

Why COVID is NOT Driving a Robot Revolution

Immature technologies and risk aversion block robotic dominance...for now.

Ever since COVID drove everyone into their homes in spring, Americans have been on an online buying jag. As a result, many fulfillment and distribution businesses have experienced dramatic increases in demand. With social-distancing rules in place at warehouses, some expected a sudden shift to robots, which would handle products and block transmission of the virus in the bargain.

That didn't happen, say UC Santa Barbara technology management assistant professor **Matt Beane** and his Stanford University colleague **Erik Brynjolfsson** in a paper published in the *MIT Sloan Review*. In ongoing research funded partially by NSF, the two have so far sampled more than twenty companies of varying sizes around the country in terms of their adaptation of AI-enabled robots specifically and automation more generally.

"This piece is about what happens to investments in automation during COVID," Beane says. "Generally, it's bad news for any firm that uses the word *robot* to describe what they're selling. A few firms sell robotic automation, physical robots that automate things, but many of those are a solution looking for a problem."

Beane says that the pandemic has driven companies to adopt what he has called *plug-and-play automation*, which "refers to anything that can be purchased easily, arrive at your facility quickly, has a small physical footprint, and is *modular* — meaning that I can easily hook it up to other forms of automation — and *repurposeable*, so that I can pretty quickly switch it from sorting one type of thing to another."

As an example, one company they studied uses industrial pumps to fill containers with a variety of liquids. When the pandemic started, they instantly lost sixty percent of their

business. When they received multiple requests to bottle hand sanitizer, they scrambled to acquire six more pumps and started packaging it, along with a different sanitizer for surfaces, and a lubricant used in the medical field. The pumps have no artificial intelligence and no robotic elements.

"They had the pumps and the filling equipment," Beane says. "The demand for lubricant dropped off quickly, but demand for the other products grew, so they had to be able to disconnect the pump from one product line and swap it over in an hour or two to a new piece of filling equipment for a different product."

The problem even with that solution, Beane says, is that companies that could integrate plug-and-play elements into their systems probably did so before the pandemic and now will snap up remaining plug-and-play units to meet increased demand, leaving nothing for would-be new adapters. If a firm wasn't already using plug-and-play technology, they will face an uphill battle to acquire it now.

Even when companies could integrate a robotics system to sort some type of good, many do not, Beane notes. "They say, 'We could go four times faster than this with a robot, but the rest of the facility can't get us products fast enough to do that, so there's no sense in us going faster.' They could go faster only if the organization completely changed five processes upstream, but that takes years of business re-process engineering."

A more common path for many companies right now is to hire more people in the short term, even if it means spending more money and being a bit less efficient, because they are wary of investing in new technology during such an uncertain time.

In fact, even before the pandemic, investment in robots was small, and resulting job losses were few.

"The robots-replacing-people thesis is misleading because the people doing the analysis don't agree on what a robot actually

is," Beane says. "If we define a robot as something that has a five- to seven-axis arm that does some manipulation task — picking something up from an uncertain position and putting it into a container — then, no way. The only robots that are adding repeatable value and therefore possibly leading to job loss are in extraordinary repeatable, long-lived production processes like in aerospace or automotive manufacturing or electronic systems assembly.

"But nobody would refer to those as robots because they don't have visible arms," he continues. "If what we mean by a robot is one of these roughly human-scaled arms that does some manipulation tasks, then the level of investment in robotics amounts to something less than a rounding error. Erik and his colleagues' very recent study, using Census data, shows that only 1.3 percent of firms are investing in any kind of robotics system, and almost all of that is invested in these proven systems. The kinds of robots that people think of as robots — not one of them is doing an uncertain task at 99.96-percent accuracy so that a business can get a good, predictable return — at least, not yet."

Beane and Brynjolfsson's research program includes only firms that are attempting to make AI-enabled robotic systems that can handle a changing list of less-structured, less-predictable tasks while making money doing it. "Every single firm in our sample we selected because they are developing absolutely bleeding-edge robotic technology," Beane says. "Some of them will be successful, and those technologies will be successful at scale, but that will be years from now. All of them right now are venture capital-sanctioned experiments."

To watch a CNBC interview with Beane and Brynjolfsson, go to: <https://cnb.cx/3kOXg6w>

