MEMAN

INTEGRAL MATERIAL AND ENERGY FLOW MANAGEMENT
IN MANUFACTURING METAL MECHANIC SECTOR

MEMAN TOOLBOX FOR IMPROVING ENERGY AND RESOURCE EFFICIENCY IN FACTORIES AND ENTIRE VALUE CHAINS

Stefan Blume, Dr. Sebastian Thiede

Chair of Sustainable Manufacturing and Life Cycle Engineering, Institute of Machine Tools and Production Technology (IWF), Technische Universität Braunschweig, Germany

June 20th 2018 – Brussels

MEMAN stands for “Integral Material and Energy flow MANagement in MANufacturing metal mechanic sector”. This project has received funding from the European Union’s Horizon 2020 Programme under grant agreement no. 636926.

The MEMAN challenge

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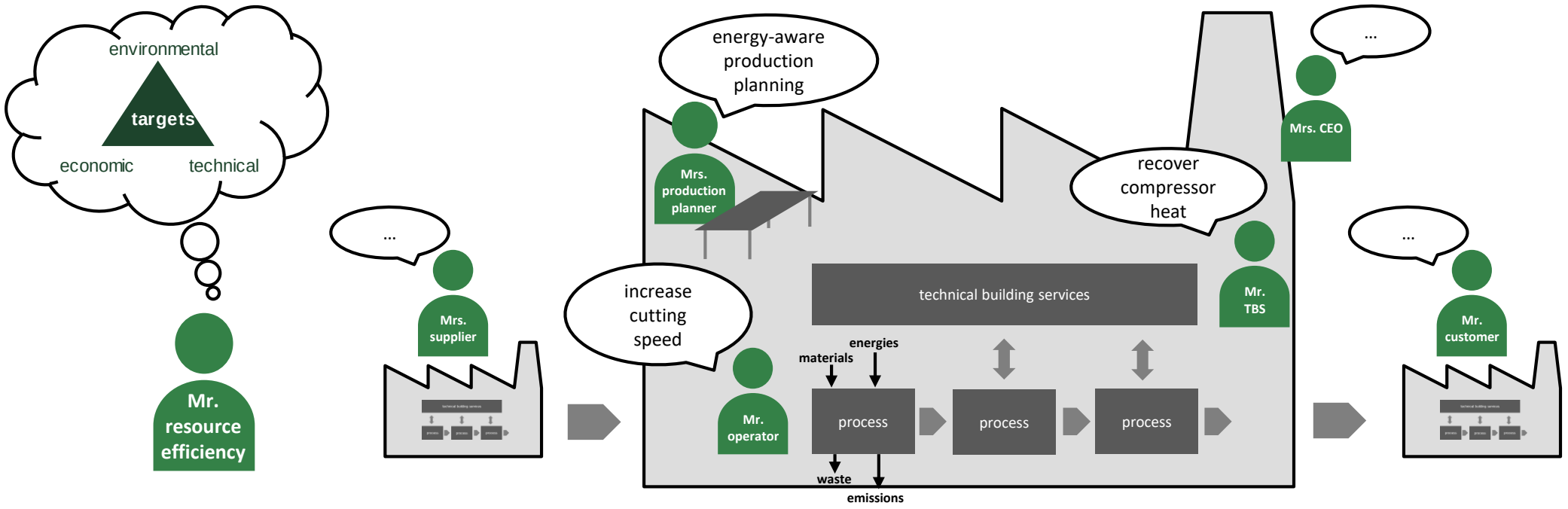
THE MEMAN CHALLENGE

Holistic improvement of resource efficiency in manufacturing

challenges
multiple targets | complexity | distributed knowledge

consequences
local focus | unexploited saving potentials



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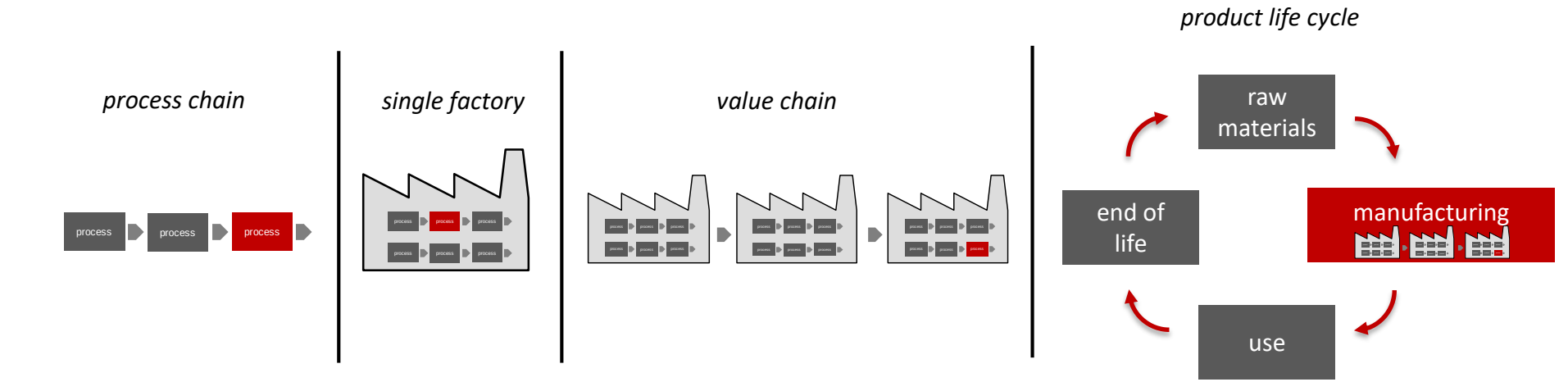
Consideration of greater scope increases complexity



covered by MEMAN

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The MEMAN toolbox

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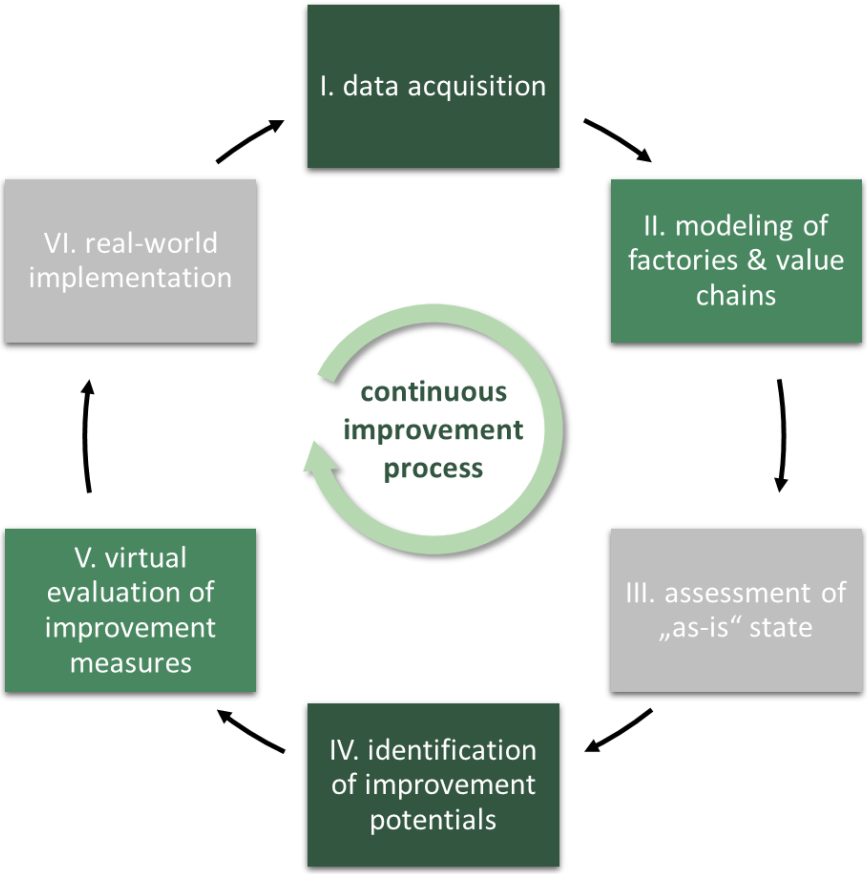
Improvement methodology



