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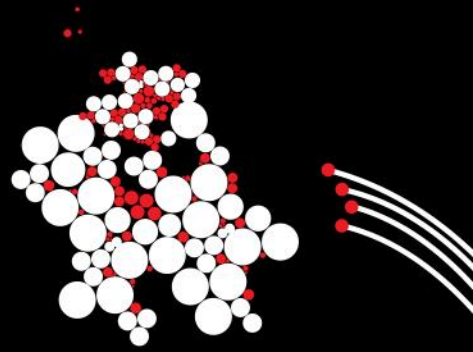
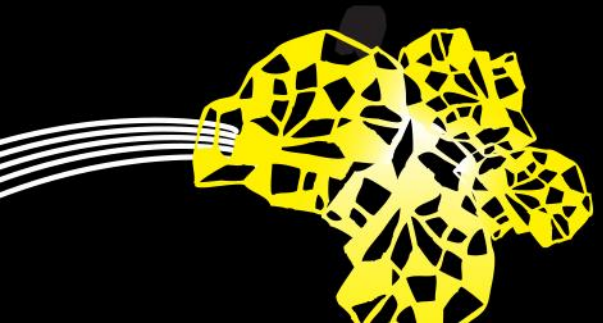


SUSTAINABILITY IMPACT OF NEW TECHNOLOGY ON AFTER-SALES SERVICE SUPPLY CHAINS

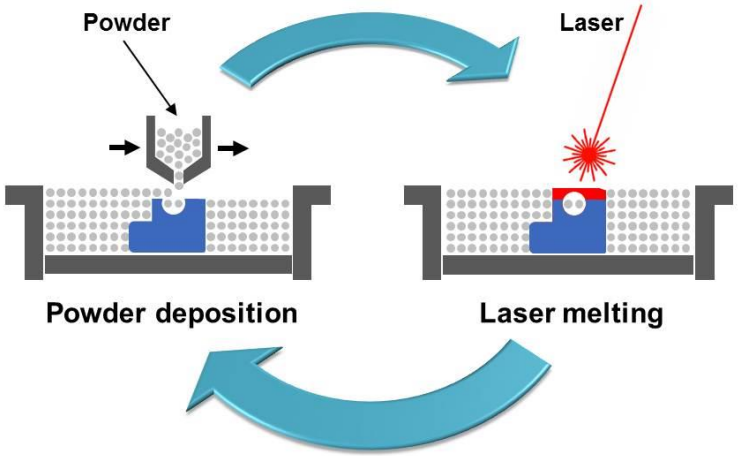
MATTHIEU VAN DER HEIJDEN

SEPTEMBER 26, 2018



3D PRINTING: WHAT IS IT?

"Process of joining materials to make objects from 3D model data, usually layer upon layer"



IMPACT ON AFTER-SALES SERVICE SUPPLY CHAINS
MOTIVATION

- Many slow movers, long lead times, may be expensive
  → High inventory levels to ensure quick response
  → Many parts discarded at end of life cycle
- Suppose that we have an alternative sourcing option:
  - Small batches (e.g., no moulds, low setup costs)
  - Short lead times
  - Distributed (local) manufacturing
- What would this mean for your supply chain?

CONSORTIUM

NWO
Netherlands Organisation for Scientific Research

Research:

UNIVERSITEIT TWENTE.

