

Download presentations:

bit.ly/jrcweekslides

Pass: 2019JRCweek!

JRC Week on Composite Indicators and Scoreboards

4-8 November 2019

Joint Research Centre



#COINCoP



European
Commission



JRC Week in Figures

3 days training

2 days community of practice

120+ participants

26 countries

12 lecturers

23 guest speakers



Take out your
smartphones and laptops

www.slido.com

#jrcweek

 #COINCoP

@EU_ScienceHub



Today we launch...



Your 10-Step Pocket Guide to Composite Indicators & Scoreboards





COIN Tool



An Excel-based Tool for Constructing and Analysing Composite Indicators

Version 1.0

About

The COIN Tool is designed to help users from research institutions, international organisations, European Union institutions, national and local governments, among others in the process of building and analysing composite indicators. It was developed by the European Commission's Competence Centre on Composite Indicators and Scoreboards (COIN) at the Joint Research Centre. The tool starts from the premise that the users have already conducted the necessary steps to define the conceptual framework, namely a thorough literature review and consultation with experts and stakeholders.

Colour codes

	Input cells (cells may be input/alterd by the user)
	Drop-down menus

Support Material

[COIN Tool User Guide](#)

[Handbook on Constructing Composite Indicators](#)

[Training on Composite Indicators and Scoreboards](#)

Contact

Please contact jrc-coin@ec.europa.eu for any enquiries and comments. We welcome your feedback.

composite-indicators.jrc.ec.europa.eu

How to cite: Becker, W., Benavente, D., Dominguez Torreiro, M., Moura, C., Neves, A., Saisana, M. and Vertesy, D., COIN Tool User Guide. 2019. ISBN 978-92-76-12385-9. doi:10.2760/523877

Version 1.0 (2019)



Content

Data entry	Database	Summary	Scenario
	Framework		MinmaxImp
Data inspection and treatment	Statistics	Imputations	DatamaxImp
	Winsorisation		GoalpostsImp
	Box-Cox		DatazImp
	Scatterplots	Methodological variations	DataprcranksImp
Correlations and rebalancing	TreatedData		Minmax
	IndCorrel		Datamax
	Rebalancing		Goalposts
Index scores and rankings	Heatmap		Dataz
	Scores		Dataprcranks
	Rankings		Dataranks
Analysing the index	ScoreCorrel	Leaving out indicators	LeaveOutScores
	RankCorrel		LeaveOutRanks
	IndWeights		CoresCorrels
Alternative aggregations	Borda		
	OutrankingMatrix		
	Copeland		

Introduction

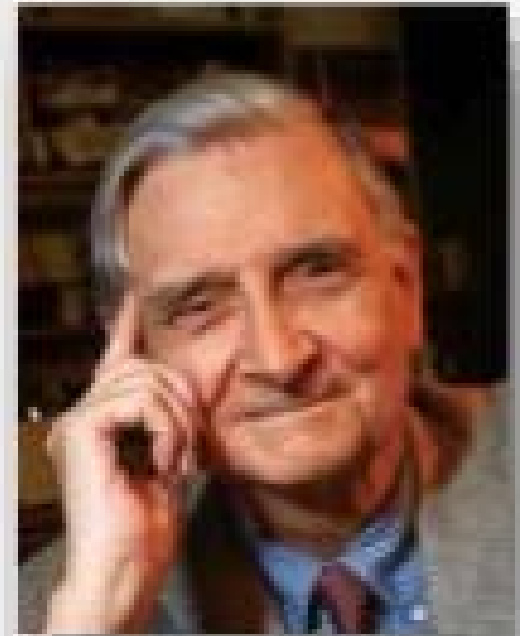
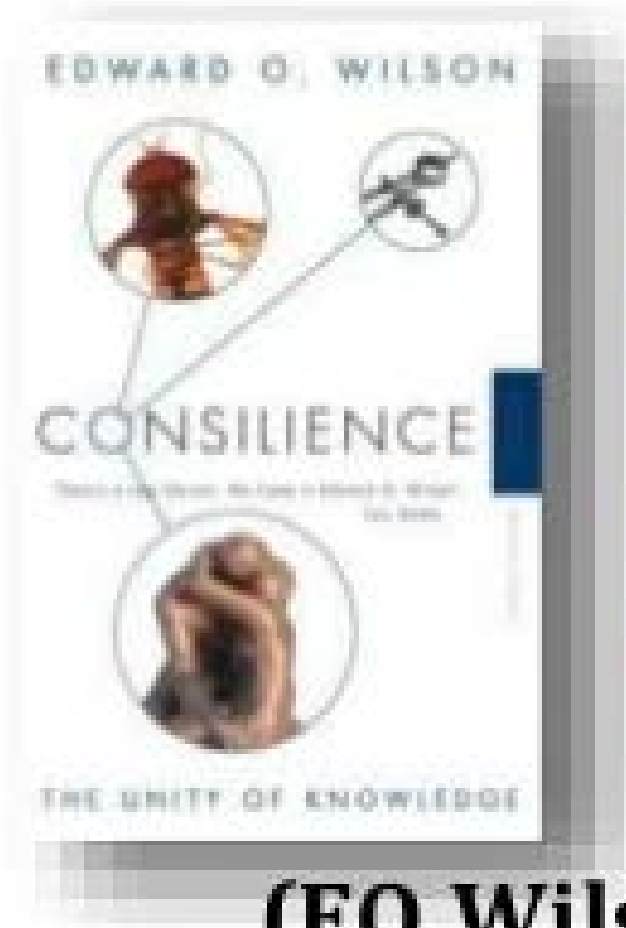
Michaela Saisana

COIN 2019 - 17th JRC Annual Training on Composite Indicators & Scoreboards
04-08/11/2019, Ispra (IT)

Starving for wisdom

*"We are **drowning in information**, while starving for **wisdom**. The world henceforth will be run by ... people able to put together the **right information** at the **right time**, think critically about it, and make **important choices wisely**."*

[E.O Wilson, 1998, Consilience]

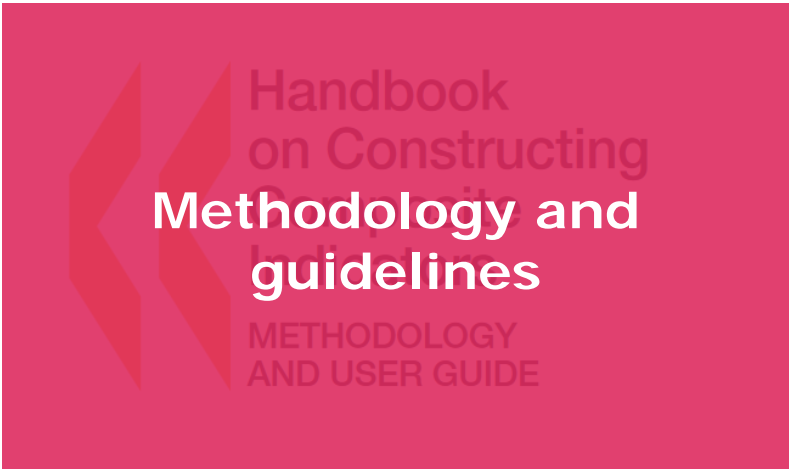


(EO Wilson, 1998)

Competence Centre on Composite Indicators and Scoreboards



Support to EU Services
in any policy area



Handbook
on Constructing
**Methodology and
guidelines**
METHODOLOGY
AND USER GUIDE

Launched 02/2016
✓ 17 years of expertise



Support to international
organisations



Training and
Community of Practice

Competence Centre on Composite Indicators and Scoreboards

Methods & Tools

COIN Data Hub

One-stop-shop gathering data on 400+ indices

COIN Tool

DIY tool to guide and build composite indicators

Handbook

Step-by-step guidance to build composite indicators

Events & Training

COIN Open Days

One-day workshops with developers

JRC Week on Composite Indicators and Scoreboards

Training and Community of Practice



4-8 November
Ispira, Italy

Competence Centre on Composite Indicators and Scoreboards

Composite Indicators are aggregations of individual indicators compiled into a single score.

