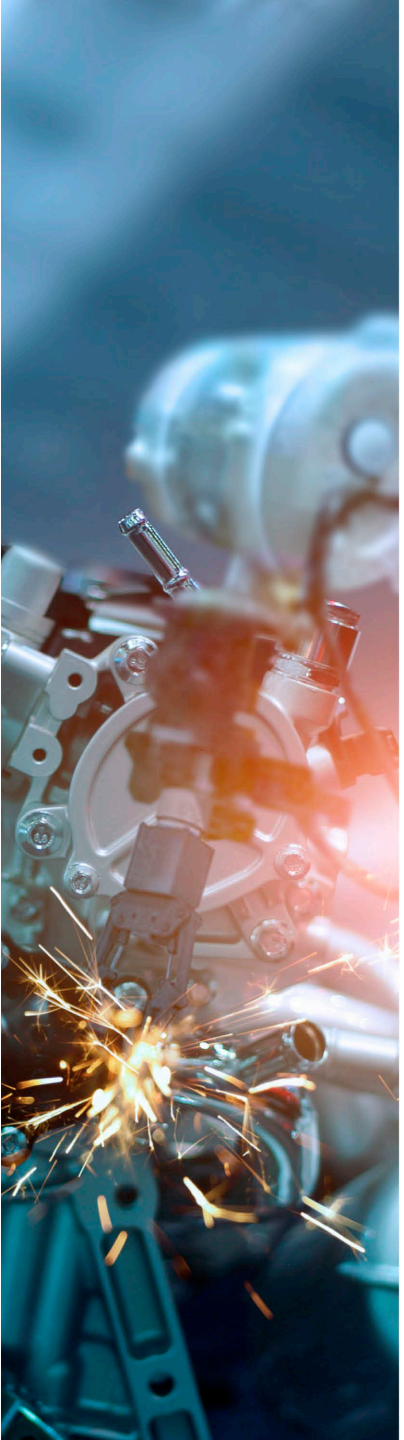

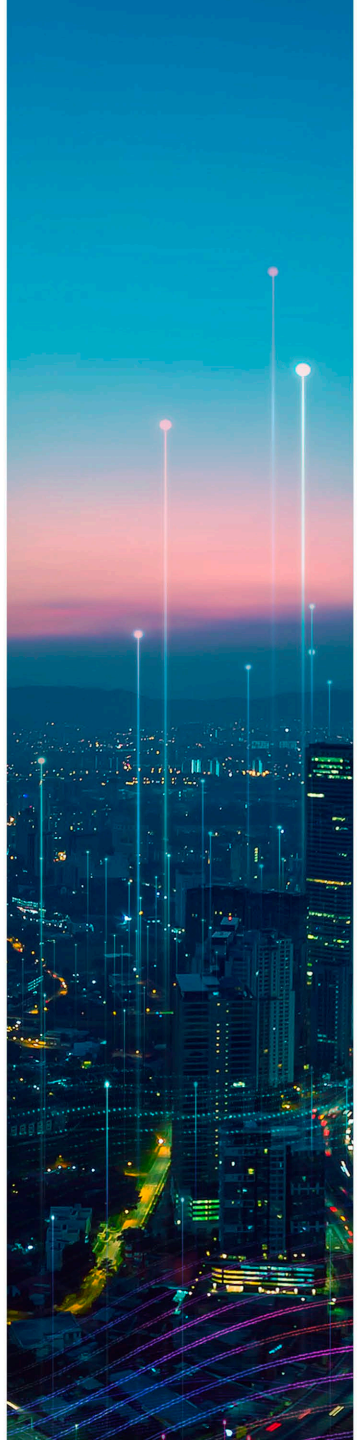

SIE Sustainable Industry Ecosystem

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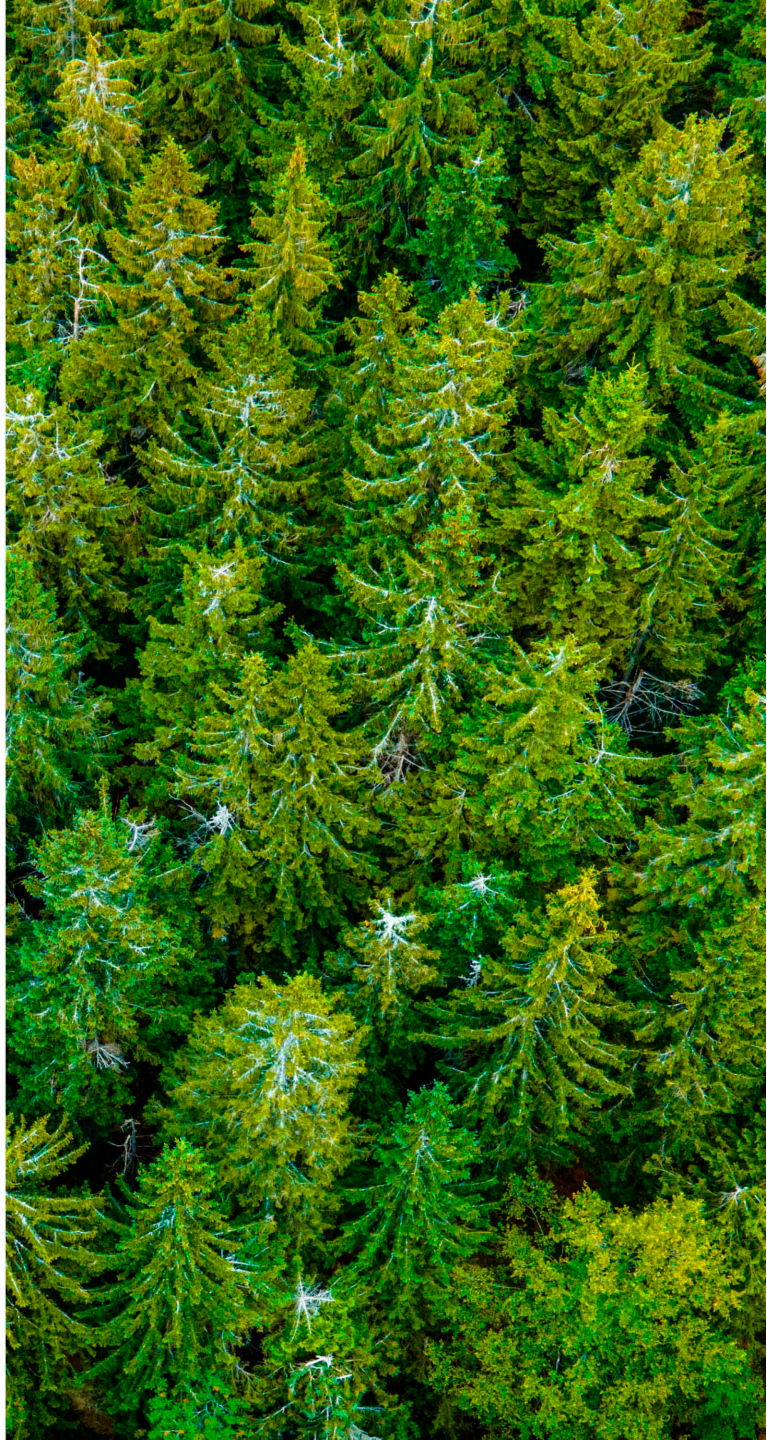


Agenda

- **9.00 Aamukahvit**
- **9.30 SIE-hankkeen esittely, professori Minna Lanz**
- **9.45–10.45 SIE-hankkeen tulokset**
  - SIRE-tutkimusfoorumi, **Riikka Virkkunen/Harri Nieminen** 10 min
  - Tulevaisuuden koulutustarpeet, professori **Heidi Kuusniemi**/professori **Ahm Shamsuzzoha** 10 min
  - Pilottilinjat ja digitaaliset infrastruktuurit – tietoisuus ja näkyvyys, professori **Antero Kutvonen** 10 min
- SRIA – Strategic Research and Innovation Agenda (**Jaakko Paasi/Juhani Heilala**) 10 min
- **10.45 Kahvit**
- **11.00–12.00 Konkreettiset toimenpiteet jatkoon (SRIA), Harri Nieminen, Riikka Virkkunen ja Jaakko Paasi**
  - Valmistavan teollisuuden tiekartan esittely
  - Muutama sana EU-yhteistyön merkityksestä
  - Työpaja/paneelikeskustelu konkreettisesta etenemisestä
- **12.00–13.00 Lounas**

Agenda

- **13.00–15.30 EU-iltapäivä, professori Antero Kutvonen ja TkT Markus Aho**
  - Yrityspuheenvuorot EU-yhteistyön tarpeista ja menestystarinoista: mm. Ponsse, **Samantha Kiljunen**
  - Tilannekuvia tieteen saralta (robotiikka, tekoäly, kiertotalous, energia)
  - Tulevat EU-hankehaut ja yhteensaattaminen
- **15.30 Loppusanat ja päätöskahvit**

Sustainable Industry Ecosystem - Collaboration Framework for Green and Digital Technologies

Professor Minna Lanz (minna.lanz@tuni.fi)

