

# Measuring Creativity and Innovation

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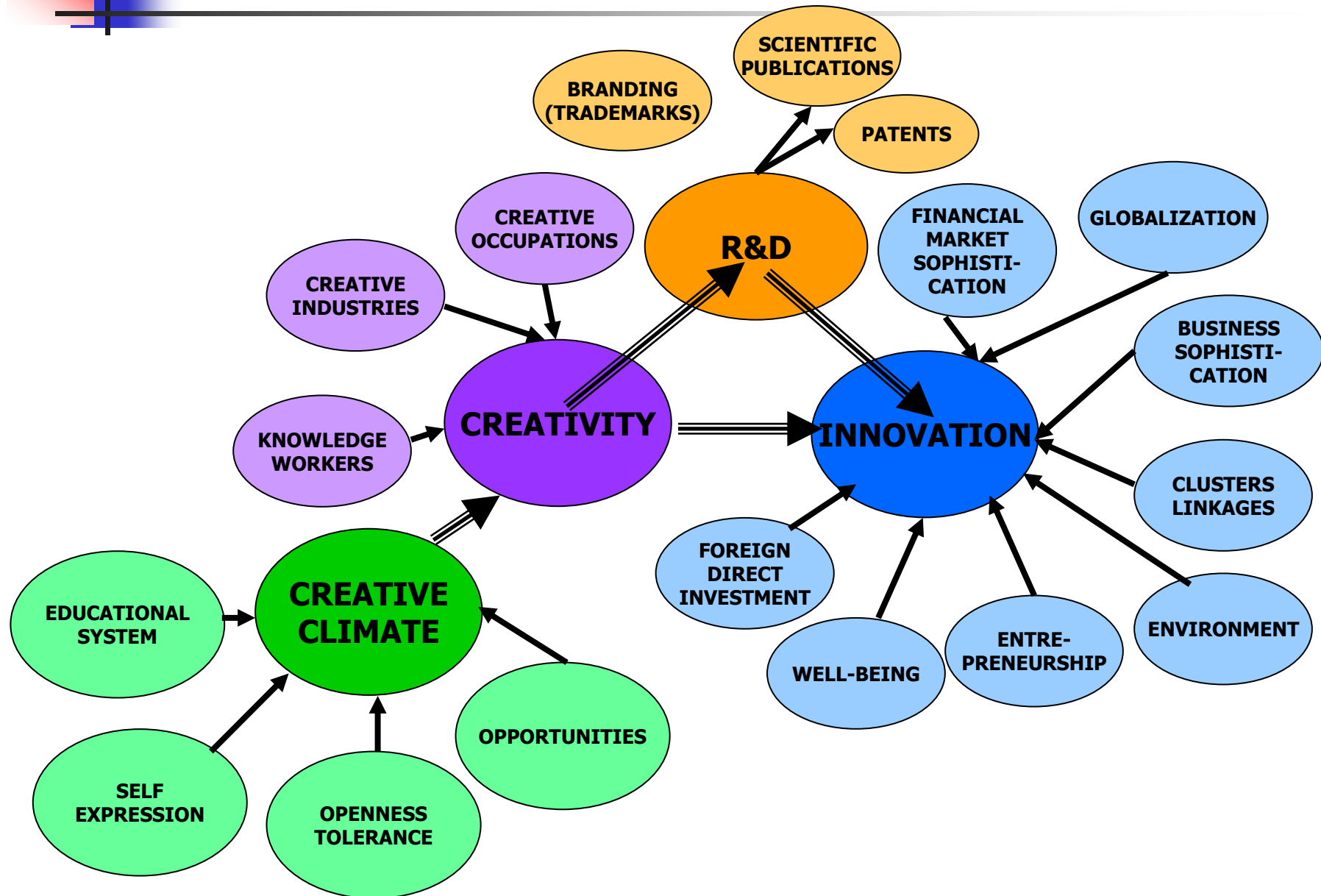
*Conference*

*"Can Creativity be Measured"*

*28&29 May 2009, Brussels, MADOU auditorium*

- Performance of a phenomenon is measured using a set of indicators which grasp the key features of that phenomenon
  - Based on
    - European Innovation Scoreboard (<http://www.eis.eu>)
    - INNO Metrics 2008 Report for DG Enterprise:  
Hugo Hollanders and Adriana van Cruysen: "Design, Creativity and Innovation: A Scoreboard Approach"
    - Work-in-progress extending the 2008 Report
  - Average performance is calculated using composite indexes and factor analysis