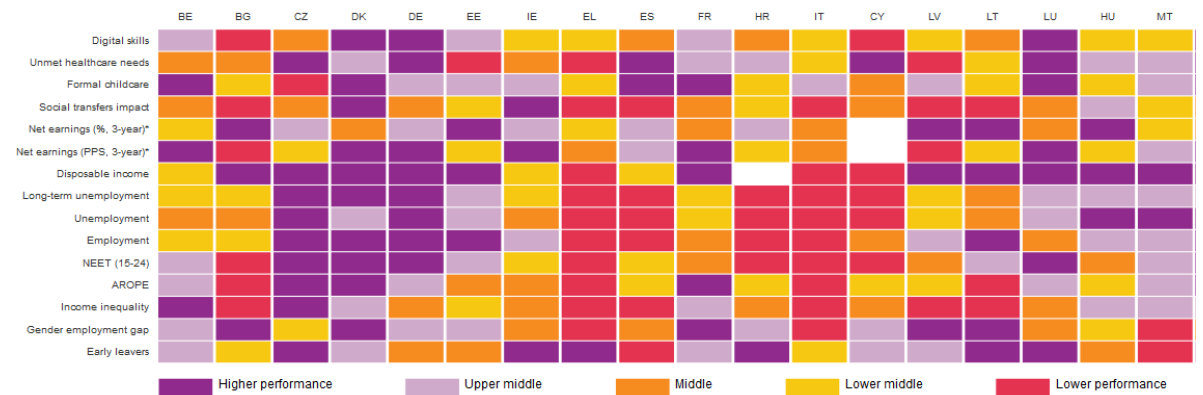
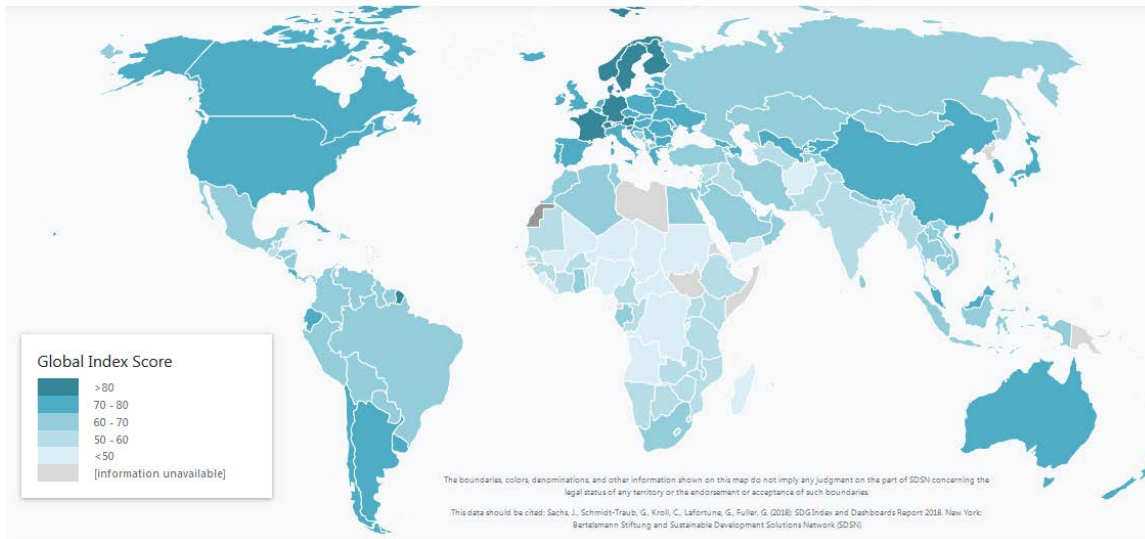
Scoreboards are collections of individual indicators that are related to a common concept.

SDG Index and Dashboards Report 2018

Global Responsibilities: Implementing the goals



BertelsmannStiftung



Competence Centre on Composite Indicators and Scoreboards

In-house development

Measuring Gender Equality in EU regions



ASEM Sustainable Connectivity Portal



The Cultural and Creative Cities Monitor



Social scoreboard

Supporting the European Pillar of Social Rights



Review of indicator frameworks

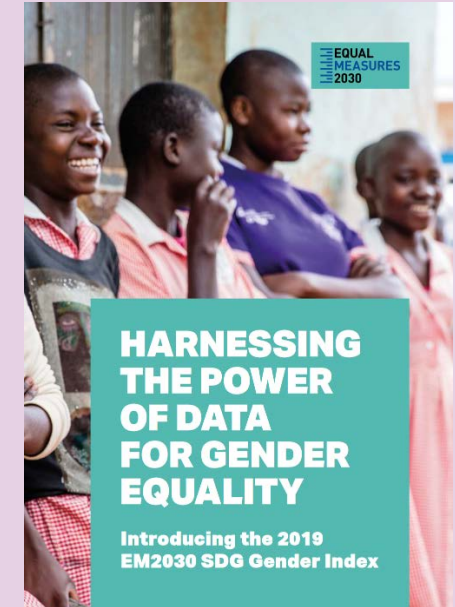
SUSTAINABLE DEVELOPMENT REPORT 2019

Transformations to achieve the
Sustainable Development Goals
Includes the SDG Index and Dashboards



HARNESSING THE POWER OF DATA FOR GENDER EQUALITY

Introducing the 2019
EM2030 SDG Gender Index



100+

Requests for JRC audits

UNDP	• Human Development Index
Oxfam	• Commitment to Development Index
UN IFAD	• Multidimensional Poverty Assessment Tool
WIPO	• Global Innovation Index
ITU	• ICT Development Index
TJN	• Financial Secrecy Index

100 requests for JRC audits by international partners (UN, UNICEF, Tax Network, WEF, INSEAD, WIPO, UN-IFAD, FAO, Harvard U., Yale U., Columbia U., Cornell U.)

Forbes

The EC JRC is an in-house science centre providing technical advice to a variety of projects throughout Europe. As part of that mission it is also an expert reviewer of project methodologies, says Siddharth Bannerjee, Nesta project lead for the EDCI. It's important to be rigorous about methodology. It's how bias can sneak in when not expected," he adds. "The EC JRC may not be well known outside certain circles, but it is the ultimate indicator of what a composite index looks like."

Requests for JRC audits

UNDP

- Human Development Index

Oxfam

- Commitment to Development Index

UN IFAD

- Multidimensional Poverty Assessment Tool

WIPO

- Global Innovation Index

ITU

- ICT Development Index

TJN

- Financial Secrecy Index

100

requests for JRC audits by international partners (UN, UNICEF, Tax Network, WEF, INSEAD, WIPO, UN-IFAD, FAO, Harvard U., Yale U., Columbia U., Cornell U.)



ESRB

European Systemic Risk Board
European System of Financial Supervision

The ranking algorithm your team provided is now approved by the ESRB Advisory Technical Committee.

According to this decision, from 2014 onwards, your work will be used for the (confidential) version of our systemic risk heat maps.

These will be included in the regular briefing material for the quarterly ESRB General Board meetings and incorporated in our general risk analysis.



Example of a scoreboard

Social Pillar Scoreboard for the European Pillar of Social Rights



- 3 dimensions & 12 areas
- 14 headline indicators
- 21 secondary indicators
- 93 indicators in total (gender/age)

Dimension	Area	Indicator	unit	EU28			EA19		
				2010	2015	Difference	2010	2015	Difference
I - Equal opportunities and access to the labour market	1 Education, skills and lifelong learning	1 Early leavers from education and training	%	13.9	11.0	↓	15.4	11.6	↓
		2 Adult participation in learning	%	9.3	10.7	↑	8.0	10.9	↑
		3 Underachievement in education [EU28 and EA19 values correspond to a simple arithmetic mean across countries]	%	...	23.9	22.8	...
		4 Tertiary educational attainment, age group 30-34	%	33.8	38.7	↑	33.7	37.3	↑
	2 Gender equality in the labour market	1 Gender employment gap [Gap expressed in absolute values]	%	13.0	11.6	↓	13.2	11.2	↓
		2 Gender gap in part-time employment [Gap expressed in absolute values]	%	23.7	23.3	↓	26.9	27.0	↑
		3 Gender pay gap in unadjusted form [Gap expressed in absolute values]	%	16.4	16.3	↓	17.0	16.8	↓
	3 Inequality and upward mobility	1 Income inequality	ratio	4.9	5.2	↑	4.9	5.2	↑
		2 Variation in performance explained by students' socio-economic status [EU28 and EA19 values correspond to a simple arithmetic mean across countries]	%	...	13.9	13.6	...
	4 Living conditions and poverty	1 At-risk-of-poverty or social exclusion rate (AROPE)	%	23.7	23.7	↔	22.0	23.1	↑
		2 At-risk-of-poverty-rate (AROP)	%	16.5	17.3	↑	16.3	17.2	↑
		3 Severe material deprivation rate (SMD)	%	8.4	8.1	↓	6.1	6.9	↑
		4 Persons living in a household with a very low work intensity	%	10.3	10.6	↑	10.4	11.2	↑
		5 Severe housing deprivation (% of owners, with mortgage or loan)	%	1.7	1.9	↑	1.4	2.0	↑
		6 Severe housing deprivation (% of tenants, with rent at market price)	%	6.8	6.3	↓	6.7	5.8	↓
	5 Youth	1 Young people neither in employment nor in education and training, age group 15-24	%	12.8	12.0	↓	12.8	12.2	↓

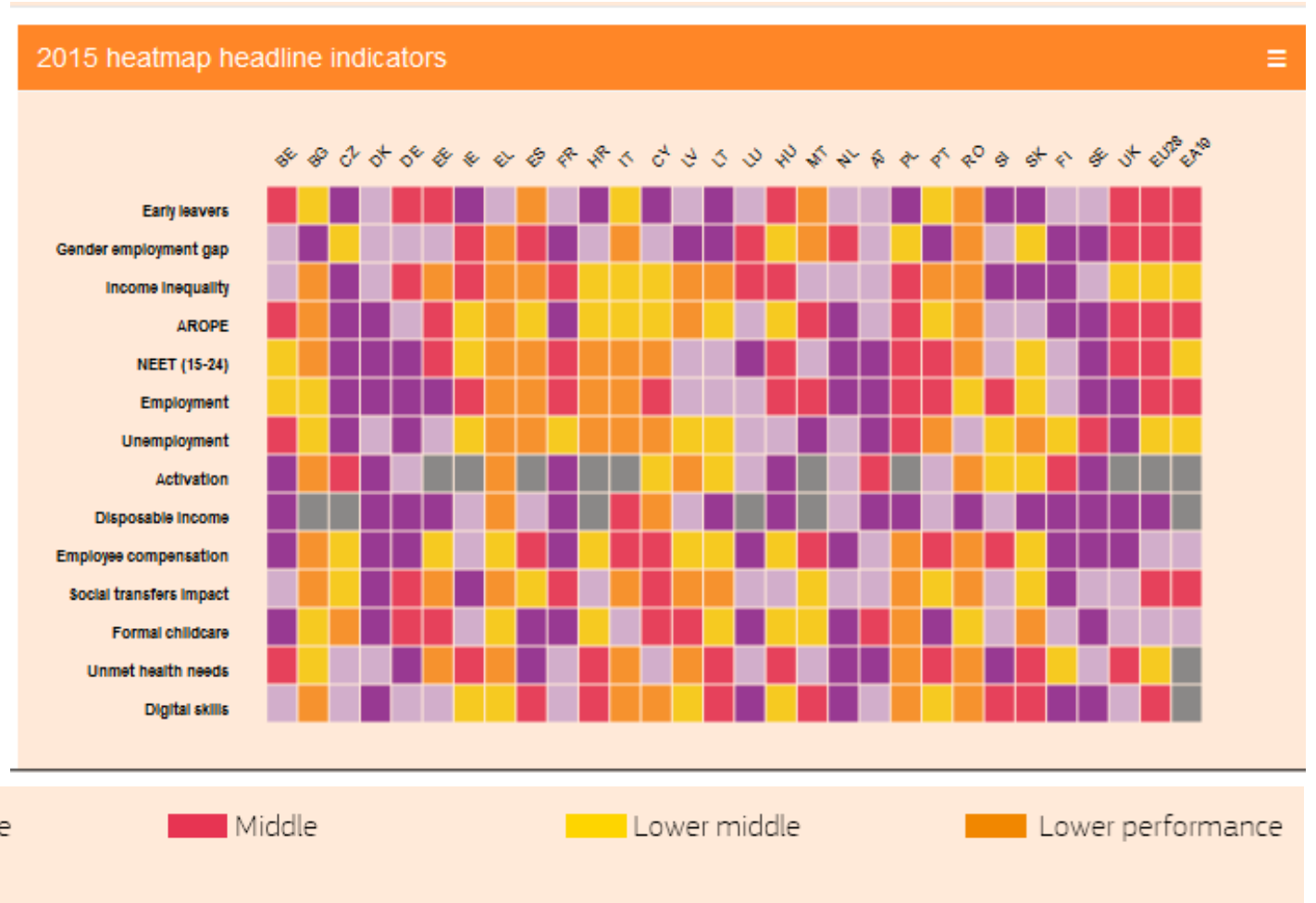
<https://composite-indicators.jrc.ec.europa.eu/social-scoreboard/>

