

28th - 30th September 2016

Seville, Spain



Changing Patterns of Territorial Policy

28-30 September 2016,
Seville, Spain

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DIFFERENCES IN ENTREPRENEURSHIP IN EU REGIONS BASED ON THE REDI METHODOLOGY

Outline

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- ▶ Objectives of the REDI project
- ▶ Conceptual Model of Entrepreneurship
- ▶ The Structure of the REDI

Methodology

- ▶ Creation of REDI

Results

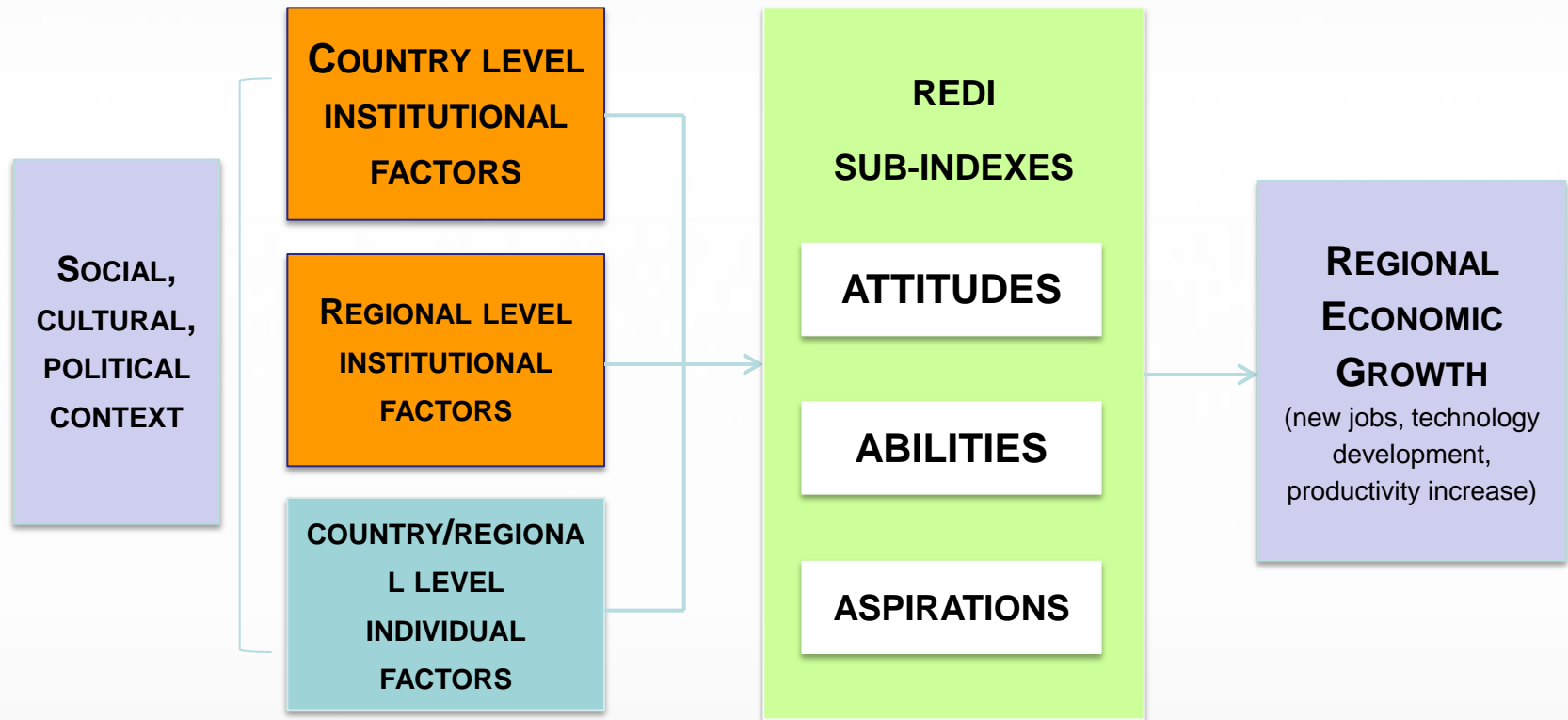
Regional Entrepreneurial Ecosystem

- *Entrepreneurship is a **complex, multidimensional** phenomenon.*
- *Both **individual and contextual levels** matter: *the complex recursive relationships between the two levels have not received much attention yet...**
- ***Dynamics** of entrepreneurial ecosystems: approaches actually do not develop a **systemic solution** to the problem.*
- *System elements coproduce system performance and **bottleneck factors** therefore may hinder the performance.*
- ***Regional level** – that is the sub-national level – is a sufficient scale to capture the socioeconomic and institutional context of systems of entrepreneurship*

Objectives of the REDI project

- 1) to identify the crucial **regional drivers** of the entrepreneurial „discovery” process,
- 2) to emphasize the **system-characteristics** of these identified drivers,
- 3) finding adequate **regional (or country-level) institutional variables and proxies**, and
- 4) to provide a **useful tool** to analyze alternative, tailor-made entrepreneurship policy scenarios.