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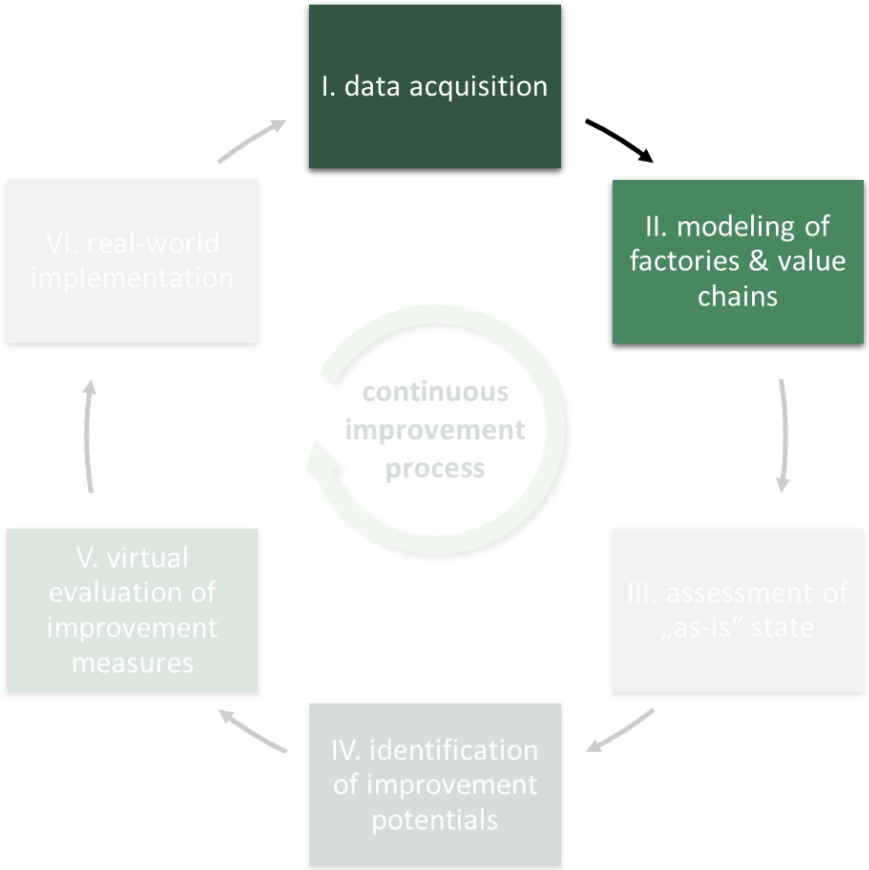

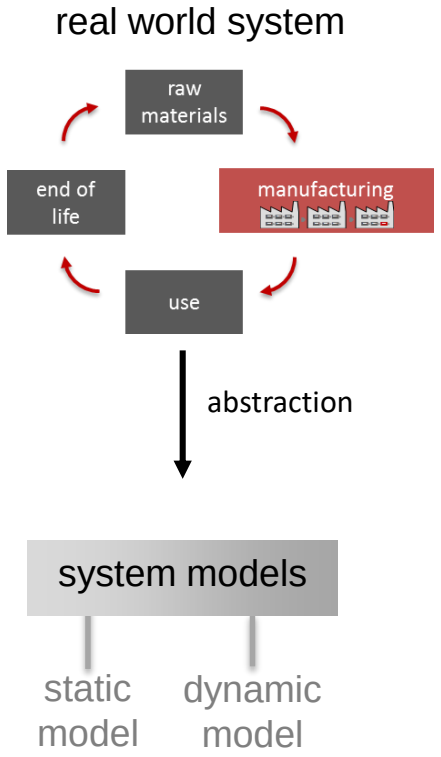

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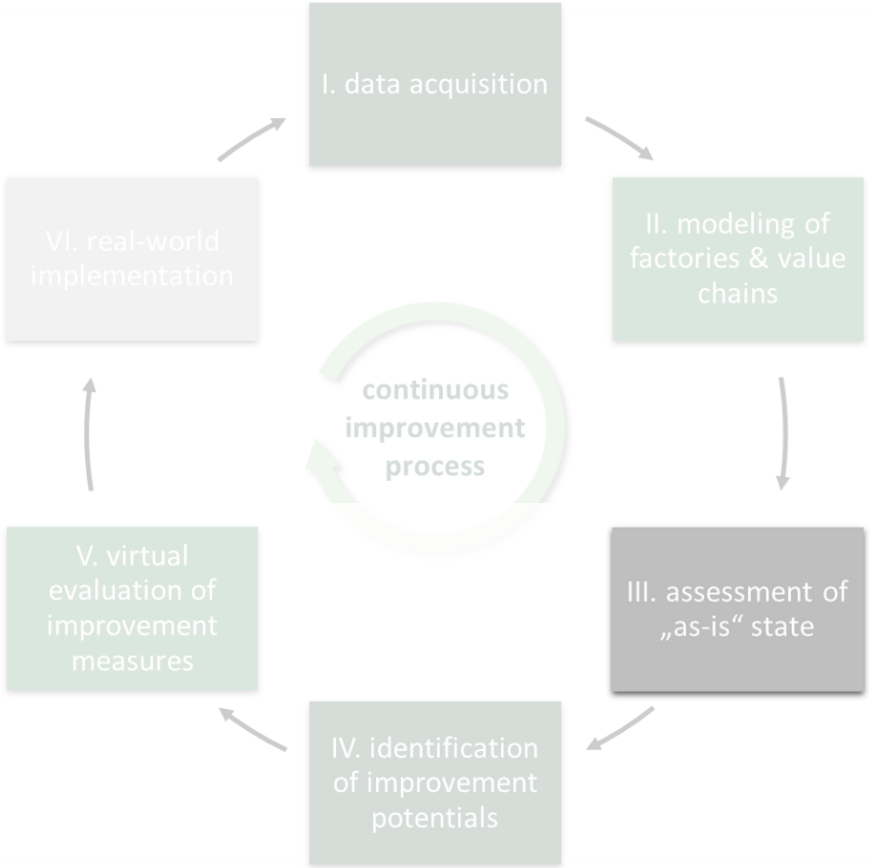

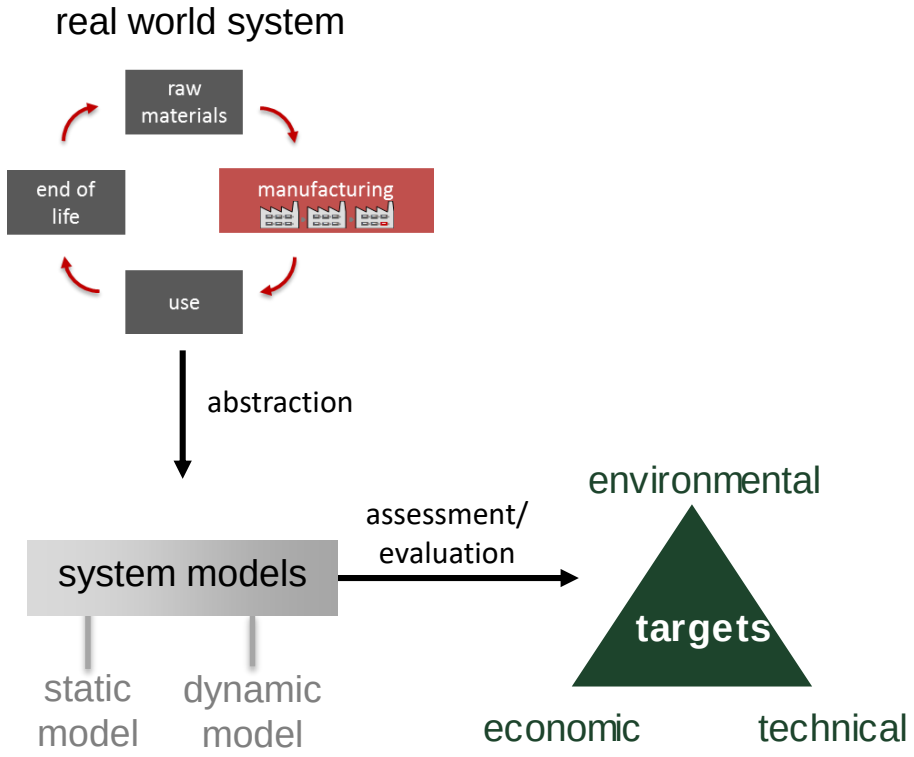

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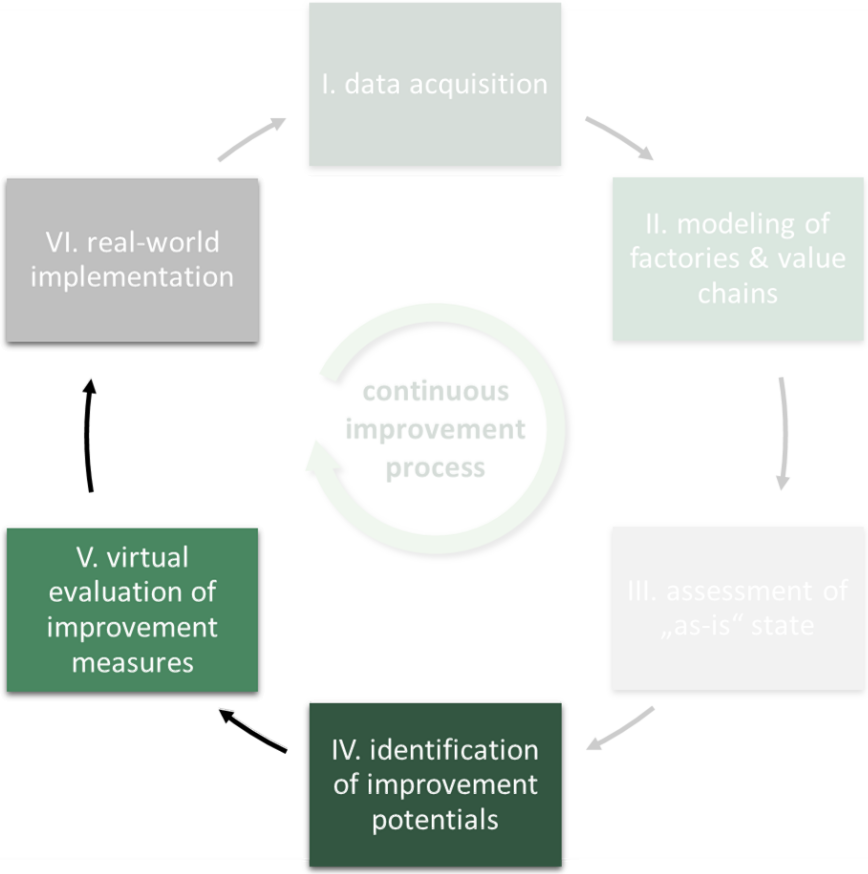