Example of a scoreboard

Social Pillar Scoreboard for the European Pillar of Social Rights



- 3 dimensions & 12 areas
- 14 headline indicators
- 21 secondary indicators
- 93 indicators in total (gender/age)



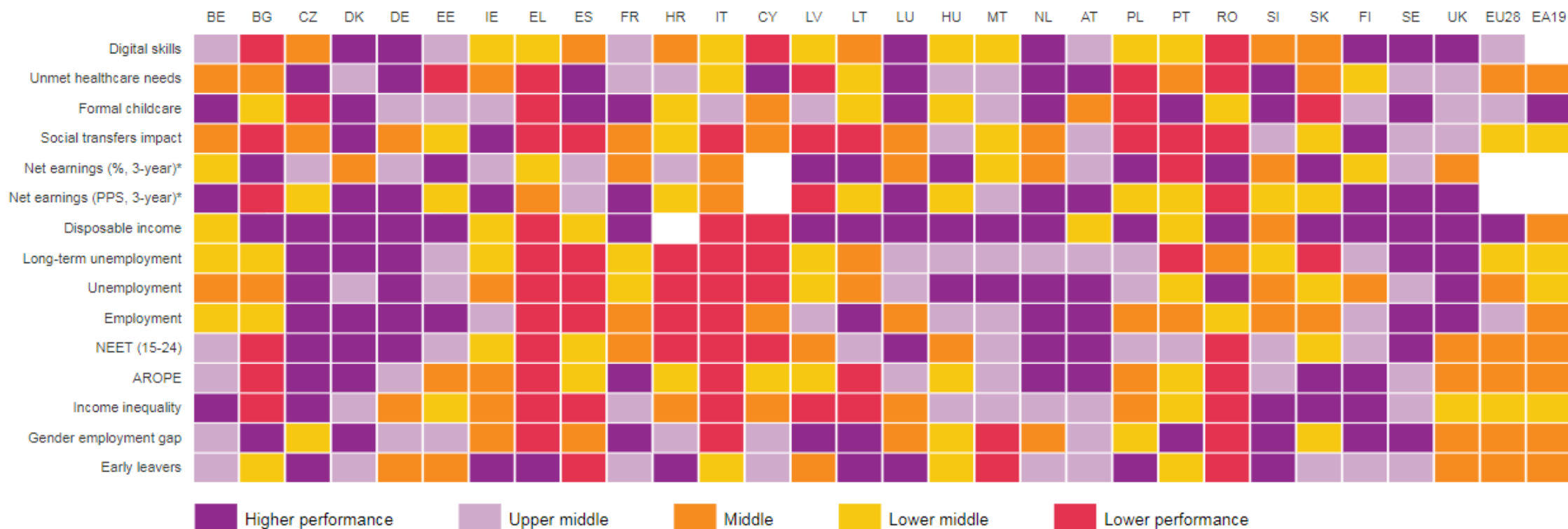
[Home](#)[map](#)[Country analysis](#)[Year heatmap](#)[Comparison table](#)[Country heatmap](#)[Time line](#)[Profile](#)

