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Published in:
Building A Circular Future - Insights from Interdisciplinary Research

Publication date:
2024

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Thuesen, C., & Köhler, J. (2024). Circular construction platforms (CircOp) – preliminary findings from four case studies. In *Building A Circular Future - Insights from Interdisciplinary Research* (pp. 63-67). BLOXHUB.

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Circular construction platforms (CircOp) – preliminary findings from four case studies

PROJECT

Grand Solution,
CircOP

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Platforms belong not just to the realm of IT, they are also powerful tools for specialization and scaling in organizations. The success of Tesla in scaling electric cars and the ambition of Ørsted to industrialize offshore wind are based on platforms and CircOp aims to do the same for circular construction.

Over the last two years, the CircOp program has utilized platform-thinking to accelerate the transformation of construction towards circularity by de-risking investments in circular solutions. Through action-oriented research in four complementary platforms, the partner companies RGS Nordic, Næste, E&P, and GXN work with CircOp to further four societal goals: climate action, responsible production, economic growth, and job creation. The complementarity is based on two dimensions: market/value propositions for linking supply and value chains of different complexities, and key capabilities for leveraging unique organizational strengths from fast local prototyping to industrialized production (see table 1).

The preliminary findings from four case studies show that platform-thinking enables six aspects of circularity transformation in construction, specifically:

1. Platforms enable detailed documentation of circular solutions and create shared standards for organizing products, processes, and organizations across projects enabling documentation and sharing of information across materials, projects, and value chains.
2. Platforms enable variance of circular solutions and secondary materials. Platform adaptability in managing customization and leveraging project similarities tackles the high-variability and low-volume of secondary materials. This platform also challenges the conventional targeting of different "end users" which in a circular economy is a problematic concept as materials have no defined end to their usefulness.
3. Platforms enable productivity development of circular solutions that are relevant over time. Existing circular solutions compete in markets that prioritize short-term gains over long-term value. In contrast, the long-term perspective of platforms drives incentives to optimize value and cost to enhance productivity and competitiveness of secondary materials to meet future needs.
4. Platforms enable effective decision-making on circular solutions. Circular construction introduces high levels of uncertainty and ambiguity, challenging decision-making. Platforms enable a better understanding of how decisions cascade along the value chain, and thereby help develop more scalable, innovative, and holistic solutions.
5. Platforms enable organizational specialization towards complex circular solutions. A fragmented industry squanders project knowledge, hampers communication and decision-making, and limits the sharing of best practices. Platforms enable value-adding repetitions driving specialization in complex circular solutions.

6. Industry-wide scaling of circular solutions. Circular solutions often fail to make the leap from prototypes to industry-wide adoption. Platforms enable industrialized production and scaling in local and global markets.

Yet, while platform-thinking represents a core enabler for the transformation of construction towards a circular economy, it faces certain challenges. These include, among others: clarifying the understanding of platforms, changing the typical project-based mindset in the industry, overcoming the lack of a one-size-fits-all strategy, defining the right balance between flexibility and standardization, and adapting platform-thinking to fit the circular economy in construction. We plan to extend CircOp with new partners/platforms and research activities to address these issues and further develop platform-thinking for the circular economy in construction.

PLATFORM	CUSTOMERS	CAPABILITIES	STRATEGIC AMBITION	
Material Supplier RGS Nordic	Næste, GXN, EP, Moelven	Reversed supply chain for production of reused & recycled materials	1. Transformation from waste handler to resource provider supplying documented materials for manufacturing of circular construction products.	
Manufacturer Næste	Lejerbo, KAB, Boligkontoret DK, DEAS	Circular supply chain, agile work, LivingLab, standardization of production under variance, new business models	1. Scaling sustainable business & value chain by using C&DW for secondary buildings (sheds). 2. Creation of new architectural typologies. 3. Scaling of model via local partners.	
Contractor Enemærke Petersen	KAB, City of CPH, Cevica...	Refurbishment, lean processes, strategic partnerships, long-term thinking	1. Use of strategic partnerships TRUST and 80s as a platform to implement circular construction 2. Integrate KAB's sustainability strategy inspired by Nordic Built Charter as a component of refurbishment and new buildings.	
Consultancy GXN Innovation	Upcycled commercial projects in UK, Belgium, Australia: e.g. British Land, Nextensa, Stockland	Circular design & construction, upcycled materials and products, strategic client advising, innovation processes, new construction, digitalization, global mindset	1. Expansion and leverage of first-mover advantage. 2. Establishment of new capabilities and supply chain partnerships.	

Figur 1:

Platform overview of CircOp



	CIRCULAR BARRIERS	PLATFORM ENABLERS	IMPACT TARGETS
	<p>1. Lack of common language and standards in procurement and processes</p> <p>2. Comprehensive assessment concepts for the recycling of C&DW.</p>	<p>1. Overview of material flow with-in the organisation</p> <p>2. ABC Analysis of materials</p> <p>3. Relational Model for Reused Concrete</p>	<p>2030: Saving 300.000 t CO2-eq</p> <p>Year 5: Saving 400.000 t of primary materials Increase revenue by 15-30 M DKK 30-50 jobs created directly indirectly</p>
	<p>1. Transparency of circular solutions and data in the reverse supply chain</p> <p>2. Lack of information on the quality and availability of materials</p> <p>3. The right model with prefab for growing business with a reversed supply chain</p>	<p>1. Overview of financial-, information-, and material flows of reclaimed wood throughout the value chain around Næste</p> <p>2. Development from A-Shed-a-Month to A-Shed-A-Week</p> <p>4. Prototyping service concept "shed as a service"</p> <p>5. Innovative mounting table for producing standardized modules out of non-standard materials.</p>	<p>2030: Saving of 155 t CO2- eq Saving 150 t of primary materials</p> <p>Year 5: Increase revenue by 40-50 M DKK 40-50 jobs created directly and indirectly</p>
	<p>1. Inefficient circular processes making circular solutions uncompetitive in the marketplace</p> <p>2. Reuse of buildings is prioritized in society, meaning refurbishment instead of demolition</p>	<p>1. Mapping flow of materials from procurement to waste</p> <p>2. Purchasing parts of Genbyg</p> <p>3. Data Dashboard including ABC Analysis for reused goods in storage (Genbyg)</p>	<p>Not estimated yet.</p> <p>Contract value on 7 B DKK 30-40 projects</p> <p>5-10.000 apartments 15-20.000 tenants</p>
	<p>1. Ability to transition to circularity in the various scenarios client cases represent, which demands agile and easy tools for, e.g. mapping and analysis of material potentials in existing buildings as well as strategic analysis and decision making at a real estate portfolio level.</p>	<p>1. Mapping and standardization of interfaces with external partners</p> <p>2. Documentation of GXNs consulting services on upcycling processes</p>	<p>2030: Saving of 15.000 t CO2-eq Saving 100.000 t of primary materials</p> <p>Year 5: Increase revenue by 15-30 M DKK 10-20 jobs created directly and indirectly</p>