Joint Research Centre

the European Commission's in-house science service

Serving society
Stimulating innovation
Supporting legislation

Critical Raw Materials:

Revision of the EU methodology

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1. Introduction

The JRC inside the European Commission

Joint Research Centre (JRC)

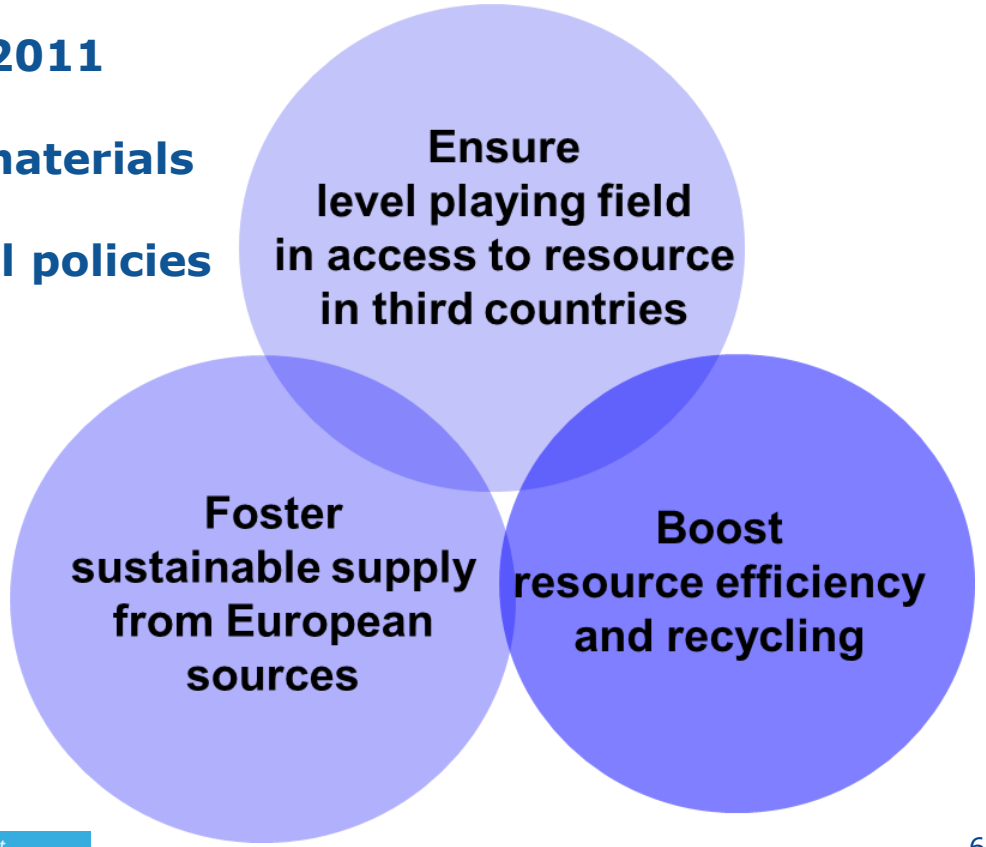
is the European Commission's in-house science service and the only DG executing direct research

Institute for Environment and Sustainability (IES)

"The mission of the IES is to provide scientific-technical support to the European Union's policies for the protection and sustainable development of the European and global environment"

EU "Raw Materials Initiative":

- **Aim:** securing sustainable supply of raw materials
- **Launched in 2008, consolidated in 2011**
- **Non-energy, non-agricultural raw materials**
- **Connecting EU external and internal policies**
- **Integrated strategy (3 pillars)**
- **Introduced list of Critical Raw Materials (CRMs) in 2011 and 2014**



2. EU 2014 list of Critical Raw Materials

How to assess Critical Raw Materials?

