

ABSTRACT

This Habilitation Thesis, carried out at 11 years after the Doctoral Thesis, presents my professional achievements and scientific contributions achieved during this time period in the field of Engineering and Management.

The **first section** of the thesis presents the main scientific achievements embodied in scientific publications and grants/projects/research contracts implementation on the following four research directions.



The **second section** of the thesis is intended for the presentation of the career and scientific development plan. This section presents the main achievements underlying the future development. The career development plan is structured based on the previously identified research fields and their specific perspectives, including short-term goals and long term goals for both the didactic component and the research component.

In the **third section** of this Habilitation Thesis I included my own references associated with the first two sections.

The Habilitation Thesis presents the research developed on the previously defined directions through the main results, highlighting the achievements considered relevant for each approach. The research directions take into account also a chronological development with the common denominator of quality management. It also includes a presentation of the conceptual background, drawing future research and pointing out the references used. The list of own publications is coded according to the four research directions addressed: Mainstreaming in quality management (M), A new approach on QFD method – methodology and applications (N), Quality in student support services (S) and Creativity and innovation in new product development (C).

My Doctoral Thesis “Quality Management System from the Perspective of Mining Equipment Builders and Users” was the starting point for further developed approaches structured in the first research direction. These aim the course from a quality management system that is dynamic, complex and with high integration potential treating the quality assurance as a cross-functional macro-process, all the way to integrated management systems essentially influenced by the "reference system" represented by the Jiu Valley mining industry with all its peculiarities giving it a unique character.

The first research direction concentrates the research results regarding quality management system analysis and its connection with risk management in order to assess the possibilities for implementing embedded systems in the mining industry; the analysis of the possibilities for evaluating the quality of the human factor actions in underground work system based on an original fuzzy model and also the analysis of the prerequisites to fulfill the preconditions regarding the organizational culture in the context of total quality management approach. The time period for this first research direction is 2004-2010.

The design, implementation and use of quality management systems must be supported by appropriate methodological tools that form the basis for the flexibility and dynamism required by the continuous adaptation to environmental changes. Thus, the second research direction focuses on the Quality Function Deployment (QFD) method presenting the research findings regarding the use of the QFD model in designing software tools for evaluation / self-assessment of quality.

I focused on developing a methodology to apply the QFD method for software quality evaluation and introduced a lifecycle model that includes in its representation the quality part.

In order to demonstrate the viability and applicability of the 3D Spiral Life Cycle Model Based on QFD and Spiral Method for Software Development Life Cycle, that is the subject of a registered patent (no. A 2012 00914 / 11.29.2012) published by OSIM, I conducted researches in the fields: software engineering; renewable energy; services (in combination with SERVQUAL model); new product development (NPD). This last field is the link to the fourth research direction, Creativity and Innovation in new products development.

The teaching activities were interlaced with the research activities within the third research direction that focuses on addressing quality in student support services (SSS). This research was carried out in the period 2008-2014. The addressed research aiming the SSS topics were: mentoring and tutoring in SSS; the role of academic counselling; the quality assurance in higher education; the role and importance of self-directed learning (SDL) methods in the context of modern learning; entrepreneurship education; the use of quality management methods in assessing eLearning systems and the use of innovative and creative methods like interactive games and gamification; innovation in education. The use of the QFD-based assessment model for modern learning-teaching systems represents the link to the second research direction and the innovative methods and techniques is the link to the fourth research direction, Creativity and innovation in new product development.

The latest researches results are oriented towards innovation integrating creativity techniques such as gamification and TRIZ with reference to the educational field and developing new products. Thus, the fourth research direction contains the main results presented

concerning the gamification techniques application in research activities and education led to the premises that a research methodology based on the principles of gamification could be useful both as a guide of the entire research activity and as motivational means in certain stages of it. The TRIZ creativity techniques have been explored for new product development research that led to the Patent No. A 2014 00167 / 27.02.2014 "Method for relevant medical information storage based on biometric identification".

This fourth research direction integrates the research directions previously addressed and presents the results from the period 2012-2015, opening new perspectives for future research in the current context oriented on inter-, multi-, trans- disciplinary approach, where the quality has the role of glue logic between all areas.