A methodology for delineating and measuring transitions: the case of Net Zero

SESSION 2 - CONNECTING THEORY WITH REALITY

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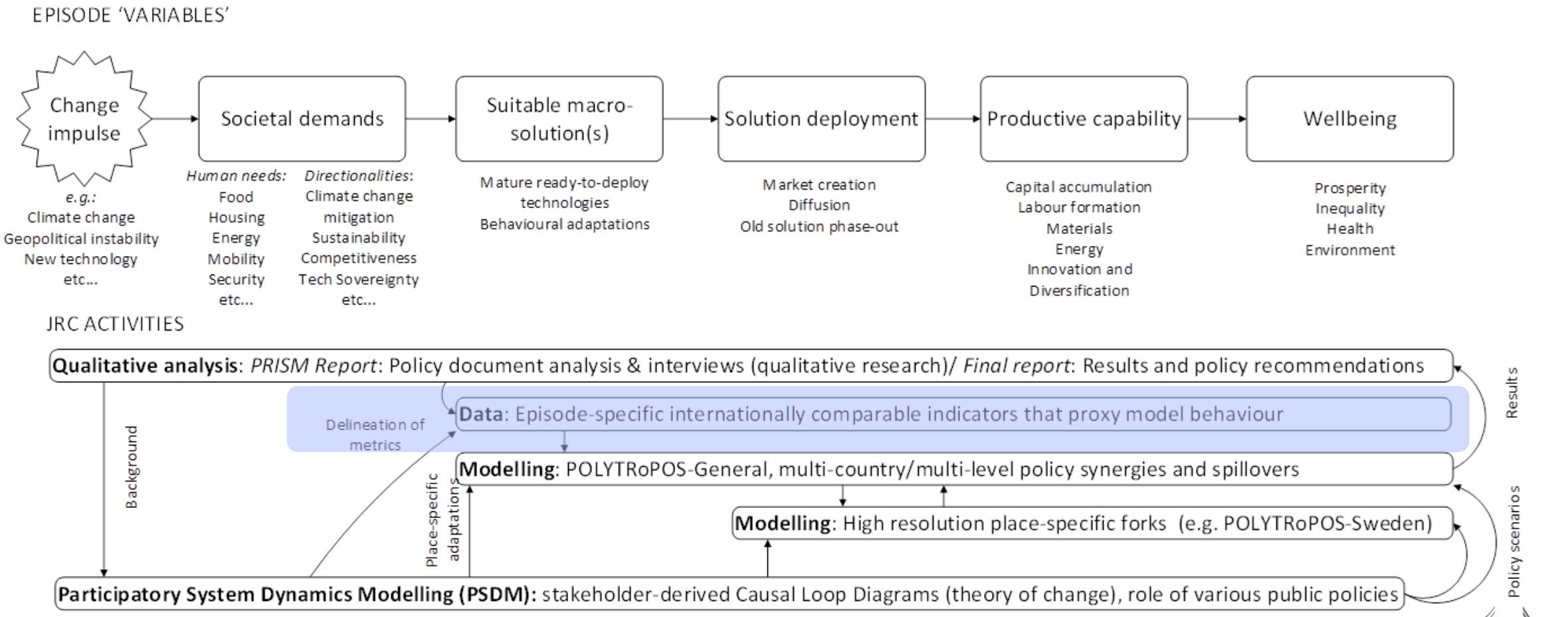
Working Group on System Dynamics for System Innovation – Day 1 – 01/12/2025

European Commission

How the metrics work supports the POLYTRoPOS model



Why we need a better mapping methodology

- Policy perimeters are often defined by **technologies**
- Statistical systems are organised by **NACE / CPA / PRODCOM**, not technologies.
- **They do not align in granularity or logic.**
- FIGARO aggregates at **2-digit level → loss of precision**.

Policy Perimeters (Technology-Based)
- NZIA
- Agrifood
- Bioeconomy

Refined mapping is required to avoid **distortions**

Statistical Classifications (Sector/product based)
- NACE (2-4 digit) – economic activities
- CPA (6-digit) – products
- PRODCOM (8-digit) – industrial products
- FIGARO (2-digit divisions) – supply–use & IOT

A structured mapping methodology

A generalisable framework for aligning policy perimeters with statistical systems:

1. Define the technology or policy perimeter (e.g., NZIA).
2. Identify relevant PRODCOM 8-digit product codes.
3. Map PRODCOM codes upward to CPA and NACE divisions.
4. Calculate production-based weights for each 2-digit division.
5. Apply weights within databases (e.g. FIGARO, EU KLEMS, SBS) to extract scenario indicators.
6. Reuse the method across future transitions (agrifood, bioeconomy,…).

