



The innovation output indicator

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History

- High-Level Panel 2010
- Eurostat data collections on HGE
- Work with OECD on innovation coefficients

The indicator

**Make it as simple
as possible, but
not simpler.
Albert Einstein**

- Simple
- Compact set of self-contained components
- Zooming in on innovation output
- With fast-growth dynamics
- Useful for policy
- Leading to a meaningful ranking

Like other occult techniques of divination, the statistical method has a private jargon deliberately contrived to obscure its methods from non-practitioners. [Ashley Perry](#)

Based on

- Eurostat's frame for quality indicators
- Latest techniques for composites
- Robustness and validation methods
- Recent and the longest possible data series

Published in



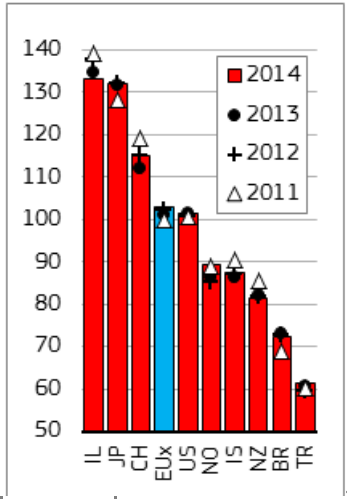
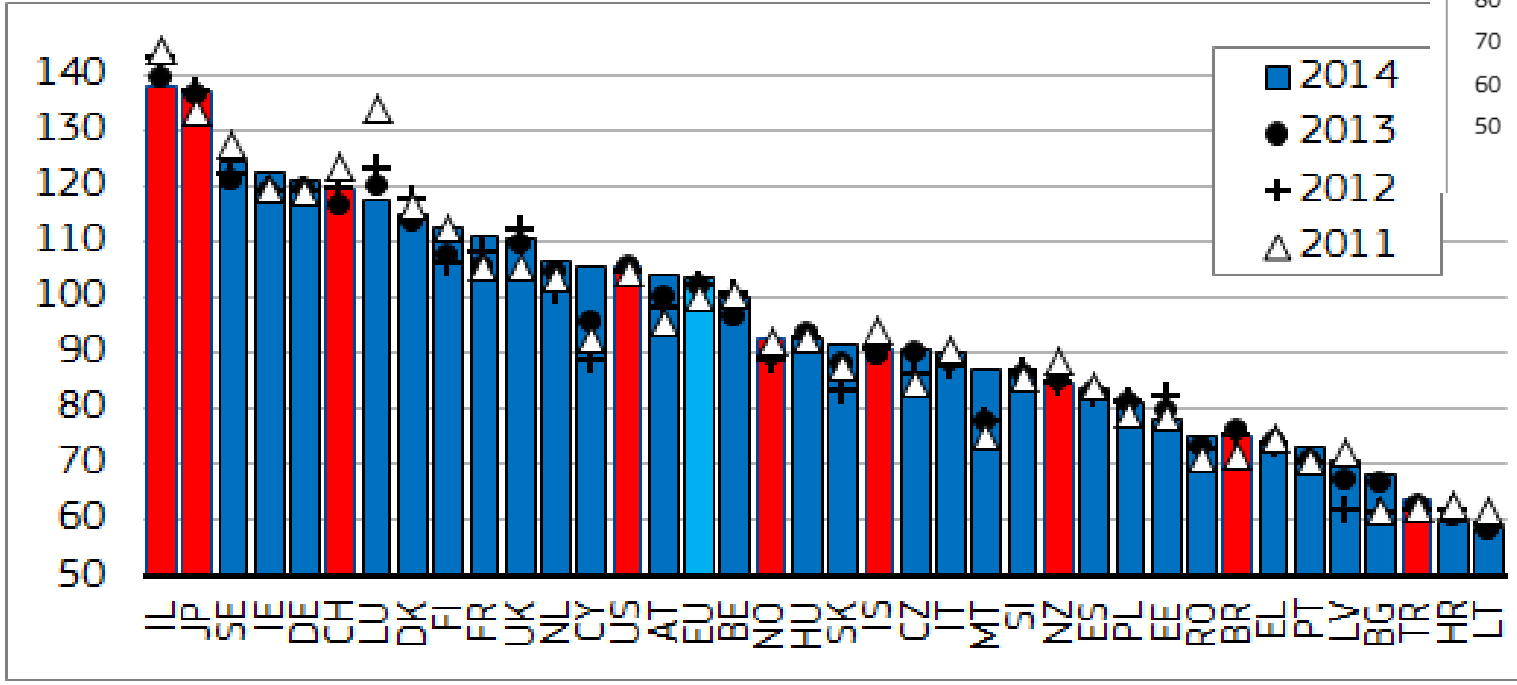
Zooming in on four policy axes

