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Universities and the Knowledge Economy

BY DR. PAUL DAVENPORT

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UNIVERSITIES AND THE KNOWLEDGE ECONOMY

Business leaders as diverse as John Roth and Gerry Schwartz have pointed out that the key to a strong Canadian economy is a strong education system. You can train people to become managers, but they first have to have a solid foundation of knowledge and an ability to think and learn.

Canada's publicly funded universities are integral to the development of a strong and vibrant Canadian economy. As we begin the 21st century, it is obvious that the public universities in this country are under increasing pressure. Governments are cutting funding. Well-trained faculty are becoming increasingly hard to find, and even harder to pay. The demand for university training is increasing, while the ability of universities to provide the educational requirements of our society is being eroded.

This is an issue that is vital to the future of Canada and, in our opinion, requires a great deal more public debate. Ivey Business Journal invited Dr. Paul Davenport, President of the University of Western Ontario, to present his views on this important topic in the hope that we can start the debate.

We invite you to respond to Dr. Davenport's article, and will publish a cross section of your comments over the coming months. — Ed Pearce, Publisher

BY DR. PAUL DAVENPORT

One of the striking attributes of the advanced economies during the last three decades has been the strong growth in demand for university graduates and university research. We are witnessing a long-term increase in the demand for both graduates and research, which reflects the transition in advanced economies toward a knowledge economy. Formal education, lifelong learning and fundamental research are central to economic progress in the New Economy. All levels of education in Canada, including our public schools and extensive community college systems,

are important to the knowledge economy, and all are worthy of our attention and support. My focus here is on universities, which through advanced education and research have a special role in allowing Canadians to take full advantage of the New Economy.

1. THE CHALLENGE OF ACCESSIBILITY AND QUALITY

Canadian universities face the extraordinary challenge of sustaining accessibility and quality over the next decade.

During that time, the children of the postwar baby boomers will enroll in university. They will produce the third great surge in university enrollments since 1945, after those involving the returning veterans in the late 1940s and early 1950s, and the baby boom surge itself in the 1960s. In Ontario, for example, during the 10 years from 1961 to 1971, university enrollments increased by nearly 100,000. For the period 1998 to 2010, current forecasts indicate an increase of some 80,000. The increase in the 1960s was associated with a significant investment of public funds, much of it earmarked for massive increases in faculty and staff, which was essential to maintaining quality as enrollments rose. Are we ready to maintain quality in the same fashion in Canada during the coming decade?

