

Abstract of the Habilitation Thesis

The empowerment thesis *Compatible electrotechnical components with Sustainable Development* synthesizes the scientific, academic and professional achievements of the author during post-doctoral degree period, starting with the PhD in Electrical Engineering (based on the Order of the Minister of Education and Research No. 5663 From 15.12.2003) and to date.

The work, structured into three chapters, opens with a concise introduction and ends with a selective bibliography list.

The first chapter, *Introduction*, is divided into three sections.

The first of these, *The Context of the performance of the empowerment thesis* presents the author's opinion on the profession of university professor in the broadest sense of this profession.

The university professor is recognized as the leader of the didactic activity, of the whole field that aims to transform the student into a specialist of high-level competence. This must have a significant volume of psycho-didactic and methodical skills and the ability to be the leader of the research team that usually includes PhD students, master students - young specialists, grouping who will be able to approach a program research, a program that was previously sketched by the contribution of each component of the group.

The second section, *Professional Achievements*, presents the stages of development of teaching career as follows: preparatory (October 1997 - March 2000), Assistant Professor (March 2000 - October 2001), Lecturer (October 2001 - October 2008), Associate professor (from October 2008 until present). The results obtained by the author of the empowerment thesis after supporting the PhD thesis in 2003 consists of: 1 patent awarded at several salons of invention (Golden Medal at the International Exhibition of Inventions in Geneva, April 12, 2013, the Golden Medal at EUREKA Salon of Inventions and Innovations in Brussels, November 2012, Award International Special OSIM, 2013), 1 book chapter in an international publishing house (InTech Publishing House), 22 books in national publishing houses recognized by CNCSIS, 86 papers in journals and conferences, 62 ISI and BDI citations, 13 research contracts or training programs.

The third section of the first chapter, *Research and Competency Directories*, presents those three main research areas addressed. The preoccupations of the author of the empowerment thesis in the post-doctoral period may obviously be classified in several

research directions (according to multidisciplinary criterion). Out of all, three main directions are clearly distinguishable. For this, the author has made a rigorous selection, recalling, for each direction in turn, the most representative scientific papers, books, patents and contracts of his research. The three research directions are: D1 - Electrotechnical Constructions of the components of which are motors and / or servomotors with or without permanent magnets; D2 - Components and electrical equipment compatible with the concept of Sustainable Development; D3 - Magnetism and Sensors / Magnetic Micro-sensors.

The second chapter, titled *Research Activity and Results obtained*, presents in extenso representative works for each research direction among the considered three.

With respect to **D1**, we can say that the wide field of electric cars has started in the last decade, this distinct group has become more and more clear electric servomotors. These machines, usually of low power, extend from fractions of watts to hundreds of watts and raise a number of special problems of a dynamic nature, which are different from other "classic" electrical machines. With all diversity of their constructive forms, these machines present many common aspects from functional, technological and design point of view, which justifies and allows their treatment in a unitary form.

For **D2**, though the use of some expressions in the economy, which encompass the word "sustainable", there is still from antiquity, the current meaning of the term "Sustainable Development" is relatively new. The current concept of sustainable development means that way development that is achieved without jeopardizing the chances of existence of future generations.

The concept began to have consistency with the onset of awareness of exhaustiveness of the Earth's resources use for a consuming population growing bigger. This was the seed of the current concept of sustainable development, concept that was later enriched, reaching a definition based on three pillars: human resources, environment and energy.

With respect to **D3**, it can be asserted that magneto-electronics is one of research fields that are developing very rapidly due to numerous applications required by industry. Multilayer magnetic configurations are one of the important aspects in this area, because they take into account the uniqueness of the use of phenomena of the types of micro-magnetic, magneto-optical and magneto-electronic types that can not be put into evidence by conventional materials.

Chapter Three *Plans for evolution and development of professional, scientific and academic career*, presents a set of principles that will underpin the future activity, the directions of professional development, the future research directions, as well as the elements

which will contribute to their performance in the future. Future development directions are detailed by scientific fields, with future plans related to the participation in national and international funding competition projects.

The thesis ends with a selective bibliographic list with both own references and with references from specialty literature.