Brief profile of subproject

Design guidelines for sustainable development

1. Challenge

The use of certain chemicals throughout the manufacturing processes of leather and leather goods serves functional (e.g. UV resistance, stiffness) as well as aesthetical purposes (such as colour, haptic). A "more sustainable" leather chemistry therefore leads, due to changes in the use of chemicals and the manufacturing process, in some cases to materials with functional and aesthetic properties that differ from those of conventionally produced leather. Among other things, these differences affect possible areas of application and related requirements (e.g. material care). One example is resistance to environmental influences such as UV radiation, mechanical friction and moisture. Although more sustainably produced leather seems to be more sensitive in this respect, the changeability and ageing of the material can be seen as aesthetic (cf. patina) or even functional unique selling propositions (USP).

However, this requires a corresponding use and design appropriate to the material that makes use of its particular aesthetic features (e.g. stone-washed jeans) as well as target-oriented marketing instruments. Design and the associated selection and sourcing of materials are inseparably linked to issues of consumer behaviour, particular material properties , areas of application and business models. Considering findings derived from these topics throughout the design and development process can be useful both in terms of design as well as sustainable development and offers new marketing potential. In addition to the use and processing of "more sustainably" produced leather, this potential also extends to business models such as those related to product-service systems (PSS; see Waidelich et al., 2019). Examples for PPS could be products that are supplemented by services (e.g. maintenance service) or products that are marketed as services (e.g. Shoe leasing).

Previous approaches in the form of guidelines, playbooks and design kits generally refer to technical and organisational aspects of product development (cf. e.g. CFDA KPI Design Kit), for example by addressing issues such as working conditions and the selection and processing of the materials used. Elsewhere, these points are complemented by the potential of extended business models (Huang et al., 2016) and co2 balances (e.g. Herva et al., 2011). Leather goods are only rarely explicitly examined as an independent area (e.g. Motawi, 2017). Guidelines and manuals, which approach the use of “sustainably” produced leather from a primarily formal-aesthetic perspective, have been lacking to date. In other areas of the fashion and lifestyle industry, on the other hand, individual market players offer guidelines (e.g. www.nikecirculardesign.com) that address not only technical aspects (e.g. "green chemistry", "disassembly") but also formal aesthetic attributes (e.g. "versatility"). They are addressingconsumer behaviour as well. However, these approaches often remain on a schematic level, replacing concrete design principles and starting points with case studies. Although guidelines such as the Circular Design Guide (www.circulardesignguide.com) from IDEO and the Ellen MacArthur Foundation do indeed address concrete principles and working methods, they also largely refer to technical and conceptual aspects of

design. Moreover, leather is only a rare case study in this context (https://www.circulardesignguide.com/story/a-systemic-approach-to-designing-with-resources).

2. Goals and project description

The subproject proposed here is concerned with the development of design guidelines for the use of "more sustainably" produced leather. To this end, a team of experts from different parts of the development process (including leather goods production, brands, sales, purchasing, design and material testing) will first define criteria for more sustainably produced leather and associated specific material properties. Based on these criteria, the aim of the guidelines is to provide users from fields such as product development and design, product management, marketing and sales with orientation and guidance in (A) how sustainably produced leather can be optimally used in products and how it can be brought to bear. Such a formal-aesthetic examination of the design potential related to the use of sustainably produced leather does not aim at strict specifications and formulas, but rather at design principles and guidelines, as an orientation aid, impulse generator and reference book. Associated with this are also questions of material sourcing.

Furthermore, (B) corresponding business models, service concepts and marketing strategies that are particularly useful in this respect are to be investigated. With the development of these design guidelines, the potential of product-service systems in relation to leather will also be explored. Possible starting points include service flat rates and leasing concepts. These distribution channels represent changed basic principles for the conception and design of leather goods, which are to be considered separately in the leather design guidelines. For example, higher quality and more sustainably produced goods could address a broader market by reducing acquisition costs or by structurally separating ownership and use. This could also result in other positive effects for suppliers, such as increased customer loyalty.

The current aim of the design guidelines is to provide an openly accessible document that addresses the characteristics, criteria, strengths and weaknesses of certain "sustainable leather types", as well as how and for what purposes these materials are ideally used and maintained. This includes in particular aspects of design and production methods.

