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Monitoring the Impact of Innovation and Investment Factors on the Efficiency of Countries' Export-Import Activity



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Relevance



GLOBAL TRENDS

High-tech exports grew by **9%** in 2024

Exports of digital services grew by **8.2%** per year over 2005-2023, compared with **4.8%** for exports of goods

Foreign direct investment in the digital sector grew by **14%** in 2024

Greenfield investment in semiconductor manufacturing and data centres increased significantly, driven by the development of artificial intelligence

UKRAINE

In 2024, agricultural products accounted for more than **50%** of **Ukraine's** total exports, while R&D expenditure was only **0.33%** of GDP

Investment in **Ukrainian** defense tech grew from **$5 million** in 2023 to **$105 million** in 2025

The European Union's **Ukraine** Facility Plan of up to **€50 billion** for 2024-2027

The concept of monitoring the impact of innovation and investment factors on the efficiency of countries' export-import activity



Monitoring of factors affecting the efficiency of countries' export-import activity is a comprehensive and systematic process that covers methodological, information and analytical support, the assessment and analysis of the impact of factors on the efficiency of countries' export-import activity, and the development of rational management decisions to improve efficiency.

System of monitoring concepts:

criteria | indicators | information databases | countries | clusters | identification | level of development | assessment | analysis | determining factors of influence | relationship between the two processes | types of influence | dynamics | observation

Information support of monitoring



Investment factors 7

- FDI (net inflows)
- FDI (net outflows, % of GDP)
- portfolio investment (net, % of GDP)
- gross fixed capital formation (% of GDP)
- portfolio equity investment (net inflows)
- FDIRRI (OECD FDI Regulatory Restrictiveness Index)
- GIRRI (Global Investment Risk and Resilience Index)

Innovation factors 9

- GII (Global Innovation Index)
- NRI (Network Readiness Index)
- EGDI (UN E-Government Development Index)
- EPART (E-Participation Index)
- ICT Regulatory Tracker
- high-technology exports (% of manufactured exports)
- Economic Complexity Index (trade, research)
- ICT goods share (% of exports)

Efficiency of export-import activity 15

- export-to-import coverage ratio and its average annual change over 5 years
- trade openness
- net trade index
- Theil product and market concentration indices (exports, imports)
- OECD Trade Facilitation Indicators
- logistics efficiency indicators – partner network coverage (number of maritime, air and B2B postal partner economies) and speed of logistics operations (container and air cargo dwell time for imports, B2B postal delivery time)

Sample: 45 countries, 2024 **Sources:** World Bank, UNCTAD, WIPO, OECD, ITU

Analytical support of monitoring



1

Cluster analysis (Ward's method):

grouping countries by the systems of indicators of innovation and investment factors and of export-import activity efficiency

2

Integral taxonomic development indicator:

identifying clusters by their level of development of investment and innovation processes and export-import activity efficiency, using the centroid values of the indicators

3

Factor analysis:

identifying the determining factors of influence within clusters

4

Canonical analysis:

assessing the relationship between the two processes: innovation and investment processes and the efficiency of countries' export-import activity

Country clusters and levels of development of investment and innovation processes (IIP) and export-import activity efficiency (EIAE)



Clusters by IIP system	Countries in the cluster	IIP development level	Clusters by EIAE system	Countries in the cluster	EIAE development level
1	1, 4, 5, 7, 9, 10 – Costa Rica, 18, 19, 20, 21, 22, 27, 28, 33, 35, 36, 38, 40, 41, **43 – Ukraine**, 45	0.471	**1**	1, 7, 10, 32, 33, 45	0.413
2	2,3, 6, 11, 12, 15, 16, 17, 24, 31, 32, 39	0.576	**2**	2, 6, 9, 18, 19, 22, 28, 38, 40	0.397
3	8, 25, 26, 29, 34	0.537	**3**	3, 5, 8, 11, 14, 16, 17, 24, 25, 26, 29, 31, 41, 44	0.340
4	13, 30, 42	0.305	**4**	4, 12, 15, 20, 21, 27, 35, 36, 39	0.556
5	23, 44	0.644	**5**	13, 30, 34, 42, **43 – Ukraine**	0.232
6	37	0.733	**6**	23, 37	0.441

1 – Argentina, 2 – Australia, 3 – Belgium, 4 – Bulgaria, 5 – Brazil, 6 – Canada, 7 – Chile, 8 – China, 9 – Colombia, 10 – Costa Rica, 11 – Germany, 12 – Denmark, 13 – Egypt, 14 – Spain, 15 – Finland, 16 – France, 17 – United Kingdom, 18 – Georgia, 19 – Greece, 20 – Croatia, 21 – Indonesia, 22 – India, 23 – Ireland, 24 – Italy, 25 – Japan, 26 – Republic of Korea, 27 – Lithuania, 28 – Mexico, 29 – Malaysia, 30 – Namibia, 31 – Netherlands, 32 – Norway, 33 – Peru, 34 – Philippines, 35 – Poland, 36 – Portugal, 37 – Singapore, 38 – Slovenia, 39 – Sweden, 40 – Thailand, 41 – Türkiye, 42 – Tanzania, **43 – Ukraine**, 44 – United States, 45 – South Africa.

