04. An Interdisciplinary Approach to Circularity

Circular Construction Economics

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Adopting the principles of the circular economy requires a fundamental shift in how we conduct business and organize our economic systems. Let me provide a few examples to illustrate how I envision this shift, and what is needed from supply chains, organizations, and the economy to make it happen.

In 2017, a graduation project examined the negotiation process between stakeholders in the stone materials supply chain to develop a voluntary sector-wide agreement aimed at adopting circular economy practices. Despite months of negotiations, the parties involved failed to reach a consensus. While everybody recognized the need for change, there was uncertainty about who would take responsibility for driving it. The parties were stuck in a stalemate, each fearing a loss of revenue if they acted before their customers did. Many pointed to the government to make the necessary changes, but unfortunately, the government had not been involved early in the negotiations. It wasn't until a government representative stepped in during the summer of 2018 that the agreement was finally signed. This case highlights the importance for each participant in a circular supply chain to understand the specific role they play in fostering circularity, and how that role can be sustained within the broader system.
In another project, we conducted contract research to support the noise barrier industry in developing a circular supply chain. The study showed that individual actors in the supply chain often propose different systems to optimize their own role in the circular economy. While this might seem problematic, these diverse proposals can actually push the sector to seek unconventional solutions to challenges they face.

In our ongoing research, we are exploring how ecosystems can innovate by experimenting with niche ideas and orchestrating supply chain functions for the industrial construction of bridges and viaducts. As our research at the supply level has shown, individual actors within a supply chain need the capability to redefine their own circular value creation. This is where the design and experimentation of such ideas becomes crucial.

There are three key points I want to highlight here:

1. Organizing Circular Value Creation

In one of our research projects, we're taking a *business model approach* to public value creation in a large municipality. This research is revealing how the municipality can create value under different conditions, whether through project-based or program-based efforts. We also found that such organizing efforts need to be flexible enough to absorb, adopt, and adapt to change, as highlighted by research at the provincial level.

2. *Testing Circular Ideas*

The second point is about the ability to test the merit of circular ideas through design and experimentation. A partner program called The Circular Road has created a platform for this purpose. Since 2020, we've been involved with this platform, using it to design and experiment with circular value propositions through a business model called *Product Service Systems*. This model is unconventional in the current infrastructure landscape. It allows contractors and clients to jointly design a combined product-service system, where contractors view bids as investments, and clients treat procurement as a service. A pilot phase completed in 2022 has shown that this model has created entrepreneurial space to incorporate circular solutions and deliver positive results. Ongoing research is now focused on identifying the conditions necessary to unlock the market potential of this model.

3. *Embracing Unconventional Systems Thinking*

Finally, embracing unconventional thinking means *being open to new pathways of change*, even if they challenge established practices. Academic research should not shy away from finding coherent alternatives to conventional models, especially when principles from unlikely sources suggest a new paradigm. For instance, in a current project, we are exploring connections between quantum theory and the industrial valuation of real estate. While value in our current built environment is predominantly viewed through economic terms, circularity calls for a broader consideration, including environmental and social dimensions. Quantum principles may offer insights here that challenge the current stalemate in conventional thinking, presenting an opportunity for a paradigm shift. This is being explored by 13 PhD researchers under the EU-funded project *QuiVal*, which seeks to evaluate the merit of this argument.

Experimenting with unconventional models has its own value. However, success is not guaranteed at every stage. Still, these experiments offer valuable insights into what works and why it might push us forward when other approaches might not.

In closing, transitioning to a more circular built environment should not continuously rely on subsidies or political goodwill. While these can provide an initial boost, *initiatives must evolve from pilot stages into self-sustaining industry-wide efforts for meaningful impact.* The economic system must be restructured to support these efforts and make them more effective drivers of change.

From a governance perspective, one project we are working on, called *ADEPT*, is exploring how public clients can leverage each other's wisdom and experiences to become more decisive in driving societal changes. In this NWO-funded project, we are investigating how a more *tenable horizon* can help public clients shape their proposed direction of change.

From a societal perspective, the NWO-funded project *IWWC* has highlighted that such sector transitions need to empower smaller actors, enabling them to become more effective agents of change.