

Management PhD Research Topic

DIY Science, technology spillovers and innovation

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Abstract

Do-it-Yourself (DIY) Science and related concepts such as DIY Laboratories, hackerspaces, makerspaces and fab-labs are all part of an emerging phenomenon that is seeing a renewed focus on scientific development outside of the traditional corporate or university driven research and development model. With decreasing costs associated with key technologies such as large scale computing power, CNC machining equipment and 3-D printing, the potential role of small operators becoming an increasingly important part of the innovation landscape is increasing. How these non-institutional systems operate, their role in economic development, how commercial imperatives are incorporated and the process by which these operations succeed (eg the role of knowledge spillovers) are all emerging areas of interest.

Detailed Explanation

DIY Science is an emerging phenomenon that allows individuals or small groups of interested individuals to engage in scientific endeavours through a variety of mechanisms to undertaking research activities in community funded laboratories through to tinkering in garages or home workshops. This expansion of science being undertaken away from traditional corporate and university laboratory environments provides significant opportunities for benefits to flow to both participants as well as for economic and social benefits to accrue within the local region. Corporate players are able to draw upon this new knowledge through crowd-sourcing and innovation competitions thereby decentralising the innovation process and benefiting from Chesbrough's notion of 'open innovation'.

One of the great challenges with this DIY Science model is that the various activities and structures that are considered to be within its bounds vary enormously. At one end of the spectrum are formal labs such as La Paillasse in Paris or BiologiGaragen in Copenhagen which are formal research laboratories that are often funded by corporate players and allow interested individuals to access the facilities and equipment for what is often a fairly nominal fee. At the other end of the spectrum, it can include enthusiasts working out of their basements, kitchens or home workshops. The key common denominator is that DIY science operations allow individuals to pursue their own interests and take liberties in developing investigative directions and testing their ideas that would not be possible in a corporate setting.

This DIY Science model is very much in its infancy as highlighted by a recent special issue in *Technological Forecasting and Social Change* and then a further special issue the following year in *Technology Analysis and Strategic Management*. Both of these special issues provide some insight into the variety of topics that could be addressed, however, some possible considerations include:

1. How do DIY labs engage in the larger innovation process in terms of where the base knowledge comes from and how they work with knowledge/people from larger corporate entities (eg knowledge spillovers), how does their work feed back into the innovation ecosystem in terms of patenting, the commercialisation of activities and who benefits from DIY lab innovations?
2. What role do DIY labs play in the larger innovation ecosystem and how can government policy levers develop appropriate settings that will build a local innovation oriented milieu to assist regional development?

3. How do the commercial imperatives impact the operation of DIY labs from who is involved to what support structures are required to allow individuals to participate in the DIY science model? For example, is the requirement for high technology public labs, legal support for patenting or other factors form fundamental barriers/enablers for DIY science?
4. What role does inter-industry technological spillovers play in supporting DIY science activities and how does the technological and institutional context affect the type of innovations that emerge?

These are just some examples of interesting research questions that relate to how DIY science may be incorporated into the larger discussion around innovation and its various outcomes. A review of recent journal articles is likely to suggest a wide variety of other interesting potential topics given the embryonic nature of this research to date.

Methodologically, most work in this area are detailed case studies of single industries. There are quantitative studies of single industries, but these are less common.

Possible journal articles to build an understanding of the field include the following. A number of the papers are by the lead supervisor to allow candidates to understand his background work in this field. Links are provided where available to the article via the title of the paper.

Arora, A., Belenzon, S., & Pataconi, A. (2018). [The decline of science in corporate R&D](#). *Strategic Management Journal*, 39(1), 3-32.

Fox, S. (2014). [Third Wave Do-It-Yourself \(DIY\): Potential for prosumption, innovation, and entrepreneurship by local populations in regions without industrial manufacturing infrastructure](#). *Technology in Society*, 39, 18-30.

Galvin, P., Burton, N., & Nyuur, R. (2020). [Leveraging inter-industry spillovers through DIY laboratories: Entrepreneurship and innovation in the global bicycle industry](#). *Technological Forecasting and Social Change*, 160, 120235.

Galvin, P., Klarin, A., Nyuur, R., & Burton, N. (2021). [A bibliometric content analysis of do-it-yourself \(DIY\) science: where to from here for management research?](#). *Technology Analysis & Strategic Management*, 33(10), 1255-1266.

Giusti, J. D., Alberti, F. G., & Belfanti, F. (2020). [Makers and clusters. Knowledge leaks in open innovation networks](#). *Journal of Innovation & Knowledge*, 5(1), 20-28.

Howard, M. D., Boeker, W., & Andrus, J. L. (2019). [The spawning of ecosystems: How cohort effects benefit new ventures](#). *Academy of Management Journal*, 62(4), 1163-1193.

Lee, J. M., Hirschfeld, E., & Wedding, J. (2016). [A patient-designed do-it-yourself mobile technology system for diabetes: promise and challenges for a new era in medicine](#). *Jama*, 315(14), 1447-1448.

Lhoste, E. F. (2020). [Can do-it-yourself laboratories open up the science, technology, and innovation research system to civil society?](#). *Technological Forecasting and Social Change*, 161, 120226.

Ng, W., Arndt, F., & Huang, T. Y. (2020). [Do-it-yourself laboratories as integration-based ecosystems](#). *Technological Forecasting and Social Change*, 161, 120249.

Sarpong, D., Ofosu, G., Botchie, D., & Clear, F. (2020). [Do-it-yourself \(DiY\) science: The proliferation, relevance and concerns](#). *Technological Forecasting and Social Change*, 158, 120127.

Wu, Q., & He, Q. (2020). [DIY Laboratories and business innovation ecosystems: The case of pharmaceutical industry](#). *Technological Forecasting and Social Change*, 161, 120336.