

Editorial: Inclusive Innovation in Developed Countries

Chris McPhee, Editor-in-Chief

R. Sandra Schillo, Louise Earl, and Jeff Kinder, Guest Editors

From the Editor-in-Chief

Welcome to the February 2018 issue of the *Technology Innovation Management Review*. This month's editorial theme is **Inclusive Innovation in Developed Countries**, and it is my pleasure to introduce our Guest Editors: **Sandra Schillo**, Assistant Professor in the Telfer School of Management at the University of Ottawa, **Louise Earl**, Section Chief in the Investment, Science and Technology Division at Statistics Canada, and **Jeff Kinder**, Director of the Innovation Lab at the Institute on Governance.

Following a regular issue in March, we will examine the theme of **Frugal Innovation** in April with Guest Editors **Deepak S. Gupta**, Executive Director of Applied Research, Innovation and Entrepreneurship Services (ARIES) at Centennial College in Toronto, Canada and **Mokter Hossain**, Assistant Professor in the Center for Industrial Production at Aalborg University, Denmark.

We have also recently issued a call for papers (tinyurl.com/y76k3kkb) for a special issue on **Transdisciplinary Innovation** with Guest Editors **Martin Bliemel** and **Mieke van der Bijl-Brouwer** from the Faculty of Transdisciplinary Innovation at the University of Technology Sydney, Australia.

For future issues, we are accepting general submissions of articles on technology entrepreneurship, innovation management, and other topics relevant to launching and growing technology companies and solving practical problems in emerging domains. Please contact us (timreview.ca/contact) with potential article topics and submissions, and proposals for future special issues.

Chris McPhee
Editor-in-Chief

From the Guest Editors

The ambition of inclusive innovation is to make innovation relevant and beneficial to societal groups that are disadvantaged or risk becoming disadvantaged. It aims to deliver solutions to issues of social inequalities and to lock-ins in innovation pathways.

Traditionally, academic research has referred to inclusive innovation in the context of developing countries, but recent work (Schillo & Robinson, 2017) in this journal provided a framework for consideration of inclusiveness in innovation in developed countries, partially as a reflection of the increasing public and policy interest, for example as expressed in the work of the OECD and policy directives in the Canadian government. The framework highlights the far-reaching implications of considering the inclusiveness of innovation along the four dimensions of “people, activities, outcomes, and governance: i) individuals and groups participating in the innovation process at all levels; ii) the types of innovation activities considered; iii) the consideration of all positive and negative outcomes of innovation (including economic, social, and environmental); and iv) the governance of innovation systems” (Schillo & Robinson, 2017).

This special issue of the TIM Review builds on this work, presenting inclusive innovation considerations in concrete application contexts. The articles in this issue present balanced perspectives on innovation, offsetting the high ambitions and achievements of scientific and social advances against the backdrop of exclusion, barriers of access to employment or new technology, prejudices against social participation and technology adoption, food insecurity, costs of medical attention, and other concerns that may accompany the introduction of innovations.

Kelly Bronson from the Faculty of Social Sciences and the Institute for Science, Society and Policy at the University of Ottawa, Canada, challenges policy makers to better manage societal impacts of new technologies,

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proactively rather than reactively, within the agricultural sector and rural Canada. This opening article effectively discounts any myths that Canada's farmers are late adopters of new techniques, technologies, or products. It documents how farmers ranging from large commercial enterprises to small family farms are responding to their suppliers' (and competitors') new business models that impose costly entrance fees on the user, including the provision of detailed production information. Farming in Canada is an early adopter of big data analytics employing new data collection methods and combining proprietary data with formal and informal public or accessible data. These "smart" business practices and technologies have the potential to disrupt Canadian agriculture through the displacement of small farmers by large commercial farmers. The buy-in or entry costs to "smart" farming technology and tools are often prohibitive to smaller farms whose yields and size are not scalable to the new business models. Bronson argues the need for responsible implementation of innovation activities that considers their potential societal consequences.

Anna Sinell, Roda Müller-Wieland, and Antonia Muschner from the Center for Responsible Research and Innovation at Fraunhofer IAO in Berlin, Germany, approach inclusiveness of innovation from a social perspective. This article explores gender-based differences and exclusion in knowledge and technology transfer (KTT) in academia and entrepreneurship by male and female scientists. Based on 40 case studies, the authors argue that better engagement of female scientists and engineers in KTT and entrepreneurship will lead to transfer outcomes with different goals and in different markets. Commercialization activities of male scientists appear to have higher individual career-oriented motivations than those of female scientists that seem to orient research more towards resolving societal challenges. The article concludes with a call to develop practices and programs that support, reward, and recognize KTT and entrepreneurship activities of both male and female scientists in order to meet the policy imperatives and strategies to enhance the innovation capacity of academic research.

Jeremy de Beer and Vipal Jain from the University of Ottawa's Faculty of Law investigate the biohacking movement as an example of open and inclusive innovation. This article argues that, in the case of biotechnology, research is moving outside of traditional labs into "biohacker spaces". The biohacking movement depends on collaboration between formal research institutions and informal research spaces requiring open

and transparent sharing of data, ideas, and resources. This example of open innovation thrives within flexible regulatory and intellectual property systems. The authors discuss the underlying tension between formal and informal research and explore when and where regulatory systems assist or detract from innovation. They conclude that the construction of an environment (ecosystem) that supports biohacker spaces is required to reap the benefits of their innovations.

