



Circular Economy approaches and scales of analysis in the Global value chains

Manuel E. Morales

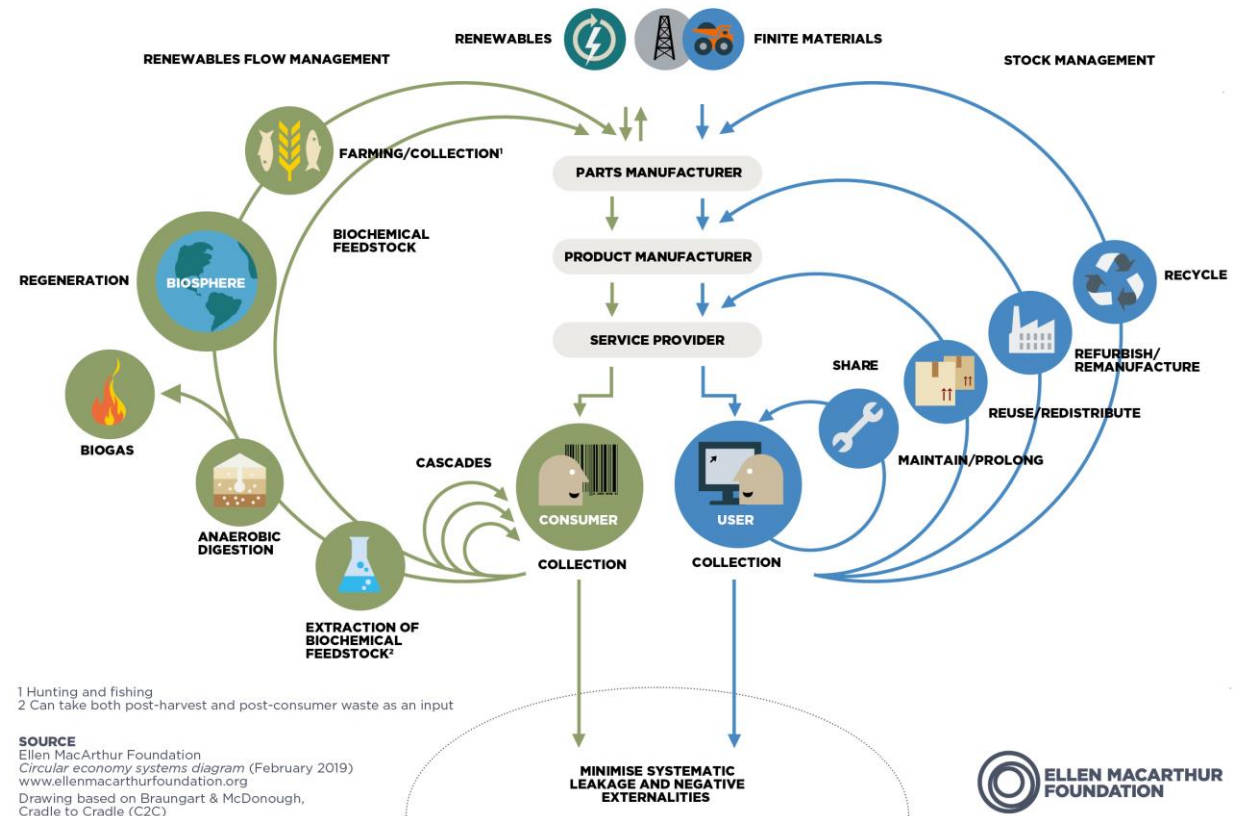
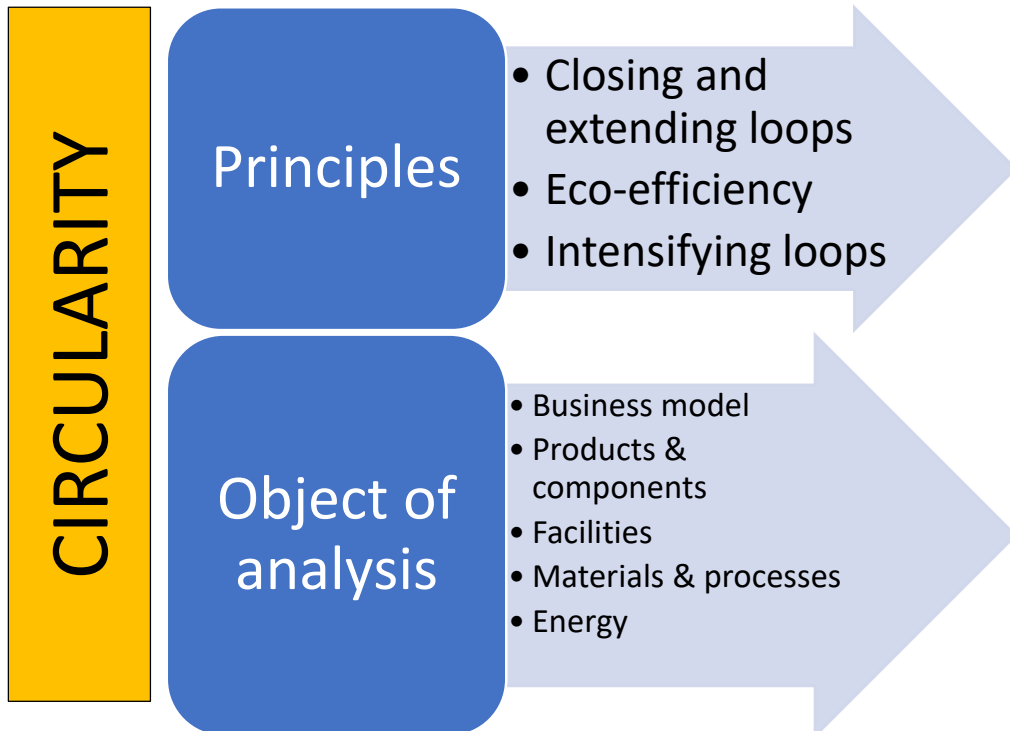
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Concepts (1/2)