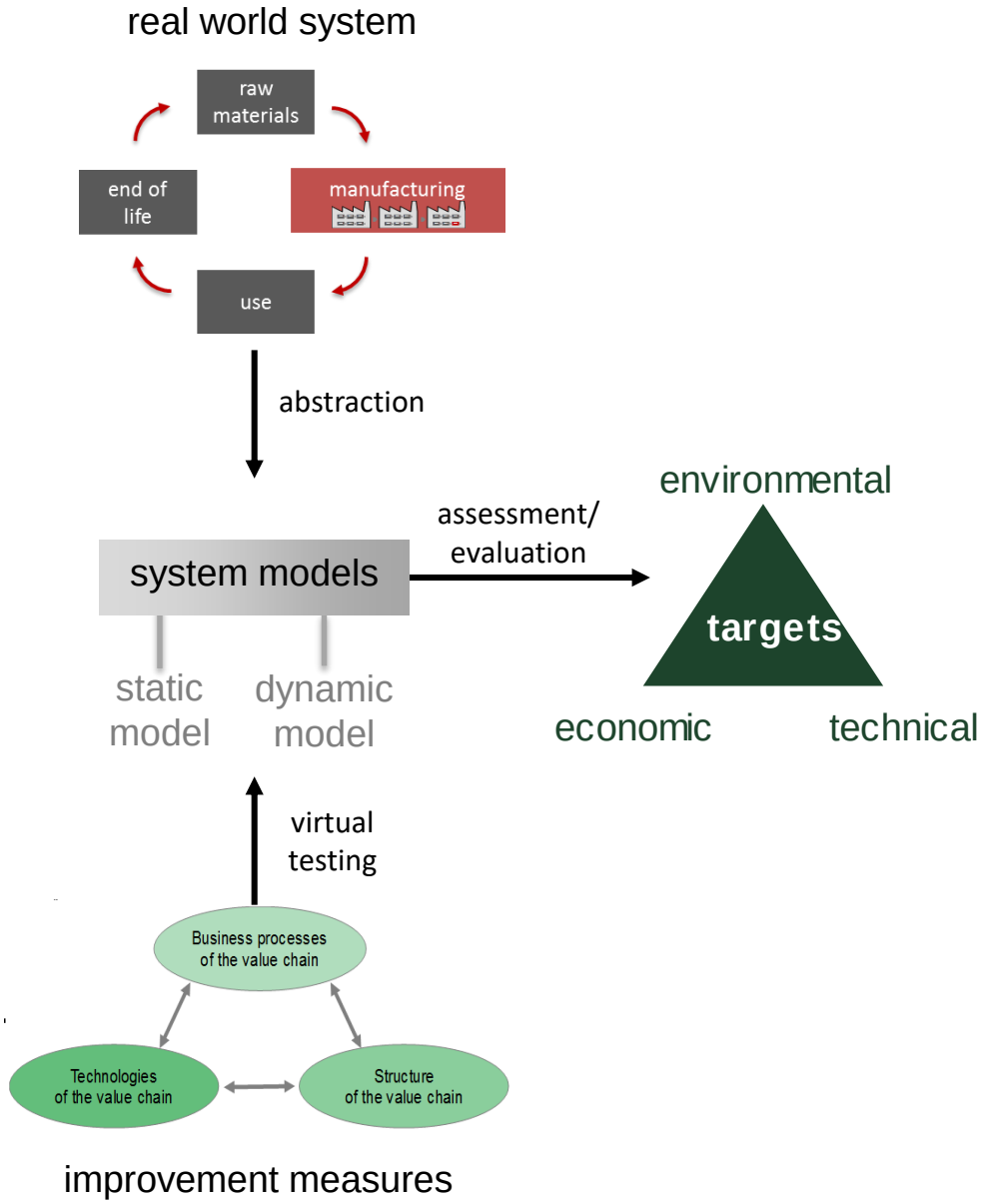

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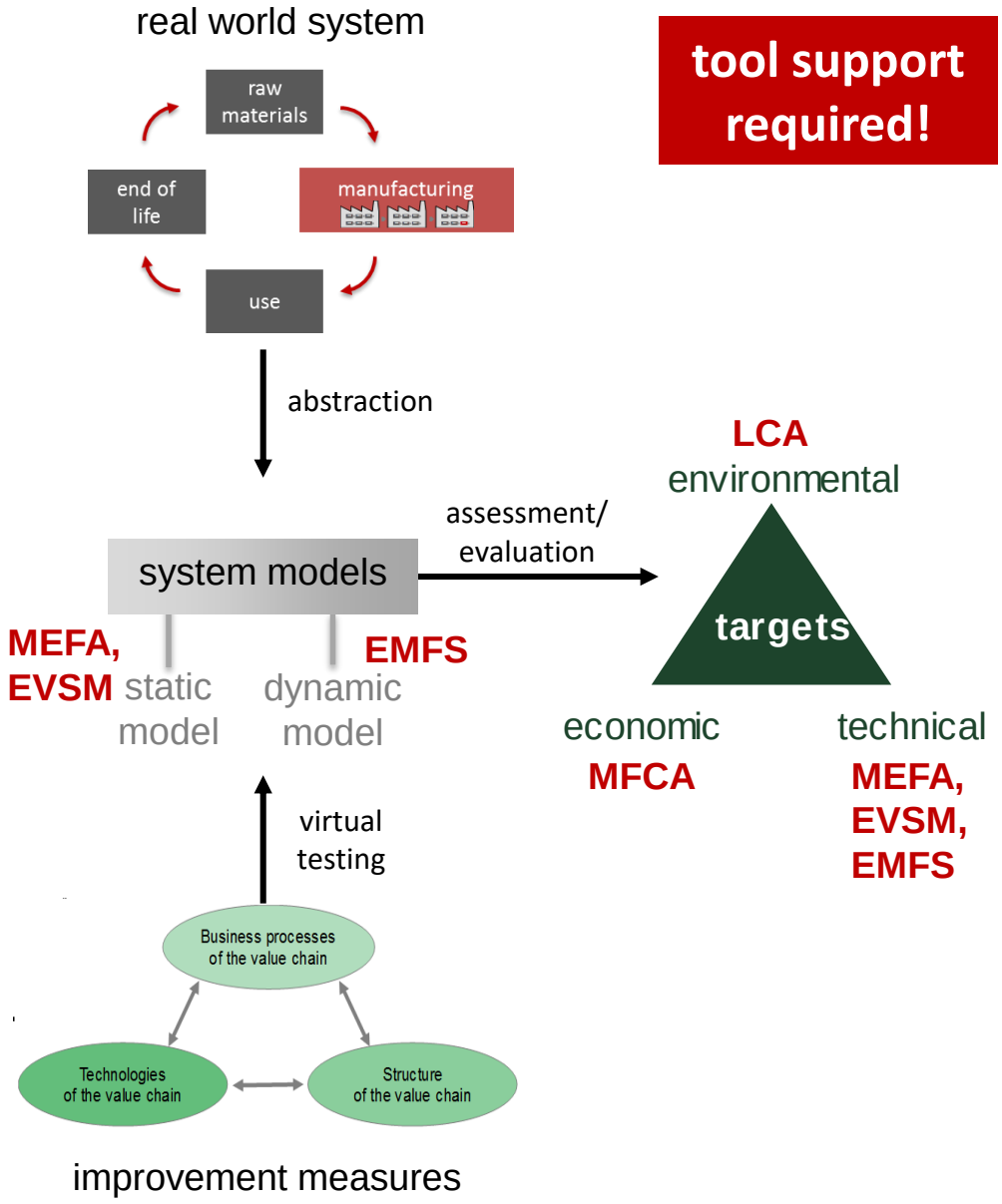
Combination of complementary methods to tackle complexity

criterion \ approach	MEFA	EMFS	LCA	EVSM	MFCA
dynamic system behavior	◔	◕	○	◕	○
economic performance	◔	○	○	○	◕
environmental performance	○	○	◕	○	○
technical performance	◕	◕	○	◕	○
changes in product/material flow	◕	◕	○	◕	○
simplicity (time & knowledge)	◔	◔	○	◔	◕
life cycle phases	○	◕	◕	○	○
decision support	◔	◔	◔	◔	◔
degree of application	○	○	◔	◔	◕

➔ **single solutions, no consistency**



tool support required!