The Conceptual Model of Entrepreneurship



The Structure of the REDI

Structure of the GEDI 3 Sub-indexes 14 Pillars		National and regional institution variables	Regional level individual variables
Entrepreneurial <i>Aspiration</i> Sub-index	Financing	FINANCIAL INSTITUTIONS	INFORMAL INVESTMENT
	Globalization	CONNECTIVITY	EXPORT
	High growth	CLUSTERING	GAZELLE
	Process innovation	TECHNOLOGY DEVELOPMENT	NEW TECHNOLOGY
	Product innovation	TECHNOLOGY TRANSFER	NEW PRODUCT
Entrepreneurial <i>Ability</i> Sub-index	Competition	BUSINESS STRATEGY	COMPETITORS
	Human capital	EDUCATION & TRAINING	EDUCATION LEVEL
	Technology sector	ABSORPTIVE CAPACITY	TECHNOLOGY LEVEL
	Opportunity start-up	BUSINESS ENVIRONMENT	OPPORTUNITY MOTIVATION
Entrepreneurial <i>Attitudes</i> Sub-index	Cultural support	OPEN SOCIETY	CARRIER STATUS
	Networking	SOCIAL CAPITAL	KN OW ENTREPRENEURS
	Risk acceptance	BUSINESS RISK	BUSINESS ACCEPTANCE
	Startup skills	QUALITY OF EDUCATION	SKILL PERCEPTION
	Opportunity perception	MARKET AGGLOMERATION	OPPORTUNITY RECOGNITION

http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/regional_entrepreneurship_development_index.pdf

Methodology (1/4)

- Selection of individual / institutional variables.
- Construction of the 14 pillars.
- Normalization.

$$x_{i,j} = \frac{z_{i,j}}{\max_i z_{i,j}}$$

for all $j= 1, \dots, m$ the number of pillars
where $x_{i,j}$ is the normalized score value for country or region i and pillar j
 $z_{i,j}$ is the original pillar value for country and region i and pillar j
 $\max_i z_{i,j}$ is the maximum value for pillar j

- Treating the outliers: 95% Capping.

Methodology (3/4)

○ Harmonization of the pillars: Equalize pillar averages.

The arithmetic average of pillar j for number n regions is:

$$\bar{x}_j = \frac{\sum_{i=1}^n x_{i,j}}{n} \quad \text{for all } j$$

We want to transform the $x_{i,j}$ values such that the potential values to be in the $[0,1]$ range.

$$y_{i,j} = x_{i,j}^k$$

where k is the “strength of adjustment”, the k^{th} moment of $x_{i,j}$ is exactly the needed average.

We have to find the root of the following equation for :

$$\sum_{i=1}^n x_{i,j}^k - n\bar{y}_j = 0$$

Newton – Raphson method with an initial guess of 0. After obtaining k , the computations are straightforward. Note that if

$$\bar{x}_j < \bar{y}_j \quad k < 1$$

$$\bar{x}_j = \bar{y}_j \quad k = 1$$

$$\bar{x}_j > \bar{y}_j \quad k > 1$$

Average pillar values before and after the average equalization (2/4)

Pillar	Pillar averages	Equalized Pillar Averages
Opportunity perception	0.38	0.51
Startup skills	0.48	0.51
Risk perception	0.55	0.51
Networking	0.43	0.51
Cultural support	0.52	0.51
Opportunity startup	0.57	0.51
Technology adoption	0.50	0.51
Human capital	0.53	0.51
Competition	0.55	0.51
Product innovation	0.63	0.51
Process innovation	0.59	0.51
High growth	0.44	0.51
Globalization	0.61	0.51
Financing	0.38	0.51
Average	0.51	0.51

Methodology (4/4)

The penalty for bottleneck methodology.

$$h_{(i),j} = \min y_{(i),j} + (1 - e^{-(y_{(i),j} - \min y_{(i),j})})$$

where $h_{i,j}$ is the modified, post-penalty value of pillar j in region i

$y_{i,j}$ is the normalized value of index component j in region i

y_{\min} is the lowest value of $y_{i,j}$ for region i .

$i = 1, 2, \dots, n$ = the number of regions

$j = 1, 2, \dots, m$ = the number of pillars

Aggregation.

$$ATT_i = 100 \sum_{j=1}^5 h_j \quad \text{where } h_{i,j} \text{ is the modified, post-penalty value of pillar } j \text{ in region } i$$

$$ABT_i = 100 \sum_{j=6}^{10} h_j \quad i = 1, 2, \dots, n = \text{the number of regions}$$

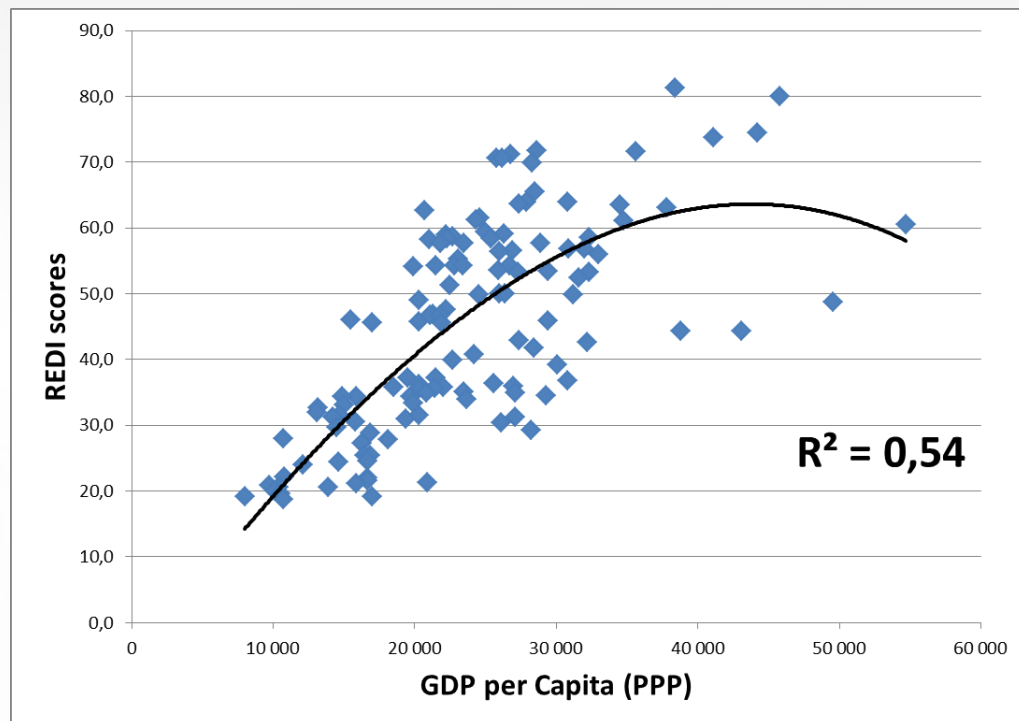
$j = 1, 2, \dots, 14$ = the number of pillars

$$ASP_i = 100 \sum_{j=11}^{14} h_j$$

$$REDI_i = \frac{1}{3} (ATT_i + ABT_i + ASP_i) \quad \text{where } i = 1, 2, \dots, n = \text{the number of regions}$$