The data landscape: different levels of detail

Statistical classifications operate at different levels of granularity:

- **PRODCOM – 8-digit Detailed products** (e.g., specific electrical components, machine parts)
  - ~3,800 detailed product codes → mapped to CPA/NACE classifications
- **CPA – 2–6 digit Product aggregation linked to economic activities**
  - 38 (2-digit) → 130 (3-digit) → 390 (4-digit) → 1,200 (6-digit)
- **NACE – 2–4 digit Industrial activities** (e.g., “Manufacture of electrical equipment”)
  - 88 divisions → 272 groups → 615 classes
- **FIGARO – 2-digit Supply–Use and IOT tables.** Too broad to isolate specific technologies
  - 64 industries / products

PRODCOM is very detailed, CPA/NACE provide structured aggregation, and FIGARO is highly aggregated → which is why we need weights to extract NZIA activity.

Case study using NZIA perimeter

- The **Net-Zero Industry Act (NZIA)** (2024) is the EU's industrial policy instrument to scale up domestic manufacturing of strategic clean technologies and support the transition to climate neutrality by 2050.

- **NZIA sits within a broader set of EU strategic initiatives**: European Green Deal (2019), Green Deal Industrial Plan (2023), Draghi Report on EU Competitiveness (2024), Competitiveness Compass (2025), and the Clean Industrial Deal (CID) (2025).

  These include **key targets for 2030**:
  - 42.5% of EU energy demand met by renewables
  - ≥40% of net-zero technology deployment met by EU manufacturing

- **All of these initiatives highlight the same challenge:** Europe must strengthen and scale up its industrial capacity in key technologies. NZIA specifies exactly which technologies are strategic, ideal perimeter for our first case study!

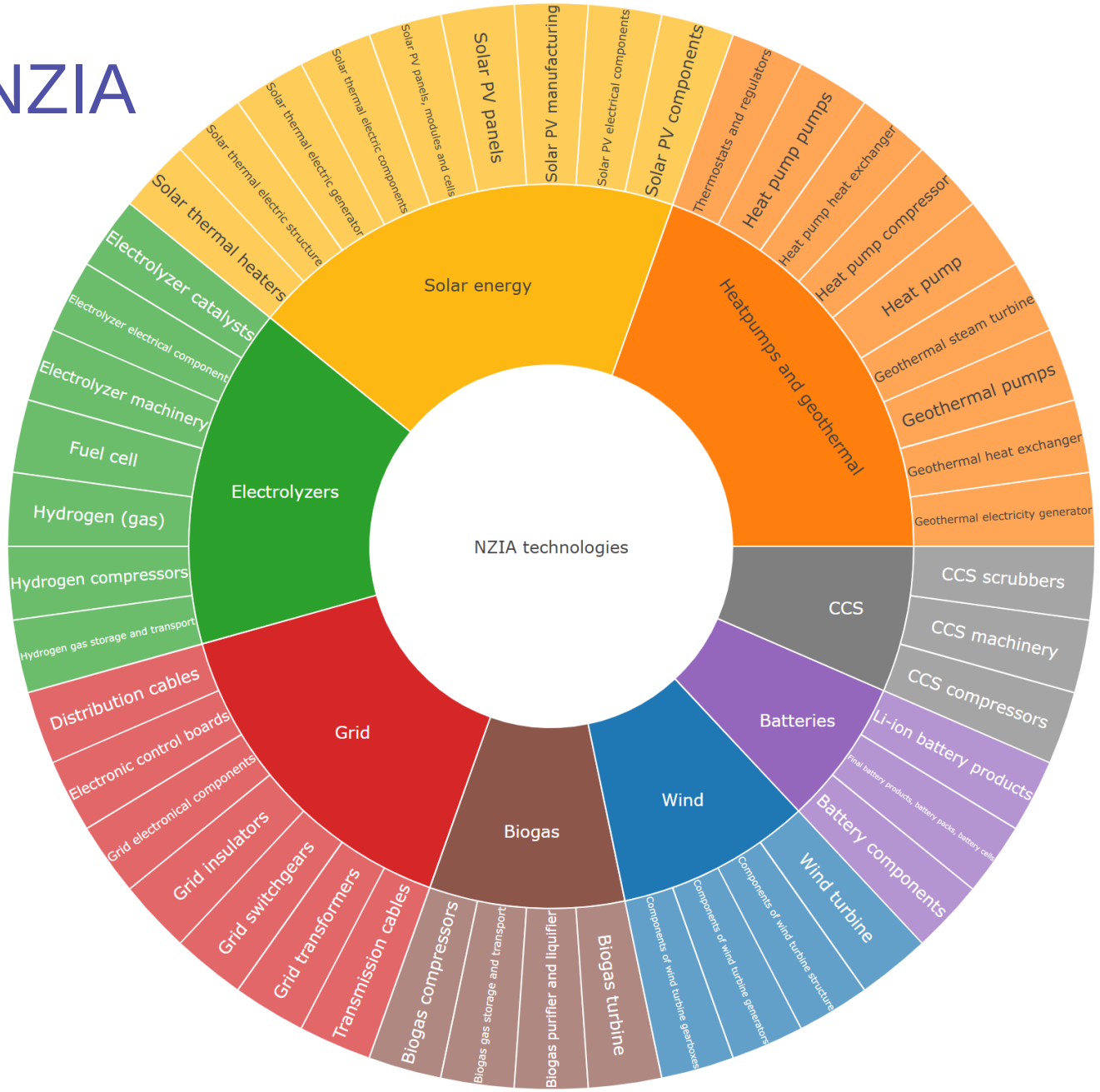
Case study: applying the method to the NZIA perimeter