# "Flow chart model" linking Creative climate, Creativity and Innovation



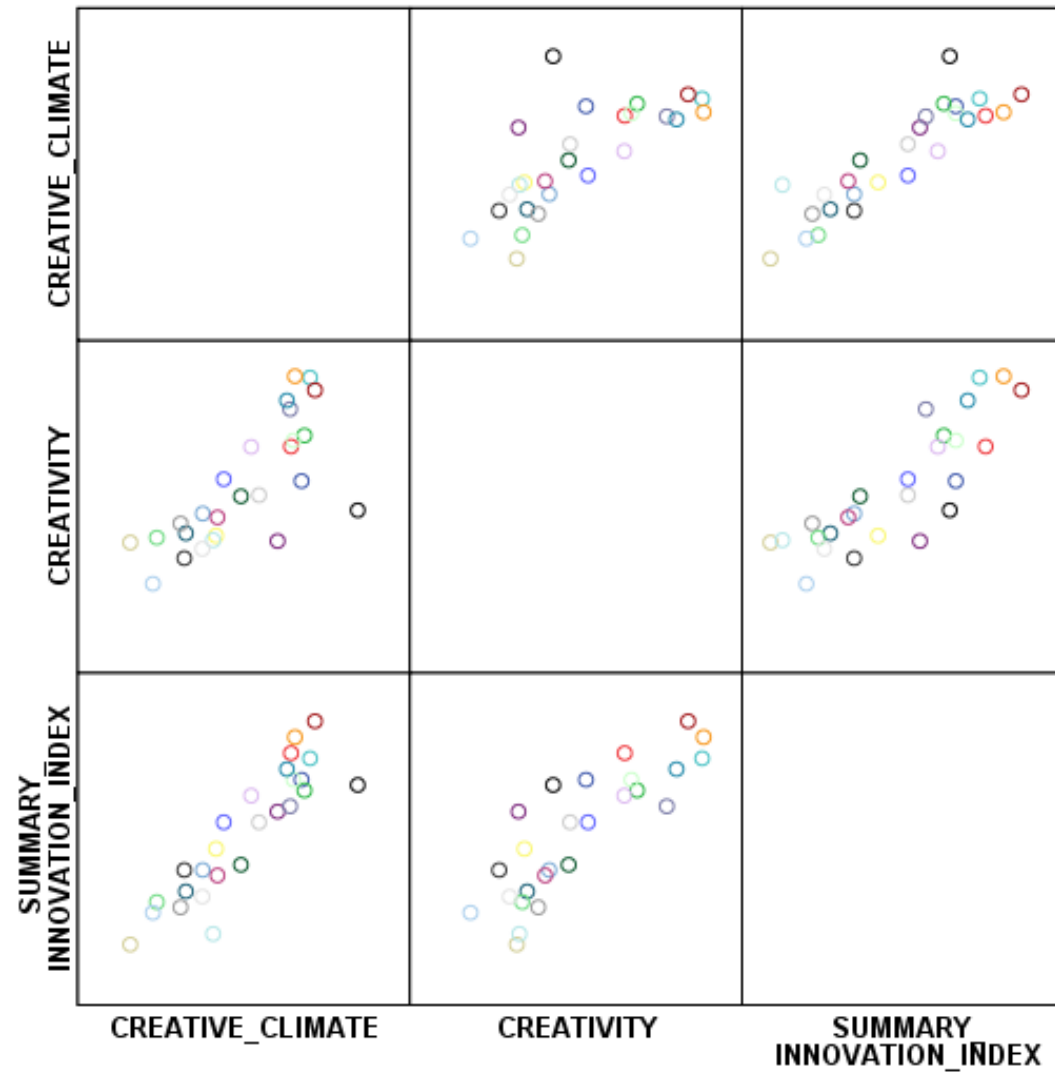
## Indicators for measuring Creative climate