MEFA: Material and Energy Flow Analysis EMFS: Energy and Material Flow Simulation LCA: Life Cycle Assessment MFCA: Material Flow Cost Accounting EVSM: Energy Value Stream Mapping

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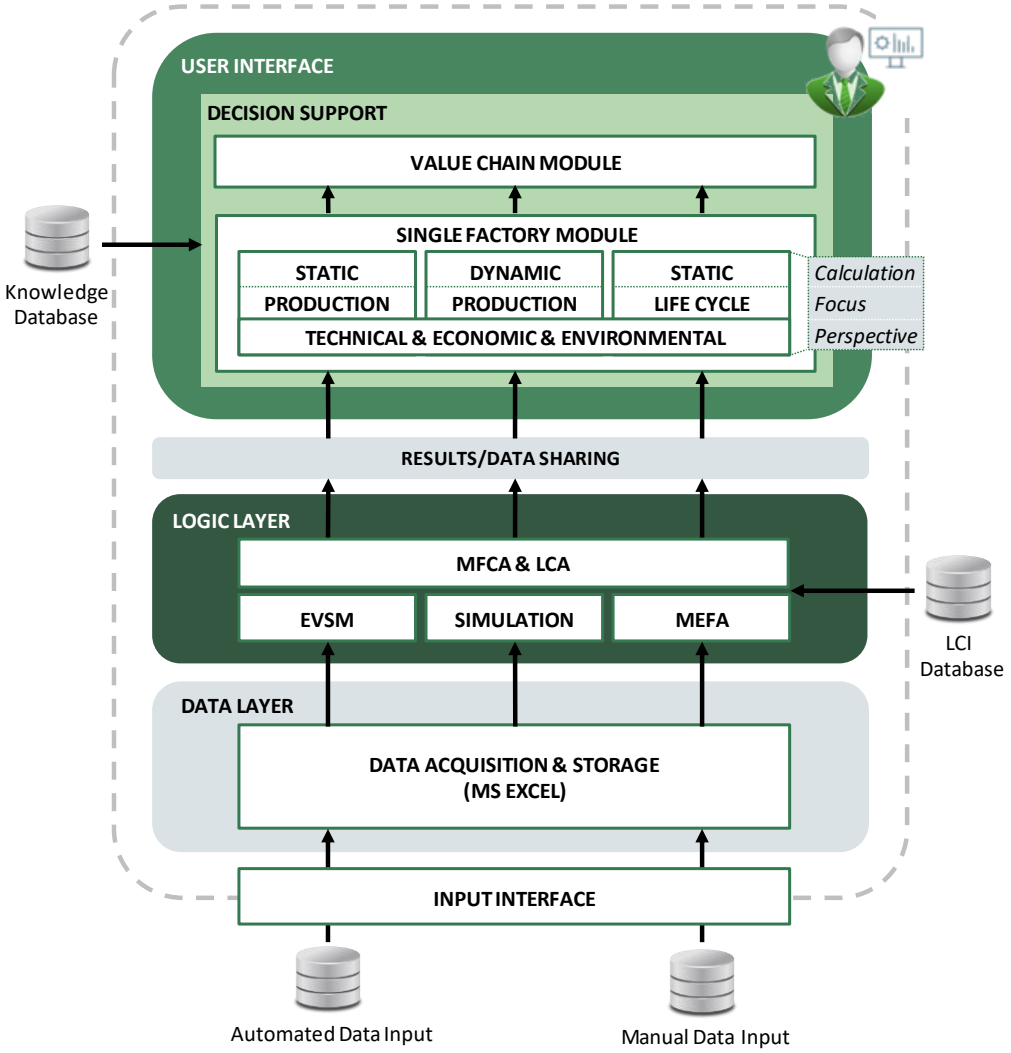
MEMAN TOOLBOX

Development of a new tool:

- novel method combination
- consistent data basis and KPI calculation
- holistic life cycle evaluation of value chains
- transparency about potential target conflicts and interdependencies
- implementation in standard software for high usability

MEMAN decision making toolbox



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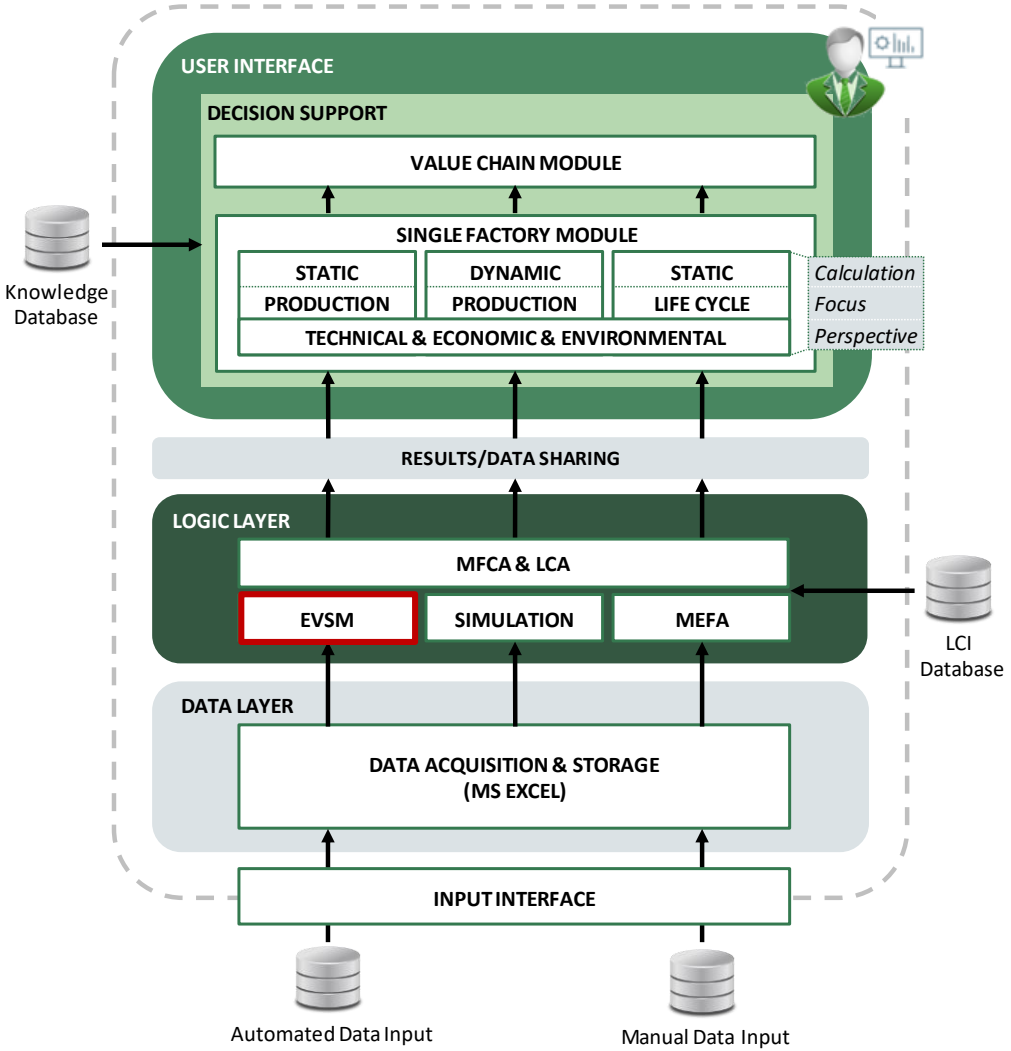
EVSM*

