Industry perspectives on R&D to maintain technological leadership

Bergforsk May 24th 2007

Martin Ivert
President LKAB
Chairman SveMin

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R&D

- Why?
- How?

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The past and future society without minerals and metals is unthinkable

- The average citizen in the Western world consumes 1,700 ton of mineral and metals (25 tonnes annually) for roads, buildings, cars, household equipments etc.

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Swedish mining is important in EU

Significant producer of ores EU-25 (2004)

Metal	Production	Rank
Iron	**89 %**	**1**
Gold	**27 %**	**2 next to Finland**
Zink	**24 %**	**2 next to Irland**
Silver	**17 %**	**2 next to Poland**
Lead	**30 %**	**3 next to Irland, Poland**
Copper	**11 %**	**3 next to Poland, Portugal**

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Major Swedish mining companies: Small but competitive through innovation and technological excellence

LKAB

NEW BOLIDEN

lundin mining

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Competitive suppliers

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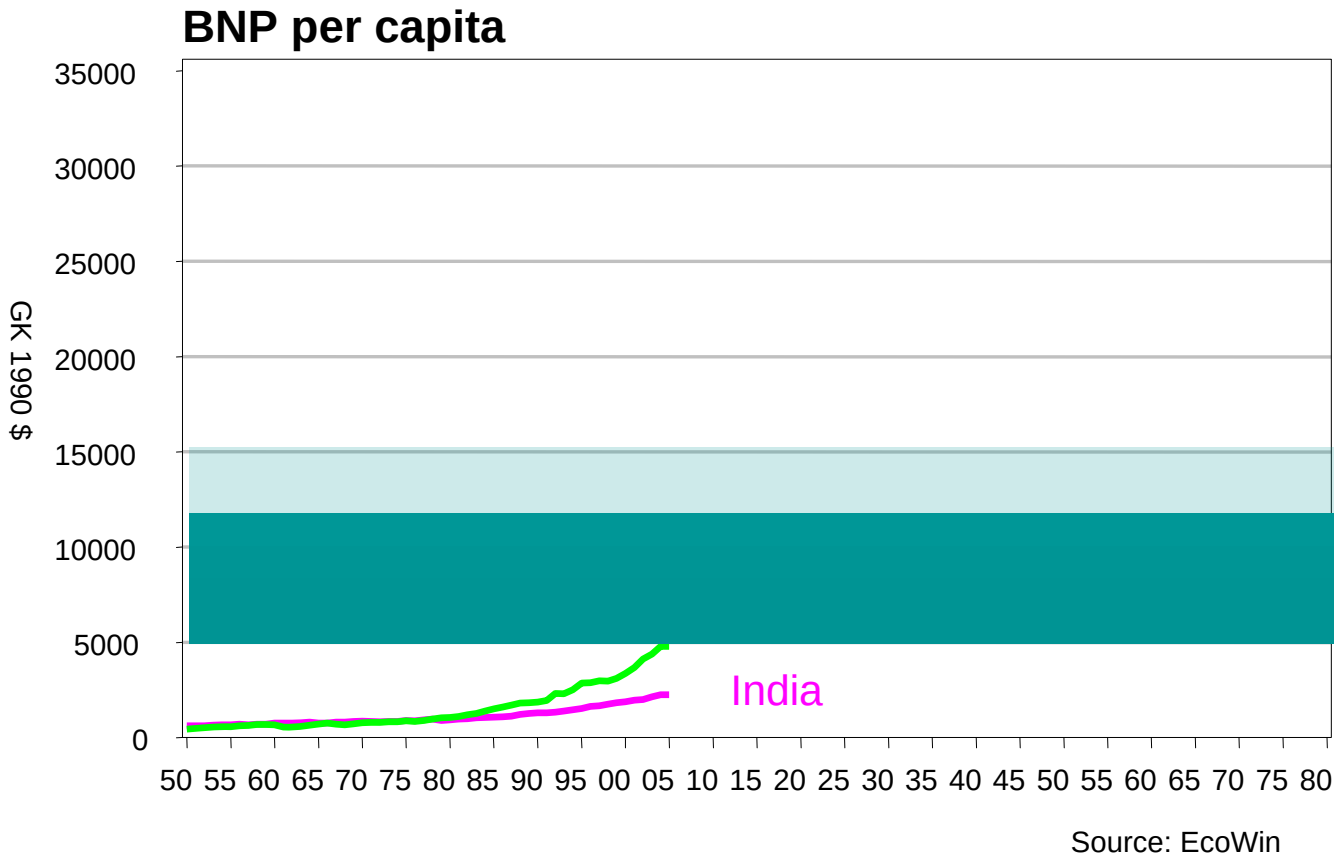
Present status

