ABSTRACT

Habilitation thesis (re)presents a synthesis of the author's personal concerns and scientific activities/achievements since the obtaining of the PhD in "Automatic Control" (2004) under the scientific coordination/mentorship of Academician Florin Gh. Filip, with the thesis entitled *"Enterprise modeling and reference architectures for informatic systems in industrial environment"*.

Although the concerns in this vast area of *systems engineering* goes back over two decades, the synthesis presented in the thesis emphasizes on one hand, the activities and results achieved in this area in the last thirteen years, by always acquiring *"State of the Art"* technologies to face with the new digital revolution, the new challenges and opportunities offered by the current movement "*internet-of-things"* and, on the other hand, the main achievements attesting the author's ability to lead scientific research in S*ystems Engineering* by presenting the results obtained during the research contracts - won through competitions – in some as the director that coordinated the research teams and in others as a member of the team, as well as proposals of COST, FP7 or H2020 projects along the similar partners and institutions from Europe.

The habilitation thesis is divided into three parts.

"*PART I - Professional Scientific Achievements*", grouped on thematic (inter)disciplinary directions/topics of research, presents, in the first chapter entitled "The **synthesis of the post-doctoral scientific and professional results**", the development of the research and the outcomes obtained starting from the concept of "enterprise system" studied in the PhD thesis, moving forward to the best decision support systems for the large volumes of data and, finally, analysis and extraction systems of the

relevant information from large amounts of data using methods such as data mining and Big Data analysis.

The second chapter, designated "**Internet Systems Engineering**", presents the work and the results achieved in the framework of research contracts, and gives details of the embedded systems developed, designed and implemented by the author, such as a "system of managing of the conferences and electronic publications" used both in conferences attended at home and abroad and a complex system of e-learning with its results and their impact in the field.

The third chapter is entitled "**Decision Support Systems** " and presents the researches regarding these systems that support the analysis of large amounts of data with the fastest and the most correct/appropriate decision making system in a particular field, as well as the research contracts and the results obtained in this thematic direction. This chapter also contains a brief presentation of a system for alerting the population in case of a disaster, developed inside of a research contract won/granted in a competition.

"**Data mining & Big Data**" is the fourth chapter and presents the research aimed at extracting of the relevant information ("data mining") from the large volumes of data currently available, the semantic representation of data based on ontology and the new guidelines of " big data".

All the skills acquired and presented in the above chapters as well as the obtained results/outcomes support further guidance in this area, thus providing the possibility to meet the challenges and opportunities "generated" by this new movement: the "*internet-of-things*".

"*PART II - Career Development Plan. Future directions regarding the academic development and the scientific research"* includes a complete "route" for the academic and scientific development. Thus, in terms of scientific

professional scale, I intend to coordinate the thesis in the field of "*Systems Engineering*", approaching and investigating further tools, techniques, methods, etc., current and new in the field, attracting young and valuable people and involving them in the interdisciplinary research projects with partners both from this country and abroad; regarding my teaching career, I will carry on updating the curricula with the newest trends in the field in order to provide solutions to the new demands of society, in general, and industry, in particular. Ultimately these career development guidelines aim at the training of specialists who can achieve /analyze/maintain systems able to provide support regarding the connection of people to systems anywhere in the world in order to remote-control them in real-time[1].

"*PART III - Bibliography*" presents references associated with the first two parts of the habilitation thesis.

[1] http://www.aut.upt.ro/motivatie.php