SIE final seminar

8.12.2022

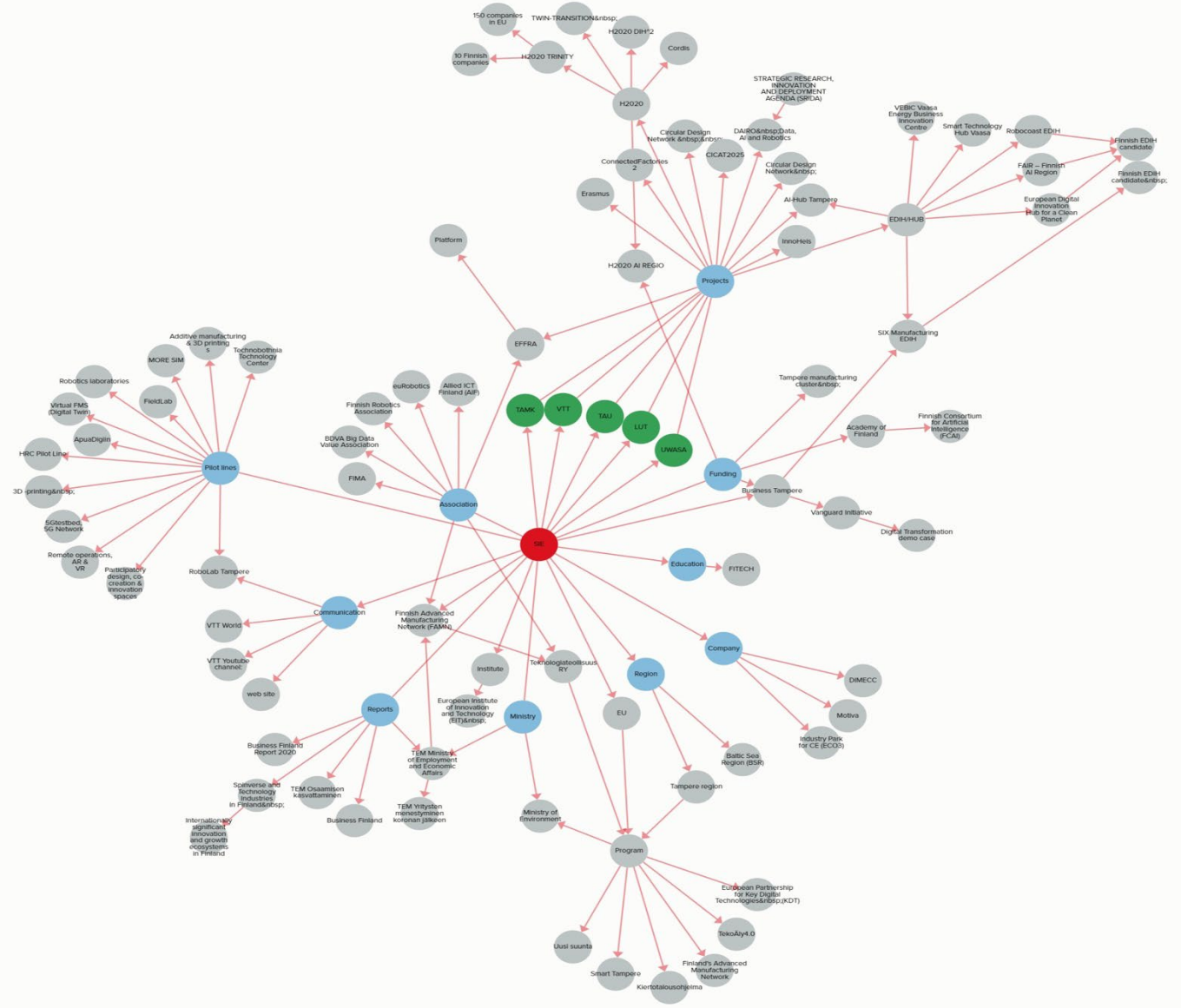
Tampere

Objectives of SIE

This SIE project aims at supporting Green and Sustainable Digital Transformation of Finnish Manufacturing SMEs, by

- collaborating and coordinating different regional, national and international smart specialization strategies,
- building a competence base for collaboration and technology adoption.
- integrating digital platforms and DIHs and enriching previous results in the domain of Industry 4.0 with innovative G&D applications and open platforms,
- creating a network of pilot lines with transparent and common access policy and realizing G&D digital tools and product-service solutions cross-sector

The project will engage the Finnish research, development and innovation community, cross-sectorial, cross-technology and cross-border.



