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LEVERAGE, DIVERSIFICATION & SUSTAINABILITY: THE GROWTH AND IMPORTANCE OF ALBERTA'S KNOWLEDGE SECTOR



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It is undeniable that the emergence of Alberta as a world-class business centre has been (and will continue to be) led by its vibrant energy sector. Equally undeniable is the observation that success in the energy sector has not always led to the development of thriving, growth-oriented and diversified economies. In the Middle East, as well as parts of Africa and South America and elsewhere, the so-called “curse of oil” seems to have led in a roughly opposite direction: economic stagnation dominated by political patronage and corruption.

That syndrome appears far less likely to afflict Alberta, for reasons detailed elsewhere. The leading reasons are broadly identified as the political and cultural stability of Alberta and greater Canada and the strong symbiotic relationship those jurisdictions enjoy with the U.S. But the unlikelihood of slipping into the status of failed petro-state is far from synonymous with maximizing the potential of a province brimming with natural and human resources. It is in the interests of both Alberta and the U.S. to aim at that much higher mark.

One of the primary areas on which such an effort should focus is the field of health research, biotechnology, and associated knowledge-based fields. Alberta holds some world-class assets in this arena in each of the five commonly discussed sub-sectors of the bioindustry: agriculture and nutraceuticals, health and pharmacology, medical devices and equipment, knowledge and service providers, and industrial and environmental bioproducts.

Alberta is home to more than 130 bioindustry companies; most are located in the Edmonton and Calgary regions and operate in the health biotechnology and medical devices & equipment sectors. Alberta bioindustry revenues for 2006 were estimated to be approximately CDN \$814 million; the sector employed more than 4,500 workers in Alberta in 2006. Total R&D spending for 2006 was approximately \$135 million and projected to reach \$247 million in 2010. This industry anchors a larger, thriving, knowledge-based sector.

Obviously, effort and treasure expended in the pursuit of better health and longer life are beneficial to all human beings. But the argument for fostering these goals specifically in Alberta goes beyond that observation, particularly for the U.S. The explosion of costs in the healthcare sector is well-documented and well-known to even casual observers of the American economic and political landscape. Indeed, in the ongoing presidential nominating contests, if a candidate can stop talking about energy dependence for a few minutes, chances are he or she will soon be discussing the upward spiral of healthcare costs and the associated problems of Americans that cannot afford health insurance.

At least part of the solution to these apparently intractable problems must lie in the development of new technology. For many years, the development of medical technology seems only to have exacerbated the problem; many of the most expensive tests and procedures are relatively new. It should always be remembered that, even if very expensive, a potentially life-saving device, technique or procedure becoming available is still an improvement, inasmuch as the assignment of a monetary value to the saved life is practically and morally difficult and execrable.

There are inescapable reasons that new technology is always expensive. The expansion of the domain of human knowledge is, by its nature, an endeavor that requires large commitments of both natural and human resources. Some of the forces that necessitate these commitments and make the pursuit of new knowledge difficult and costly include economy of scale, cost of repeated failure leading to innovation, and lead-time often required before investment is recouped.



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First, there is the economy of scale. Until a technology is proved, the demand for the tools or expertise that it requires is too small to allow anyone to democratize and cheapen that technology through mass production. If only a few hospitals have the materiel, equipment or know-how to get a certain job done, simple laws of supply and demand suggest that the cost for that job will be very high.

It is not hard to see how this economy of scale problem is a great deal more acute in Canada (population approximately 33 million) than in the U.S. (population over 300 million). Innovation in any field is more likely to occur if the potential market for it is larger and more potentially profitable. While it may be more natural to think of consumers needing producers, in perhaps no other field is the need of producers for a market capable of sustaining their efforts than in the critically important field of medical research.

Second, the costs of repeated failure constitute a strong disincentive for investment in new research. The more cutting edge the research, the stronger that disincentive becomes. In the field of pharmacology, for example, one of the reasons that newly patented drugs are so expensive is that the drug companies' business models require that a new successful therapy not only pay for the money invested to develop it, but perhaps for the money spent on several blind alleys of parallel research that failed to yield a marketable product.

Cooperation across the border can help assuage this problem. Canadian firms will be willing to spend more money of research and development if the large, well-heeled American market awaits any successes they might create. Moreover, motivated by public health concerns rather than profit motive, the Canadian medical system might spend more freely on certain types of research.