TOP 20			
CODE	REGION	REDI	Ranking
DK01	Hovedstaden	81,3	1
UKI	London	80,0	2
FR1	Île de France	74,5	3
SE11	Stockholm	73,8	4
SE23	Vastsverige	71,7	5
IE02	Southern and Eastern	71,6	6
DK05	Nordjylland	71,1	7
SE12	Östra Mellansverige	70,7	8
SE22	Sydsverige	70,6	9
UKJ	South East (UK)	69,9	10
DK04	Midtjylland	65,4	11
DK03	Syddanmark	63,9	12
SE33	Övre Norrland	63,9	13
DE3	Berlin	63,7	14
NL3	West-Nederland	63,5	15
FI1B	Helsinki-Uusimaa	63,1	16
IE01	Border, Midland and Western	62,7	17
UKH	East of England	61,5	18
UKK	South West (UK)	61,2	19
DE7	Hessen	61,2	20
LAST 20			
CODE	REGION	REDI	Ranking
PT18	Alentejo	27,8	106
PT16	Centro (PT)	27,3	107
ITF	Sud	25,5	108
ITG	Isole	25,4	109
SK02	Západné Slovensko	24,6	110
SK03	Stredné Slovensko	24,4	111
SK04	Východné Slovensko	24,0	112
HU23	Dél-Dunántúl	22,1	113
EL1	Voreia Ellada	22,0	114
RO3	Macroregiunea trei	21,6	115
EL4	Nisia Aigaiou, Kriti	21,2	116
HU22	Nyugat-Dunántúl	21,1	117
HU31	Észak-Magyarország	20,8	118
HU21	Közép-Dunántúl	20,6	119
HU33	Dél-Alföld	20,6	120
HU32	Észak-Alföld	20,0	121
RO1	Macroregiunea unu	19,6	122
EL2	Kentriki Ellada	19,1	123
RO2	Macroregiunea doi	19,1	124
RO4	Macroregiunea patru	18,7	125

Old period (2007-2011)

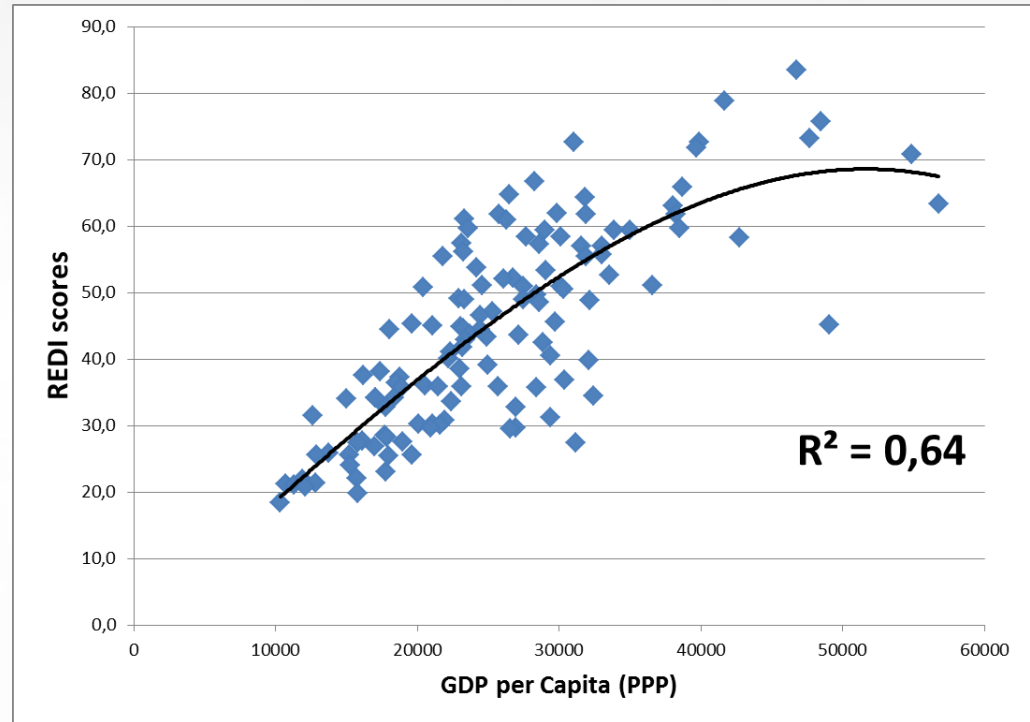


Source: own calculation

- REDI scores range from the **18.7** to **81.3** showing that even the best European region is almost 19 points from the potential maximum level.
- 3rd degree polynomial adjustment explains **54 %** of the variations.
- Pearson's correlation coefficient is **0.69**.