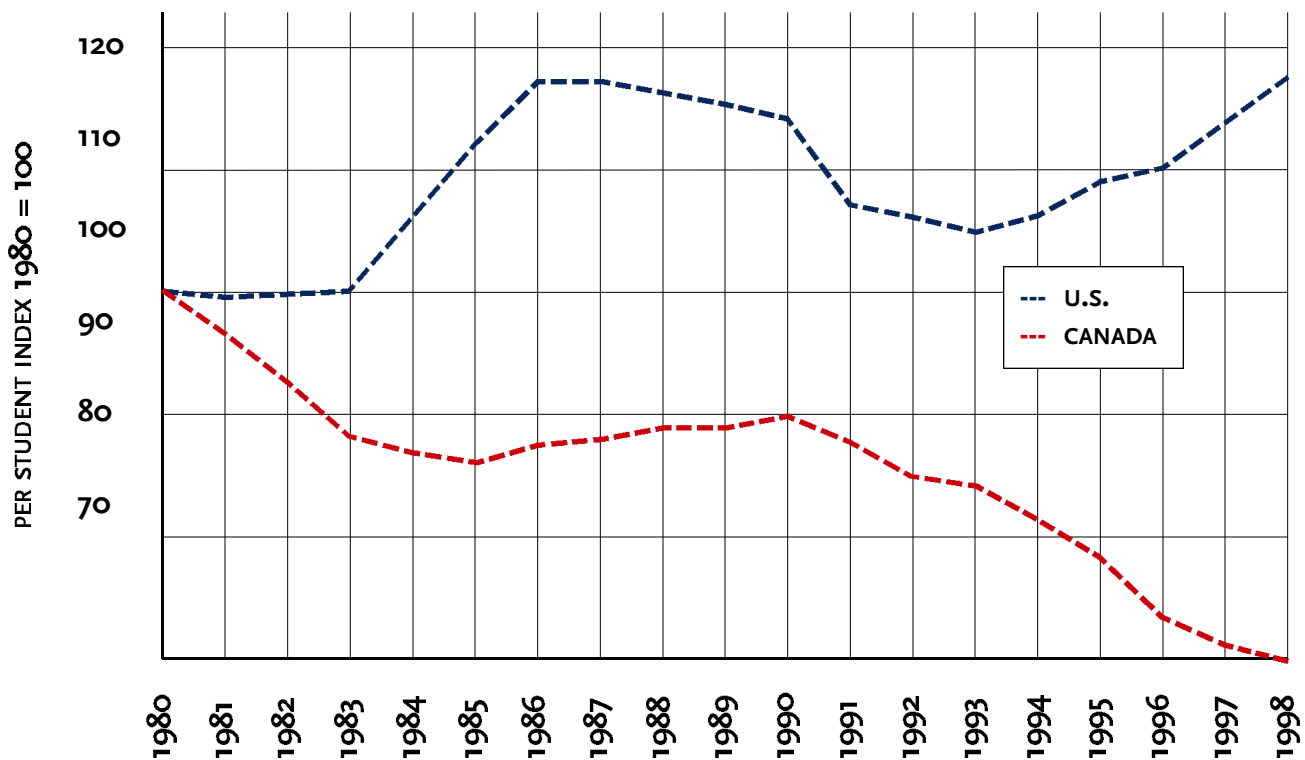
If we judge the next decade by the policies of the past one, there is no reason for confidence in our ability to meet the accessibility challenge. During the past decade, Canada has systematically cut its real public funding per student, with the result that student-faculty ratios have risen steadily. As Figure 1 shows, during the last two decades, real per-student public funding in public universities has been

reduced by 30 percent in Canada, while it has been increased in U.S. state universities by 20 percent. Revenue per student is nearly 40 percent greater in U.S. public universities, with core public funding, tuition and student aid all significantly higher. (The comparison is made with a purchasing-power parity rate for the Canadian dollar of 82 cents U.S., well above the official exchange rate.)

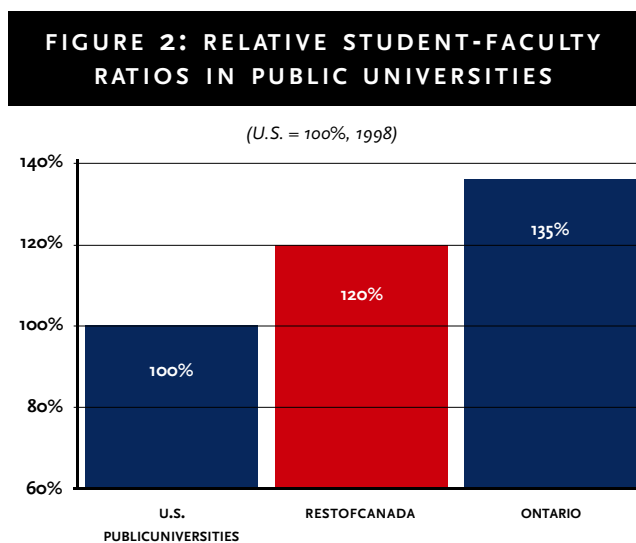
An immediate result of these differences is the growing inability of Canadian universities to compete for faculty who receive offers from U.S. universities. The competition is most intense in areas where the private demand for faculty is also high, such as business and economics, electrical engineering and computer science, and certain areas of medical research.