quick hotspot identification

results

- bottlenecks (static)
- quality losses
- energy hotspots
- …



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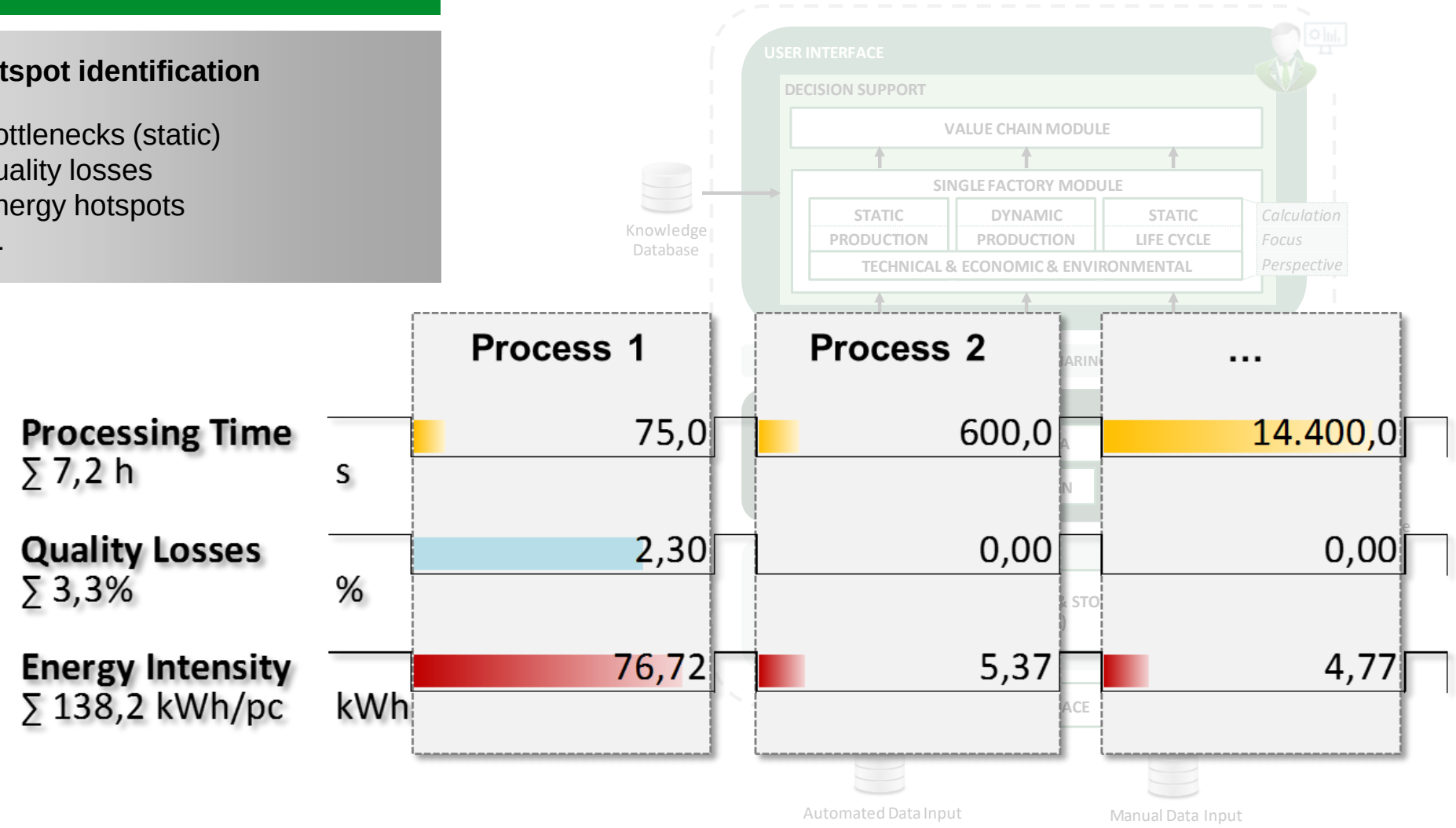

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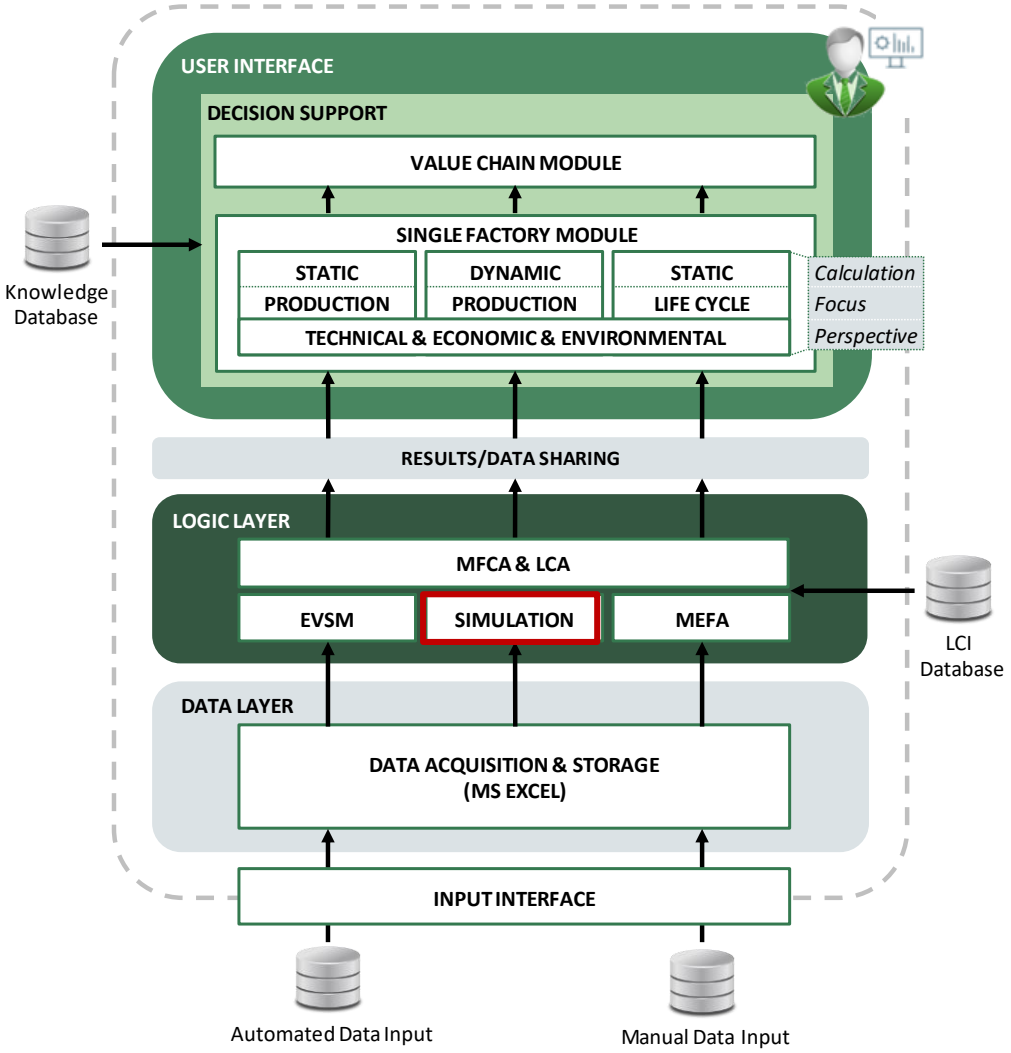
EMFS*

dynamic system behaviour understanding

results

- energy demand profiles
- machine utilisation, inventories, bottlenecks (dynamic)
- part specific energy demands
- …



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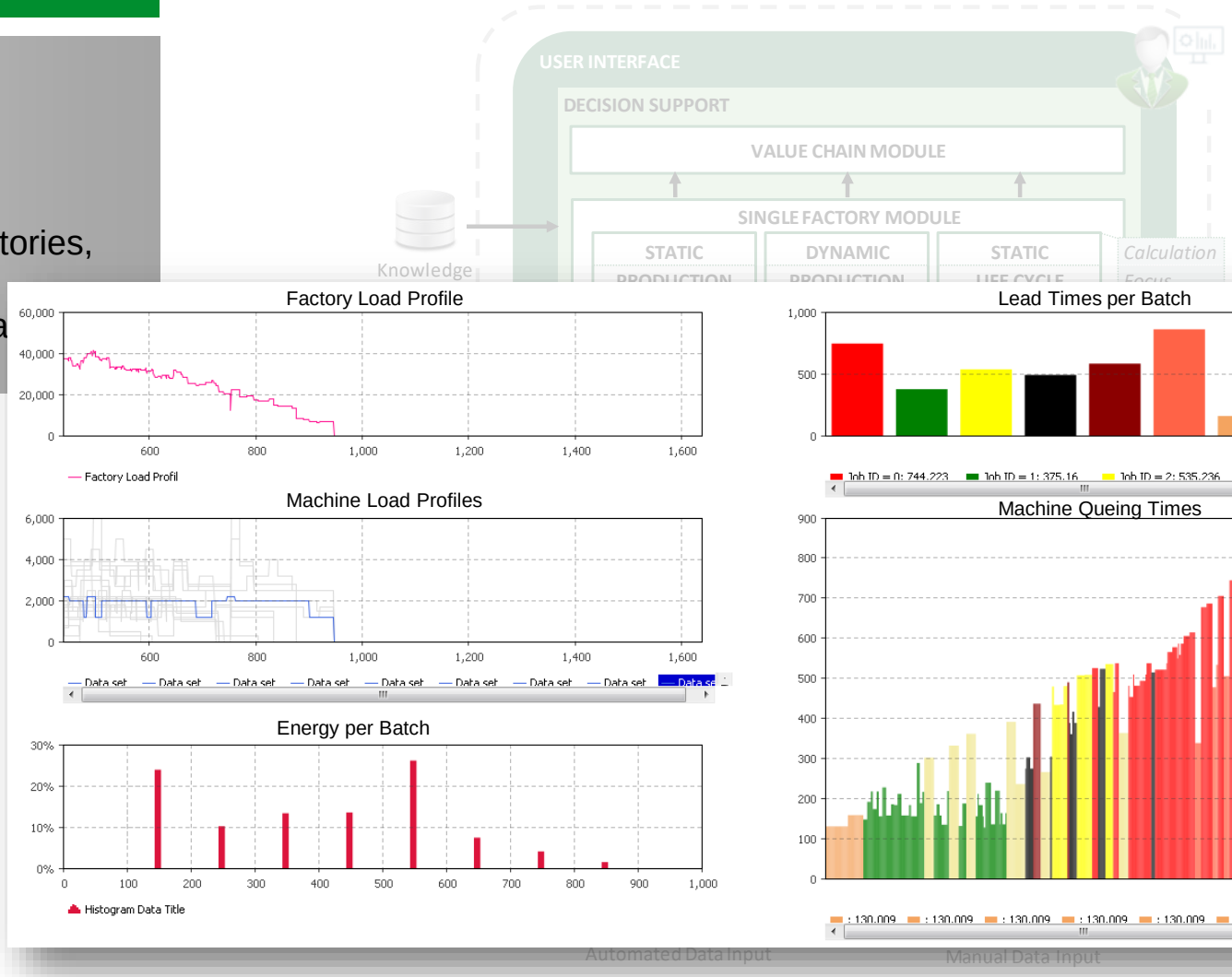

