

BUCHAREST UNIVERSITY OF ECONOMIC STUDIES



Doctoral School of Cybernetics and Economic Statistics

DOCTORAL THESIS

Presented and publicly supported by the author:

ANDREEA IOANA D.C. CHIRIAC

Doctoral thesis title:

**COMPUTER INTELLIGENCE METHODS FOR ANALYSIS OF
FINANCIAL SITUATIONS**

PhD Supervisor: Prof. univ. dr. COSTEA ADRIAN

Doctoral thesis support committee:

PhD. EMILIA ȚIȚAN (Chairperson) – ASE București

PhD. MIRCEA GEORGESCU (Referee) – Universitatea Al. I. Cuza Iași

PhD. VALENTINA VASILE (Referee) – Universitatea N. Titulescu București

PhD. dr. FELIX FURTUNA (Referee) – ASE București

PhD. ADRIAN COSTEA (PhD Supervisor) – ASE București

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2.Keywords

Statistical analysis; Neural networks; Logistic regression; Financial analysis; Computational intelligence.

3.Synthesis of the thesis

In recent years, the field of computational intelligence has emerged as a powerful and innovative approach to financial statement analysis. This interdisciplinary field combines elements of artificial intelligence, machine learning, statistics, and data mining to develop intelligent systems that can process and analyze large volumes of financial data. By applying computational intelligence methods to financial statements, researchers and practitioners can gain deeper insight into the patterns, trends, and relationships that underlie financial performance.

This PhD thesis delves into the field of computational intelligence methods and their application in the analysis of financial statements. Emphasizing the importance of financial index analysis for financial performance assurance, this study investigates the integration of regression, clustering methods, modeling, financial forecasting, and neural networks.

The initial section highlights the need for computational intelligence in business and elucidates its differentiation as a valuable tool. The fundamentals of computational intelligence are explored, highlighting their ability to improve business practices.

The subsequent sections present the research objectives, the main aim of the study and the methodology adopted.

Finally, the paper examines the objectives set by using different statistical methods. These objectives are the comprehensive analysis of previous research using computational intelligence methods, identifying the determinants that encourage financial institutions to use these methods, examining the financial performance of different companies operating in various industries and regions, experimenting with multiple modeling techniques, analyzing churn forecasting and bankruptcy along with neural network exploration. The obtained results are then interpreted, leading to conclusive insights.

In conclusion, this scientific work explores the application of computational intelligence methods for the analysis of financial statements, having all the initially set objectives achieved and explored. Delving into various statistical techniques, modeling approaches, and neural networks, this research elucidates their value in improving financial performance assessment, forecasting, churn prediction, and bankruptcy analysis. The findings contribute to the existing body of knowledge in the field, highlighting the importance of using these methods.