Indicators	Data source
<b>CREATIVE EDUCATION</b>	
Number of art schools per million population	ELIA (European League of Institutes of the Arts) / Eurostat (population)
Quality of educational system (1= does not meet the needs of a competitive economy, 7= meets the needs of a competitive economy)	Global Competitiveness Report 2007/2008
Public expenditure on education per capita	Eurostat
Share of tertiary students by field of education related to culture	Eurostat
Extent of staff training (The general approach of companies in your country to human resources is: 1= to invest little in training and employee development, 7= to invest heavily to attract, train and retain employees)	Global Competitiveness Report 2007/2008
<b>SELF EXPRESSION</b>	
Language skills (share of population being able to have a conversation in at least one other language besides their mother tongue)	Special Eurobarometer 243
Share of population involved in artistic activities	Eurobarometer 278
Self-expression values	Inglehart and Welzel (2004)
<b>OPENNESS &amp; TOLERANCE</b>	
Share of foreigners in employment of population aged 25 to 64	Eurostat
Share of cultural employment in total employment for employees with a completed tertiary education	Eurostat
Openness to other countries, share of population very interested in arts and culture in own other European countries	Eurobarometer 278
<b>Opportunities</b>	
Share of foreign tertiary students	Eurostat
Brain drain (reversed) (Your country's talented people: 1= normally leave to pursue opportunities in other countries, 7= almost always remain in the country)	Global Competitiveness Report 2007/2008