1. Growth via new markets – patents
2. Knowledge jobs – "KIA" employment
3. Long-term global competitiveness –
trade in mid/high-tech commodities
4. Successful businesses - jobs in
innovative fast-growing firms

I only believe in statistics that I doctored myself. **Winston Churchill (wrongly attributed)**

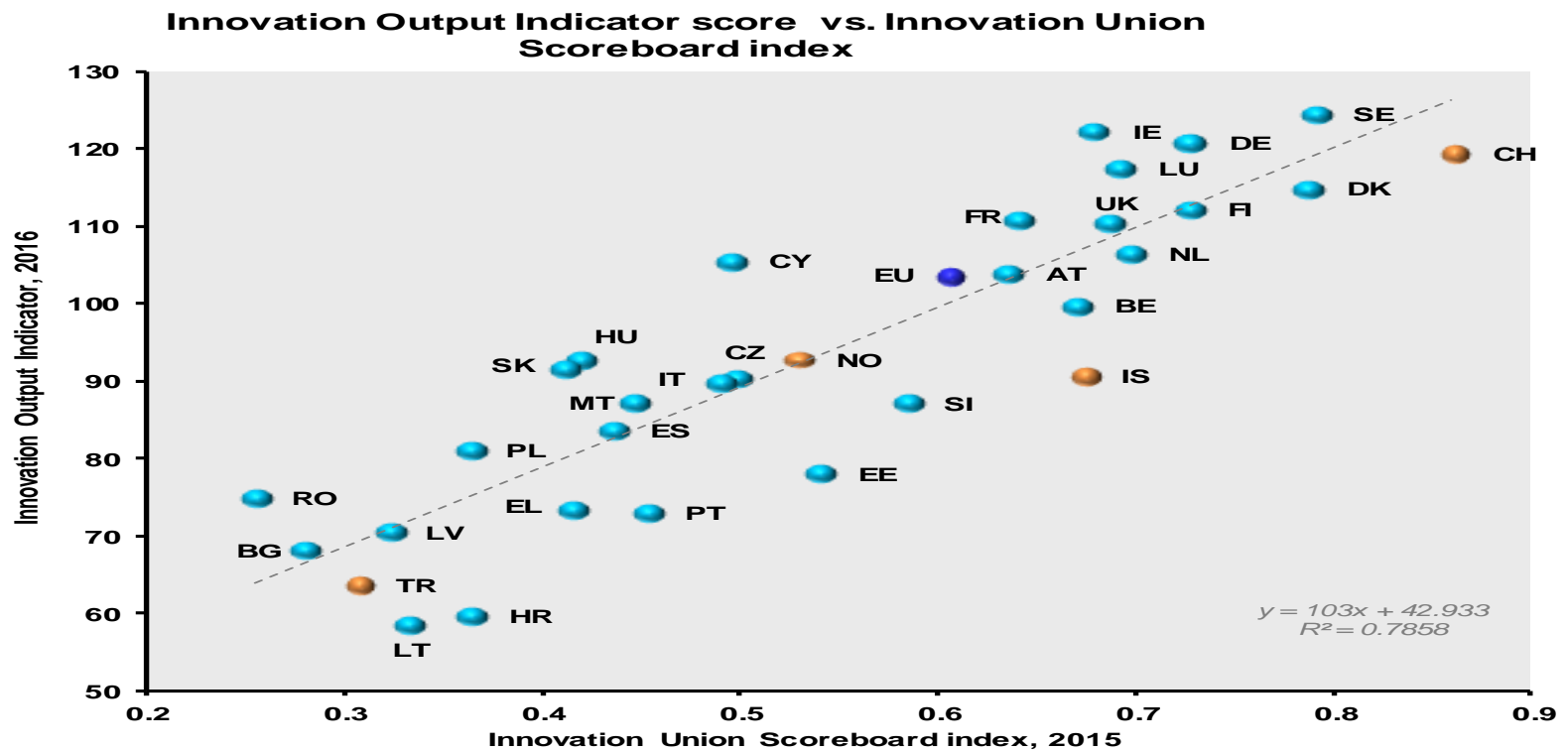
Results

(European comparison and international comparison)