Next, **Jasmin Winter** from the First Nations Technology Council in British Columbia and **Justine Boudreau** from the University of Ottawa explore social exclusion of indigenous peoples through distortion of technological adoption, preconceptions of cultural mores, and their biased misrepresentations in early photography. Opening with a famous photograph that they show was "photoshopped" to meet the colonial preconceptions of indigenous life, they argue that indigenous communities continuously have employed technological advancements strategically as tools for survival. This article shows how indigenous communities are adopting social media to write their current and future stories based on their worldviews and their histories. This approach revises, reconciles, and addresses past misrepresentations. The authors promote the potential of "makerspaces" towards improving inclusiveness by bridging digital and social divides. Makerspaces bring together tools, projects, and skills to devise new techniques and applications on a gamut of activities ranging from woodworking and sewing to cutting-edge robotics and machine learning. The appeal of makerspaces lies in their accessibility, facilitation of inclusivity, and acceptance of diversity.

The final article, by **Laurette Dubé, Pan Du, Cameron McRae, Neha Sharma, and Srinivasan Jayaraman** from McGill University in Montreal, Canada, and **Jian-Yun Nie** from the Université de Montréal, provides exploratory research employing deep learning and other artificial intelligence techniques to consumer behaviour towards food. Centred within convergent innovation theory, the authors argue that affordable and accessible foods as well as consumer education are important to inclusive growth and equitable health and wealth. Their conclusions provide insights into consumer behaviour towards food innovation and direction for future research. The authors provide a thorough discussion of their approaches to user-generated content through social media sources to develop their data for analysis. Their model and approach are food for thought for researchers intending to explore unstructured web-based data as primary data sources.

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Taken together, the contributions to this TIM Review special issue further the discussion on inclusive innovation in developed countries. They provide a sampling of perspectives that clearly demonstrate that developed economies also face challenges associated with inclusion. They also document the global extent of the challenges of inclusiveness across political boundaries and across cultural, gender, and digital divides, and they emphasize the interrelatedness of multinational enterprises, regulatory environments, and communities. In this way, this special issue is a call to view innovation as impacting social, economic, environmental, cultural, and technological divides in developed countries – and to carefully assess both positive and negative consequences of innovation.

R. Sandra Schillo, Louise Earl, and Jeff Kinder
Guest Editors

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About the Editors

Chris McPhee is Editor-in-Chief of the *Technology Innovation Management Review*. Chris holds an MAsc degree in Technology Innovation Management from Carleton University in Ottawa, Canada, and BScH and MSc degrees in Biology from Queen's University in Kingston, Canada. He has nearly 20 years of management, design, and content-development experience in Canada and Scotland, primarily in the science, health, and education sectors. As an advisor and editor, he helps entrepreneurs, executives, and researchers develop and express their ideas.

R. Sandra Schillo is an Assistant Professor in Innovation and Entrepreneurship at the Telfer School of Management, University of Ottawa, Canada, and an affiliate of the Institute for Science, Society and Policy at the University of Ottawa. Prof. Schillo's research investigates systems aspects of innovation and entrepreneurship in her academic work and places emphasis on contributions to practice. Prof. Schillo holds a PhD in management from the University of Kiel, Germany, and a Master's (Diplom) in engineering management from the University of Karlsruhe, Germany.

Louise Earl is a Section Chief in the Investment, Science and Technology Division at Statistics Canada has been active in the measurement and analysis of science, technology and innovation since 2000. Louise holds a Master of Arts from Queen's University, Kingston and a Bachelor of Arts degree with first class honours from the University of New Brunswick. Louise is a vice chair of the Organisation for Economic Co-operation and Development's (OECD) Working Party of National Experts on Science and Technology Indicators. She is actively involved in the soon to be concluded revision of the OECD's *Oslo Manual, Guidelines for Collecting and Interpreting Innovation Data*. She contributed to the *Frascati Manual 2015, Proposed Standard Practice for Surveys on Research and Development* revision. She is the co-editor of *National Innovation, Indicators and Policy* (2006, Edward Elgar) and is the author of chapters in *Measuring Knowledge Management in the Business Sector: First Steps* (2003, OECD). Her analytical works at Statistics Canada on topics such as impacts of science, technology and innovation; organization and technological change in the public and private sectors; indicators of growth firms; knowledge management practices; household e-commerce; and wage gaps have been published in the *Canadian Economic Observer, Perspectives on Labour and Income, Services Indicators, Health Reports, Focus on Culture*, and various working papers series.

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Jeff Kinder, Director of Innovation at the Institute on Governance has almost 30 years of experience in government science, technology and innovation policy in the US and Canada. His US experience includes the National Science Foundation, the National Academies and the Naval Research Laboratory. In Canada, Jeff has worked at Industry Canada, Natural Resources Canada and the Council of Science and Technology Advisors. In 2014, he supported the External Advisory Group on Federal S&T (the Knox Panel). Most recently, he led the Federal Science and Technology Secretariat supporting the Minister of Science, the Deputy Minister Champion for Federal S&T and related initiatives. He is now on interchange with the Institute on Governance where he leads the ASPIRE Innovation Collaboratory. At the University of Ottawa, Jeff is a Fellow of the Institute for Science, Society and Policy and an adjunct professor at the Telfer School of Management. He is author and co-editor with Paul Dufour of *A Lantern on the Bow: A History of the Science Council of Canada* (forthcoming from Invenire), author of *Government Science 2020: Re-thinking Public Science in a Networked Age* and co-author with Bruce Doern of *Strategic Science in the Public Interest: Canada's Government Laboratories and Science-Based Agencies* (U. Toronto Press, 2007). He holds a PhD in public policy, a Master's in science, technology, and public policy, and a BS in physics.

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