## Indicators for measuring Creativity

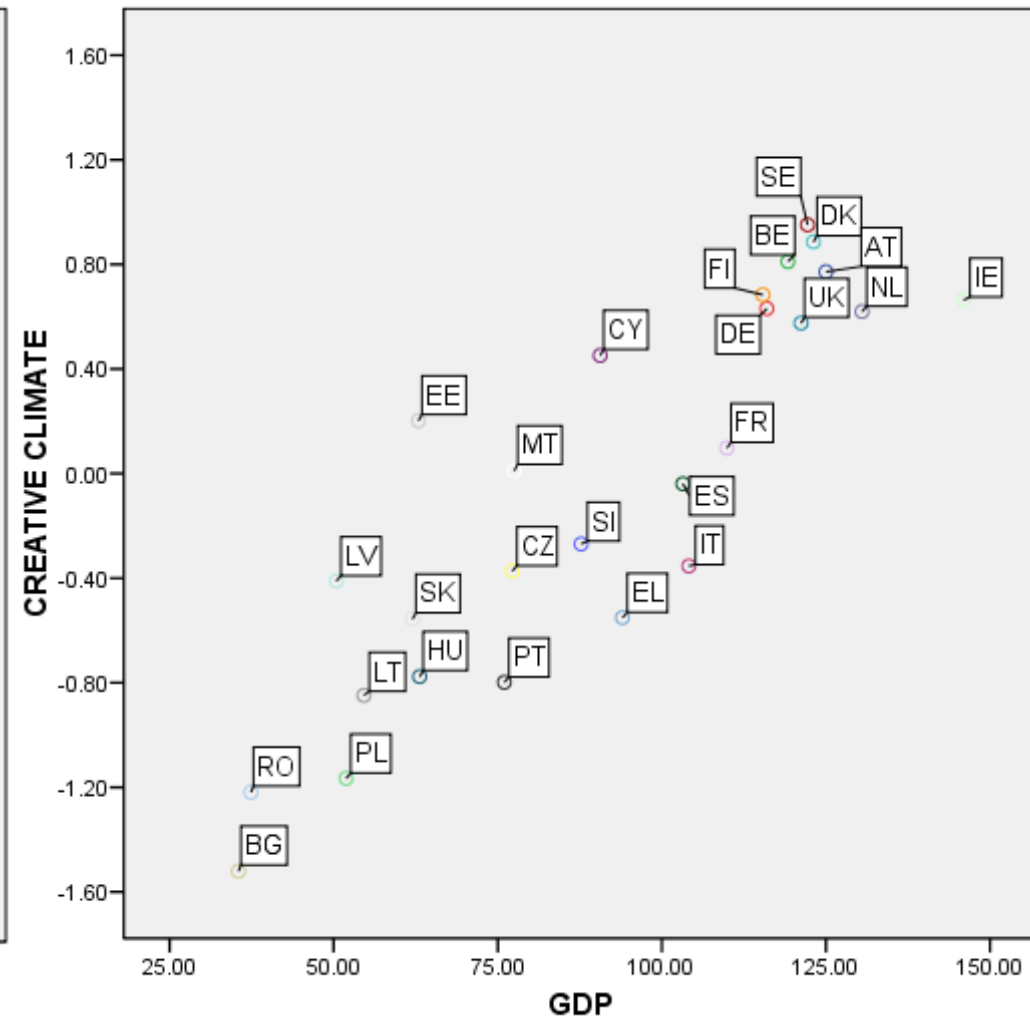
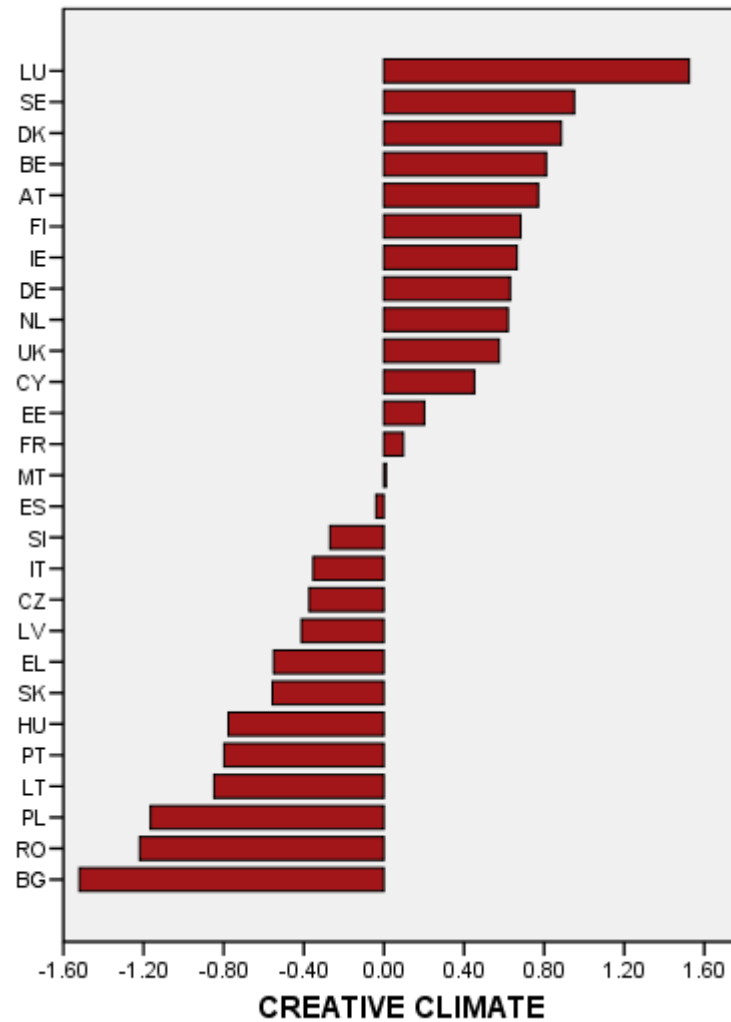
<b>Indicators</b>	<b>Data source</b>
<b>CREATIVE SECTOR</b>	
Share of creative occupations (ISCO classes 1 and 2) of population aged 25 to 64	Eurostat
Share of knowledge workers in S&T (HRSTC – Core of Human Resources in Science and Technology)	Eurostat
Value added share of creative industries	KEA (2006)
<b>CREATIVITY IN R&amp;D</b>	
National patent applications per million population	WIPO (patents) / Eurostat (population)
Scientific publications per million population	Thomson Reuters Web of Science & CWTS (Leiden University) / Eurostat (population)
Trademark applications by residents per million population	WIPO (trademarks) / Eurostat (population)

