

TWO FACES OF REGIONAL INNOVATIVENESS

**– THE EVIDENCE FROM VISEGRAD
GROUP STATES**



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THE AIM OF THIS STUDY:

evaluating the innovativeness of 35 regions of Visegrad Group

PRESENTATION CONSISTS OF 4 SECTIONS DELIVERING ANSWERS TO THE FOLLOWING QUESTIONS:

- What is the regional innovativeness and how to measure it?
- What methodological approaches were used to evaluate the level of regional innovativeness?
- Which V4 regions are leaders and which ones are losers?
- What are the final conclusions from the study?

INNOVATION - the process of transforming an idea or invention into a good or service that creates value

REGIONAL INNOVATIVENESS - may be seen as the ability to use knowledge to generate, develop and improve new products, processes and services that finally lead to an increase in region's welfare.

How to measure the regional innovativeness?

Indicators widely used as a proxy of the regional innovative potential or performance:

| Indicator | Notation | Data scope and source |
|--|----------|------------------------------------|
| Total R&D expenditure (PPS per inhabitant at constant 2005 prices) | RDexp | average of 2008 – 2012 Eurostat |
| Total R&D personnel and researchers (% of total employment - numerator in full-time equivalent) | RDemp | average of 2008 – 2012 Eurostat |
| Patent applications to the European Patent Office (per million inhabitants) | EPO | average of 2008 – 2012 Eurostat |

These indicators were used to evaluate the innovativeness of 35 V4 regions

METHODOLOGY:

I. COMPOSITE INDICATOR

- Region's innovativeness is reflected by the sum of its innovative attributes

Regional Innovation Index (RII) was calculated as the unweighted average of the normalised scores of three mentioned above indicators

The data were transformed using a square root transformation to obtain the skewness below 1 and then normalized by the min-max procedure ($0 \leq RII \leq 1$)

| | |
|--------------------|----------------------|
| $RII \geq Q3$ | Innovation Leaders |
| $Q2 \leq RII < Q3$ | Innovation Followers |
| $Q1 \leq RII < Q2$ | Moderate Innovators |
| $RII \leq Q1$ | Modest Innovators |

II. TECHNICAL EFFICIENCY SCORE

- Region is technically efficient if it is able to produce the possible maximum of innovative outputs from a given amount of innovative inputs

Regional Innovation Efficiency (RIE) was calculated by applying Data Envelopment Analysis