The target group of the guidelines are primarily users from the fields of design, development, purchasing (of materials and semi-finished products) and marketing, who can make more informed design and conceptual decisions with the help of the guidelines. In addition, the guidelines are intended to open up new forms of marketing and diversification (e.g. product service systems, circular economy, etc.) to decision-makers in sales and in management. These guidelines can also serve as a tool for importers and purchasing departments to communicate concrete design requirements and demands with regard to sustainable development in a clear and referencable manner.

3. Research and transfer questions:

How can a set of criteria and specific properties of sustainably produced leather commonly be defined?
What are the specific characteristics, properties and advantages/disadvantages of different types of sustainably produced leather?
How can the specific properties, potentials and limitations of sustainably produced leather be optimally exploited in product development and use?
Which design principles (e.g. technical construction of the product, form-fit, connection between parts and materials, etc.) promote aspects of sustainable development (e.g. robustness, longevity, reparability, recyclability, etc.)?
Which Product Service Systems can be derived from this (e.g. #circular economy) and what special requirements do these PSS place on material, product, supplier and supply chain?

4. Structure

A tandem consisting of one representative from the Darmstadt University of Applied Sciences and one from practise coordinates the project. Anyone interested can participate in the project.

The cooperation takes place via meetings / web conferences / workshops.

Project group coordination

Representing Darmstadt University of Applied Sciences: **Jonas Rehn**

Representing the practise: **#tbd**

Development plan:

Major project steps (partly running parallel)	Format(s)
1. research on tanning processes and material properties in relation to sustainable development	Desk Research, Expert interviews
2. research on aspects of sustainable development in relation to leather goods	Desk Research, Expert interviews
3. analysing the results of the research and developing a common definition of criteria and specific properties of sustainably produced leather.	Conference calls / Workshop
4. development of a taxonomy as a basis for the guidelines	Workshop / Working papers
5. development of the guidelines based on the taxonomy	Workshop / Working papers
6. elaboration of PSS approaches and examples	Workshop / Working papers
7. publication of the guidelines (open-access)	
8. development and testing of concrete offers and products based on the guidelines	Workshop

5. Extract of relevant literature

Glessman, Megan; McAlpin, Casey; McClauley, Kerin; Quartararo, Elizabeth; Tsukada, Kately; Wallace, Sam: CFDA KPI Design Kit. A Sustainable Strategies Playbook for Measurable Change. Hg. v. Kevin Bass und Marc Karimzadeh. NYU Stern - Center for Sustainable Business; Council of Fashion Designers of America. Online verfügbar unter https://s3.amazonaws.com/cfda.f.mrhenry.be/2019/10/CFDA-KPI-Design-Kit-HIGHRES.pdf, zuletzt geprüft am 23.04.2020.

Herva, Marta; Álvarez, Antonio; Roca, Enrique (2011): Sustainable and safe design of footwear integrating ecological footprint and risk criteria. In: *Journal of hazardous materials* 192 (3), S. 1876–1881. DOI: 10.1016/j.jhazmat.2011.07.028.

Huang, Yu-Chen; Tu, Jui-Che; Hung, So-Jeng (2016): Developing a Decision Model of Sustainable Product Design and Development from Product Servicizing in Taiwan. In: *EURASIA J MATH SCI T* 12 (5). DOI: 10.12973/eurasia.2016.1513a.

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Kering Luxury Activities (Hg.): Sustainability Principles. Online verfügbar unter https://keringcorporate.dam.kering.com/m/0cb4a4b5740cf783/original/Sustainability-Principles_EN.pdf, zuletzt geprüft am 23.04.2020.

Leibowitz, Domenica; Croke, Lauren: CFDA Guide to Sustainable Strategies. Hg. v. Council of Fashion Designers of America. Online verfügbar unter https://s3.amazonaws.com/cfda.f.mrhenry.be/2019/01/CFDA-Guide-to-Sustainable-Strategies_16.pdf.

Motawi, Wade (2017): Shoe material design guide. The shoe designers complete guide to selecting and specifying footwear materials.

Nike (2020): Nike Circularity Workbook. Online verfügbar unter https://www.nikecirculardesign.com/guides/CircularityGuide.pdf, zuletzt geprüft am 29.04.2020.