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## Mobilizing Canada's innovation system to win in the global marketplace

By Robert James

"Those white coats will drive you crazy". These are the words that greeted me in the early 1990s as I announced to my boss that I had decided to leave a corporate federal public service job to join the Canadian Centre for Mineral and Energy Technology at Natural Resources Canada. Within months of my first foray into the world of science and technology, I knew that S&T and Innovation (STI) would become one of my life long passions.

Having left the federal public service in April 2013, I find myself reflecting upon the insights I have gained into innovation system dynamics and the global innovation landscape. My exposure to the STI world has afforded me an opportunity to learn from a variety of perspectives and experiences.

These include the inspiration of truly amazing ideas; great and dedicated scientific and technical minds; courageous, disciplined, and strong private sector entrepreneurs and leaders; inquisitive and impactful universities; terrific policy minds; diverse Canadian communities who have experienced successes and challenges in technology clustering; various domestic and international cultures, and key national allies such as the United States.

I have developed an overarching perspective more by happenstance than design I suppose. Nevertheless, I would like to share this perspective with our national community of innovators and policy-makers alike.

In a world marked by prolific technological progress and unprecedented knowledge generation, social dynamics are king! It is the social dynamic that can mobilize the innovation system to realize inherent strengths and opportunities. This is ultimately where the game will be won or lost for nations. In my view, any nation that moves down this track, even part way, will gain an edge relative to other countries/regions mired in the inertia driven by various barriers to interaction. This is the long-term differential that is truly difficult for competitors to replicate.

As Gary Hamel pointed out in his seminal work on Strategic Intent in the late 1980s, sustained value capture depends upon fending off replication by competitors. In Canada we have seen the affliction and impact of fleeting advantage in companies such as Nortel and Research in Motion. The rapid emergence of dominant players such as Huawei in the telecom industry magnifies this concern.

I witnessed this firsthand over the past decade, helping to design, implement, and adjust various technology clustering initiatives in communities across Canada. All had access to Canadian competitive advantages such as excellent marketplace framework conditions, talent, academic institutions, leading-

edge infrastructure, and promising technology concepts. All benefited from Canada's comparative advantages such as its social values and high standards of living. Yet some communities were much more successful than others. Why?

Best practices that emerged in these cluster initiatives point to the power and value of the social dynamic:

1. The use of high-profile local champions who rally communities in a common direction. Business leaders such as Terry Matthews of Wesley Clover in Ottawa, Tom Jenkins of OpenText in Waterloo, and Jim Griffiths of Timken in Ohio epitomize this leadership;
2. The creation of highly engaged and integrated community leadership boards that meet regularly to chart the path forward and to assess performance/progress-to-date. The PEI BioAlliance, headed by Rory Francis, is one of the best run and most effective cluster organizations in the country involving the private sector, colleges and universities, and federal and provincial governments;
3. Addressing issues such as Intellectual property restrictions that are barriers to interaction. Dr Luis Proenza, president of the University of Akron explained to me why he chose this route for his institution — the recognition that as small-to-medium-sized enterprises flourish due to reduced IP barriers and increased interactions with the university, the overall regional innovation system flourishes, including the University of Akron — a self-fulfilling prophecy of sorts; and,
4. Cluster leaders with vision and courage reach outside their regional and even national domains to seize a wide array of benefits through more formal, on-going social interaction. This speaks to the international twinning of clusters. Dr Maja Veljkovic, former director general of the Institute for Fuel Cells in Vancouver, had the foresight to implement with China a Shanghai-Vancouver twinned cluster in fuel cells membrane technologies. While R&D was an important goal of this effort, the twinning of clusters was fundamentally an effort to secure long-term, sustained access to international markets — aligning very well with current government priorities in trade and investment.

Unfortunately, the tag line 'cluster' caused unnecessary confusion and skepticism amongst key policy- and decision-makers. In the final analysis, it is really about mobilizing and harnessing the value from the social dynamic. Thus clusters are perhaps more suitably defined as community-based partnerships seeking competitiveness through research and innovation.

For Canada, focusing on the social dynamic — the yeast of the ingredients if you will — holds the promise of shaping the Canadian innovation system to thrive on integration, focus, reach and performance. These community-based partnerships in themselves hold tremendous potential to become a cohesive and powerful national innovation system with global and domestic reach.

Canada, its provinces and regions, communities, firms, and other key institutions with the courage and foresight to seek fulsome cooperation are more apt to successfully draw upon a vast array of knowledge, expertise, infrastructure, and marketplace framework conditions — our competitive advantages — as well as upon Canada's natural comparative advantages such as natural resources and geographic/climatic realities.

The Canadian Science, Technology, and Innovation Council recognizes this, noting in its 2010 State of the Nation report that clusters are "an environment for innovation to flourish" and that "the participation of

innovation-intensive companies in such clusters and the active collaboration of the research and business communities will help ensure that Canada's world-class research can be successfully commercialized for the benefit of this country." The Obama administration with its intention to establish a billion dollar initiative in manufacturing innovation hubs recognizes this. Taiwan, China, and other economic forces are busily strengthening linkages to and via science parks. They recognize this too.

Canada has a true national asset in its innovation system. The Canadian government should be congratulated for its use of patient capital and for nurturing strong marketplace conditions, fiscal conditions, and more recently a strengthened trade access and investment focus. But how do we as a nation draw upon these strengths to seize a sustained advantage? How can Canadian innovation players in various communities reach across the nation to take advantage of infrastructure, talent, complementary technologies, or risk capital, no matter where they reside? By relying upon the principles of social dynamics that underpin technology clustering.

Canadian competitiveness is under pressure. It will always be under pressure given factors such as exponential growth in knowledge, the reality of fleeting advantage, and highly motivated emerging economies. Canada has all the ingredients to succeed under these conditions. But it will depend upon our nation's ability and courage to act cohesively.

Ironically, in a changing world dominated by the explosion in social media, one of the greatest challenges for decision-makers is to recognize the value of social in a hard-wired world. Comprehensive and true national policy discussions along these lines will propel the nation forward relative to other countries.

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