TOP 20			
CODE	REGION	REDI	Ranking
SE11	Stockholm	83,4	1
DK01	Hovedstaden	78,8	2
UKI	London	75,7	3
FR1	Île de France	73,2	4
UKJ	South East (UK)	72,6	5
F11B	Helsinki-Uusimaa	72,6	6
IE02	Southern and Eastern	71,8	7
DE6	Hamburg	70,9	8
SE22	Sydsverige	66,7	9
NL3	West-Nederland	65,8	10
UKH	East of England	64,8	11
DE3	Berlin	64,3	12
BE1	Région de Bruxelles-Capitale	63,3	13
DE1	Baden-Württemberg	63,1	14
DK03	Syddanmark	61,9	15
UKK	South West (UK)	61,8	16
DE2	Bayern	61,8	17
SE23	Vastsverige	61,7	18
IE01	Border, Midland and Western	61,1	19
UKM	Scotland	60,9	20
LAST 20			
CODE	REGION	REDI	Ranking
HR04	Kontinentalna Hrvatska (Conti	27,7	106
SK02	Západné Slovensko	27,6	107
SK03	Stredné Slovensko	27,4	108
ITH	Nord-Est	27,4	109
ES43	Extremadura	26,8	110
SK04	Vychodné Slovensko	25,8	111
ES42	Castilla-la Mancha	25,6	112
RO1	Macroregiunea unu	25,6	113
HR03	Jadranska Hrvatska (Adriatic C	25,6	114
HU22	Nyugat-Dunántúl	25,5	115
EL1	Voreia Ellada	24,0	116
EL4	Nisia Aigaiou, Kriti	23,1	117
HU21	Közép-Dunántúl	22,1	118
HU23	Dél-Dunántúl	21,9	119
RO4	Macroregiunea patru	21,3	120
HU31	Észak-Magyarország	21,2	121
HU32	Észak-Alföld	21,1	122
HU33	Dél-Alföld	20,8	123
EL2	Kentriki Ellada	19,8	124
RO2	Macroregiunea doi	18,5	125

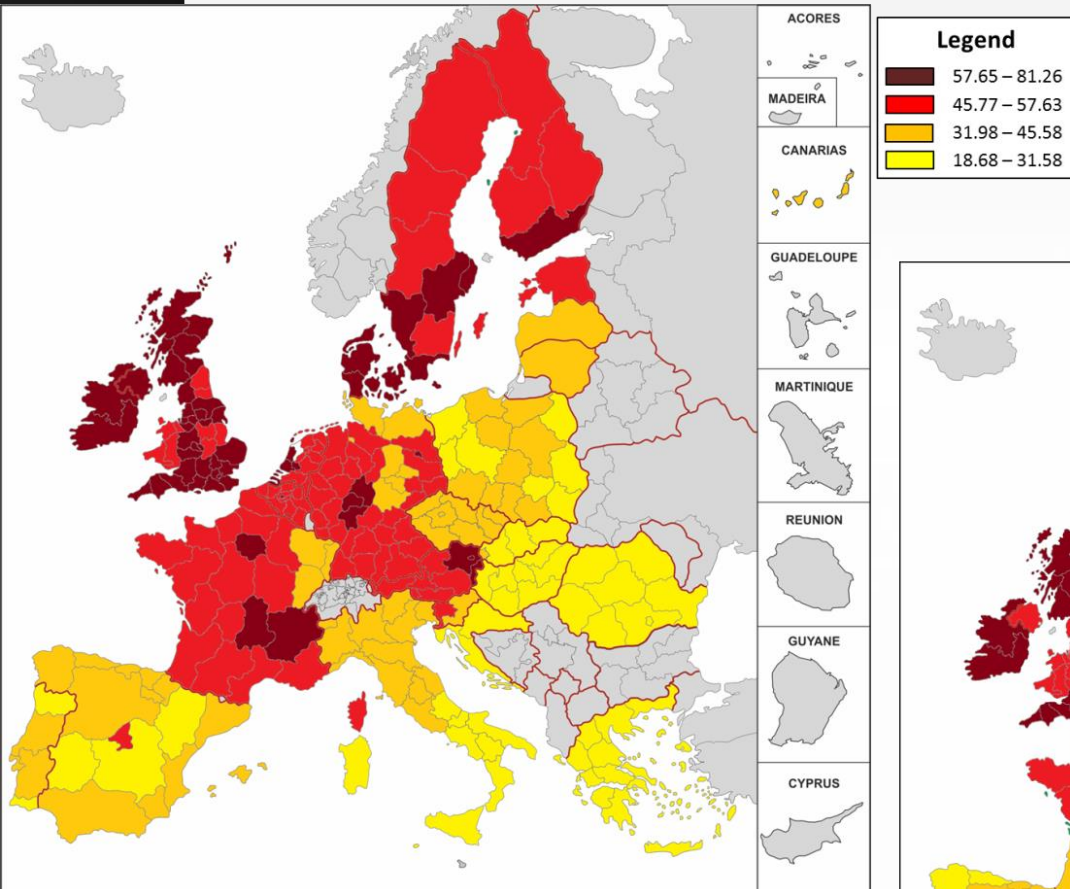
New period (2012-2015)



