

# THE MATERIAL LIFE CYCLE

A STEERING WHEEL FOR EUROPE'S RAW  
MATERIALS ACADEMY



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# Engineering Education in Europe

Going full circle ?

# Engineering Education in Europe

## A clear line

- A cradle of engineering education

- First Mining Academies (1770)

- ✓ 1763 Banska Stiavnica
    - ✓ 1765 Freiberg
    - ✓ ...



- Industrial Revolution (1850-1970)

- Development of engineering education all along the value chain
    - Strong link with local industrial network
      - ✓ Leoben, Lulea, Liège, Nancy,...

RESOURCE

Ir Géologue

MINING

Ir Mines

METALLURGY

Ir Métallurgiste

MECHANICS

Ir Mécanicien

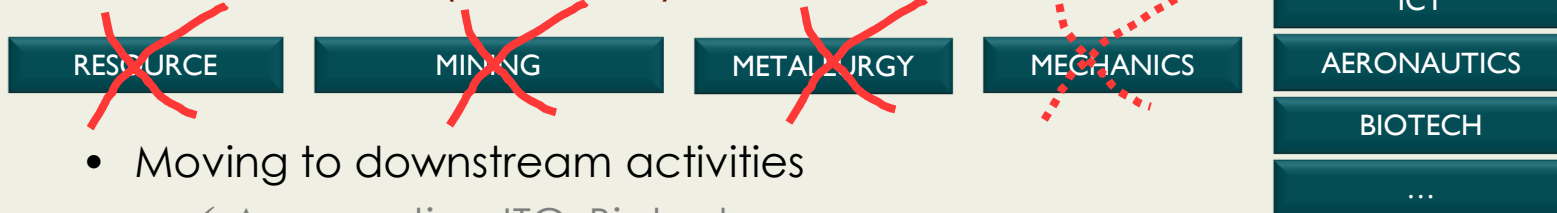
MANUFACTURING

# Engineering Education in Europe

## Sustainable Choices ?

- NIMBY engineering education

- Industrial Evolution (1970-2010)



- Moving to downstream activities
    - ✓ Aeronautics, ITC, Biotech,...
  - Disconnection with minerals, metals and materials
  - Mine and steel mill closures ► environmental concerns
    - ✓ Close down mining education or shift to geological engineering
      - » *De Cuyper J., Analysis of mining engineering higher education and training in the European Community (DGIII, Brussels, 1992).*

- Resilience

- European Mining Course
    - ✓ Delft, Aachen, Helsinki, London
  - Tradition and/or strong socio-political awareness
    - ✓ Lulea, Freiberg, Leoben Wroclaw,...

# Engineering Education in Europe

## A Sudden Awakening

Critical Raw Materials for the EU

European Innovation Partnership

Raw Materials Initiative

H2020 – SPIRE - ...

Circular Economy Package

- Reinvent engineering education(2010-...)
  - Need for innovation across the whole value chain
    - Technologic
      - ✓ Exploration – Mining – Substitution - Recycling
    - Non-technologic
      - ✓ Land use planning, mineral policy, **education,...**

*There is a **shortage of specialists** in Europe in some of the areas related to raw materials production and processing (e.g. mineral processing), and the problem should be addressed at European level. The problems faced by the mining sectors are **the lack of skilled workforce**, no or sometimes bad image impacting interest in mining education and its relative **unattractiveness**, ageing workforce and **lack of replacement**.” (EIP SIP Part II, p.46).*

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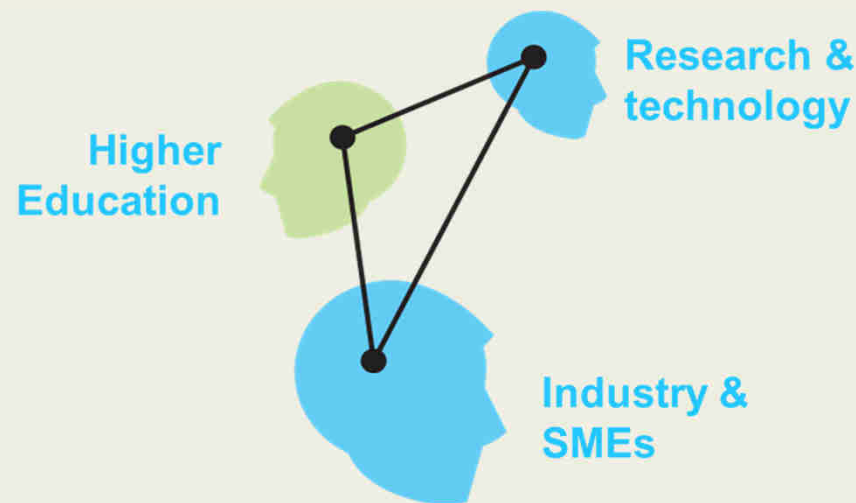
# A time for innovation

