

# Predictive analytics pays off with complementary investments

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Kristina McElheran is an assistant Professor of Strategic Management at the University of Toronto, Scarborough and Rotman School of Management. Credit: Rotman School of Management

The predictive analytics industry is slated to earn more than \$273 billion in 2022. Yet, despite the hype over big data and the forecasting power of

tools such as statistical modelling and machine learning, not all firms that sink money into them reap benefits, prompting a research team to probe what makes the difference.

They found that significant and complementary investments in IT capital, an educated workforce, and high efficiency manufacturing processes were "indispensable" to getting the most out of predictive tools that help firms optimize their performance. Among the 30,000 manufacturers surveyed in 2015 study, companies with [predictive analytics](#) averaged about a \$500,000 to \$1 million revenue increase. Firms that did not make at least one of these, mutually-reinforcing investments, however, saw little to no benefit.

"These complements provide the organizational infrastructure to collect, analyze, and respond to predictions based on objective data," explains Kristina McElheran, an assistant professor of strategic management at the University of Toronto Scarborough and UofT's Rotman School of Management.

"IT capital captures investments in [data collection](#) and computer hardware that can transmit, store, and analyze data, for example. Educated workers are known to be an essential ingredient for that system. And certain production environments provide richer data due to the processes they use."

Prof. McElheran and her co-authors worked with the U.S. Census Bureau to create a survey that was returned by a highly-representative sample of U.S. manufacturing plants for the two survey years, 2010 and 2015. The survey asked about manufacturers' use of predictive analytics, management practices, availability and use of data in decision-making, and design of their production processes. Results were cross-linked with related data such as company production inputs and outputs. Manufacturers were targeted because they tend to be early innovation

adopters. More than three-quarters of responding plants had adopted some form of predictive analytics by 2010, researchers found, although most firms used the tools only annually or monthly. Higher intensity of use was associated with greater productivity gains.

Government requirements for collecting environmental and safety data also helped to "nudge" some firms into adopting predictive analytics by pushing them to implement necessary infrastructure and train workers to use it. Companies nudged in this way ultimately displayed stronger performance in the researchers' findings.

It's no secret in the management world that IT investments realize better returns when supported by educated workers, and vice versa. What the research shows is that some firms have not yet made that connection in the context of predictive analytics, says Prof. McElheran.

"We found it puzzling," she says. "More research is needed to understand the organizational or market frictions that are causing this apparent misalignment, one that is proving to be quite costly in the firms we observe."

This is the first study to examine the impact of predictive technologies on productivity in a large sample. The paper was co-written with Erik Brynjolfsson, of Stanford University and Wang Jin at the MIT Initiative on the Digital Economy.

The study appears in *Business Economics*.

**More information:** Erik Brynjolfsson et al, The power of prediction: predictive analytics, workplace complements, and business performance, *Business Economics* (2021). [DOI: 10.1057/s11369-021-00224-5](https://doi.org/10.1057/s11369-021-00224-5)

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