

Extended Abstract

1.Introduction

The banking sector plays a critical role in national and global economies by providing deposit and lending services that support business activities. Efficient banks are essential for economic development, particularly in developing countries with less mature financial markets, as weak banks can trigger financial instability. Intellectual capital (IC) has emerged as a key driver of value creation and performance within organizations, while financial stability and capital adequacy are crucial for risk management and long-term sustainability. This study investigates the combined impact of intellectual capital and financial stability efficiency on the financial sustainability of banks in Iran and Iraq, aiming to identify the factors that enhance resilience and operational efficiency within the banking sector.

2. Research Hypotheses

- H1: Intellectual capital positively influences the financial sustainability of banks.
- H2: Financial stability efficiency enhances banks' long-term sustainability.
- H3: Bank characteristics such as capital adequacy and size positively affect financial sustainability, while high leverage, state ownership, and concentration negatively influence it.

3.Research Methodology

This study employs a quantitative, ex-post research design using comprehensive financial data from 22 Iranian and 44 Iraqi banks over the period 2000–2023. Advanced machine learning techniques, including Bayesian deep learning, transformer networks, graph neural networks, and hybrid deep learning panel models, are used to identify complex and nonlinear relationships among financial variables. Spatial vector autoregression and normalization methods (min-max scaling) are applied to address interbank dependencies and currency differences. The methodology enables a multidimensional analysis of financial stability, efficiency, and the role of intellectual capital in sustaining banking operations.

4.Results

Findings indicate that intellectual capital, financial stability efficiency,

capital adequacy, and bank size are the primary positive determinants of financial sustainability. In contrast, high bank concentration, state ownership, and financial leverage negatively impact stability. Hybrid models combining neural networks and Bayesian learning demonstrate the highest predictive accuracy, revealing hidden patterns and nonlinear relationships that traditional approaches cannot capture. The results highlight the importance of integrating machine learning and spatial analysis for robust financial assessment.

5. Discussion and Conclusion

The study confirms that intellectual capital and financial stability efficiency are critical for long-term sustainability in Iranian and Iraqi banks. High-quality predictive models enable policymakers and bank managers to identify vulnerabilities and optimize financial and operational strategies. The findings emphasize the need for regulatory improvements, enhanced risk management, investment in human capital, and innovation to strengthen banking networks. By combining machine learning with spatial econometrics, the study provides a comprehensive framework for understanding the drivers of financial sustainability, offering practical insights for enhancing the resilience of banks in emerging economies.

Keywords

Intellectual Capital, Financial Stability Efficiency, Financial Sustainability, Neural Networks, Spatial Panel, Machine Learning