

Reflecting on 10 Years of the TIM Review

Chris McPhee, Teemu Santonen, Ahmed Shah, and Ali Nazari

“Fare forward, you who think that you are voyaging;
You are not those who saw the harbour
Receding, or those who will disembark.
Here between the hither and the farther shore
While time is withdrawn, consider the future
And the past with an equal mind.”

T. S. Eliot (1888–1965)
Poet, dramatist, and literary critic
In *The Dry Salvages* (1941)

In July 2007, the first issue of this journal was published under the banner of the *Open Source Business Resource*. Re-launched with a broader scope in 2011 as the *Technology Innovation Management Review*, the journal now celebrates its 10th anniversary. In this article, we review the 10-year history of the journal to examine what themes have been covered, who has contributed, and how much the articles have been read and cited. During those 10 years, the journal has published 120 monthly issues, including more than 800 publications by more than 800 international authors from industry, academia, the public sector, and beyond. As discovered with topic modelling, the journal has covered seven themes: open source business, technology entrepreneurship, growing a business, research approaches, social innovation, living labs, and cybersecurity. Overall, the website has attracted over 1 million readers from around the world – 31% from Asia, 30% from the Americas, 26% from Europe, 8% from Africa, and 5% from Oceania – with over 25,000 readers now accessing the site each month.

Introduction

For the past 10 years, this journal has published monthly issues on the theories, strategies, and tools relevant to launching and growing technology businesses. In seeking to bring together diverse viewpoints – from academics, entrepreneurs, companies of all sizes, the public sector, the community sector, and others – the *Technology Innovation Management Review* (TIM Review) has tried to bridge the gap between theory and practice. The journal’s aim is to provide significant benefits to readers, authors, guest editors, partners, and stakeholders worldwide.

In this article, we trace the evolution of the journal by analyzing its distinct aspects, the topics it covered, the authors that contributed to it, and the extent to which its articles were read and cited. Our goals are to share with others the lessons learned and to use these lessons to inform the future directions of the journal.

A Brief History of the TIM Review

Ten years ago, this journal was launched as part of a government program “to help business innovators take their products to market” (DeFoe, 2007). With financial support from the Ontario Ministry of Research and Innovation and led by the Technology Innovation Management (TIM) Program (timprogram.ca) at Carleton University in Ottawa, Canada, the journal was a key component of a province-wide project to encourage research commercialization and knowledge transfer, initially within Ontario, then to the rest of Canada, and then worldwide.

The goal of the government program was to spur economic development in Ontario by helping its researchers and entrepreneurs “to combine their expertise to help commercialize their innovations and create high-value jobs” (DeFoe, 2007). Carleton University’s project – the Talent First Network – sought to develop and

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transfer “knowledge about how businesses can use open source assets and processes to generate revenue and reduce costs” (Bailetti, 2007). The project leads decided that a monthly journal appealing to a cross-section of relevant audiences could help develop and disseminate relevant knowledge to help companies compete in emerging technology-based domains (Bailetti, 2007). Thus, this journal was launched in July 2007 by its founding Editor-in-Chief, Dru Lavigne, as the *Open Source Business Resource* (OSBR). As its focus, the journal sought to answer the question of how to make money with something that is free: to explore the business side of open source (McPhee, 2011). However, the choice to focus on open source software was more about developing understanding and capability within a new competitive environment that it was about free software (Bailetti, 2007).

As open source became “a better-understood, mainstream tool for technology businesses” (McPhee, 2011) and continuing with the mid-2010 appointment of a new Editor-in-Chief, the journal began to broaden and shift its scope towards technology entrepreneurship and innovation management in addition to open source business. After publishing 50 monthly issues as the OSBR (McPhee, 2011), this gradual change was formalized in the re-launch of the journal as the *Technology Innovation Management Review* in October 2011. The scope and audience of the journal broadened, but the focus remained fixed on developing and disseminating knowledge about the issues and emerging trends relevant to launching and growing technology businesses. The journal published its 100th issue in 2015 (McPhee, 2015) and now celebrates its 10th anniversary in July 2017.

Format and Scope

Distinctive features

The following features have distinguished the journal through its 10-year history:

1. *Free to readers and authors:* To encourage a diversity of readers and authors, and to remove financial barriers to access or contribution, the journal is online and fully open access and no fees are charged to authors, despite a rigorous peer review process and a high level of editorial support. Authors also retain copyright of their work, which is published in the journal under a Creative Commons Attribution licence (CC-BY; creativecommons.org/licenses/by/3.0/). Readers are encouraged to share and build upon the insights published in the journal.
2. *Monthly issues with short publication timescales:* The journal is published monthly with publication timelines of three to four months, which may be normal or even long for most practitioner publications but are short for most academic publications. The intention (and challenge) is to provide a steady flow of insights at the pace of business while still meeting the requirements of academic contributors.
3. *Themed issues:* In most issues, the journal brings together authors who can provide diverse perspectives on a theme. The journal now also publishes regular (unthemed) issues of articles fitting the overall scope of the journal.
4. *Guest editors:* Guest editors play a key role in defining the vision for themed issues and recruiting high-quality authors to contribute. Through their networks, the journal is able to access new areas of expertise and efficiently grow its community.
5. *Practical implications:* Given the focus on the theories, strategies, and tools that help small and large technology companies succeed, authors are required to emphasize the practical implications of their work.
6. *Diversity:* The journal is designed to bring together diverse viewpoints – from academics, entrepreneurs, companies of all sizes, the public sector, the community sector, and others – to bridge the gap between theory and practice.
7. *Rigorous editorial process:* All articles published in the journal are peer reviewed using a double-blind process. Regardless of whether they represent industry or academia, authors undergo the same process and write using the same format. The intention is to bring diverse authors together to share insights and to avoid segregating audiences based on article format. Although practitioners must provide adequate support and explanation for any assertions or shared insights, they are not expected to draw upon academic sources. Publications based on research must meet high standards for methodology and analysis while also making the results and their implications accessible to a diverse audience that includes non-academics.
8. *Author support:* Following peer review and revision, authors whose articles have been accepted receive unique value in the form of editorial support, which goes far beyond copyediting and proofreading to include advice and recommendations on how to im-

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prove their articles, particularly to ensure it will be accessible to diverse readers. This editorial support is provided free of charge to improve the quality of the journal but also to extend its international reach, particularly to authors whose first language is not English.

9. *Emphasis on emerging topics:* The journal was founded based on a need to understand an emerging domain (open source business), and this remains an emphasis. The journal provides guest editors, authors, and readers with opportunities to explore emerging areas, where there may be more questions than answers.

Types of content

In all, there have been 795 publications in the TIM Review up to and including the May 2017 issue (Table 1), which is the timeframe used for most analyses in this article. In each monthly issue of the journal, the Editor-in-Chief and the Guest Editors contribute an editorial to introduce that issue's editorial theme and give notice of upcoming issues and events. These editorials represent 15% (118) of all publications. Articles, however, form the core of the TIM Review content: this publication type has accounted for almost 75% (590) of all content published in the journal (Table 1). Less commonly, authors write shorter, less formal pieces focusing on a single practical question: these 39 "Q&As" account for about 5% of the content. Finally, 6% of the content takes the form of 48 summaries from the TIM Lecture Series at Carleton University, which is hosted by the TIM Program. The TIM Lectures provide a forum to promote the transfer of knowledge between university research to technology company executives and entrepreneurs as well as research and development personnel. The lecture subjects mirror areas of interest to the academic program, which are also reflected in the scope of the journal, and both have evolved in parallel over the 10-year history of the journal.