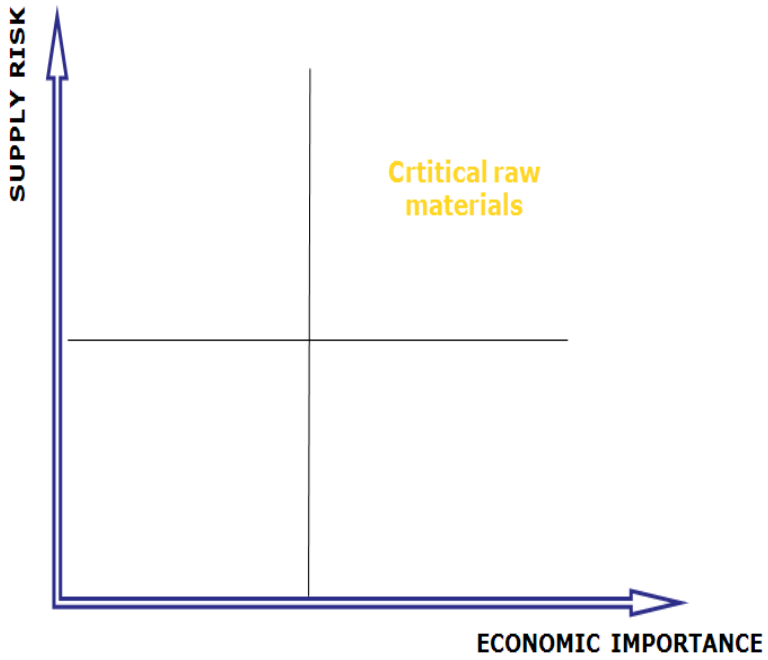
Economic importance

- Importance of a raw material per economic sector & importance of the sector in the EU economy

Supply risk

- Political and economic stability
- Level of production concentration
- Potential for substitution
- Recycling rate

EU 2014



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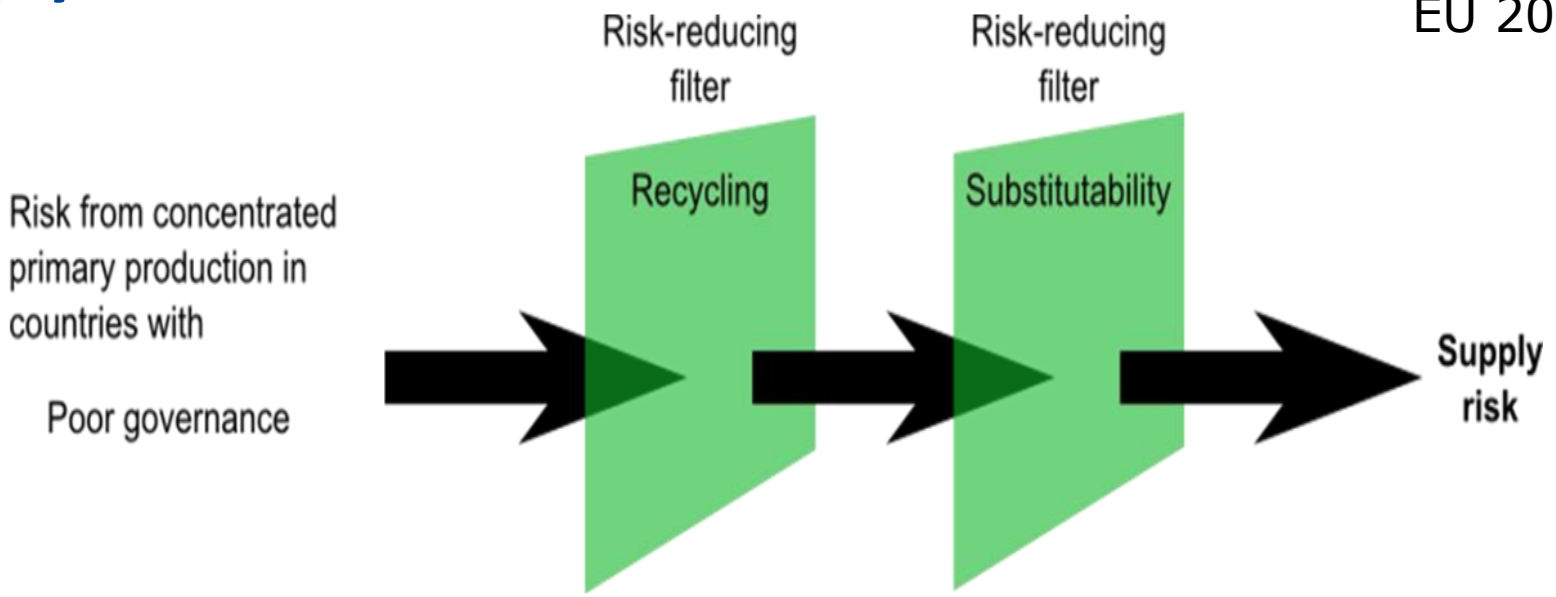
Supply risk

