

Analysis of the Impact of Economic Policies and Regulations on the Sustainability of Corporate Strategies

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Abstract -

This paper examines how economic policies and regulatory constraints shape the optimization of corporate sustainability strategies. Using a systematic literature review of 85 peer-reviewed articles published between 2010 and 2023 (Scopus and Web of Science), the study analyzes how firms optimize their strategic decisions under economic incentives (tax credits, innovation subsidies) and regulatory requirements (environmental standards, non-financial reporting).

The findings show that incentive-based policies enhance the optimization of low-carbon investment decisions, increasing the adoption of clean technologies by up to 35% among manufacturing SMEs. However, optimization outcomes remain uneven, as large firms capture nearly 65% of available incentives, generating structural inefficiencies and access constraints for smaller firms. Regulatory frameworks such as the CSRD and TCFD improve transparency and strategic alignment but introduce asymmetric compliance costs, affecting firms' optimization trade-offs between profitability, innovation, and regulatory compliance.

The study highlights persistent optimization tensions between economic performance, regulatory constraints, and sustainability objectives. It proposes an integrated analytical framework that models sustainability as a constrained optimization problem, balancing economic efficiency, social equity, and environmental performance. This research contributes to the optimization literature by providing insights into policy-driven strategic decision-making under regulatory and economic constraints.

Keywords — Optimization; Economic policies; Regulatory constraints; Corporate sustainability; SMEs; Strategic decision-making.

I. INTRODUCTION

In recent years, optimization has become a central paradigm for analyzing corporate decision-making under increasing economic, environmental, and regulatory constraints. Firms are no longer solely optimizing profit functions, but are required to integrate sustainability

objectives, regulatory compliance, and social responsibility into their strategic optimization processes. Economic policies and regulatory frameworks act as external constraints and incentive mechanisms that reshape firms' optimization models, influencing investment choices, innovation trajectories, and long-term competitiveness.

The International Journal on Optimization and Applications (IJOA) provides an appropriate platform for this analysis, as sustainability challenges increasingly require optimization-based approaches that reconcile economic efficiency with environmental and social constraints. Understanding how firms optimize their strategies under these multidimensional constraints is essential for advancing both optimization theory and its practical applications in economics and management.

The remainder of this paper is organized as follows. Section II presents the motivation and methodology underpinning this study. Section III introduces the conceptual framework and optimization model. Section IV discusses the key findings from the systematic review. Finally, Section V concludes with implications and future research directions.

II. MOTIVATION & METHODOLOGY

A. Motivation

Optimization theory provides a powerful analytical framework for studying decision-making under constraints. In contemporary corporate environments, firms face increasingly complex optimization problems involving economic performance, regulatory compliance, and sustainability objectives. Economic policies and regulatory frameworks introduce external constraints and incentive mechanisms that reshape firms' feasible strategy sets, transforming sustainability into a constrained optimization problem rather than a purely normative objective.

Despite the growing literature on corporate sustainability, most studies adopt descriptive or policy-oriented perspectives, with limited integration of optimization logic. The existing research often fails to conceptualize how firms optimize strategic choices when confronted with asymmetric incentives, regulatory costs, and resource

constraints—particularly across heterogeneous firm sizes such as SMEs and large corporations.

This study is motivated by the need to bridge this gap by framing sustainability strategies as optimization problems under economic and regulatory constraints. By synthesizing empirical and theoretical findings through an optimization lens, the paper contributes to the objectives of the International Journal on Optimization and Applications (IJOA), which emphasizes the development and application of optimization-based approaches across multidisciplinary fields.

B. Methodology

This research adopts a systematic literature review methodology structured to support optimization-oriented analysis. The review follows the PRISMA guidelines to ensure transparency, reproducibility, and analytical rigor. A corpus of 85 peer-reviewed articles published between 2010 and 2023 was selected from the Scopus and Web of Science databases.

The selected studies were coded and analyzed to identify optimization mechanisms related to corporate decision-making under economic incentives and regulatory constraints. Each article was examined according to five analytical dimensions: policy instrument, firm characteristics, optimization objective (e.g., cost minimization, innovation maximization, compliance efficiency), constraint type, and strategic outcome.

Qualitative thematic analysis was conducted using NVivo to extract recurring optimization patterns, trade-offs, and constraint structures. A double-coding procedure applied to 20% of the sample ensured analytical consistency, achieving an inter-coder agreement rate of 92%.

By structuring the literature around optimization objectives and constraints, this methodology aligns with the scope of IJOA, offering a systematic synthesis of how optimization principles are applied—explicitly or implicitly—to sustainability-oriented corporate strategies.

III. Conceptual Framework and Optimization Model

In the context of optimizing corporate strategies under economic incentives and regulatory constraints, the total cost (C) can be modeled as the sum of investments in clean technologies (x) and compliance costs (y):

$$C = c_1 x + c_2 y \quad (1)$$

where:

- (x) represents the investment in green technologies,
- (y) denotes the cost of regulatory compliance,

- (c_1) and (c_2) are the respective unit cost coefficients associated with these expenditures.

The objective is to minimize the total cost (C) subject to economic policies and regulatory constraints such as budget limits, minimum environmental performance thresholds, and innovation incentives. This simple model captures the trade-offs firms face in allocating resources between technological investments and compliance efforts.

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