

The case for engineering programs in the province

Herb Emery Public policy



University engineering programs in New Brunswick were casualties of the 2008 recession's lasting economic effects. For a province that after 2008 looked to entrepreneurs and innovation strategies as a way to restore prosperity, the gutting of engineering teaching and research capacity in the province couldn't have come at a worse time.

The good news is that in an essentially broke province, reinvigorating university engineering programs can be a quick way to increase productivity, employment and GDP.

Per capita funding from all sources for universities in New Brunswick and Nova Scotia contracted sharply after 2007, whereas in other provinces, university budgets remained the same or higher. The two provinces then saw their per capita university budgets bump back up for two years in 2010 before sliding into slow decline seen in most provinces.

The shock to university funding was likely greater for New Brunswick than Nova Scotia because where Nova Scotia is one of the provinces with high per capita funding of universities, New Brunswick has typically had the lowest.

With this sharp funding contraction, the resources and enrolment levels in New Brunswick's programs have been falling behind those of engineering faculties in other provinces.

The consequences of the contraction of engineering in New Brunswick universities were apparent in research funding. Federal research funding to New Brunswick had previously converged toward the per capita levels of Nova Scotia, which are among the highest for the six smaller population provinces; but since 2010, federal research funding is increasingly concentrated in Nova Scotia as funding to New Brunswick has declined returning to levels not seen since the early 2000s.

So why was New Brunswick's choice to gut its university engineering programs a problem?

Research universities engage in activities with the potential to impact regional innovation, entrepreneurship and economic performance. For New Brunswick, universities are a targeted way to overcome some of the natural disadvantages of being small. University research and development activities are a source of productivity spillovers to local industries; the size of the spillover effect increases with the research intensity of the university and the degree of technological alignment between university activities and local firms.

The importance of engineering for regional development stems from the fact that within universities, engineering has extensive interaction with industry reflecting a more applied orientation, amenable to commercial activity and potentially more impactful local development. Engineering programs are perceived to be aligned with the knowledge infrastructure required for growth and innovative activity in the regional economy.

In addition, many of the big industries in a province such as power utilities or resource-based industries have idiosyncratic qualities which require researchers and graduates with knowledge and experience specific to the geographic location.

In a study of the impact of university activity on provincial economic outcomes, I found that measures of engineering research and teaching activity suggest important productivity spillovers. If New Brunswick boosted its engineering program enrolments to proportionately match those in Nova Scotia, then New Brunswick would gain \$1 billion in additional GDP per year. Three-quarters of this gain is associated with increased labour productivity and the remainder from an increase in total employment of 5,000.

By implication, New Brunswick's choice to contract its engineering programs after 2008 was a cause of some of our lost employment, lack of growth in labour productivity and slow growth in GDP.

While the overall value of university research and teaching within a province is not determined solely by its impact on the province's economic outcomes, local economic impacts should be of interest to provincial funders of universities. In short, provincial governments and taxpayers may recognize the value of university education and research, but they have a choice to free-ride on the investments in universities elsewhere by importing graduates and innovations of other provinces.

But if the best graduates and ideas produced by world class universities, funded by other provinces' taxpayers, are available to New Brunswick, then why should New Brunswick taxpayers fund their own universities other than to educate its own young?

Here's why: If university economic impacts are observed locally as they are for engineering, then this would signal a return to provincial residents from investing in their own universities over a strategy of importing/attracting human capital and relying on innovations produced outside the province. Imports of human capital and innovations from outside the province are not perfect substitutes for the outputs of provincial engineering programs.

New Brunswick made a mistake after 2008 by failing to maintain its engineering faculties and it continues to pay for that mistake in terms of lost productivity, fewer jobs and slow growth of the economy.

But thankfully, the size of investment required to reinvigorate university engineering research and teaching in New Brunswick is not large.

The capital cost and annual operating expenditure increases over 20 years required to restore New Brunswick university engineering capacity (i.e. to be on par with Nova Scotia) is around \$175 million (net present value). That \$175 million investment would yield an additional \$11.8 billion in GDP (net present value) over the same 20-year period.

If you know of any other investments with a 69:1 return, then please forward them to the premier's office.

HERB EMERY is a Telegraph-Journal columnist and the Vaughan Chair in Regional Economics at the University of New Brunswick.