- Mining industry is NOT a ”sunset industry”

Globalisation and growth



Source: EcoWin

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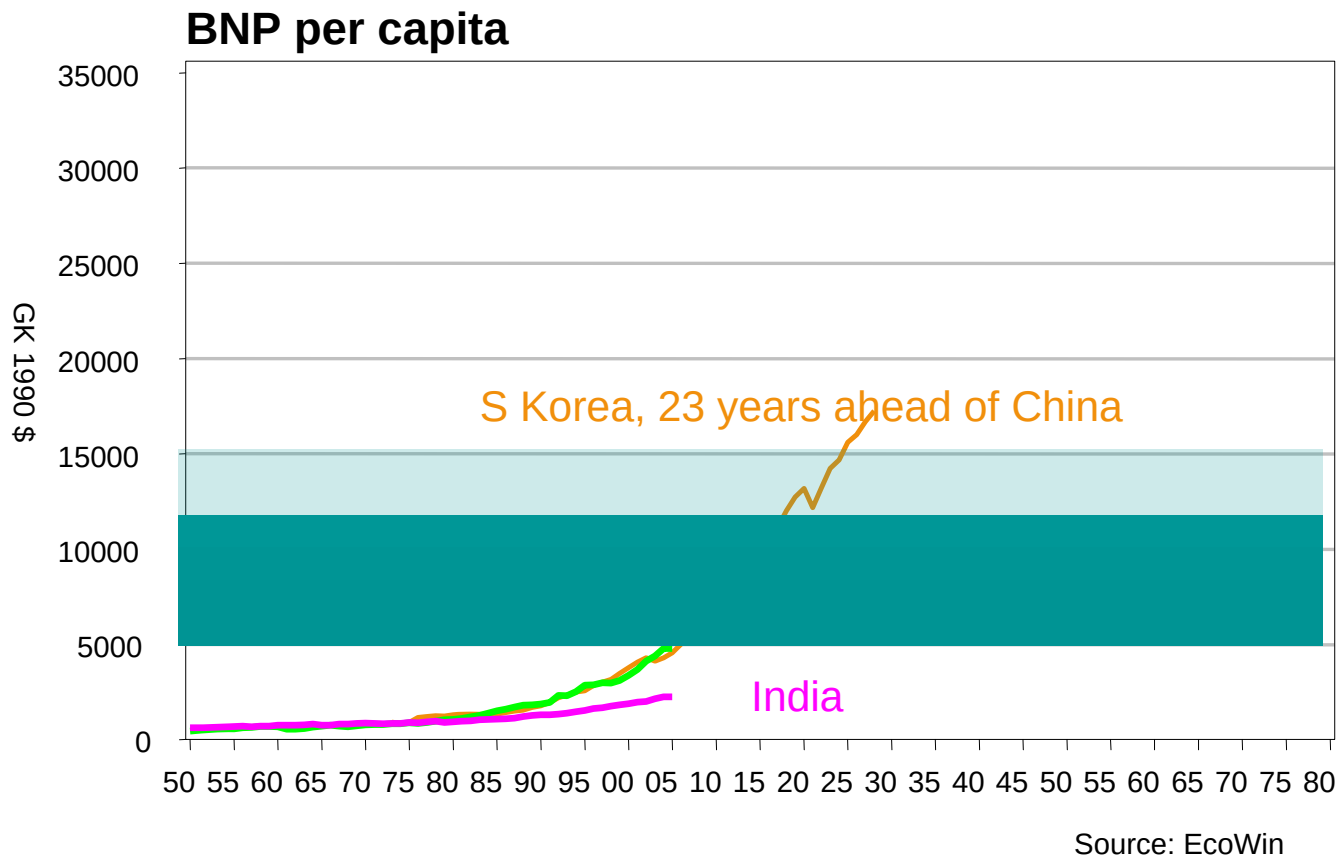
Globalisation and growth