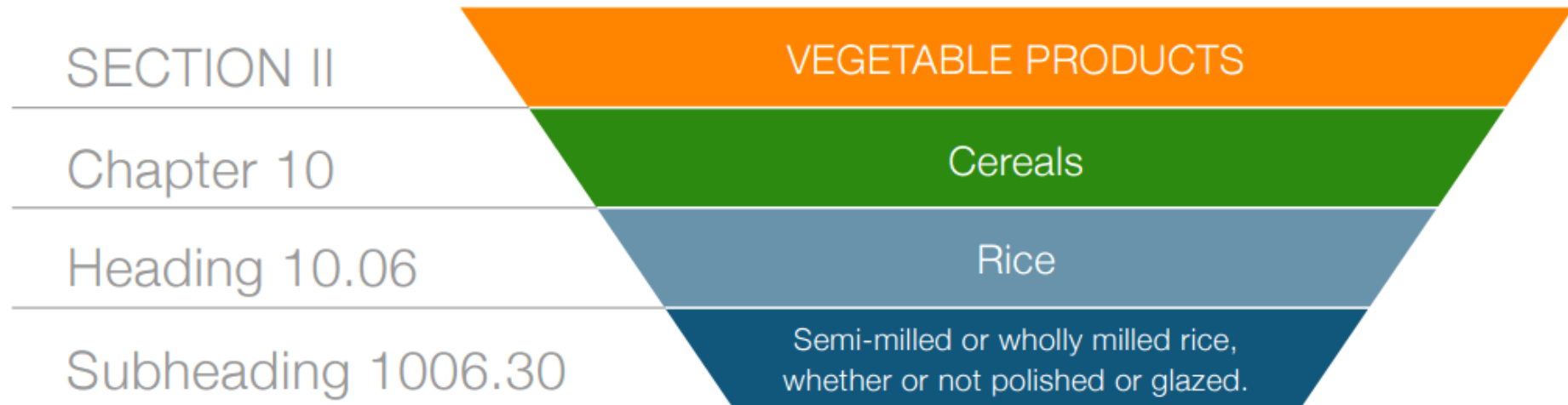
Circular economy (CE): resource minimization and the adoption of cleaner technologies (Merli et al., 2018) while maintaining the value of products, materials and **resources in the economy for as long as possible** (3R's or 10R's)



Concepts (2/2)