Table 1. Distribution of number of publications by publication type

	Article	Editorial	Lecture	Q&A	Total
Number	590	118	48	39	795
Share	74%	15%	6%	5%	100%

Themes

To examine the text of 10 years of TIM Review articles, we used topic modelling, which is a text-mining technique for discovering themes in a large collection of documents (Blei, 2012). The technique assumes that documents are "mixtures of topics", where a topic is a group of words that frequently occur together (McCallum, 2002; Steyvers & Griffiths, 2007). Even when documents are labelled or dominant topics are well known, topic modelling can help discover hidden patterns or provide additional structure to organize, search, navigate, or summarize large collections of documents. The two key outputs of generating a topic model on a collection of documents are: i) a list of topics (i.e., groups of words that frequency occurs together) and ii) lists of the documents that are strongly associated with each of the topics. Ideally, groups of documents that are identified as highly associated with a given topic should be related to each other, and each topic should be distinguishable from other topics.

To generate a topic model for the TIM Review, we used "MALLET: A Machine Learning for Language Toolkit" (mallet.cs.umass.edu), which is open source software developed by Andrew McCallum and other contributors at the University of Massachusetts and the University of Pennsylvania (McCallum, 2002). We pre-processed the text data by defining a list of "stop words" (i.e., familiar words to be ignored in the analysis such as "a", "and", "the", "etc.", "TIM", "review", and "author"), stemming the text (i.e., treating "agent" and "agents" as the same word), and joining multi-word terms (e.g., converting "living labs" and "supply chain" to "living_labs" and "supply_chain").

Here, we report the results obtained when generating seven topics in the topic modelling algorithm. Each topic is represented by a set of words that describe the topic and degree to which individual publications are associated to it. Based on our interpretation of these sets of words and our knowledge of the documents associated with each of them, we inferred and applied a subjective label, or "theme", to each of the seven topics identified by the algorithm.

Table 2 lists the seven themes along with their topic words, which are the 20 words that are most likely to occur in publications within that topic. The subsections that follow discuss each of the discovered themes and their associated content (i.e., issues and articles), including results examining the topics over time, which

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Table 2. The seven themes of the TIM Review from 2007 to 2017 and their associated topic words, as discovered using topic modelling

Theme	Topic Words
1. Open Source Business	open source, software, project, community, open, user, code, license, source, developer, development, application, oss, system, support, commercial, f/loss, free, proprietary, tool
2. Technology Entrepreneurship	entrepreneur, technology, business, startup, patent, university, global, firm, research, program, innovation, venture, company, woman, growth, market, knowledge, development, student, opportunity
3. Growing a Business	business, company, customer, service, product, model, market, process, firm, technology, ecosystem, innovation, platform, organization, management, development, solution, strategy, capability, resource
4. Research Approaches	research, entrepreneur, study, ecosystem, creative, process, network, relationship, theory, firm, actor, knowledge, game, analysis, context, activity, employee, behavior, social, individual
5. Social Innovation	social, people, community, work problem, idea, organization, time world, group, project, experience, team, challenge, health, change, support, individual, member, solution
6. Living Labs	Innovation, living lab, research, user, process, project, knowledge, service, case, development, open, study, network, activity, stakeholder, co-creation, city, design, region, context
7. Cybersecurity	data, security, system, information, cybersecurity, device, risk, infrastructure, network, technology, control, mobile, cloud, threat, internet, access, research, application, critical, vulnerability

allowed us to track the evolving importance of the seven identified themes over the 10-year publishing record of the TIM Review. Figures 1 to 7 show the monthly changes in each theme, including a fitted line to summarize the overall trend.

1. Open Source Business

For this topic, the model returned words commonly associated with open source and its intersection with business, such as “open source” (and related terms), “license”, “proprietary”, “free”, and “commercial” (Table 2). Given the history of the journal, it is expected that the emphasis on the “Open Source Business” theme would decrease over time, and this trend is reflected in the results (Figure 1). Although open source business was the dominant theme in the journal’s early history, it is now rarely covered. The business aspects of open source shifted from being a thread that ran through

most of the journal’s early publications to a subject that was addressed in recurring special issues specifically dedicated to open source business in January of 2011, 2012, 2013, and 2014, as indicated in Figure 1.

2. Technology Entrepreneurship

The theme of “Technology Entrepreneurship” is relevant throughout the 10 years of the journal. It relates to the business side of open source, as reflected by its minor presence in early articles, but it was given greater emphasis from 2010 onwards (Figure 2), particularly in the early issues following the re-launch of the TIM Review. Notably, four consecutive issues on Technology Entrepreneurship were published in early 2012 (see Baitletti et al., 2012 for an overview of the four issues), and the several articles in these issues have played a key role in the subsequent growth of the journal, as will be discussed later.

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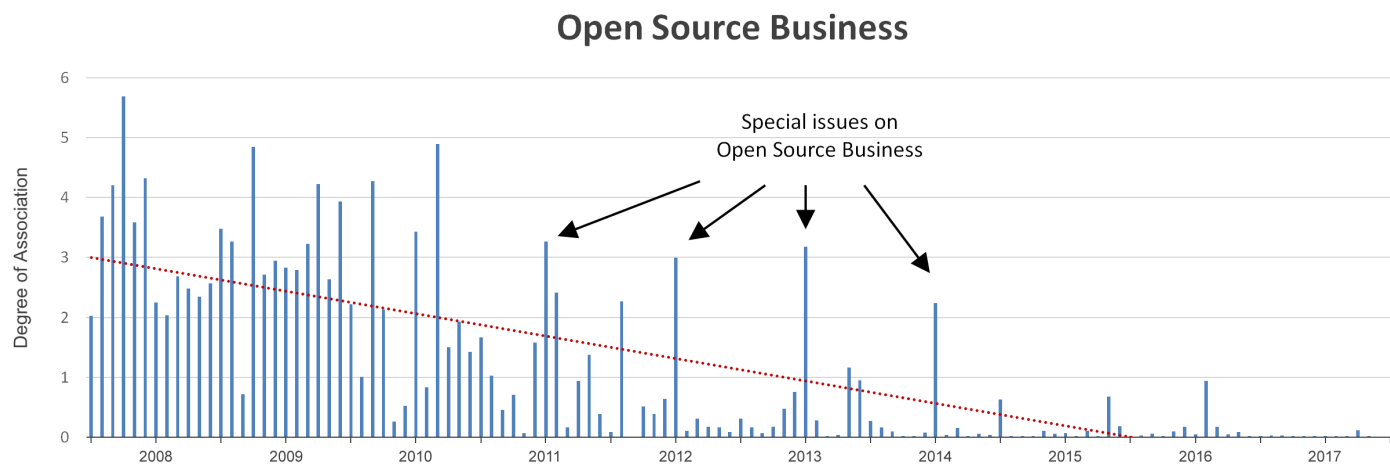


Figure 1. Tracking the “Open Source Business” theme in the OSBR and TIM Review (2007–2017) with key special issues marked

