DIGITAL TECHNOLOGY AND FIRM DECARBONISATION

A case study of the construction value chain

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Research Objective

- ✓ Digital technologies raise a lot of hopes among academics and policy makers that they can contribute to decarbonisation (European Commission Joint Research Centre, 2022; Maher et al., 2022; Vidmar et al., 2021).
- ✓ Expectations are that if digital technologies are strategically deployed, a twin transition is possible where firms digitalise and decarbonise at the same time (George et al., 2020).
- ✓ However, using digital technologies do not necessarily lead to reduced carbon emission and scholars have advocated the need to unpack the mechanisms linking digital and sustainability (Xia et al., 2022)

Research question: ***How do firms use digital technologies to do their net-zero transition?***

Conceptual framework

- ✓ Information system literature emphasizes the importance of digital technologies (DT) in promoting sustainable business practices (Watson et al., 2021)
- ✓ DT do that by performing five functions which can contribute to decarbonisation (Pinkse and Bohnsack, 2024)

Functions of DT

- ✓ Firms respond to climate change by engaging in carbon management activities (Lee, 2011): optimizing processes, designing low-carbon buildings, productivising (i.e. industrialize production); reporting carbon performance; incentivizing adoption of low carbon products.

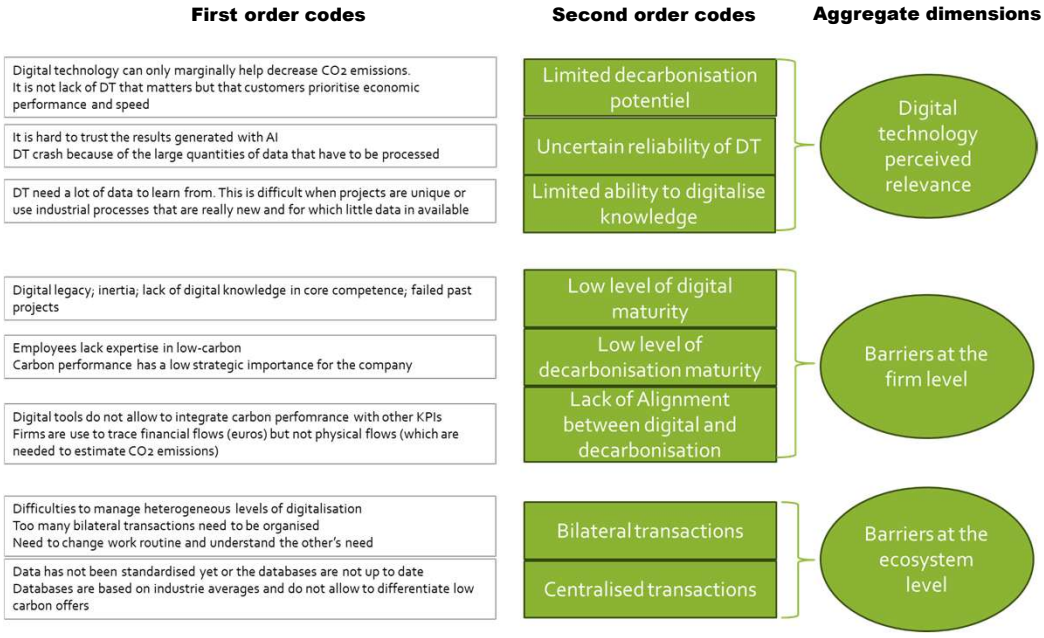
We analyse how firm use DT for carbon management activities and what limits the capacity of firms to use DT to their full potential

Research method:
46 semi-structured interviews with material providers (ex. cement; wood), architecture firms, construction companies, renovation companies, digital service providers
Thematic coding

Findings

We analyse barriers at three levels:
- Digital technology (it is not seen as relevant)
- Firm level (the firm is unable to use digital functions for carbon management activities
- Ecosystem level (the firm does not have full control over the digital control loop)

We find that barriers vary depending on the type of carbon management activities.



Contributions

- ✓ We discuss the mechanisms through which carbon management activities and digital technologies articulate and explain what limits the use of DT for decarbonisation.
- ✓ We discuss tensions that firms face and how they limit their capacity to use DT to their full potential.
- ✓ We show that to understand the potential of DT to contribute to decarbonisation it is best take a systemic approach and considering how DT operate within digital control loops.

Policy and managerial recommendations:
Incentivise the development of libraries of digital building blocks
Align digitalisation strategy and decarbonisation strategy