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HOCHSCHULE DARMSTADT
UNIVERSITY OF APPLIED SCIENCES

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SYSTEM INNOVATION FOR
SUSTAINABLE DEVELOPMENT

Chemicals and Process Innovations for the Leather Supply Chain

Short status presentation

19.10.2021

Patrick Rojahn | Prof. Dr. Frank Schael

Department of Chemical Engineering and Biotechnology | Hochschule Darmstadt
University of Applied Science, Germany

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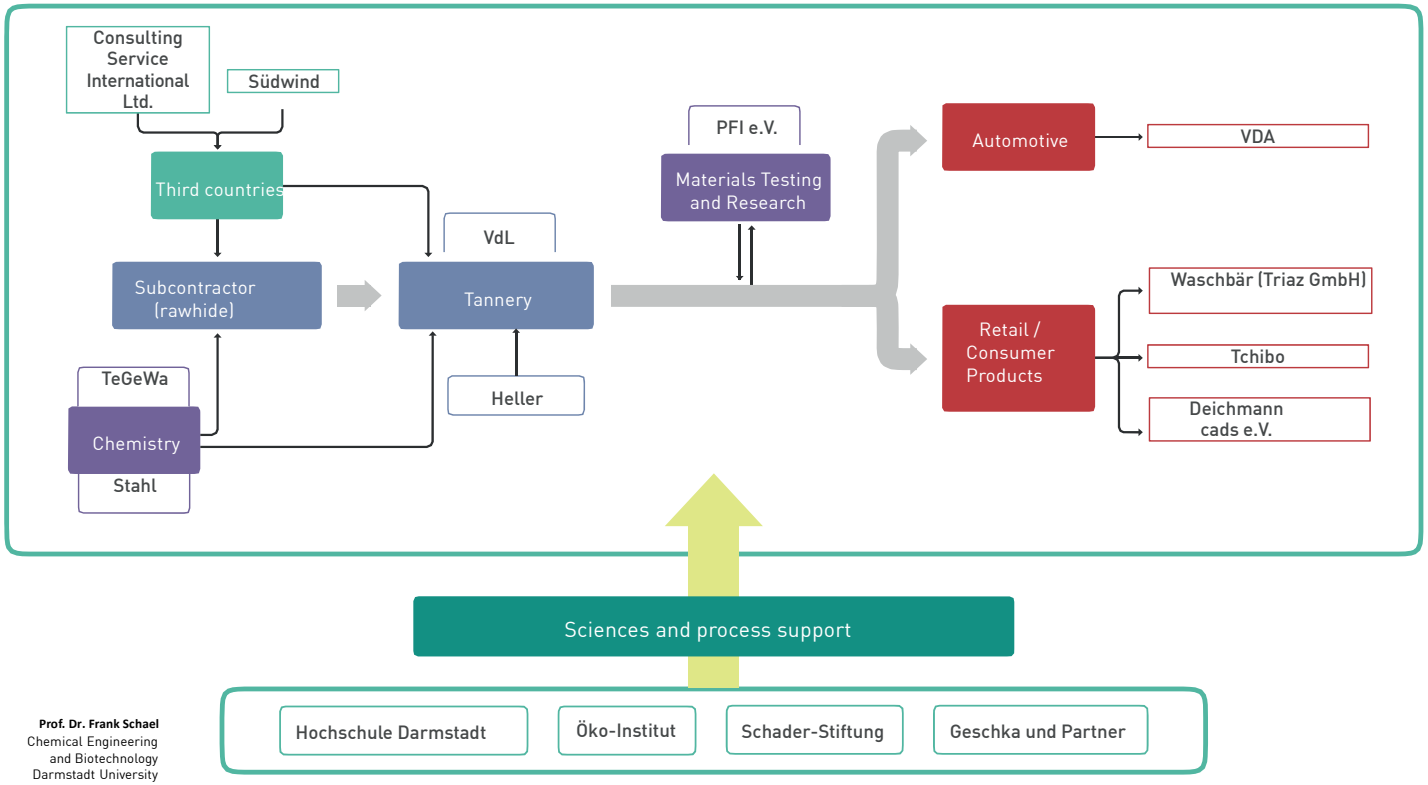
Background I: Scenario process participants (2019 -2020)

Commitment from representatives along the supply chain and other stakeholders to leather 2035 scenario



Scenario B: Quality through Appreciation and Awareness

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Background II: Pathway from subprojects to impacts as defined in leather 2035 scenario (theory of change)