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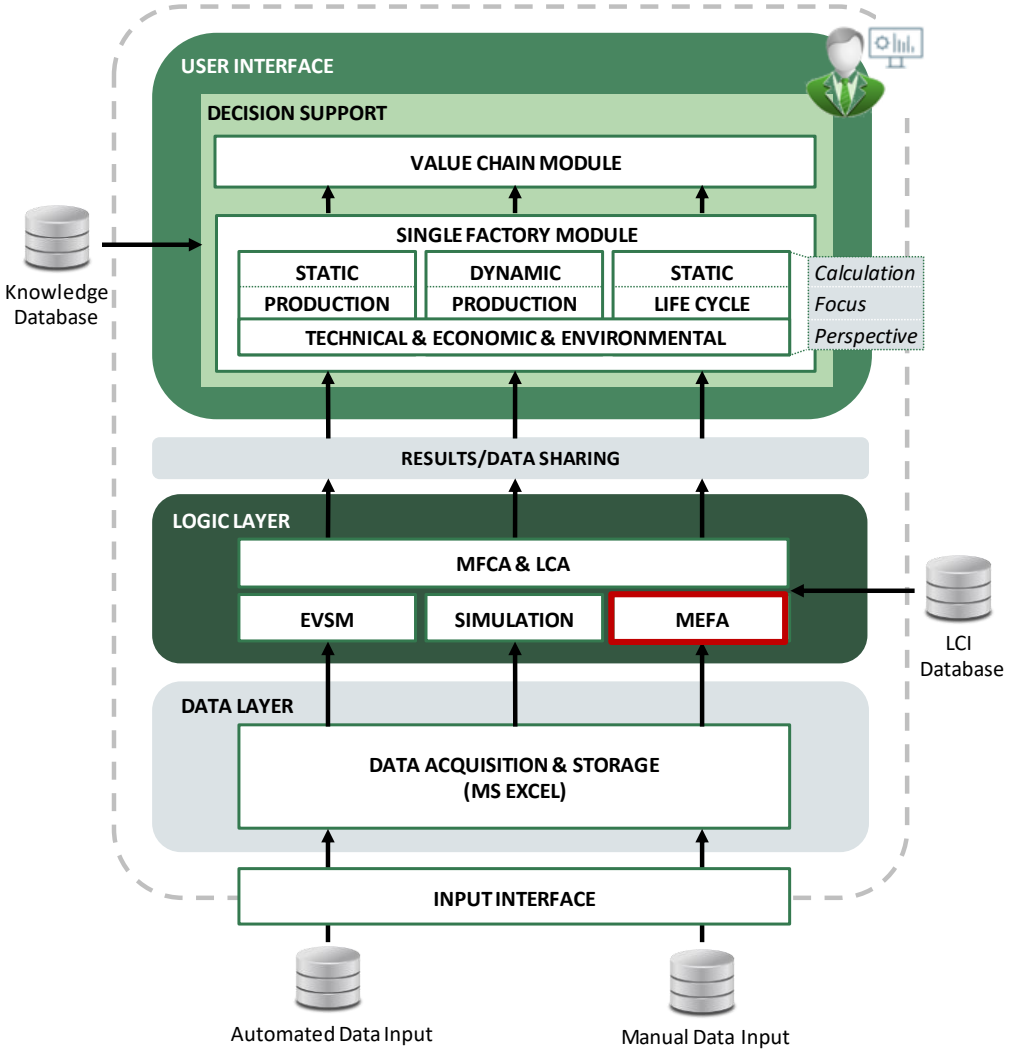
MEMAN TOOLBOX

MEFA*

flows of materials and energies

results

- input & output balances for processes, factories, life cycle phases
- basis for cost & environmental impact calculations



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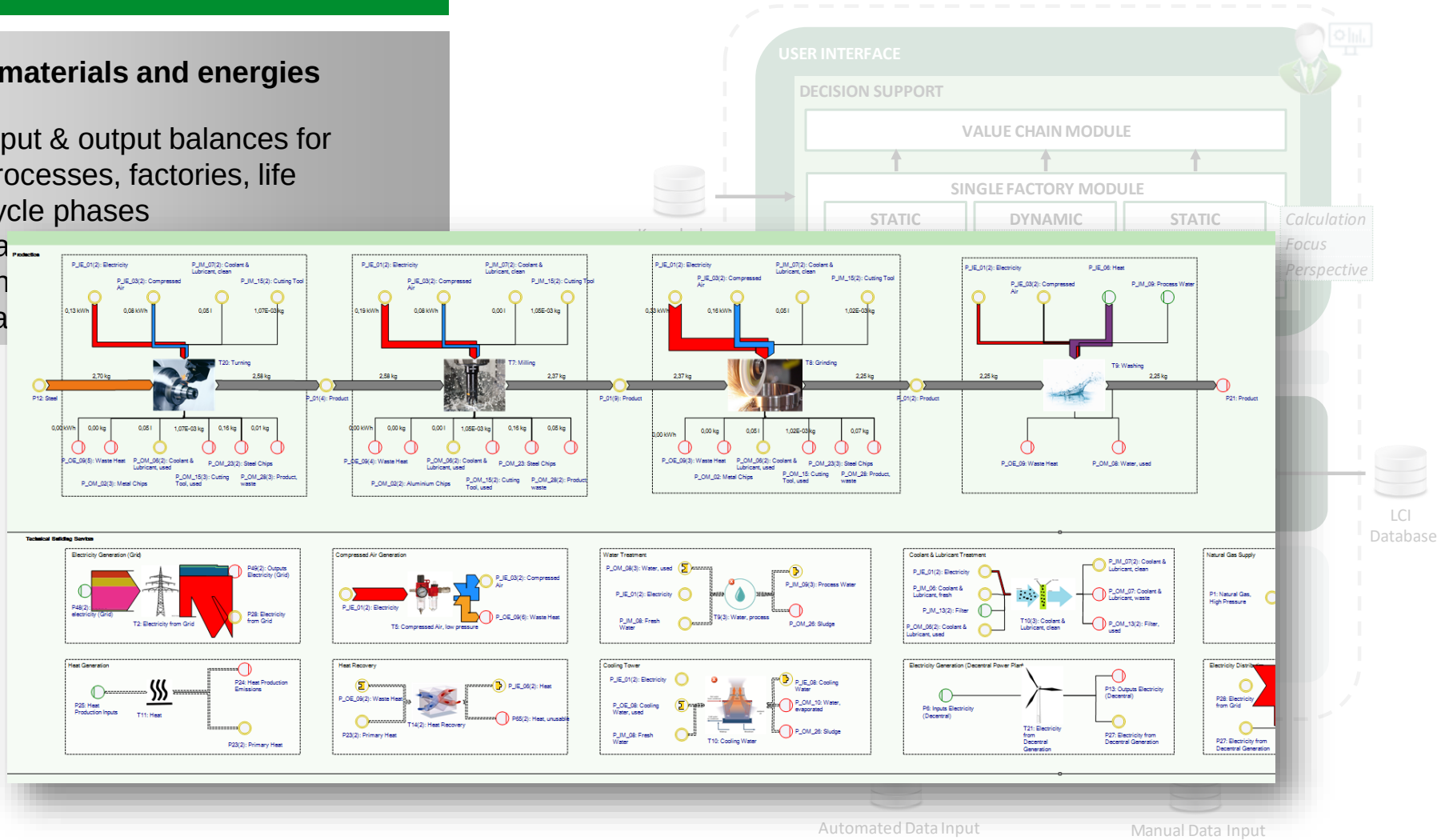
- ba
  en
  ca



