FAKULTÄT TECHNIK UND INFORMATIK
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Social Evaluation of Aircraft

Sustainability assessment must look at three aspects: social, environmental, and economic aspects (SEE). Generally, economic aspects are given more importance than environmental aspects. Least attention is on social aspects. This is mirrored by the small number of publications on the topic.

A single aircraft is a unit too small for a social evaluation. "Aircraft" is meant here in plural. The evaluation is done as a social life-cycle assessment (S-LCA) of the whole project for an aircraft type. The life cycle starts with the first idea and ends with the last aircraft of its type at its end of life. The Airbus A380 project is used as a good example for an S-LCA, because of its impact far beyond company premises.

METHODOLOGY

Social impacts of an aircraft program are analyzed by conducting a Social Life Cycle Assessment (S-LCA) based on the S-LCA Framework. Stakeholders and subcategories are chosen, and data is collected by conducting qualitative interviews and web searches. An impact assessment is performed using the Subcategory Assessment Method (SAM). The results are interpreted and generalized. (Figure 1, 2, 3)

FINDINGS

During its life span, an aircraft program has an impact on different stakeholders. The life cycle stage "raw material extraction" could lead to human rights violations, but also local communities near main manufacturing sites face social implications, both positive and negative. The economic importance of the aeronautic sector influences society, political decision makers, local communities, and workers. All this was evident also in the A380 program [4].

Documentation of the S-LCA Framework:

- Mapping the process from ISO "Environmental Management: Life Cycle Assessment (LCA)": ISO 14040 – "Principles and Framework" and ISO 14044 – "Requirements and Guidelines".
- "Guidelines for Social Life Cycle Assessment of Products", developed by the United Nations Environmental Programme (UNEP) and the Society of Environmental Toxicology and Chemistry (SETAC) (2009) [1]
- "Guidelines for Social Life Cycle Assessment of Products and Organizations" UNEP (2020) [2] (an update to [1]).
- "Methodological Sheets for Subcategories in Social Life Cycle Assessment" (UNEP 2013) [3] provide information about the inventory indicators and the data that needs to be collected.

"Social Organizational Life Cycle Assessment (SO-LCA) is a compilation and evaluation of the social and socio-economic aspects and the positive and negative impacts of the activities associated with the organization as a whole ... [not just one project] adopting a life cycle perspective." [2]

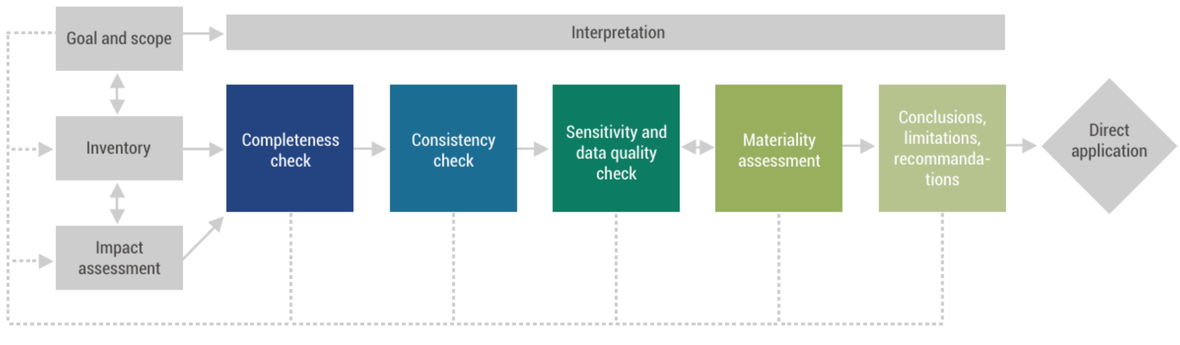

Figure 3: **The elements of the interpretation phase in S-LCA and their relationship with the other life cycle phases. The dashed arrows highlight the iterative nature of the different steps. [2]**

RESEARCH LIMITATIONS

Data availability may limit the investigation. The project may not cover all typical life cycle stages and stakeholder groups. Emphasis may be given in the evaluation to selected program stages and stakeholder groups.

PRACTICAL IMPLICATIONS

The results of an S-LCA can help aviation decision makers to shape the aircraft project in a way to improves the well-being of its stakeholders.

SOCIAL IMPLICATIONS

Performing an S-LCA in aviation puts social implications of an aircraft program into focus and provides a foundation for a general discussion about its social sustainability. The S-LCA can draw attention to social hotspots.

ORIGINALITY

According to the literature review, this seems to be the first research on the topic of S-LCA of an aircraft or aircraft program.

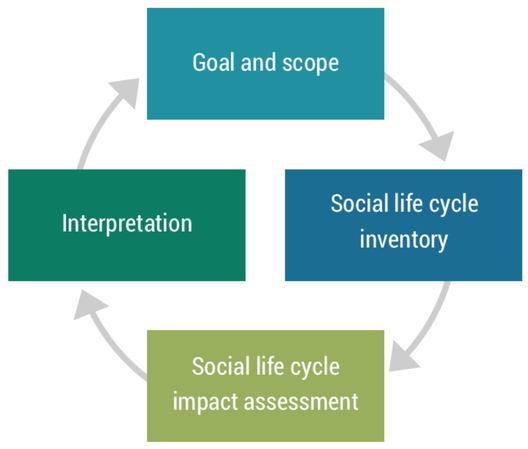

Figure 1: **The four iterative phases of an S-LCA The arrows represent connections between all phases. [2]**

Stakeholder	Subcategory
Local community	Delocalization and Migration
	Community Engagement
	Cultural Heritage
	Local Employment
	Safe and Healthy Living Conditions
	Material Assets
Workers	Freedom of association and collective bargaining
	Fair salaries
	Hours of work
	Health and safety
	Equal opportunity / discrimination
	Social benefits
Passengers	Health and safety
	Comfort
Society	Public commitment to sustainability issues
State	Political power and prestige
	Contribution to economic growth
Company	Profit
	International teamwork
	Technology development

Figure 2: **Selected stakeholders and subcategories chosen for the Subcategory Assessment Method (SAM) as part of the S-LCA of the A380 program. Loth (2021).**

References

[1] https://perma.cc/ZSZ4-6KPH [2] https://perma.cc/3GEY-DEAQ
[3] https://perma.cc/T93U-CQ63
[4] SCHOLZ, 2022. Airbus A380–Ein Nachruf. https://doi.org/10.48441/4427.402

All details in the Bachelor Project of Loth (2021):

https://nbn-resolving.org/urn:nbn:de:gbv:18302-aero2021-12-16.012

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