Select Year



Sort countries by performance

2016: 14 headline indicators



Higher performance

Upper middle

Middle

Lower middle

Lower performance

Select Year

Sort countries by performance

2016: 14 headline indicators

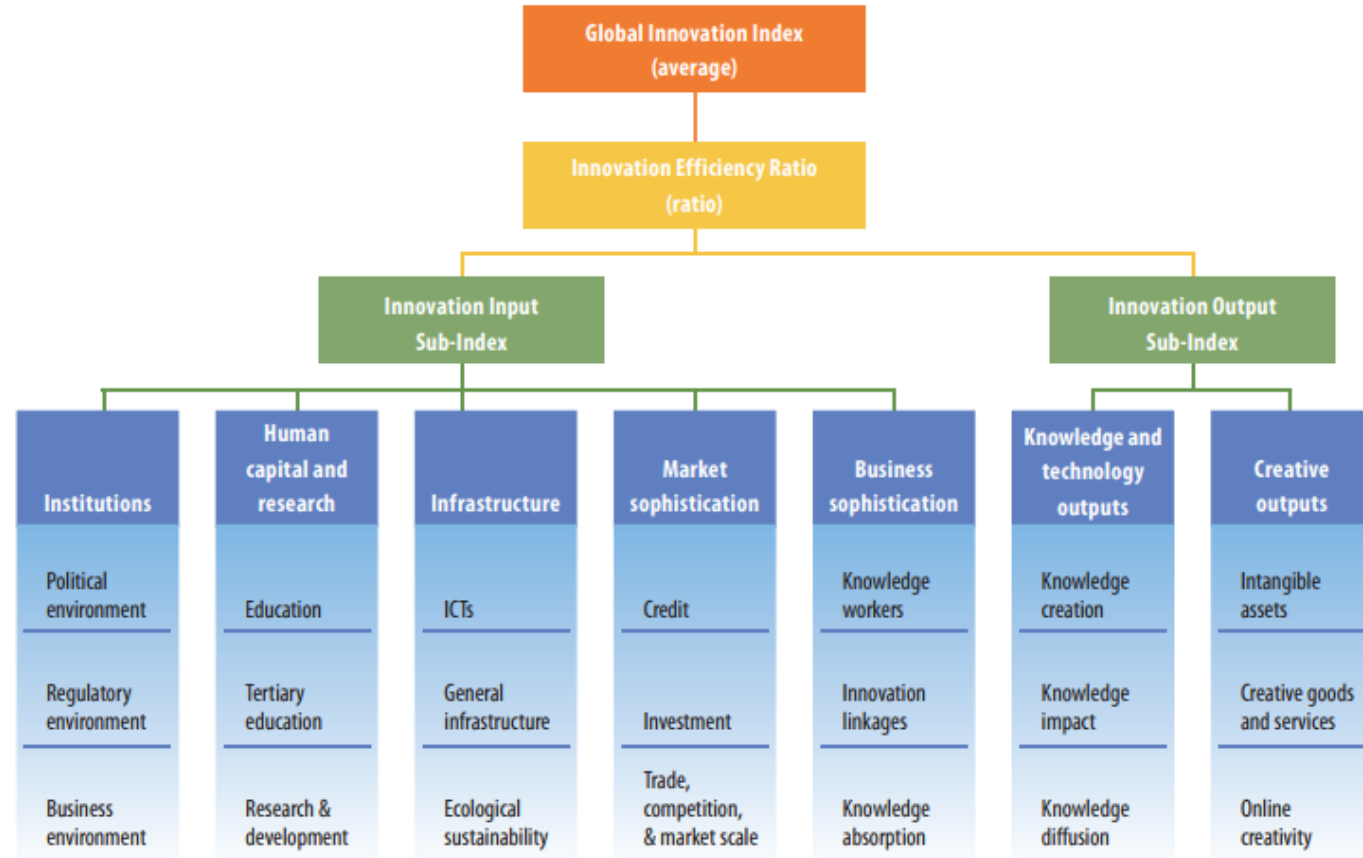


Example of a composite indicator

Global Innovation Index

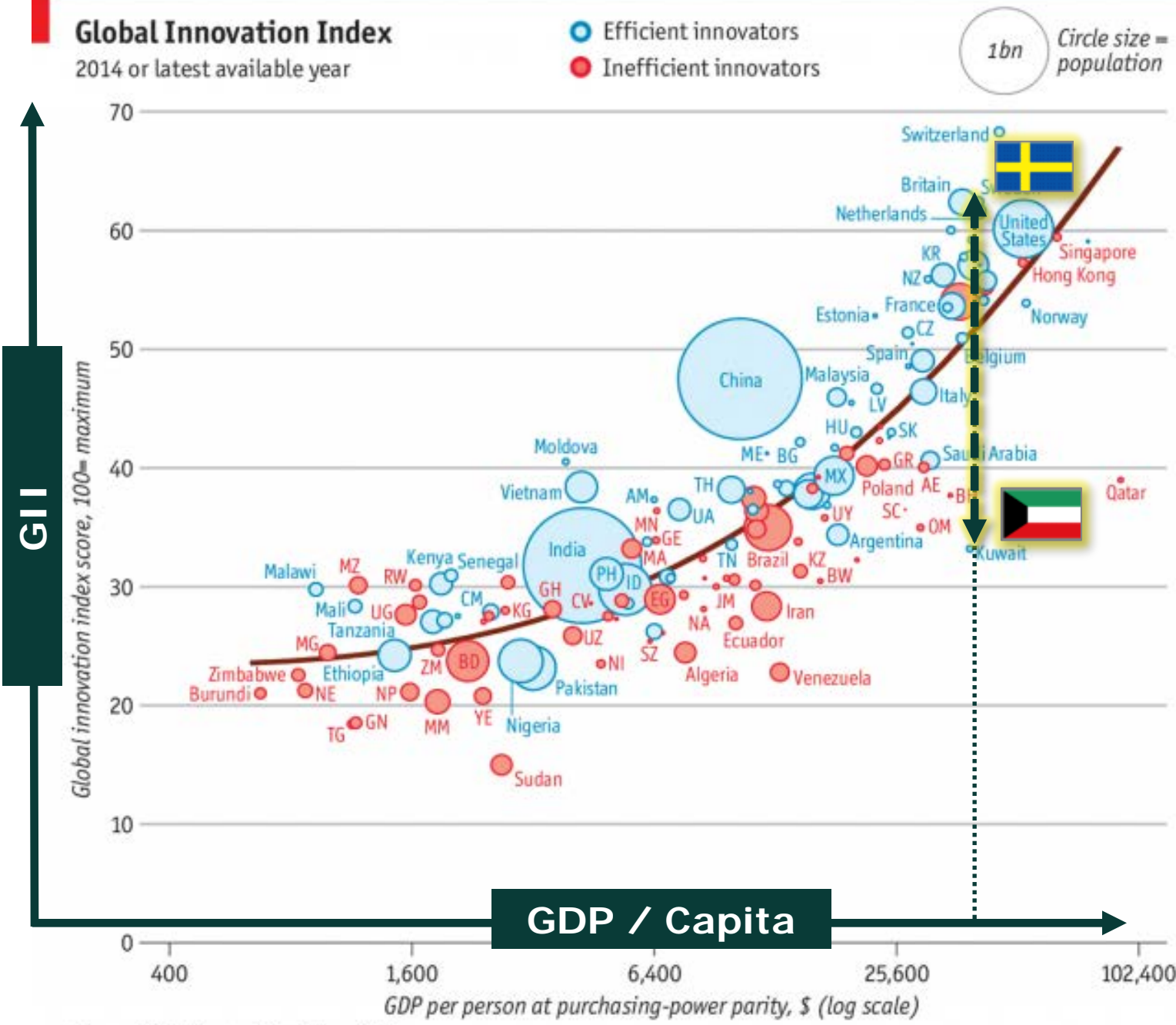


- 1 index
- 2 sub-indices
- 7 pillars
- 21 sub-pillars
- 80+ indicators



Example of a Composite Indicator: The GLOBAL INNOVATION INDEX

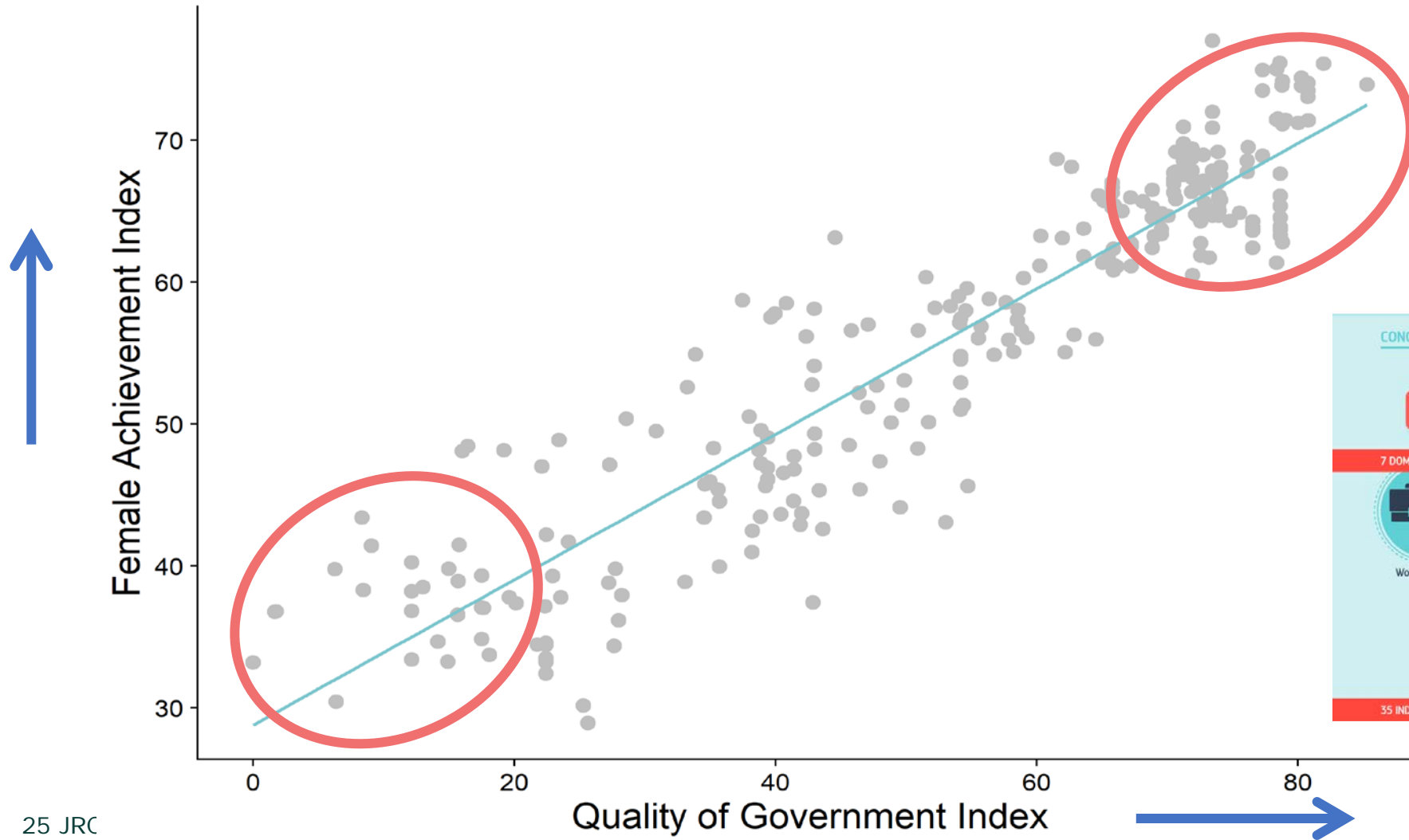
- What GDP doesn't show



Source: Global Innovation Index, 2015

Economist.com

The Regional Gender Equality Monitor



Polarized audience



The diagram consists of two large, light blue arrows pointing in opposite directions, one to the left and one to the right, set against a light blue background. The left arrow contains text about enthusiastic supporters, and the right arrow contains text about skeptical economists and official statisticians.

Enthusiastic supporters, mostly from advocacy groups developing their own indices to advance a cause

Skeptical economists and official statisticians concerned by the subjective nature of the selection of variables, weights and aggregation

