

Science and technology

Don't ask voodoo to solve our productivity problem

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If you were the powerful Canadian science and technology lobby, how do you know when you have achieved ultimate success – I mean blow-out, smash-hit, over-the-top success?

It is when the lead editorial in The Globe and Mail states as fact something central to your beloved stance, even though the assertion is based purely on superstition. Given that science is the topic, this is particularly ironic, especially since it has been centuries since the Scientific Revolution elevated data over superstition as the basis for decision-making.

Last Tuesday, The Globe's lead editorial (The Forgotten Issue: The Productivity Gap) asserted: "The U.S. has far more postsecondary university graduates per capita. And more of those graduates excel in science and engineering." Correct on the first part. The U.S. graduated about 26 per cent more per capita from university in 2002/2003, the latest year that good comparative statistics are available.

The second part is false -- absolutely false.

But it is exactly what the science-and-technology lobby wants everybody, including The Globe and Mail, to believe and propagate. The facts: Canada enjoys a 13-per-cent greater stock of scientists and engineers per capita than the U.S., and Canada produces a 6-per-cent greater annual flow of newly graduated scientists and engineers.

Perhaps by including the word "excel," The Globe is trying to make the point that while Canada graduates 14 per cent more at the BSc level, the U.S. graduates 19 per cent more with an MSc (PhDs in science and technology are tied) and that is a big problem.

However, this is hardly the advanced education problem for Canada to focus on. Across all fields, the U.S. graduates more than double our number of masters and 33 per cent more PhDs every year -- so Canada does disproportionately way better in advanced degrees in science and engineering than all other fields.

Why is all of this important?

It is because Canada's whole innovation and commercialization strategy (such as it is) is predicated and resourced on a flawed notion of Canada's problem -- that we are not investing enough in either science and technology education or science and technology research.

The science-and-technology lobby has done a brilliant job of convincing important policy players -- from the federal government all the way to The Globe editorial page -- to ignore the facts.

Contrary to superstition, we educate more scientists and engineers than the U.S. In addition, proportionate to our economy, we have higher funding than the U.S. of university research -- the vast majority of which is directed to science and technology research. Yet the overwhelming majority of new federal government funding into education and research continues to be in -- you guessed it -- science and technology.

We hold near and dear to our hearts that the U.S. is richer than us because of their high-tech economy. Pure superstition. Across the entire U.S. economy, a mere 1.9 per cent of jobs are in the following combined sectors

generally considered to represent all of "high tech": IT or information technology (hardware and software); communications equipment; aerospace vehicles and aerospace engines; medical devices, and pharmaceuticals and biotechnology. In Canada, the number is 1.6 per cent.

What would be the effect if we were to make our jobs distribution as high tech-intensive as the U.S. by magically raising our total to 1.9 per cent of jobs and raise the wages in the extra 0.3 per cent from the average of all sectors to the average of the six high tech sectors?

Answer: it would reduce our prosperity gap with the U.S. from the current 15.7 per cent by 0.1 per cent to 15.6 per cent - a number that most data-oriented folks would call a "rounding error."

Ah, but U.S. companies in other non-high-tech clusters do better because of proximity to the information and communications technology industries. Yeah, right: It is really hard for Canadian companies to get IBM computers, Cisco routers, and GE medical devices. How many superstitions are we going to put up with?

The data are clear.

We don't have an innovation problem because of the lack of university science and technology research and education. We have an innovation problem because businesses in Canada don't spend enough on innovative activities, including - but not restricted to - research and development.

Why might that be?

Why don't we look at the education of Canada's business managers, since educational attainment seems to be an issue for The Globe editors?

Across the entire U.S. economy, 50 per cent of the managers have university degrees versus a mere 33 per cent in Canada. At the other end of the spectrum, 14 per cent of our managers did not graduate from high school versus 2 per cent in the U.S.

Why might so few managers in Canada have a university degree? There may be multiple reasons, but one might be that they can't get university education in their field of choice (business) and choose therefore not to gain university education.

Why would that be? It is because Canada has decided as a country to ruthlessly ration university business education. There are only half the spaces in university business programs per capita relative to the U.S. and it drops to 40 per cent for graduate business spaces.

Is that because Canadian kids coming out of high school don't want to pursue business education? Nope. We turn them away by the droves. In Ontario, for instance, it is 15-per-cent harder to get a space in a university undergraduate business program than it is in engineering. Those are real facts, not superstition.

In a nutshell, our innovation strategy for prosperity in Canada, as supported by the science-and-technology lobby, is to invest more than the U.S. in university science-and-technology R&D, invest in producing more science and engineering graduates than the U.S. and then hand both the research output and the science and engineering personnel over to significantly less-trained business managers, in particular those with less business training, and hope that great commercially-viable innovation happens.

Not surprisingly, our innovation strategy in Canada is failing miserably.

I take my hat off to the science-and-technology lobby: It has run a fabulous campaign. However, the challenge with battles over policy is that the minute you win, the clock on performance starts. And someone, some time, is going to wake up, look at the clock and say: "You know what? It has been a while and this policy isn't working." And at that point, the big win turns into a giant loss.

Before that day of reckoning, which will be good for no one, Canadian innovation policy needs to catch up with the Scientific Revolution. It needs to throw out the superstition and start working with data.

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