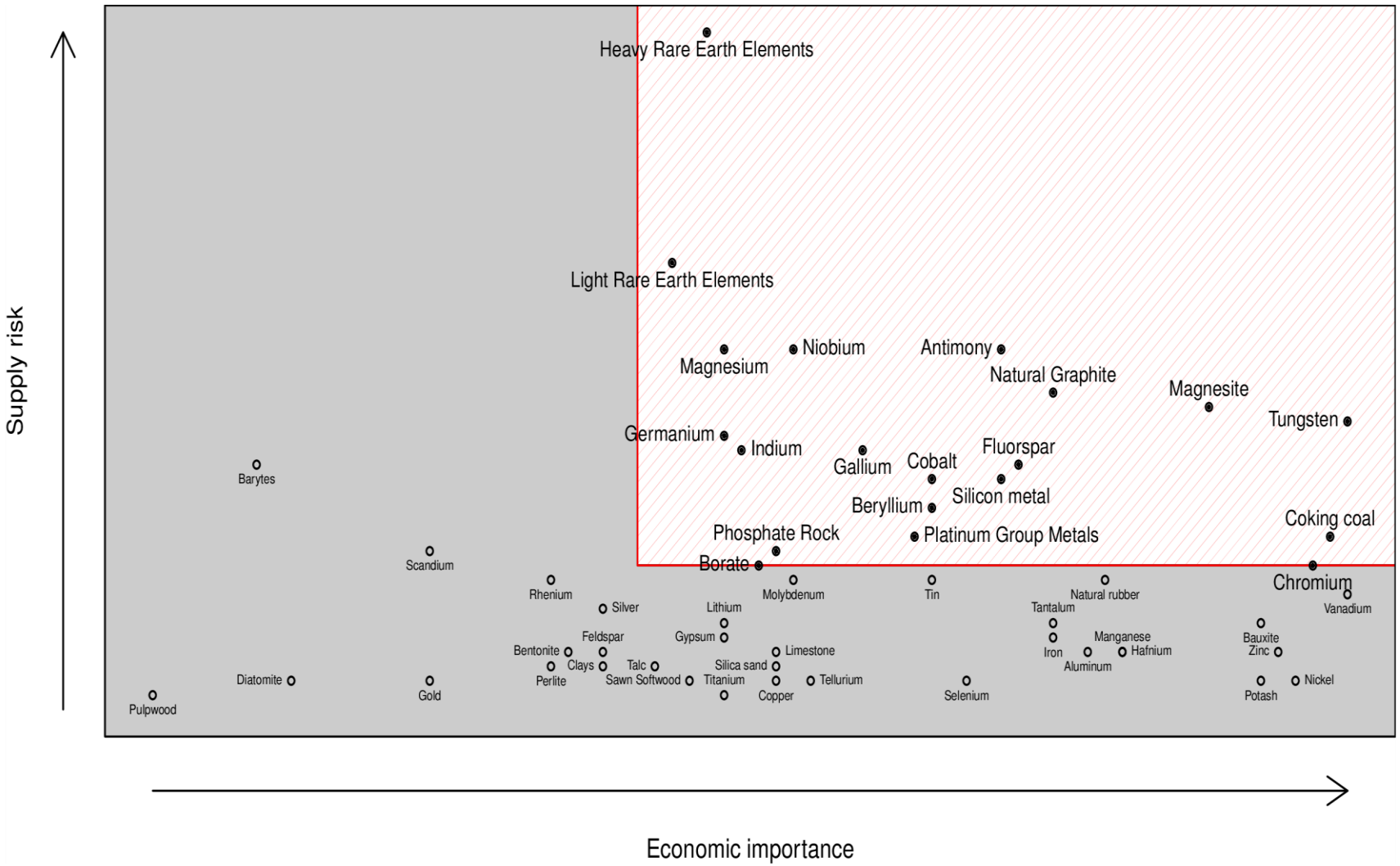
EU 2014



Source: Fraunhofer ISI.