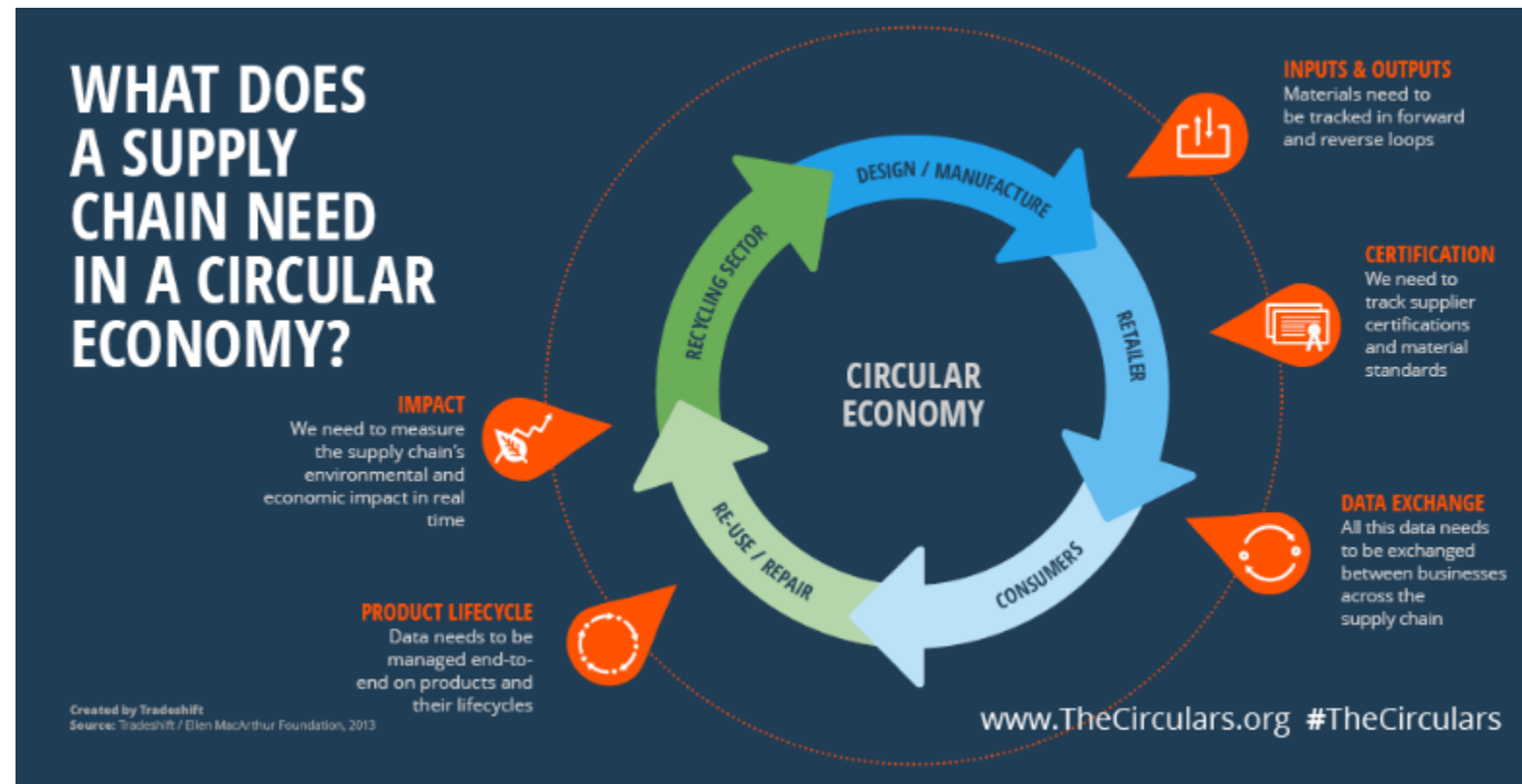
Value chain: breaks down the concept of **intertwined supply network** (Ivanov & Dolgui, 2020) narrowing its scope into interconnected supply chains with **territorial boundaries**, aiming to **secure the provision of goods & services to society**.

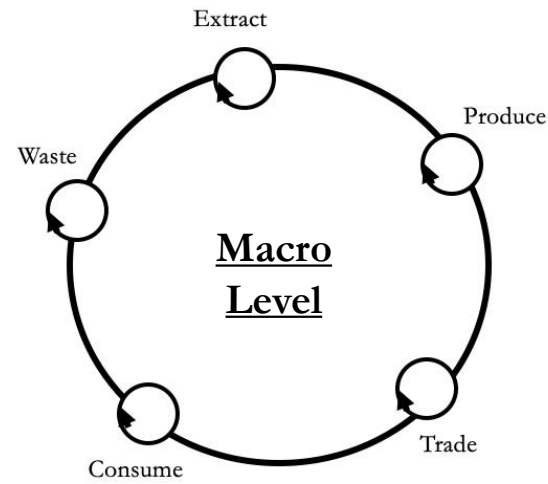
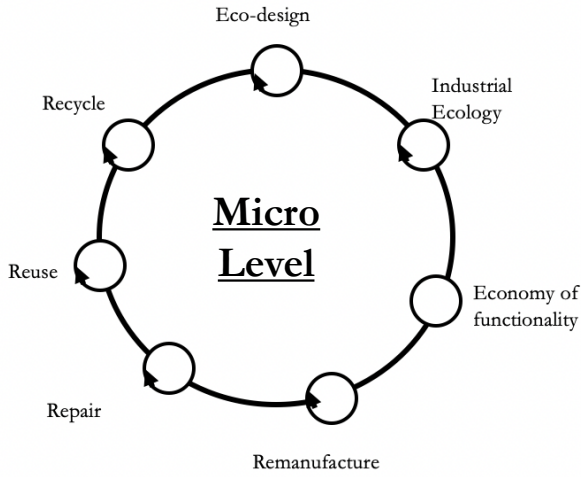
The Harmonized System at Work



