

# The Productivity-Technology Nexus and Socio-environmental Externalities

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## Summary

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*The proposed PhD project aims to investigate the productivity outcomes from introduction and implementation of new or upgraded technologies, while conditioning and accounting for externalities and socio-environmental constraints. The research applies modern approach in productivity estimation via rapidly evolving empirical productivity frontier and efficiency estimation methods, which account for the constraints and externalities emerging in the production process. Supervisor Prof. Kadri Männasoo; Co-supervisor Prof Aaro Hazak*

Research field:	Economics and finance
Supervisors:	Prof. Dr. Aaro Hazak Prof. Dr. Kadri Männasoo
Availability:	This position is available.
Offered by:	School of Business and Governance Department of Economics and Finance
Application deadline:	Applications are accepted between November 16, 2020 00:00 and December 16, 2020 23:59 (Europe/Zurich)

## Description

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The present day world puts growing demands on industries in terms of efficiency and productivity, but increasingly so in consideration of socio-environmental aspects and related institutions (incl. regulations). The anticipated doctoral research pays particular attention to inputs and outputs of the production function, while estimating the frontier and benchmarking the production processes/entities against the estimated frontier.

The contemporary empirical methods for benchmarking, performance and/or efficiency evaluation for the study can be:

1. parametric stochastic frontier methods (stochastic frontier analysis, SFA)
2. nonparametric frontier methods (Data Envelopment Analysis, DEA; Free Disposal Hull, FDH).

The quantitative performance analysis enables to specify the most efficient/productive technology or production process and hence separate the efficient and technologically advanced entities from inefficient and technologically backward entities or from entities, whose activity is generating substantial negative socio-environmental externalities. It also provides the statistical significance of the drivers of productivity/efficiency, and their quantitative impact upon improved performance. The research is valuable in reaching a better understanding on how to improve the productivity of existing processes by implementation of contemporary technologies and production processes while taking into account socio-environmental consequences. Ultimately, the projects helps to generate ground for evidence-based decision making in sustainable production, but it also provides input for policy makers in designing regulations for improved incentives by producers and consumers in following economic aims, such as efficiency and competitiveness, without compromising the long-term socio-environmental outcomes.

Some particular applied outcomes of the research may relate to the analysis of economic aspects of implementation of digital technologies, the problems related to carbon capture and storage solutions, and positive and negative production externalities surrounding other sustainable energy solutions, especially in the context of emerging market economies yet to reach sustainable development paths.

The research undertaken as part of the thesis has a primarily empirical as well as a policy oriented focus, with strong focus on developing advanced data use and analysis capabilities.

This doctoral thesis is related to the:

- European Commission Horizon 2020 research project “Individual Behaviour and Economic Performance: Methodological Challenges and Institutional Context” (IBEP), led by Tallinn University of Technology, in collaboration with Aalto, Helsinki and Tel Aviv universities;
- Erasmus+ Programme of the European Union Project No 611059-EPP-1-2019-1-EE-EPPJMO-MODULE “The Economic and Legal Evaluation of Digital Ecosystems in the EU” and



- RiTa programme project „Climate Change Mitigation with CCS and CCU Technologies“ (ClimMit).

**Qualifications:**

- Master's degree in economics or finance or other area closely related to the topic
- Experience in econometric modelling



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