- NZIA defines **8 strategic technology pillars**
- These contain 46 sub-technology categories
- Expert mapping (DG Energy & Ecorys, 2025*)
- Result: 149 different NZIA-relevant PRODCOM 8-digit codes
- Allows linking NZIA technologies → CPA/NACE → FIGARO

1. Batteries & storage
2. Biogas
3. CCS
4. Electrolysers
5. Grid technologies
6. Heat pumps & geothermal
7. Solar energy
8. Wind energy

* DG Energy & Ecorys (2025). *The Net-Zero Manufacturing Industry Landscape Across Member States.* European Commission, Directorate-General for Energy.

Sunburst chart of 8 NZIA technologies and 46 subcategories



[Open interactive NZIA sunburst]

Sunburst chart of CCS, 3 subcategories and 20 PRODCOM codes

[Open interactive CCS sunburst]

How NZIA technologies translate into NACE divisions

- 149 NZIA-relevant PRODCOM codes identified
- These map to 8 NACE 2-digit manufacturing divisions
- Over 70% fall into NACE 27 and NACE 28

NACE	Description	NZIA codes	Total PRODCOM codes
20	Manufacture of chemicals and chemical products	7	683
22	Manufacture of rubber and plastic products	6	165
23	Manufacture of other non-metallic mineral products	7	186
25	Manufacture of fabricated metal products, except machinery	9	356
26	Manufacture of computer, electronic and optical products	10	289
27	Manufacture of electrical equipment	68	299
28	Manufacture of machinery and equipment n.e.c.	41	697
32	Other manufacturing	1	168
	Total	149	2843

Why compare PRODCOM and FIGARO

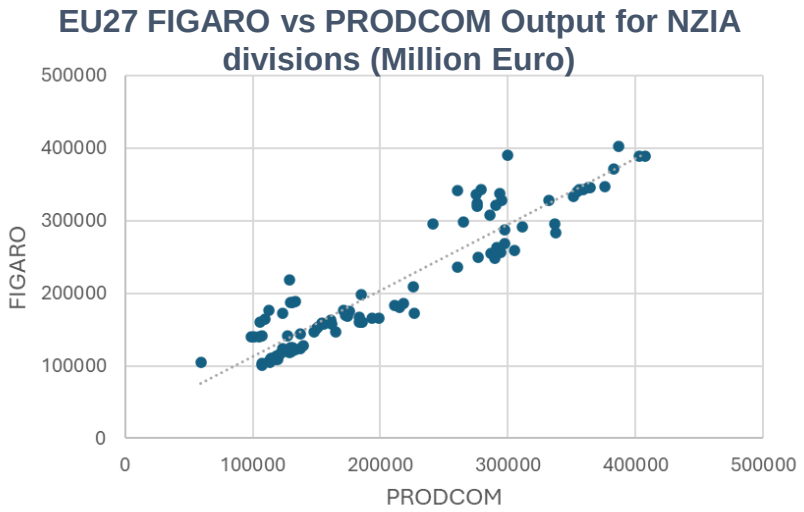
We compare the two sources to ensure the weighting methodology is valid and unbiased.

