



University of Seville
*Instituto Universitario de
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Towards a Life Cycle Sustainability Assessment method for the quantification and reduction of impacts of buildings life cycle

AUTHORS

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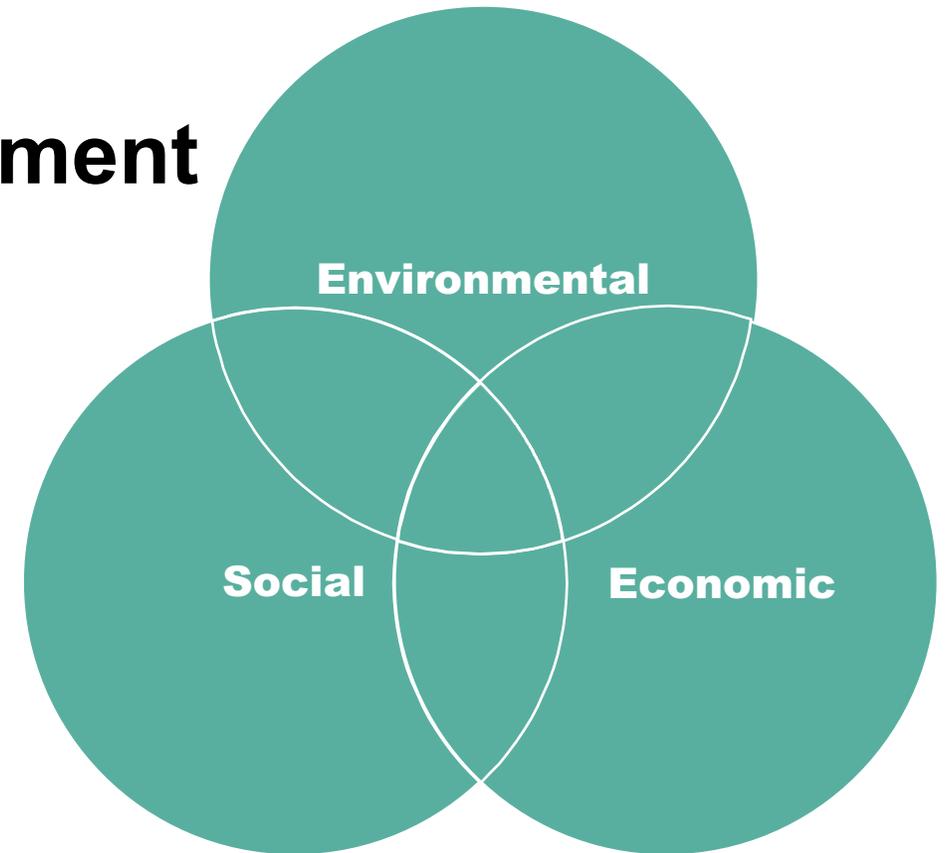
Research significance

Life Cycle Sustainability Assessment

Aims to go beyond the limitations of the “traditional” (environmental) LCA approach, by integrating environmental, economic and social dimensions.

$$\mathbf{LCSA=LCA+LCC+S-LCA}$$

Klöpffer (2008) formula



Contents



Aims and methods

Describe a methodological framework based on an LCSA approach, used during design stages of buildings and integrated into a building's design methodology such as Building Modelling Information (BIM).



Literature review

Identify the main contributions and the research gaps on the field of LCSA and BIM-based LCA approach application.



Method

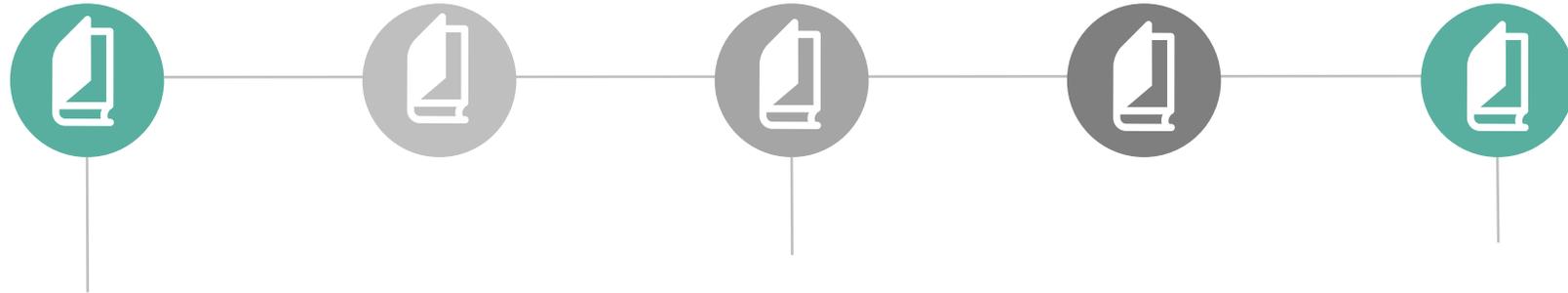
General description of the main methodological aspects to be considered to conduct LCSA during design stages of buildings, and a possible workflow is proposed.