Supply risk = HHI x WGI x (1-R) x S

EU 2014 :


Supply risk
Economic importance
Heavy Rare Earth Elements
Light Rare Earth Elements
Magnesium
Niobium
Antimony
Natural Graphite
Magnesite
Tungsten
Germanium
Indium
Gallium
Cobalt
Fluorspar
Silicon metal
Beryllium
Coking coal
Phosphate Rock
Platinum Group Metals
Borate
Chromium
Barytes
Scandium
Rhenium
Silver
Lithium
Molybdenum
Tin
Natural rubber
Tantalum
Vanadium
Feldspar
Gypsum
Manganese
Iron
Hafnium
Aluminum
Bauxite
Zinc
Bentonite
Limestone
Clays
Talc
Silica sand
Perlite
Sawn Softwood
Titanium
Tellurium
Copper
Diatomite
Gold
Selenium
Nickel
Potash
Pulpwood

Context of EU 2014 list of Critical Raw Materials:

- 2014 is a follow-up the 2010 list of Critical Raw Materials
- As Criticality changes with time, updates foreseen every 3-4 years
- Next: EU 2017 list of Critical Raw Materials

Preparation of the EU 2017 list of Critical Raw Materials:

- Review of methodology by DG GROW- DG JRC (end early 2016):
    - Supply risk and economic importance
    - Role of export restrictions and import dependency
    - Reliable data for assessing criticality
    - Additional influences on criticality
    - Biotic materials
    - Uses of the list of Critical Raw Materials

- Improved methodology available to consultants in charge of EU 2017 list

3. Criticality methodology

Some currently investigated potential adjustments

European Commission

* Working definition of criticality:

*A **Critical Raw Material** is one with high risk of a supply disruption and, at the same time, with high economic importance. **High risk of supply disruption** means that supply might not be adequate to meet EU industry demand. **High economic importance** means that the raw material is fundamental in industry sectors to create added value and jobs, which are lost in case the raw material is not available **and adequate substitutes cannot be used instead.***

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* Adjusting for export restrictions (trade barriers)

- Abrupt increase of export restrictions in minerals and metals sectors worldwide since 2009