# Relation between Creative climate, Creativity and Innovation

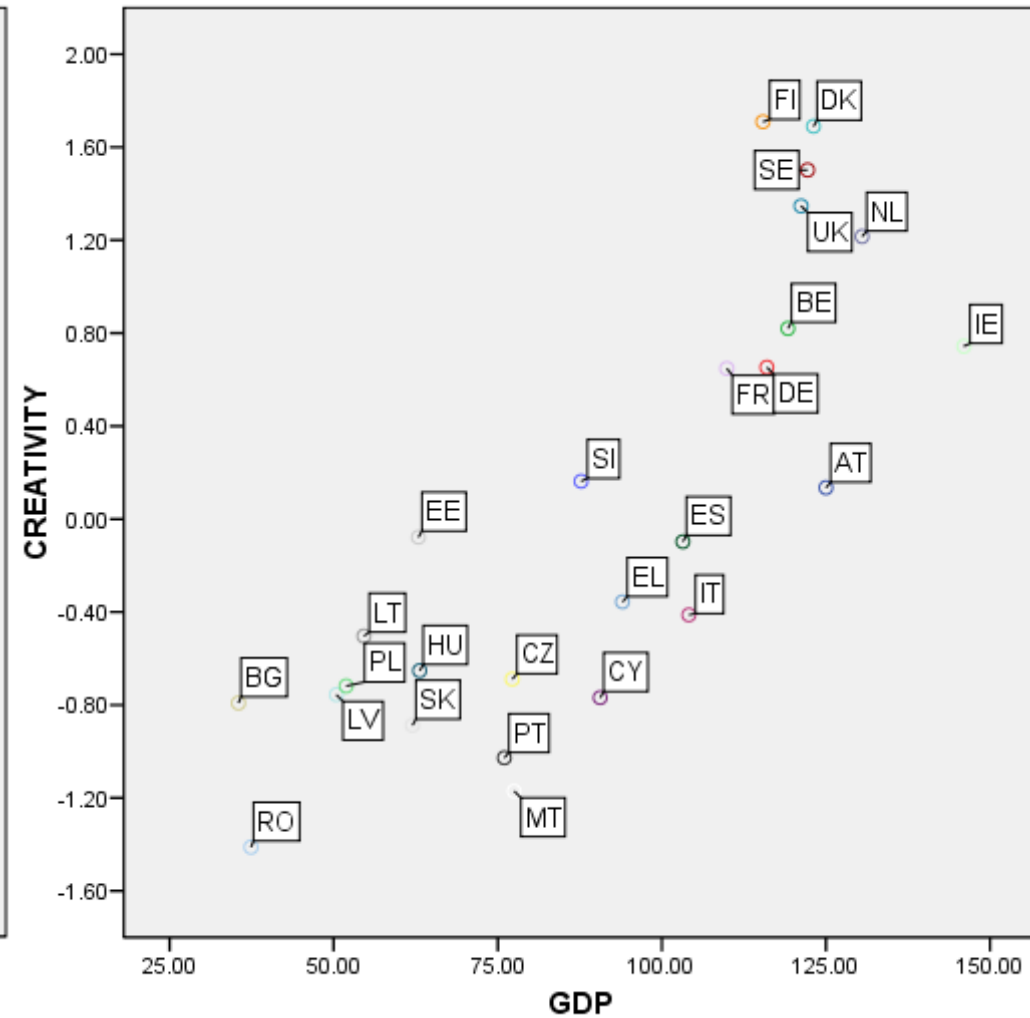
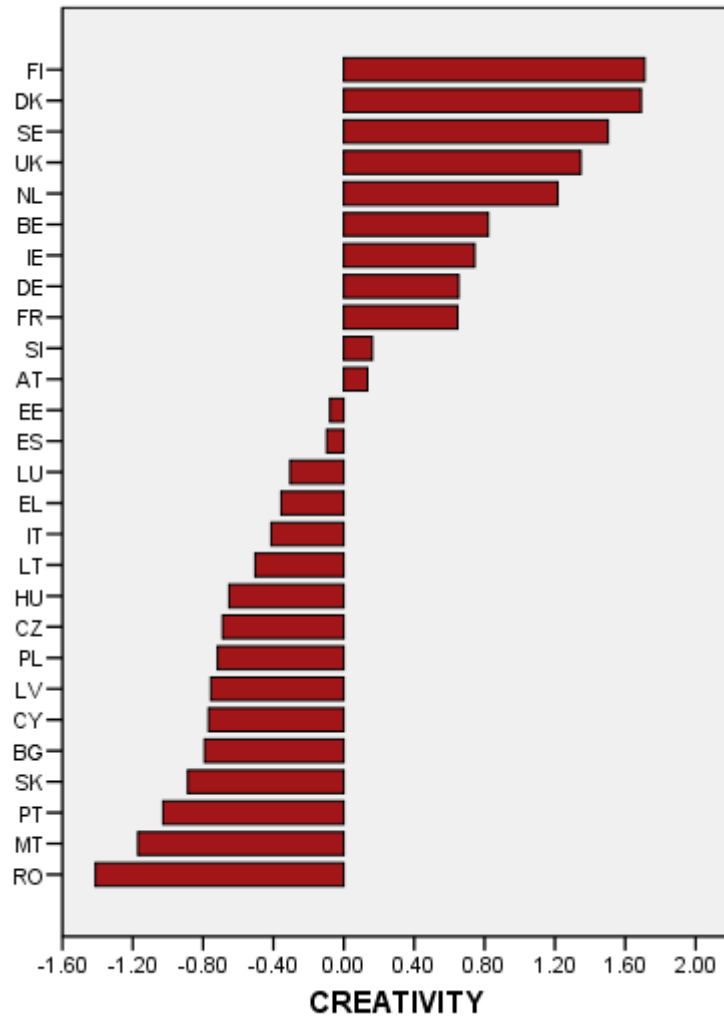