The cuts have also led to a growing student-faculty ratio in Canadian universities. In Ontario, the student-faculty ratio has increased by some 25 percent since 1987-88, an extraordinary change in just over a decade. The result has been larger class sizes, reduced contact between faculty and students, and what both students and faculty experience as a decline in educational quality. Again, the comparison with U.S. ▶

FIGURE 1: REAL PER-STUDENT PUBLIC FUNDING OF PUBLIC UNIVERSITIES



public universities is instructive: Figure 2 shows the student-faculty ratio is some 20 percent higher in Canada than in the U.S., and some 30 percent higher in Ontario. Thus, superior funding in U.S. public universities allows for a higher quality of education and contributes to the brain drain of outstanding academics to the United States.



One approach to the accessibility challenge in Canada over the coming decade would be to simply allow the student-faculty ratio to continue to increase. In Ontario, for example, where it has increased by 25 percent, there has been no great public outcry. Larger class sizes do not create the dramatic crowds at emergency wards or growing waiting lists for surgery that dominate our political debates today and often provide leading stories for the evening news or the morning paper. Who really cares if the student-faculty ratio goes up another 25 percent in the next decade? We could adopt in Canada what might be termed the “barn model” of university accessibility: As long as you get in the barn, and eventually get a degree, you will receive all the benefits of university education. What goes on in the barn is not really very important. The barn model is wrong, wrong for students and wrong for society. To see why, we need to review the role of university education in the knowledge economy.

2. UNIVERSITY EDUCATION AND THE KNOWLEDGE ECONOMY

Evidence of the growing importance of the knowledge

economy comes in large part from the relative growth and superior remuneration of highly educated persons in the workforce. A particularly striking example of the advent of the New Economy is the dramatic increase of university graduates in the labour force over the last four decades, with no corresponding decline in their relative income. If the 19th century was marked by a strong demand for physical capital in the form of buildings and machines, the 20th century saw a growing demand for intangible capital represented by education and research. In the words of Abramovitz and David, two distinguished American economic historians, in the 20th century “the bias of technological innovation has been intangible capital-using and, in particular, has increased the relative demand for human capital formed through investments in education.” This is a broad definition of the importance of education in the economy, and it is not limited to a particular sector of economic activity. In his speech on January 17, 2001, to the Canadian Society of New York, Finance Minister Paul Martin made this point very clearly: “The volatility of the dot.com craze notwithstanding, the spread of technological change will continue to drive economic growth in all sectors...this is where the true New Economy is to be found.”

Too often, however, the knowledge economy is given a technological definition, as meaning that the economy is now almost entirely driven by the changes in information technology which have occurred during the last three decades. I do not hold that view, although I think that changes in such technology have been crucial to the development of the knowledge economy. Rather, I believe that to understand the knowledge economy, we must focus first on people and organizations, not on technology, still less on a particular technology. Learning in organizations has a fundamental characteristic: It involves people who act in teams. The ability to learn and to interact with others, to learn from others, is at the heart of individual success in the knowledge economy.

The knowledge economy generates a strong demand for university graduates because of the very nature of scholarly activity in a university. Universities are special places because learning takes place in an environment of research and scholarly innovation. Non-university institutions may well play a growing role in conveying facts and basic skills to young people after high school. As important as facts and basic skills are, however, the knowledge economy is setting a higher premium on the ability to learn continu-

ously, to take risks and to work in teams—the very abilities our universities cultivate, because of their special position of teaching in a research setting.

For a decade, the Conference Board of Canada has asked its members to describe the skills they seek in university graduates. The skills identified did not focus on information technology, but are instead those of the knowledge economy. Canadian companies are looking for graduates with the ability to communicate clearly both orally and in writing; work effectively in teams; think critically and creatively; solve problems and exercise leadership. Learning these skills requires the debate and discussion typical of small classes. Students who spend virtually all their time in very large classes will be short-changed on this crucial part of their learning experience. The barn model of accessibility just does not work for the real needs of our students in the knowledge economy. Thus, as we discuss affordability for university education, we need at the same time to ensure quality, and that must involve stopping the steady climb in the student-faculty ratio.