EIT Raw Materials

# A time for initiatives

## Building a Knowledge Innovation Community

- EIT European Institute for Innovation and Technology
  - Enhance Europe's ability to innovate by nurturing young entrepreneurial talent and supporting new ideas.
  - Set up a unique European Knowledge Innovation Community (KIC) with a long-term perspective and top level management
  - Promote education in the knowledge triangle



From student  
to entrepreneur

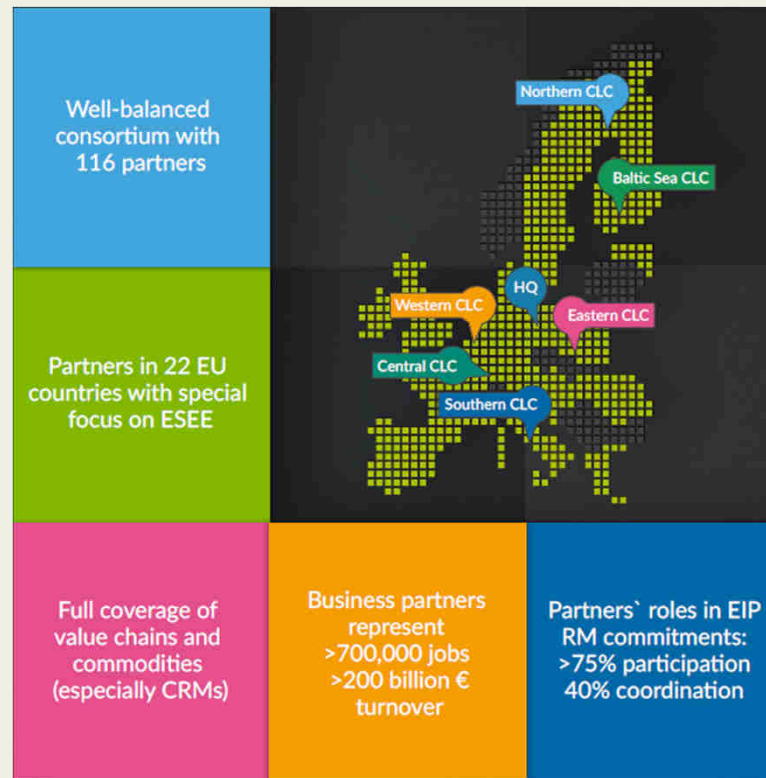
From idea to  
product

From lab to  
customer

# A time for innovation

## Building a Knowledge Innovation Community

- EIT Raw Materials *(est. Dec 2014)*
  - Boost the competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and entrepreneurship.