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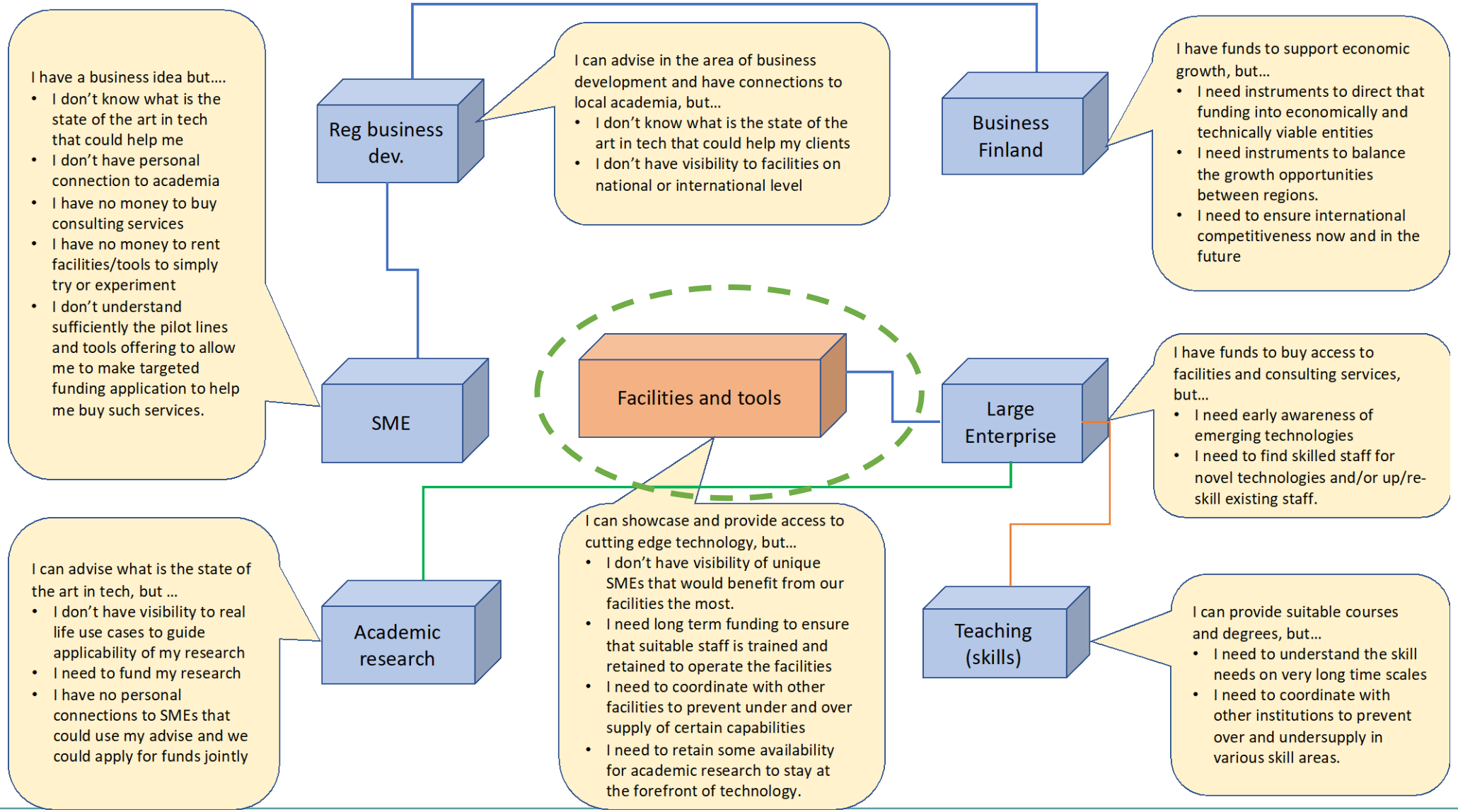
Hypothesis as a baseline



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Overview of Green and Digital tools & Pilot Lines

Sustainable Industry Ecosystem

What are green and digital tools?

- Green and digital tools are tools and services that enable, accelerate and promote information-based innovation & sustainability in the energy and manufacturing industries.

What is a pilot line?

- A pilot line is a pre-commercial ('test before invest') production or prototyping environment, physical or virtual that enables learning through experimentation in new product, service and business development.

Overview of Digital and Green tools & Pilot Lines

Digital tools & services (some examples)

- G&D Tools 1: Design for Additive Manufacturing (TAMK)
  - Digital design and optimization for Additive Manufacturing with sustainable materials, topology optimization for AM
  - AM Process simulation
- Free Maturity tools for assessing position in digitalisation (VTT)
- Visual Analytics open source tool (VTT OpenVA)
- SW Engineering & AI (VTT)
- Materials Performance (VTT)
- Robotics Exercises (TAU)
- AR/VR safety training and applications (HRC Pilot Line & Robolab) (TAU)
- Industrial data sharing & cyber security (UWASA)
- Technobothnian Pilot Environment for Future User Interface Innovations (UWASA)
- SIM Studio (LUT)
- Digital Twin test platform (LUT)

https://sites.tuni.fi/sie-en/green-and-digital-tools/

Piloting Environments

- Robolab Tampere (TAU)
- Virtual FMS (TAU)
- Human-Robot Collaboration Pilot line (TAU)
- FieldLab: AM of large biocomposite structures via robot systems (TAMK)
- Fieldlab: Testbed and capability creation for industry 4.0 (TAMK)
- J. Hyneman Center (LUT)
- MoreSIM (LUT)
- Digital Design and Manufacturing (VTT)
- Experience Center (VTT)
- VTT World (VTT)
- VEBIC (UWASA)
- Technobothnia (UWASA)

