Interview: Dr. Roman Szumski â?? Vice-president (life sciences), National Research Council, Canada

â??It is important for NRC to travel the world and learn from what other countries are doing!â?•

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Dr. Roman Szumski, vice-president of life sciences at the National Research Council (NRC), Canadaâ??s industrial innovation and research organization, highlights the strategic and operational changes that have occurred over the past decade, NRCâ??s focus on promoting biologics and vaccines development within Canadaâ??s life sciences environment, and NRCâ??s work in promoting collaboration between industrial, academic and governmental actors.

Roman, having been vice-president of life sciences at the National Research Council (NRC) for 12 years, how have you seen NRCâ??s mandate and activities evolve?

There has been some significant shifts. As one of Canadaâ??s economic development policy instrument, NRC has always held the mandate of helping industry grow, across the spectrum of industries from construction to aerospace to life sciences. But six or seven years ago, there was a strong revectoring of NRC to work very closely with industry in order to close the gap between industry and us. That had a particularly large impact on the life sciences sector, particularly as we broadened our horizon from looking only at our local environment for partners to looking across Canada. Our major R&D facility is based in Montreal but today we have a significant number of clients and collaborators across the country, from Toronto to Vancouver. This has led to some great successes like Zymeworks, a Vancouver-based biotech company with whom we have worked closely since their inception. They have raised funds very successfully and now have two products in their R&D pipeline.

Following that, with the appointment of our new President, Iain Stewart, a year ago, NRC decided to focus more on discovery work and invention in order to prepare the tools and technology that will be required by industry in the future â?? without losing this close relationship with industry. There was also an increased emphasis on areas more focused on the public good. For instance, over the past few years, we have looked at Canadaâ??s health priorities in terms of vaccinations. While there is a list shared by many countries globally, there were also some uniquely Canadian priorities like infant meningitis caused by Haemophilus influenza type A, which is particularly an issue for the northern populations. We have a team here working with many international collaborators on this. As the market is very small, this is not something Big Pharma would necessarily be interested in but it is important for the country, and the resulting product will be of great value to a smaller pharma player.

The final one I would like to highlight is our operational shift from an â??instituteâ?? model to a â??programâ?? model, so that today, almost all the activities within the NRC are developed through programs with specific business plans, specific goals, and specific desired outputs in mind; they have a beginning and an end. Furthermore, programs can be multi-disciplinary. A program impacting healthcare would be able to draw heavily from engineering, ICT and other expertise within NRC. For instance, within our engineering department, we are very advanced in sensor development, and a large part of health technology involves the use of sensors in wearables to measure health and wellness metrics. We are able to harness that technology in healthcare projects because we have it in-house. That was an important structural change to the way NRC is managed, which has given us a tremendous amount of alacrity and flexibility. This is very important because the whole world is digitalizing and adopting new, disruptive technologies, so we need to live in the world and operate at the speed.

Canada, like many countries, value its health and we have a good standard of healthcare in this country. The Canadian government has been investing heavily in this area, and some of the grant councils are exclusively in the life sciences areas, like the Canadian Institutes for Health Research (CIHR). At NRC, we invest just under a third of our resources in life sciences, which include medical devices and agricultural sciences.

The life sciences industry is one of the most innovative industries, investing USD 150 billion in R&D globally, and Canada is the 10th largest pharma market in the world. How does the NRC work in collaboration with industry, governments and academia to attract pharmaceutical companies to carry out research and development activities?

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It is certainly important for life sciences stakeholders to work across silos. Currently, while the delivery of healthcare within Canada is set up as a service, not as an innovation generator or an economic development tool, and the innovation side is naturally about growing the industry and developing new technology, there is no conflict here because any technology developed here is made for global markets; the local market will generally not be able to sustain companies â?? except hopefully in hemophilia influenza type A!