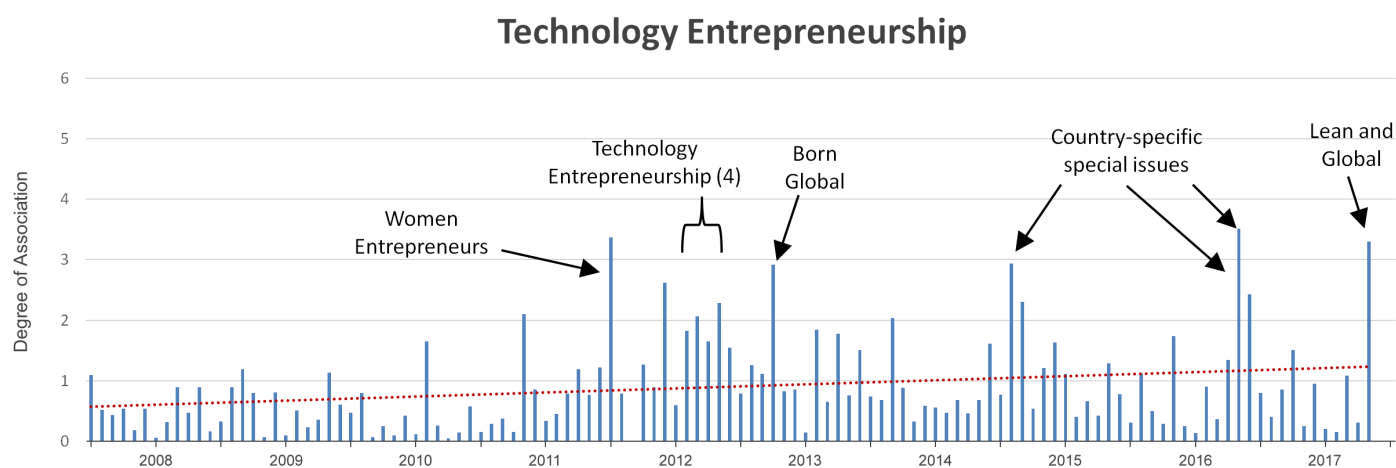


Figure 2. Tracking the “Technology Entrepreneurship” theme in the OSBR and TIM Review (2007–2017) with key special issues marked

Other articles that have strong associations to this theme have come from special issues:

- An issue on Women Entrepreneurs in July 2011.
- Issues on the global aspects of entrepreneurship, such as Born Global in October 2012 and Lean and Global in May 2017.
- Issues focusing on entrepreneurship and innovation in particular countries, such as India in August 2014 and May 2016 and Australia in June 2016.

Aside from publications within these dedicated special issues, many other articles are associated with the

theme of Technology Entrepreneurship, particularly since the re-launch of the journal.

3. Growing a Business

Articles associated with the theme of “Growing a Business” cover processes, methods, strategies, and other aspects relating to the practical aspects of launching and growing technology businesses, such as developing business models, platforms and business ecosystems, products and services, customers, capabilities, and markets. Although not strongly associated with any special issues or particular efforts in this regard (Figure 3), they highlight the journal’s emphasis on the practical implications of the articles, whether they come from academic authors, industry authors, or others.

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Growing a Business

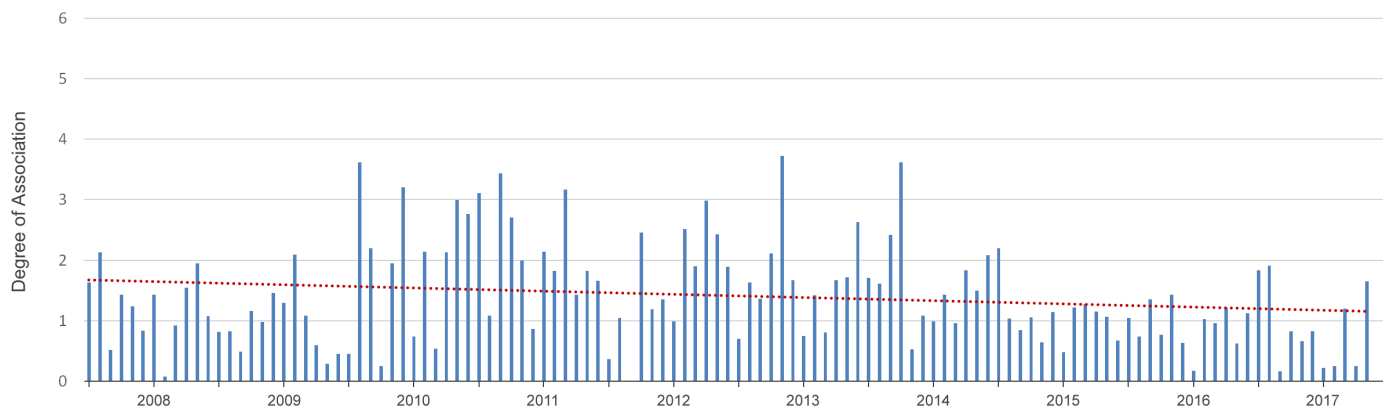


Figure 3. Tracking the “Growing a Business” theme in the OSBR and TIM Review (2007–2017)

Research Approaches

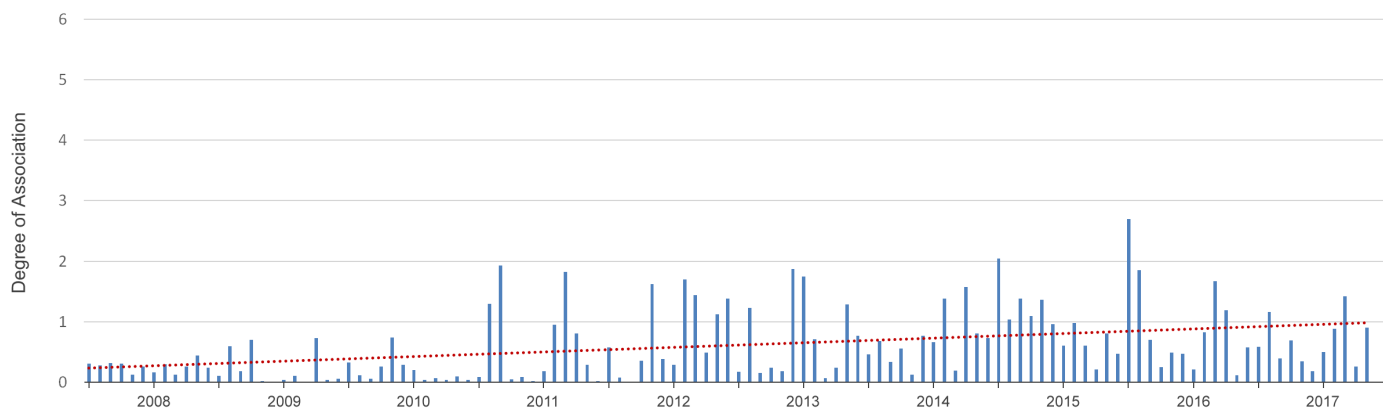


Figure 4. Tracking the “Research Approaches” theme in the OSBR and TIM Review (2007–2017)

4. Research Approaches

In contrast to the “Growing a Business” theme, the “Research Approaches” theme emphasizes an academic view of technology innovation management. The degrees of association are lower in magnitude than the other themes (contrast Figure 4 to the other related figures), but this theme’s increasing emphasis reflects both greater attention to this area following the re-launch of the journal and the journal’s increasingly academic perspective. However, the articles associated with this theme also represent a bridging of theory and practice given they seek to identify the research questions, trends, and approaches that will best support technology companies.

