Circularity – finding tools to make it work

Result from LUPIN – a pilot study with industrial input

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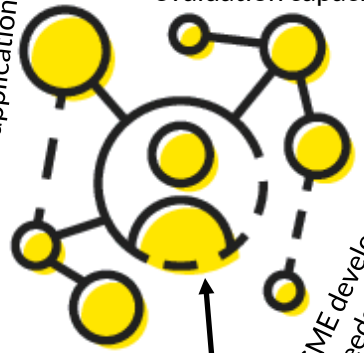
LUPIN - Lab for Evaluation of production technology and innovations – Network

A pilot study financed by ”RISE IVF Intresseförening”

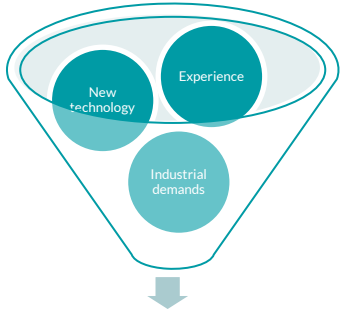
Large corporations with production in Sweden.
Needs: :
-evalutate digital tools and solutions
-minimize risk in industrial applications.

SME without internal evaluation capacity



SME developing digital tools and solutions
Needs:
-evaluations in production environment
-meet customer demands

Evaluation labs and networking under RISE’s independent leadership.



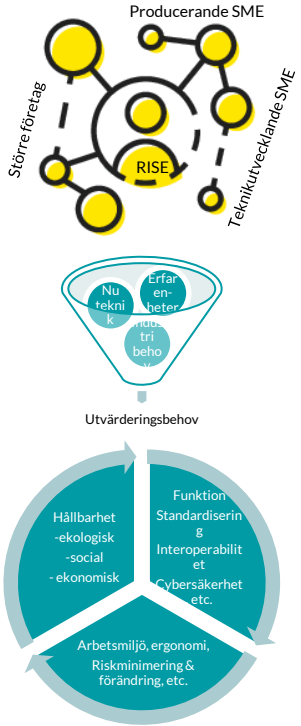
Evaluation needs
Market mature technology

Speed up sustainability through digitalization and data utilization.

Collaboration around
-Needs
-Expericences
-Opportunities

Pilot study methodology

- Interviews
  - Industrial stakeholders
  - Testbed managers at RISE
- Analysis
- Plan for next steps

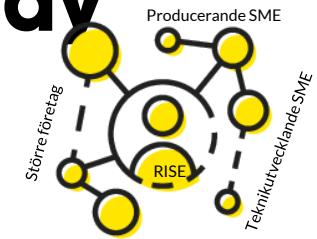


Conclusions from the LUPIN study

- The industry says that the original LUPIN concept is ”nice to have” but not ”need to have”. Low willingness to pay.

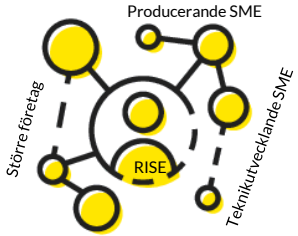
- Two areas identified with pressing needs:
  1. Cybersecurity
  2. Disassembly and circularity

- The LUPIN concept is now further developed within these two areas.



Industrial input – 5G and Cybersecurity



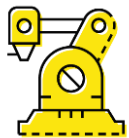


Utvärderingsbehov

- Cybersecurity issues can be showstoppers for new production technology.
- ”No factory manager wants to take risks, but every factory manager wants to have been the first introducing new technology”
- 5G and updated system architectures increase cybersecurity, but are seen as large steps by the industry.
- New production technology must meet stress tests, i.e. it has to work 100 % from day one. 85% is not enough.
- The industry wants:
  - Traceability of material and components ”all the way to the mine”.
  - More value from collected data.
  - Minimal or eliminated inspections => data driven inspections.
  - Digital twins, of the products and the manufacturing.
- Ericsson supports Swedish projects with industrial 5G, and would like to contribute with their testbed.





Next step – Cybersecurity and 5G

- **Application** to the program **Advanced Digitalization.**

- **Vision**: Show how today's technology can solve the cybersecurity challenges of yesterday, today and tomorrow, through the "power of setting a good example".

- **Goal** – understand how **private 5G networks** and **updated system architectures** can meet industrial demands for cybersecurity.
  - Risk analysis and comparison methodologies
  - Security
  - Upgrades
  - Scaleability
  - Device control
  - Traceability
  - Opportunity to develop new applications

- **Impact** – More efficient and more resilient industrial companies

Cybersecurity and 5G

Advantages of private 5G networks for the industry

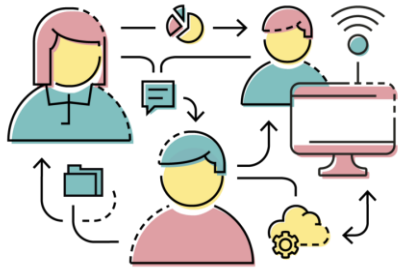
- High capacity, high datarate, low latency.
- Controlled spectrum – no interference
- Resources can be allocated to factory needs.
- Good range, good handover, works indoors and outdoors.
- Good traceability, easy to log all communications since all devices need a SIM-card or soft-SIM.
- Handover between the private and the public networks.
- Power use could be minimized.
- Position services.
- ”Digital shadow” can visualize the entire supply chain and the product through the supply chain.
- Safety for e.g. autonomous vehicles on factory area.
- Testbed ”minifactory” at Ericsson in Kista