- Creative climate, Creativity and Innovation are highly correlated
- This raises the question if we are not in fact measuring the same phenomenon using different indexes
- Is there a possible problem of spurious correlation where two unrelated indexes appear to be correlated simply because each of the indexes correlates with a third unobserved index?

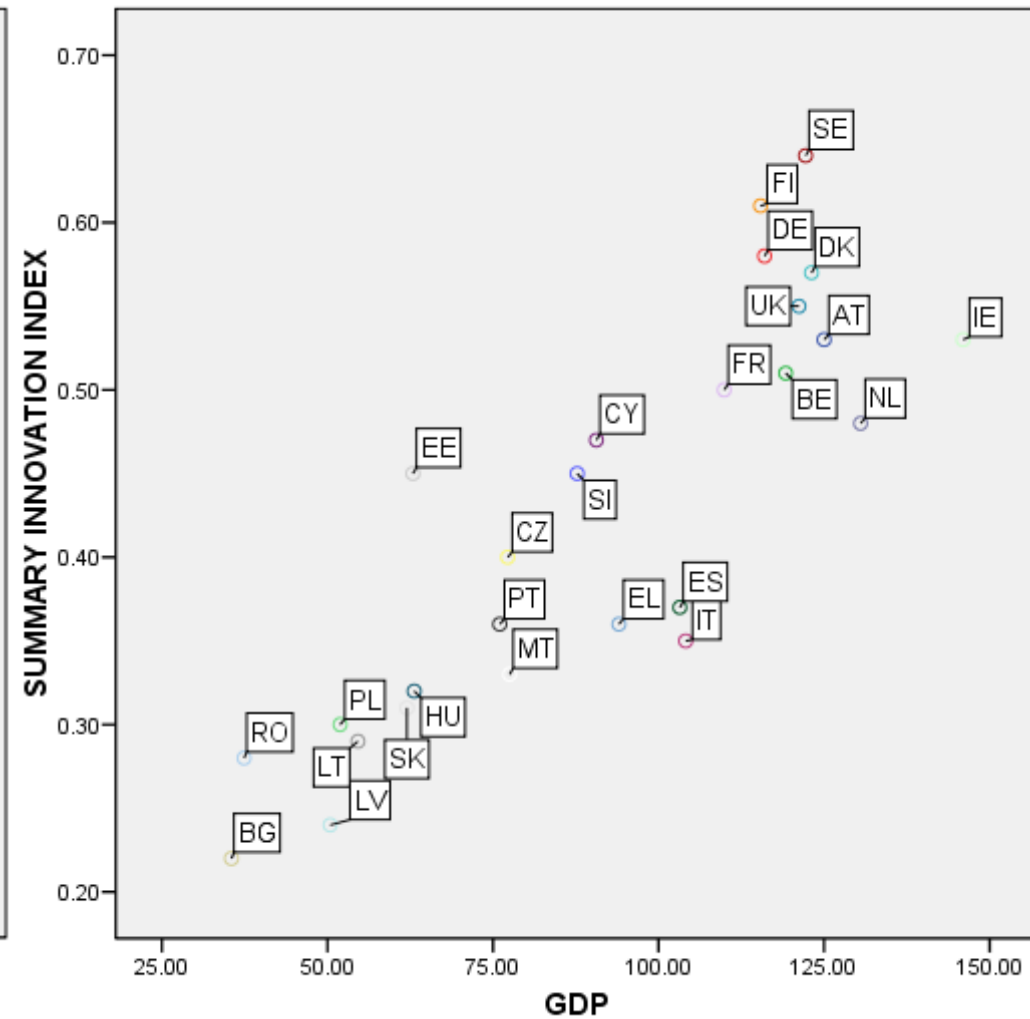
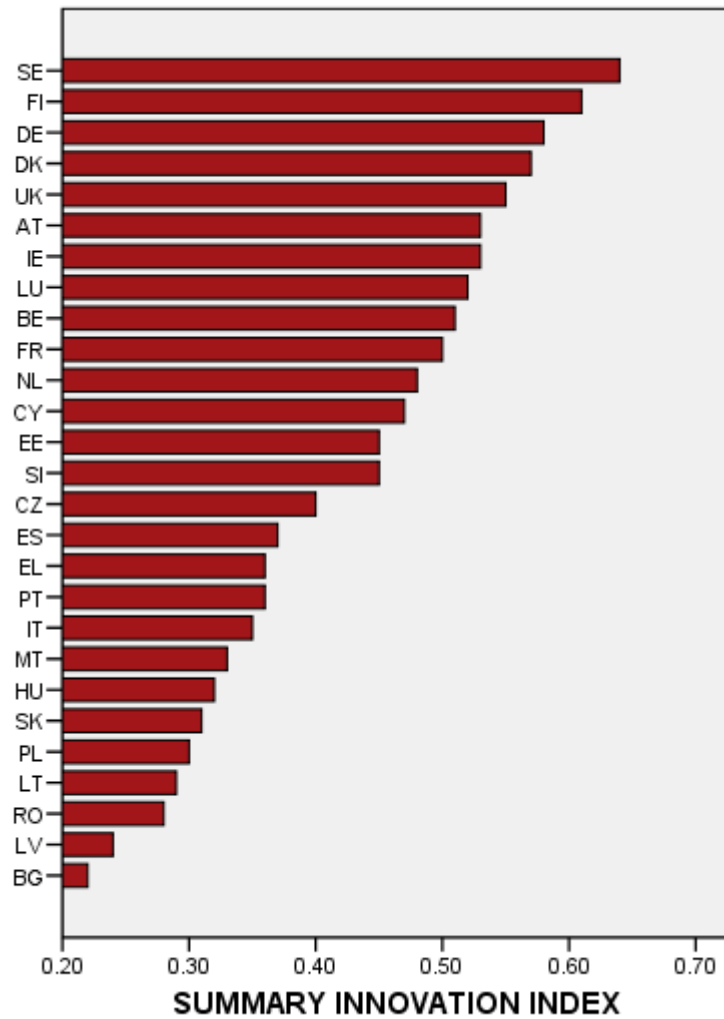
# Creative climate: High-income countries perform better