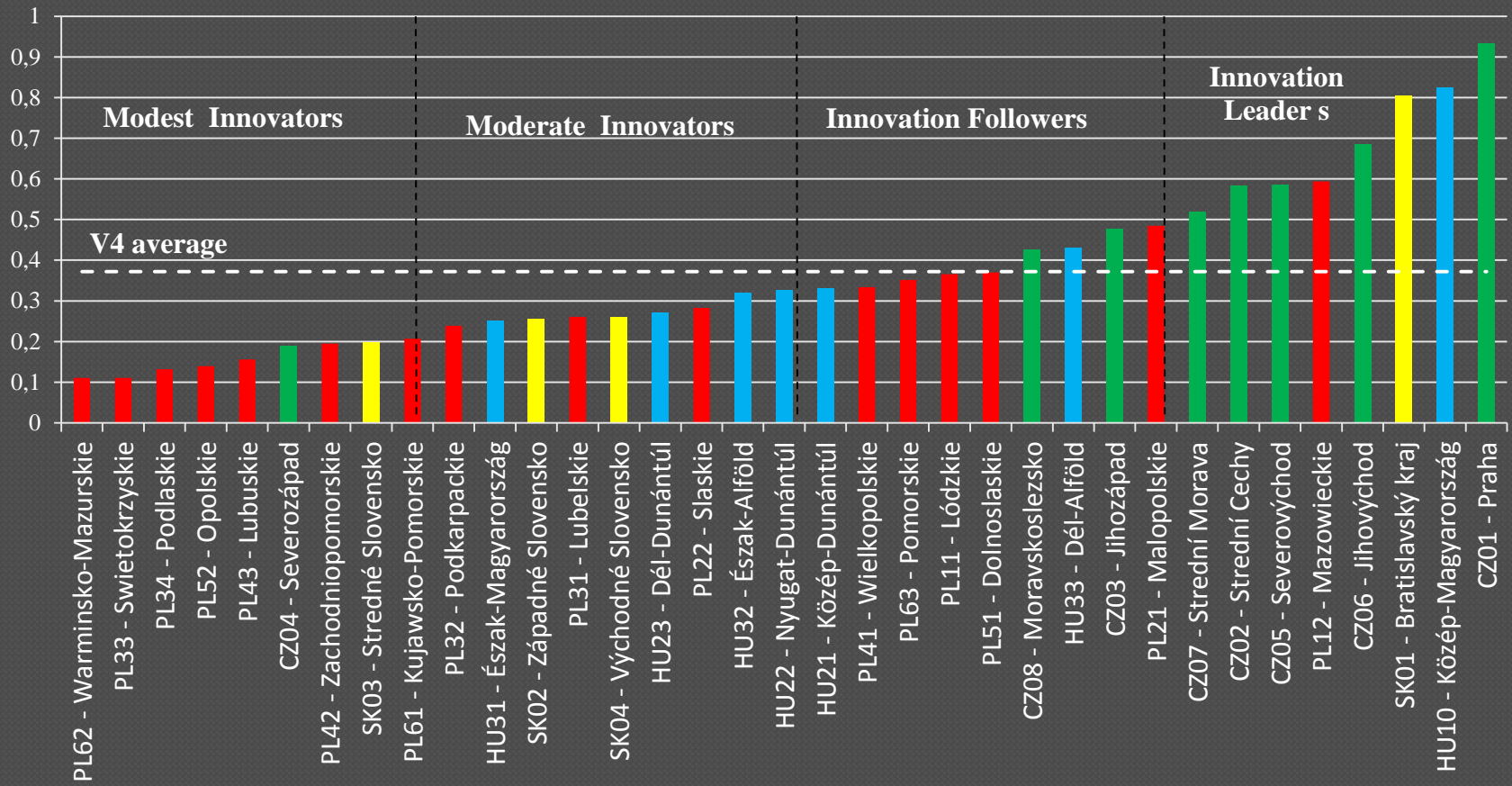
Inputs: R&D expenditures
R&D employment

Output: Patent applications

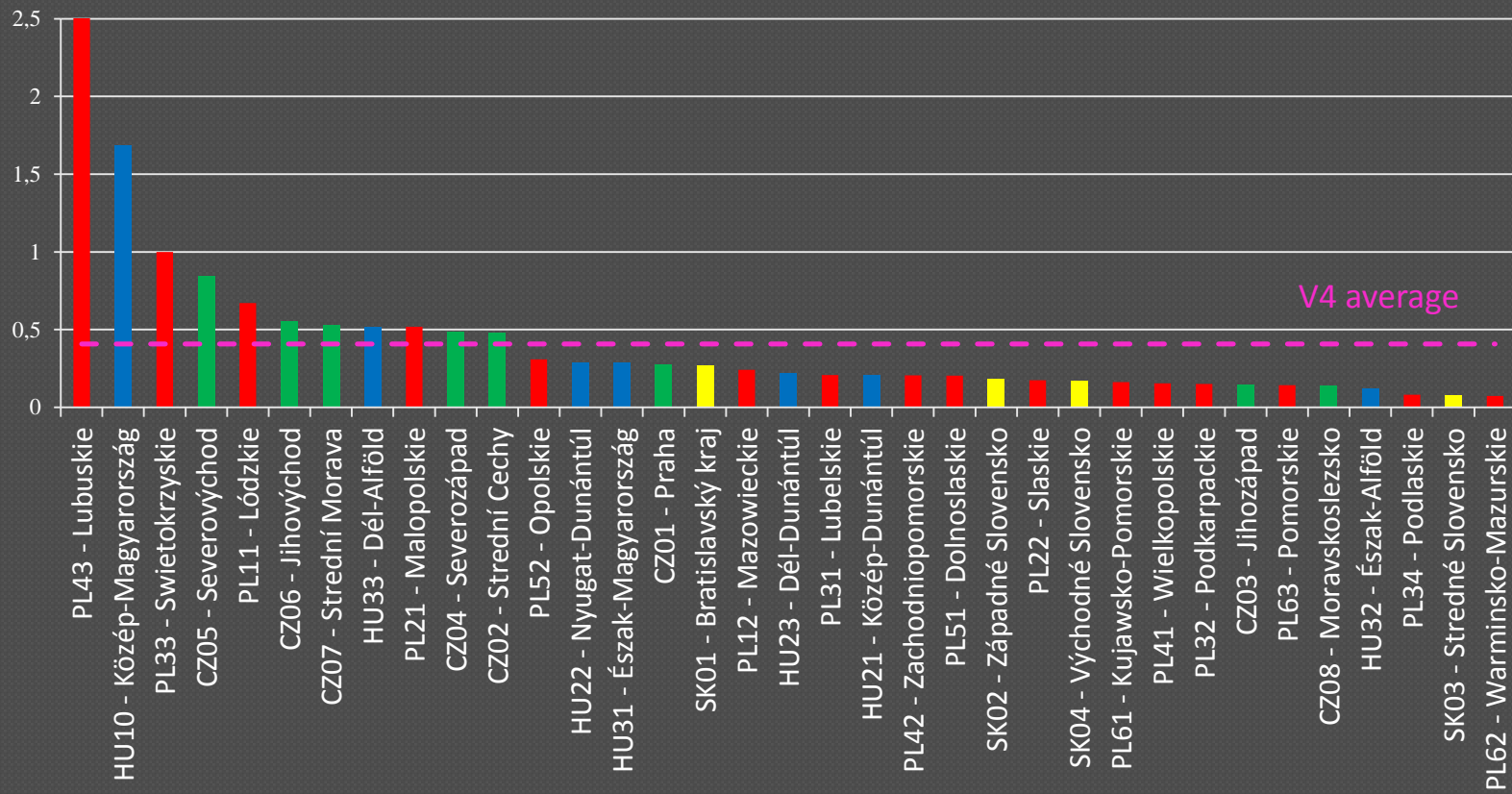
In this study the super-efficiency and non-oriented slacks-based DEA model under the assumption of variable returns to scale (DEA SE-NO-SBM-V) was applied