Challenges for industrial uptake of private 5G networks

- Relatively untested.
- Lack of 5G competence in many companies
- Shortage of 5G consultants.
- Questions about cost, today and tomorrow.
- Shortage of 5G chips and modules for devices
- 5G could imply demands on system architecture developments.
- Need operator support or private license.
- Who develops the services that the industry needs?

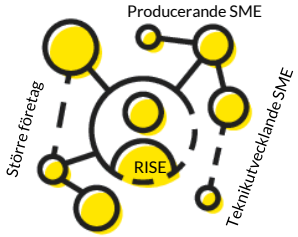
Potential consortium partners

- RISE, researchers and test beds Cyber Range, ICE Edge, AstaZero
- Ericsson, including the test bed ”minifactory”.
- Telia or other operator
- Industrial corporations with production in Sweden.
- Industrial networks.
- Cybersecurity companies
- Other stakeholders



Industrial input – disassembly and circularity



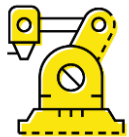


Utvärderingsbehov

- Swedish industries excel in assembly, but not in disassembly and reuse.
- Several vehicle companies support the idea of more development around disassembly and reuse.
  - Disassembly, quality assurance, classification, etc.
  - Automation of data handling and logistics.
- The industry wants:
  - Traceability of material and components ”all the way to the mine”.
  - More value from data.
  - Minimal or eliminated inspections => data driven inspections.
  - Digital twins, of the products and the manufacturing.
- New production technology must meet stress tests, i.e. they have to work 100 % from day one. 85% is not enough.

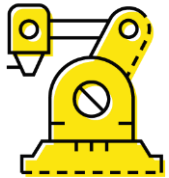




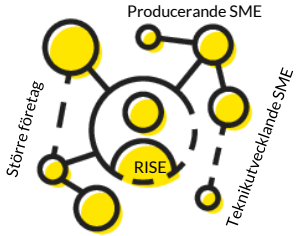



Next step - Disassembly and circularity

- RISE runs a cross-disciplinary initative called ”Technical Solutions for sustainable and circular products” led by Andreas Reeb, where disassembly and reuse are central themes.
- Goals of this initiative includes
  - Industrial offerings
  - Research projects in areas not yet mature enough for industrial use.
- The initiative will develop an offering based on the LUPIN concept.



Invitation x 2

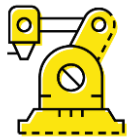


Utvärderingsbehov

RISE would hereby like to invite industrial stakeholders interested in participating in our application to Advanced Digitalization, for evaluating private 5G networks and cybersecurity.

RISE would also like to invite industrial stakeholders interested in disassembly, reuse and circularity to further discussions on needs and demands.

If interested please email Adam Edström or Marie-Louise Bergholt, adam.edstrom@ri.se or marie-louise.bergholt@ri.se.



Thank you!