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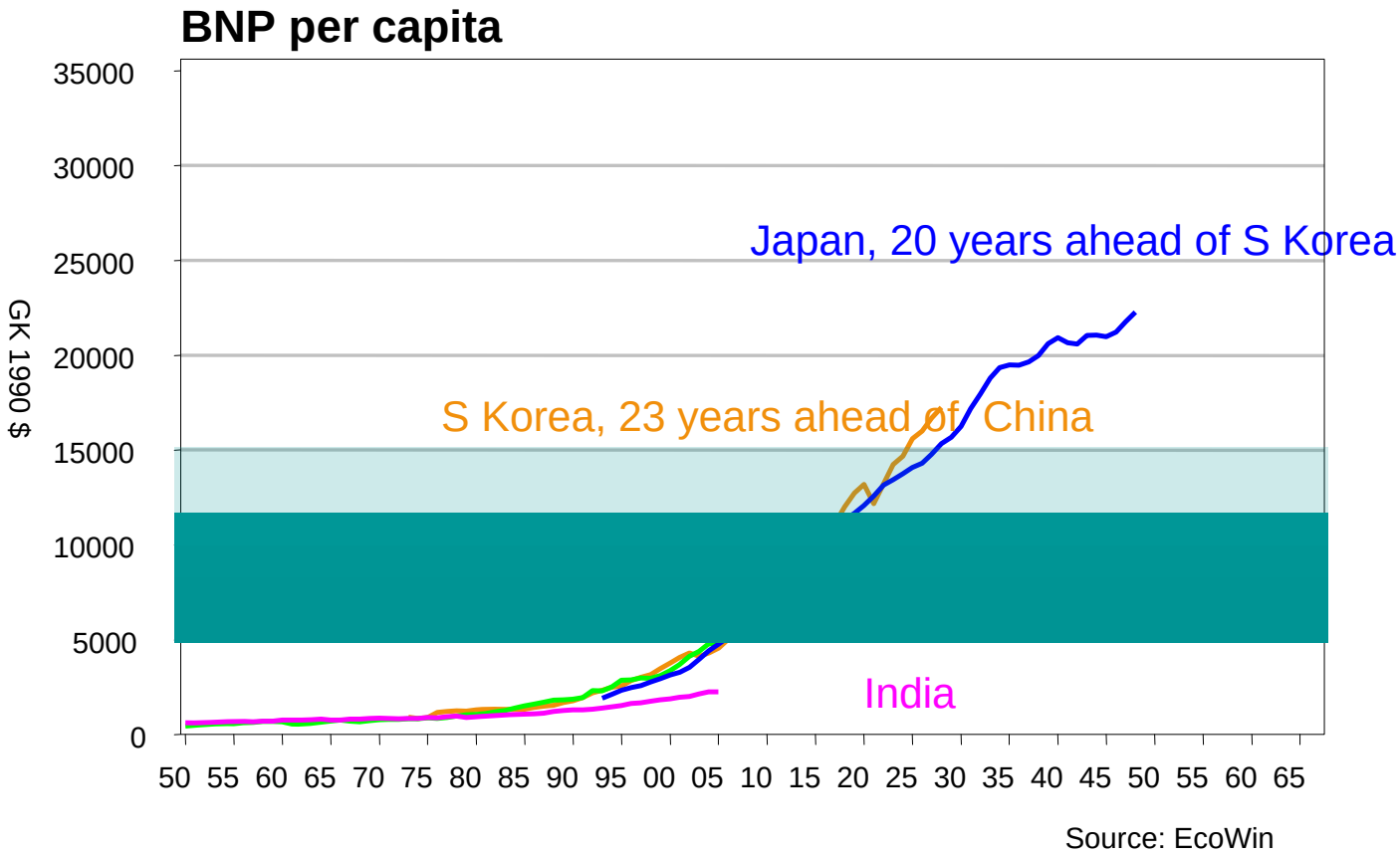
Globalisation and growth



