

Editorial: Transdisciplinary Innovation

Chris McPhee, Editor-in-Chief

Martin Bliemel and Mieke van der Bijl-Brouwer, Guest Editors

From the Editor-in-Chief

Welcome to the August 2018 issue of the *Technology Innovation Management Review*. This month's editorial theme is **Transdisciplinary Innovation**, and it is my pleasure to introduce our Guest Editors, **Martin Bliemel** and **Mieke van der Bijl-Brouwer**, who are both from the Faculty of Transdisciplinary Innovation at the University of Technology Sydney, Australia.

Looking ahead to a related future issue, please note the upcoming special issue on **Action Research** with guest editors **Magnus Hoppe** (the author of the first article in this issue) and **Erik Lindhult** from Mälardalen University in Sweden. The submission deadline for abstracts is October 1, 2018. Please see the call for papers for details: tinyurl.com/yd5gacsv

For other 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.

Finally, we invite you to attend ISPIM Connects Ottawa (ispim-connects-ottawa.com), which will be held in Ottawa, Canada, from April 7–10, 2019. The TIM Review and its associated academic program at Carleton University, the TIM Program (timprogram.ca), are proud to be the local hosts of the event in collaboration with other partners.

Chris McPhee
Editor-in-Chief

From the Guest Editors

We are living in a rapidly changing, hyper-connected world and are facing increasingly global, complex, and dynamic problem situations such as income disparity, environmental crises, organized crime, and health management issues. These complex or “wicked” problems cannot be adequately tackled from the sphere of individual disciplines, because they are not individual problems, they are interrelated and “intrinsically linked in a meta-system of problems”, and as such cannot be solved in isolation (Rittel et al., 1973; Özbekhan, 1970: 13). Complex problem situations require what has been defined as a *transdisciplinary* approach (Jantsch, 1972). There are many definitions of transdisciplinary innovation and transdisciplinary research, but a general consensus is that transdisciplinary innovation has the following characteristics: it is action-oriented and future-focused, participatory, holistic and systemic, and purposive, and it transcends individual disciplines or practices (Jantsch, 1972; Klein, 2002; Polk, 2015).

A transdisciplinary approach to innovation differs from multidisciplinary and interdisciplinary approaches in that it is not just about working towards a shared goal or having disciplines interact with and enrich each other (Figure 1). Instead, transdisciplinary innovation is about placing these interactions in an integrated system with a social purpose, resulting in a continuously evolving and adapting practice (van der Bijl-Brouwer, 2018). A by-product of transdisciplinary innovation is that the integrated solution contributes back to the disciplines it drew upon to evolve them, too.

The term “transdisciplinarity” was originally coined and developed within academia as a response to the fragmented organization of universities into faculties, schools, and degrees. More recently, transdisciplinarity is increasingly relevant to innovators and entrepreneurs whose technologies or solutions are aimed at addressing complex societal problems. This larger-scale emphasis moves innovation beyond “customer-centred” to a “society-centred” perspective, and it requires active collaboration with public and private sector organizations, governments, and communities.

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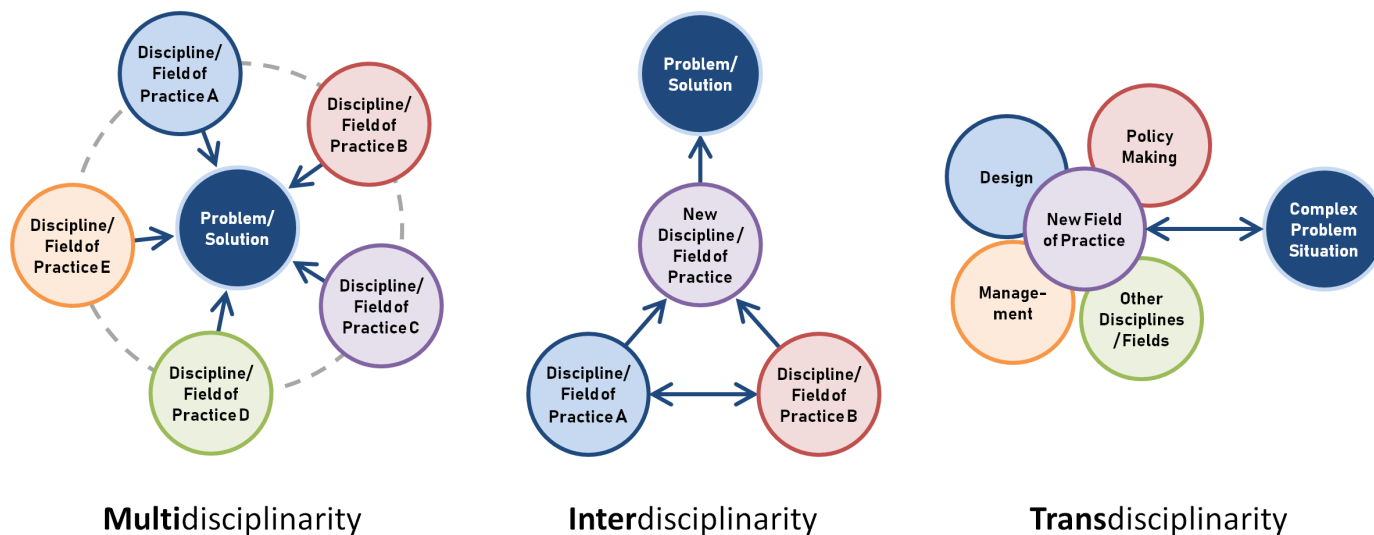