https://sites.tuni.fi/sie-en/pilot-lines/

Overview of Digital and Green tools & Pilot Lines - Examples

Sustainable Industry Ecosystem

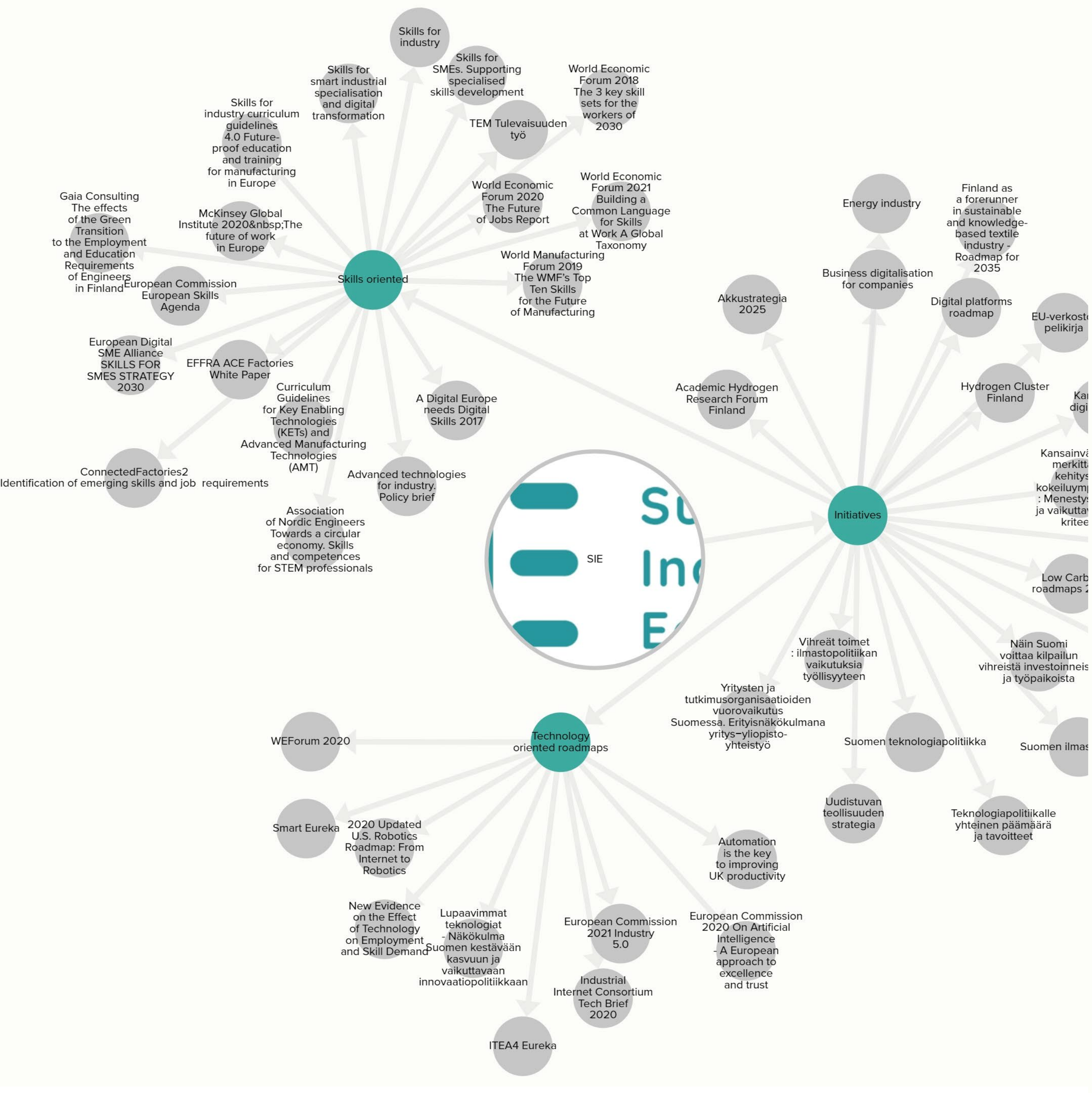
Key Findings from the SIE-project

Specific challenges

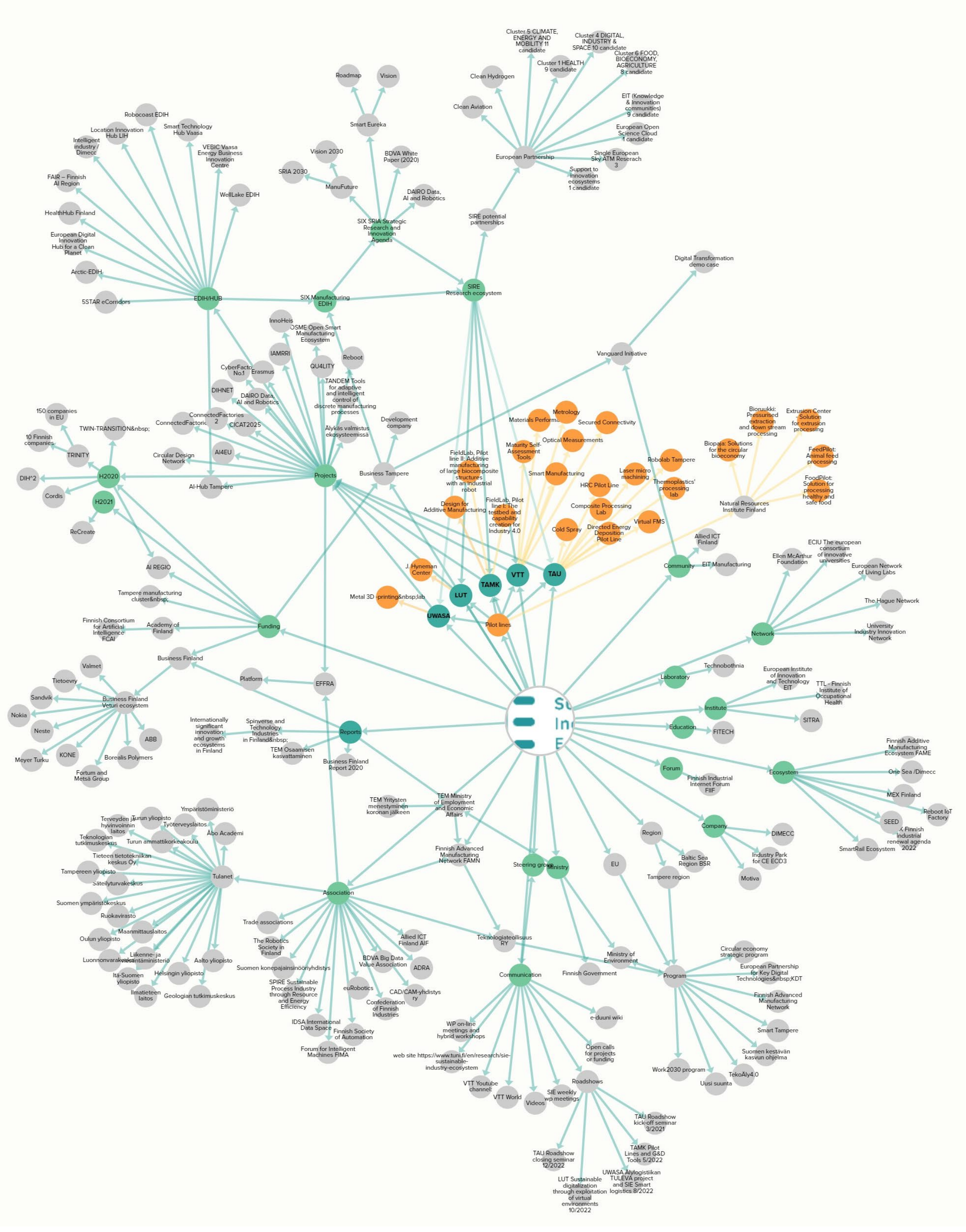
- Connection between SMEs and academia is still very narrow.
- The industry-academia collaboration has not been improving in recent years
- The >4% goal for R&D increases is looming in 2030 (Tekoäly4.0 working group).
- The emerging technologies and paradigm change requires up-skilling and training services (life-long training).
- The industrial needs and training possibilities are perhaps not clearly communicated back and forth
- The visibility of the Pilot lines and digital tools among the SMEs, LEs and academia is poor.
- Concrete efforts to support Finnish industry in the twin transition require better coordinated action from all stakeholders