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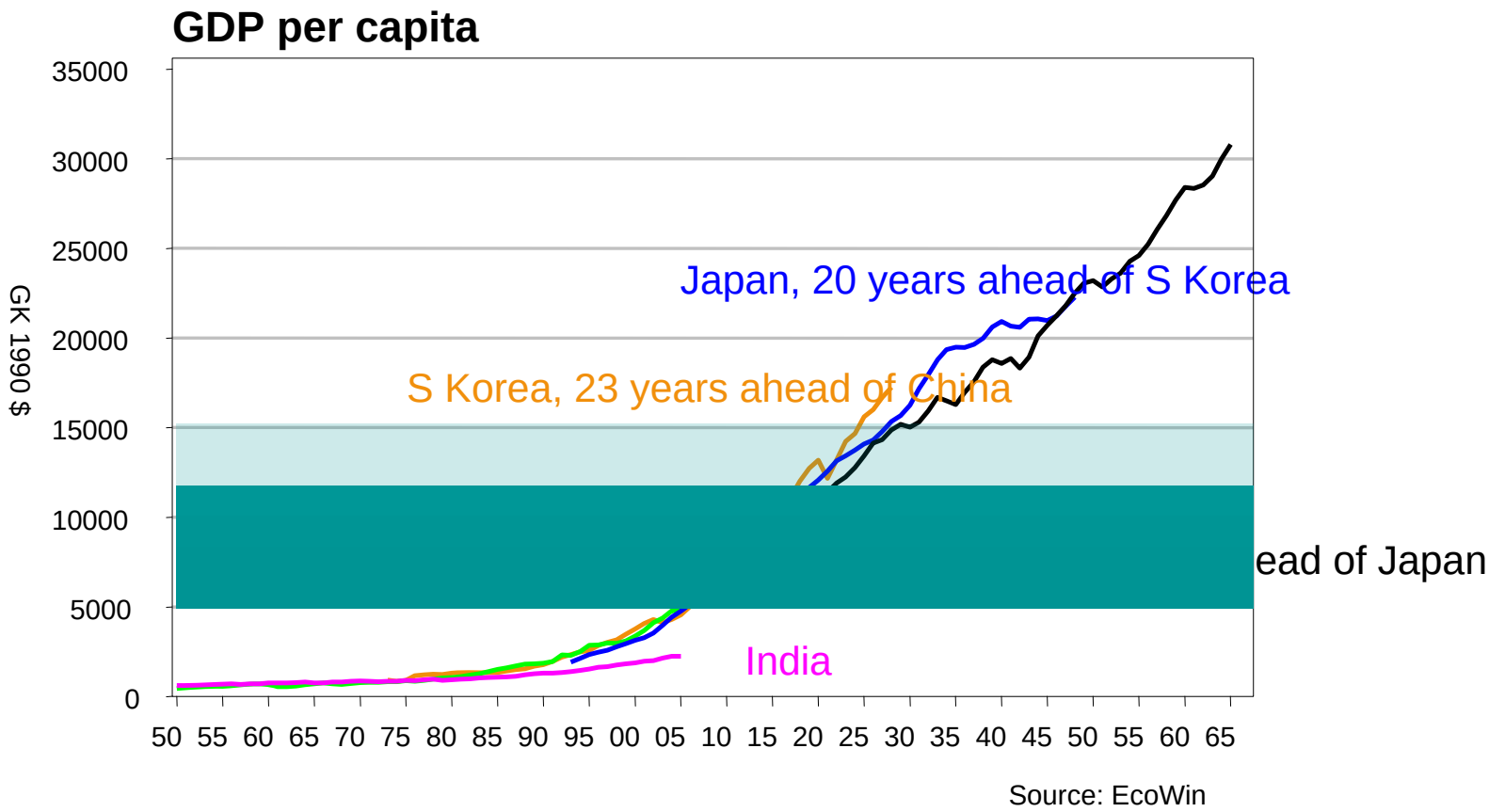
Globalisation and growth



Source: EcoWin

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Present status

- Mining industry is NOT a ”sunset industry”
- Mining is important for the Swedish industrial system
  - Demanding customer for the international suppliers and drivers for high-tech solutions
  - Important player in the transport sector
  - Driver of the economical development in the regions (around 2 billion € in investments by LKAB and Boliden)

What are the main challenges for the industry?

- **Supply of minerals from new mineral resources.** No sources, no extractive industry.
- **Competitiveness.** Lower costs by productivity gains and higher revenues by value adding and new products. No profit, no industry.
- **Reuse and recycling** to use less resources and preserve non-renewable mineral assets for the future generations.
- **In harmony with the society;** otherwise no land access, no operating permits, no workforce. Minimise pollution and accidents. Maintain trust.

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Why R&D?

- R&D is a tool to meet the objectives of the company
- R&D is profitable (1 € expense => 4 – 7 € in return)
- Sustainable competitiveness on the global market
- Meet future requirements and conditions
- Strengthen the competence
- High-quality education for supply of qualified employees

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Our strategies for efficient R&D

- Triple Helix (industry, academia, and authorities) working together with a common objective
- Co-operation with other primary industries (energy, forest, paper, pulp, steel)
- Co-operation directly between companies through R&D brokers like Rock Tech Centre and Amira
- Co-operation with “extractive industries” (aggregates, coal, industrial minerals, metal, oil and gas) through the Technology Platform Sustainable Mineral Resources

Swedish Mining Research Programme

- 50 MSEK (US$ 7 M) through Government (VINNOVA) during 2007-2010

- > 50 MSEK through industry (LKAB, Boliden, Lundin etc) during 2007-2010

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Agreement Sweden – Poland May 16th 2007

- **Objectives**: Strengthening co-operation for efficiency of R&D and for creating an impact on the European arena

- **Partners:**
  - Luleå Univ. of Technology
  - AGH Univ. of Science and Technology
  - KGHM Cuprum
  - Wroclaw Univ. of Technology
  - MiTU – Swedish Mining Research