Figure 1. A comparison of multidisciplinary, interdisciplinary, and transdisciplinary approaches to innovation

This special issue includes a rich and nuanced set of takeaways for practitioners, academics, and members of the public or third sectors. We highlight four of them here, regarding learning, spaces, levels of impact, and partner selection. We nonetheless strongly encourage you to read the entire set of articles to make sure you get a balanced overview of different ways in which transdisciplinary innovation occurs.

Key takeaways of this special issue:

1. The first of the overarching takeaways recognizes that transdisciplinary innovation is more than coordinated input from multiple knowledge domains to solve a problem (see Figure 1: Multidisciplinary). With transdisciplinary innovation, solving the problem results in new knowledge forming via the integration of those domains that contributes back to them (see Figure 1: Transdisciplinarity, noting the two-way arrow). In other words, learning is an inherent part of transdisciplinary innovation. This learning can occur by individual innovators (see Zafeirakopoulos and van der Bijl-Brouwer in this issue) or as a collective (see Riedy et al., and Baumber et al., in this issue).
2. The second key takeaway is that the unpredictability of transdisciplinary innovation requires giving it “space” and not over-constraining or controlling it. The articles by Femenías and Thuvander and Riedy and co-authors emphasize this with examples of “space” in the sense of allocating time, physical space, or nurturing interactions between others in a way that does not try to (pre-maturely) force transdisciplinary innovation to progress along a prescribed path.

3. The third takeaway is consideration of what the level of impact of the innovation is. Does it only affect the innovator (often referred to as a transdisciplinary innovation researcher in this special issue)? Or, does it affect the collective group of people directly involved? Or, are the broader social implications of greater importance? Answering these questions can influence how you aim to fund transdisciplinary innovation projects, as exemplified by the projects discussed in the articles by Baumber and co-authors, by McGregor, and by Dorst.
4. The fourth takeaway builds on this by encouraging readers to carefully choose their partners for transdisciplinary innovation projects. This means being conscious of the respective disciplines or practices being integrated as well as being conscious of there being expertise in shepherding the transdisciplinary innovation process. McGregor's article provides an excellent overview of how painstakingly slow transdisciplinary innovation can be if the process is left to emerge organically. Meanwhile, Dorst's article presents an alternative approach in which the integration can be designed into the process at a very early stage.

The first article in this special issue is by **Carolyn McGregor AM**, who draws on her personal decades-long journey of evolving a big data project about neonatal intensive care into astronaut health monitoring. We selected this as the first article in the special issue because it neatly contrasts i) disciplinary innovation occurring in sequence, ii) multidisciplinary innovation occurring as multiple disciplines in parallel,

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and iii) interdisciplinary innovation occurring at the interaction of the knowledge domains. The article concludes with iv) a constructive approach to structure a path for purposeful transdisciplinary innovation in precision public health.

Next, **Alex Baumber, Graciela Metternicht, Peter Ampt, Rebecca Cross, and Emily Berry** examine the co-production of online land management tools. This article goes beyond conventional concepts in innovation management that are built on Rogers' adoption of innovation. To do so, this article elaborately presents a case study of transdisciplinary innovation as a participatory development process that integrates perspectives, including those of the end users. But, transdisciplinary innovation is not quite so easy. It simultaneously involves reflexivity, wherein participants challenge assumptions, including their own, thereby learning and developing a more open-minded or transformative approach to co-producing the innovation.