5. Social Innovation

Throughout the 10 years, the journal has published many articles with a strong social innovation element. Indeed, tracking the “Social Innovation” theme over time (Figure 5) highlights contributions from several special issues related to social issues, including:

- Social Innovation in September 2008 and July 2012.
- Women in Open Source in June 2009 and, to a lesser degree, Women Entrepreneurs in July 2011.
- Humanitarian Open Source in December 2010.

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Social Innovation

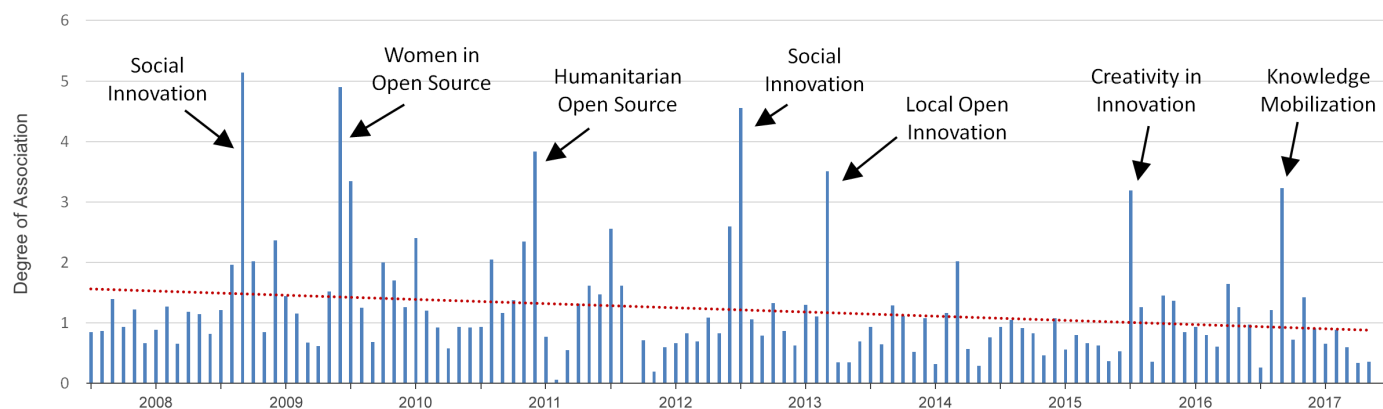


Figure 5. Tracking the “Social Innovation” theme in the OSBR and TIM Review (2007–2017) with key special issues marked

More recently, however, articles from several special issues on innovation have shown associations with this theme, likely because of a terminology overlap and common ideas around building relationships and communities, considering all viewpoints and bringing people together to contribute ideas, share knowledge, etc. These shared concepts may explain the associations from articles associated with the following special issues and contributions:

- Articles related to community building, which is a particularly important concept in open source projects.
- Articles related to collaboration and open innovation approaches, including an issue on Local Open Innovation in March 2013.
- A special issue on Creativity in Innovation in July 2015.
- A special issue on Knowledge Mobilization in September 2016.

6. Living Labs

A particularly prominent theme in the TIM Review has been “Living Labs”, which has featured in seven special issues beginning in September 2012 (Figure 6). The prominence of this theme and the special issues was triggered and driven by the appointment of Mika Westlund to the TIM Program in July 2012; his recurring collaborations with co-guest editors Seppo Leminen, Dimitri Schuurman, Pieter Ballon, and Eelko Huizingh; and the journal’s partnerships with the European Network of Living Labs (ENoLL; openlivinglabs.eu) and the Internation-

al Society for Professional Innovation Management (ISPIM; ispim-innovation.com), which are discussed below.

Given the conceptual overlap, the theme of Living Labs also includes associations from non-living-lab articles that focus on co-creation, open innovation, and service innovation, which are recurring subjects in the TIM Review.

Finally, note that the TIM Review archive of articles on the subject of living labs has been reviewed recently as part of efforts to develop a framework of the defining characteristics of *urban* living labs (Steen & van Bueren, 2017), which is featured in the same issue as the present article.

7. Cybersecurity

The seventh theme emerging from topic modelling the TIM Review’s 10-year database is “Cybersecurity”. Although some early articles are associated with cybersecurity through its relevance to open source software, the theme truly emerges more recently through the journal’s partnerships with the VENUS Cybersecurity Corporation (which was first announced in the TIM Review: see Ballelli et al., 2013), Canada’s Communications Security Establishment (CSE), and Carleton University’s Global Cybersecurity Resource (GCR). These partnerships have also led to a new initiative to develop topic modelling and machine learning tools to discover and explore topics in the TIM Review, and the current analyses represent only an initial step towards this capability. Since July 2013, the TIM Review has published 9 special issues on Cybersecurity (Figure 7).

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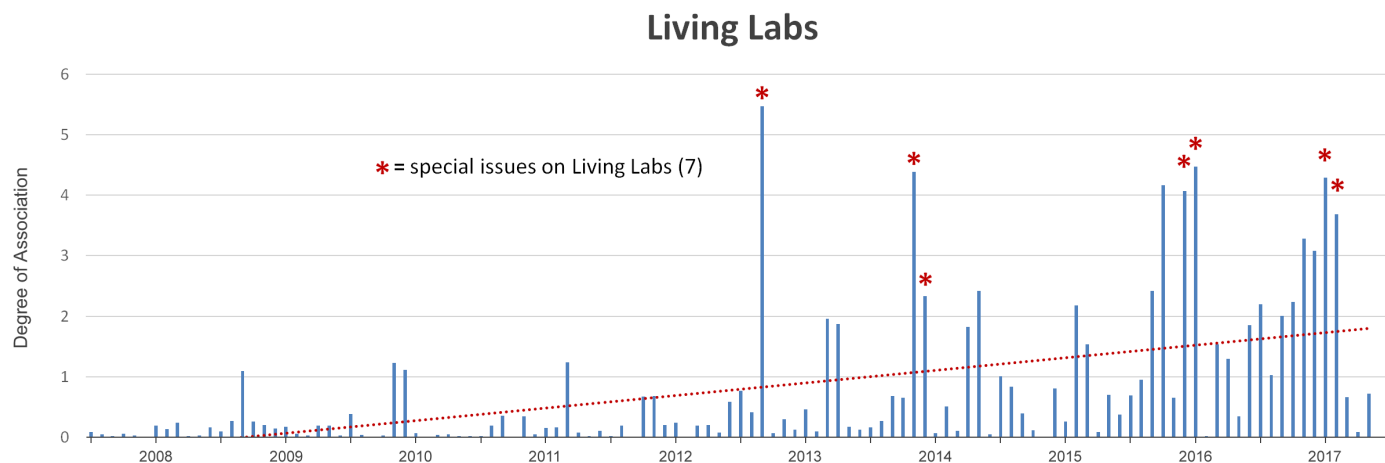


Figure 6. Tracking the “Living Labs” theme in the OSBR and TIM Review (2007–2017) with key special issues marked