Polarized audience

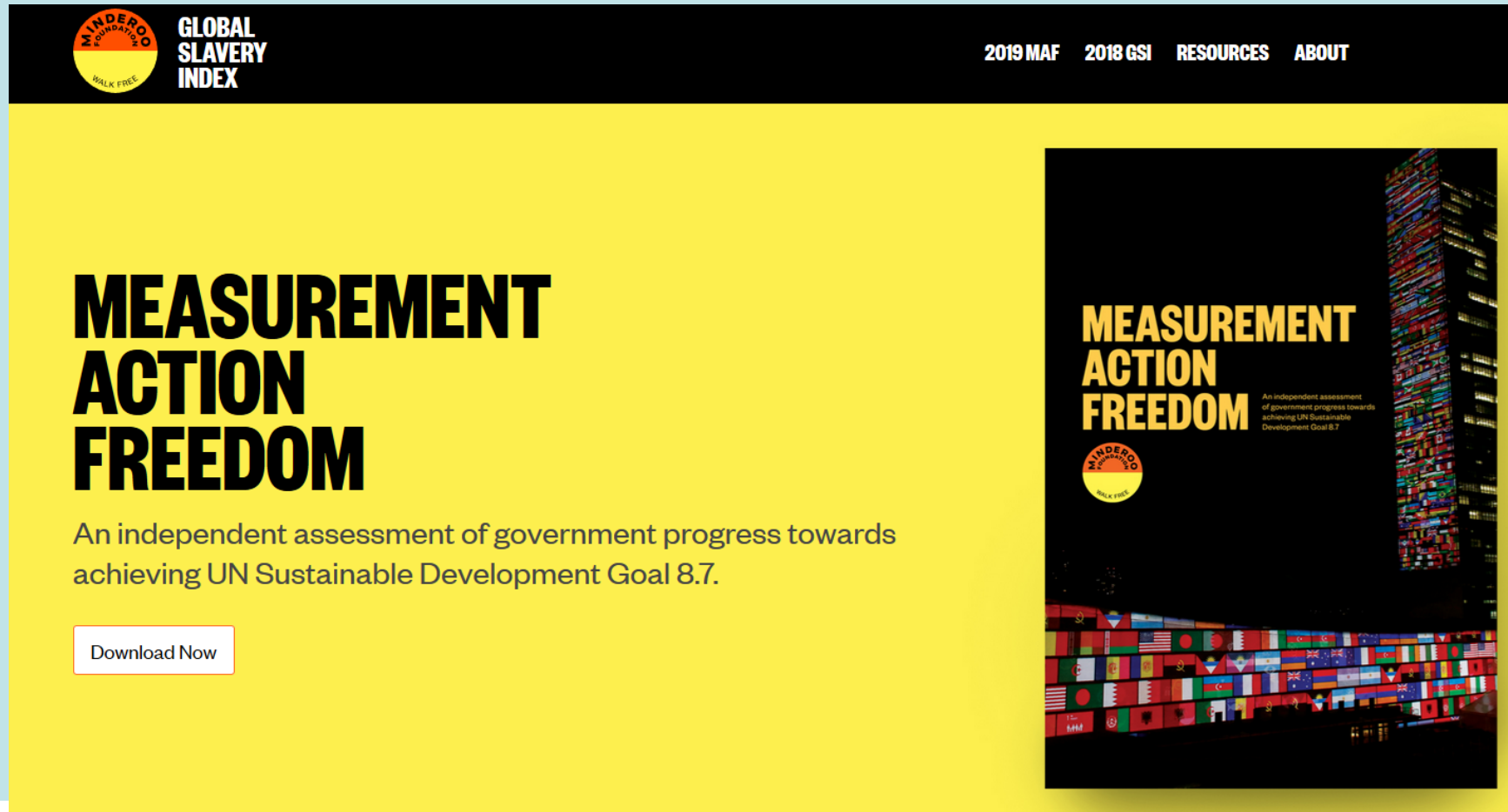


The diagram consists of two large, light blue arrows pointing in opposite directions, one to the left and one to the right, set against a light blue background. The left arrow contains text about enthusiastic supporters, and the right arrow contains text about skeptical economists and official statisticians.

Enthusiastic supporters, mostly from advocacy groups developing their own indices to advance a cause

Skeptical economists and official statisticians concerned by the subjective nature of the selection of variables, weights and aggregation

Indicators are powerful advocacy tools



The screenshot displays the website for the Minderoo Foundation Global Slavery Index. The top navigation bar includes the Minderoo Foundation logo, the text 'GLOBAL SLAVERY INDEX', and links for '2019 MAF', '2018 GSI', 'RESOURCES', and 'ABOUT'. The main content area features a large yellow background with the title 'MEASUREMENT ACTION FREEDOM' in bold black letters. Below the title, a subtitle reads: 'An independent assessment of government progress towards achieving UN Sustainable Development Goal 8.7.' A 'Download Now' button is positioned below the subtitle. To the right, a smaller image shows the cover of the report, which features a tall building facade covered in numerous national flags.

Polarized audience



The diagram consists of two large, light blue arrows pointing in opposite directions, one to the left and one to the right, set against a light blue background. The left arrow contains text about enthusiastic supporters, and the right arrow contains text about skeptical economists and official statisticians.

Enthusiastic supporters, mostly from advocacy groups developing their own indices to advance a cause

Skeptical economists and official statisticians concerned by the subjective nature of the selection of variables, weights and aggregation

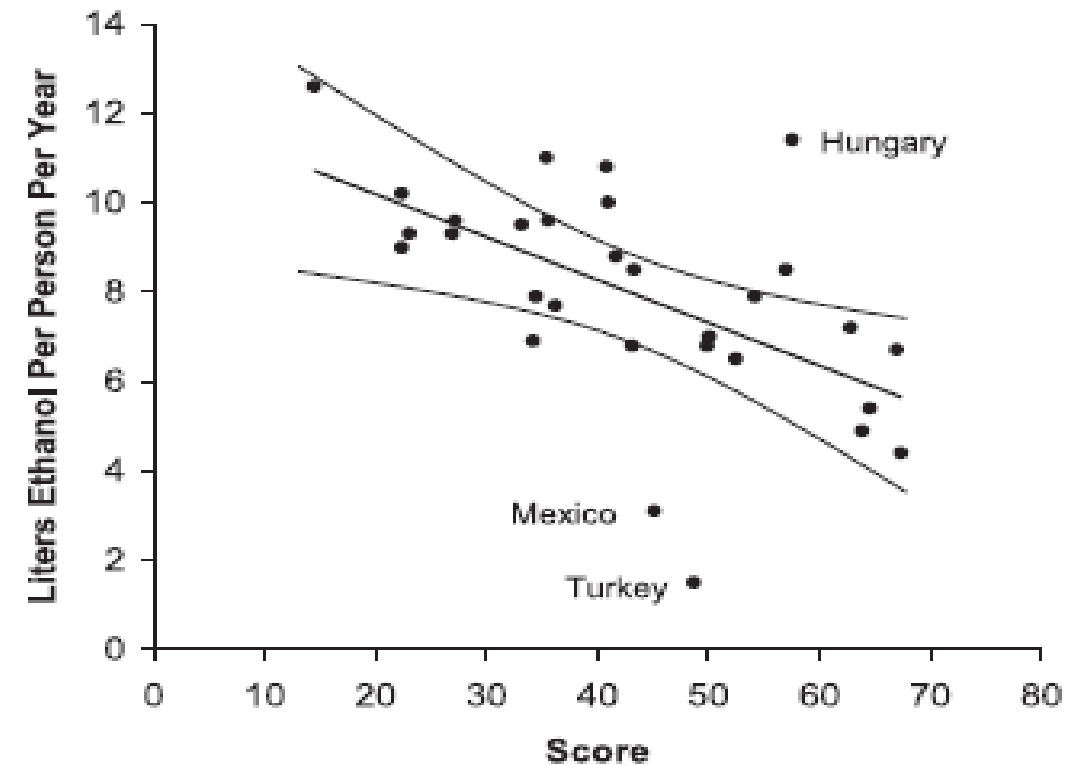
«Measurements without theory...»

Conceptual Framework – World Health

Domains	Ratings	Topics	Policies
Physical availability (32 points)	☆☆☆	Legal alcohol purchase age (y)	16, 17, 18, 19, 20+
	☆☆☆	Alcohol server liability for damages caused by actions of patrons	No, Yes
	☆☆	Restrictions on types of alcoholic beverages sold in retail stores	None; Partial government monopoly; Full government monopoly
	☆☆	Restrictions on density of stores selling alcoholic beverages in a given locale	None; On wine only; On wine and spirits; On wine, spirits, and beer
	☆☆	Restrictions on business hours for selling alcohol	None; On hours or days; On both hours and days
Drinking context (8 points)	☆☆	Community mobilization programs to increase public awareness of, and prevent alcohol problems	No, Yes
	☆	Mandatory training of alcohol servers to prevent and manage aggression	No, Yes
Alcohol prices* (24 points)	☆☆☆	Beer price index	0–0.29, 0.30–0.59, 0.60–0.89, 0.90+
	☆☆☆	Wine price index	0–0.9, 1.0–1.9, 2.0–2.9, 3.0+
	☆☆☆	Spirit price index	0–2.9, 3.0–5.9, 6.0–8.9, 9.0+
Alcohol advertising (3 points)	☆	Number of different media (print, broadcast, billboards) with advertising restrictions	0, 1, 2, 3
Motor vehicles (34 points)	☆☆☆	Random breath testing	None, ^b Rare, Occasional, Often, Very often
	☆☆☆	Legal blood alcohol limit—adult (mg/dl)	0.08+, 0.03–0.07, 0–0.02
	☆☆☆	Legal blood alcohol limit—youth (mg/dl)	0.04+, 0.02–0.03, 0–0.01
	☆☆	Mandatory penalty for exceeding legal limit	Fine, License suspension
	☆☆	Graduated licensing for young drivers	No, Yes

Unlike the Alcohol Policy Index, **most composite indicators cannot be validated versus a ground truth**

[Alcohol Policy Index, 2007, *PLoS Medicine*, 4(4):752-759]



...and on top of that indices have ... strong Political and Policy Implications

- The **Malaysian** Industrial Development Authority insisted that Malaysia aims to move from the 24th to top 10 on in the **World Bank's `Doing Business'** ranking list. *"We continue to ask ourselves what it will take to reach the top 10, and are we willing to do what it takes to get there."* [Asia in Focus, Jan. 8 2007]
- The Minister of the Economic Development in **Kyrgyzstan**, expressed a hope (in 2008) that his country shall rank among top 20 countries in the Doing Business rating in three years.

[The WB *Doing Business Report* has long been credited with bringing about reforms in countries – as many as 2000 distinct reforms since its 2003 launch (Source: The Economist 2013)]

Up to which level should we aggregate?



Issues we may detect

Up to a level that is meaningful...

Table 8. Pearson's correlation coefficients between the ten MPAT Components

	Food & Nutrition Security	Domestic Water Supply	Health & Healthcare	Sanitation & Hygiene	Housing & Energy	Education	Farm assets	Non-farm assets	Exposure & Res. to shocks
Domestic Water Supply	0.06								
Health & Healthcare	-0.13	0.35*							
Sanitation & Hygiene	-0.01	0.23	0.32*						
Housing & Energy	0.23	0.11	0.08	-0.04					
Education	0.10	0.19	0.18	0.07	0.20				
Farm assets	0.20	0.42*	0.26	0.21	0.16	0.14			
Non-farm assets	0.13	0.13	0.18	0.08	0.05	0.08	0.27*		
Exposure & Res. to Shocks	0.08	-0.01	-0.02	-0.07	0.14	-0.10	0.07	-0.14	
Gender Equality	0.08	0.21	0.04	-0.21	0.22	0.19	0.10	0.01	0.17

* Significant coefficients are greater than 0.27 ($p < 0.05$, $n = 527$)

*“[...] a **final composite indicator** should not be seen as **a goal per se**. It is sometimes preferred to **stop** the aggregation procedure at the **components level** and not aggregate further. This was both **conceptually and statistically** confirmed in the case of the MPAT.*

[JRC audit]

Issues we may detect

Up to a level that is meaningful...

