

Abstract

The present doctoral thesis *Assessment of the Effects of the Covid-19 Pandemic on the National and European Business Environment and the Influence of Digitalization on the Economic Recovery of the Energy Sector* investigates the interaction between contemporary crises — the COVID-19 pandemic and the conflict in Ukraine — and the role of digitalization in the economic recovery, organizational adaptation, and consolidation of resilience of energy companies in Romania. In a context marked by cumulative shocks, climate pressures, the green transition, and the redefinition of energy security, the paper analyzes digitalization not as an isolated technical solution, but as a socio-technical process whose effects depend on the interplay between technology, people, strategy, processes, and the institutional framework.

The scientific approach is structured around three major objectives: examining the effects of the pandemic on the economy through classical indicators (GDP, public finances, inflation rate) with a focus on the energy sector; analyzing the evolution of energy prices before, during, and after the pandemic, including the impact of Russia's invasion of Ukraine; and exploring the ways in which advanced digital technologies — big data, artificial intelligence, blockchain, Internet of Things, cloud computing — can address sectoral challenges. The research is organized into eight chapters, tracing the path from the theoretical foundation and analysis of the macroeconomic context, through the quantitative and qualitative studies, to the longitudinal case study and the formulation of conclusions.

The methodology employed is a triangulation-based design, combining three complementary components: a quantitative survey based on a questionnaire with 329 respondents from the Romanian energy sector, analyzed through advanced statistical methods (ANOVA, multiple regression, structural equation modeling, hierarchical clustering and k-means with silhouette index validation); ten semi-structured interviews with experts, analyzed according to Braun & Clarke's reflexive thematic analysis methodology, with theoretical saturation reached after the seventh interview; and a longitudinal case study of Electric Planners (2019–2025), evaluated through three composite indices constructed with equal weighting — the Digitalization and Data Quality Index (IDC), the Operational Index (IOP), and the Sustainability and RES Index (ISR).

The results highlight that digitalization creates the potential for performance and resilience, but value only emerges when technology is strategically integrated through people, processes, and governance. Four of the five formulated hypotheses are directly confirmed, while the central hypothesis concerning the relationship between digitalization and performance is confirmed in a mediated form, empirically validating the theory of Bharadwaj et al. (2013), according to which technology alone does not generate value. The quantitative analysis identifies three distinct organizational profiles — proactive, contextually constrained, and structurally inhibited — while the qualitative component reveals three convergent themes: the dual role of digitalization, the tensions between potential and constraints, and the necessary organizational conditions. The thesis brings an original contribution across four dimensions — theoretical, methodological, empirical, and applied — and formulates differentiated recommendations for public policy, companies, education, and financial institutions, in line with European objectives of digital transformation and energy transition.

Keywords: digitalization, energy sector, organizational resilience, digital transformation, COVID-19 pandemic, energy crisis, performance, organizational profiles, composite indices, Romania