Discussion Conclusions

A set of limitations, challenges and resulting research gaps is presented.

Literature review



LCSA of buildings

Infrequent in building sector, especially focused on guiding the design stages and assessing scenarios for sustainability.

BIM-based LCSA

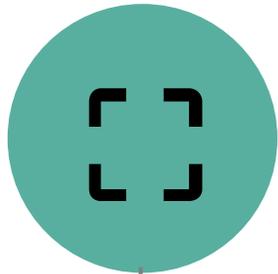
Scarce existence of tools or methods, that develop BIM based LCA “triple approach” (environmental, social and economic).

LCSA design stages

Scarce existence of tools or methods based on the quantification of impacts produced by buildings during their life cycle, that can be used to guide decision-making during the design stages

Description of the method

Methodological considerations in LCSA



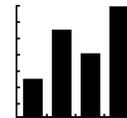
Goal and scope

The system boundary comprised relevant unit processes, at least for one of the methods.



Life Cycle Inventory

Using BIM model and the interaction of environmental, economic and social data about the building.



Life cycle Impact Assessment

A combined framework for impact assessment based on the individual S-LCA, LCC and LCA was performed.

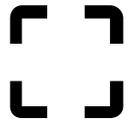


Interpretation

Combination of environmental, economic and social aspects was performed.

Description of the method

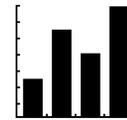
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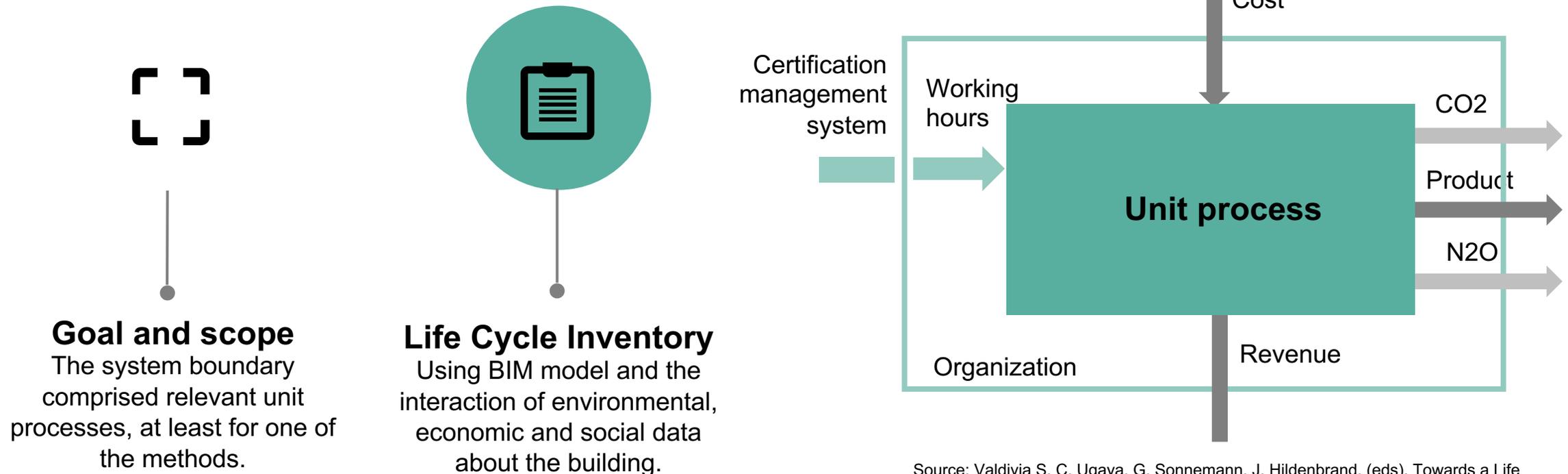
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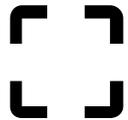
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Source: Valdivia S, C. Ugaya, G. Sonnemann, J. Hildenbrand, (eds), Towards a Life Cycle Sustainability Assessment. Making informed choices on products., Paris, 2011.