Two Different Measures

- PRODCOM: Sold production of goods (8-digit)
- FIGARO: Total economic output (P1) at 2-digit
- Different scope, valuation and coverage

Validation Results

- Very strong correlation: R = 0.94
- Consistent trends across time interval 2010-2021



Production-based weights: isolating NZIA activity within each NACE division

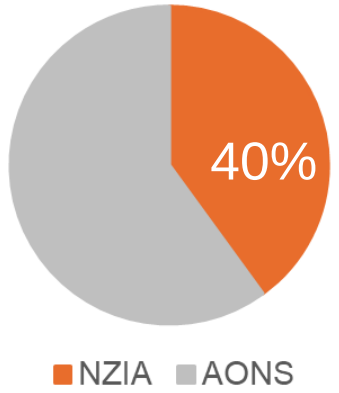
FIGARO is only available at 2-digit CPA/NACE. These divisions include both NZIA-relevant and non-NZIA products. Need a method to extract only the NZIA share.

How weights are calculated:

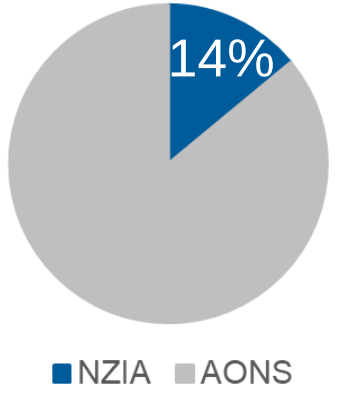
1. Sum PRODCOM output for each NZIA subcategory
2. Aggregate PRODCOM to its parent **2-digit CPA/NACE division**
3. Compute the share:
   NZIA share = NZIA PRODCOM output / Total division PRODCOM output

Apply these shares to extracted indicators

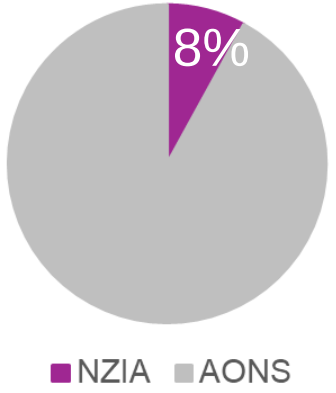
NACE 27 - Manufacture of electrical equipment