Key questions

- 1) What is the role of **tax differences** according to the production processes and materials origins in the circularity of global supply chains?
- 2) What are the insights obtained from **the state of the art** on the implementation of circular economy in the global supply chains? and Why CE is gaining momentum in the political agendas?





MACRO

MESO

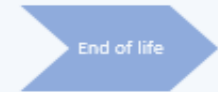
MICRO



BUSINESS MODEL



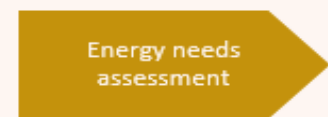
PRODUCTS & COMPONENTS



FACILITIES



MATERIALS & PROCESSES



ENERGY



Materials and methods to disentangle CE in Customs

- **Computational literature review (CLR)** of existing scientific production on CE and sustainability.
- **Content analysis method (CAM)** entailing **impact, structure and content analysis**.
- **CE priority areas identification**
- **CE scales of analysis,**
- Corroboration and validation of outcomes with **statistical data from Eurostat**
- **Empirical outcomes from interviews** that define the socio-political implications.



For further analysis of the Computational literature review methodology see:
<https://www.mdpi.com/2071-1050/13/21/11636>

Article

Theoretical Research on Circular Economy and Sustainability Trade-Offs and Synergies

Manuel E. Morales ^{1,2}, Ana Ballesteros ³, Francisco Joaquín Cortés-García ⁴ and Luis Jesús Belmonte-Ureña ^{2,3,*}

EU's Monitoring Framework on the Circular Economy

The monitoring Framework on the Circular Economy set up by the European Commission consists of 10 indicators

4 thematic issues

Production and consumption
Waste Management
Secondary Raw Materials
Competitiveness and Innovation