Finally, the long lead-time between investment in biotechnology and financial payoff is another disincentive, apart from the possibility that no profitable innovation will arise. When investors consider their options, they consider not only downside risk, but also liquidity: how long they should expect to lose access to their capital, even assuming the investment eventually pans out. Again, the larger market and other cross-border forces tend to dissipate this disincentive.

The common thread of all these points is that pursuing new fields of knowledge in concert across the border is likely to leverage the assets of all participants and lead to more rapid advancements. It provides a means of escaping, for example, the inherent difficulties of medical research. Innovation is not easy, nor inexpensive, and the greater the numbers brought to bear, in both people and money, the better it can be expected to proceed.

The good news is that the universe of human knowledge is ever expanding; and the faster it can be expanded, the sooner some of those cutting-edge, expensive marvels might become more mundane, and thus more affordable. Moore's Law – the notion that computing power per dollar of cost can be expected to double every two years – has proved far closer to observed events than many thought it would be, and over a longer period. Something like it is to be expected at the margins of many knowledge-based fields of effort.

In the medical field, this principle will pay dividends far more rapidly at the regional level. One of the factors placing upward pressure on health costs in the U.S. – as a glance at the classifieds section of any American city's daily newspaper will attest – is the shortage of health-care professionals. Any assistance in addressing that shortage that can be brought to bear by efforts in Alberta would be welcome indeed; and substantial contributions throughout the knowledge-based sector can be anticipated from Alberta.



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The province is home to both the Universities of Calgary, Alberta, and Lethbridge; but its contribution to education and research is far from ending there. The Alberta Heritage Foundation for Medical Research (AHFMR) has recruited (in conjunction with all of those universities) over 230 senior scientists from Canada and around the world, as well as another 300 researchers-in-training. Founded by an act of the Alberta legislature in 1980, the AHFMR is a good example of how the private and public sectors in Alberta have worked together toward common goals. The Foundation has granted almost \$1 billion to support health research in Alberta, which has helped to attract even more investment in the sector from other sources.

The demonstrated commitment of government, industry and individuals in Alberta to the biotech and health research field constitutes both a force multiplier and an alternative means of achieving success from the U.S. perspective. The healthcare field is a highly regulated industry in both Canada and the U.S.; but the substantial differences in the details of those regulation regimes present opportunities in the research field. In the U.S., a large percentage of research is funded by private companies. The primary responsibility of these companies to their shareholders dictates that certain kinds of projects are more likely to be funded than others.

Often, discussion of health issues from a cross-border perspective devolve into arguments over whether government-run healthcare systems are better or worse than a private-sector, for-profit format. But in the area of funding research, that argument is distracting. Each system has its idiosyncrasies that make it more likely that certain projects will be funded in favor of others; but in the area of health research, few would argue with the principle, "the more the merrier." Everyone is better-served if all reasonable and promising avenues of research are pursued (within certain established and currently-debated ethical boundaries); and that ideal is more closely approximated when alternative, and in some senses, competing models of funding for such research exist.

The government of Alberta, as well as the city government of Edmonton and Calgary and regional organizations have already been working hard to facilitate the growth of the bioindustry, through such projects as the building of a wet lab facility in Edmonton. The commitment of government at multiple levels is helping to set the stage for another round of growth in the sector.

The Big Picture

Governments are not the only ones thinking seriously about capitalizing on Alberta's energy resource wealth to jump-start its integration into global supply chains and the 21st-century economy. The Edmonton International Airport is soon to be home to not only an airport that can handle even the new, largest-ever Airbus A380, but a fully integrated, multimodal "inland port," serving as a switching station from air to road and rail transports systems for cargo. In addition to facilitating trade with the U.S., this facility is designed to allow for dramatic growth in trade levels with the fast-growing economies of China, India and South Korea.

This kind of forward thinking makes Alberta an even more attractive economic partner for U.S. businesses. It also contributes to what *The New York Times* columnist Thomas Friedman has called the "flattening" of the earth, by integrating economies globally across vast distances and thereby exposing business players to both competition and opportunities that were previously outside of their effective universe. The new deep-water port at Prince Rupert, sporting a 58-hour faster trip to Asia than other ports, is another aspect of this revolution – and another reason that U.S. integration with Alberta is a good idea.



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The planet has never seen a mutually beneficial trade relationship quite like the one enjoyed by Canada and the U.S. Moreover, both nations have a compelling strategic interest to not only maintain, but expand and strengthen that relationship wherever possible.