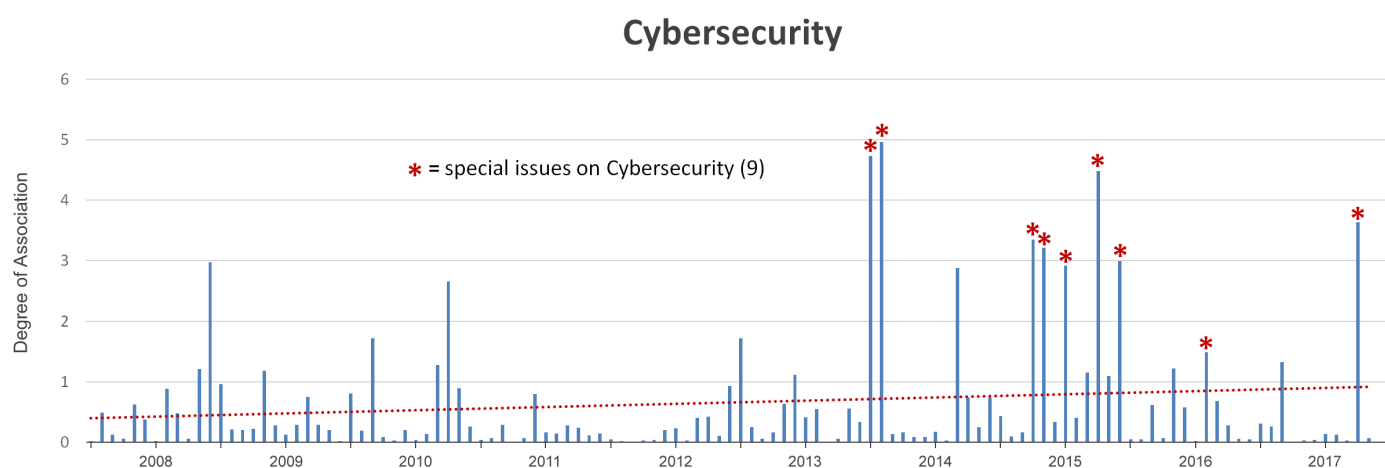


Figure 7. Tracking the “Cybersecurity” theme in the OSBR and TIM Review (2007–2017) with key special issues marked

Contributors

Evolution of the contributor community

As of May 2017 (the endpoint of our analyses for this article), the TIM Review community included 818 different authors. Figure 8 shows the number of new authors per year and the cumulative size of the author community for each year, excluding the incomplete current year (2017). On average, the author community has expanded by 83 authors each year, although the rate of annual growth has increased in recent years (correlation 0.756*, sig. 0.011 when 2017 is excluded from analysis). However, less than 3% of authors (N=22) have published in both the OSBR and TIM Review, and most of them (N=12) have either TIM affiliation (i.e., they are a TIM student, TIM faculty, or TIM adjunct) or have acted

as an editor (N=10 when editors are included and N=6 when TIM affiliations are excluded). In all, the OSBR gained 304 authors (37%) and the TIM Review gained 514 authors (63%). Basically, these findings indicate that the author community underwent a nearly complete transformation following the re-launch of the journal. When articles about open source business were published following the re-launch, they tended to arise from within the TIM Program, reflecting the retention of expertise and interest in this topic among faculty and students. Moreover, the shift in scope from the OSBR and TIM Review mirrored the evolving research and teaching topics in the TIM Program, which further explains why the authors that bridged the two iterations of the journal were predominantly from the journal’s associated academic program. However, the

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re-launch of the journal allowed new areas of existing networks to step forward and created opportunities for new contributors, including international guest editors, authors, and partners.

This recent increase in growth is partially associated with an increase in the number of articles contributed by multiple authors. The number of authors is positively correlated (0.377**, sig. 0.000) with creation year. There is a very strong negative correlation (N=11, -0.958**, sig. 0.000) in single-author publications, and there are strong positive correlations for articles having two authors (0.788**, sig. 0.004), four authors (0.727*, sig. 0.011) and five or more authors (0.918**, sig. 0.000). In the early years, single-author publications represented about 80% of the articles, but by 2017, this share had dropped to around 25%. However, the profiles between the two eras of the journal are different. In the case of the OSBR, there is no correlation between the number of authors and publication year, whereas the TIM review keeps the positive correlation (0.212**, sig. 0.000). The very strong negative correlation remains within TIM Review (N=6, -0.957**, sig. 0.003) in single-author publications as well as for three authors (0.867*, sig. 0.025) and five or more authors (0.872*, sig. 0.023). In the case of the OSBR, there are no correlations. In light of the increasingly international reach of the TIM Review since the re-launch, the tendency to favour larger co-author teams is not a surprise: it is in line with prior suggestions from Santonen and Ritala (2014), who viewed a trend of increasing co-authorship as an indicator of increased knowledge sharing and creation, as a result of the collaboration that co-authorship requires (Newman, 2004).

Contributor origins and roles

TIM review authors represent 33 countries, which break down by continent as shown in Figure 9. As reported at the time of the re-launch (McPhee, 2011), 85% of OSBR authors were from Canada or the United States, but over the entire 10-year period, the continent of the Americas represents 56% of the overall author community (Figure 9), with an increasing representation of European authors accounting for most of the change (12% vs. 36%). Table 3 lists the top 10 countries by author and readers, further highlighting the European contributions with six out of the top 10 countries for authors being from Europe.

Table 3. Top 10 countries by TIM Review authors and readers

Authors		Readers	
1.	Canada	1.	United States
2.	United States	2.	India
3.	Finland	3.	Canada
4.	Germany	4.	United Kingdom
5.	Australia	5.	Australia
6.	Belgium	6.	Malaysia
7.	United Kingdom	7.	Philippines
8.	Denmark	8.	Germany
9.	India	9.	Netherlands
10.	Sweden	10.	Kenya