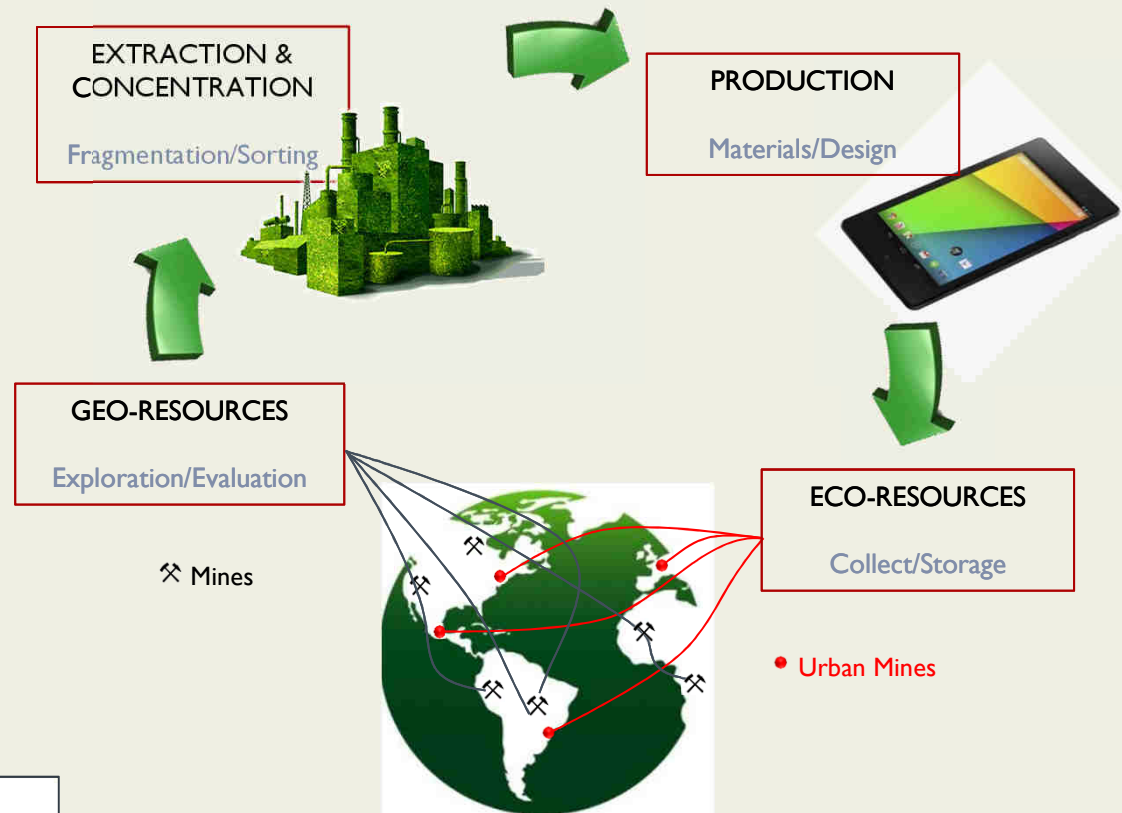




# A time for initiatives

## Building a Knowledge Innovation Community

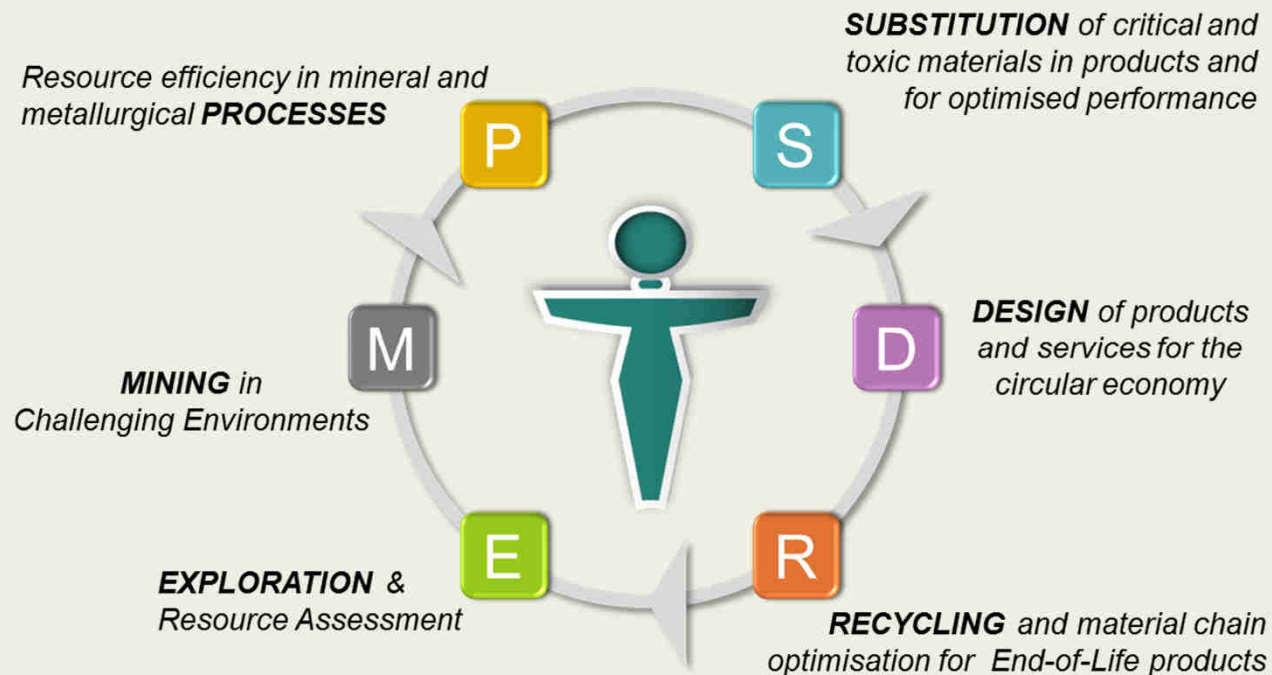
- Developing a systemic thinking
  - The RM Academy aims at educating a new generation of European entrepreneurs to tackle the resource supply in a holistic and creative way.



