Industrial Engineering Education to support manufacturing competitiveness

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Manufacturing Engineering

Structural Changes of the economy of Luxemburg

Migration from base material production via financial services to knowledge

Picture: internet

Structural Changes of the economy of Luxemburg

Migration from base material production via financial services to knowledge

GOODYEAR

DELPHI

ADITYA BIRLA NOVELIS

CERATIZIT

a sense for innovation iEE

FANUC

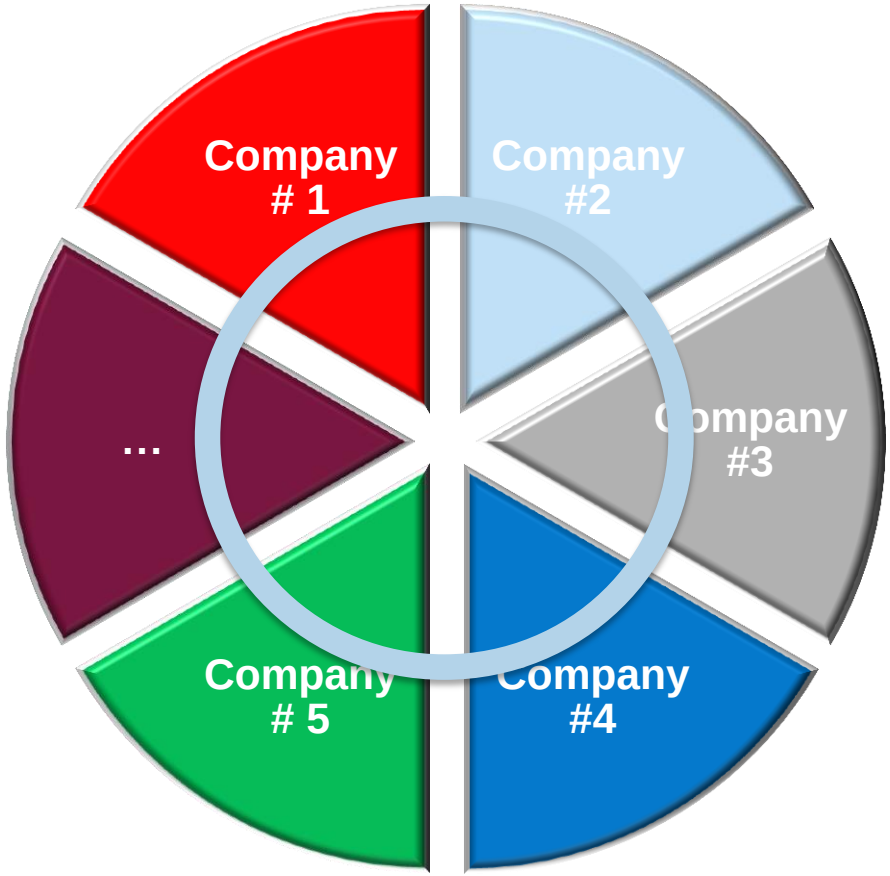
EURO-COMPOSITES®

NORTON SAINT-GOBAIN

Picture: internet

Challenges

Diversity



- **Identification of common manufacturing technologies needed**

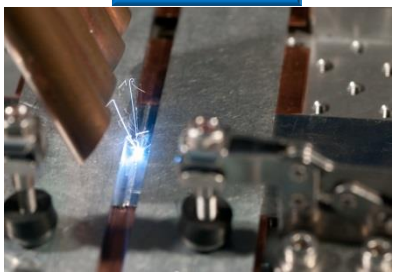
Cross sectorial knowledge in assembly technologies

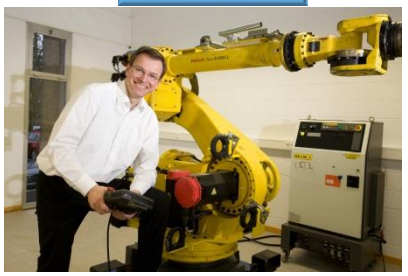
Support industry
to increase manufacturing competitiveness