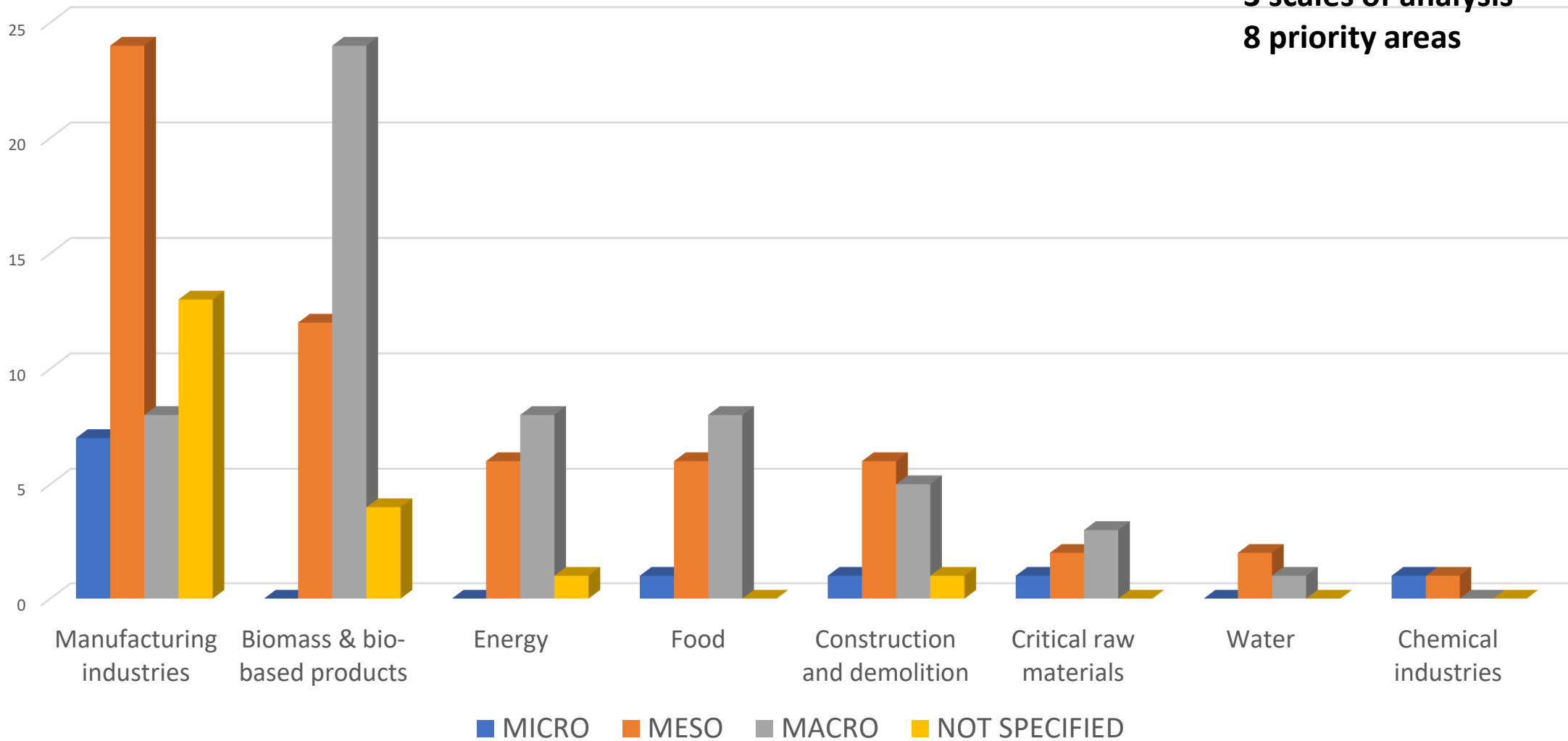
Circular economy monitoring framework



- ZIP Circular economy indicators
 - ZIP Production and consumption (cei_pc)
 - ZIP EU self-sufficiency for raw materials (cei_pc010) M i
 - ZIP Generation of municipal waste per capita (cei_pc031) M i
 - ZIP Generation of waste excluding major mineral wastes per GDP unit (cei_pc032) M i
 - ZIP Generation of waste excluding major mineral wastes per domestic material consumption (cei_pc033) M i
 - ZIP Waste management (cei_wm)
 - ZIP Recycling rate of municipal waste (cei_wm011) M i
 - ZIP Recycling rate of all waste excluding major mineral waste (cei_wm010) M i
 - ZIP Recycling rate of packaging waste by type of packaging (cei_wm020) M i
 - ZIP Recycling rate of e-waste (cei_wm050) M i
 - ZIP Recycling of biowaste (cei_wm030) M i
 - ZIP Recovery rate of construction and demolition waste (cei_wm040) M i
 - ZIP Secondary raw materials (cei_srm)
 - ZIP Contribution of recycled materials to raw materials demand - end-of-life recycling input rates (EOL-RIR) (cei_srm010) M i
 - ZIP Circular material use rate (cei_srm030) M i
 - ZIP Trade in recyclable raw materials (cei_srm020) M i
 - ZIP Competitiveness and innovation (cei_cie)
 - ZIP Private investments, jobs and gross value added related to circular economy sectors (cei_cie010) M i
 - ZIP Patents related to recycling and secondary raw materials (cei_cie020) M i

