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**Open Science and Innovation**

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[**Open science and innovation**](http://www.sensorica.co/home/working-space/events/canadian-science-policy-center-cspc-2017)

* The open science and innovation movement explores and prototypes new practices and methods of producing, diffusing and using knowledge. Initiatives like Open Access, Open Data and Open Labs strive for a more open, transparent and collaborative scientific process, both inside and outside of academic research (i.e. from citizen scientists).
* Open innovation is more than open science. It also includes:
	+ Open and free publications
	+ Crowdsourcing and crowdfunding science
	+ Open and connected academic labs
	+ Shareable equipment and instruments that allow socialization of work
	+ IT infrastructures for open collaborative work

**Open innovation networks**

* Open innovation networks like SENSORICA tackle complex problems through interdisciplinary teams, accelerate innovation practices, build bridges between stakeholders and connect with communities on the ground.
* Knowledge produced and shared through these networks has been used to address local problems quickly and economically.

**We must engage the crowd**

* The crowd (i.e. people) is the third pillar in scientific development and open innovation. Canada should encourage public-private-people (crowd) partnerships.
* The “old” model (academia) did research and found solutions. The new model (crowd) has become the vehicle for generating new solutions.
* An example is [Breathing Games](https://www.youtube.com/watch?v=fP32bzSh-fs), in which clinicians, designers, patients, etc. come together to create an app that transforms education and treatment into something fun and engaging while providing data back to researchers.
* Bringing the local community into the problem/design/solution process builds empathy and helps researchers more fully understand the issues and problems that community is facing.

**The socio-economic benefits of open science and innovation**

* A closed, market-driven approach to innovation creates redundancies, is more likely to lead to obsolescence, is exclusionary, creates disparities and does not engage relevant populations. Open, people-centric settings make use of collective intelligence, are more likely to result in uptake by populations and are inclusive and accessible.
* Open science can motivate hospitals and universities to collaborate, and can even allow projects that have been abandoned due to lack of funding to start up again.
* Traditional institutions that connect to or form larger collaborative ecosystems can:
	+ Cut costs by mutualizing resources
	+ Increase the speed and the quality of innovation
	+ Facilitate transactions
	+ Streamline economic activity and logistics
* Barrier-free access to publications will increase application of research. This allows researchers applying for grants to show the practical application of the research, which increases their likelihood of receiving the grant.

**Facilitating and encouraging open science and innovation**

* Academics and industry must interact with the crowd and open spaces, and this interaction must be incentivized.
* Look to Europe for models; e.g. public funds for research based on/in interactive open spaces, funding makerspaces. Canada needs to catch up, and to shift its culture to one that embraces these approaches.
* Canada needs to go beyond investing in new technologies and experiment with emerging research methodologies and participatory approaches.
* Ensure there is strong digital infrastructure so that data produced by these open science and innovation collaborations are not lost.
* Implement policies that ensure data can be collectively managed in safe and ethical ways.
* Redesign scientific instruments to be easily shared by many people (i.e. not easily broken or disrupted), and make them connected (i.e. so they can directly share data).
* There should be a federation that connects the various makerspaces, hakerspaces, etc. It should work to build the ecosystem, bring in industry and academics, and create a robust and communal IT infrastructure. This will help:
	+ Ensure a unified experience across various spaces.
	+ Map and increase the visibility of resources.
	+ Encourage spaces to collaborate by implementing shared governance and oversight, increasing their resources if they participate, and allowing to access communal infrastructure (right now, many spaces operate on membership models and are worried about losing clients to other spaces if they collaborate).
	+ Generate a governance layer that helps create shared expectations/understanding of the rules of open science and innovation, and accountability if those rules are not followed.