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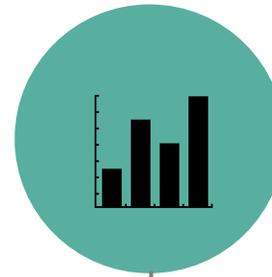
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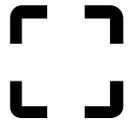
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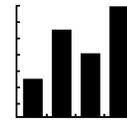
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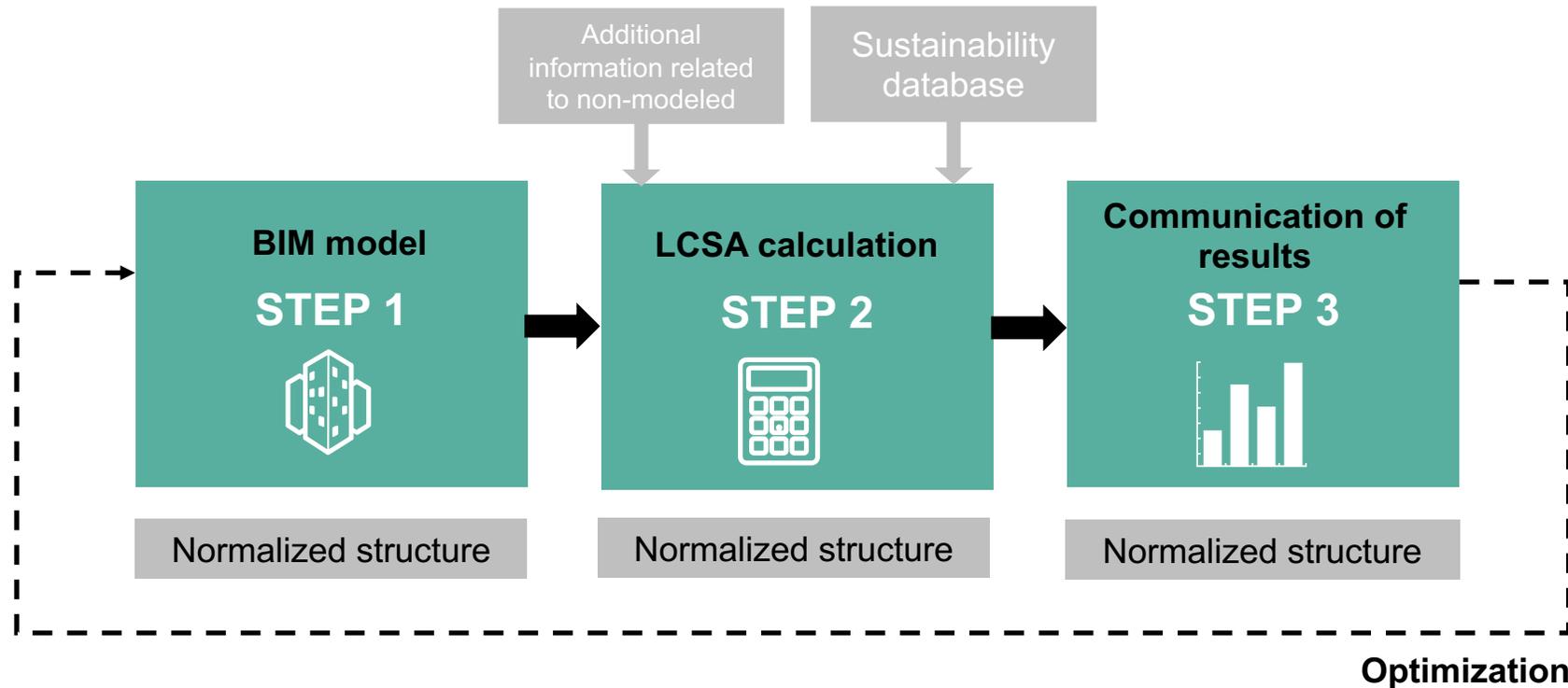
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Description of the method

BIM model to LCSA



Discussion and conclusions

Limitations on conducting LCI and LCIA

The implementation of LCI using the structure based on the LCSA unit process approach can be problematic.

1

Data availability and design-oriented benchmarks

The lack of available S-LCA data is underlined.
The development of benchmarks for guiding designers is recommended.

2

Communication of results

Difficulties of integrating environmental, economic, and social aspects in the communication of results were detected.

3

Thanks for your attention!

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