- Industrial Engineering
- Mechanical Engineering

TU/e

Project management

DINALOG
Dutch Institute
for Advanced Logistics

SINTAS

3D printing technology

NLR

Additive Industries

Spare part suppliers

THALES

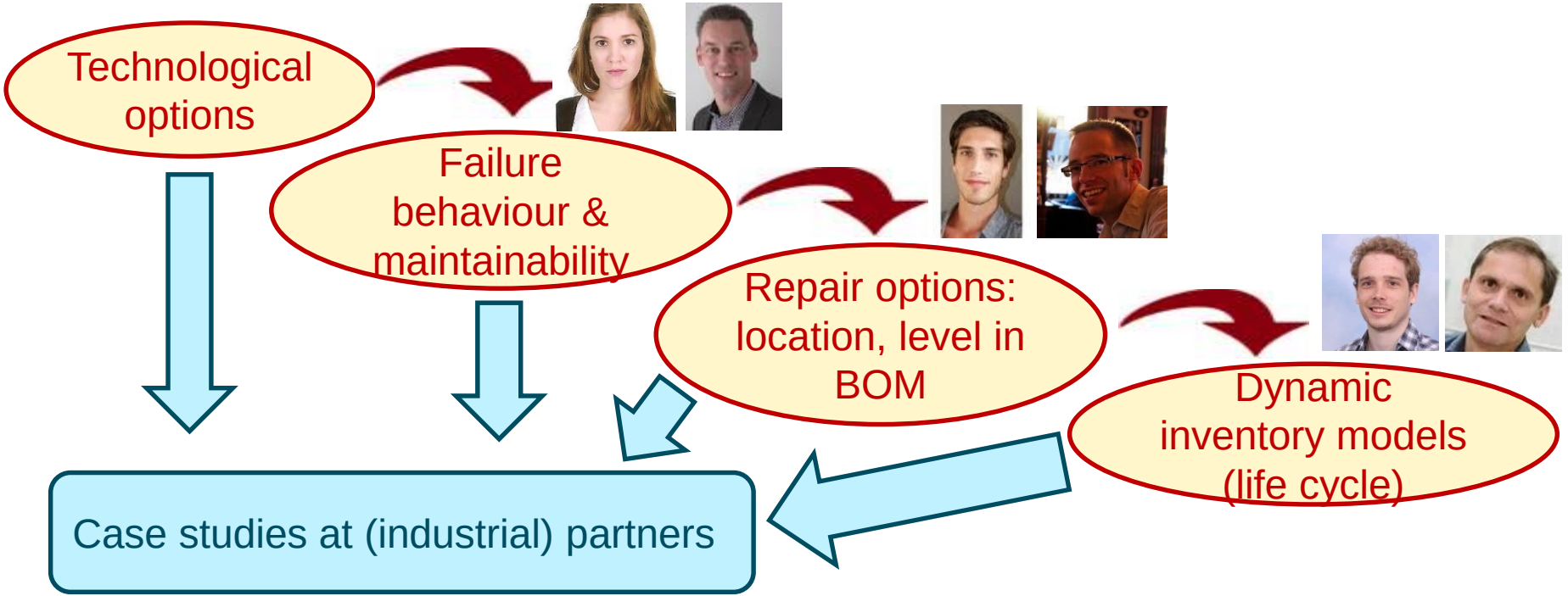
FOKKER
SERVICES

UNIVERSITY OF TWENTE.

Asset owners

Royal Netherlands Army

RESEARCH STRUCTURE



REMAINING PROGRAM FOR TODAY

13:15-13:45	Identifying business cases for 3D printing in service logistics	Knofius (UT), Alizadeh (FS)
13:45-14:30	Supercharging Supply Chains with 3D Printing	Pannett (Visagio)
14:30-15:00	3D printing during missions	Westerweel (TU/e), de Boer (RNLA)
15:00-15:30	BREAK	
15:30-16:00	Developments in Metal Additive Manufacturing spare part production	Cordova (UT) de Smit (NLR)
16:00-16:45	In-field Additive Manufacturing	Norberg (Fieldmade)
16:45-17:30	Challenges for 3D printing in after-sales service supply chains	Panel discussion
17:30-19:00	Drinks / networking	

PROPOSITION

- 3D printing offers by far the most potential for small subcomponents (that may not even be present on the spare part list)

- But: then the impact on after-sales service supply chains will remain limited in the next 5-10 years

PROPOSITION

- The gains of 3D printing in supply chain management mainly exist for special cases, like
  - remote areas, including temporary fix
  - supply disruptions (including end-of-life)

PROPOSITION

- Supply chain managers should be more in the lead when introducing 3D printing of parts
  - Product development tends to focus on technological superiority rather than supply chain profitability and thus overlook relevant parts

PROPOSITION

- 3D printing of spare parts on demand will remain an illusion for downtime critical equipment
  - Throughput time including postprocessing will remain too long in the next decades

PROPOSITION

- An important advantage of 3D printing is that it facilitates printing on location
  - No long customer order lead times (transportation, customs, …) for centralized inventories

PROPOSITION

- The technical challenges of printing parts at remote locations (and affecting their performance) will limit the application of AM for spare parts considerably

PROPOSITION

- In most case, it is best to outsource 3D printing of spare parts to a specialized industrial partner

PROPOSITION

- An unexplored but promising area is to combine 3D printing of spare parts with predictive maintenance

PROPOSITION

- It would be a huge advantage for after-sales service supply chains if parts could be produced as one piece (part consolidation)
  - Lower failure rate
  - Less complexity (only Line Replaceable Units, no Shop Replaceable Units)

PROPOSITION

- The added value of 3D printing lies mainly in improved product design, and less in supply chain improvements