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Massimiliano Granieri
Andrea Basso *Editors*

Capacity Building in Technology Transfer

The European Experience

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Volume 14

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Capacity Building in Technology Transfer

The European Experience

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ISSN 2239-2688

ISSN 2239-2696 (electronic)

SxI – Springer for Innovation / SxI – Springer per l’Innovazione

ISBN 978-3-319-91460-2

ISBN 978-3-319-91461-9 (eBook)

<https://doi.org/10.1007/978-3-319-91461-9>

Library of Congress Control Number: 2018942161

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Printed on acid-free paper

This Springer imprint is published by the registered company Springer International Publishing AG
part of Springer Nature

The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Acknowledgements

This book has been made possible by the efforts of many people that were involved in the European project ProgressTT, as well as other friends and colleagues that are engaged on a daily basis with the hard work of technology transfer. To all of them goes our gratitude.

A few names need to be recalled here: Laura McDonald and her team at ASTP-Proton headquarters in Leiden, together with Marta Catarino and Christian Stein; the experts of ProgressTT that worked with a selected number of technology transfer offices across Europe, to implement the capacity building strategy, whose names are Dominic De Groote, Christophe Haunold, John McManus, Michel Berg, Michel Morant, Sue Sundstrom, Tom Flanagan, Alan Kennedy, Shulamit Hirsch, Tom Hockaday, Lisa Cowey, Christi Mitchel, Dirk Groenewegen. Many thanks to all of them.

The European Union is often criticized, and the number of contrarians seems to be increasing. But the European Union is also challenging some of our comfort zones, and it is showing what is the potential of working together within professional and human communities. This book builds on that unique experience and counts the story of a different Europe.

Last but not least, we are indebted to Maria Cristina Acocella and Francesca Bonadei at Springer, always open to projects in science, technology, and innovation, but above all supportive and patient with authors and editors.

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Building Capacity Building in Technology Transfer. An Introduction

Massimiliano Granieri and Andrea Basso

Abstract

This chapter provides an overview of the book and the underlying project about building capacity for technology transfer in Europe. Notwithstanding the robust scholarly production on technology transfer and the role of technology transfer offices, very rarely scholars and practitioners dealt with the intersection between technology management and organization theory and the implications for growing the capacity of a technology transfer organization to improve its performance.

An extensive stream of literature in technology management and organization deals with the role and the performance of technology transfer offices (TTOs). TTOs at universities, research hospitals, research foundations and other public research organizations play a crucial role in supporting the processes that are required to bring research results to market, through cooperative agreements, licenses, sales and, in some cases, through the creation of spin-off companies.

Seduced by the performance of large TTOs in the United States, particularly as a (real or alleged) consequence of the Bay-Dole Act, a worldwide movement exists that seeks to understand if and how that performance can be reproduced elsewhere. Sure enough, the ability to create impact and generate significant financial returns is not something a TTO can do irrespective of the quality of the background research, the presence of critical masses, the availability of financial resources and an industrial environment ready to absorb the technology created. In this respect, the American example should be seen in its entirety rather than just selectively.

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And nonetheless, in the United States as elsewhere, TTOs and the professionals involved, other things being equal, are the critical factor of success.

While managerial literature investigates the determinants of TTOs performance, there has been also a constant attention by policy makers at regional, domestic and European level to identify policy measures that can improve the activity of TTOs and generate a significant return on investment for R&D expenditures. For more than two decades now, governments and institutions experimented a combination of initiatives around what it is now called, at least in part, the Third Mission, although the expression can be misleading, since technology transfer represents a smaller portion of all the activities of social and economic engagement by universities and public research organizations.

Much of the initiatives and the policy measures launched revolved around the idea of professional training, under the assumption that the performance of TTOs is largely influenced by skills and competences, that professionals typically lack, and that academic courses typically do not offer. Professional training and, later on, professional certification, were seen as a way to gain recognition for the technology transfer profession and to improve the internal legitimacy of the TTO, that is ordinarily needed for an accomplished and respected manager to propose and drive any change in the organization that advances technology transfer activities. Such change also includes the setting of the internal goal to have more human resources to staff a good office and, first and foremost, setting the agenda for the research community that also embraces technology transfer and it is not limited to the traditional publishing and teaching duties.

Professional training only partially solved the problem and while its importance and impact cannot be underestimated, clearly additional efforts are required to raise the overall performance of TTOs in Europe.