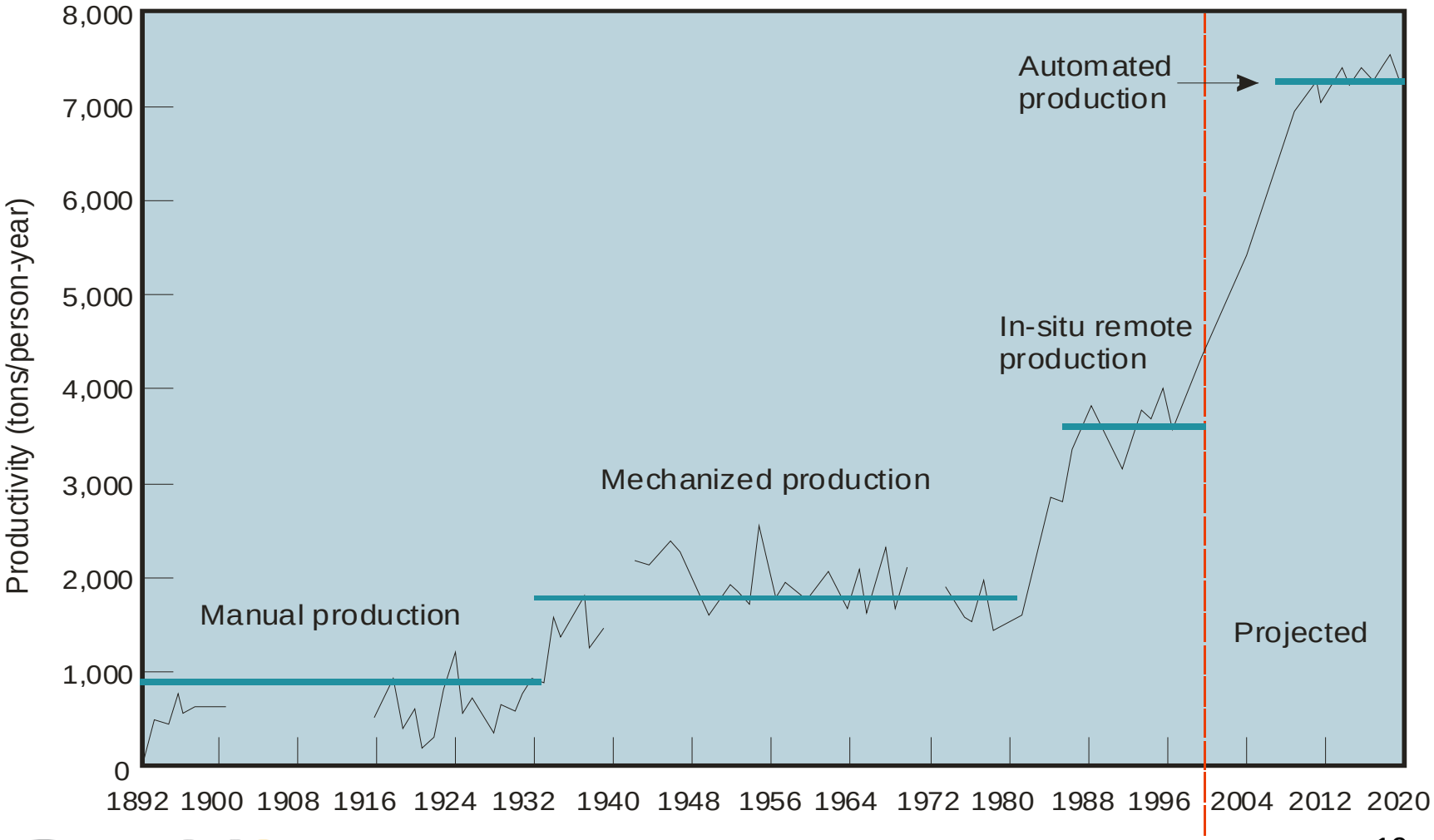
- **Expected outcome:** Joint projects in several areas

Examples of Swedish strategic activities in the pipe

- Creation of research centres at LTU to implement the Mining Research Programme
- Financing of ore geology and geophysics through the Swedish Geological Survey (> 7 MSEK/y)
- Participation in the LTU Process Management, Engineering and Control Centre proposed to the Process Industry Centre on Research and Competence through Swedish Foundation on Strategic Research

Automation and productivity

Source: Rio Tinto



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LKAB R&D examples

- 100 MSEK R&D fund created at Luleå University

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- AggloLab-EPP-EBF

Concluding remarks

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- We need long-term commitments from industry, academia and authorities to create “critical masses” of competence
- Strength through co-operation

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