Laser assembly

Robotic assembly

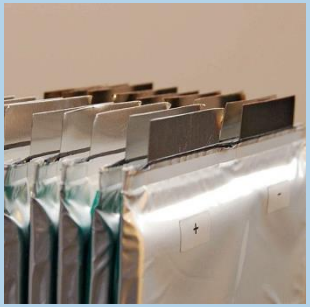
Lean assembly





1. Laser Technology Competence Center

Laserjoining of NF metals

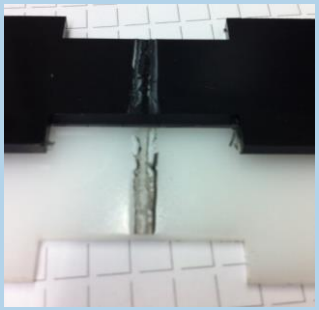


- Electro-mobility
- Cu & Al
- brittle, high resistance, corrosion

Laserjoining of polymers and metals

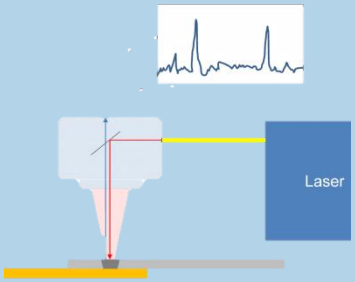
- Joining of PA 6 and Aluminum
- Lightweight design
- Automotive, railway, airplanes, ..

Laserwelding of plastics (e.g. POM)



- Automotive
- Plastics welding
- Define process parameters

Process Monitoring



- Scientific profound understanding of process
- High speed monitoring of melt

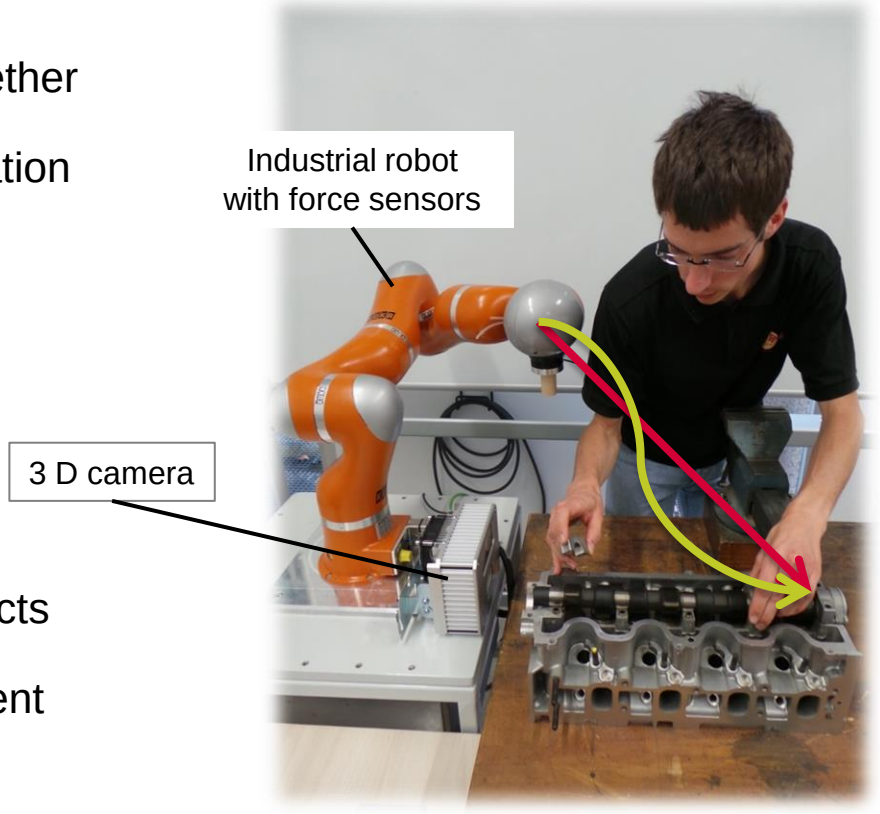
Pictures: auto-motor-sport; Universite du Luxembourg

2. Robotic Assembly

Force-controlled assembly of automobile modules

Objectives:

- Robot and human operator work together
- Perform complicated assembly operation
- Force-controlled joining process
- Safe joining algorithm



Expected results:

- Versatile assembly e.g. of new products
- Knowledge about dynamic environment
- Automation of difficult assembly
- Migration from manual to robotic assembly