The high return of a university education, both to the individual and to society, is a central tenet of belief in the U.S., but still poorly understood by some in Canada. Writing in the *Financial Post* in 1998, Diane Francis described the low value of a university degree: “The public is beginning to realize a technical education at a college or vocational school is considerably more valuable than more university degrees.” While Ms. Francis refers to an opinion survey conducted in Ontario in 1998, she does not examine any real data on employment and income. And with good reason: All the official data we have for decades show the superior labour-market performance of university graduates. Using her comparison of college and university graduates, the data show that university graduates have lower unemployment rates, higher incomes and lower default rates. The default rate in 1999 of private vocational schools in Ontario—institutions whose only purpose is presumably to be closely connected to the labour market—was 31 percent, nearly four times the university rate of eight percent. The high return to university education reflects its growing importance within the knowledge economy.

3. UNIVERSITY RESEARCH, INNOVATION AND GLOBALIZATION

Growth in the knowledge economy is founded on discovery and innovation, in which university research has a central role. There will continue to be debate in all advanced countries about the balance between fundamental and applied research in universities and the appropriate degree of public funding for each. It is vital to understand, however, that it is precisely the distance of universities from the market that makes them such valuable collaborators with

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competitive firms in the knowledge economy. When the discoveries of fundamental research run dry, the innovative companies of the private sector have no fuel in their pipelines. While technology transfer and industrial collaboration are important, the knowledge economy as a whole will suffer if universities ever lose the focus on basic, fundamental research.

In his New York speech, Mr. Martin listed with pride the massive federal investments in recent years in university and hospital research: the Canada Foundation for Innovation, the Canada Research Chairs, the Canadian Institutes for Health Research, and Genome Canada. Our provinces have also supported research: Ontario, for example, has invested hundreds of millions of dollars through the Ontario Research and Development Challenge Fund, the Ontario Investment Trust, and the Premier’s Research Excellence Awards. These investments have made a profound impact on our ability to undertake research in Canada, to retain some of our best faculty, and to keep the innovation pipeline full of discoveries from fundamental science.

The significant public investments in university research have created a strangely bifurcated pattern of funding in our major universities. Growing volumes of ►

research funding contrast with a penury of operating funds. Those who associate the regular announcements of new research funding at Western with general prosperity at the institution are often startled to hear that over the last decade, faculty positions have fallen by 12 percent and staff by 16 percent. During the same period, enrollment has increased by five percent. The reductions in real operating funds are forcing us to lay off staff and close faculty positions on a regular basis. Research funding, which is focused on equipment, laboratory renovations and research assistants, generally does not allow for the payment of faculty salaries. Indeed, it diverts funds in our operating budgets away from teaching, to support of space and other infrastructure requirements of modern research. Hiring in Canadian universities in recent years has been insufficient even to replace departing professors, at a time when we should be preparing for the enrollment boom of the coming years and anticipating the growing tightness of the faculty labour market.

Looking at this bifurcated approach to funding, one might think that our national strategy for universities in the knowledge economy was to maintain a small nucleus of very well-supported research professors in a limited number of fields and let the general education and research capacity of our universities continue to decline. This strategy will fail, because the knowledge economy is broadly based—it is present “in all sectors,” to use Mr. Martin’s words—and is thus creating a growing demand for well-educated university graduates in all fields. Our current approach to university funding will not allow that broad demand to be met and will drive economic opportunities and talented people out of Canada.

4. MEETING THE CHALLENGE OF ACCESSIBILITY AND QUALITY

To meet the enrollment surge from the children of the baby boomers, we need to build on the investments in research of recent years with a similarly substantial commitment to operating funds. The glass is half full now; we need to fill it if we are to remain competitive in the North American knowledge economy. Fortunately, the challenges facing Canadian universities can be met if we focus on four policy initiatives: reducing the student-faculty ratio; funding the

indirect costs of research; extending the growth in direct research funds; and building more income contingency into the repayment plans for student loans.

Reduce the student-faculty ratio. A modest goal for the next 10 years would be to reduce the average student-faculty ratio in Canadian universities by 10 percent, thereby closing a part of the large gap with the United States. This

“We can expect severe competition, both in hiring and salary levels, from the U.S.”

will require that we plan operating funds for the coming enrollment expansion accordingly. Grants should be increased in Canada sufficiently to achieve two objectives: (1) provide funding to accommodate the additional students while bringing the student-faculty ratio down to levels competitive with the average for public universities in the U.S.; (2) ensure that Canadian faculty salaries do not become less competitive with those in public universities in the United States. The challenge will be a great one, because the additional faculty required will come at a time for record retirements.

