

Circular economy in the construction sector. Advancing environmental performance through systemic and holistic thinking

Introduction

The construction sector is progressively becoming more circular by reducing waste, re-using building materials and adopting regenerative solutions for energy production and biodiversity protection.



The implications of circularity for construction activities are complex and require careful evaluation of impacts to select the appropriate pathway forward. The aim of this paper is therefore to better understand systemic enablers and constraints for circular economy (CE) implementation by focusing on methods for addressing environmental performance.

Methods

This paper uses systemic thinking to map and evaluate different impact assessment methodologies and their implications for a shift to more circular solutions. This will give better understanding of impacts horizontally, across topics and involved sectors (increasing scope), and vertically, from individual projects to international bodies (increasing comprehensiveness).



The following systemic levels are used to group the methodologies: product (material life cycle declarations and building assessments), organisation (certification and management schemes) and system (policies, standards and regulations).

Results

The results confirm that CE is integrated in life cycle-based assessment methodology at all levels. Assessments are in practice tailored to the appropriate systemic level where they can act as both enablers and constraints for CE depending on the context.

Level	Methodology	Possibly enabling	Possibly constraining
Product (building components)	Material life cycle declarations	Better performance at supplier level, product improvements	The ability to compare impacts across areas and life cycle stages
Product (building itself)	Building life cycle assessments	Circular building design and solutions	Enhanced efficiency due to case-to-case based solutions
Organisational	Building certification schemes, environmental management	Higher built environment standard and better organisational performance	Unidirectional effect due to voluntariness and user driven ambition levels
System	Policies, standards and legislations	Broad scale systemic change	Voluntary initiatives for innovative solutions

However, development and structure are not coordinated or governed unidirectionally, but rather occur simultaneously at different levels. This recursive structure is positive if the methods are applied in the correct context, thus providing both autonomy and cohesion in decision making. Methods at lower systemic levels may then improve production processes and stimulate the market to create circular and innovative building solutions, whereas methods at higher systemic levels can be used, for example, by real estate builders, trade organisations and governments to create incentives for circular development and innovation in a broader perspective.

References

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