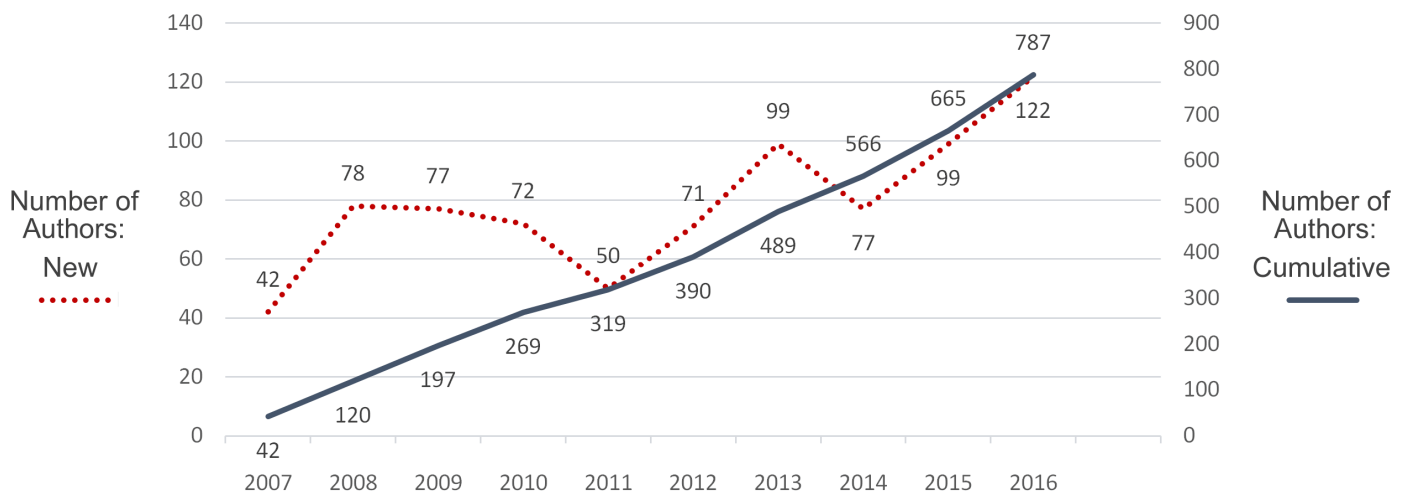


Figure 8. Growth of the TIM Review author community per year and cumulatively

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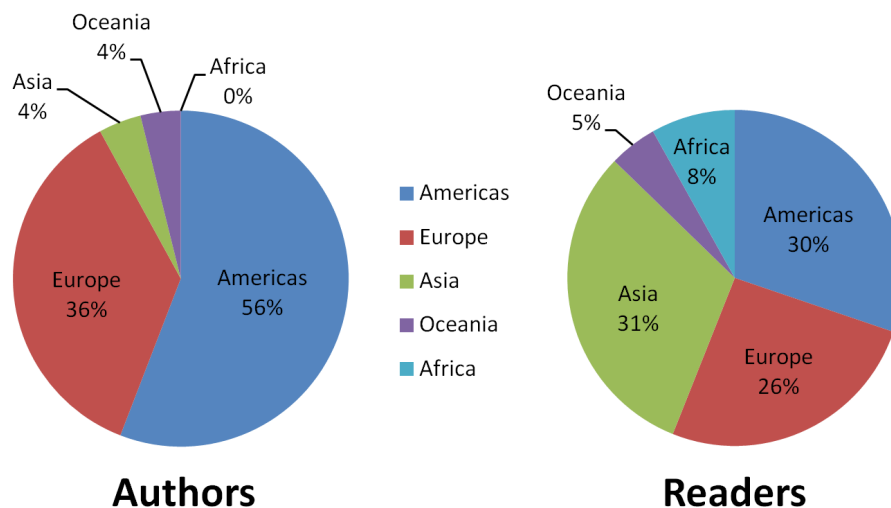


Figure 9. Global distribution of TIM Review authors (2007–2017) and readers (2011–2017)

The authors also represent a diversity of roles. Based on their primary affiliations, we identify 56% of authors as representing academia, with 38% of those at the professor or post-doctoral level and 18% being graduate students. Private sector contributors represent 27% of authors and the public and third sectors make up the final 17%. Relative to the OSBR, the TIM Review attracts more academic contributions (McPhee, 2015); however, we note these results under-represent contributors from the private and public sector who are concurrently undertaking graduate studies, which is a common situation in the TIM Program, for example.

Partners

The growth of the TIM Review has been accelerated by partnerships with like-minded and complementary organizations. As the following examples illustrate, these collaborations have typically centered around network building and the production of special issues:

- **Lead To Win:** In several ways, the TIM Review has greatly benefitted from its relationship to the Lead To Win entrepreneurship program (LTW; leadtowin.ca). Led by Carleton University, Lead To Win was recognized by UBI Global as a Top University Business Incubator, which ranked the program seventh overall in North America (Spratt, 2015). In addition to issue sponsorship, the journal has received many contributions from Lead To Win entrepreneurs and mentors, and it has been an ongoing source of insights, ideas, and research projects.

- **ISPIM:** Since March 2013, the TIM Review has published 11 special issues related to conferences and other events held by the International Society for Professional Innovation Management (ISPIM; ispim-innovation.org). Even some of the collaborations underpinning the co-authorship of this article result from relationships built at ISPIM events (e.g., Santonen & Conn, 2015).
- **ENoLL:** The TIM Review's extensive publications on the theme of "Living Labs" (as described earlier) have benefitted from special issues in partnership with the European Network of Living Labs (ENoLL; openlivinglabs.eu), and the journal has received numerous additional contributions from members of its network.
- **GCR:** The Global Cybersecurity Resource (GCR) is a Carleton University project funded by FedDev Ontario (feddevontario.gc.ca) and focused on growing cybersecurity and cybersecurity-differentiated companies. The GCR has identified analytics – as exemplified by the topic modelling analyses presented earlier in this article – as one means of providing novel and potentially instrumental insights to such companies.

Readership and Citations

Readership growth

Over its 10-year history, the journal has attracted over 1 million readers, defined as unique visitors (or users) according to its website analytics. Early in the journal's

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history, readership fluctuated with the popularity of the current issue. Website analytics data for the OSBR is available from May 2008, and it shows peak readership of 4,400 readers visiting the website in June 2009, which coincided with the publication of the popular special issue on Women in Open Source. However, readership steadily declined over the next year before levelling out at around 1,000 readers per month.

This sustained low level of readership prompted the TIM Program to re-think the journal's objective. A research project was then undertaken to develop a results-based organization design methodology, which drew upon lessons learned from theory and from operating the OSBR, to establish design principles for the re-launch of the journal in October 2011 (McPhee, 2012a, 2012b).

Following the successful re-launch of the journal, and buoyed by its early success in restoring readership to near-peak levels, in May 2012, the TIM Program declared a goal of reaching 10,000 monthly readers of the TIM Review as part of a TIM Lecture that was subsequently published in the journal (TIM Lecture Series, 2012). This goal of tripling the journal's readership was surpassed a little more than a year later. Now, in 2017, current readership levels fluctuate around 25,000 readers per month (Figure 10). In recent years, as the journal's archive has attracted an increasing share of visits, the monthly readership patterns reflect seasonal fluctuations on a background of growth (Figure 10).

Global reach

In the first issue of the OSBR, the founding Editor-in-Chief declared that: "Initially, the scope of the OSBR will be the province of Ontario, then Canada, and eventually the world" (Lavigne, 2007). Although geographical readership data from the OSBR are not available, the authorship data indeed shows a focus centred on the city of Ottawa, where the journal is based at Carleton University, and a strong majority of authors from Canada. As shown above, the author diversity has become increasingly global since the journal was launched, and the readership data shows an even stronger global reach since the re-launch of the journal in 2011. At 31%, Asia has the highest share of readers based on visits to the journal's website (<http://timreview.ca>) since October 2011 (Figure 9). Close behind, the Americas represent 30% of readers, 19% of which are in the United States. Only 9% of TIM Review readers are based in Canada. The third major component of readership comes from Europe at 26%. Finally, 8% of readers are in Africa 5% are in Oceania.

Popularity

In terms of which publication types have proven most popular with readers, articles (N=590) clearly have the strongest impact given that they have generated 85% of pageviews on the journal's website since the re-launch. On average, an article will generate 2,063 pageviews. Editorials (N=118) generate less than 2% of all pageviews, which suggests that they are only valued by those who