Concepts & solutions to improve the situation

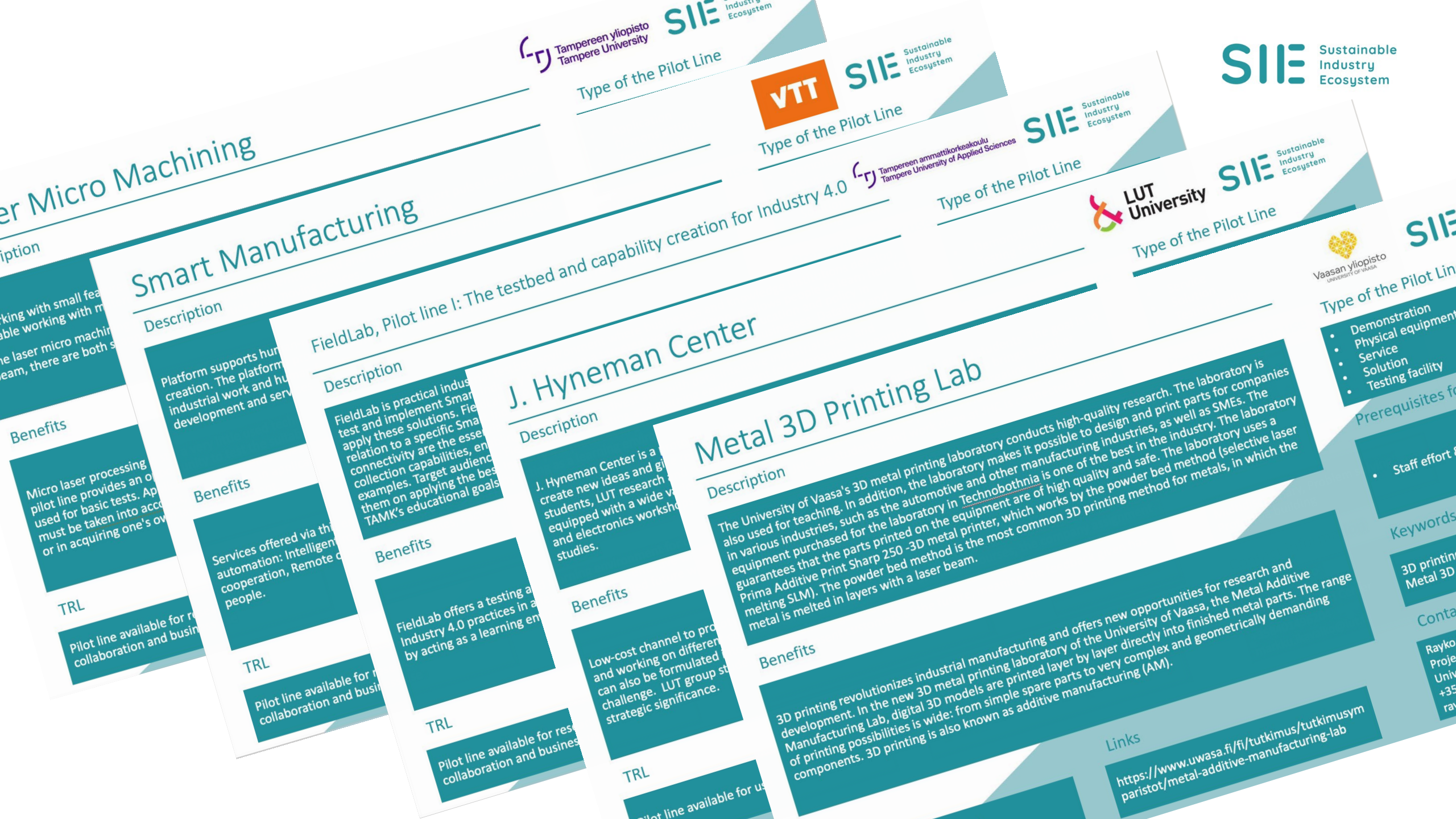
- Establishment of the Sustainable industry research ecosystem (SIRE) to complement the SIX network
  - SRIA (document)
  - SIRE Memorandum of Understanding (community)
- Expansion of the SIX community (www.six.fi)
- Formulation of the round table to support the strategic, tactical and operational activities for increasing the R&D investments
- Formulation of the Industry4.0 technology strategy in collaboration with the ministries
- Identification and development of new curricula for answering the skills gaps few examples
  - Development of green & digital skills and competence base
  - Sustainability and green transition (Identified Gaps)
  - Robotics
    - Robotics BSc & MSc Curricula (starts 2023 at TAU)
    - New life-long learning module 20cr (2023)
    - BSc→ MSc upskilling education, Seinäjoki (2024)
- Development of a catalogue concept for Pilot Lines and Digital tools
- SIE project is currently activating co-development of the ecosystem and common new projects