Comparative analysis of development levels in country clusters



1. A high level of development of IIP does not always lead to high EIAE
2. Countries with a high level of development of IIP and high EIAE (Singapore, Ireland)
3. Countries with a high level of development of IIP but low EIAE (USA, Belgium, Germany, Spain, France, United Kingdom, Italy, Netherlands)
4. A low level of development of IIP leads to low EIAE (Egypt, Namibia, Tanzania)

5 Ukraine:

IIP – satisfactory level

(0.471)

EIAE – low level

(0.232)

Relationship between IIP and EIAE in Ukraine's cluster



First latent factor for the development of IIP: **%Var = 26.71%**

$$F_{II1} = 0.539I_1 + 0.398I_7 + 0.946X_1 + 0.733X_2 + 0.551X_5 + 0.735X_7$$

First latent factor for EIAE: **%Var = 27.244%**

$$F_{EIAE1} = 0.453Y_4 + 0.875Y_5 + 0.765Y_6 + 0.313Y_7 + 0.892Y_8 - 0.715Y_{12} - 0.354Y_{14}$$

Relationship between the two processes based on canonical analysis:

$$U_{EIAE1} = 0.24Y_4 - 0.942Y_5 + 0.503Y_6 + 0.623Y_7 - 0.592Y_8 - 0.969Y_{12} - 0.098Y_{14}$$

$$V_{II1} = 0.062I_1 + 0.85I_7 + 0.024X_1 - 0.967X_2 - 0.157X_5 + 0.843X_7$$

$r_{u_1v_1} = 0.928$, **P-value = 0.0021**

Indicators that determine the relationship:

X_2 – Network Readiness Index

I_7 – Global Investment Risk and Resilience Index

X_7 – Economic Complexity Index (Trade)

Y_{12} – Number of B2B postal partner economies

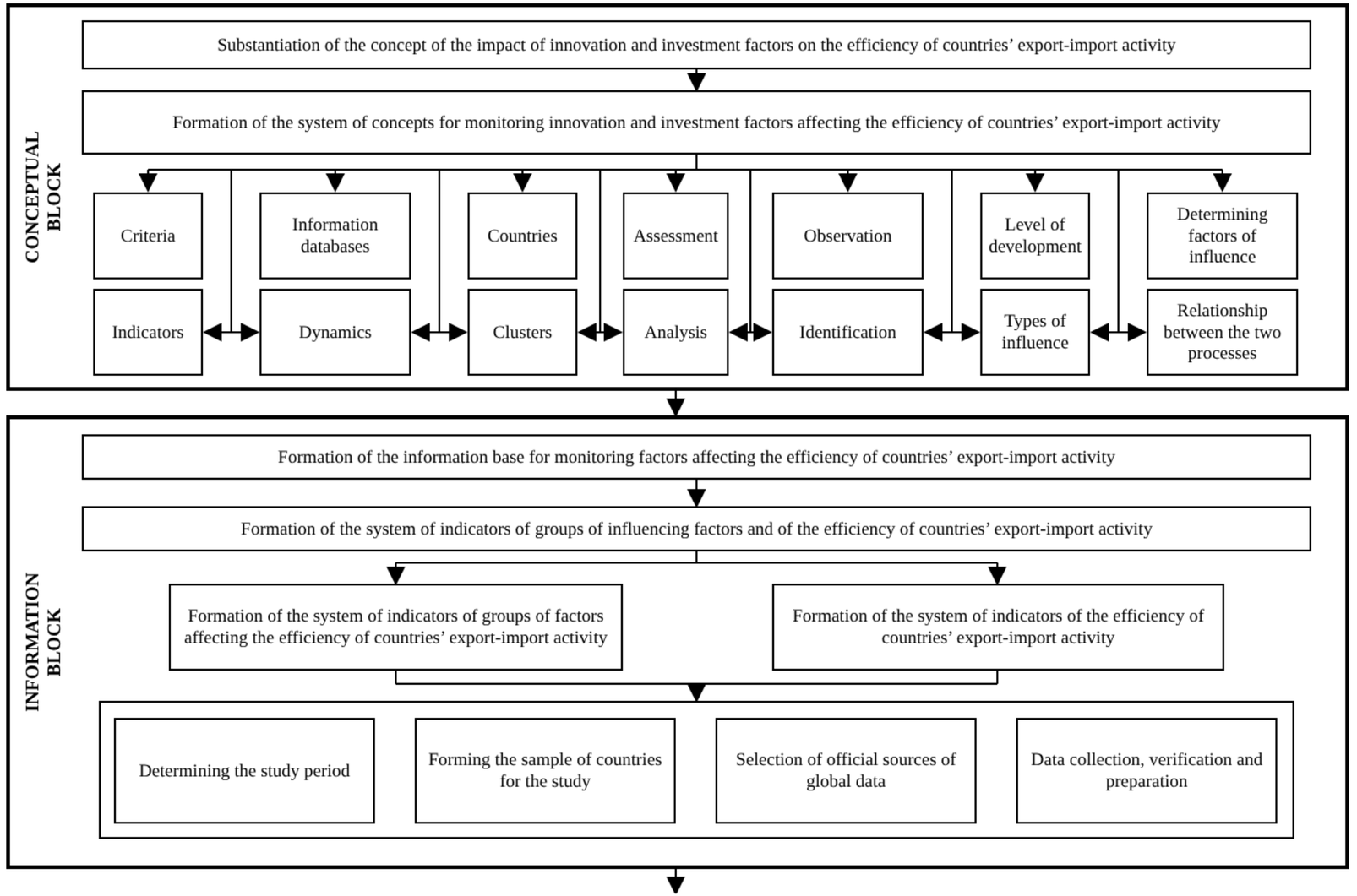
Y_5 – Theil product concentration index (exports)