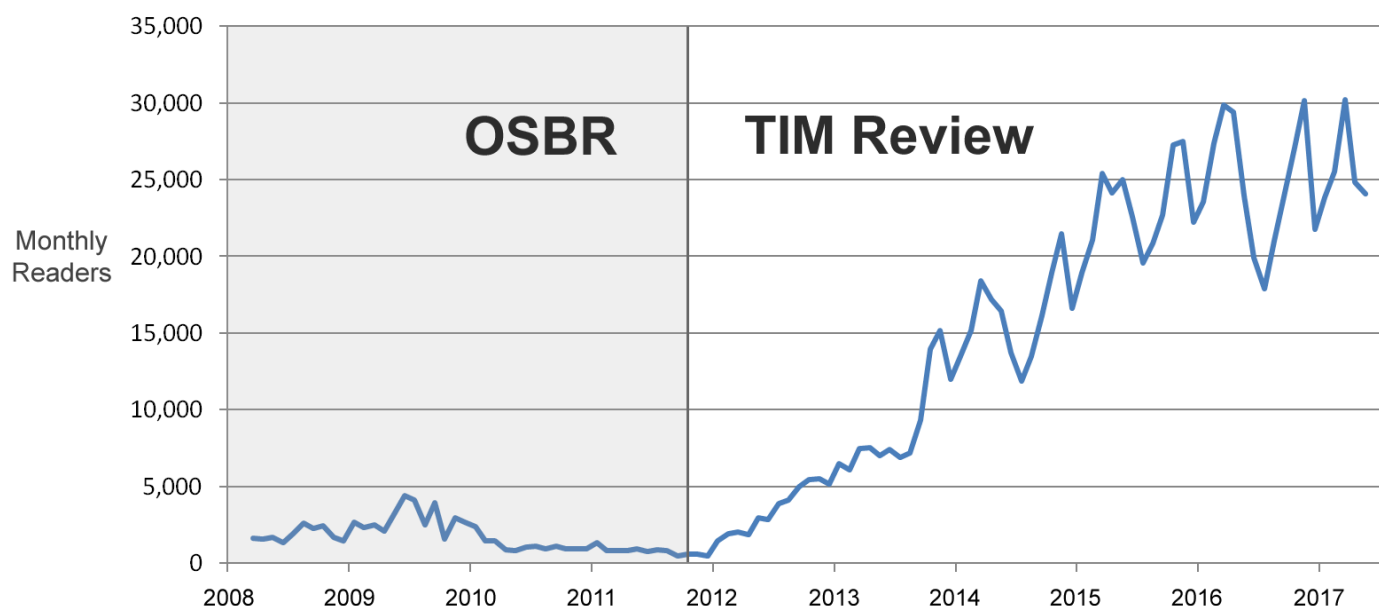


Figure 10. TIM Review readership growth: monthly readers (unique visitors or users) at osbr.ca (May 2008 to September 2011) and timreview.ca (October 2011 to May 31st, 2017)

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read a full issue as a collected work. However, the website analytics show that the vast majority of readers come to the site from a search and read only one article, which means they may not encounter the editorials. The TIM Lecture summaries (N=48) follow a somewhat similar low-impact profile as the editorials: although they capture key messages from the lectures, it is expected that they represent higher value to those who physically attended the lectures compared to those reading their summaries. Finally, for the Q&As (N=39), on the surface, their average of 4,236 pageviews suggests that this publication type has twice the impact of articles. However, a large standard deviation of 18,282 indicates that there is high impact variation for Q&As, and indeed, one Q&A is driving this variation. The Q&A titled “What is customer value and how do you deliver it?” was written by Aparna Shanker (2012) a customer applications engineer with Alcatel-Lucent at the time she was a graduate student in

the TIM Program at Carleton University, and it is clearly the most viewed publication in the TIM Review archive. It has generated 114,673 pageviews, whereas the second most popular publication – “Technology Entrepreneurship: Overview, Definition, and Distinctive Aspects”, an article by TIM Program Director Tony Bailetti (2012) from the same issue – has generated 67,957 pageviews. Close behind in third position, with 66,721 pageviews, is the article “Social Entrepreneurship: Definition and Boundaries”, which was written by Samer Abu-Saifan (2012) while he was a TIM student. These three articles were published in the same February 2012 issue, which was the first in a series of four consecutive issues on Technology Entrepreneurship. As Table 4 shows, most of the publications attracting a high number of pageviews are TIM Review articles; among the 10 most-viewed articles, only two are OSBR articles (ranked 7th and 9th).

Table 4. Top 10 articles by pageviews

Rank	Pageviews	Author and Year	Article Title and Link
1	114,673	Shanker (2012)	Q&A. What Is Customer Value and How Do You Deliver It? timreview.ca/article/525
2	67,957	Bailetti (2012)	Technology Entrepreneurship: Overview, Definition, and Distinctive Aspects timreview.ca/article/520
3	66,721	Abu-Saifan (2012)	Social Entrepreneurship: Definition and Boundaries timreview.ca/article/523
4	49,043	Tanev (2012)	Global from the Start: The Characteristics of Born-Global Firms in the Technology Sector timreview.ca/article/532
5	36,635	Shanker (2012)	A Customer Value Creation Framework for Businesses That Generate Revenue with Open Source Software timreview.ca/article/534
6	30,799	Hakanen & Soudunsaari (2012)	Building Trust in High-Performing Teams timreview.ca/article/567
7	28,233	Savolainen & Häkkinen (2011)	Trusted to Lead: Trustworthiness and its Impact on Leadership timreview.ca/article/429
8	26,891	Abhyankar (2014)	The Government of India’s Role in Promoting Innovation through Policy Initiatives for Entrepreneurship Development timreview.ca/article/818
9	18,993	Crenna (2011)	Learning from Failure: A Case Study in Entrepreneurship timreview.ca/article/447
10	18,978	Davies & Gilbert (2011)	A Sales Execution Strategy Guide for Technology Startups timreview.ca/article/491

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Citations

In academic journals, citations are a more traditional way to evaluate publication impact than website pageviews. Therefore, we used Publish or Perish software (harzing.com/pop.htm) to collect all the citations for TIM Review publications, including OSBR publications. Publish or Perish uses Google Scholar citation data, which typically reports a greater number of citations for an article than commercial citation services such as Web of Science and Scopus.

In all, TIM Review and OSBR publications have generated 2,893 citations. A majority of the citations (2,411 citations, 83%) have been generated by TIM Review publications, whereas OSBR publications have generated

only 482 citations (17%). Nearly all the citations (N=2827, 98%) have been made to articles, and only a small number of these have had the greatest impact. The top five articles alone account for 21% of all citations, and the top 10 account for 32% of all citations. In all, there are only three publications with more than 100 citations. Furthermore, for articles, pageviews as a genuine impact metric was also partially validated: article pageviews and citations were moderately correlated (0.536**, sig. 0.000). As Table 5 shows, most of the publications attracting a high number of citations are TIM Review articles; among the 10 most-cited articles, only one is an OSBR article (ranked 4th). Notably, articles on living labs represent 4 of the top 10 articles (and 12 of the top 20 articles; not shown).

Table 5. Top 10 most-cited articles

Rank	Citations	Pageviews	Author and Year	Article Title and Link
1	179	66,721	Abu-Saifan (2012)	Social Entrepreneurship: Definition and Boundaries timreview.ca/article/523
2	133	4,162	Westerlund et al. (2012)	Living Labs as Open-Innovation Networks timreview.ca/article/602
3	105	4,363	Almirall et al. (2012)	Mapping Living Labs in the Landscape of Innovation Methodologies timreview.ca/article/603
4	93	8,518	Sanders & Simons (2009)	A Social Vision for Value Co-creation in Design timreview.ca/article/310
5	92	5,190	Westerlund & Leminen (2011)	Managing the Challenges of Becoming an Open Innovation Company: Experiences from Living Labs timreview.ca/article/489
6	85	67,957	Bailletti (2012)	Technology Entrepreneurship: Overview, Definition, and Distinctive Aspects timreview.ca/article/520
7	65	8,946	Westerlund (2014)	Designing Business Models for the Internet of Things timreview.ca/article/807
8	47	6,066	Moogk (2012)	Minimum Viable Product and the Importance of Experimentation in Technology Startups timreview.ca/article/535
9	46	1,799	Juujärvi & Pessa (2013)	Actor Roles in an Urban Living Lab: What Can We Learn from Suurpelto, Finland? timreview.ca/article/742
10	45	49,043	Tanev (2012)	Global from the Start: The Characteristics of Born-Global Firms in the Technology Sector timreview.ca/article/532

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The author citation profile is very similar to the publication citation profile. In all, 258 authors (34%) out of 751 who have published an article have not received any citations, and 112 authors (15%) have received only one citation. The top 10 authors in terms of article citations are listed in Table 6. Being an active author strongly explains the number of citations: the number of article publications is moderately correlated with citations (0.638**, sig. 0.000).

