

# The Impact of Artificial Intelligence on Innovation

Iain M. Cockburn<sup>1</sup>, Rebecca Henderson<sup>2</sup>, and Scott Stern

School of Management Boston University, MIT Sloan School of Management Heinz Professor of Environmental Management Harvard Business School

## Abstract

Artificial intelligence may greatly increase the efficiency of the existing economy. But it may have an even larger impact by serving as a new general-purpose “method of invention” that can reshape the nature of the innovation process and the organization of R&D. We distinguish between automation-oriented applications such as robotics and the potential for recent developments in “deep learning” to serve as a general-purpose method of invention, finding strong evidence of a “shift” in the importance of application-oriented learning research since 2009. We suggest that this is likely to lead to a significant substitution away from more routinized labour-intensive research towards research that takes advantage of the interplay between passively generated large datasets and enhanced prediction algorithms. At the same time, the potential commercial rewards from mastering this mode of research are likely to usher in a period of racing, driven by powerful incentives for individual companies to acquire and control critical large datasets and application-specific algorithms. We suggest that policies which encourage transparency and sharing of core datasets across both public and private actors may be critical tools for stimulating research productivity and innovation-oriented competition going forward.

## Biography

Dr. Cockburn currently serves on the Government Industry Partnerships for the Development of New Technologies, National Research Council, Steering Committee in Washington, DC. He has testified in cases in

His research interests include the economics of innovation, intellectual property, pharmacoeconomics, productivity measurement, competitive strategy, and applied econometrics. He is Professor of Finance and Economics and

the US and Canada.

Prior to coming to Boston University, he was the Van Dusen Professor of Business Administration in the Faculty of Commerce the University of British Columbia.

Richard C. Shipley Professor in Management at the School of Management at Boston University in Boston, MA and a research associate at the National Bureau of Economic Research in Cambridge, MA.