NACE 25 - Manufacture of fabricated metal products, except machinery



NACE 26 - Manufacture of computer, electronic and optical products



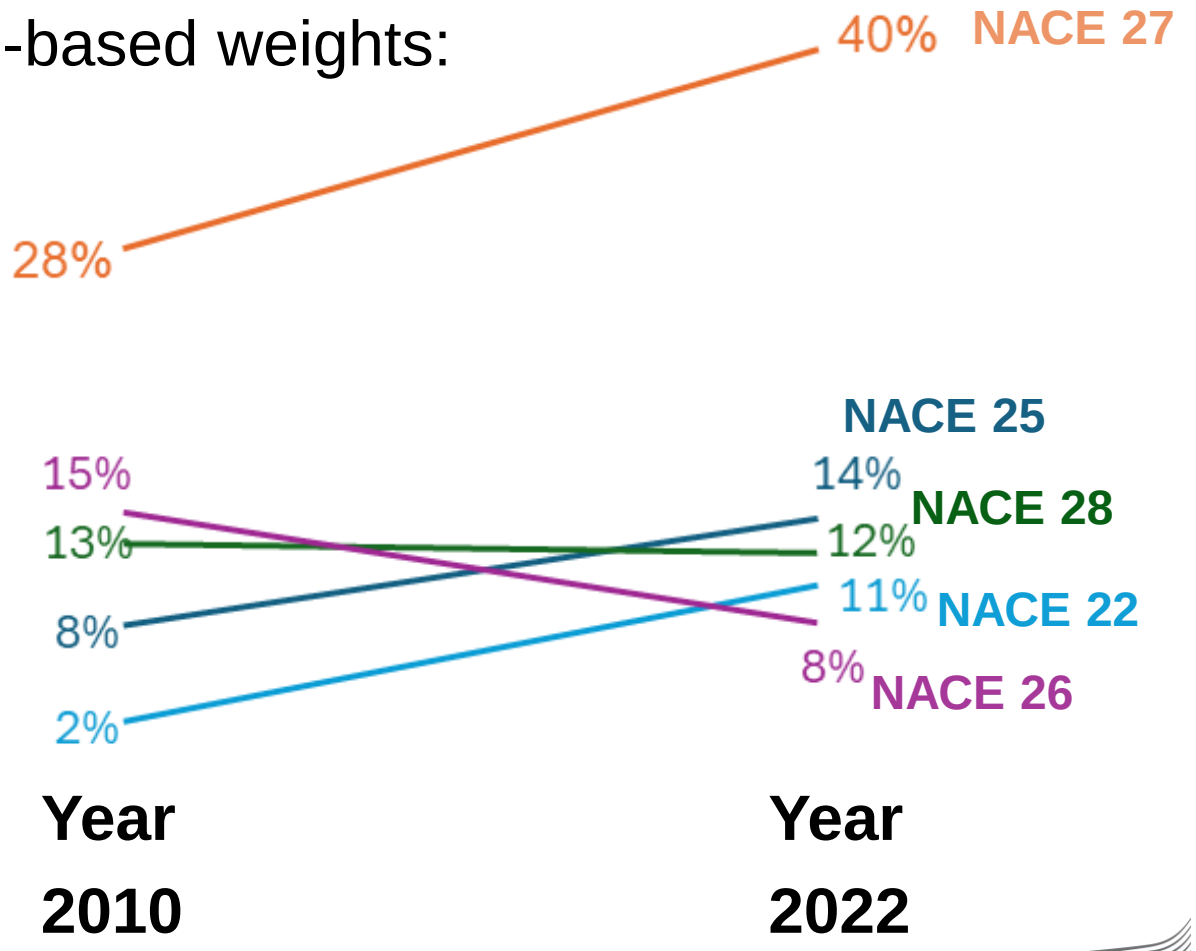
NZIA weights for 2022

AONS= All Other NACE Sectors

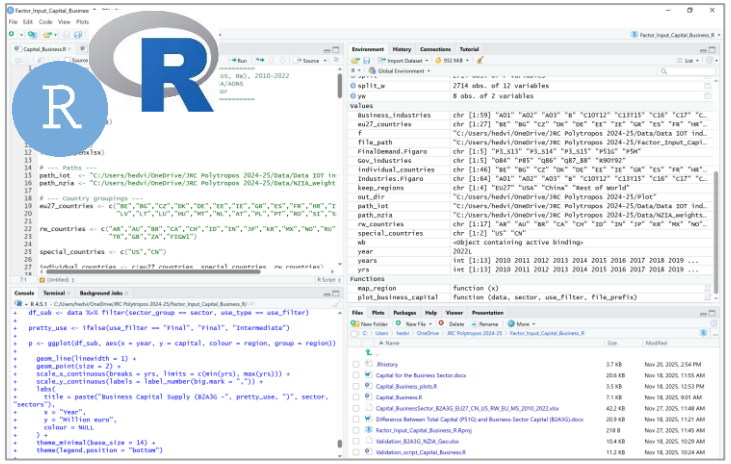
What the weights reveal: NZIA structure over time