Source: own calculation

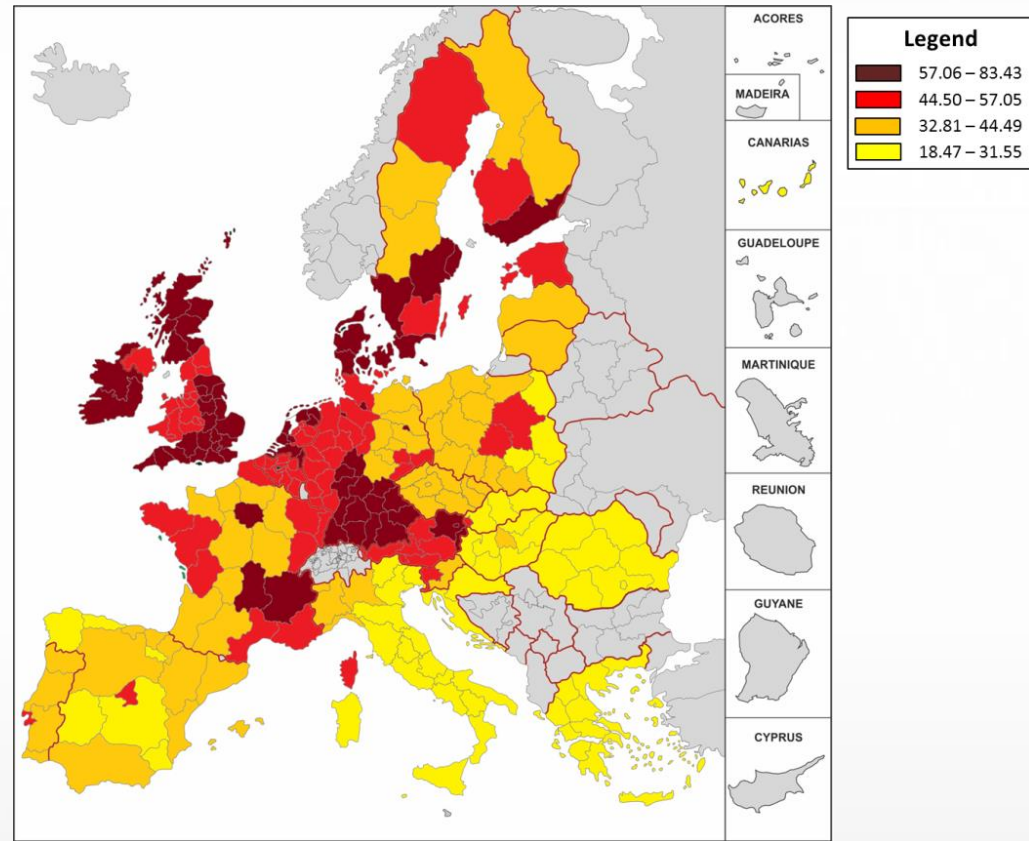
- REDI scores range from the **18.5** to **83.4** showing that even the best European region is almost 17 points from the potential maximum level.
- 3rd degree polynomial adjustment explains **64 %** of the variations.
- Pearson's correlation coefficient is **0.77**.

Old period (2007-2011)



Source: own calculation

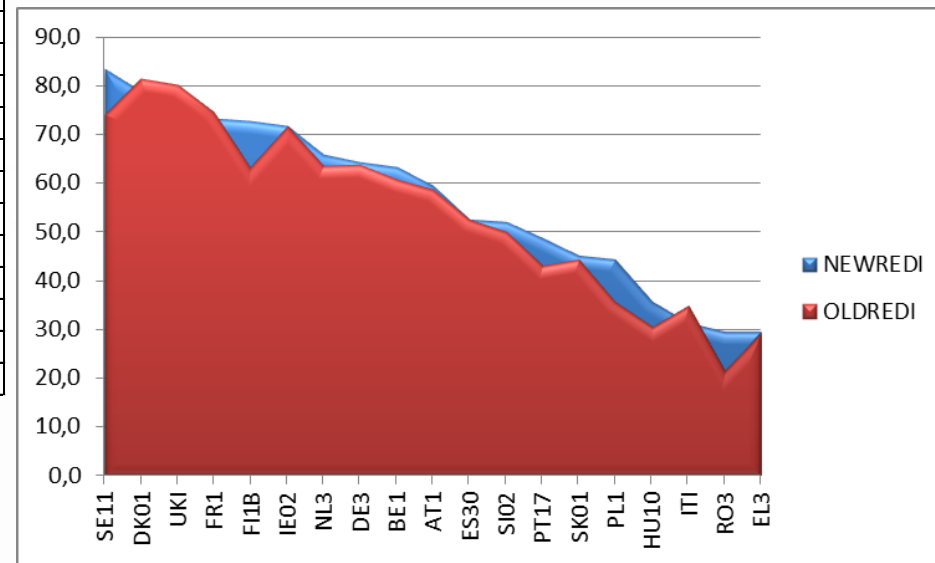
New period (2012-2015)



Source: own calculation

Capital regions of REDI 125

Code	Region	NEWREDI	New ranking	OLDREDI	Old ranking
SE11	Stockholm	83,4	1	73,8	4
DK01	Hovedstaden	78,8	2	81,3	1
UKI	London	75,7	3	80,0	2
FR1	Île de France	73,2	4	74,5	3
FI1B	Helsinki-Uusimaa	72,6	6	63,1	16
IE02	Southern and Eastern	71,8	7	71,6	6
NL3	West-Nederland	65,8	10	63,5	15
DE3	Berlin	64,3	12	63,7	14
BE1	Région de Bruxelles-Capitale	63,3	13	60,6	21
AT1	Ostösterreich	59,4	24	58,6	26
ES30	Comunidad de Madrid	52,6	39	52,4	48
SI02	Zahodna Slovenija	52,1	41	49,9	52
PT17	Lisboa	48,6	53	42,9	67
SK01	Bratislavsky kraj	45,2	58	44,4	66
PL1	Region Centralny	44,5	62	35,6	81
HU10	Közép-Magyarország	35,7	86	30,4	101
IT1	Centro (IT)	31,3	96	34,9	85
RO3	Macroregiunea trei	29,7	101	21,6	115
EL3	Attiki	29,7	102	29,2	103



Source: own calculation

Improved position (at least 10 point increase)

	Code	Region	ATT		ABT		ASP	
			Score	Rank	Score	Rank	Score	Rank
NEW	UKF	East Midlands (UK)	66,8	14 (+13)	61,0	27 ⁽⁻¹⁾	51,2	37 (+32)
OLD			62,5	27	62,9	26	40,3	69
NEW	PL1	Region Centralny	45,4	58 (+10)	31,4	90 (+21)	56,7	23 (+33)
OLD			41,1	68	20,3	111	45,6	56
NEW	HU10	Közép-Magyarország	28,0	102 (+1)	35,8	82 (+11)	43,4	61 (+39)
OLD			29,0	103	31,8	93	30,5	100
NEW	RO3	Macroregiunea trei	26,0	104 (+8)	19,4	120 ⁽⁻²⁾	43,7	57 (+52)
OLD			20,2	112	16,3	118	28,3	109

Source: own calculation

Worsened position (at least 10 point decrease)

