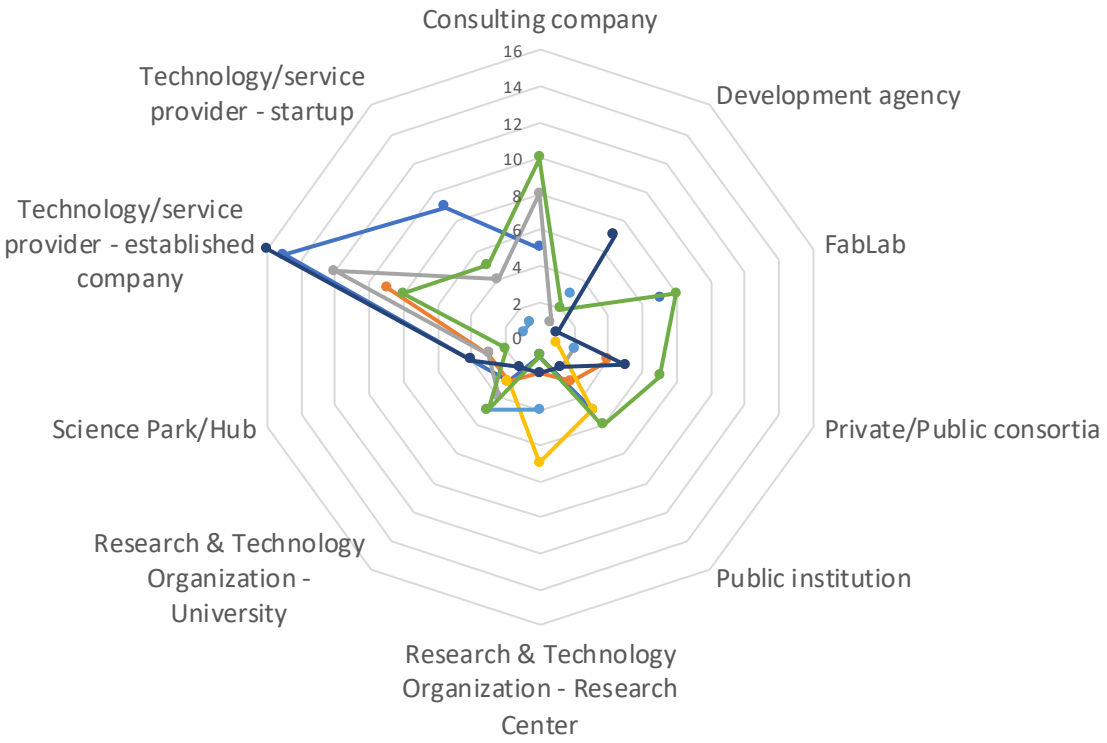
SPECIES

RELEVANT ACTORS (CATEGORIES)

- Development agency
- Public institution
- Private/Public consortia
- Research & Technology Organization - Research Center
- Research & Technology Organization - University
- Technology/service provider - startup
- Technology/service provider - large company
- Consulting company
- Science Park/Hub
- FabLab