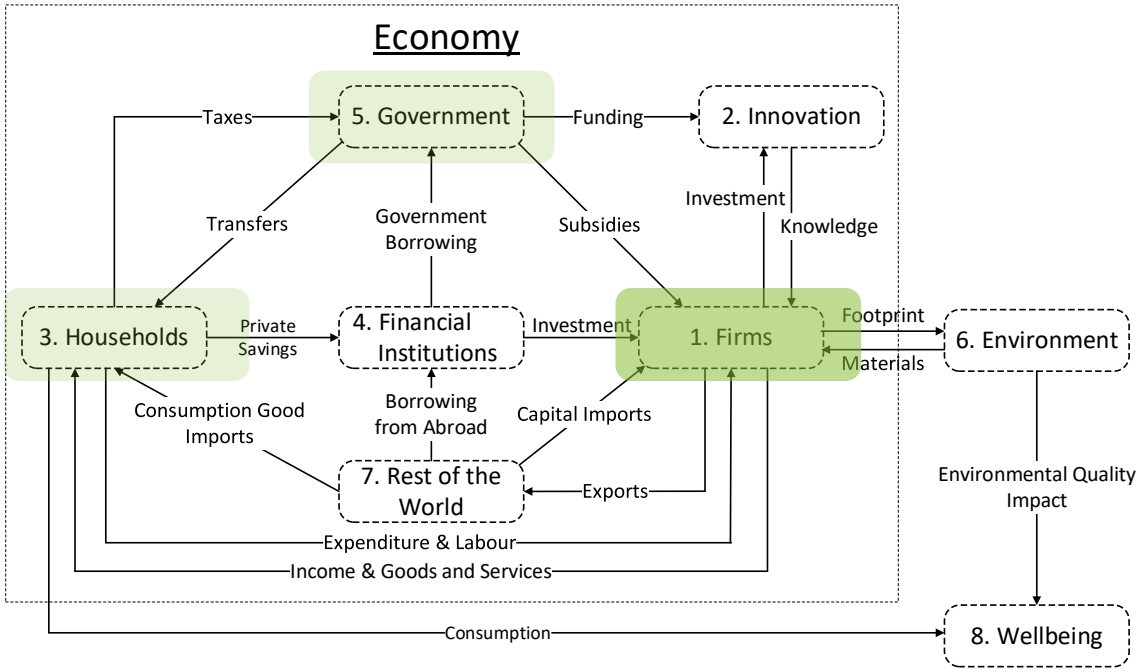
Key insights from NZIA production-based weights:

- **NACE 27 (Electrical equipment):** rises steadily
- **NACE 25 (Fabricated metal products):** consistently strong
- **NACE 28 (Machinery):** stable backbone
- **NACE 22 (Plastics):** sharp increase
- **NACE 26 (Electronics):** gradual decline over the period
- **NACE 20, 23, 31-32**: consistently marginal shares under 5%



From mapping to measurement: NZIA indicators extracted





Indicators we coded and extracted within NZIA perimeter:

1. Value Added

- Supply-side VA (intermediate, final, export) (FIGARO)
- Demand-side VA (HH, government, business, exports) (FIGARO)

2. Capital Inputs

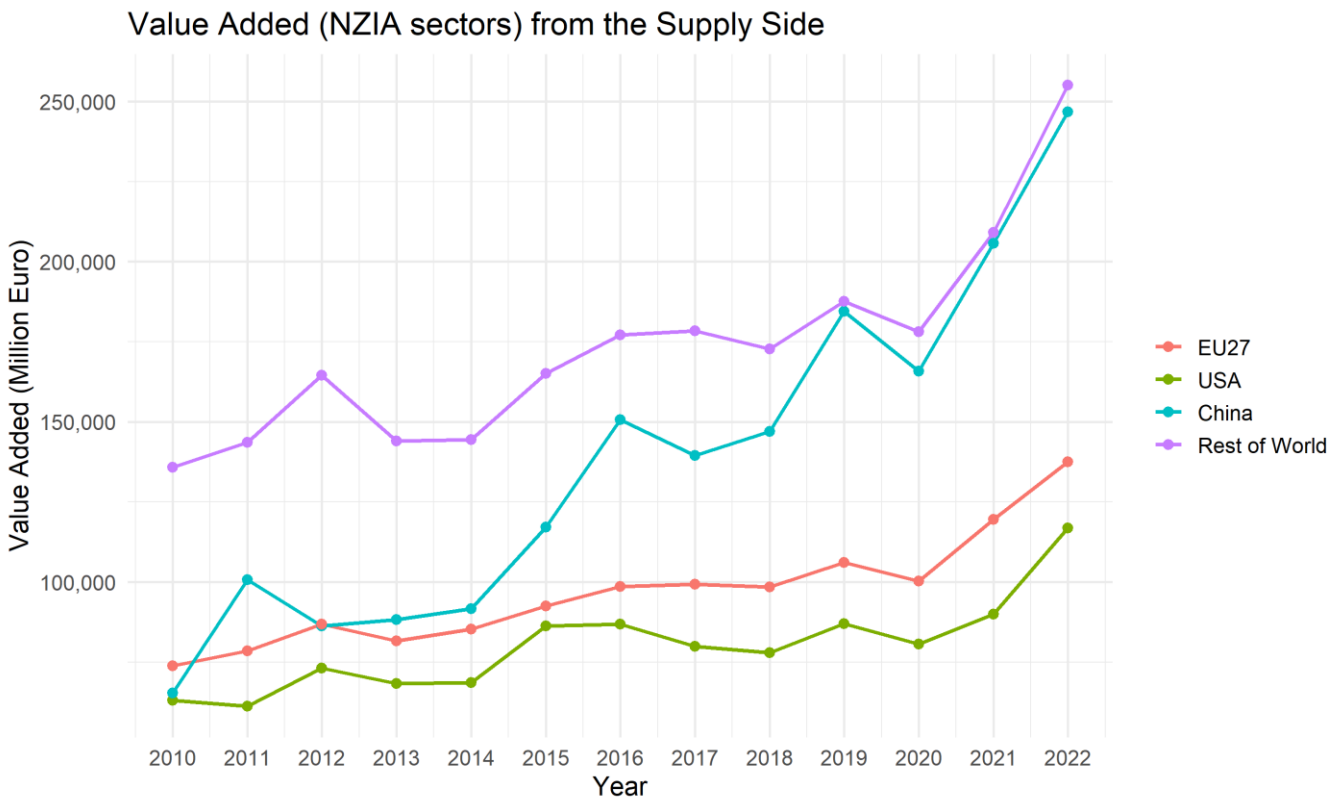
- Tangible capital (business, government, households) (FIGARO)
- Household capital formation (FIGARO)
- Intangible investment (EU KLEMS / INTANProd)