There are certainly ample opportunity to benefit from the healthcare systems in Canada. My experience as an executive of a healthcare services provider managing medical lab systems in the province of Alberta made me realize healthcare systems are a source of tremendous innovation. Industrial developments certainly require close collaboration with hospitals. This is where NRC benefits from our trusted status because as a government R&D organization, we can move closer to the academic setting and teaching hospitals more easily than corporations. In that way, we act as a bridge: first we develop partnerships and develop unique technologies, and subsequently, we transfer that to industry for deployment.

An example is our work with le Centre hospitalier universitaire (CHU) Sainte-Justine Hospital, a childrenâ??s hospital in Montreal dealing with childhood cancers. They have priceless specimens from children, built over decades, which would be fantastic to work with in order to develop novel cancer therapeutics. Our current techniques are based on adult samples, not child samples, so we have our microfluidics experts working with hospital researchers to take our known methodology and miniaturize them for these precious specimens. We have just started this project, but we expect to see many successes from this collaboration. I strongly believe it will place Canada in the leadership position for developing childhood oncology therapeutics.

The common refrain is that while Canada has excellent basic science, it generally struggles at the commercialization of innovations. How is the NRC supporting local companies in their efforts to develop and commercialize breakthrough therapies?

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One challenge within the ecosystem is the low number of large, homegrown companies. Large companies are always a boon to the ecosystem. But Canadian life sciences companies tend to be small.

What NRC has done is look at the track record of drug development in Canada. We found that for small molecule development, the pathway to the US or Europe is very quick because such technology is very easy to patent and these products can be manufactured everywhere. Our sense is that biologics and vaccines are a little harder to shift; once something is working, there is an art as well as a science to master! The technology is not as easily replicable, so it is more likely that whatever is discovered in Canada will be commercialized in Canada. We also have strong universities like the University of Toronto and the University of British Columbia conducting cutting-edge research in these areas. Here too, NRC works with technology coming out of universities to move it along the value chain.

In order to really capitalize on this, there needs to be more contract manufacturing for biopharmaceuticals in Canada. NRC has the scale-up and processes and techniques in Montreal to bring a process up to commercial scale, but we are not a commercial operation. We would really like to see the growth of the biopharma CMO sector in Canada, both in terms of the existing companies growing or there being more companies within this space. The Canadian biotech industry would certainly appreciate that because my sense is that Canadian biotech entrepreneurs would typically like to stay here if they had the resources and ecosystem here.

Does NRC face any HR challenges given that it is a publicly funded organization that works so extensively with industry?

Many people like to imagine that we are disadvantaged when it comes to recruiting talented people but we do have excellent people on our teams. Naturally, financial compensation is a factor for potential employees but we find that our employees are highly motivated by the challenges they get to encounter at work and are thrilled at helping Canadian biotech companies grow. Over 100 NRC employees have worked with Zymeworks in its journey, as an example. We find that there are people that take a lot of pride and enjoyment from being a civil servant and working for the people â?? and this is increasing as we are now shifting towards doing more public good-related programs as well. This is an aspect of our work that is very appealing to people from a values perspective.

How active is NRC in terms of international outreach activities?

It is important for NRC to travel the world and learn from what other countries are doing! Going back to biomanufacturing, for instance, we are very impressed with what Australia has done to expand

their biomanufacturing capacity. We see that as something we would want to learn from. On the medical device space, Israel is a tiny country that is absolutely hitting the ball out of the park!

We also work with international partners on projects. For instance, some of our work on Haemophilus influenza type A was with the China National Biotec Group (CNBG) â?? and we have collaborated with them on a number of other initiatives too.

We also work with all the big names within the pharma industry, which is valuable also because it allows us to introduce them to promising Canadian companies. This allows Canadian technology to earn validation on the global stage in commercial settings, which benefits the whole local ecosystem.

On a more personal note, what keeps you motivated after 12 years in your role?

Certainly, it is seeing these companies â?? Canadian companies â?? succeed â?? and stay Canadian! In addition, for everybody working in the healthcare space, whether they are in the private or the public sector, the fact that you are doing something to make a difference to someoneâ??s life is extremely motivating. You are certainly very well-liked at parties, for instance! This binds everyone working in this space together. It is undoubtedly a very exciting industry to be in.

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