# Creativity: High-income countries perform better



# Innovation: High-income countries perform better



- Is it Creativity that we are measuring or something else?
  - It appears that differences in income levels explain (part of) the results
  - This is observed in many benchmarking exercises
  - Control for differences in income levels!!

## Partial correlation results (controlling for differences in income)

Control Variables			CREATIVE CLIMATE	CREATIVITY	SUMMARY INNOVATION INDEX
GDP	CREATIVE CLIMATE	Correlation	1.000	.607	.772
		Significance (2-tailed)	.	.001	.000
		df	0	24	24
	CREATIVITY	Correlation	.607	1.000	.800
		Significance (2-tailed)	.001	.	.000
		df	24	0	24
	SUMMARY INNOVATION INDEX	Correlation	.772	.800	1.000
		Significance (2-tailed)	.000	.000	.
		df	24	24	0

- Strong relationship among Creative climate, Creativity and Innovation
- But there is a (potential) problem of causality:
  - e.g. is creativity fostering innovation or is innovation fostering creativity?

- Can creativity be measured?
  - Only indirectly, either by looking at “framework condition” indicators or by looking at indicators *assumed* to relate positively to creativity
  
- What aspects are missing?
  - Missing are indicators directly measuring creativity (in innovation)
  
- Are these indexes relevant for policy?
  - Partly, measuring performance in creativity is important, but for policy it is the explanations for observed differences in performance that are crucial!



Thank you

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- For questions or comments, please contact:

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