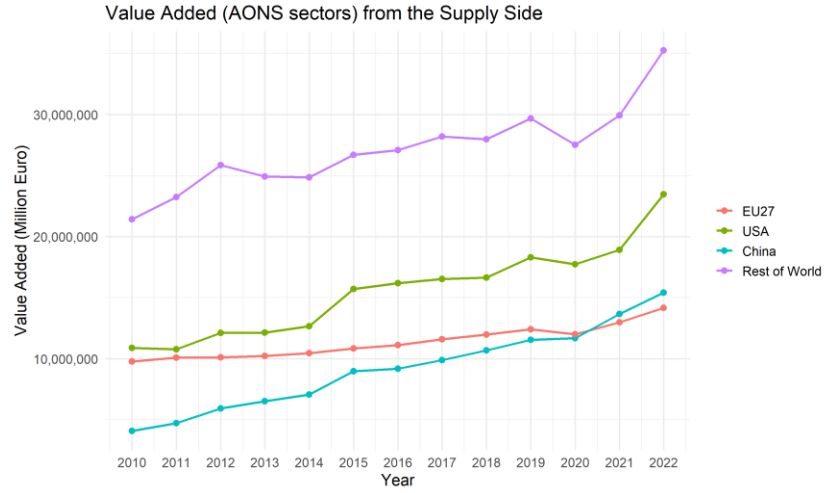
3. Labour Inputs

- Labour compensation (FIGARO)
- Employment headcounts (Eurostat, EU KLEMS, NBS, ILOSTAT)