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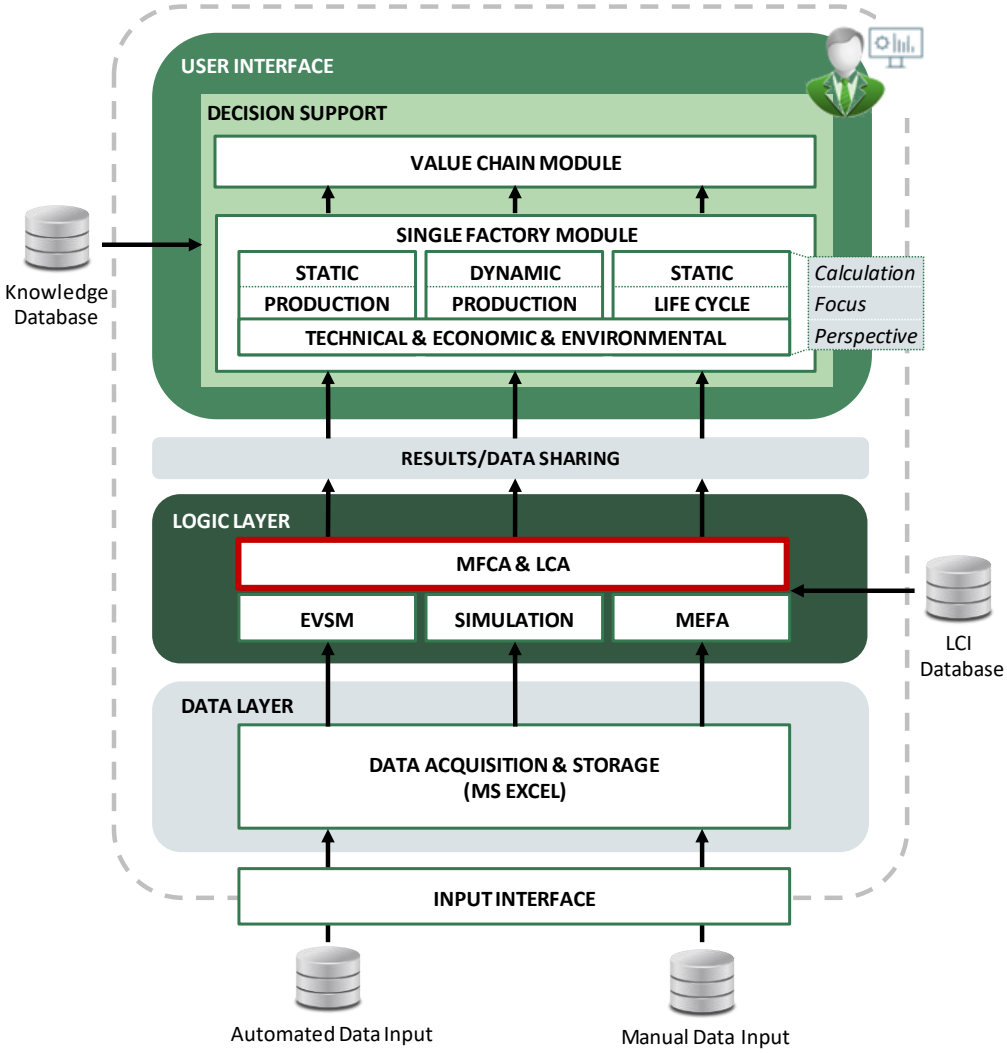
MFCA* & LCA**

economic & environmental consequences

- carbon footprint, toxicity, eutrophication etc.
- energy costs, material costs, labor costs etc.



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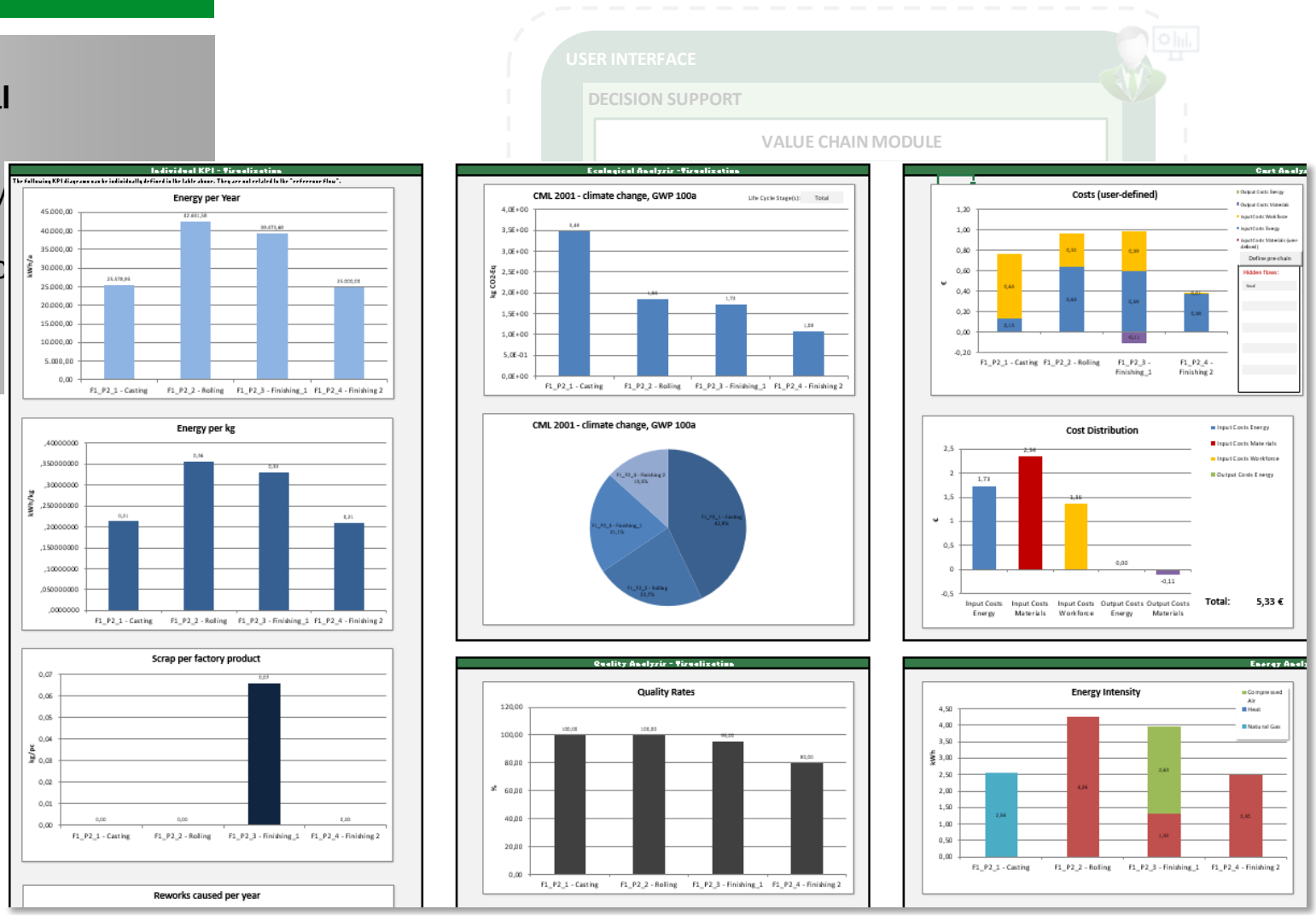

