All Researchers Should Become Entrepreneurs

Jordi Cabot, Hugo Bruneliere, Gwendal Daniel, Abel Gómez

▶ **To cite this version:**

Jordi Cabot, Hugo Bruneliere, Gwendal Daniel, Abel Gómez. All Researchers Should Become Entrepreneurs. 2021 IEEE/ACM 8th International Workshop on Software Engineering Research and Industrial Practice (SER&IP) - Co-located with ICSE 2021, Jun 2021, Madrid, Spain. 10.1109/SER-IP52554.2021.00019 . hal-03250329

HAL Id: hal-03250329
https://hal.science/hal-03250329

Submitted on 4 Jun 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

All Researchers Should Become Entrepreneurs

Jordi Cabot
ICREA
Universitat Oberta de Catalunya (UOC)
Barcelona, Spain
jordi.cabot@icrea.cat
ORCID: 0000-0003-2418-2489

Hugo Bruneliere
NaoMod Team
IMT Atlantique, LS2N (UMR CNRS 6004)
Nantes, France
hugo.bruneliere@imt-atlantique.fr
ORCID: 0000-0002-5987-2175

Gwendal Daniel
Internet Interdisciplinary Institute (IN3)
Universitat Oberta de Catalunya (UOC)
Barcelona, Spain
gdaniel@uoc.edu
ORCID: 0000-0003-0692-0628

Abel Gómez
Internet Interdisciplinary Institute (IN3)
Universitat Oberta de Catalunya (UOC)
Barcelona, Spain
agomezlla@uoc.edu
ORCID: 0000-0003-1344-8472

***Abstract*—We often complain about the challenges associated with a fruitful research-industry collaboration. The coronavirus pandemic has just aggravated them as, clearly, companies face difficult times and have mostly paused their R&I activities. In this context, we propose that researchers become entrepreneurs and play both roles at the same time. Right now, this is much more the exception than the rule in the academic system. However, we argue this is the quickest way to get real feedback on the quality and impact of our research.**

***Index Terms*—industry, research, transfer, entrepreneurship**

I. Introduction

The benefits of transferring technology from research labs to the (software) industry are well-known [1], [2]. However, it does not happen as often as we would like. Indeed, industry-research collaboration has always been problematic. As a result, software engineering research too often risks to be irrelevant in a real industrial context [3].

Lack of specific funding for exploratory tech transfer actions, limited tax deductions for R&D, and the coronavirus pandemic—forcing many companies to drastically cut their innovation budget—are deteriorating this situation. As a result, real scientific progress is in danger of stagnating [4].

We argue that the only solution is to become ourselves the industry partners we too often miss. This way, we will be able to reap the benefits of bringing our research ideas to the market and get real feedback for them.

While not a silver bullet either, we believe the entrepreneurial path is worth exploring, at least as a complement to other—more standard—collaboration models. Even if the researcher does not end up creating a spin-off, some of the intermediate steps, like evaluating the product market-fit, are valuable on their own to improve the quality of the research and therefore worth pursuing.

II. Standard collaboration models

There are many models for research and technology collaboration and/or commercialization [5]: direct transfer contracts, industrial PhDs, participation in large EU-funded industrial consortia, etc. Each of them comes with a different set of trade-offs and limitations when it comes to their actual implementation. For instance, industrial PhDs aim to facilitate the collaboration between research teams and companies to solve real challenges companies have but, often, companies pressure the PhD student to work on more pressing short-term problems. Another example could be European ECSEL-type projects consisting in large multi-national consortia that gather together to create a set of useful tools for specific sectors with a high Technology Readiness Level but that, due to this same large number of partners, suffer from coordination problems that hamper the final result.

Among those, in the past, we favored the collaboration model depicted in Fig. 1. Relying on an open-source infrastructure and through an intermediate SME (Small Medium Enterprise), researchers get new research challenges from users. These are then solved via research prototypes that the SME matures and makes available to the end-users to close the cycle [6]. Nevertheless, this model still has two main issues: *(i)* researchers get some user feedback but have no direct access to the clients' day-to-day experiences with the tool, since users may use a different version of the tool, provided and evolved

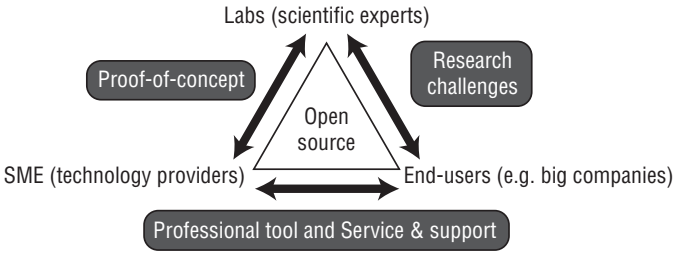

Fig. 1. A virtuous industrialization triangle

by the SME[1]; and *(ii)* the role of the SME is key to balance the collaboration. And, more often than not, finding a SME that believes it could play that role and make a living out of it is the most difficult part of the whole process.

III. Let's become industry ourselves!

When none of the previous collaboration models work for us, the solution is conceptually "simple": if we cannot find the right company/SME, let us create it ourselves so that we can control all parts of the equation. Thus, we would like to encourage researchers to try the entrepreneurship path every time they feel one of their research results has the potential to generate a major social and economic impact.