Skills for industry
Skills for smart industrial specialisation and digital transformation
Skills for SMEs. Supporting specialised skills development
World Economic Forum 2018 The 3 key skill sets for the workers of 2030
Skills for industry curriculum guidelines 4.0 Future-proof education and training for manufacturing in Europe
TEM Tulevaisuuden työ
World Economic Forum 2020 The Future of Jobs Report
World Economic Forum 2021 Building a Common Language for Skills at Work A Global Taxonomy
Gaia Consulting The effects of the Green Transition to the Employment and Education Requirements of Engineers in Finland
McKinsey Global Institute 2020 The future of work in Europe
Skills oriented
World Manufacturing Forum 2019 The WMF's Top Ten Skills for the Future of Manufacturing
European Commission European Skills Agenda
European Digital SME Alliance SKILLS FOR SMES STRATEGY 2030
EFFRA ACE Factories White Paper
Curriculum Guidelines for Key Enabling Technologies (KETs) and Advanced Manufacturing Technologies (AMT)
A Digital Europe needs Digital Skills 2017
ConnectedFactories2 Identification of emerging skills and job requirements
Advanced technologies for industry. Policy brief
Association of Nordic Engineers Towards a circular economy. Skills and competences for STEM professionals
SIE
Energy industry
Finland as a forerunner in sustainable and knowledge-based textile industry - Roadmap for 2035
Business digitalisation for companies
Akkustrategia 2025
Digital platforms roadmap
EU-verkosto pelikirja
Academic Hydrogen Research Forum Finland
Hydrogen Cluster Finland
Initiatives
Vihreät toimet : ilmastopolitiikan vaikutuksia työllisyyteen
Näin Suomi voittaa kilpailun vihreistä investoinneis ja työpaikoista
Yritysten ja tutkimusorganisaatioiden vuorovaikutus Suomessa. Erityisnäkökulmana yritys–yliopisto-yhteistyö
Suomen teknologiapolitiikka
WEForum 2020
Technology oriented roadmaps
Smart Eureka
2020 Updated U.S. Robotics Roadmap: From Internet to Robotics
Uudistuvan teollisuuden strategia
Teknologiapolitiikalle yhteinen päämäärä ja tavoitteet
Automation is the key to improving UK productivity
New Evidence on the Effect of Technology on Employment and Skill Demand
Lupaavimmat teknologiat - Näkökulma Suomen kestävään kasvuun ja vaikuttavaan innovaatiopolitiikkaan
European Commission 2021 Industry 5.0
European Commission 2020 On Artificial Intelligence - A European approach to excellence and trust
Industrial Internet Consortium Tech Brief 2020
ITEA4 Eureka