3. Leitz supports Lean Engineering Education in Luxembourg

3. Lean Manufacturing Laboratory

ly line

1

3

4

5

Assembly chassis

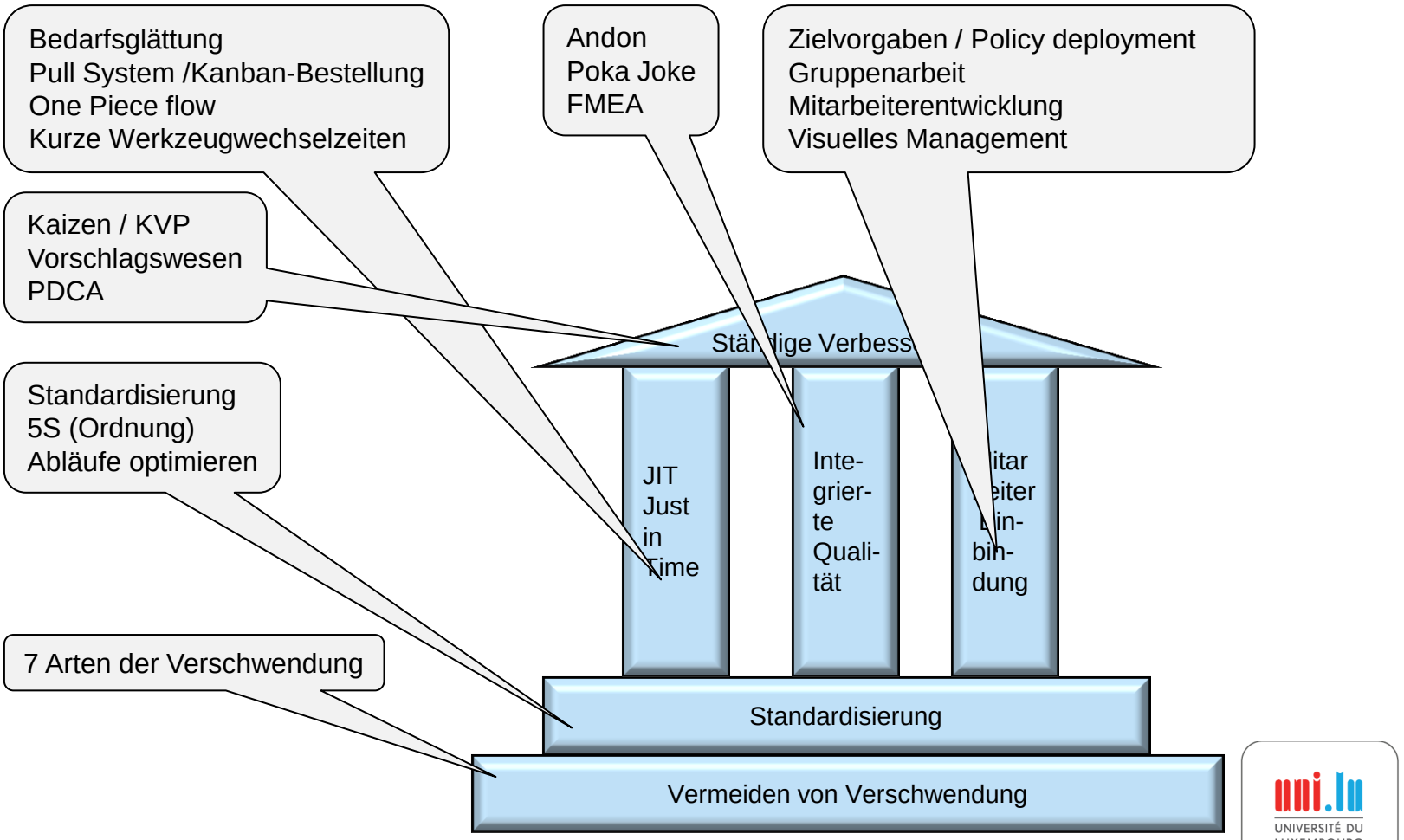
Marriage

QS

Packaging & shipment

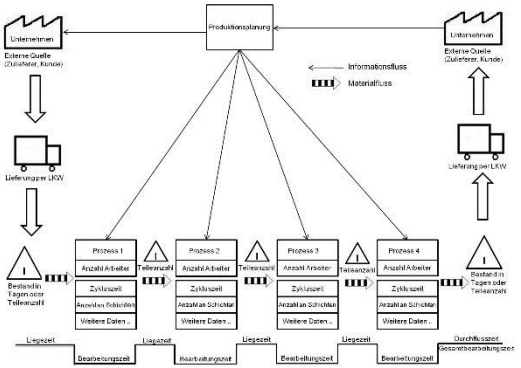
3. Lean Manufacturing Laboratory

Key Elements of Lean Production systems



