

## ABSTRACT

Today, we are operating in a global knowledge economy, which is characterized by an increasing competition for survival, development and thriving. In this new environment, organizations have to maintain and enhance the factors that influence their competitiveness. Among the existing approaches, the quality and knowledge management methods, practices and tools are recognized to have a very important potential to improve the competitiveness of organizations.

Within this framework, the habilitation thesis presents the most important research and contributions of the author in the fields of quality and knowledge management after receiving his doctoral degree in 1998 and is organized in three main parts: Scientific, academic and professional achievements, Career development plan and References.

**The first part** of the habilitation thesis presents the most important scientific results as well as the main academic and professional achievements after obtaining the title of "doctor engineer". The section *Scientific Achievements*, constitutes the core of the habilitation thesis. The scientific results presented in this section are mainly related to the research developed in different research grants. They are grouped in two main directions of the research activity: 1) Quality and reliability engineering, and 2) Knowledge management in higher education institutions. Each research field is shortly described next.

*Quality and reliability engineering.* The research activity in quality and reliability engineering has been oriented towards the following topics: (i) Monitoring the state of the technical systems, (ii) Reliability modeling and maintenance planning, and (iii) Quality and reliability improvement with the Taguchi approach of design of experiments.

The foundation of the quality and reliability analysis and modeling of the technical systems is represented by the establishment of the influence and causal determination of their failure processes. Since the failure detection methods have no universal application and accordingly with the process, equipment or technical system characteristics, specific methods must be used. Within this framework, the state of the technical systems was monitored with data acquisition systems as well as an infrared camera.

The effectiveness of the technical systems is based on their intrinsic reliability and on the characteristics of the maintenance interventions. Therefore, the reliability

modeling of technical systems was carried out first at the level of components based on the adoption of distribution law of the time-to-failure. The reliability modeling was also performed at the structural level. The preventive and predictive maintenance strategies were used to plan the maintenance actions to prevent failures, each having its advantages and challenges in industrial practice. The preventive maintenance was formulated based on the block replacement policy and the age replacement policy, respectively. Moreover, periodic inspections were also used to further improve the effectiveness of systems.

The recent advancement in the field of the data acquisition systems has accelerated the development of the condition-based maintenance. However, when different parameters such as vibrations and temperature are used to monitor the current state of a system and its components, different decision may be employed in carrying out the maintenance actions. Moreover, the estimation of the state of technical systems may be affected by some vagueness or uncertainty due to the limitation of the condition-based maintenance. In this direction, a fuzzy logic approach was used to plan the maintenance activities and the results show that fuzzy logic is a method which can be successfully employed for appropriate planning of maintenance activities.

In nowadays competitive business environment, the quality and reliability characteristics of products need to be improved at a minimal cost. While many potential factors may influence both the quality and reliability of products, some factors are more significant than others, so they are important to be established. The values of the relevant factors in improving the quality and reliability of products are also important to be identified. The Taguchi method of design of experiments was employed for this purpose and the results obtained by the author demonstrate the effectiveness of this approach in improving the quality and reliability of products.

*Knowledge management in higher education institutions.* Today higher education institutions operate within a global and dynamic world, where they have to face new roles and new challenges. In this new environment, the use of knowledge management in universities may be a promising solution for their success. However, the knowledge management in higher education institutions is an emerging field, where experiments are just at the beginning. Within this framework, the research interest in this field has been mainly directed towards the relationship between the knowledge management in universities and their nationwide environmental contexts. Moreover, the following topics have been addressed in the research activity: (i) Developing knowledge maps to describe a visual architecture of the investigated

knowledge area; (ii) Identifying Knowledge Management Dimensions in Romanian higher education context, (iii) Knowledge management practices in Romanian higher education context.

Although knowledge management has lately attracted growing attention, very few studies have been carried out on how the Romanian national environmental realities affect the knowledge management activities in universities. Therefore, the knowledge management priorities, knowledge management tools and knowledge management practices were investigated in the Romanian higher education context. The results show the management of knowledge in universities as complex and multifaceted process sensitive to the nationwide context and realities.

The main professional and academic results are presented in the section ***Academic and professional achievements***. The didactic activity and the involvement in the implementation of several projects for the development of the students' competencies are described. The engagement in the academic management is presented. The main research projects and fellowships are also emphasized as well as the professional achievements: memberships in the editorial staff or scientific committees of journals or scientific manifestations; evaluator for different research projects; memberships in different professional associations and societies.

The Career development plan is illustrated **in the second part** of the habilitation thesis. Considering the results obtained until now, the author will continue with the advancement of his research that will complement the already existing research. New research topics are related to the collaboration between Industry-University in an Open Innovation context.

The publication of the future research results in mainstream journals indexed in international recognized databases (and especially in ISI journals with significant impact factor), will continue to be one of the main objectives to increase the international visibility of the research activity. Another important objective will be the publication of chapters of books or books in international recognized publishing houses. The development of new research projects at both national and international levels, especially within the frame of the Horizon 2020 program, will remain another main objective.

The dissemination of all research results will be accomplished together with the teams involved on each topic of interest. The aim of the author to contribute in the development of competitive young researchers will be achieved by including in these teams of an increase number of future doctoral students. Including the

research results in the teaching programs, mainly for master and doctoral studies will also better link the research and didactic activities.

Knowledge management in higher education is a new area, where experiments are just beginning, so the implementation of a knowledge management environment in higher education institutions may be a challenging objective. Nevertheless, it will represent a major topic in the future work of the author, which can prove evidence that academics are able to manage their explicit and tacit knowledge, with considerable benefits in improving research competitiveness, enhancing teaching and learning or offering better opportunities for cooperation with industry.

The bibliographic references are included in **the last part** of the habilitation thesis.