EDIH/HUB
SIRE
Projects
H2020
Funding
Reports
Association
Tulanet
Communication
Program
Network
Ecosystem
Company
VTT
TAU
TAMK
LUT
UWASA
Pilot lines


er Micro Machining
Description
Benefits
TRL
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Tampere University
SIE
Sustainable
Industry
Ecosystem
Type of the Pilot Line
Smart Manufacturing
Description
Benefits
TRL
VTT
Type of the Pilot Line
FieldLab, Pilot line I: The testbed and capability creation for Industry 4.0
Description
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TRL
Tampereen ammattikorkeakoulu
Tampere University of Applied Sciences
Type of the Pilot Line
J. Hyneman Center
Description
Benefits
TRL
LUT
University
Type of the Pilot Line
Metal 3D Printing Lab
Description
The University of Vaasa's 3D metal printing laboratory conducts high-quality research. The laboratory is also used for teaching. In addition, the laboratory makes it possible to design and print parts for companies in various industries, such as the automotive and other manufacturing industries, as well as SMEs. The equipment purchased for the laboratory in Technobothnia is one of the best in the industry. The laboratory guarantees that the parts printed on the equipment are of high quality and safe. The laboratory uses a Prima Additive Print Sharp 250 -3D metal printer, which works by the powder bed method (selective laser melting SLM). The powder bed method is the most common 3D printing method for metals, in which the metal is melted in layers with a laser beam.
Benefits
3D printing revolutionizes industrial manufacturing and offers new opportunities for research and development. In the new 3D metal printing laboratory of the University of Vaasa, the Metal Additive Manufacturing Lab, digital 3D models are printed layer by layer directly into finished metal parts. The range of printing possibilities is wide: from simple spare parts to very complex and geometrically demanding components. 3D printing is also known as additive manufacturing (AM).
Links
https://www.uwasa.fi/fi/tutkimus/tutkimusym
paristot/metal-additive-manufacturing-lab
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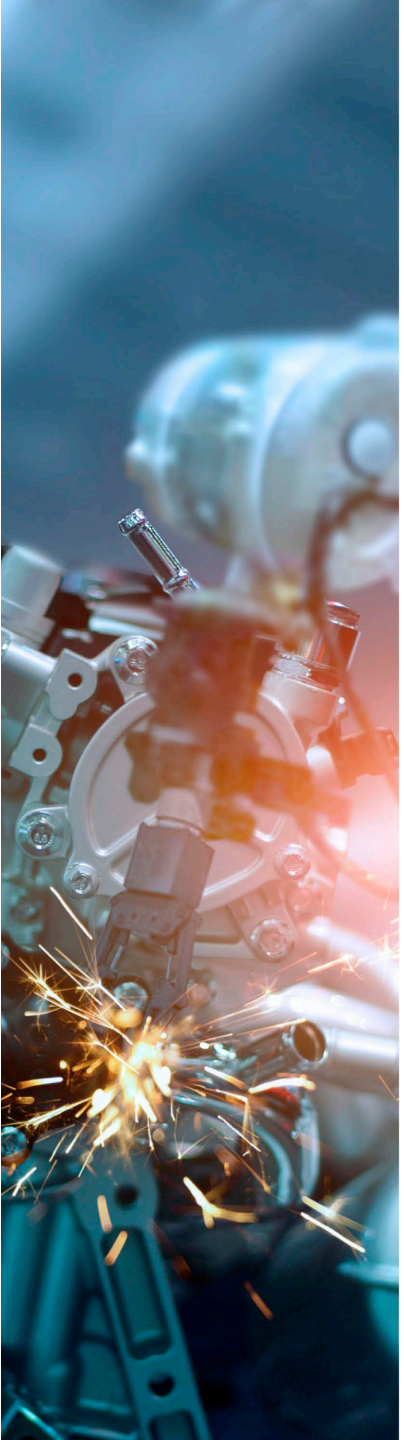
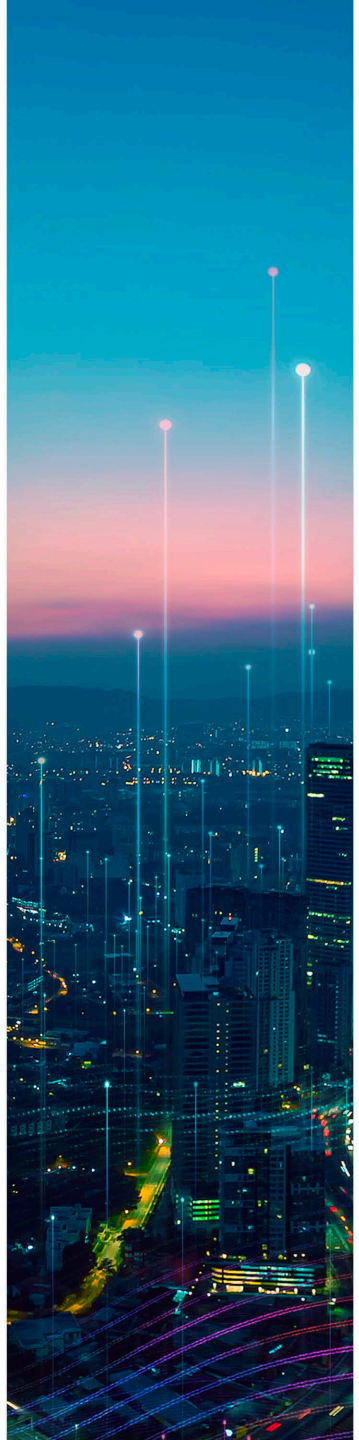
Type of the Pilot Lin
Demonstration
Physical equipment
Service
Solution
Testing facility
Prerequisites fo
Staff effort
Keywords
3D printin
Metal 3D
Conta
Rayko
Proje
Univ
+35
ra





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