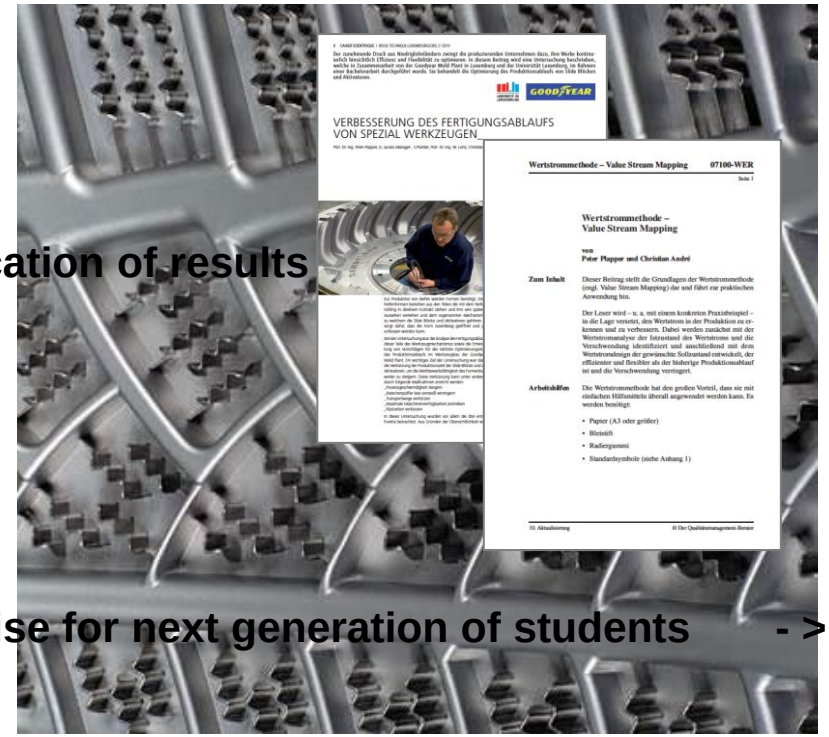
3. Lean Manufacturing: Value Stream Mapping

Example of combination of Research and Education



1. **Project: Value Stream Mapping of complete manufacturing flow of special die assembly**

2. **Publication of results**



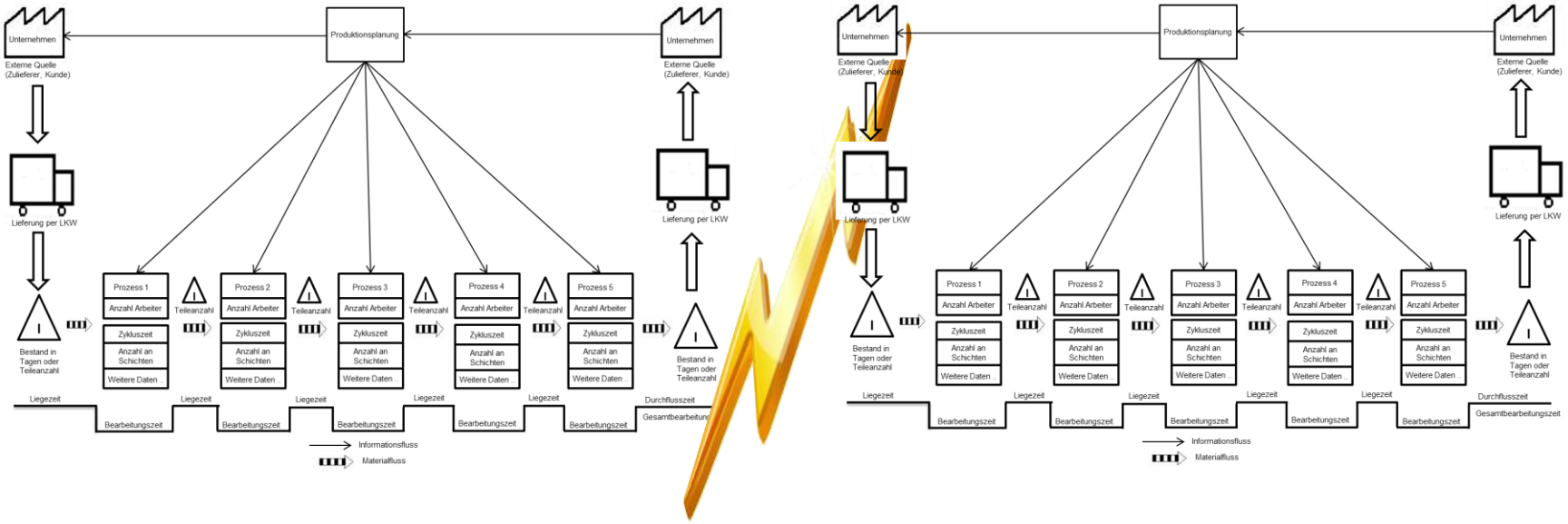
3. **Exercise for next generation of students - >**