1 Harmonisation of Standards

2 IT Tools and Governance for Traceability

3 Chemicals and Process innovation

4 Leather Design Guidelines for Sustainable Development

Outcomes 1

- Normative impulses
- More active critical public
- Structural system optimization and corresponding business models
- Process innovations
- Industry-wide governance structures for traceability
- Vertical and horizontal cooperation
- Capacity building in production countries
- Changed product development processes (towards SD)
- Changed purchasing behaviour (sourcing towards SD)
- Raising consumer awareness
- Product and information services at the point of sale

Outcomes 2

- Improved working conditions in third countries
- Enforcement
- „Cultural change" in the supply chains
- More sustainable production methods
- More sustainable products
- Changing consumption patterns

Impact

Establishing a „more sustainable" chemistry in the leather supply chains

Scenario B: Quality through Appreciation and Awareness

https://sne.h-da.de/en/implementation-project/system-innovation-for-a-more-sustainable-leather-chemistry/

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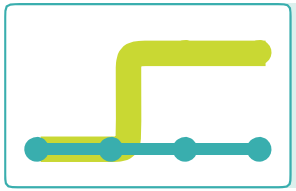
Objectives Subproject „Chemicals and Process Innovations“

Role of chemicals and process innovations viewed from system perspective



Strategies on how **leather chemicals** can be produced and used in a **more sustainable and economical way**

Identification of possible **technical and organizational potentials for process innovations** including possible contributions of modern process engineering concepts

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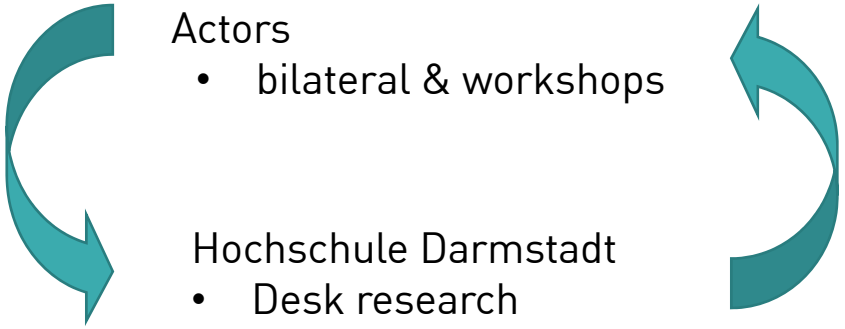
- Together with actors from the leather chain definitions, actions, tools are discussed (bilateral and / or in workshops)
- Based on (workshop and discussion) results Hochschule Darmstadt performs research
- Results are discussed in follow-ups and procedures are shaped



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General project approach

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- **Two international interactive workshops**
  - with impulse talks by experts from ÖkoInstitut, ZDHC
  - Definition of working fields
- **Lab & Pilot Plant Research**
  - Reactor development and technical synthesis of potential leather chemicals from renewable resources

    (Rojahn et al., Ind. Eng. Chem. Res. 2020;
    Schael et al., AOCS Meeting 2021)
- **Desk Research**
  - **Process assessment tool for the leather supply chain**

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SP3: Status & Results I

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Process assessment tool for the leather supply chain

- The workshops lead to the conclusion that an easy-to-use tool for sustainability assessment of the various steps of leather fabrication is missing
- h_da Team thus started to work out a concept which is described on the following pages
- The development followed the steps
  - Definition of requirements
  - Concept development
  - Test Implementation as spreadsheet
- The next steps are examinations with test users

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- Open source, easy to use, transparent, no special sw ⇒ MS Excel
- Provide direct internal benefit for the company: Auditing, management, process improvements
- Generally applicable throughout manufacturing actors of the supply chain
- Basis: Inputs, outputs, process performance
- “Sustainability” framework: Economic, environmental, social aspects
- Results presented as score value, no internal data to leave the company
- Under discussion: Results for external presentation on basis of accepted reference process (from textbook?)

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Technical approach for SP3 assessment tool