That strategic interest begins, as noted above, in the energy sector. With oil prices near \$100 per barrel, Alberta and the U.S. are absolutely united in a profound desire to see more production in the province. For the Alberta energy sector, that production is handsomely profitable; for the U.S., it is both an economic and a strategic necessity. As demand continues to grow in Asia and elsewhere, greater supply is needed to prevent another price surge that could prove devastating to the U.S. economy. And no supplier is preferable, for geopolitical and strategic reasons, to Alberta.

But the relationship between Canada and the U.S. goes a bit beyond mere economics. This is not maudlin sentimentality. The simple fact is that at some point, economic interdependence and intertwining can become so advanced that they comprise a strategic reality of its own. A simple thought experiment can reveal why.

Suppose that the price of oil were to rise high enough for long enough to tip the U.S. economy into recession. (What price or duration that might require is uncertain, but not necessary for this exercise.) What would, say, a 5 percent contraction of the U.S. economy mean to Canada? Well, for starters it would represent the loss of \$13 billion of export revenue – or, \$391 for every man, woman and child in the country.¹ This may well be a conservative estimate, since recessions tend to crimp disproportionately energy demand – and Canada is the number one energy supplier to the U.S., including oil, gas, uranium and electric power.²

The *per capita* GDP of Canada is \$35,700, which means, all other things remaining equal, that a 5 percent recession in the U.S. economy, *all by itself*, would cause more than a one-percent contraction in the Canadian economy. But that is not all. As such events would dampen energy demand, oil prices would likely fall, and investment in greater production from the oil sands might well falter. The effect would be vicious cycle that would be very difficult for either nation to recover from.

¹ According to the U.S. Census Bureau, American imports from Canada in 2007 totaled \$261,309,300,000 through October, five percent of which is \$13.07 billion. This was divided by the July, 2007 population estimate of Canada in the CIA World Fact Book of 33,390,141. These references are available online at <http://www.census.gov/foreign-trade/balance/c1220.html#2007> and <https://www.cia.gov/library/publications/the-world-factbook/geos/ca.html#People> respectively.

² CIA World Fact Book, <https://www.cia.gov/library/publications/the-world-factbook/geos/ca.html#Econ>

Strength in Diversity

This exercise demonstrates the real, somewhat subtle reason that an Alberta economy that is both strong and diverse is in the long-term economic and strategic interests of the U.S. In a world that is increasingly unpredictable in both the economic and geopolitical spheres, having partners that can take a punch is becoming more important. For the U.S. to rely for its oil imports on some of its other traditional trade partners is becoming progressively more unwise. Nations such as Venezuela, Saudi Arabia and even Mexico are not as secure in terms of economics and geopolitics as one would prudently like to see in his energy partners.



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And while the energy sector can single-handedly power an economy for a time, too much reliance upon it seems always to lead to economic stagnation and corruption. There are both simple and complex reasons that contribute to this phenomenon. Simply, it is perhaps psychologically corrupting, in the sense of what economists sometimes call “moral hazard,” to generate enormous sums of cash selling things one finds in the ground. Many have argued that this taint is an inescapable element of extractive industry.

More complicated (and perhaps more persuasive) is the nature of the energy industry as one that is extremely capital- but not at all labor-intensive. It is not hard to imagine how an economy that relies upon such an industry too much tends to concentrate an enormous percentage of its wealth – and the power that attends it – in the hands of a tiny minority of companies and individuals. And if, as Lord Acton insisted, power tends to corrupt, then the so-called “oil syndrome” may not be all that hard to explain.

No one is suggesting that Canada or Alberta are in danger of becoming failed petro-states. But the integration of their economies with that of the U.S. means that a substantial percentage of their interests are necessarily aligned. It is, therefore, in the interests of the U.S. that the economy of Alberta not become distorted by an energy sector that is too outsized.

And the fact is that the energy sector is growing very fast and poised to grow faster. If there are inherently distorting pressures created by an energy sector that comprises too large a percentage of the overall economic picture, then substantial growth in other sectors of the Alberta economy may well be necessary to avoid them.

Conclusion

Through hard work and foresight, Alberta is already a leader in the bioindustry. But its relatively small population base is necessarily limiting factor, and one that cooperation with the U.S. across the border will alleviate. The deep and myriad economic ties across the border ensure that action on one side that helps the other is only a slightly circuitous route to helping oneself.

Through information sharing and cooperation, those in the bioindustry on both sides of the border are much more likely to make discoveries more rapidly, as well as glean greater profits, both financial and otherwise, when breakthroughs are achieved. Finally, in a rapidly-expanding and highly competitive global environment, the strengths brought to bear by both sides of such a partnership will lead to better outcomes for all.