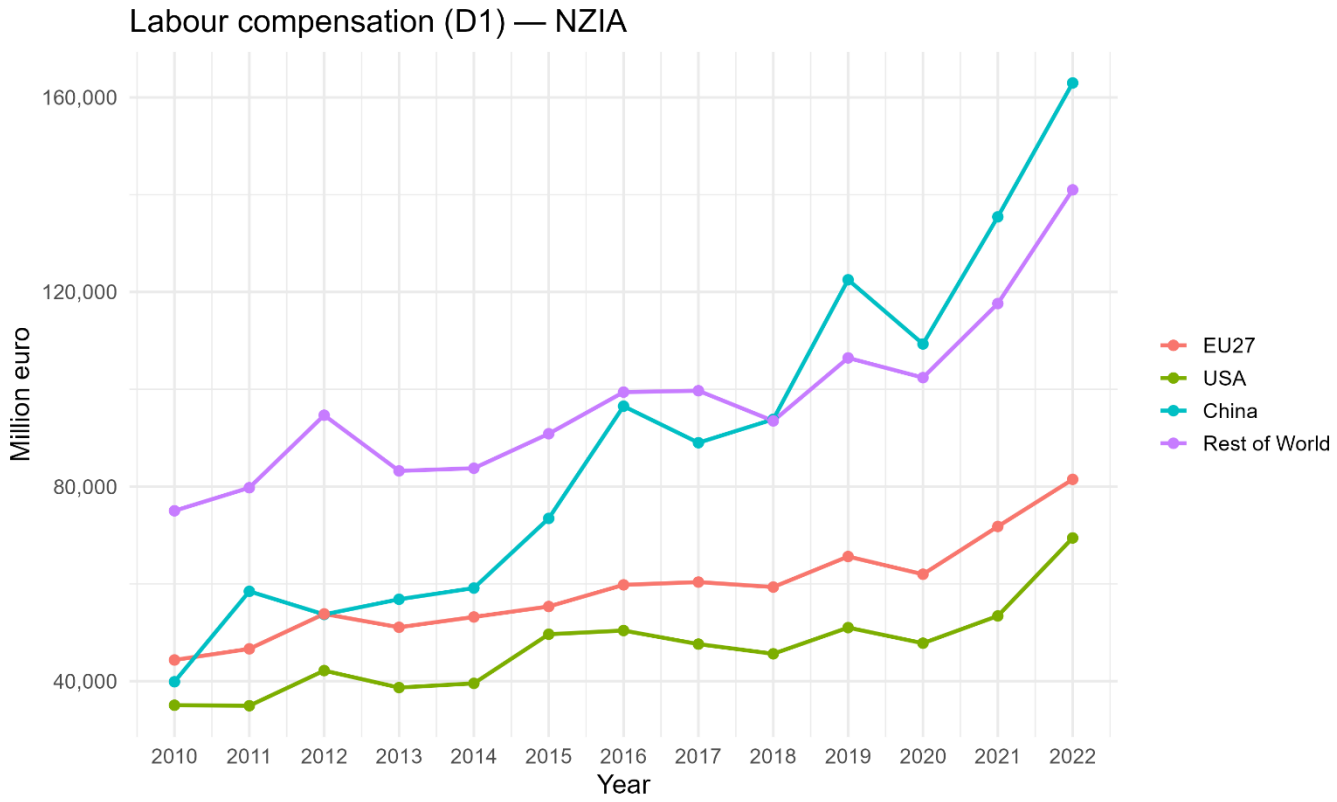
Geographical coverage: EU MS, EU27, China, US, “Rest of World”

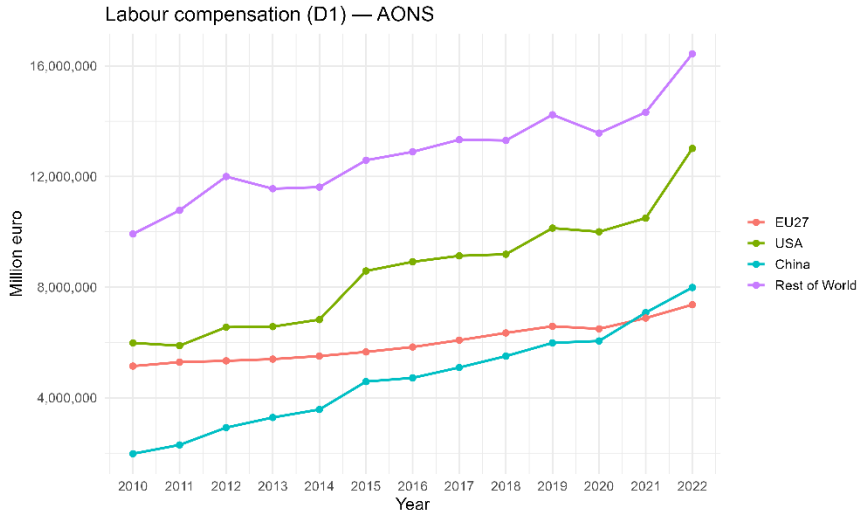
Some results from the extractions: VA





Labour


Labour compensation (D1) — NZIA
160,000
120,000
80,000
40,000
Million euro
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
EU27
USA
China
Rest of World


Labour compensation (D1) — AONS
16,000,000
12,000,000
8,000,000
4,000,000
Million euro
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
EU27
USA
China
Rest of World

Generalising the methodology to other transitions

The method is generalisable:

- Starts from any policy-defined perimeter (e.g. Agrifood, Bioeconomy,…)
- Maps technologies → PRODCOM → CPA/NACE → FIGARO
- Uses production-based weights to isolate relevant activity
- Fully compatible with input–output and SUT frameworks
- Allows cross-scenario and cross-country comparisons

Thank you

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