

Invitation

You are cordially invited to the public defense to obtain the academic degree of

DOCTOR IN BUSINESS ECONOMICS

by Laís Bandeira Barros

COMMERCIALIZATION OF INNOVATIONS IN THE CONSTRUCTION INDUSTRY

Advisors:

Prof. dr. Mirjam Knockaert, Prof. dr. Maikel Pellens, Prof. dr. Abir Al-Tabbaa

Thursday, 30 May 2024 at 16h00

In the Faculty Board Room, Campus Tweekerken, Tweekerkenstraat 2, 9000 Ghent
Please confirm your attendance no later than 15 May by email to Lais.Barros@ugent.be

EXAMINATION BOARD

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Abstract

This dissertation investigates the multifaceted process of commercializing innovations within the construction industry, a sector known by its traditionalism and resistance to change. This study is particularly pertinent given the industry's significant role in economic growth and the global push towards sustainable practices. The research focuses on three primary areas: the technology transfer process from academia to industry, the commercialization of self-healing concrete, and the technological evolution of Fiber-Reinforced Concrete (FRC).

Identifying three substantial research gaps at the outset, this study addresses the need for a deeper understanding of Technology Transfer (TT) within the construction sector, the prioritization of technology development over commercialization, and the historical evolution of construction-related technologies, particularly FRC. The dissertation poses three key research questions aimed at unraveling these gaps, focusing on the understanding of TT processes within construction, barriers and facilitators to self-healing concrete commercialization, and the evolution of FRC technology over time.

The methodology employed to address these questions combines a systematic literature review, qualitative empirical studies, and patent analysis. The literature review aims to consolidate current knowledge on TT in construction, analyzing scientific articles up to October 2020. The empirical study uses semi-structured interviews to explore the commercialization process of self-healing concrete, tapping into the expertise of industry and academic leaders. The patent analysis adopts Main Path Analysis (MPA) to trace the development of FRC technology, shedding light on the innovation pathways and market dynamics of this material. The research was embedded within the SMARTINCS project, funded by the Marie Curie grant, which provided a rich environment for interdisciplinary collaboration and a real-world context for the study of innovation in construction.

Key findings from the research highlight that the TT process in the construction industry is distinctive, requiring a more collaborative approach between academia and industry from the beginning. The study reveals that collaborative research and demonstration projects play a crucial role in TT, contrary to general TT studies that often overlook these aspects. Concerning self-healing concrete, the dissertation identifies a significant barrier in the lack of demonstration projects, which hinders progress along the value chain. On the other hand, increasing demand for sustainable materials acts as a facilitator in its commercialization process. Regarding FRC, the analysis indicates that the technology has reached a mature stage in its lifecycle, with cost-effectiveness and market potential guiding its development more than regulatory compliance.

Theoretical implications extend to technology transfer, engineering management, and construction innovation literatures, enriching discourse by emphasizing context-specific perspectives and providing tailored commercialization frameworks. Practically, the dissertation offers actionable recommendations for academia, industry, and policymakers, advocating increased incentives for university-industry collaborations to mitigate environmental impacts in construction. Looking ahead, future research avenues include empirical studies investigating the impact of TT on company performance, evaluation of the effectiveness of self-healing concrete commercialization frameworks, and broader patent analyses across various case studies to deepen understanding of construction technology evolution.

In conclusion, this dissertation contributes to a nuanced understanding of the commercialization process within the construction industry. It delineates strategies and recommendations for stakeholders to foster innovation and economic growth, highlighting the significance of aligning technology development with market needs and societal acceptance to ensure the successful introduction of innovations in the construction sector. The research underscores the potential of the construction industry to adapt and evolve, paving the way for further research and practical advancements in the field of construction innovation.

Curriculum vitae

Láís Bandeira Barros (born in Maceió, Brazil) holds a Master of Science degree in Structural Engineering and Building Materials from the University of Brasília, Brazil, a Bachelor's degree in Civil Engineering from the Federal University of Alagoas, Brazil, and a Bachelor's degree in Business Administration (Maurício de Nassau College – Brazil). Láís joined the Department of Marketing, Innovation, and Organisation at Ghent University in August 2020. Prior to her return to academia, Láís worked as a consultant on a project focused on proposing an innovative management framework for the Brazilian Army's Personnel System. Láís's doctoral research is part of the SMARTINCS Project funded by the EU Horizon 2020 under the Marie Skłodowska-Curie grant, focusing on commercializing self-healing concrete. Her PhD journey extends to international collaborations, notably as a visiting researcher at nine institutions across Spain, Italy, the UK, the Netherlands, and Belgium. During her PhD, Láís presented the results of her research at the ISPIM Innovation Conference (Copenhagen), the International Conference on Self-Healing Materials (Milan), and the SMARTINCS Conference on Self-Healing, Multifunctional, and Advanced Repair Technologies in Cementitious Systems (Ghent). Chapter 2 of Láís' dissertation is published in the Handbook of Technology Transfer, while Chapter 3 is published in the Journal of Construction and Building Materials.