Y_7 – Theil product concentration index (imports)

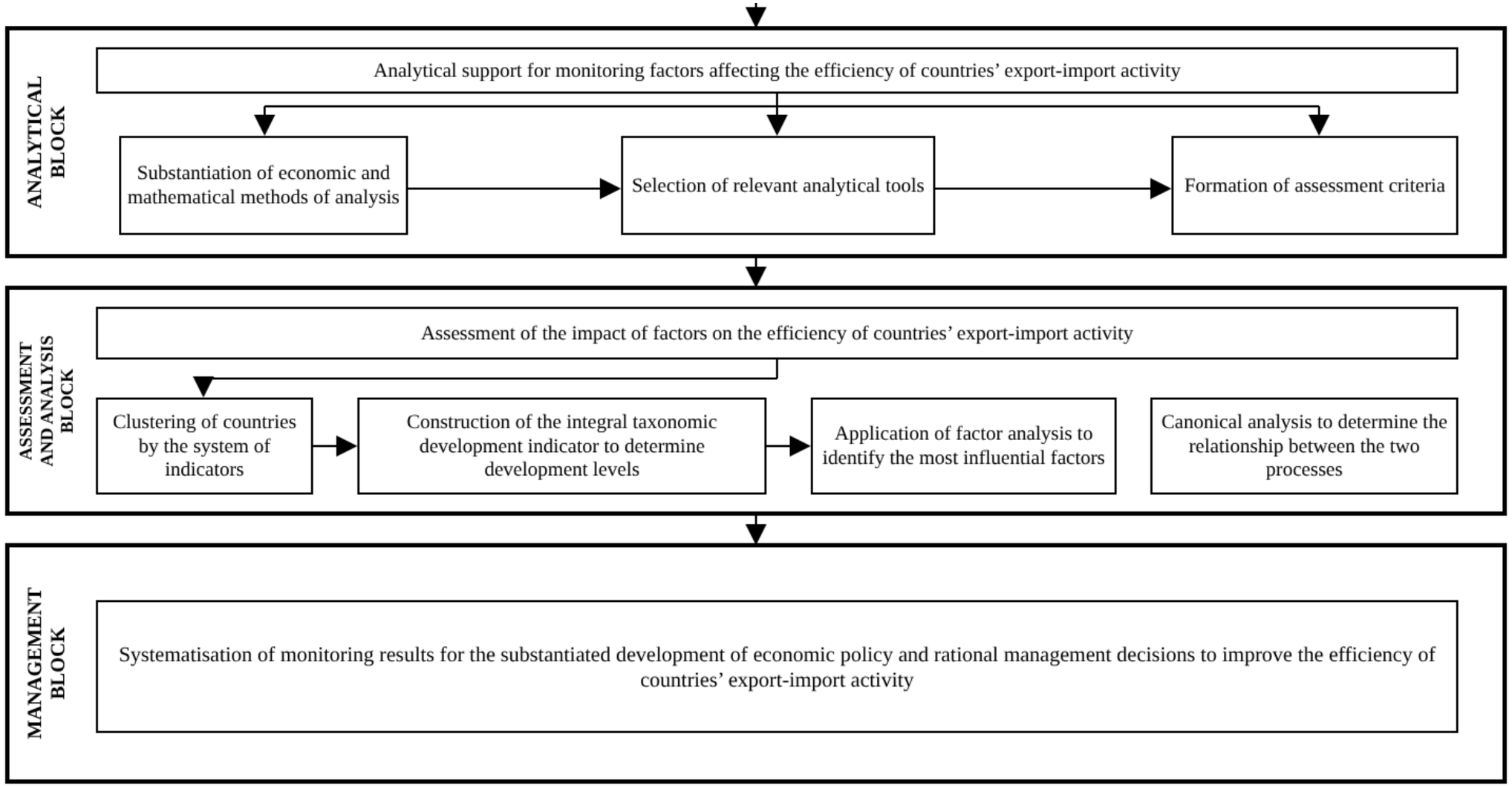
Y_8 – Theil market concentration index (imports)

Y_6 – Theil market concentration index (exports)

Stages of monitoring factors affecting the efficiency of countries' export-import activity



Stages of monitoring factors affecting the efficiency of countries' export-import activity



Thank you for your attention!