In the third article, **Paula Femenías and Liane Thuvander** add further nuance to the management of transdisciplinary innovation by reflecting on 14 years of experience with transdisciplinary research in the built environment. This article highlights the importance of creating a protected or neutral space where transdisciplinary innovation participants can meet as equals to co-produce the innovation. The importance of this space and its sense of ownership is revealed in the authors' humbling insights of how participants expected the facilitators to own or control the space and tell participants what to do, when the facilitators were primarily presenting the opportunity for participants to take ownership of the space. The ability of the facilitators to instil a sense of ownership by all participants is challenged further by the turnover in participants during the transdisciplinary innovation process, with new participants distrusting the facilitator and other participants, plus a general reluctance to take ownership of a project their predecessors started.

In a similar vein, **Chris Riedy, Dena Fam, Katie Ross, and Cynthia Mitchell** of the University of Technology Sydney's Institute for Sustainable Futures (ISF) reflect on long-term experiences with transdisciplinary research. Based on two decades of work aimed at creating change towards sustainable futures, Riedy and co-authors share how they have started to shape learning spaces or "crossroads" within the ISF to facilitate individual and collective learning. They argue that learning is central to transdisciplinary research and

practice as it underpins innovation and catalyzes organizational and social change. To nurture individual and collective learning, they acknowledge informal learning opportunities including unplanned conversations, while also actively shaping "formal crossroads" including collective writing, annual retreats – "the centrepiece of transdisciplinary practice" – and roundtable sessions.

In the next article, **Mariana Zafeirakopoulos and Mieke van der Bijl-Brouwer** further discuss the concept of learning within transdisciplinary innovation. Where Riedy and co-authors focus on the collective learning experiences of academics, this article is focused on the individual learning experiences of innovation practitioners who have started to shift their originally positivist approach to transdisciplinary ways of working to address complex problems. Based on a series of interviews with innovation professionals, the authors identify the motivations and drivers of practitioners to start and continue transdisciplinary learning, their emotions experienced during the shift, and the dissemination of their new learning into professional practice. These insights help us reflect on intervention points throughout the whole-of-life education journey that practitioners undertake to spark, revive, or amplify the required attitudes that enable innovation.

The first five articles in this special issue highlight the need to bring people together who have different types of knowledge towards transdisciplinary innovation. To complement this view, **Kees Dorst** presents a more strategic approach to address a particular complex problem and to learn from other disciplines. To achieve this, Dorst presents a layered model of "practices", which are the smaller units of action within disciplines. Practices consist of the values we find important, the principles we use to think about them, and the methods and actions we are going to apply. Framing, a design-based practice, is suggested as means to identify practices that can be "mixed" and integrated to innovatively address a particular complex problem. Dorst furthermore proposes to use the layered model for "practice dialogues" between professionals to promote the exchange of practices between disciplines.

We hope that this special issue provides inspiration to "think bigger" and to integrate multiple disciplines and practices on your next projects to the benefit of a larger contingent of society and your own learning. For a more practical toolkit to facilitate cross-disciplinary collaboration, see Griffith, Carruthers, and Bliemel (2018, due in October) for a review or search online for "method

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cards” including ones by our Faculty of Transdisciplinary Innovation (tinyurl.com/ybdkjwnl) at the University of Technology Sydney, Ontario Digital (medium.com/ontariodigital), IDEO (ideo.com), 18f.gov (18f.gsa.gov), and others. Of course, many of the sources mentioned in each article in this special issue are also well worth tracking down to learn more about the philosophy, art, and practice of transdisciplinary innovation.

Martin Bliemel and Mieke van der Bijl-Brouwer
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.

Martin Bliemel is the Director of the Diploma in Innovation at the new Faculty of Transdisciplinary Innovation at the University of Technology Sydney (UTS). Martin holds a BSc (Mechanical Engineering) and MBA from Queen’s University in Kingston, Canada, and a PhD in Business from Simon Fraser University in Vancouver, Canada. His research interests include entrepreneurial networks, accelerators, education, research commercialization, entrepreneurial ecosystems, and the entrepreneurial university. His research has been published in several prestigious journals including *Nature Nanotechnology*, *Entrepreneurship Theory and Practice*, *Education+Training*, the *International Journal of Entrepreneurial Behavior & Research*, and the *Entrepreneurship Research Journal*, where one of his articles on entrepreneurship education is the journal’s most downloaded article. Martin is a recipient of the nationally competitive Office of Learning and Teaching Citation.

Mieke van der Bijl-Brouwer is a Senior Lecturer at the Faculty of Transdisciplinary Innovation at the University of Technology Sydney in Australia. Her research interests span the fields of human-centred design, systemic design, and public and social sector innovation. As a lecturer, she is responsible for coordinating part of the transdisciplinary degree Bachelor of Creative Intelligence and Innovation. Mieke holds a Master of Science degree in Industrial Design Engineering from Delft University of Technology and a PhD on the topic of user-centred design from the University of Twente, both in the Netherlands.

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