FACTOR 1: Limited Government Powers

- 1.1 Government powers are defined in the fundamental law
- 1.2 Government powers are effectively limited by the legislature
- 1.3 Government powers are effectively limited by the judiciary
- 1.4 Government powers are effectively limited by independent auditing and review
- 1.5 Government officials are sanctioned for misconduct
- 1.6 Government powers are subject to non-governmental checks
- 1.7 Transition of power is subject to the law

FACTOR 2: Absence of Corruption

- 2.1 Government officials in the executive branch do not use public office for private gain
- 2.2 Government officials in the judicial branch do not use public office for private gain
- 2.3 Government officials in the police and the military do not use public office for private gain
- 2.4 Government officials in the legislative branch do not use public office for private gain

FACTOR 3: Order and Security

- 3.1 Crime is effectively controlled
- 3.2 Civil conflict is effectively limited
- 3.3 People do not resort to violence to redress personal grievances

FACTOR 4: Fundamental Rights

- 4.1 Equal treatment and absence of discrimination
- 4.2 The right to life and security of the person is effectively guaranteed
- 4.3 Due process of law and rights of the accused
- 4.4 Freedom of opinion and expression is effectively guaranteed
- 4.5 Freedom of belief and religion is effectively guaranteed
- 4.6 Freedom from arbitrary interference with privacy is effectively guaranteed
- 4.7 Freedom of assembly and association is effectively guaranteed
- 4.8 Fundamental labor rights are effectively guaranteed

FACTOR 5: Open Government

- 5.1 The laws are publicized and accessible
- 5.2 The laws are stable
- 5.3 Right to petition the government and public participation
- 5.4 Official information is available on request

FACTOR 6: Regulatory Enforcement

- 6.1 Government regulations are effectively enforced
- 6.2 Government regulations are applied and enforced without improper influence
- 6.3 Administrative proceedings are conducted without unreasonable delay
- 6.4 Due process is respected in administrative proceedings
- 6.5 The Government does not expropriate without adequate compensation

FACTOR 7: Civil Justice

- 7.1 People can access and afford civil justice
- 7.2 Civil justice is free of discrimination
- 7.3 Civil justice is free of corruption
- 7.4 Civil justice is free of improper government influence
- 7.5 Civil justice is not subject to unreasonable delays
- 7.6 Civil justice is effectively enforced
- 7.7 ADRs are accessible, impartial, and effective

FACTOR 8: Criminal Justice

- 8.1 Criminal investigation system is effective
- 8.2 Criminal adjudication system is timely and effective
- 8.3 Correctional system is effective in reducing criminal behavior
- 8.4 Criminal system is impartial
- 8.5 Criminal system is free of corruption
- 8.6 Criminal system is free of improper government influence
- 8.7 Due process of law and rights of the accused

FACTOR 9: Informal Justice

- 9.1 Informal justice is timely and effective
- 9.2 Informal justice is impartial and free of improper influence
- 9.3 Informal justice respects and protects fundamental rights

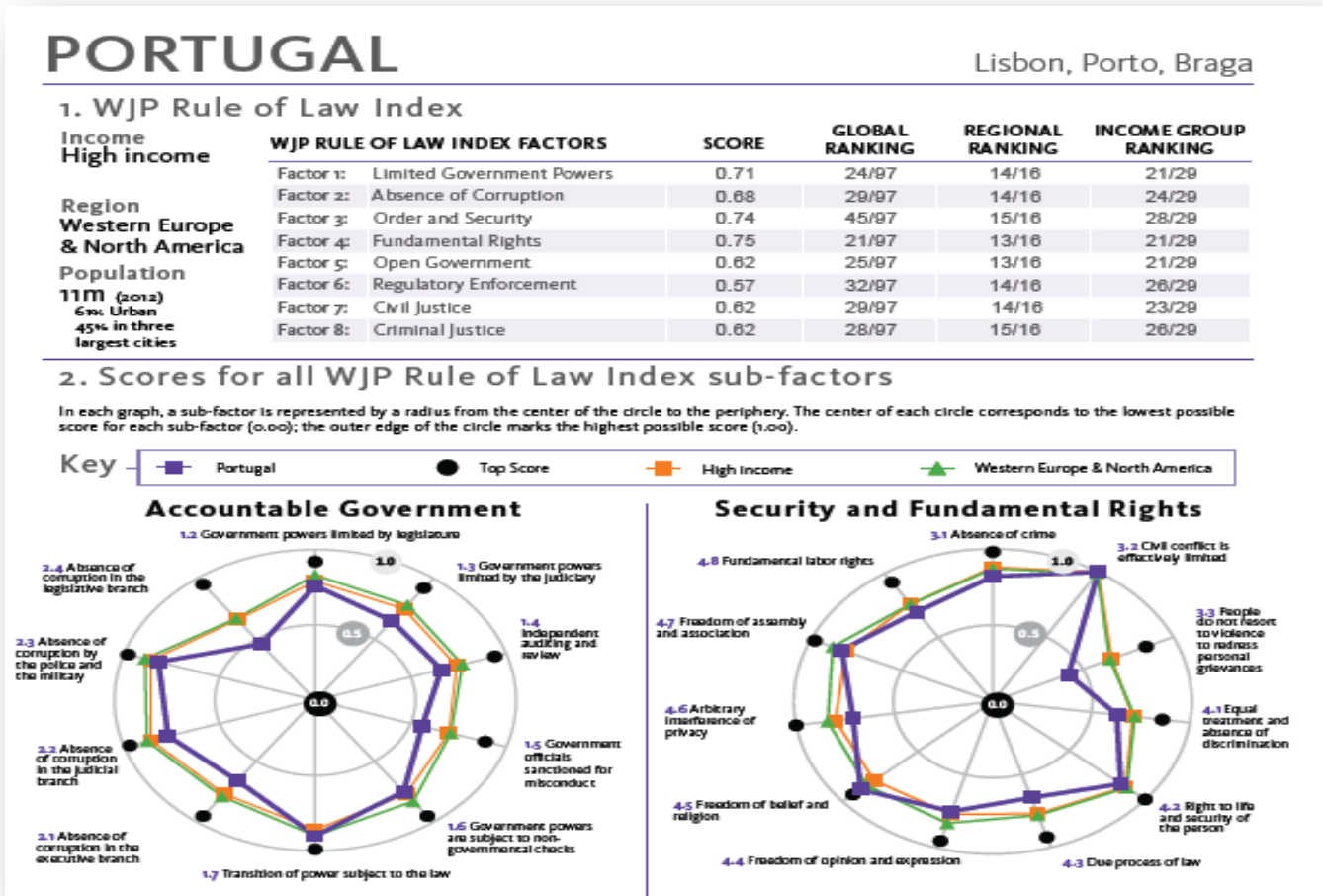
The oposite example

World Justice Project:
Rule of Law Index 2012

Issues we may detect

Up to a level that is meaningful...

World Justice Project:
Rule of Law Index 2012

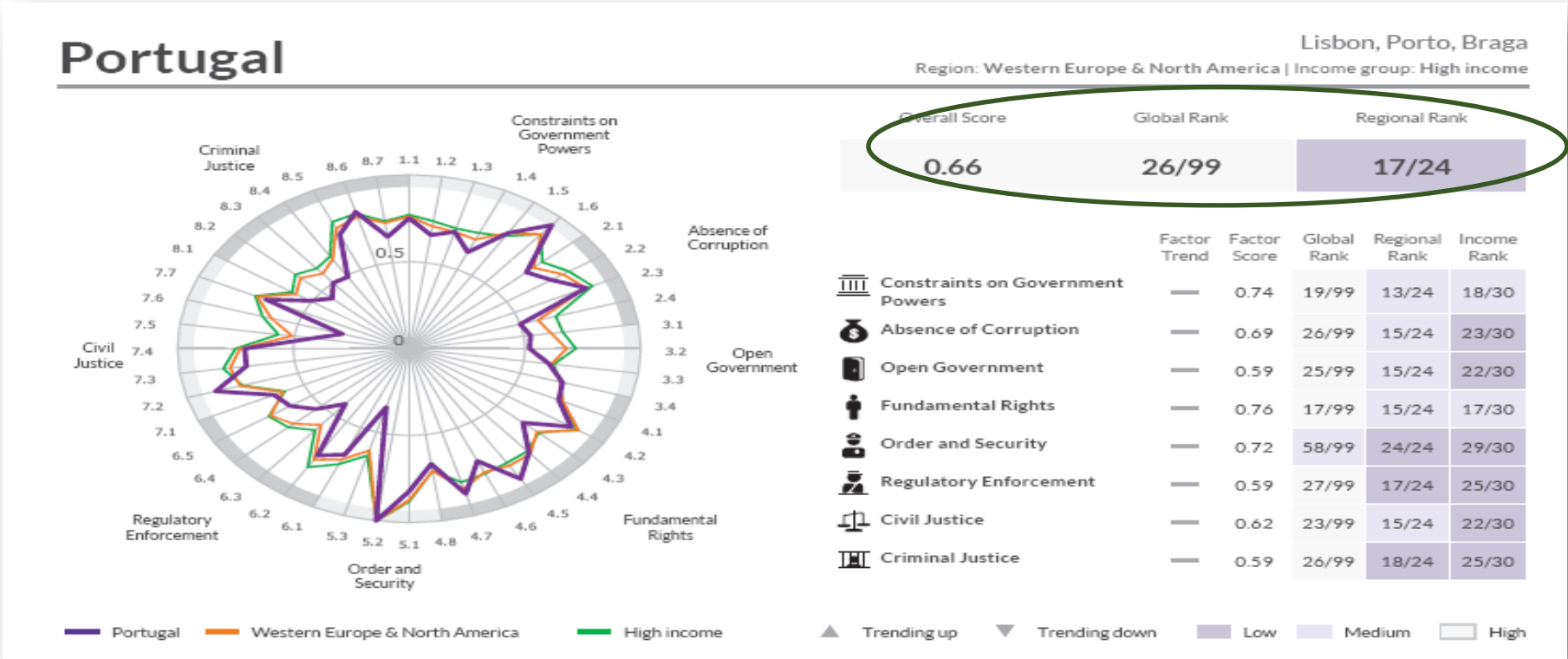


“ Finally, the eight dimensions share a single latent factor that captures 81% of the total variance. This latter result could be used as a statistical justification for aggregating further the eight dimensions into a single index by using a weighted arithmetic average. This is *not currently done*, as the WJP team aims to shed more light to the dimensions of the rule of law as opposed to an overall index.” [JRC audit]

Issues we may detect

Up to a level that is meaningful...