picture: www.fotokonzepte.com

3. Value Stream Mapping of the complete Supply Chain

Cross-company value creation process has potential for optimization

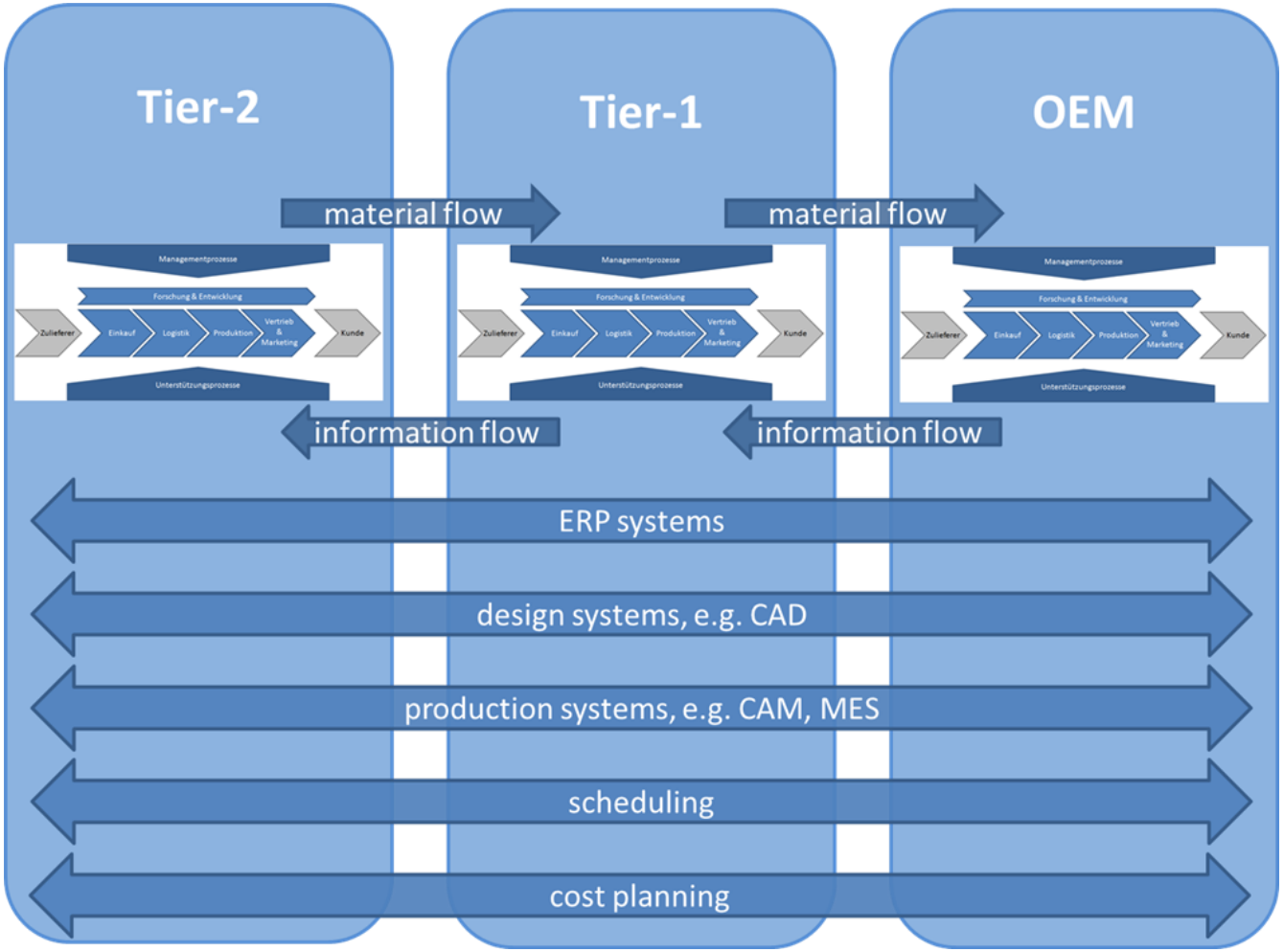
supplier → OEM



- **Eliminate waste along the complete supply chain**
- **Reduce the use of energy and resources along the supply chain**
- **Focus complete supply chain on customer´s needs**