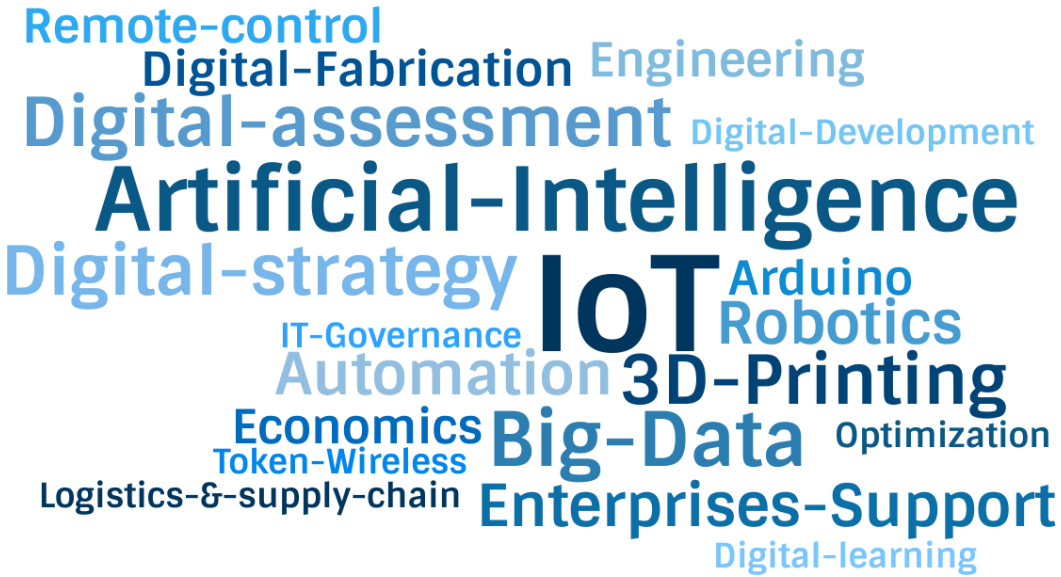

N. of reported organizations per region
Usti Region (for RIS as Severozápad including Karlovy Vary Region) (CZ)
Upper Austria (Oberösterreich) (AT31)
Małopolska (PL)
North Croatia (Kontinentalna Hrvatska) (HR)
West Transdanubia (Nyugat-Dunántúl) (HU)
Lombardia (ITC4)
Veneto (IT)
0
10
20
30
40
50
60


Reported species in all regions
Technology/service provider - established company
Research & Technology Organization - University
Public institution
Consulting company
Private/Public consortia
Technology/service provider - startup
Development agency
Research & Technology Organization - Research Center
Science Park/Hub
FabLab
0
10
20
30
40
50
60
70


Consulting company
Development agency
FabLab
Private/Public consortia
Public institution
Research & Technology Organization - Research Center
Research & Technology Organization - University
Science Park/Hub
Technology/service provider - established company
Technology/service provider - startup
16
14
12
10
8
6
4
2
0
Lombardia (ITC4)
Małopolska (PL)
North Croatia (Kontinentalna Hrvatska) (HR)
Upper Austria (Oberösterreich) (AT31)
Usti Region (for RIS as Severozápad including Karlovy Vary Region) (CZ)
Veneto (IT)
West Transdanubia (Nyugat-Dunántúl) (HU)

Regional Technology Specializations

LOMBARDIA (IT)



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Regional Technology Specializations

VENETO (IT)

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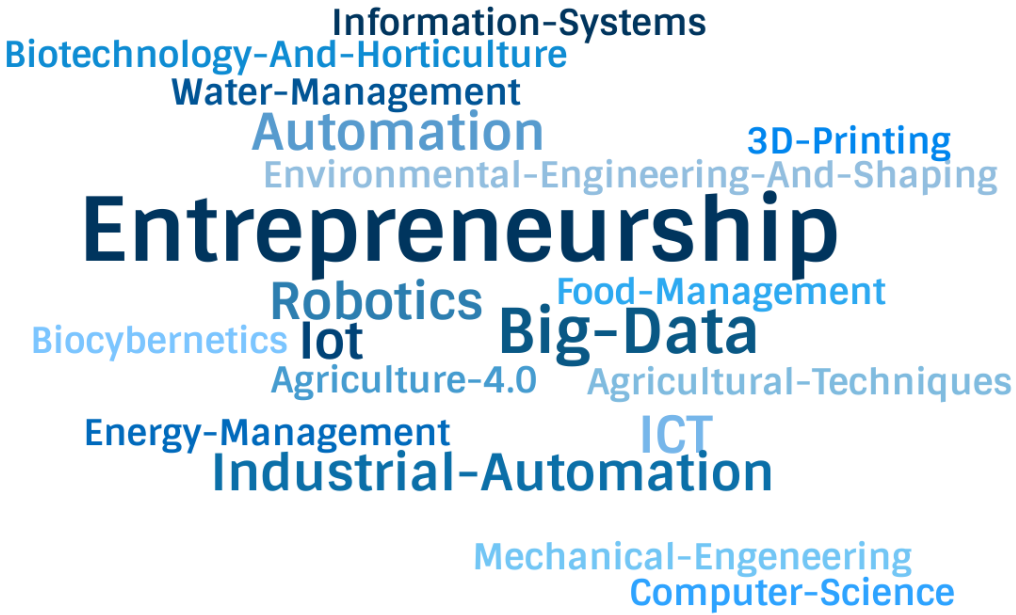
Regional Technology Specializations