WJP Rule of Law Index 2014



An overall index has been calculated!

The Cultural and Creative Cities Monitor

THE CULTURAL AND CREATIVE CITIES MONITOR

2017 edition

Culture and creativity are vital in driving economic and social development. Our new Monitor will help cities across Europe make the most of this potential.

Commissioner Tibor Navracsics

@TNavracsicsEU



#EUCreativeCities

Cultural and Creative Cities Monitor online:

<https://composite-indicators.jrc.ec.europa.eu/cultural-creative-cities-monitor>



European
Commission



In **42 %** of the European cities analysed more than 50 % of the inhabitants live less than 2km away from the closest cultural venue



More than **70 %** of cultural venues are easily accessible by public transport



2km



#EUCreativeCities

Cultural and Creative Cities Monitor online:

<https://composite-indicators.jrc.ec.europa.eu/cultural-creative-cities-monitor>



European
Commission

BRATISLAVA

(SLOVAKIA)

GDP

1

Population

3

Employment

1

European Capital of culture

UNESCO Creative city

International Cultural festivals

Groups of peers

Group by

POP

GDP

EMP

Selection criteria

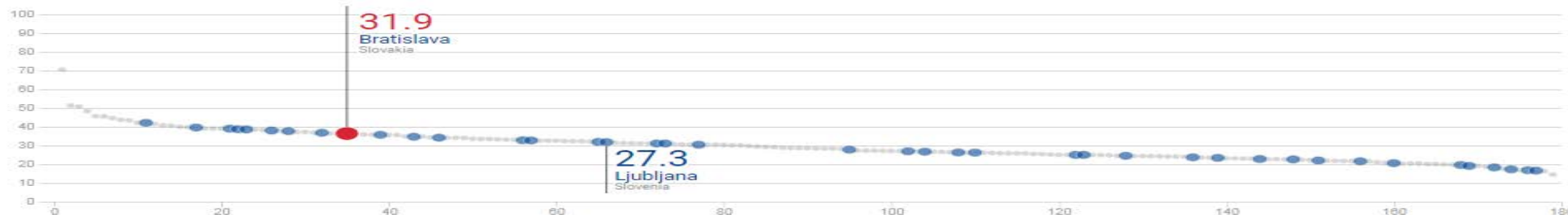
Rank by

Cultural and Creative Cities Monitor

Index

Sub indices

Dimensions



Performance by Dimension

POP

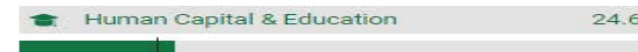
GDP

EMP

Sub index performance



Dimension performance



#EUCreativeCities

Cultural and Creative Cities Monitor online:

<https://composite-indicators.jrc.ec.europa.eu/cultural-creative-cities-monitor>





City profiles



Country profiles



Docs & data



Create your own Monitor



Add your own city



Policy scenario builder



Provide data



"Did you know that...?"



Cultural gems

#EUCreativeCities

Cultural and Creative Cities Monitor online:

<https://composite-indicators.jrc.ec.europa.eu/cultural-creative-cities-monitor>



Human Capital Index (World Bank) World Happiness Ranking (UN SDSN)

Education for all Development Index (UNESCO)

Global Slavery Index (Walk Free Foundation)

Human Development Index (UNDP)

World Press Freedom Index (Reporters Without Borders)

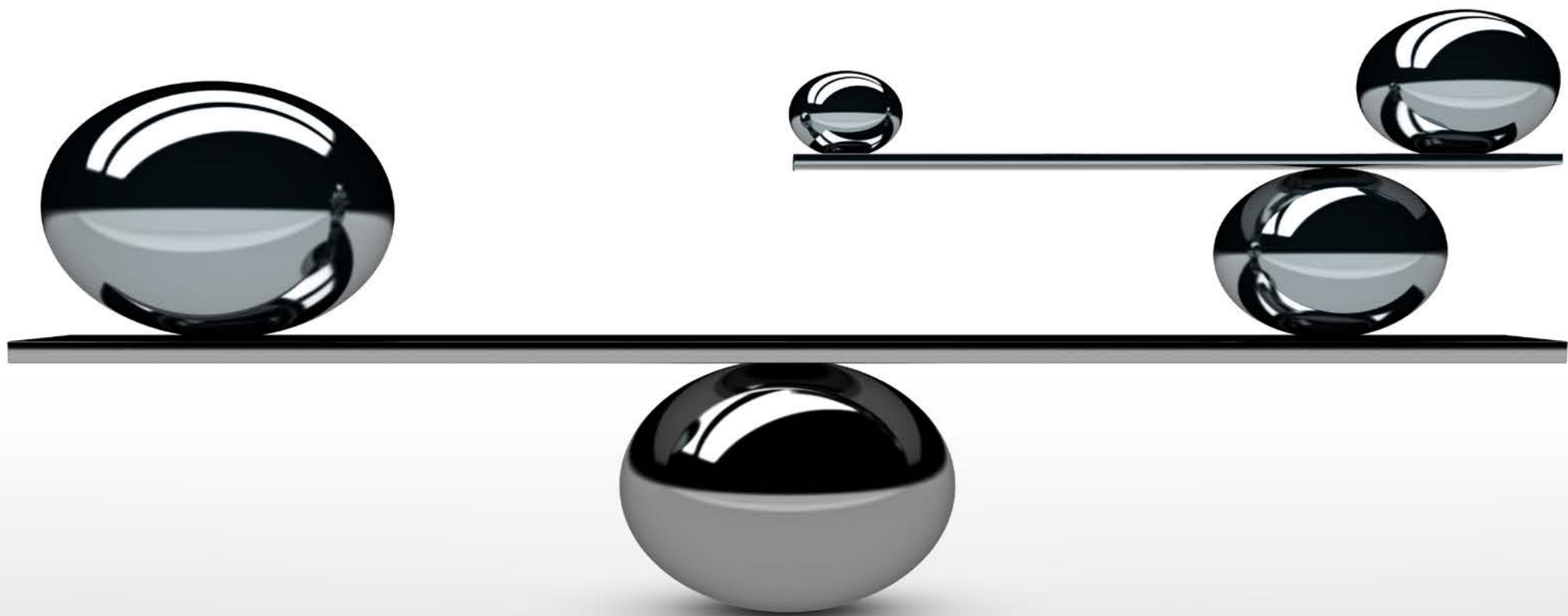
Better Life Index (OECD)

Living Planet Index (WWF)

Global Innovation Index (WIPO, INSEAD, Cornell)

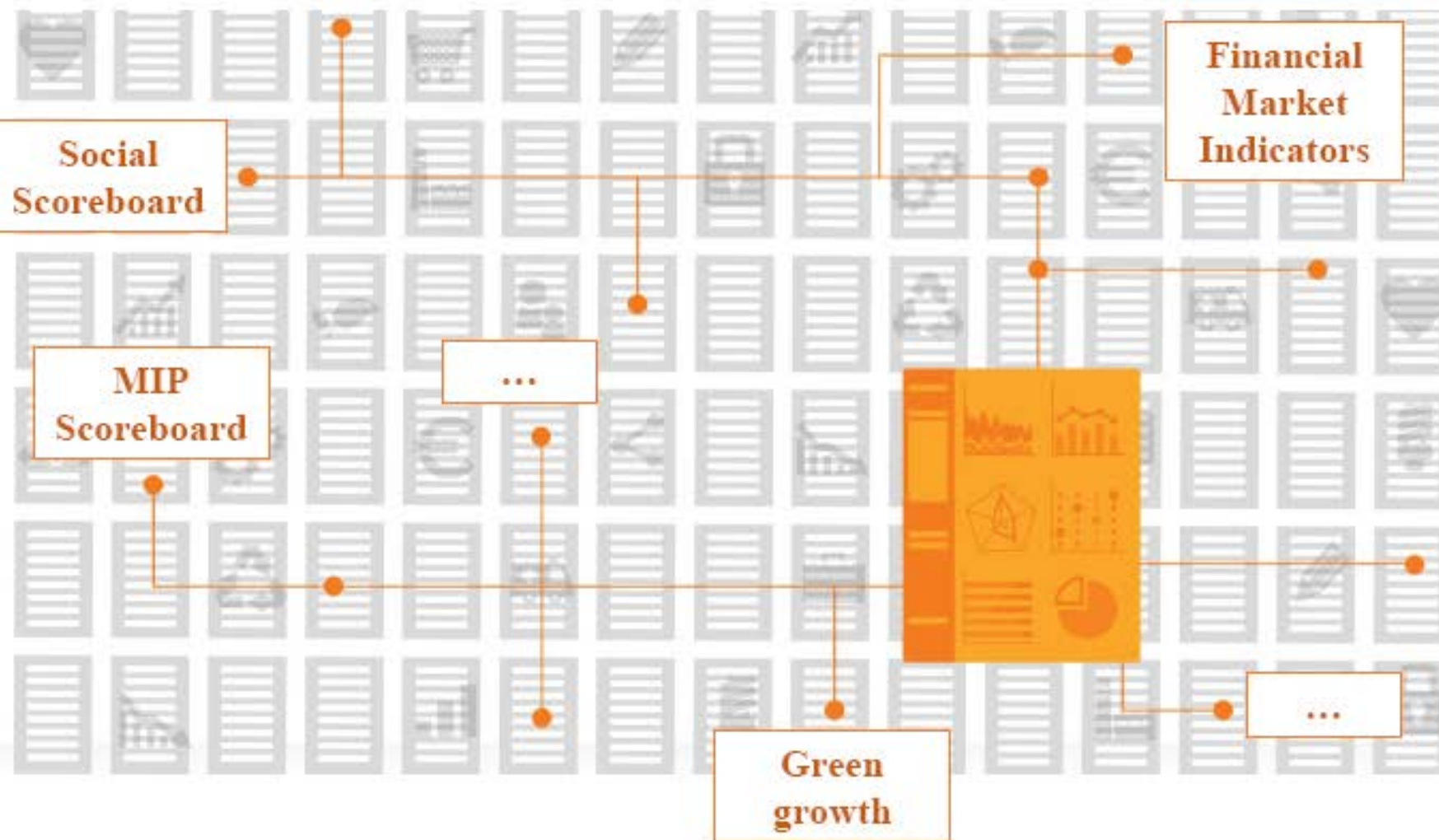
Best Countries for Business (Forbes)

