

EIT RawMaterials Stakeholders Meeting

Trondheim, Norway 20 Sept. 2017

Partner presentation:

Modelling Factory & other VTT
projects

Sami.majaniemi@vtt.fi



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- VTT is one of the leading R&D&I organisations in Northern Europe.
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* Loikkanen, T. et al. Roles, effectiveness, and impact of VTT. Towards broad-based impact monitoring of a research and technology organisation. 2013. VTT, Espoo. VTT Technology 113. 106 p. + app. 5 p.



Net turnover and other operating income
269 M€ (VTT Group 2016)



Personnel 2,414
(VTT Group 2016)

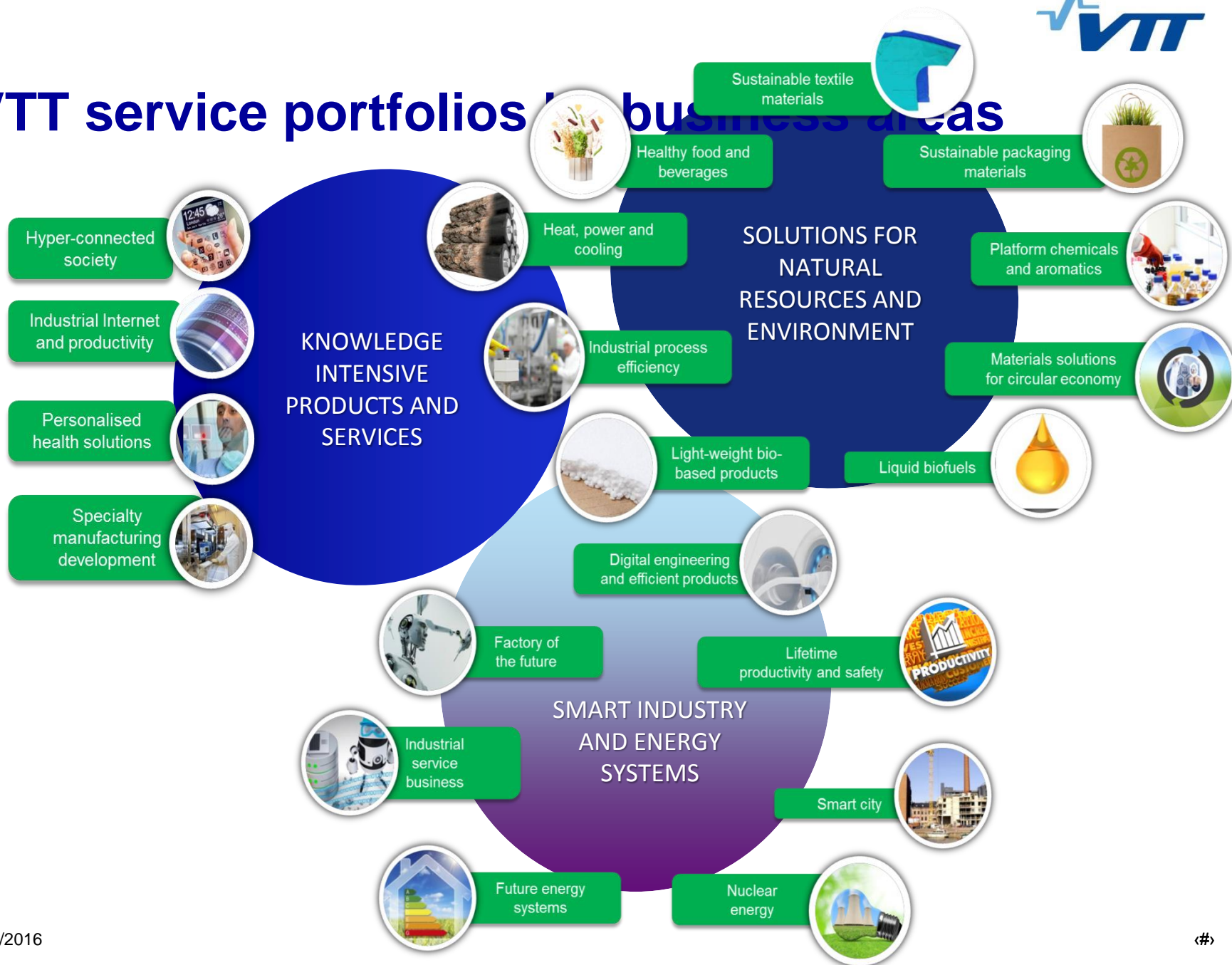


Unique research and testing infrastructure



Wide national and international cooperation network

VTT service portfolios & business areas



VTT Portfolio 2018

31 projects (8 coordinated)

- 12 Upscaling
- 7 L&E
- 7 NoI
- 5 ESS/INT

EIT Raw Materials

- EIT Raw Materials It will focus initially on establishing the raw material needs of **information technology**, **transport** and the **energy** sector, as well as those related to the **manufacture of machinery** and equipment.
- EIT Raw Materials has the ambitious vision of turning the challenge of raw materials dependence into a strategic strength for Europe. Its mission is to boost the competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and entrepreneurship. This **KIC will integrate multiple disciplines**, diversity and complementarity along the three sides of the knowledge triangle (business, education and research) and **across the whole raw materials value chain**.