# A time for initiatives

## Building a Knowledge Innovation Community

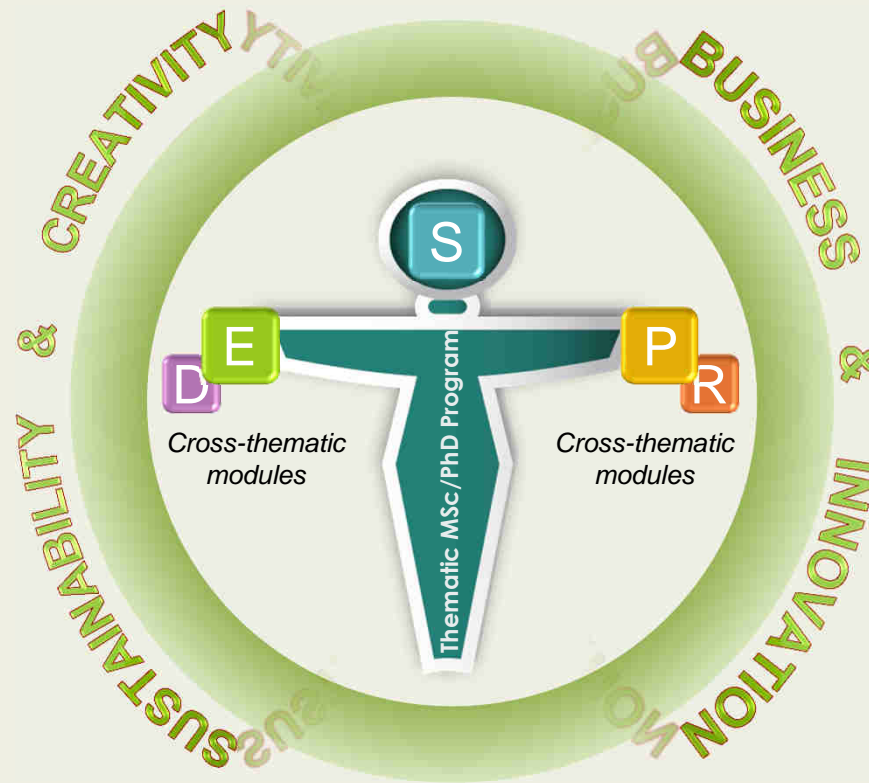
- Educating actors at the core of the raw materials value chain



# A time for initiatives

## Building a Knowledge Innovation Community

- From T-shaped engineers to T-shaped entrepreneurs
  - A T-shaped professional combines an in depth knowledge of his own discipline with a sound understanding of the challenges of the raw materials value chain.