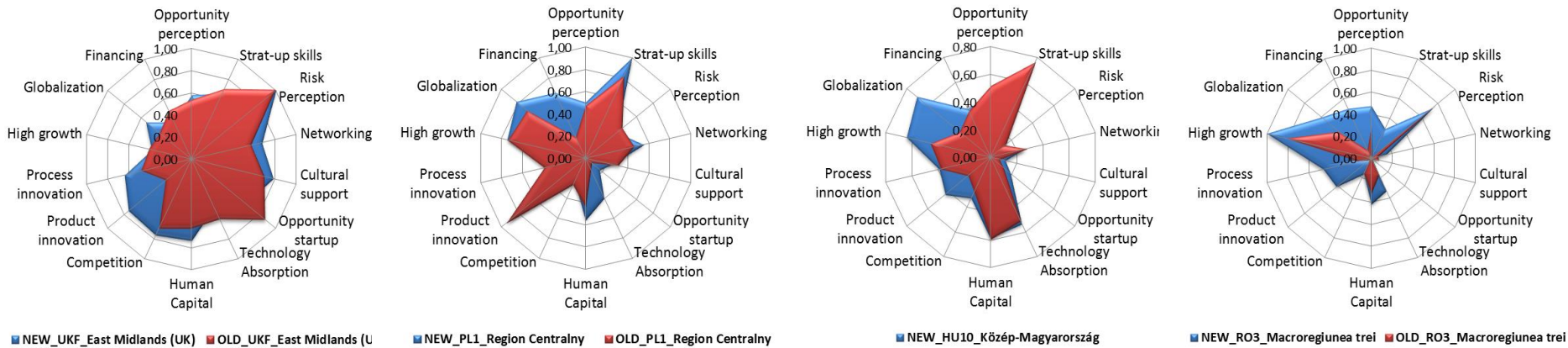
	Code	Region	ATT		ABT		ASP	
			Score	Rank	Score	Rank	Score	Rank
NEW	SE23	Vastsverige	68,3	11 (-6)	66,8	17 (-6)	50,1	41 (-33)
OLD			77,0	5	70,9	11	67,3	8
NEW	BE02	Vlaams Gewest	40,6	65 (-18)	51,1	51 (-27)	54,7	28 (-4)
OLD			50,7	47	63,9	24	58,3	24
NEW	ITC	Nord-Ovest	28,5	101 (-19)	29,7	92 (-10)	45,3	55 ⁽⁺⁵⁾
OLD			36,4	82	36,1	82	45,1	60
NEW	ES12	Principado de Asturias	33,5	94 (-22)	37,5	75 (-11)	21,5	121 (-42)
OLD			38,2	72	43,9	64	37,6	79

Source: own calculation

Improved regions relative position: pillar level

	Code	Region	Opportunity perception	Strat-up skills	Risk Perception	Networking	Cultural support	Opportunity startup	Technology Absorption	Human Capital	Competition	Product innovation	Process innovation	High growth	Globalization	Financing
NEW	UKF	East Midlands (UK)	0,58	0,66	1,00	0,67	0,77	0,64	0,48	0,73	0,76	0,74	0,64	0,38	0,54	0,37
OLD			0,54	0,70	1,00	0,57	0,70	0,88	0,60	0,63	0,69	0,31	0,48	0,40	0,38	0,48
NEW	PL1	Region Centralny	0,50	1,00	0,37	0,55	0,25	0,17	0,40	0,55	0,23	0,93	0,35	0,74	0,82	0,65
OLD			0,47	0,83	0,44	0,46	0,31	0,07	0,11	0,44	0,27	0,93	0,39	0,73	0,69	0,21
NEW	HU10	Közép-Magyarország	0,45	0,61	0,14	0,26	0,11	0,19	0,53	0,58	0,33	0,43	0,39	0,64	0,70	0,39
OLD			0,52	0,77	0,14	0,28	0,06	0,12	0,51	0,59	0,28	0,21	0,38	0,46	0,29	0,38
NEW	RO3	Macroregiunea trei	0,48	0,30	0,74	0,15	0,00	0,00	0,33	0,42	0,16	0,41	0,46	1,00	0,60	0,50
OLD			0,29	0,01	0,78	0,06	0,08	0,01	0,16	0,32	0,15	0,02	0,13	0,82	0,39	0,09