Complementary with Scoreboard

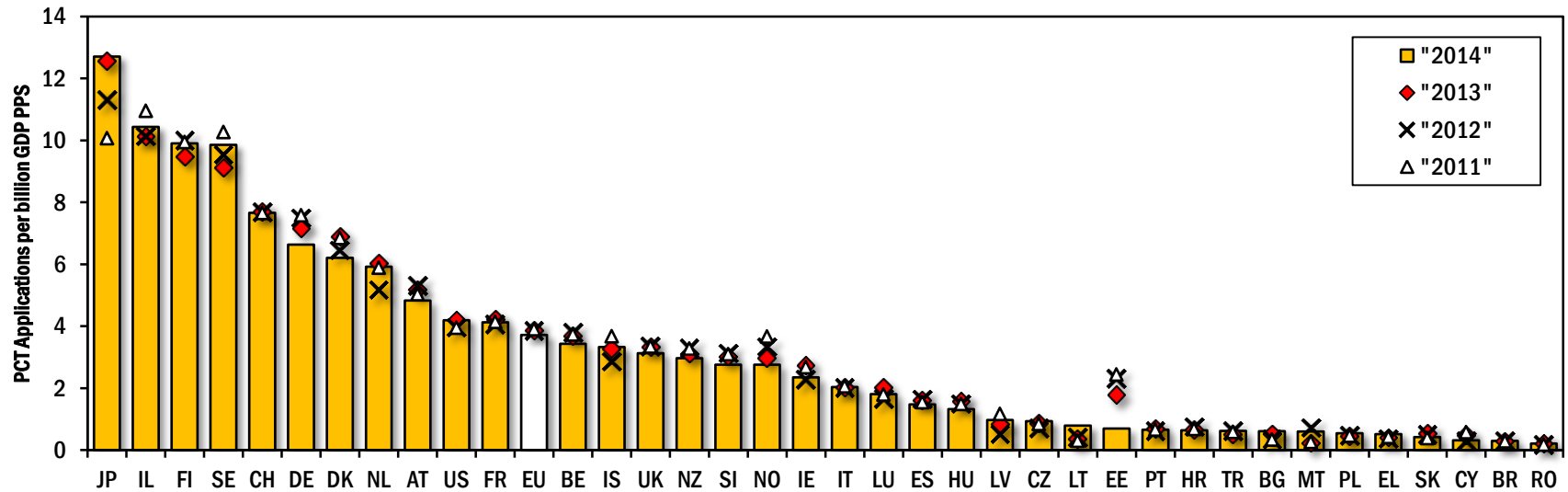
Inno output



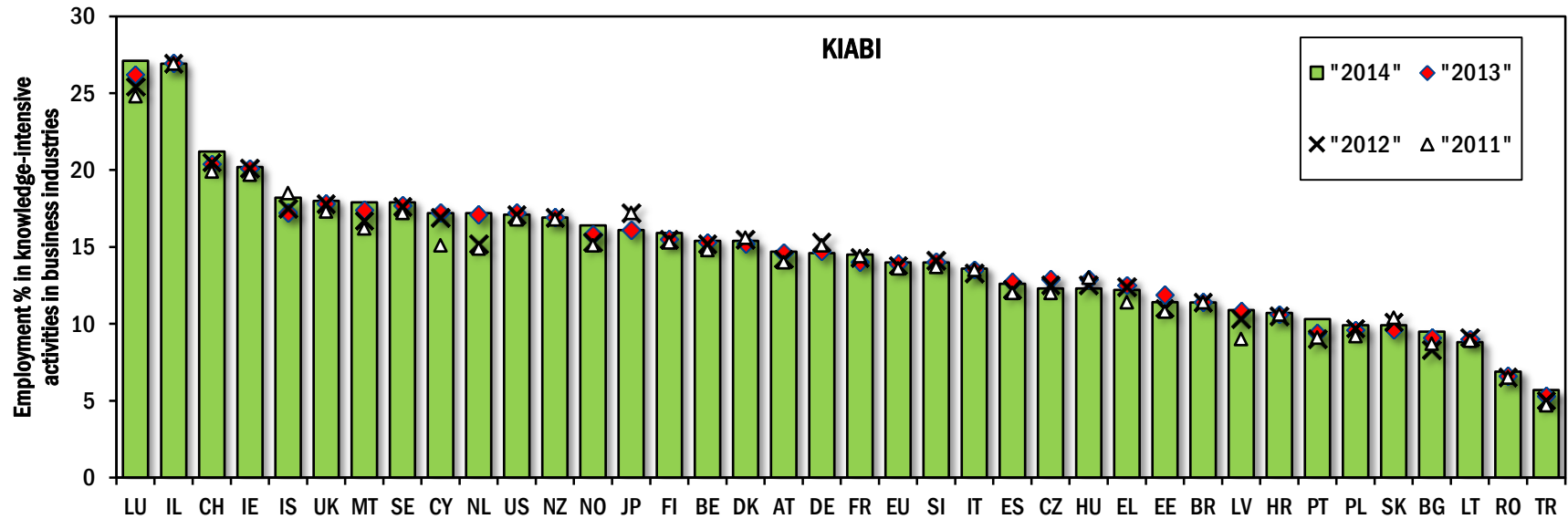
Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research Policies
Data: Innovation Union Scoreboard 2015, DG JRC