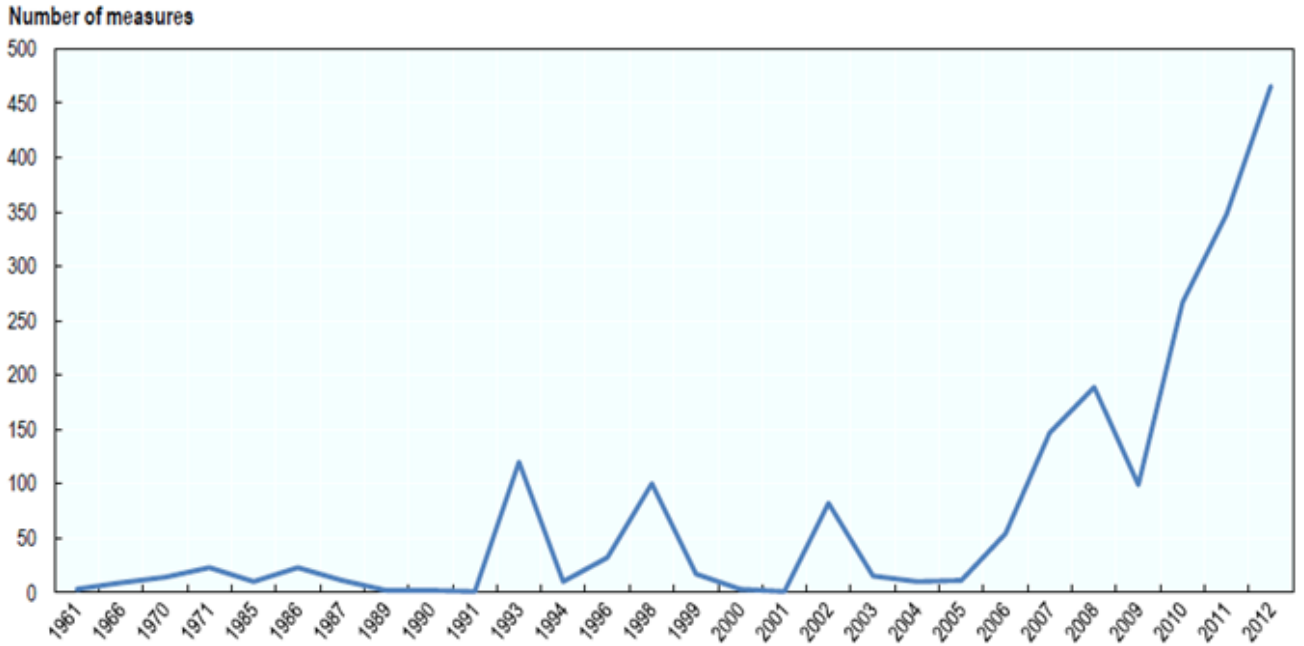


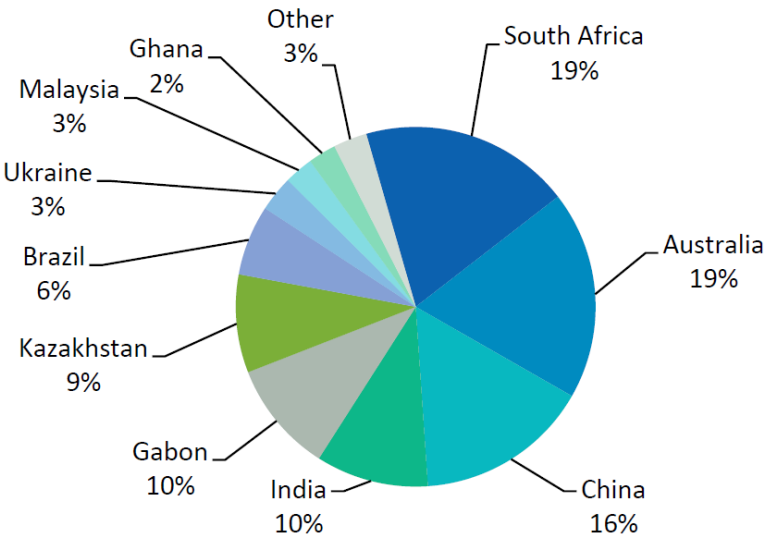
Figure 1: Year of introduction of export restriction measures present in 2012 (OECD database)

- Supply risk may increase by these export restrictions (country-specific)

* Country concentration of supply: need to be specific?

-Global production versus specific supply: the example of Manganese

Worldwide production



Source: EC, 2014

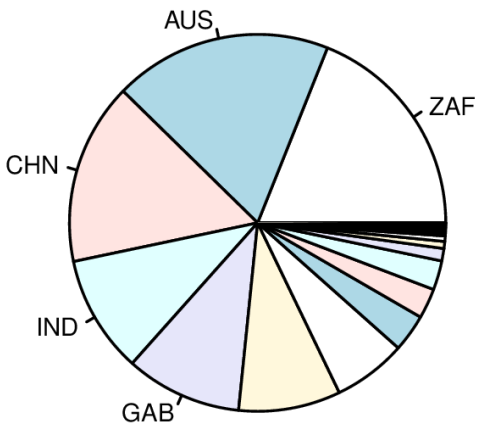
US supply

- 100% import dependent
- Manganese ore:
  72% Gabon
- Ferromanganese:
  67% South Africa, China, Brazil

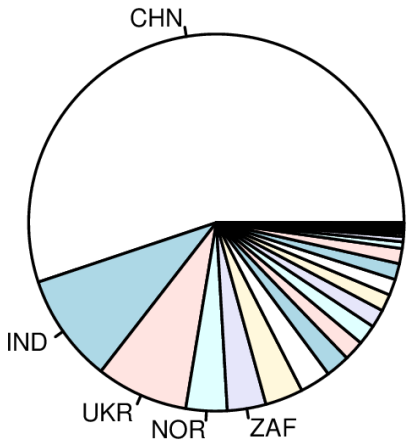
Source: NRC-US, 2008

* Concentration shifts along the supply chain "primary production"

Manganese



Mining stage



Refining stage

Source: EC, 2014

4. Supply risk influences and resilience

- Other additional influences on supply risk?
    - byproduct dynamics
    - land use: economic competition, regulation
    - …