MALOPOLSKA (PL)



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Regional Technology Specializations

NORTH CROATIA (KONTINENTALNA HRVATSKA) (HR)

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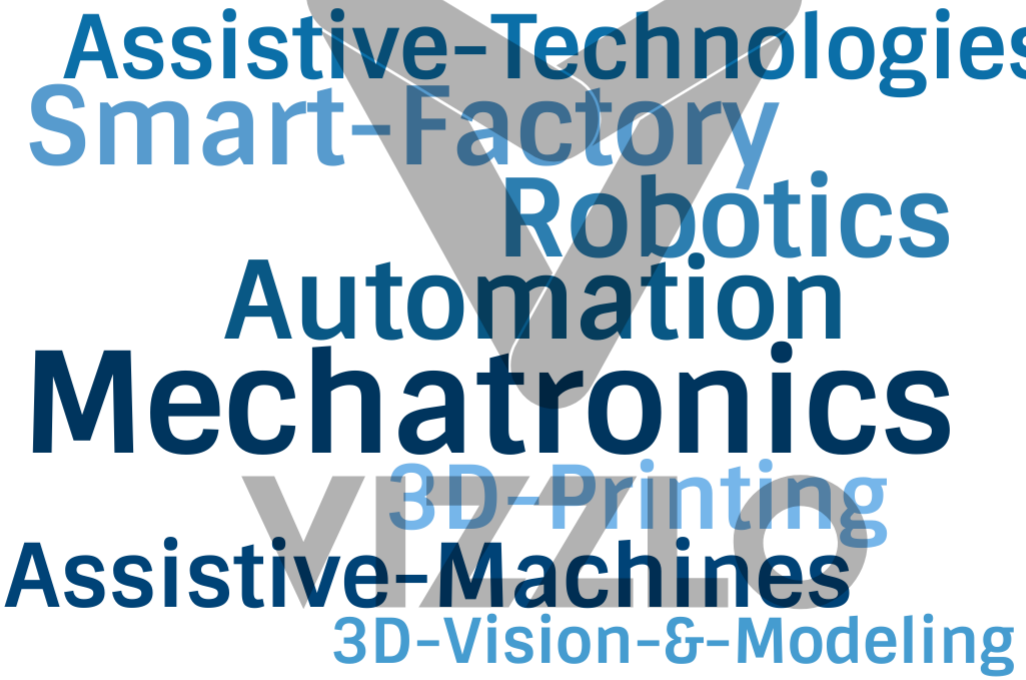
Regional Technology Specializations

UPPER AUSTRIA (OBERÖSTERREICH) (AT31)



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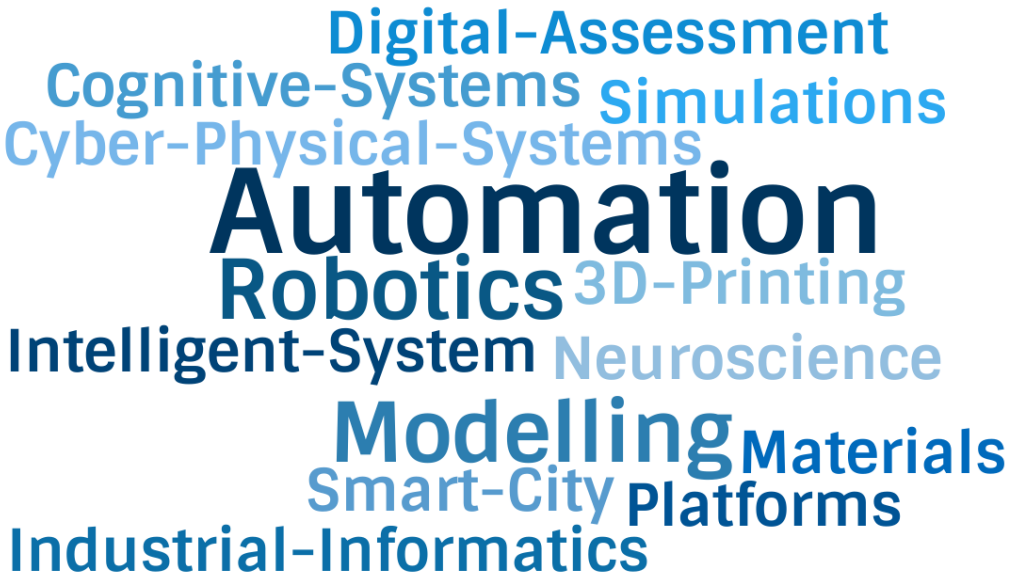
Regional Technology Specializations

