Accounting and Finance PhD Research Topic

Digital Transformation, Carbon Accounting Quality, and Greenwashing in Global Capital Markets

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Project Summary

This project investigates whether corporate digital transformation improves the quality and credibility of carbon accounting disclosures or facilitates greenwashing in global capital markets. As sustainability reporting expands under frameworks such as IFRS S1 and S2, firms increasingly rely on digital technologies to support environmental reporting. Using large-scale text analysis and panel data methods, the study examines how digitalisation affects the quality of emissions disclosure and environmental credibility. The project evaluates whether digital technologies enhance transparency and accountability or intensify symbolic sustainability communication without substantive improvement.

Detailed Project Description:

Climate-related reporting has become one of the most significant developments in contemporary accounting and finance. Across global capital markets, regulators, investors, and standard setters increasingly demand transparent, credible, and decision-useful carbon disclosures (Kazemian et al., 2022). Frameworks such as IFRS S1 and S2, alongside evolving climate disclosure regulations across major jurisdictions, are placing growing pressure on firms to improve the quality, comparability, and assurance of sustainability reporting (Hodder & Schipper, 2025).

At the same time, firms are rapidly investing in digital transformation initiatives, including artificial intelligence, automation, cloud computing, data analytics, and digital platforms. These technologies have the potential to fundamentally reshape carbon accounting systems by improving emissions tracking, internal controls, data integration, and reporting accuracy (He et al., 2022). Digital technologies may therefore enhance the quality of carbon accounting by enabling firms to produce more complete, precise, and verifiable climate disclosures (Khan et al., 2024).

Carbon accounting quality has therefore emerged as a critical issue in sustainability reporting research and practice. High-quality carbon accounting enables firms to provide accurate, complete, and verifiable information regarding greenhouse gas emissions, climate-related risks, and transition strategies. Credible carbon disclosures improve investor confidence, support regulatory compliance, strengthen corporate accountability, and enhance the effectiveness of climate-related decision-making (Bowen & Wittneben, 2011). However, many firms continue to provide incomplete emissions reporting, limited Scope 3 disclosures, weak methodological transparency, or sustainability narratives unsupported by substantive reporting practices. These concerns have intensified global attention on disclosure quality, assurance, and the credibility of climate-related information.

However, digital transformation may also create new risks associated with greenwashing. Firms increasingly possess sophisticated digital communication capabilities that enable them to intensify environmental narratives and project an image of sustainability leadership without corresponding improvements in disclosure substance or accountability (Wang et al., 2024). This creates a critical tension between symbolic environmental communication and genuine carbon transparency (Bai et al., 2025).

This project examines whether corporate digital transformation improves the quality and credibility of carbon accounting disclosures. Specifically, it investigates how digitalisation affects the precision and completeness of Scope 1, 2, and 3 emissions reporting, whether digital transformation reduces or intensifies greenwashing behaviour, whether regulatory environments moderate the relationship between digitalisation and carbon accounting quality, and whether the effects are stronger in high-emission industries or firms with greater climate exposure.

Therefore, the current research tried to answer the following questions:

1. Does corporate digital transformation improve the quality and credibility of carbon accounting disclosures?
2. How does digitalisation affect the precision and completeness of Scope 1, 2, and 3 emissions reporting?
3. Does digital transformation reduce or intensify greenwashing behaviour in sustainability reporting?
4. Do regulatory environments moderate the relationship between digitalisation and carbon accounting quality?
5. Are the effects stronger in high-emission industries or firms with greater climate exposure?

The project combines large-scale text analysis with panel data econometrics. Sustainability and annual reports will be processed using natural language processing techniques to construct digitalisation and environmental narrative measures. These text-based indicators will be integrated with structured financial, governance, and emissions data sourced from databases such as Compustat, Refinitiv, and Bloomberg. Panel regressions with firm and year fixed effects will examine the relationship between digital transformation and carbon accounting quality, while a mediation analysis will test whether greenwashing behaviour explains part of the effect of digitalisation. Robustness tests may include alternative digitalisation measures, lag structures, and regulatory shock designs.

The project is expected to contribute to accounting and finance literature on sustainability reporting credibility, digital transformation, ESG disclosure quality, and corporate accountability. The findings will also provide practical implications for regulators, investors, assurance providers, and firms implementing digital sustainability reporting systems.

Desired Skills: Strong quantitative background, econometrics, data analytics, Python or R, interest in sustainability accounting and digital transformation.
Project Area: Accounting and Finance
Project Level: PhD

References

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