DEA RIE ≥ 1 => efficient region
DEA RIE < 1 => inefficient region

Ranking of 35 V4 regions due to the composite indicator (RII)



Ranking of 35 V4 regions due to DEA scores (RIE)



The above investigations can be summarized as follows:

- Both methodological approaches show the high innovation diversity in 35 examined regions of the V4 states (the coefficient of variation equals 56% and 117%)
- There is no the correlation between RII and RIE indicators (the Pearson coefficient equals 13%):
 - only 7 of 35 regions kept their position (+/- 1) in both rankings,
 - almost 40% of regions changed rank by 10 places or more.
- The winners of this research are regions which maintain their position in the upper quartile (Innovation Leaders) in both rankings:
 - the Hungarian region - Közép-Magyarország ,
 - three Czech regions: Jihovýchod, Severovýchod, Strední Morava.
- The biggest disappointment comes from Prague which gained the top position due to the composite innovation indicator (RII) but the fifteenth place due to the innovation efficiency (RIE) score. The similar situation occurs in the case of Bratislavský kraj.
- The biggest surprise concerns the advancement of two Polish regions - Lubuskie and Świętokrzyskie - which moved from the end of the ranking based on composite indicator RII onto the top of the ranking based on efficiency indicator RIE.
- The biggest losers of this research are regions which form the lower quartile in both rankings. These are two Polish voivodeships - Warminsko-Mazurskie and Podlaskie as well as Slovakian region -Stredné Slovensko.

CONCLUSIONS

The presented findings cause a question which ranking shows a truer picture of the innovativeness in examined regions

- **Both methodological approaches have their advantages and disadvantages.**
- **The evaluation based on the composite indicator is a kind of diagnosis of innovative potential based on sub-measures which are essential preconditions for innovativeness but at the same time this method is rather weak in assessing the productivity of resources employed in pro-innovative activity.**

This approach usually favours highly developed regions where economic wealth is strongly influenced by factors rooted in beneficial historical circumstances, geographical advantages, political significance, etc.

- **On the contrary, the approach which focuses on examining the relationship between pro-innovative inputs and innovative outputs disregards these specific regional conditions which make up their competitiveness and ability to development.**

This approach is not satisfying too because we all know that the innovation potential of any territory is embedded in the conditions of that territory.

Two approaches used in this study to evaluate the regional innovativeness should not be considered as the substitutes but rather as complementary methods.