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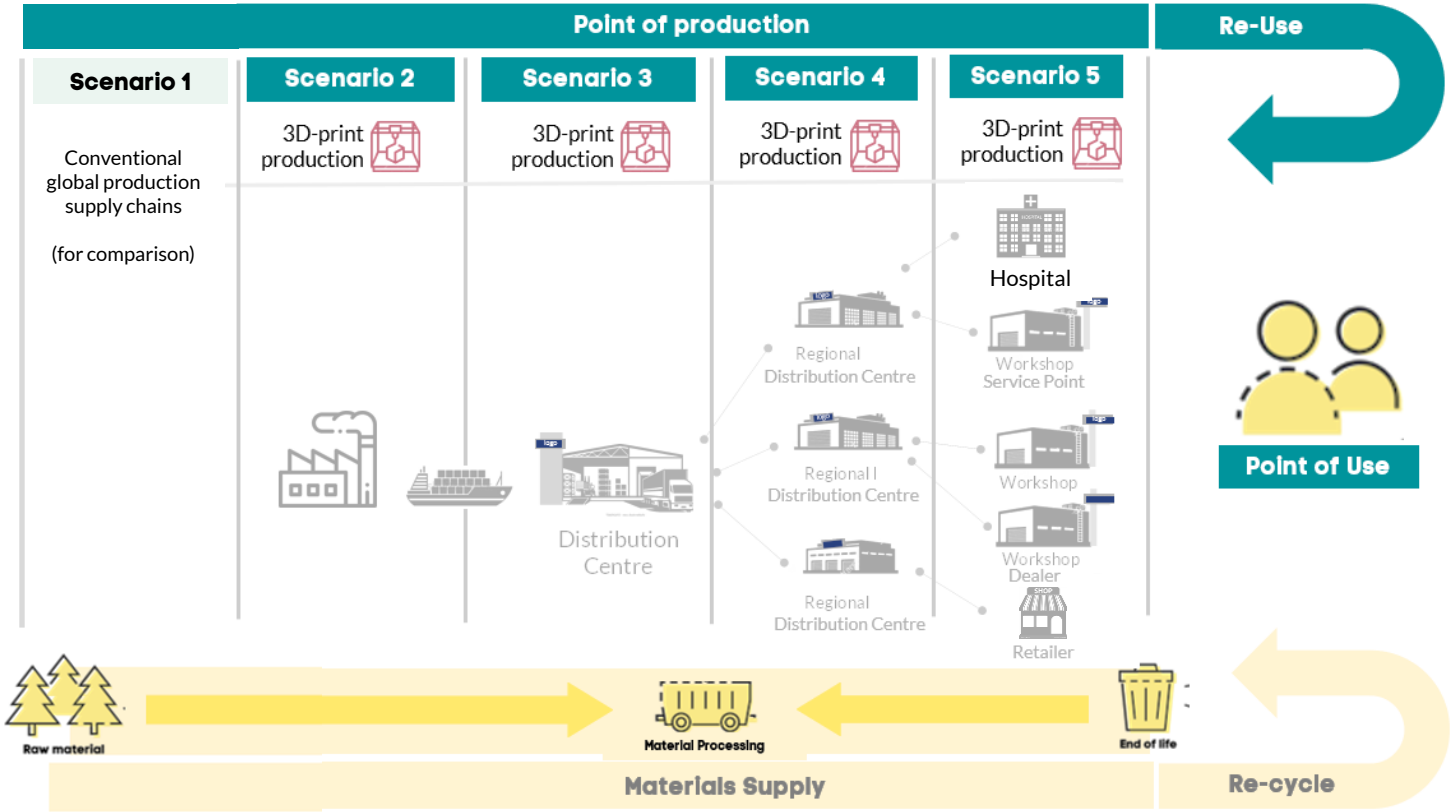
SPARSAM

Business criterias for selection of 3D-printed components

KI

RI.
SE

5 Supply Chain Scenarios for 3D-printing



SPARSAM Summary of Results

1 Which Components shall be 3D printed?

Technical Selection Criteria's
- Complex shape
- Expensive material
- Low weight is essential
- Technical properties can be improved
- Individual variations (tailored)
- Potential to parts consolidation
- A need to reduce assembly time
- Smaller series

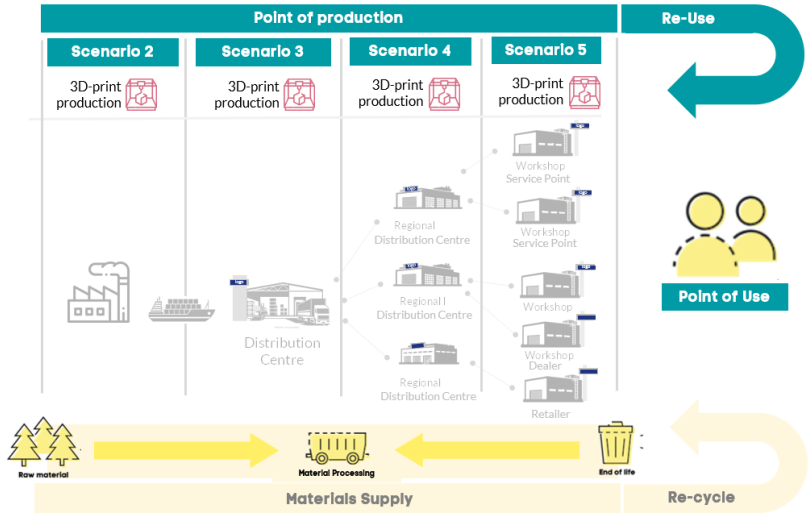
Business Selection Criteria's
- Reduced Warehouse cost
- Reduced Inventory Costs
- Increased Part Availability
- Lead time
- Optimized Demand Management
- Reduced Transportation
- Reduced Production Cost
- Increased Uptime

Sustainability Selection Criteria's
- CO2 Emissions
- Material Consumption
- Energy Usage

NEW

SPARSAM: Extends the technical selection criteria's with business and sustainability selection criteria's

2 Where should they be 3D-printed? Scenario 1-5



NEW

SPARSAM: Provides a generic model to describe convectional supply chains and production scenarios based on 3D-printing

3 What are the saving and value in each scenario?

COST

TIME

SUSTAINABILITY

NEW

SPARSAM: Provides a model to calculate the value with-3d print compared to conversional methods

Learn more

Today: “Business Criteria for Selection of 3D-printed components”
14:30 - Conference Room “Blue Box”

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Research: Just-In-Demand
Matching demand with 3D-printed supply

Project: SPARSAM
Quantify Cost, Time & Sustainability savings with 3D-print