SUMMARY

The habilitation thesis, entitled "***STUDIES AND RESEARCH ON THE MANUFACTURING OF MATERIALS AND THEIR USE IN INDUSTRIAL BIOTECHNOLOGIES***", provides an overview of my professional, scientific, and academic activities following the completion of my doctoral studies, the defense of my PhD thesis, and the awarding of the scientific title of Doctor (after 2011).

Structured in three parts, the thesis reflects both the experience gained and the primary scientific contributions, as well as the specific directions of my academic career. The content aligns with national and European priority research areas in the field of Industrial Engineering. This is evidenced by the publication of over 36 scientific articles in specialized journals and volumes of major scientific events, which fall within the thematic area of Applied Sciences and demonstrate the ability to synthesize and carry out research activities.

Another significant aspect of my research activity involves participation as a member in over 15 research projects focused on Engineering Sciences. These projects addressed issues related to the development of materials for use in technologies and industrial biotechnologies.

The knowledge and skills acquired during my PhD studies in laboratories in France served as a foundation for future research directions, which I developed after obtaining my doctorate. In recent years, my research has adopted an interdisciplinary approach, integrating various fields I have explored throughout my teaching and research career.

The second part of the habilitation thesis focuses on a detailed analysis of the relevant results obtained in research activities, highlighting key aspects related to the chemical synthesis of organo-inorganic nanomaterials and their use in various biotechnologies.

The research presented and validated by scientific articles highlights the fabrication of organo-inorganic nanomaterials through the chemical modification of plant-based polymers, further using the resulting matrices to retain pollutants (e.g., polycyclic aromatic polymers) with the help of microorganisms, resulting in a new soil remediation biotechnology.

Another direction explored was the modification of inorganic substances, such as clays, with organic substances like dextrins, dendrimers, and polymers. The purpose of these couplings is their applicability in industry, with tests conducted on contaminants from the food industry. Thus, studies were highlighted that focused on the retention of phthalates, phenolic compounds, and polyphenols from foods, such as alcoholic beverages.

Special importance was given to the modeling and testing of the obtained nanomaterials through their use in industrial biotechnologies. These nanomaterials were brought into contact with microorganisms to test antibacterial and catalytic activity.

Biocorrosion is another interdisciplinary direction addressed in the habilitation thesis. Studies were presented on the influence of corrosive agents (saline, microbiological) on metallic materials such as steel, with applicability in the manufacturing of equipment for the processing industry and the machine-building industry.

The third section presents my plan for the development of my professional, scientific, and academic career, which focuses on exploring new internationally relevant research directions, such as the valorization of waste for the production of reusable materials and the deepening of studies on biocorrosion and the impact of nanomaterials in biotechnologies.

I aim to diversify teaching methods and update teaching materials, involve students in research internships and Erasmus+ mobilities, and develop new academic and industrial partnerships.