# A time for initiatives

## Building a Knowledge Innovation Community

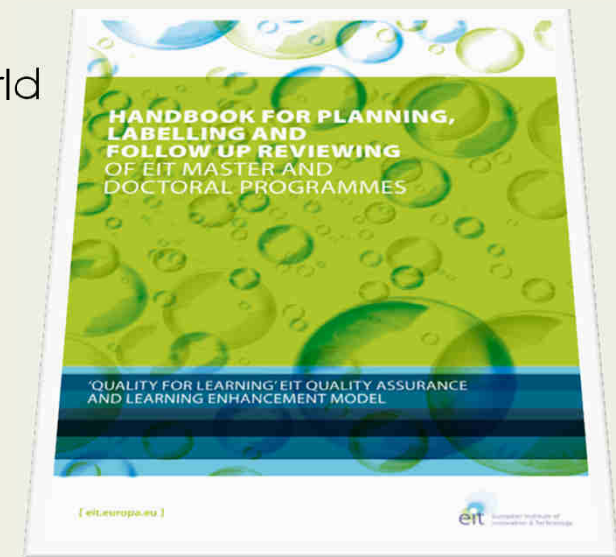
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- Missions of the EU Raw Materials Academy
  - Promote a permanent offer of **cross-disciplinary programmes**.
  - Actively involve **industry** in education.
  - Promote problem-based learning, self organisation and **learning by doing**.
  - Offer an open learning environment and a series of **online courses**.
  - Facilitate access to **experimental platforms** for hands-on training.
  - Promote **lifelong learning** in the perspective of a resource efficient economy.
  - Stimulate **wider society learning** initiatives aiming at raising social awareness.
  - Foster **international** cooperation.
  - Create a lively community of **alumni**.

# A time for initiatives

## Building a Knowledge Innovation Community

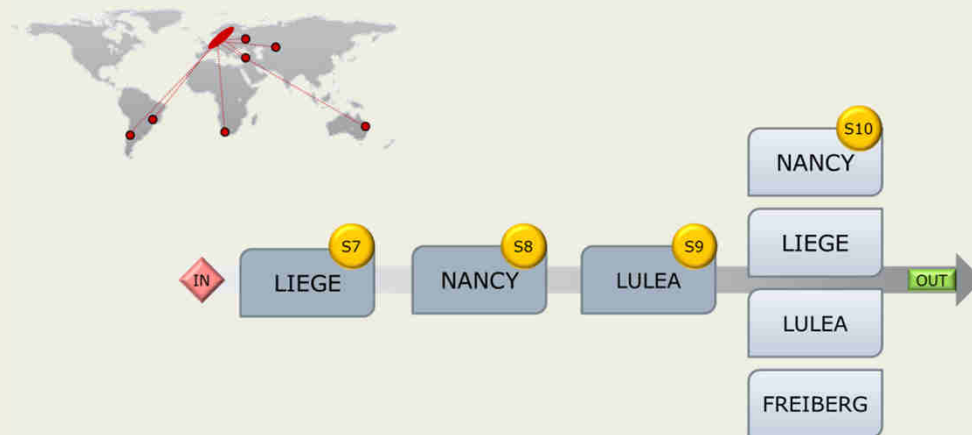
- Towards an EIT Labelling of Master / PhD programs
  - Robust **entrepreneurship** education
    - Entrepreneurial skills; Experience of professional life in industry;...
  - Highly integrated, **innovative** « learning-by-doing » curriculum
  - International and cross-organisational **mobility**
    - European dimension and openness to the world
    - English as teaching language
    - Multiple degrees
  - **Access** policy and joint outreach strategy
    - Joint admission criteria, joint diploma



# A time for initiatives

## First steps

- Master in Georesources Engineering (EMerald)
  - Innovative Education in Geometallurgy
    - Bridging the gap between resource experts and process engineers
  - Strong industrial support
    - Aurubis, Imerys, Lhoist, LKAB,...
  - Worldwide network of associates
  - Full English program



# A time for initiatives

## First steps

- Towards EIT Labelling
  - EIT Raw Materials funded intensive **“Winter Business School”**
    - Marketing, Finance, ...
    - Business Model + Business Game
    - Supply chain management
    - Young entrepreneurs testimonials



Working session with F. Renardy (CEO of G-TEC)



Working session with K. Whalen (Founder of “In The Loop”)



[www.em-georesources.eu](http://www.em-georesources.eu)



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# Circular Economy

A steering wheel



# Circular Economy

## RM Academy's ambition

- Become the steering wheel of a more circular economy
  - Connect all T-shaped entrepreneurs to actively contribute in steering tomorrow's circular economy.