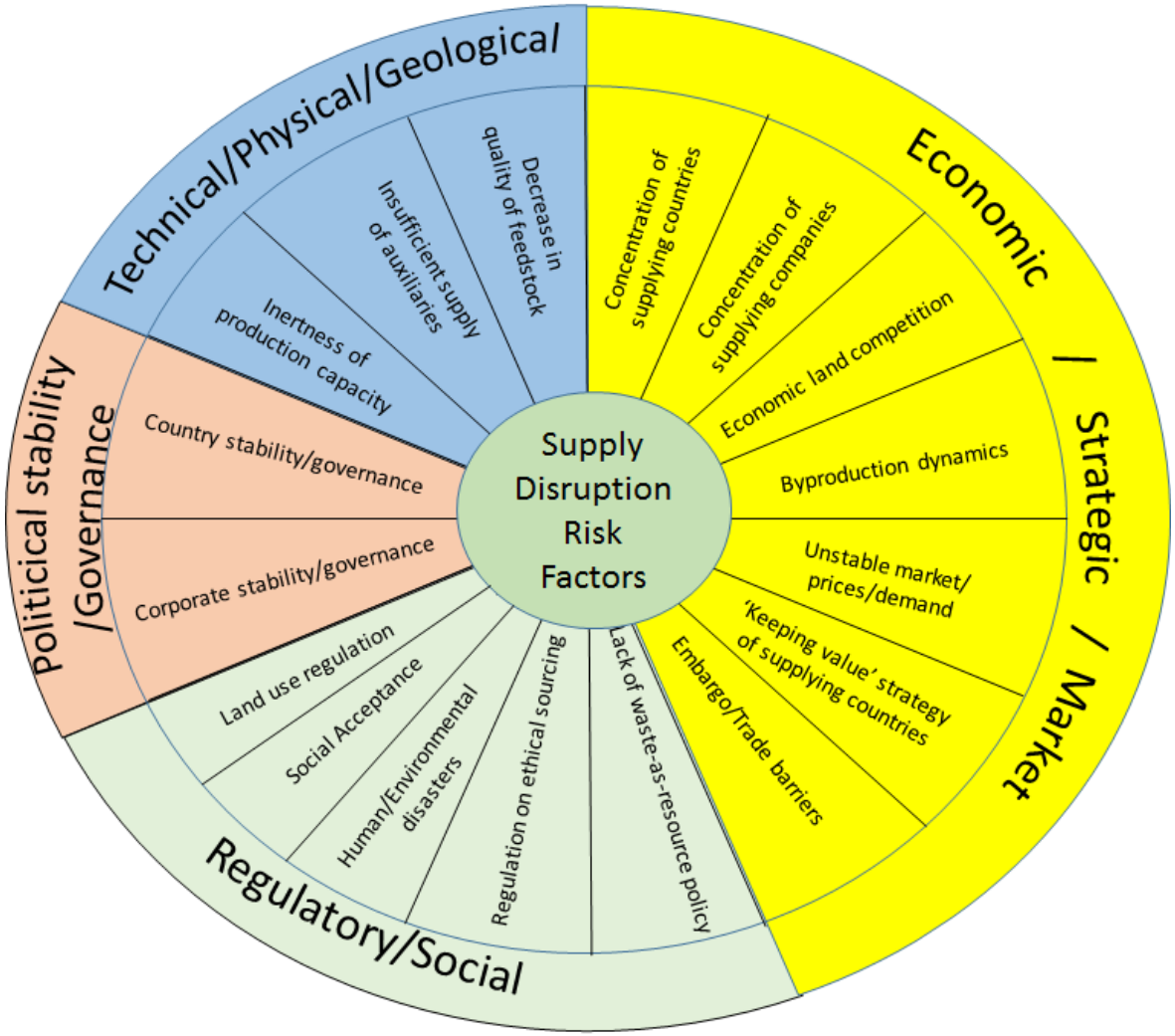
    → no comprehensive structure

- Supply risk disruption versus resilience to supply disruption

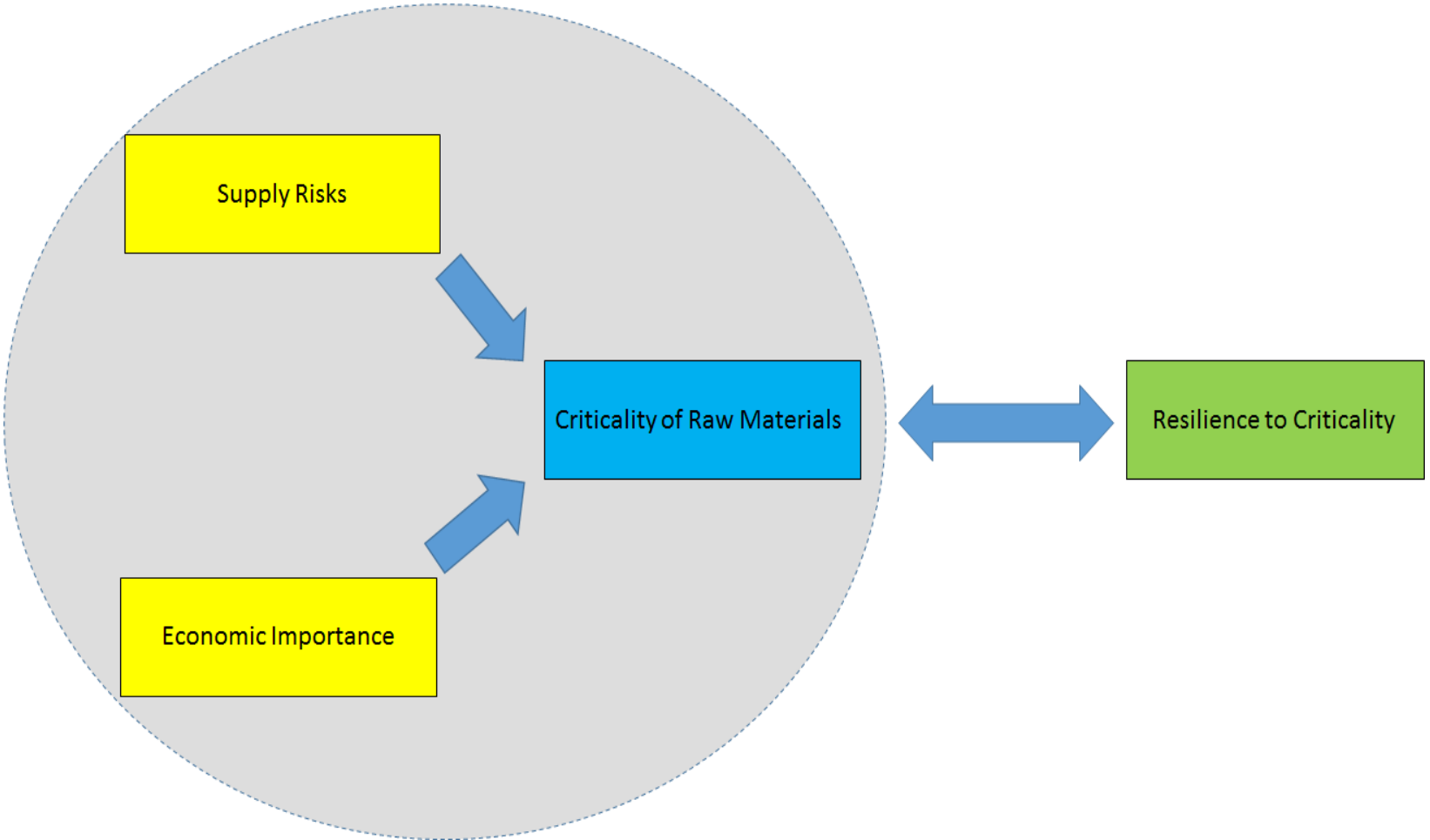
TERP Concept:

- 4 groups of influences:
  - Tech/Phys/Geol.
  - Econ/Strategic/Market
  - Regulatory/Social
  - Political stability & Governance

- 17 particular influences:



Influences on supply risk or on resilience to supply disruption?



Thank you!

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Sustainability Assessment

European Platform on Life Cycle Assessment (EPLCA):
http://eplca.jrc.ec.europa.eu/

Raw Material Information System (RMIS):
http://rmis.jrc.ec.europa.eu/

Sustainability Assessment (H08):
http://sa.jrc.ec.europa.eu/

JRC Science Hub:
https://ec.europa.eu/jrc/