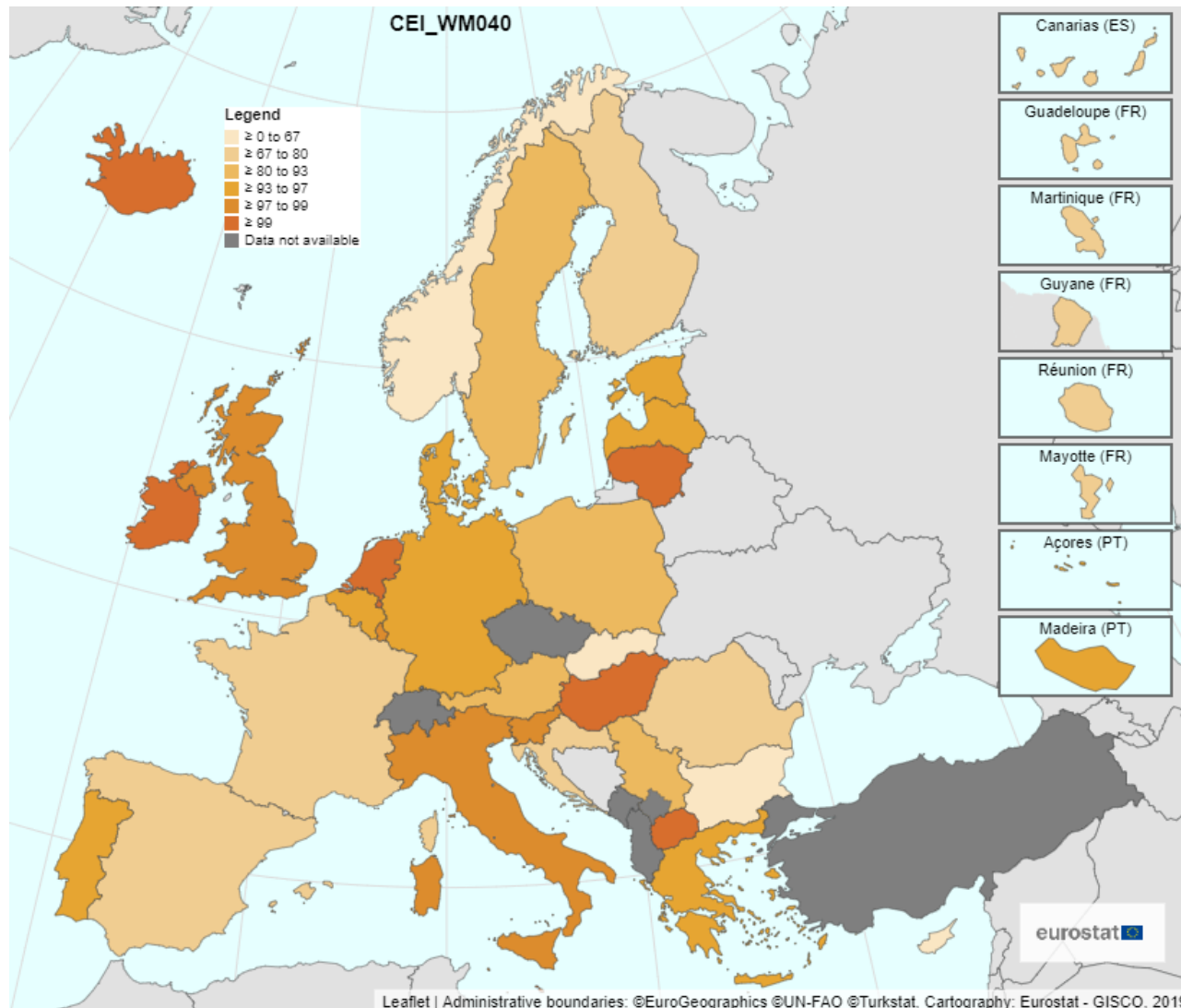
Outcomes

3 scales of analysis
8 priority areas



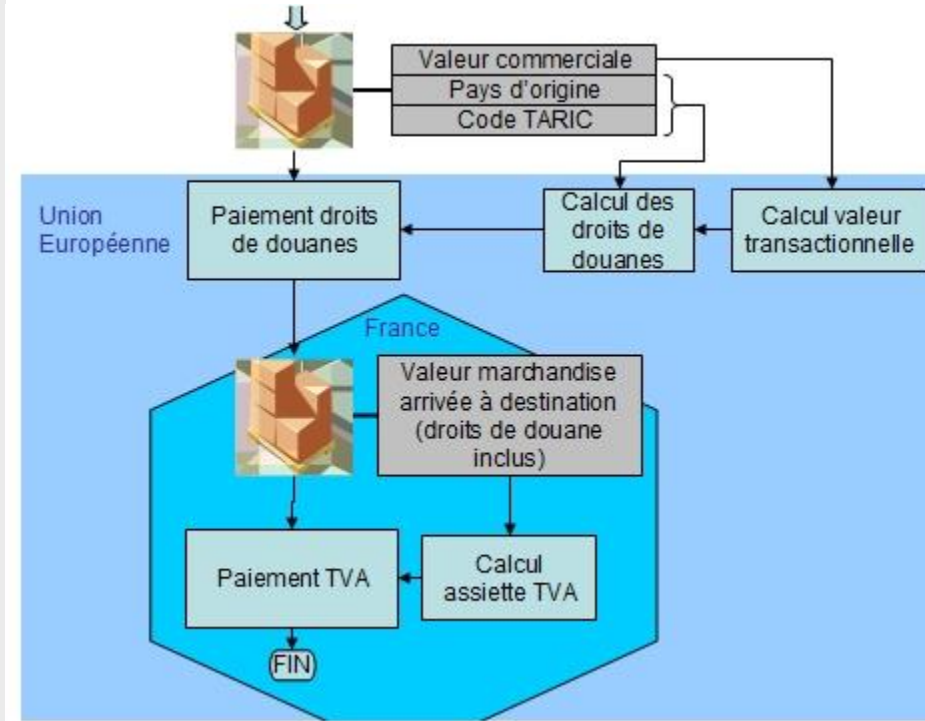
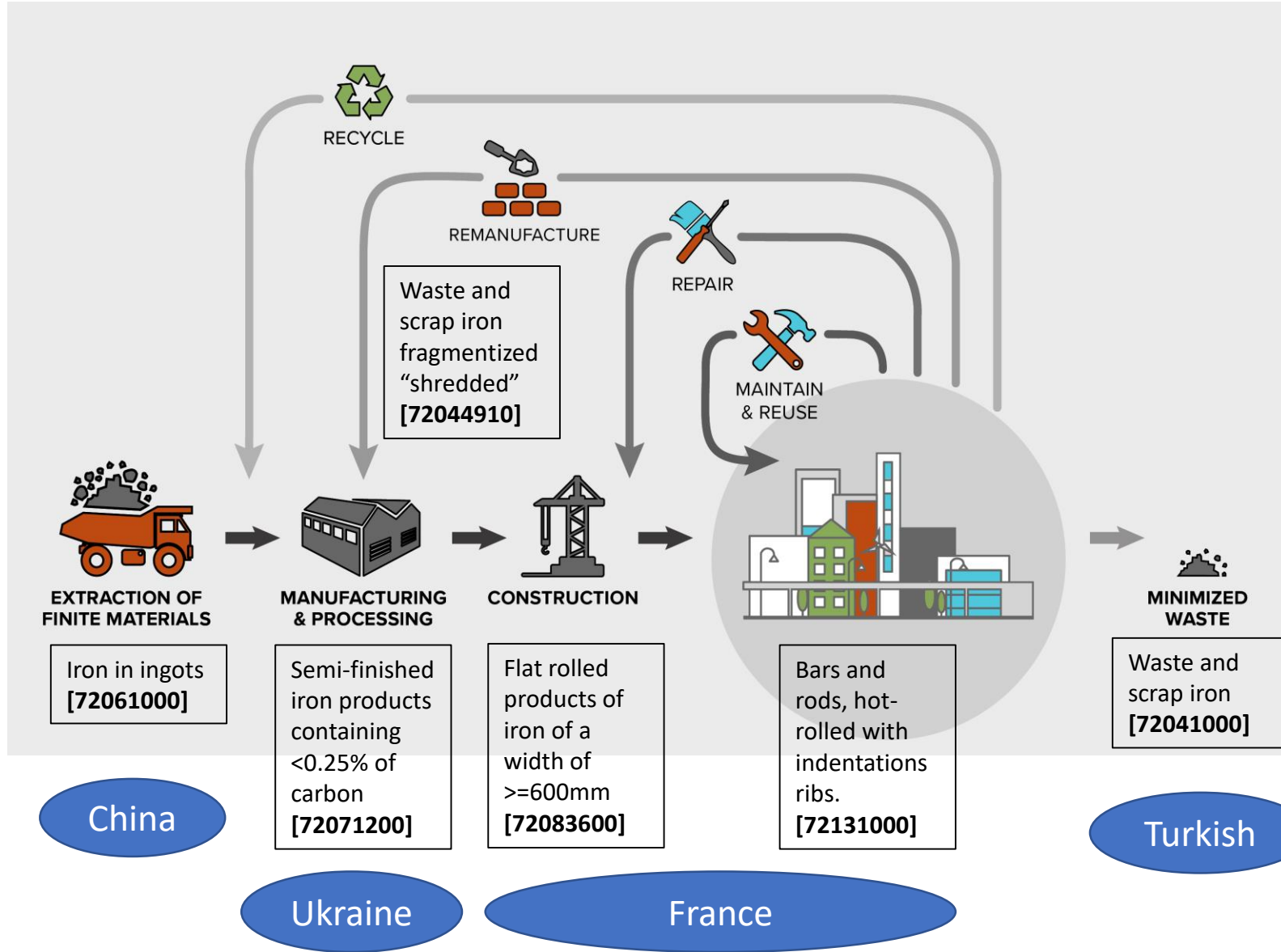
Outcomes

RECOVERY RATE OF CONSTRUCTION AND DEMOLITION WASTE



Is the ratio of construction and demolition waste which is **prepared for re-use, recycled or subject to material recovery**, including through backfilling operations, **divided by the construction and demolition waste treated**.