Source: own calculation

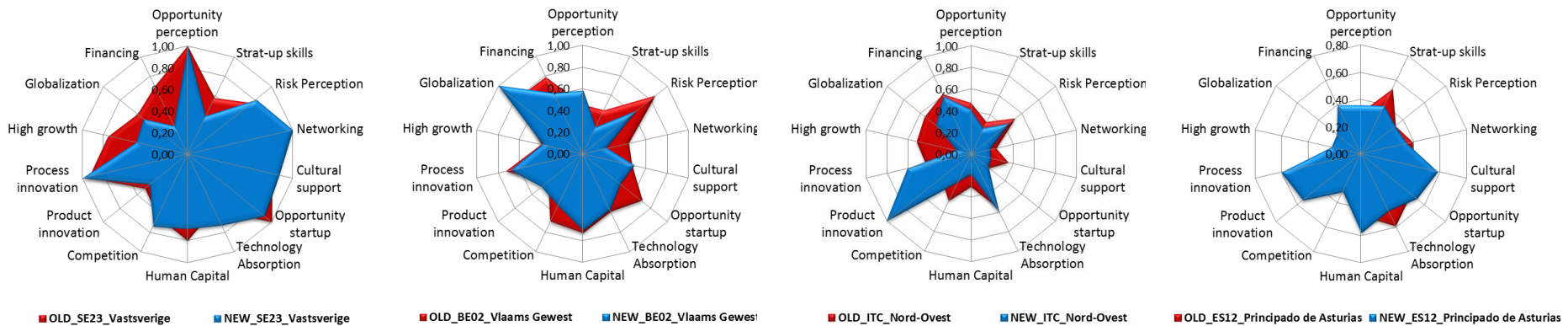


Source: own calculation

Worsened regions relative position: pillar level

	Code	Region	Opportunity perception	Strat-up skills	Risk Perception	Networking	Cultural support	Opportunity startup	Technology Absorption	Human Capital	Competition	Product innovation	Process innovation	High growth	Globalization	Financing
NEW	SE23	Vastserige	1,00	0,39	0,81	1,00	0,87	0,91	0,73	0,69	0,74	0,45	1,00	0,49	0,52	0,29
OLD			1,00	0,57	0,77	0,98	0,80	1,00	0,56	0,80	0,63	0,51	0,94	0,76	0,59	0,70
NEW	BE02	Vlaams Gewest	0,58	0,27	0,63	0,22	0,49	0,45	0,58	0,71	0,54	0,49	0,69	0,38	1,00	0,61
OLD			0,45	0,44	0,85	0,43	0,46	0,69	0,59	0,73	0,69	0,41	0,73	0,39	0,79	0,78
NEW	ITC	Nord-Ovest	0,41	0,27	0,46	0,18	0,19	0,20	0,61	0,19	0,29	1,00	0,60	0,14	0,42	0,59
OLD			0,47	0,33	0,52	0,24	0,35	0,21	0,54	0,30	0,48	0,35	0,43	0,52	0,55	0,61
NEW	ES12	Principado de Asturias	0,31	0,53	0,32	0,38	0,39	0,47	0,58	0,45	0,28	0,19	0,53	0,09	0,06	0,36
OLD			0,36	0,39	0,32	0,34	0,58	0,52	0,47	0,58	0,31	0,55	0,60	0,23	0,23	0,40

Source: own calculation



Source: own calculation

Hungarian regions relative position: pillar level

Regional Code	Regions	Opportunity perception	Strat-up skills	Risk Perception	Networking	Cultural support	Opportunity startup	Technology Absorption	Human capital	Competition	Product innovation	Process innovation	High growth	Globalization	Financing	Less favourable	Most favourable	Regional convergence		
																		To the capital region	To the RED1125 average	To the most entrepreneurial region
NEW (2012-2015)																				
HU10	Közép-Magyarország	0,45	0,61	0,14	0,26	0,11	0,19	0,53	0,58	0,33	0,43	0,39	0,64	0,70	0,39	Cultural support	Globalization		0,80	0,43
HU21	Közép-Dunántúl	0,21	0,15	0,13	0,23	0,15	0,25	0,32	0,30	0,16	0,17	0,14	0,38	0,48	0,15	Risk perception	Globalization	0,62	0,50	0,26
HU22	Nyugat-Dunántúl	0,32	0,21	0,14	0,25	0,15	0,29	0,26	0,34	0,19	0,20	0,14	0,39	0,87	0,13	Financing	Globalization	0,71	0,57	0,31
HU23	Dél-Dunántúl	0,20	0,13	0,12	0,22	0,14	0,19	0,26	0,29	0,25	0,36	0,19	0,60	0,33	0,07	Financing	High growth	0,61	0,49	0,26
HU31	Észak-Magyarország	0,20	0,11	0,13	0,19	0,12	0,22	0,32	0,31	0,12	0,09	0,18	0,60	0,43	0,17	Product innovation	High growth	0,59	0,47	0,25
HU32	Észak-Alföld	0,17	0,13	0,13	0,21	0,13	0,17	0,20	0,30	0,14	0,31	0,24	0,48	0,36	0,14	Risk perception	High growth	0,59	0,47	0,25
HU33	Dél-Alföld	0,19	0,15	0,12	0,18	0,13	0,20	0,28	0,28	0,15	0,22	0,20	0,27	0,47	0,15	Risk perception	Globalization	0,58	0,47	0,25
OLD (2007-2011)																				
HU10	Közép-Magyarország	0,52	0,77	0,14	0,28	0,06	0,12	0,51	0,59	0,28	0,21	0,38	0,46	0,29	0,38	Cultural support	Startup skills		0,68	0,37
HU21	Közép-Dunántúl	0,21	0,24	0,14	0,23	0,17	0,25	0,28	0,37	0,21	0,09	0,16	0,44	0,27	0,05	Financing	High growth	0,68	0,46	0,25
HU22	Nyugat-Dunántúl	0,30	0,32	0,13	0,22	0,17	0,27	0,36	0,40	0,17	0,04	0,12	0,20	0,43	0,10	Product innovation	Globalization	0,69	0,47	0,26
HU23	Dél-Dunántúl	0,22	0,20	0,14	0,24	0,17	0,28	0,26	0,37	0,20	0,20	0,21	0,35	0,34	0,08	Financing	Human capital	0,73	0,49	0,27
HU31	Észak-Magyarország	0,21	0,19	0,11	0,20	0,14	0,22	0,35	0,34	0,23	0,06	0,15	0,72	0,20	0,07	Product innovation	High growth	0,68	0,46	0,26
HU32	Észak-Alföld	0,15	0,25	0,12	0,19	0,15	0,22	0,33	0,32	0,21	0,13	0,25	0,22	0,25	0,09	Financing	Technology absorption	0,66	0,45	0,25
HU33	Dél-Alföld	0,16	0,26	0,13	0,19	0,15	0,19	0,22	0,30	0,19	0,18	0,23	0,38	0,28	0,11	Financing	High growth	0,68	0,46	0,25