World Health Report (WHO)



The COIN Data Hub





Visualisation and analysis

Granularity

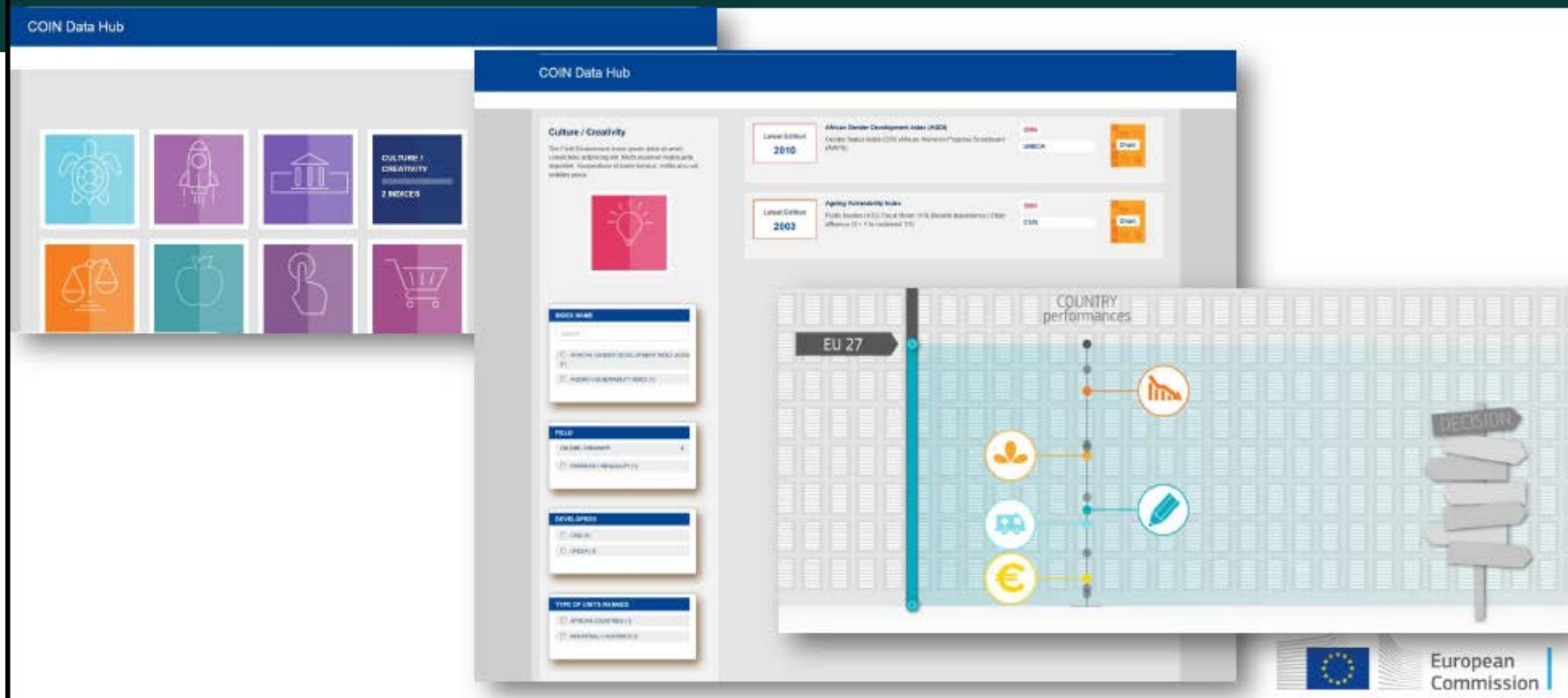
Trend analysis

Priorities for intervention

...



COIN Data Hub



Austria

Select the Country ▾

EU28

International

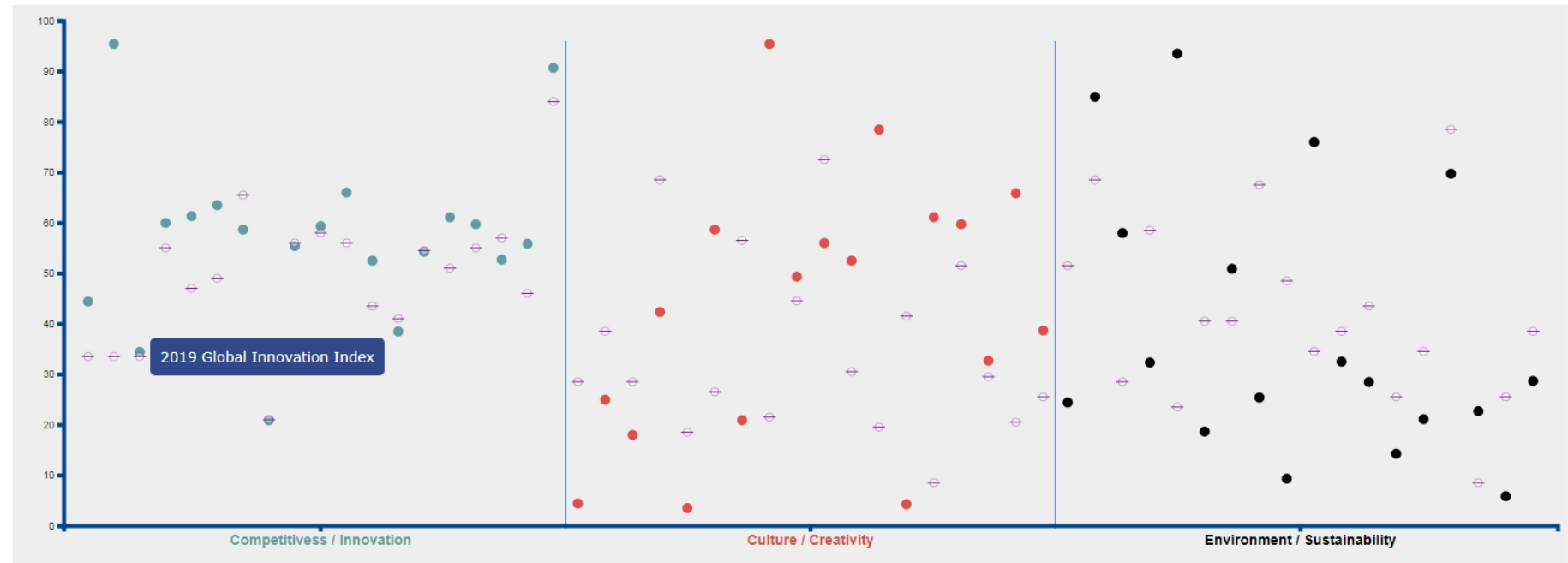
EC Priorities

Categories

- Competitiveness & Innovation
- Corruption & Governance
- Culture & Creativity
- Environment & Sustainability
- Fairness / Inequality
- Health / Nutrition
- Information / Digital transformation
- Education / Skills
- Markets / Consumers
- Poverty / Social Rights
- Resilience / Risk management
- Ageing / Migration

Active filters

- ☒ Competitiveness & Innovation
- ☒ Culture & Creativity
- ☒ Environment & Sustainability



(Composite) Indicators

Powerful evidence based narratives supported by good statistical measures and good analytic work are a possibility which should not be left untried

We need relevant and sound...



Indices are powerful advocacy tools

*COIN helps to ensure that composite indicators are ...
developed sensibly and used responsibly.*

- ✓ **'Sensible development'** of a composite indicator implies a quality control process based on both conceptual and statistical considerations.
- ✓ **'Responsible use'** calls for care in drawing conclusions and recommendations without taking into account the conceptual context in which composite indicators were developed.

The European Commission's
Competence Centre on Composite
Indicators and Scoreboards





THANK YOU

Welcome to email us at: jrc-coin@ec.europa.eu

COIN in the EU Science Hub

<https://ec.europa.eu/jrc/en/coin>

COIN tools are available at:

<https://composite-indicators.jrc.ec.europa.eu/>

The European Commission's
Competence Centre on Composite
Indicators and Scoreboards



Pre-training survey:
bit.ly/preCOINsurvey