AI for Strategic Edge:
An Empirical Analysis of Learning Economics at the Firm Level

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About His Dissertation

How does artificial intelligence help firms innovate faster and more efficiently? How can that advantage be measured?

This is the central issue that Carlos E. Salazar Urrea explores, in which he investigates how AI is transforming the economics of research and development at the firm level. As companies face a new era of dynamic, nonlinear technological change driven by AI, business leaders and scholars alike are searching for ways to understand AI not just as a tool, but as a strategic capability that can unlock faster learning, greater innovation, and a sustained competitive advantage.

To answer this question, Salazar Urrea examines how AI enhances a firm's ability to generate new knowledge through R&D. Drawing from foundational theories in strategic management and innovation economics, he analyzes a global panel of 120 early AI-adopting firms over a 16-year period (2008–2023). He uses a dynamic panel modeling with Generalized Method of Moments (GMM) to track how AI affects firms' learning efficiency and innovation output over time.

At the heart of the analysis is a new concept: the AI Knowledge Amplification Coefficient (AIKA). This metric quantifies how the interplay between human capital and AI capabilities can accelerate knowledge creation. AIKA captures changes in the speed in the data-to-insight cycle generated by the synergy of human and machine intelligence, enabling firms to tackle previously intractable problems and produce new knowledge. Salazar Urrea finds that firms with advanced AI capabilities realize improvements in the effectiveness and strategy of their R&D efforts.

These findings have broad implications for business strategy and policy. For executives, the research offers a new way to measure the ROI of AI investments not just in terms of automation, but in terms of accelerated innovation. For innovation-driven industries, it provides a framework for benchmarking AI capability as a key driver of competitive advantage. And for scholars, it deepens the understanding of AI as a dynamic capability that fundamentally reshapes industrial learning curves.

This research offers a new framework for understanding how AI reshapes the economics of innovation. It demonstrates that when human expertise and AI capabilities are intentionally integrated, firms unlock a true "co-intelligence advantage," a synergy that accelerates learning, multiplies creative capacity, and enables organizations to adapt faster than competitors in an era of relentless technological change.
In short, Salazar Urrea's work provides a powerful lens for understanding how AI is rewriting the rules of innovation and how firms can harness that potential to stay ahead.