

PREFACE

Special Issue on SIGEF 2025

This Special Issue includes a selection of the extended contributions presented in the XXIII SIGEF Congress: *Digital Transformation and Intelligent Systems in Economics and Business* held in the hybrid mode and organized by the Faculty of Economics, UANL (FAECO) and the International Association for Fuzzy Set Management and Economy (SIGEF), in Monterrey, Nuevo León, Mexico in October 2025.

The main purpose of this Special Issue is to stimulate scientific exchanges, promote international cooperation between academic community and companies, and disseminate results of international research. The papers are organized as follows.

The first paper by Vesa Niskanen examined semi-fuzzy cognitive maps from the statistical and fuzzy systems standpoints. Since the prevailing corresponding model outcomes seemed to lack sufficient empiric justifications, a combined statistical and fuzzy system approach was suggested that applied linear regression analysis and fuzzy rule-based models instead. In his previous studies only statistical methods were used, but in here fuzzy rule-based models were also applied. This method seemed to yield viable results and now the outcomes could be studied by applying ordinary statistical reasoning.

In the second paper, Xavier Molas, Salvador Linares, Joan Ferrer and Marc Carreras considered how to combine compositional data analysis with fuzzy cluster analysis for providing a more reliable approach to bankruptcy prediction. The financial data from agricultural retail firms were used in this analysis. The results indicated that the compositional approach can improve prediction accuracy by adequately addressing the relative nature of financial ratios while reducing the distorting effects of asymmetry and outliers, improving conventional methods.

The third paper by Antonio Terceño, Maria-Teresa Sorrosal-Forradellas, Laura Fabregat-Aibar and Maria-Glòria Barberà-Mariné examined the rising

interest in the consideration of environmental, social, and governance (ESG) criteria in investment decisions in the investment fund industry. The TOPSIS, a multi-criteria decision model, was suggested to rank a variety of investment funds based on both financial and ESG criteria. This approach provided the investors with a more comprehensive and flexible assessments and enabled them to make investment decisions from a sustainable investment perspective, considering both financial and non-financial factors.

The fourth paper by Jose Brotons and Jose Zapata studies a Muchamiel tomato crop grown in a greenhouse under such production strategies as grafting, water deficit, and shading. The different treatments used were ranked from a multicriteria perspective, using the Criteria Importance Through Inter-Criteria Correlation method (CRITIC). This is a multicriteria method aimed to rank the different alternatives starting with the values from the criteria themselves combined with the Ordered Weighted Averaging (OWA), that allows introducing the attitudinal character of the decision-maker. The results indicated that Muchamiel tomato was highly adapted to Mediterranean conditions. The combination of shading and deficit irrigation seemed to be a strongly recommended strategy for this type of crop.

In the fifth paper by Perla Motola-Villanueva and Klender Cortez, Bitcoin forecasting by applying Monte Carlo methods and feedforward neural networks were studied with historical data. In each model it was analyzed the real price movements to determine which one most accurately captured the behavior and volatility of Bitcoin when incorporating key events such as Bitcoin halving. The results indicated that the feedforward neural network exhibited superior predictive power compared to the traditional stochastic methodologies. As a result, this study contributed to assessing which projection methodology provided a more accurate simulation of Bitcoin prices relative to traditional forecasting models used in traditional financial markets.

The sixth paper by Angel Roberto, Nava Solis, Rodriguez Garcia and Martha de Pilar, analyzed Bitcoin prediction with random forest method with on-chain data. Large data sets were used, and confusion matrix was used in their evaluations. The random forest model yielded better accuracy than the other models such as the neural networks.

In the seventh paper by Victor Rendón, Vivian Castañeda, Samuel Montalván and Pilar Franco, Cost at Risk (CaR) management tool was applied to a Colombian company. By using historical monthly observations, the 95% CaR for each cost component (labor, raw materials, packaging, energy) and for total unit cost across products were estimated. Three approaches were adopted, parametric simulation under normality, parametric simulation with an alternative right-tailed distribution to capture skewness, and nonparametric bootstrap. The results were reported as component-level and total CaR percentages, and they were mapped into an income-statement scenario to stress-test gross margin. This framework supported pricing, budgeting buf-

fers, supplier negotiation priorities, and targeted cost-control actions under adverse but plausible conditions.

The final paper by Edwin Montes-Orozco, Román A. Mora-Gutiérrez, Eric A. Rincón-García, Sergio G. de-los-Cobos-Silva, Miguel A. Gutiérrez-Andrade and Pedro Lara-Velázquez simulated microaggressions in organizational environments with an agent-based modeling (ABM) framework. Three scenarios were evaluated: a baseline with no intervention, a bystander-training program, and a combined policy package integrating bystander training, perceived organizational support, and anonymous reporting. The results indicated that the combined intervention yielded nonlinear improvements, including an approximate 55% reduction in microaggression incidents, a 41% increase in internal reporting, and a 35% faster recovery from emotional distress. The framework demonstrated the value of ABM as a decision-support tool for designing evidence-based organizational policies.

The foregoing selected and peer-reviewed Chapters in this Special Issue are expected to provide novel prospects for both the researchers and practitioners when examining the socio-economic phenomena in the world today. We would like to thank the Referees who have critically evaluated the manuscripts. We would also like to express our thanks to the Editor-in Chief of the MVLSC Journal, Prof. Dan Simovici, for accepting this Special Issue.

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