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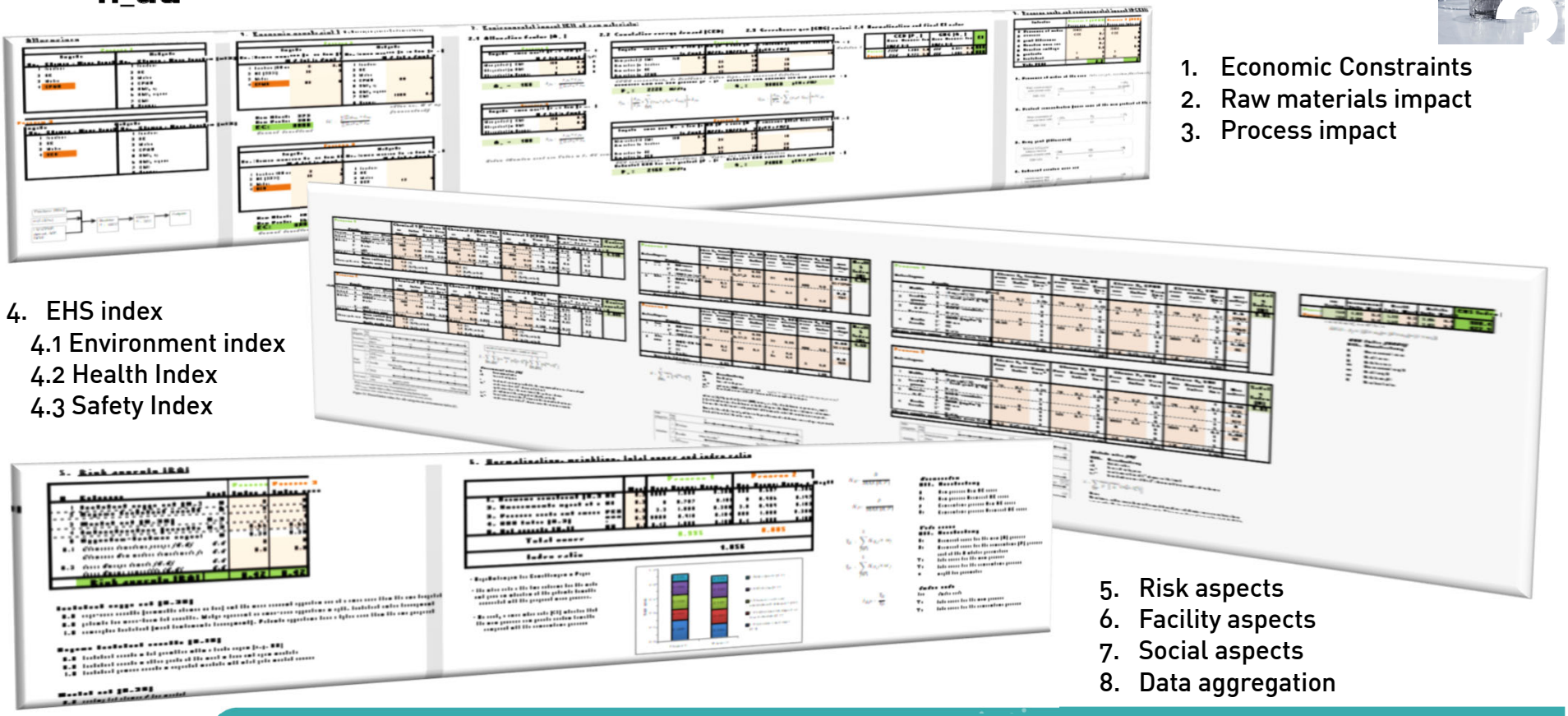

1. Economic Constraints
2. Raw materials impact
3. Process impact

4. EHS index
   - 4.1 Environment index
   - 4.2 Health Index
   - 4.3 Safety Index

5. Risk aspects
6. Facility aspects
7. Social aspects
8. Data aggregation

Current spreadsheet implementation of concept

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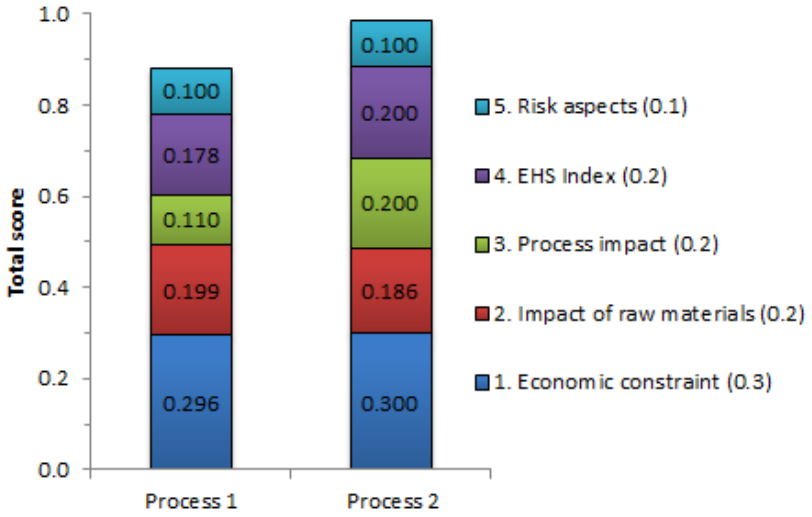
Results:

- Transparent comparison of score value for different processes on quantitative level
- Transparent concerning weighting factors
- Allows for sensitivity analysis
- T.b.d.: reference process



Exemplary results of spreadsheet implementation

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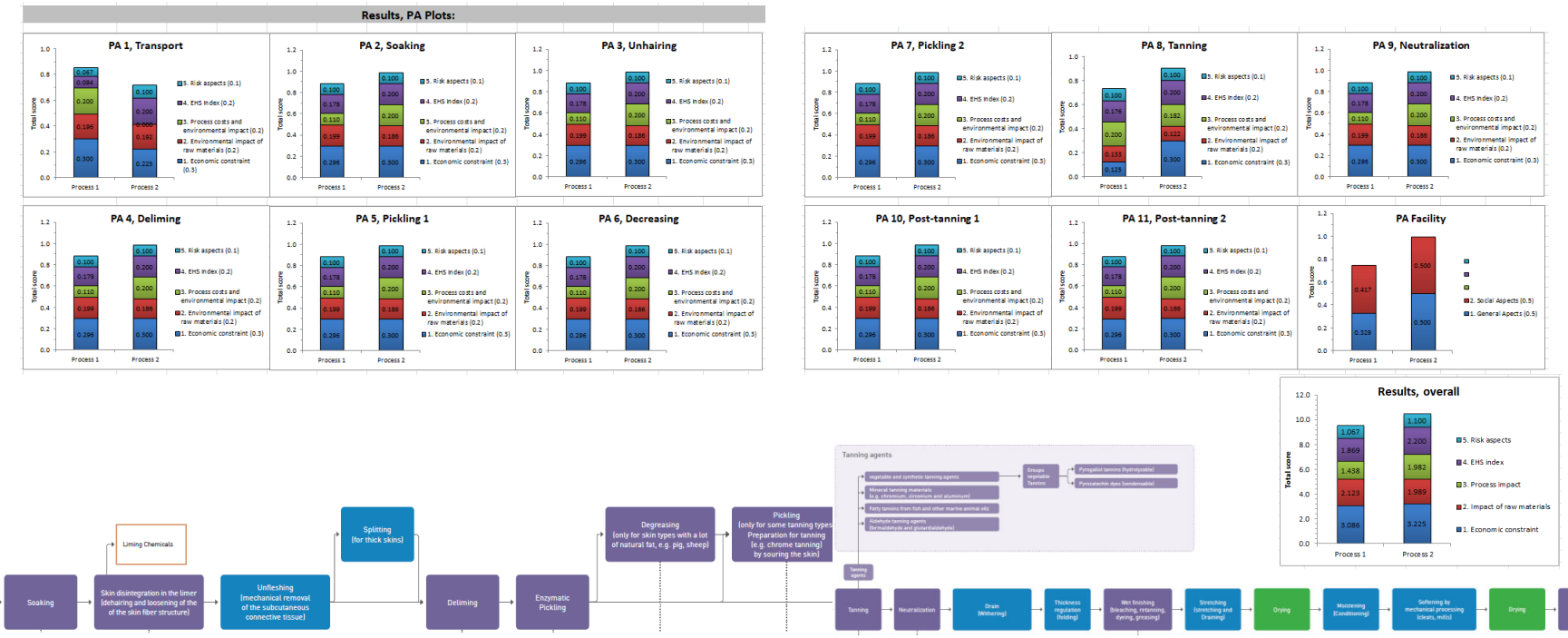

- Proposals for indicators, weighting factor, procedures for various fabrication steps
- Discussion, improvement & tests with actors

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Status & Next Steps

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- We are seeking for European tanneries which cover a number of leather processing steps to develop jointly an easy-to-use, simplified LCA tool with sustainability aspects for the leather industry.
- We kindly ask for collaboration partners for
  - Discussion of indicators
  - Selection of practically relevant input data
  - Discussion of practicability
- No actual data from your process or company is required
- Benefits:
  - Partners will receive test copy of the tool for own evaluation
  - Partners may use the tool also for auditing, process improvement, management

Call for participation: Opportunity to contribute & benefit

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Chemical Engineering
and Biotechnology
Darmstadt University
of Applied Sciences

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Thank you for your attention!

Prof. Dr. Frank Schael
Department of Chemical Engineering and Biotechnology
Hochschule Darmstadt University of Applied Science
Stephanstr. 7
D-64295 Darmstadt
Germany

Email: frank.schael@h-da.de
Phone. +49 6151 1638224

Contact information