In Ontario, for example, it is estimated that over the next decade, the province’s universities will need to hire 7,500 faculty to replace retirees and other departures, 4,200 to meet the enrollment expansion, and 1,800 to reduce the student-faculty ratio by 10 percent. The total required, 13,500 new hires is greater than the current level of full-time faculty of 12,000. By 2005-06, there will be a need for \$600 million more a year in provincial operating funding. Along with the additional revenue from tuition fees, this would allow Ontario universities to meet student demand and reduce the student-faculty ratio by 10 percent. Without such a commitment of public funds, we will not maintain an affordable university system of high quality. Our graduate programs in Canada have not been expanding at a rate sufficient to meet this challenge. We can expect severe competition, both in hiring and salary levels, from the U.S., which will also be experiencing massive retirements and the echo of the baby boom enrollment increase.

Funding the indirect costs of research. For years now, Canada's universities have called upon the federal government to fund the indirect costs of research on its direct research grants. In the spring budget of 2000, the Ontario government announced such funding for its own research grants. The generally accepted rate of indirect cost, and the one adopted by Ontario, is 40 percent of the direct grants. Provision of these funds by the federal government would help in building world-class centres of research excellence, by allowing universities to use the indirect costs to build on their strengths. The indirect costs would be allocated among universities on a competitive basis, based on success in peer-reviewed grant competition, thereby fostering competitive excellence and providing an incentive to institutions to make difficult selective choices in support of outstanding research.

Extending the growth of direct research funds. While direct support for research in Canadian universities has grown significantly over the last five years, measured per faculty member or per grant, it is still only a fraction of such support in the United States. We need to continue the upward trend and extend new funding to the social sciences and humanities. New government research funding programs have for the most part focused on science, engineering and medicine. It is now time to expand the opportunities for outstanding faculty in the social sciences and humanities, whose work is vital to the guidance of private decisions and public policy in areas such as economic regulation, immigration, bioethics and support of Canadian culture.

Building an income-contingent loan repayment system. Maintaining accessibility requires not only that the faculty and staff be in place to teach and serve students, but that the resulting education be affordable. Rising tuition over the last decade has led to growing debt loads for students. While default rates have declined slightly in Ontario in recent years, there is nonetheless a growing concern among students and parents with regard to student debt and potential default. During the later 1990s, the federal

and Ontario governments increased support for student aid significantly, with programs for interest relief, interest deductibility and new scholarships, as loans outstanding increased steadily. There is, in my view, one policy, which while discussed at some length by both levels of government, has yet to be implemented: a full-fledged income-contingent loan repayment plan coordinated between the two levels of government, involving both interest relief and debt reduction.

Such a comprehensive plan would involve society sharing the risk involved in student borrowing, and providing help to those with very limited incomes sufficient to keep them out of default. This increases accessibility, especially in the case of those from low-income families who may fear taking out a student loan because of the potential for default. Such a plan is also beneficial to society as a whole, which reaps the productivity and tax benefits of the majority of university graduates who are very successful on the labour market at the relatively minor cost of helping those who are not.

While the knowledge economy, with globalization and rapid technological change, opens up tremendous opportunities for Canadians, we must make the necessary public investments to prepare our workforce to compete in that economy. While Canada lags behind the U.S. in the percentage of the labour force with a university degree, our country is ahead of major European countries. We have thus been doing a fairly good job in the number of people attending university, but that accessibility has been bought at an unacceptable rate of increase in the student-faculty ratio. As we look ahead to the echo of the baby boom, we need a commitment to increase public funding in a manner that will accept large numbers of additional students and lower the student-faculty ratio. With sufficient public funding for operating budgets and student aid, complemented with private giving and tuition, we can increase the quality of our universities and keep them affordable for students. ■

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