The Circular Economy as Applied in the Building Environment



Discussion

In the scientific literature **47%** of studies are **linked to the Macro** scale, **41% to a Meso** scale and only the **12% correspond to a Micro** scale of analysis

Eight priority areas identified in the study are: (1) *Manufacturing industries*, (2) *Biomass & bio-based products*, (3) *Energy*, (4) *Food*, (5) *Construction and demolition*, (6) *Critical raw materials*, (7) *Water*, (8) *Chemical industries*. The most important CE area is **Manufacturing industries which represents the 23%**.

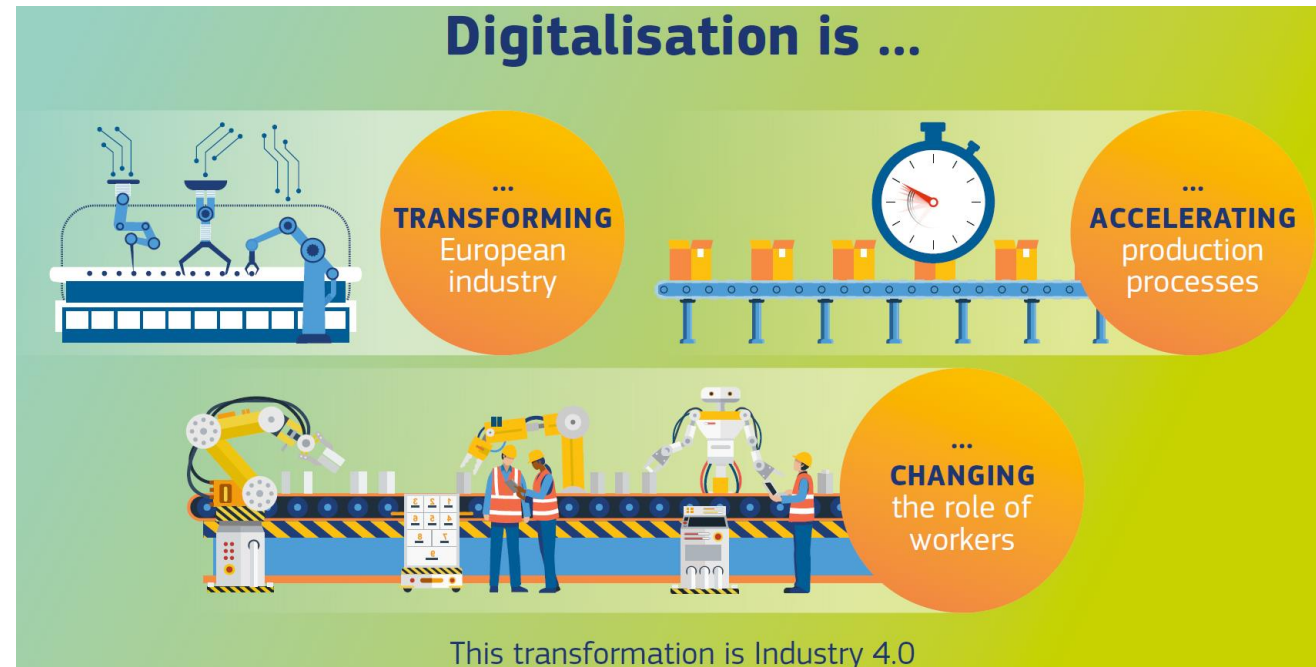
The most frequently implemented CE strategies have the aim to **preserve the circular business models** and the aim of **preserving materials & processes**.

Conclusions

Transparency, you can only tax correctly what you can measure

Digital transformation is required to put in trails the implementation of smart coding systems, data analytics in multi-dimensional strategic evaluation and blockchain technologies among others

The analysis of the CE strategy, according to its scale, reports that **meso analysis** is predominant in the studies on *Manufacturing, Construction, Demolition and Water*, while **the macro** approach predominates in the areas of *Biomass, bio-products, food and energy*.





Presenter:
Dr. Manuel E. Morales
IN4ACT Researcher

Thank you!

Manuel E. Morales

Industry 4.0 Impact on Management Practices and Economics

(IN4ACT)- KTU/ERASME

manuel.morales@ktu.lt