3. Value Stream Mapping – areas of action

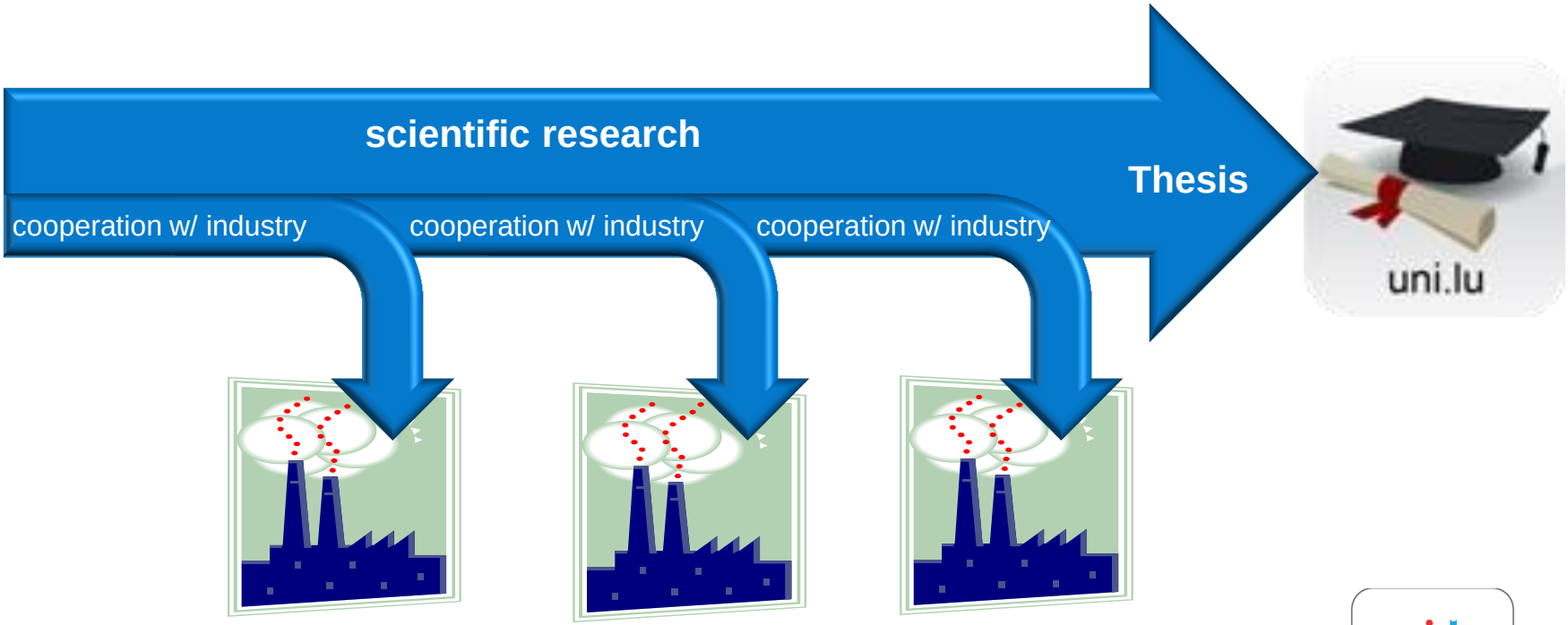
Integrated information and material flow eliminates waste



Mission statement

“Support industry to improve manufacturing competitiveness”

- **All research / PhD projects with industrial partners**



The team

“Support industry to improve manufacturing competitiveness”

Summary

- Economy of Luxembourg
- Need for Mfg. Education and Research

- Assembly technologies development
  - Laser welding of dissimilar materials
  - Robot-Human Interaction for assembly automation
  - Multi company Value Steam Optimization

- Mission of the Engineering Education in Luxembourg:

  “Support industry to improve manufacturing competitiveness”