

From Data to Value: The Interlinkages of Digital Product Passports and Circular Business Models in Construction

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Abstract The Digital Product Passport (DPP), as promoted by the Ecodesign for Sustainable Product Regulation (ESPR, 2024), serves as a comprehensive digital repository providing accessible information about a product's composition, origin, performance, and environmental footprint. This data availability offers a transformative opportunity to rethink how construction materials and components are managed, from initial sourcing to their end-of-life.

This paper explores the critical interlinkages between DPPs and new Circular Business Models (CBMs) in redefining how lifecycle data can create added value among stakeholders and support the adoption of new CBMs based on a closed-loop approach. By embedding enhanced traceability and transparency, DPPs optimize existing processes and establish entirely new benchmarks for increasing asset value and fostering circular practices. This paper presents key findings from an EU-funded research project that specifically investigated the practical implementation and impacts of a DPP for bio-based construction materials. Outcomes will focus on:

1. Supply Chain Facilitation: by digitizing and centralizing key information, it allowed for the effortless sharing of data regarding the quality, sustainability certifications, and environmental impact of raw materials. This streamlined information flow significantly reduced administrative burdens, paperwork, and time loss.

2. Local Regeneration & Community Engagement: by providing verifiable data on the sustainable attributes of bio-based materials and their carbon sequestration potential, the DPP enabled the transparent quantification and potential sale of carbon credits. It can play a key role in improving local communities' understanding and involvement in urban regeneration initiatives.

3. Innovative Post-Sale Services: by collecting and analysing lifecycle data, stakeholders can be guided in circular practices. Specifically, this aims on extending product lifespans and facilitating material recovery strategies once a product reaches the end of its initial use or changes function. By taking responsibility for their products beyond the point of sale, manufacturers are driven to design for durability, recyclability, and reusability.

This research unequivocally demonstrates that DPPs are far more than a regulatory or compliance tool; they are a powerful, indispensable catalyst for systemic change, driving the emergence of new business paradigms that prioritize resource longevity, radical transparency, and collaborative value creation across the entire construction industry.