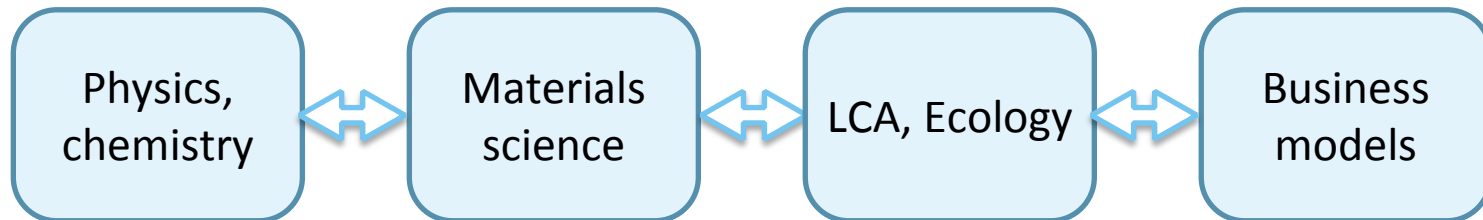
Case: Modelling Factory

Harnessing Collective Intelligence for Material Efficiency and Circular Economy

- Project goal: Help developing new insights into obtaining, using, and recovering materials and designing Circular Economy practices
- Platform vision: When many people want to exchange spoken word and pictures at distance, they use telecom platform (e.g. Skype/Lync etc.) When many people want to develop a shared understanding of a common problem and exchange simulation models and data, they use Modeling Factory.
- The idea in the Factory is to create a **virtual working space, where individuals and organisations can test and share their ideas on how to advance material efficiency and circular economy by creating different types of computational models and solutions and to validate them against scientific, industrial and environmental data**

Collaboration across disciplines and scales

- Successful virtual upscaling calls for realization of **multi-design** principles which aim at improving collaboration between domain experts in different fields.
- Multi-design enables data exchange between different scientific disciplines ('horizontal integration') and computational tools operating on different time and length scales ('vertical integration')
- Wide scale span (physical and computational) requires sophisticated data management and work methods.



Modelling Factory

Harnessing Collective Intelligence for Material Efficiency and Circular Economy

Base technology for Modelling Factory

- has been published as an open source software and maintained through non-profit association
- has development consortium of 13 member companies that pay annual maintenance budget of about 60k€
- has annual development project portfolio of about 1M€
- about 200 registered individual users
- MF's open source system dynamic modelling tool that has over 5000 downloads (one of many available tools)
- is used by large automation, power and process industry companies



Examples of industrial projects implemented with Modeling Factory technology

- Pöyry project management game application (teaching at companies, collaboration practices) <http://demo.enable.fi/Modrio-short.mp4>
- ProAgria food chain digitalization (ValueChain LCA) <https://pohjois-savo.proagria.fi/ajankohtaista/biocode-kattava-ymparistovaikutusten-laskentajjestelma-maatilojen-kayttoon-8774>
- Large scale information sharing and **network level impact assessment**
- Ecosystem level Waste recycling design using system dynamic modeling (commencing soon)
- ValueChain LCA demonstration 2017 Modelling Factory Nol



Some observations: industrial partners & EIT

- New collaboration and business models: improved operations at network/supply chain level, trusted operator model
- EIT Raw Materials has been a good funding source / home base for multi-disciplinary collaboration (from direct raw materials related aspects to teaching and circular economy related applications)
- EIT Raw Materials has been helpful in crystallizing and evolving the business model development of the ongoing projects



Related EIT projects: PoSe

Powder technology piloting service for Secondary raw materials
Example – Metal 3D printing

Experimental route



Raw materials



Gas atomization

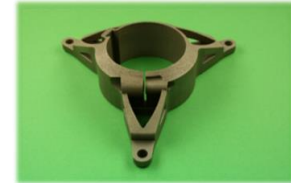


Powder modification

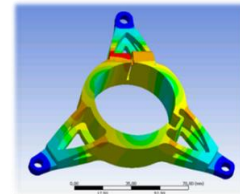
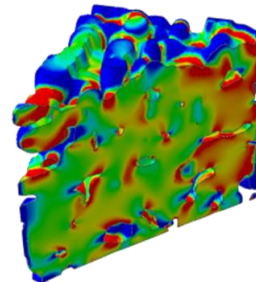
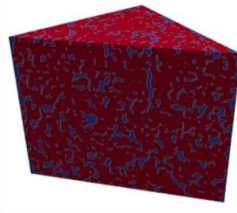
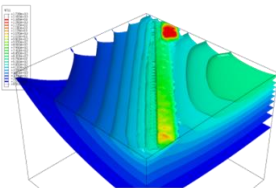