Conclusion

This journal was launched 10 years ago by the Talent First Network and the TIM Program at Carleton University to promote economic development by providing companies within its region with competitive advantages through increased understanding of the business side of open source. However, not only did this primary

goal change over time in parallel with the evolution of the TIM Program, the journal was also intended to provide additional benefits, which took on increasing importance over time as the scope of the journal and its global reach expanded.

In terms of the next 10 years, the journal seeks to continue to provide benefits to its readers, contributors, partners, and other stakeholders, particularly through increased growth and the use of innovative technologies. For example, the journal is developing new tools based on machine learning and topic modelling to deliver increased value to its various audiences. Future growth will depend on further community building and partnerships to reach new contributors and readers. We will apply the lessons of the journal's past when considering its future.

Table 6. Top 10 most-cited authors and their number of articles

Rank	Citations	Author	Articles	Country	Primary Affiliation
1	416	Seppo Leminen	11	Finland	Laurea University of Applied Sciences
2	390	Mika Westerlund	15	Canada	Carleton University
3	179	Samer Abu-Saifan	1	Canada	Carleton University
4	172	Tony Bailetti	19	Canada	Carleton University
5	138	Stoyan Tanev	13	Denmark	University of Southern Denmark
6	133	Anna-Greta Nyström	2	Finland	Åbo Akademi University
7	120	Dimitri Schuurman	10	Belgium	imec
8	105	Esteve Almirall	1	Spain	ESADE Business School
	105	Jonathan Wareham	1	Spain	ESADE Business School
	105	Melissa Lee	1	Spain	ESADE Business School
9	93	George Simons	1	United States	NBBJ
	93	Liz Sanders	1	United States	MakeTools
10	77	Steven Muegge	10	Canada	Carleton University

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Acknowledgements

The 10-year history of the TIM Review and all its successes are the result of countless small and large contributions from its readers, authors, reviewers, board members, partners, funders, sponsors, and champions, particularly the Director of the TIM Program, Tony Bailetti, as well as the staff and faculty of the TIM Program at Carleton University and the journal's founding Editor-in-Chief, Dru Lavigne.

The authors also gratefully acknowledge funding from FedDev Ontario through the Bayview Yards business acceleration shop in Ottawa, Canada, which enabled the topic modelling analyses presented in this article and the related tools being developed to further enhance the value of the journal to its readers and contributors.

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References

- Abu-Saifan, S. 2012. Social Entrepreneurship: Definition and Boundaries. *Technology Innovation Management Review*, 2(2): 22–27.
<http://timreview.ca/article/523>
- Bailetti, T. 2012. Technology Entrepreneurship: Overview, Definition, and Distinctive Aspects. *Technology Innovation Management Review*, 2(2): 5–12.
<http://timreview.ca/article/520>
- Bailetti, T., Bot, S. D., Duxbury, T., Hudson, D., McPhee, C., Muegge, S., Weiss, M., Wells, J., & Westerlund, M. 2012. An Overview of Four Issues on Technology Entrepreneurship in the TIM Review. *Technology Innovation Management Review*, 2(5): 28–34.
<http://timreview.ca/article/557>
- Bailetti, T., Craigen, D., Hudson, D., Levesque, R., McKeen, S., & Walsh, D. 2013. Developing an Innovation Engine to Make Canada a Global Leader in Cybersecurity. *Technology Innovation Management Review*, 3(8): 5–14.
<http://timreview.ca/article/711>
- Blei, D. M. 2012. Probabilistic Topic Models. *Communications of the ACM*, 55(4): 77–84.
<http://dx.doi.org/10.1145/2133806.2133826>
- Lavigne, D. 2007. Editorial: Introducing the OSBR. *Open Source Business Resource*, July 2007: 3.
<http://timreview.ca/article/92>
- McCallum, A.K. 2002. *MALLET: A Machine Learning for Language Toolkit*.
<http://mallet.cs.umass.edu>
- McPhee, C. 2011. Reflecting on Fifty Issues of the OSBR. *Open Source Business Resource*, August 2011: 32–36.
<http://timreview.ca/article/465>
- McPhee, C. 2012a. Results-Based Organization Design for Technology Entrepreneurs. *Technology Innovation Management Review*, 2(5): 10–17.
<http://timreview.ca/article/554>
- McPhee, C. 2012b. *Using a Results-Based Organization Design Methodology to Construct the Technology Innovation Management Review*. Master's Thesis in Technology Innovation Management, Carleton University, Ottawa, Canada.
- McPhee, C. 2015. Reflecting on 100 Issues of the TIM Review. *Technology Innovation Management Review*, 5(11): 5–11.
<http://timreview.ca/article/940>
- Newman, M. E. J. 2004. Coauthorship Networks and Patterns of Scientific Collaboration. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 101(Suppl 1): 5200–5205.
<http://dx.doi.org/10.1073/pnas.0307545100>
- Santonen, T., & Conn, S. 2015. Evolution of Research Topics at ISPIM from 2009 to 2014. In E. Huizingh, S. Conn, & I. Bitran (Eds.), *Proceedings of the ISPIM Innovation Summit*, Brisbane, Australia, December 6–9, 2015.
- Santonen, T., & Ritala, P. 2014. Social Network Analysis of the ISPIM Innovation Management Community in 2009–2011. *International Journal of Innovation Management*, 18(1).
<http://dx.doi.org/10.1142/S1363919614500108>
- Sprott. 2015. Carleton's Lead To Win Program for Entrepreneurs Named One of Top Ten in North America. *Sprott School of Business*, November 5, 2015. Accessed July 1, 2017:
<http://sprott.carleton.ca/2015/carletons-lead-to-win-program-for-entrepreneurs-named-one-of-top-ten-in-north-america/>
- Shanker, A. 2012. Q&A. What Is Customer Value and How Do You Deliver It? *Technology Innovation Management Review*, 2(2): 32–33.
<http://timreview.ca/article/525>
- Steen, K., & van Bueren, E. 2017. The Defining Characteristics of Urban Living Labs. *Technology Innovation Management Review*, 7(7): 21–33.
<http://timreview.ca/article/1088>
- Steyvers, M., & Griffiths, T. 2007. Probabilistic Topic Models. In T. K. Landauer, D. S. McNamara, S. Dennis, & W. Kintsch (Eds.), *Handbook of Latent Semantic Analysis*: 424–440. Mahwah, NJ: Laurence Erlbaum Associates.
- TIM Lecture Series. 2012. TIM Lecture Series: Leadership Position in Technology Entrepreneurship and Commercialization. 2012. *Technology Innovation Management Review*, 2(6): 49–53.
<http://timreview.ca/article/569>

Citation: McPhee, C., Santonen, T., Shah, A., & Nazari, A. 2017. Reflecting on 10 Years of the TIM Review. *Technology Innovation Management Review*, 7(7): 5–20. <http://timreview.ca/article/1087>



Keywords: TIM Review, OSBR, journal, open source, technology, innovation, management, entrepreneurship, business, research, topic, topic modelling, scientometric analyses