IUS -SII

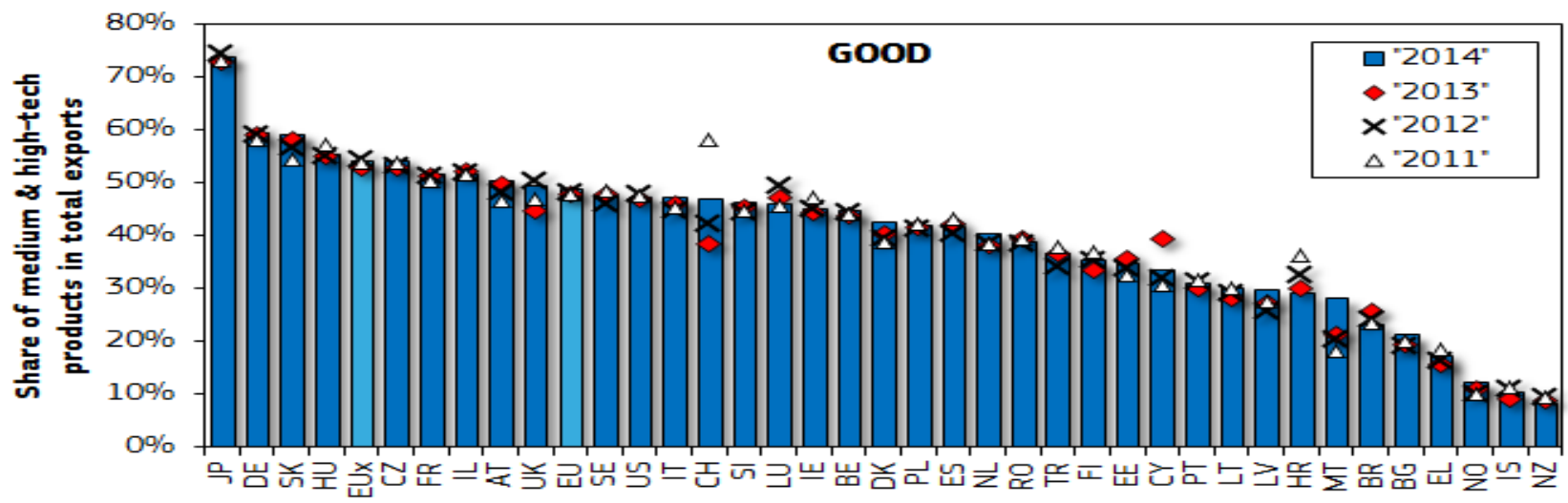
PCT patents per GDP



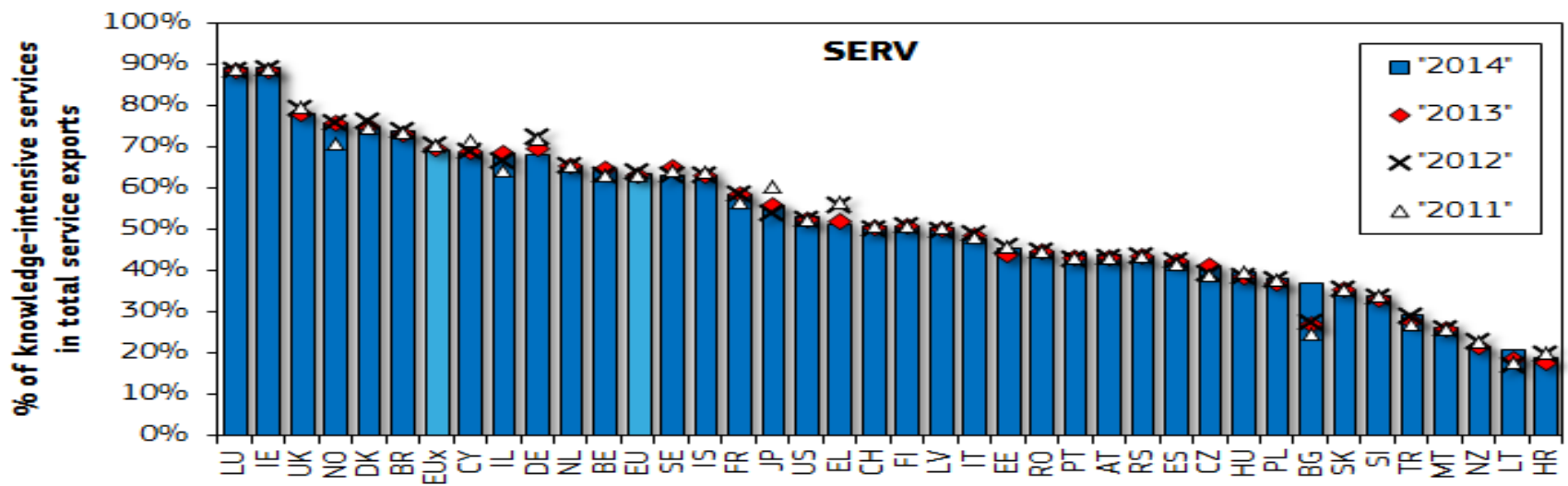
Business employment in KIA



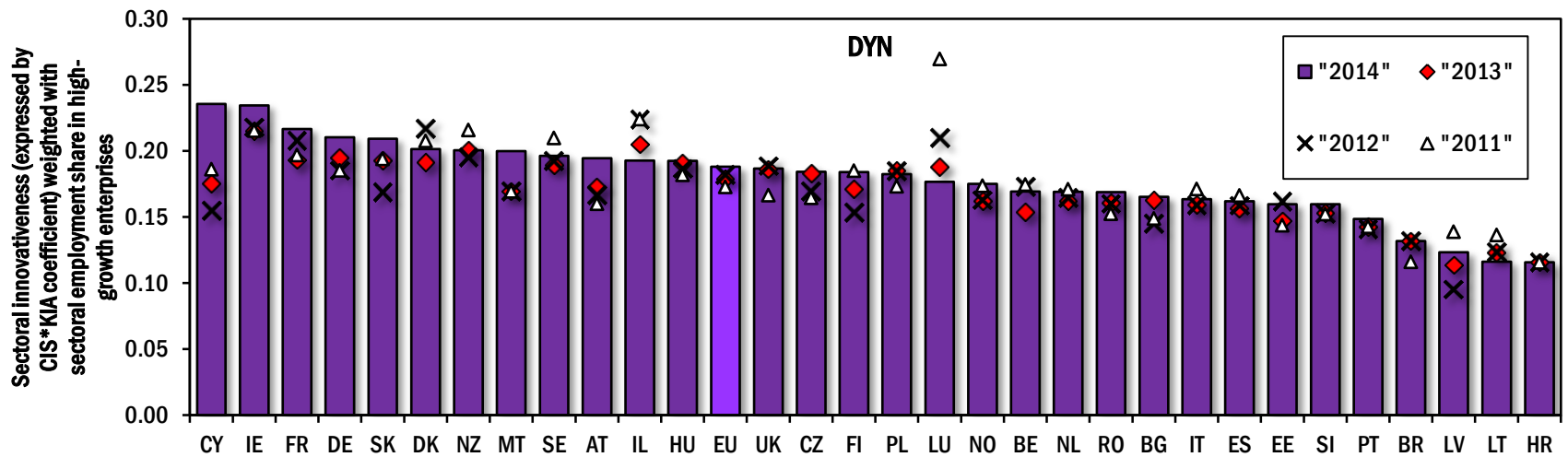
Global knowledge competitiveness trade in goods



Global knowledge competitiveness trade in services



Dynamics of fast-growing firms



If you want to measure change, don't change the measure.

A wise Statistician?

Methodological fine-tuning

2014

- ❑ Adjustments in GOOD + financial services in DYN

2016

- ❑ Improved timeliness: by 2 years
- ❑ Wider country coverage: IL, BR, NZ

Component	Specific change
PCT patents	GDP (denominator): switch to ESA 2010 (new GDP time series)
SERV trade	New sectoral classification (BPM6 instead of BPM5)
DYN	Update of CIS*KIA coefficients (from 2008 to 2010)

Robust

A robustness analysis of rankings to all modelling assumptions is performed following best practices.



Michaela Saisana, Andrea Saltelli, and Stefano Tarantola, 2005, Uncertainty and sensitivity analysis techniques as tools for the quality assessment of composite indicators.

J. R. Statist. Soc. A **168**(2), 307–323.

2005

Coherent

Effective weights are compared with nominal weights to ensure coherence between the two.



2013

Paolo Paruolo, Michaela Saisana, Andrea Saltelli, 2013, Ratings and rankings: Voodoo or Science?, *J. R. Statist. Soc. A*, **176** (3), 609-634



**Our days (minutes) are
counted - by statisticians.
Stanislav Lem**

Thank you !