Romanian regions relative position: pillar level

Regional Code	Regions	Opportunity perception	Strat-up skills	Risk Perception	Networking	Cultural support	Opportunity startup	Technology Absorption	Human capital	Competition	Product innovation	Process innovation	High growth	Globalization	Financing	Less favourable	Most favourable	Regional convergence		
																		To the capital region	To the RED1125 average	To the most entrepreneurial region
NEW (2012-2015)																				
RO1	Macroregiunea unu	0,40	0,13	0,72	0,12	0,07	0,08	0,21	0,26	0,14	0,44	0,16	1,00	0,37	0,30	Cultural support	High growth	0,86	0,57	0,31
RO2	Macroregiunea doi	0,37	0,03	0,69	0,10	0,02	0,01	0,10	0,22	0,13	0,23	0,13	0,90	0,32	0,09	Cultural support	High growth	0,62	0,41	0,22
RO3	Macroregiunea trei	0,48	0,30	0,74	0,15	0,00	0,00	0,33	0,42	0,16	0,41	0,46	1,00	0,60	0,50	Cultural support	High growth		0,67	0,36
RO4	Macroregiunea patru	0,41	0,07	0,79	0,12	0,04	0,03	0,12	0,25	0,10	0,33	0,16	0,96	0,33	0,14	Opportunity startup	High growth	0,72	0,48	0,26
OLD (2007-2011)																				
RO1	Macroregiunea unu	0,32	0,02	0,74	0,07	0,13	0,05	0,13	0,31	0,17	0,02	0,15	0,71	0,37	0,16	Startup skills	Risk perception	0,90	0,44	0,24
RO2	Macroregiunea doi	0,31	0,01	0,79	0,05	0,05	0,01	0,09	0,24	0,16	0,14	0,11	0,83	0,39	0,26	Startup skills	High growth	0,88	0,43	0,24
RO3	Macroregiunea trei	0,40	0,04	0,76	0,09	0,03	0,00	0,19	0,41	0,15	0,09	0,41	0,81	0,38	0,13	Opportunity startup	High growth		0,48	0,27
RO4	Macroregiunea patru	0,29	0,01	0,78	0,06	0,08	0,01	0,16	0,32	0,15	0,02	0,13	0,82	0,39	0,09	Startup skills	High growth	0,86	0,42	0,23

Policy optimization

		Opportunity Perception	Startup Skills	Risk Perception	Networking	Cultural Support	Opportunity Startup	Technology Absorption	Human Capital	Competition	Product Innovation	Process Innovation	High Growth	Globalization	Financing	Total Effort
OLD																
BE1	Région de Bruxelles-Capitale	0 0%	0 0%	0 0%	0,06 12%	0,18 35%	0,26 51%	0 0%	0 0%	0,01 2%	0 0%	0 0%	0 0%	0 0%	0 0%	0,51 5%
BE2	Vlaams Gewest	0,17 15%	0,17 15%	0 0%	0,18 16%	0,15 13%	0 0%	0,02 2%	0 0%	0 0%	0,21 19%	0 0%	0,22 20%	0 0%	0 0%	1,12 13%
BE3	Région wallonne	0,12 13%	0,25 26%	0 0%	0,17 18%	0,19 20%	0,18 19%	0,02 2%	0 0%	0 0%	0,02 2%	0 0%	0 0%	0 0%	0 0%	0,95 12%
NEW																
BE1	Région de Bruxelles-Capitale	0 0%	0 0%	0 0%	0,22 27%	0,17 21%	0,13 16%	0,2 24%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0,1 12%	0,82 8%
BE2	Vlaams Gewest	0 0%	0,25 32%	0 0%	0,29 37%	0,03 4%	0,07 9%	0 0%	0 0%	0 0%	0,02 3%	0 0%	0,13 16%	0 0%	0 0%	0,79 10%
BE3	Région wallonne	0 0%	0,28 44%	0 0%	0,14 22%	0,12 19%	0,06 9%	0,04 6%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0,64 8%
OLD																
SK01	Bratislavsky kraj	0 0%	0 0%	0,07 17%	0 0%	0,23 56%	0,08 20%	0 0%	0 0%	0,03 7%	0 0%	0 0%	0 0%	0 0%	0 0%	0,41 5%
SK02	Západné Slovensko	0,08 8%	0,15 15%	0,08 8%	0 0%	0,21 20%	0,13 13%	0 0%	0,03 3%	0,16 16%	0,17 17%	0,02 2%	0 0%	0 0%	0 0%	1,03 25%
SK03	Stredné Slovensko	0,11 12%	0,07 7%	0 0%	0,22 23%	0,14 15%	0,07 7%	0 0%	0,14 15%	0,19 20%	0 0%	0 0%	0 0%	0 0%	0 0%	0,94 20%
SK04	Vychodné Slovensko	0,08 8%	0,15 15%	0,09 9%	0 0%	0,23 23%	0,15 15%	0,11 11%	0,04 4%	0,14 14%	0,03 3%	0 0%	0 0%	0 0%	0 0%	1,02 25%
NEW																
SK01	Bratislavsky kraj	0 0%	0 0%	0,03 9%	0 0%	0,22 63%	0,05 14%	0 0%	0 0%	0,05 14%	0 0%	0 0%	0 0%	0 0%	0 0%	0,35 4%
SK02	Západné Slovensko	0,1 10%	0,22 23%	0,08 8%	0 0%	0,23 24%	0,04 4%	0 0%	0,04 4%	0,2 21%	0 0%	0,06 6%	0 0%	0 0%	0 0%	0,97 21%
SK03	Stredné Slovensko	0,13 13%	0,2 20%	0,09 9%	0 0%	0,23 23%	0,11 11%	0 0%	0,05 5%	0,19 19%	0 0%	0 0%	0 0%	0 0%	0 0%	1 22%
SK04	Vychodné Slovensko	0,07 8%	0,2 22%	0,07 8%	0 0%	0,24 26%	0,13 14%	0,02 2%	0,07 8%	0,13 14%	0 0%	0 0%	0 0%	0 0%	0 0%	0,93 21%

Weaknesses...seeking further improvements

- All factors of regional environment have been considered?
 - unconsidered, but important factors may exist...
- Different cost of the indicators...
- Drawbacks of the PFB method:
 - arbitrary selection of the magnitude of the penalty,
 - potential that a particularly good feature can have a positive effect on the weaker performing features.

Thank you for your attention!

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