

Summary

In this study, Jorge Niosi examines the channels by which university-developed technologies are transferred to industry. Canada invests large sums in academic research, but the fruits of these investments are not reflected in more industrial innovation and improved productivity.

To frame the analysis, Niosi lays out a supply-demand model of innovation according to which basic discoveries and advances in frontier science ultimately bear fruit in the form of commercially viable technologies. The supply side is where ideas are organized into useful concepts, research and discovery, and it is dominated by university research. Because the economic benefits of such research are broad in scope and difficult to predict, governments tend to be heavily involved in financing it. Using indicators such as investment in university research and development (R&D), numbers of science and engineering graduates and scholarly publication rates, Niosi concludes that the supply side of university technologies is reasonably healthy in Canada.

At the demand end of the university research pipeline, businesses build on basic technologies to develop commercially profitable products or processes, which often require complementary investments in R&D. Niosi points out that several factors – notably Canada’s relatively small and geographically dispersed domestic market – work against strong demand for technology here compared with in the United States. Despite pockets of strength in the pharmaceutical and electronic equipment industries, demand for university research is surprisingly low. The author notes that most Canadian companies turn to other firms for licensed technology, which is circumstantial evidence that they are not finding the technologies they need in universities.

Niosi terms the grey area between the supply and demand of university-developed technologies the “valley of death,” not only because of the paucity of funding, but also because of mismatched expectations. From the perspective of business, universities provide a potential vehicle for developing early-stage technologies that would otherwise be too risky and costly. However, from the perspective of academia, professors are primarily motivated by scholarly publication of their work, for which commercial potential is typically much less important than originality.

Currently in Canada, most efforts to connect university-developed technologies to potential commercialization opportunities pass through academic offices of technology transfer (OTTs). OTTs are charged with evaluating the com-

mercial potential of these technologies, securing appropriate intellectual property protection and division of royalties, and seeking out potential licensees – essentially a supply-push approach. But they have neither the human resources nor the market knowledge to provide effective technology transfer.

Niosi suggests that a demand-pull approach, by which businesses seek out and cultivate university technologies, would be much more useful, and points to several US initiatives that have proven effective. These include the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, which provide seed funding to small- and medium-sized enterprises for early-stage technology development in cooperation with academic researchers. In addition, the Advanced Technology Program (ATP) helps companies commercialize generic technologies, in part by involving them directly in university research priorities. By contrast, says Niosi, legislation along the lines of the landmark 1980 *Bayh-Dole Act*, which grants intellectual property rights to the inventors rather than the funders of technologies, would be ineffective in Canada.

In the Canadian context, the key objective in developing a demand-pull approach to university-industry technology transfer would be to involve businesses in the development of academic research agendas without allowing them to dictate those agendas entirely. Many of the Expert Panel on Commercialization’s proposals are lacking in this regard, because they would keep decisions about what technologies to fund in the hands of universities and governments. The author proposes that Canada create pilot programs along the lines of the STTR and ATP under the rubric of the successful and well-regarded Industrial Research Assistance Program.

Two commentators provide university and industry practitioner perspectives. University of Alberta President Indira Samarasekera broadly agrees with Niosi’s diagnosis of the problem, and emphasizes that, given that university-industry partnerships are currently limited to a small number of large firms, policies must better connect small and medium-sized enterprises to universities. Ilse Treurnicht, head of the MaRS innovation consortium, cautions that the US innovation ecosystem is quite different from that of Canada, which means that a cookie-cutter approach may not be very effective. She agrees, however, that businesses should be involved in developing academic research agendas, because they have the market knowledge that universities and granting councils lack.