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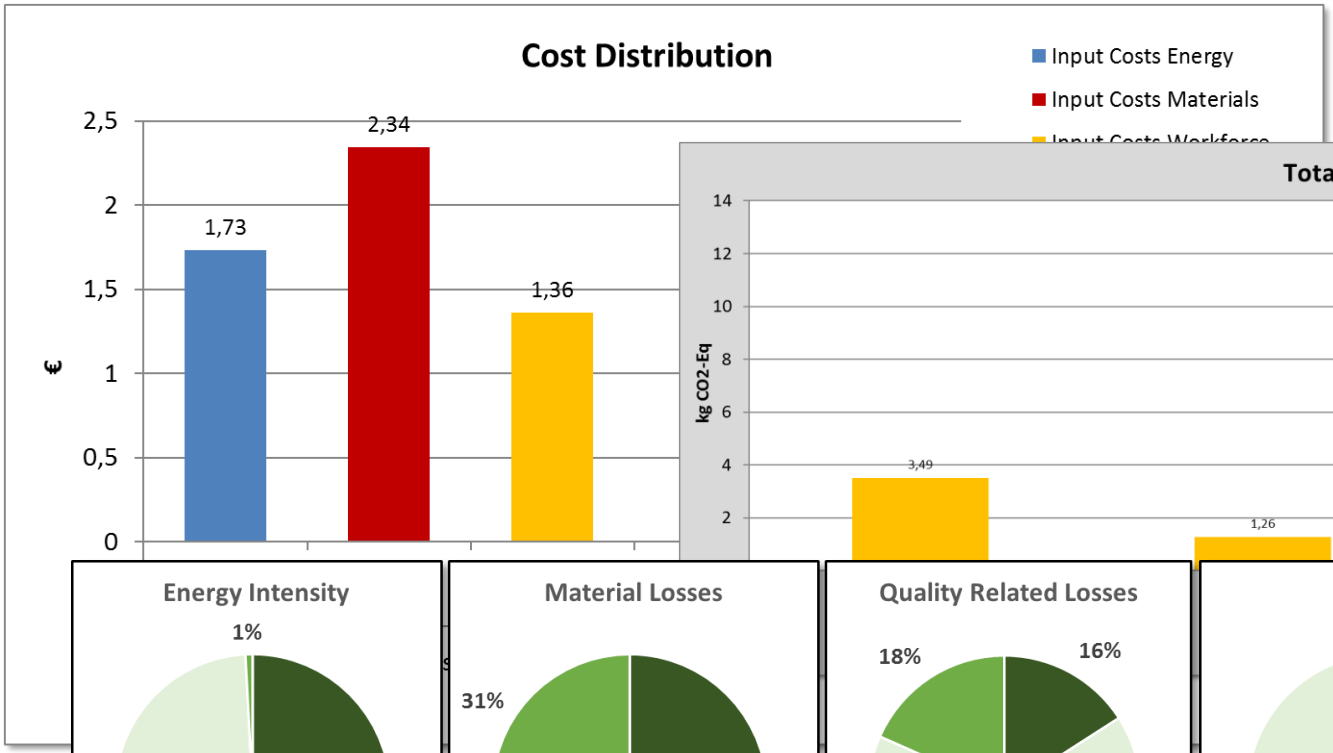
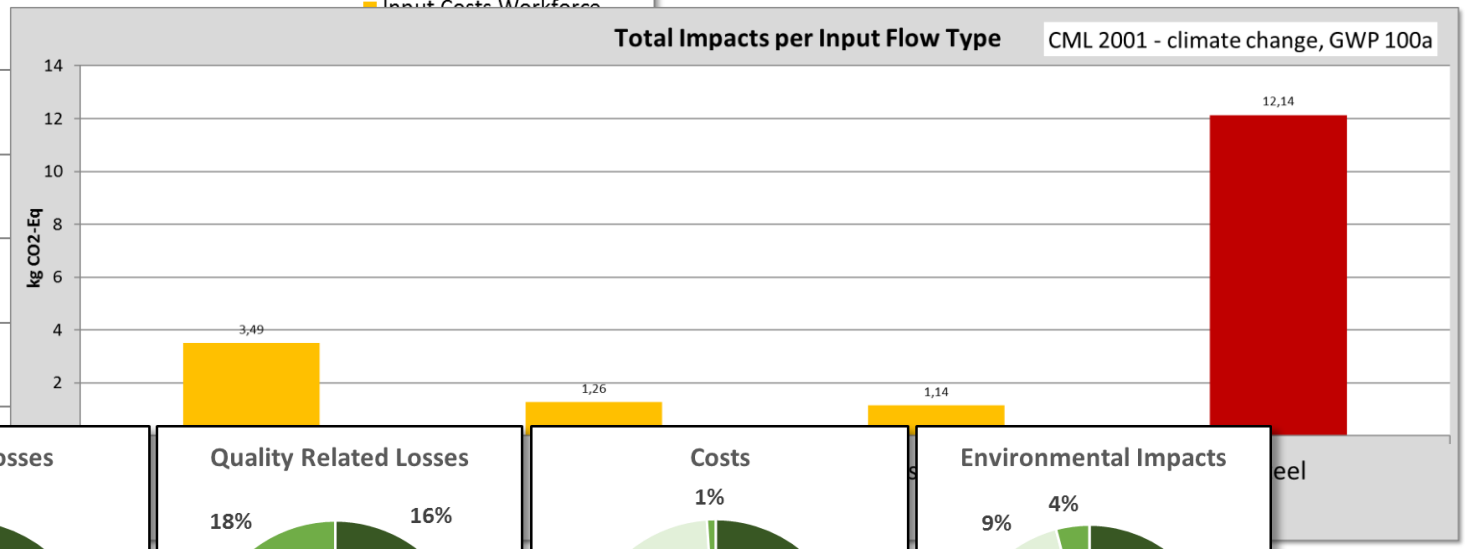
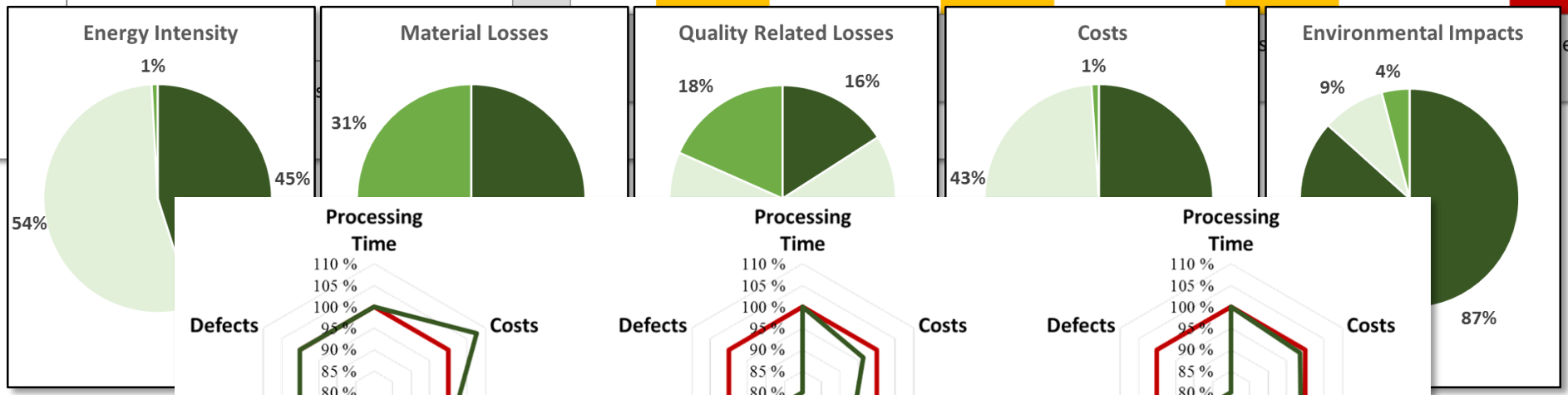
costs per product

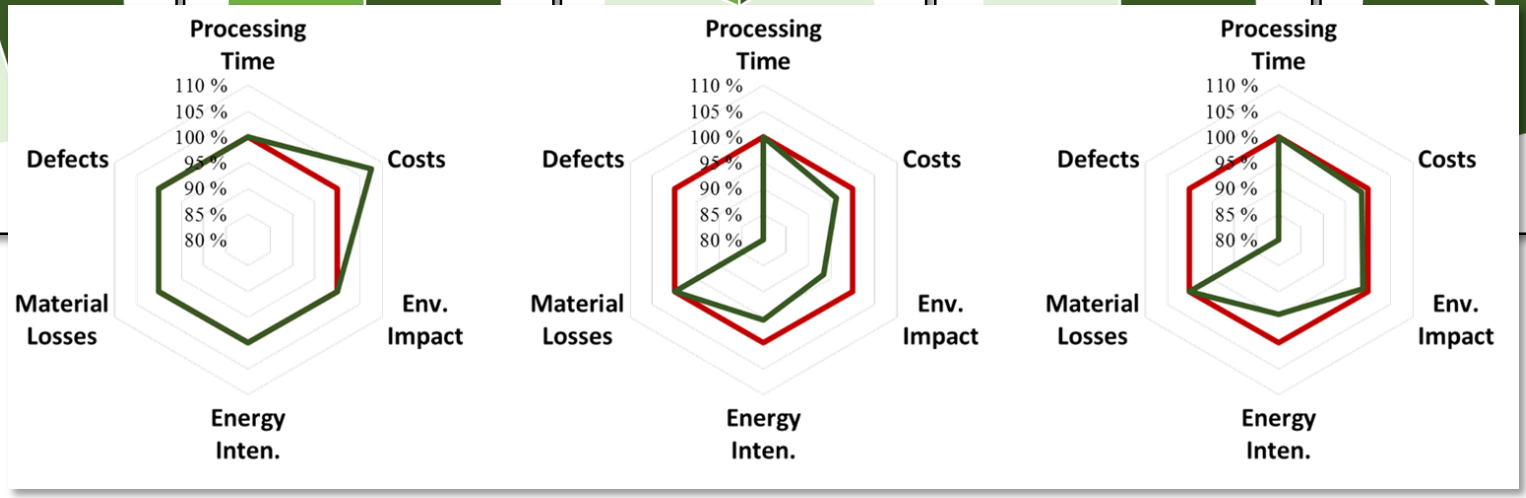


environmental impacts per product





impacts across the value chain



target conflicts

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Want to know more?

Downloadable publications (open access)

- Blume et al. 2018: “Increasing Resource Efficiency of Manufacturing Systems Using a Knowledge-Based System”
- Blume et al. 2017: “Toolbox for Increasing Resource Efficiency in the European Metal Mechanic Sector”
- Blume et al. 2017: “Toolbox zur Steigerung der Ressourceneffizienz im metallverarbeitenden Gewerbe“

see also: www.meman.eu

Contact

TU Braunschweig, Germany
Institute of Machine Tools and Production Technology (IWF)
- Chair of Sustainable Manufacturing and Life Cycle Engineering -
www.tu-braunschweig.de/iwf/

Dr.-Ing. Sebastian Thiede
Deputy Head, Group Leader „Sustainable Manufacturing”
s.thiede@tu-braunschweig.de

M.Sc. Stefan Blume
Research Assistant
stefan.blume@tu-bs.de

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