We believe the journey will provide plenty of useful feedback and information to improve the research activity itself, even if the researcher stops short of creating the spin-off. Evaluating the product-market fit, talking to the users, testing the product under realistic conditions, explore the potential revenue model, thinking about how to scale the technology, etc., are mandatory steps in any feasibility study prior to company creation that will improve the researchers' perception of the domain and of the quality of their own research ideas.

To maximize the amount and quality of the collected feedback, we propose to adopt a commercial open-source business model (COSS [7]) in which you:

1) Release the prototype as OSS.
2) Improve it to make it usable in real environments.
3) Aim to get free users to kickstart a community.
4) Try to get paying users by creating a commercial extension or services on top of the open-source core.

Nowadays, Step 1 is already typically done in Software Engineering research. Emphasis in reproducibility and artifact evaluation tracks are also generally progressing in the research community (cf. Step 2). However, Step 3 and Step 4 is where *the real fun* does happen. This is especially the case in Step 4 where the *show me the money* factor usually makes more honest feedback emerge. Indeed, you cannot "fake" customers such as in more traditional research (cf. ongoing criticisms on the scientific peer-review process[2]).

A. Case study: Xatkit

Our reflections are greatly influenced by the lessons learned while creating Xatkit. Xatkit is a model-based approach to (chat)bot development [8]. Xatkit started already as a research-industry collaboration but after the partner company quit the project, we took the plunge and industrialized the tool ourselves, creating a spin-off in the process.

We are now two years in this journey, and it is surprising to see how much the tool has changed. While our technical choices seemed to work great for our research prototype, we quickly realized they imposed some severe limitations once we tried to use Xatkit for real client work.

A first major change was the realization that we needed a more powerful formalism as serious bots were much more complex than what we had anticipated while building toy examples. As a result, we had to rework Xatkit as a state-machine-based framework.

Actual users also taught us that our chatbot domain-specific language (DSL) was not an optimal fit for any user profile. For non-technical people, it was too complex to use. For developers, it was not easy enough to integrate into their current tooling infrastructure. This led us to refactor the DSL as a fluent API to better fit the Java ecosystem while, in parallel, we worked on a dedicated interface for less technical users.

These lessons are a direct result of our interactions with customers and companies. We have observed in practice that there is a significant gap between what is considered a valid research prototype and an actual product. And you only learn how big this gap is once you actually try to bridge it.

IV. Conclusion

We propose that researchers dare to play more often the role of industry in order to get real and direct feedback on the potential usefulness and impact of their scientific work.

We are aware that this is a challenging proposition and that many researchers may not be inclined to go down this road, e.g., because they do not have nor want to develop the required business, marketing, or financial skills. Thus, for this to be viable, entrepreneurship in academia should be better acknowledged and rewarded by research institutions [9]. This would go in line with initiatives like the DORA declaration[3] that already recognize the need to improve how researchers and the outputs of scholarly research are evaluated.

[1] Note that, in particular cases, researchers can work in a lab directly inside a company and may have privileged access to some internal resources.

[2] https://lemire.me/blog/2021/01/01/peer-reviewed-papers-are-getting-increasingly-boring/

[3] https://sfdora.org/

References

[1] B. Bozeman, "Technology transfer and public policy: a review of research and theory," *Research policy*, vol. 29, no. 4-5, pp. 627–655, 2000.

[2] V. L. McDevitt, J. Mendez-Hinds, D. Winwood, V. Nijhawan, T. Sherer, J. F. Ritter, and P. R. Sanberg, "More than money: The exponential impact of academic technology transfer," *Technology & Innovation*, vol. 16, no. 1, pp. 75–84, 2014.

[3] V. R. Basili, L. C. Briand, D. Bianculli, S. Nejati, F. Pastore, and M. Sabetzadeh, "Software engineering research and industry: A symbiotic relationship to foster impact," *IEEE Softw.*, vol. 35, no. 5, pp. 44–49, 2018.

[4] T. Cowen and B. Southwood, "Is the rate of scientific progress slowing down?" 2019. [Online]. Available: https://bit.ly/39mZ1DQ

[5] G. D. Markman, D. S. Siegel, and M. Wright, "Research and technology commercialization," *Journal of Management Studies*, vol. 45, no. 8, pp. 1401–1423, 2008.

[6] H. Bruneliere and J. Cabot, "On developing open source mde tools: Our eclipse stories and lessons learned," in *Open Source Software for Model Driven Engineering (OSS4MDE'14) workshop - a MODELS 2014 Satellite Event*, 2014.

[7] S. Shahrivar, S. Elahi, A. Hassanzadeh, and G. Montazer, "A business model for commercial open source software: A systematic literature review," *Inf. Softw. Technol.*, vol. 103, pp. 202 – 214, 2018.

[8] G. Daniel, J. Cabot, L. Deruelle, and M. Derras, "Xatkit: A multimodal low-code chatbot development framework," *IEEE Access*, vol. 8, pp. 15 332–15 346, 2020.

[9] M. Wright, S. Birley, and S. Mosey, "Entrepreneurship and university technology transfer," *The Journal of Technology Transfer*, vol. 29, no. 3-4, pp. 235–246, 2004.