USTI REGION (Severozápad including Karlovy Vary Region) (CZ)



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Regional Technology Specializations

WEST TRANSDANUBIA (Nyugat-Dunántúl) (HU)

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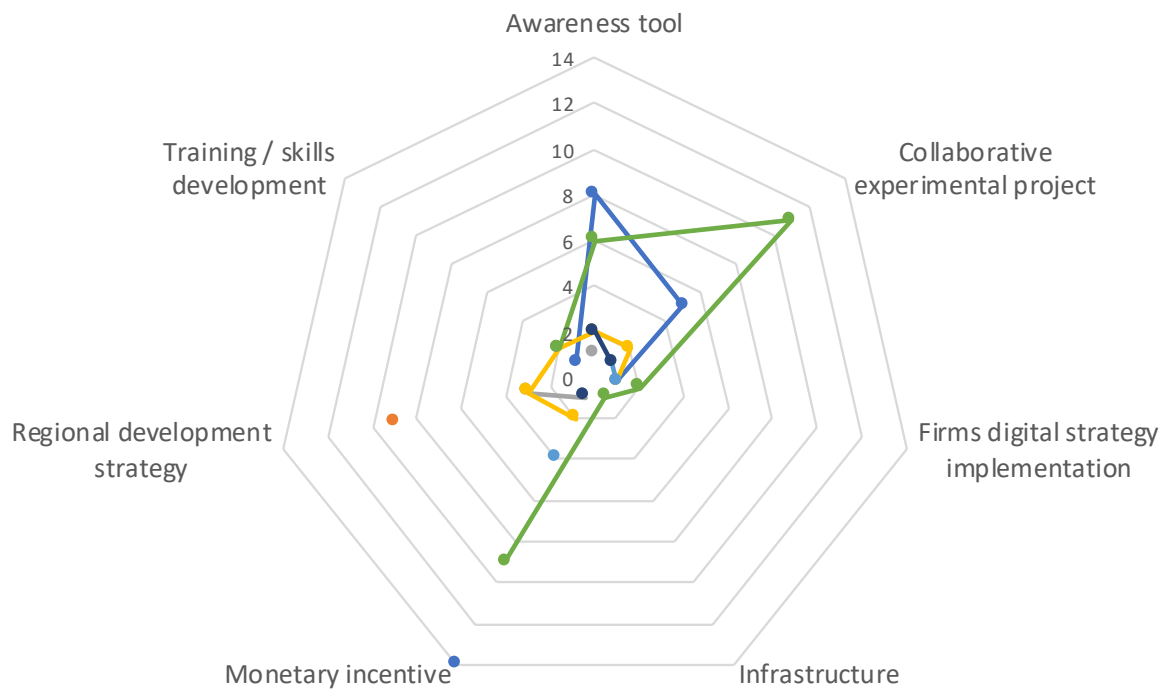
POLICIES

POLICIES CLASSIFICATION

- × Awareness tool
- × Collaborative experimental project
- × Firms' digital strategy implementation
- × Infrastructure (e.g., connectivity)
- × Monetary incentive
- × Regional development strategy
- × Training/skills development

Policies distribution by region



- Lombardia (ITC4)
- Malopolskie (PL)
- North Croatia (Kontinentalna Hrvatska) (HR)
- Upper Austria (Oberösterreich) (AT31)
- Usti Region (for RIS as Severozápad including Karlovy Vary Region) (CZ)
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THANK YOU FOR YOUR ATTENTION.