Selective Laser Melting

Hot isostatic pressing and other post treatments



Component testing and demonstration



Modelling - digital route

Related EIT projects:

T-shaped Doctors in Residence (T-DoRe) Project

Doctoral training in RTOs and Industries

Objective

Our project 'T-shaped Doctors in Residence' training program aim is to create holistic innovation champions through **Doctors in Residence training of T-shaped professionals** for RTOs and industry in the raw materials sector with knowledge in applied sciences, practice, and market innovations. It target to 1) pursue knowledge in the **service of innovation**, 2) pursue knowledge according to a **trans-disciplinary way**, and 3) develop a **broader skill set**, such as teamwork skills, capacity to build networks, and effective communication skills were central in the program.



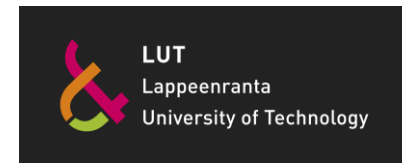
Related EIT projects:

SOLVOFLEX NoI

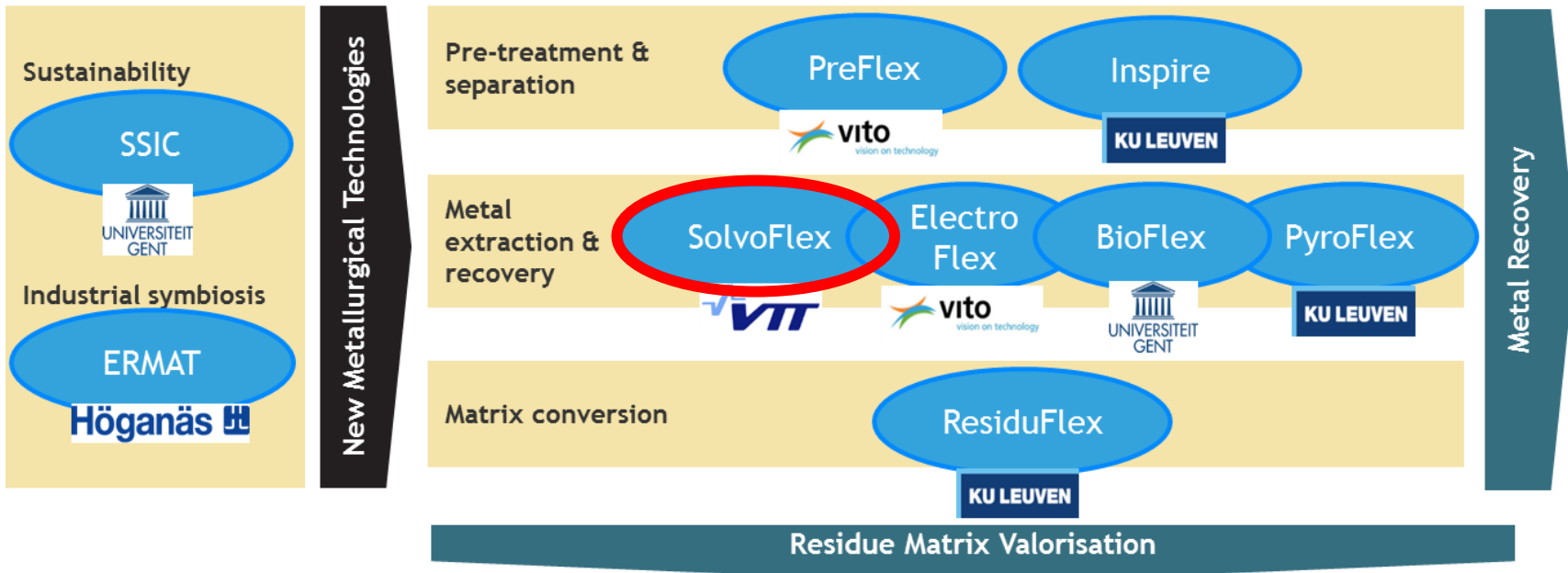
Duration: 01/2016 – 12/2018

KIC-wide hydrometallurgical infrastructure and expertise for

- ✦ Leaching (in situ, heap, dump, vat, reactor, pressure)
- ✦ Precipitation
- ✦ Cementation
- ✦ Crystallization
- ✦ Liquid-liquid extraction
- ✦ Ion exchange
- ✦ Solids separation



Complex, low grade ores and residues containing base and critical metals



Demo: Modelling Factory

- <https://modellingfactory.org/>
- <http://modellingfactory.simupedia.com/amdh/>
(sample work room for metal powder 3D printing)
- Interested in trying it out yourself? Check out instructions at
- <https://modellingfactory.org/instructions>