One of the main observations at both practice and scientific level was that the process of transferring technology to the market needs, soon or later, complementary financial resources, to deal with the lower maturity level of technology (now often measured in terms of technology readiness level, TRL) of public funded research results, as well as to validate such results at prototype level (proof-of-concept or proof-of-principle) or to move further towards the market through the creation of a company. Higher levels of maturity in technology development trigger different kinds of early stage/seed investors; for lower level of maturity, the combination of technological risks and asymmetric information leaves a great deal of promising technologies unexploited or underexploited. This situation has been clear to the European Commission since the launch of Europe 2020, when one of the action items was to identify any measure that would stimulate the technology market in Europe and solve the problem of the so-called sleeping patents, most of which of academic origin.

To attract additional resources and launch development programs for early stage technologies, there is a common belief that TTOs should also have a role in managing the several steps needed to access such resources and to handle them, while supporting inventors and faculty in the proof-of-concept stage.

The perception that the majority of TTOs in Europe (with the exclusion of the usual suspects) would not be able to efficiently manage financial resources for pre-seed investments and the willingness to fix the market failure by securing such financial resources for universities and TTOs had induced the European Commission to envisage two back-to-back pilot measures within the Work Programme 2012–2014 of Horizon 2020.

The creation of a Technology Transfer Financial Facility with an initial endowment of about 64 million Euros was supposed to be launched with resources also from the European Investment Group and, in particular, through the European Investment Fund and its Technology Transfer division. Later, those resources ended up in the Horizon 2020 Access to Risk Finance Work Programme 2016–2017, but their intended use remained the same. As of the writing of this book, those resources are flowing to intermediaries through national initiatives with the purpose of fostering technology transfer activities along the public-private trajectory.

But even before providing financial resources, the Commission clearly meant to take a step back and make sure the candidate TTOs and other intermediaries for the financial resources would be up to their role. In this respect, the Work Programme introduced, for the first time in Horizon 2020 and, to a larger extent, in Europe, a capacity building pilot action for technology transfer (hereinafter, CBTT) with the aim to go beyond pure training and professional development and to steadily empower TTOs with the capacity to manage the technology transfer process in a more efficient way.

A consortium of eight public and private entities, named PROGRESS-TT, was awarded the resources of CBTT and started its 3-year journey to identify and support a number of TTOs with the purpose to increase their overall technology transfer capacity and make them able to deal with financial investors and providers. The change in perspective with PROGRESS-TT was dramatic. For the first time, the goal of increasing the TTOs performance was not pursued by acting at individual level (the professional) but at organizational level, putting the TTO as such at center stage and crafting specific actions for building and strengthening the office capacity in several dimensions. Moreover, the idea of leveraging on training programs was expanded and somehow replaced by those of coaching and mentoring both individual TTOs and clusters of TTOs willing to join forces and reach critical masses within given regional contexts.

While this book is not part of PROGRESS-TT foreground and, as such, not one of the project's outcome, it draws partly from its intermediate and final results and tries to build a conceptual framework for capacity building in technology transfer that could be applied in the future for other actions. It is not by chance that when PROGRESS-TT was already delivering its activities, another capacity building actions was launched by the European Commission (DG Regio) to foster the TTOs performance in the Western Balkans.

The structure of the book and its chapters reflect the purpose of witnessing the creativity of PROGRESS-TT in outlining and accomplishing an otherwise poorly defined notion of capacity building. Moreover, it aims at putting capacity building in the context both of all the policy actions that so far have been implemented to

improve the performance of TTOs and in the current scholarly debate on technology transfer and on the use of financial resources to accelerate the translation of research results into new products and services.

In the first chapter, Patrick McCutcheon endeavors to sketch the full line of policy interventions that have been launched over the years to fix the market failures of technology transfer, strengthen the background conditions, and endow TTOs with all the necessary resources to better perform at European level and in the international setting. The chapter provides an impressive account of the intensity and motivation of the European Commission in supporting the world of technology transfer while pursuing an R&D policy that is progressively interested in the impact of the results and not just on theoretical, yet crucial, outcomes.

Lutz Maicher, Katja Dralle Mjos and Liina Tonisson provide an initial overview of the determinants of TTOs performance and success with the purpose of highlighting the space and the directions that in principle exists for capacity building actions. Their contribution is helpful to understand how complex a capacity building action can be if it purports to address all the multiple, internal and external, aspects that have an influence on the efforts of a TTO and on its real ability to create value out of research results. The chapter is an indispensable reading to then understand some of the choices that in practice have been made by the PROGRESS-TT consortium in delivering the capacity building action.

Fabiola Bertolotti, Elisa Mattarelli and Paula Ungureanu bring the academic perspective of organizational studies in the topic of capacity building in technology transfer. Their contribution reconnects the topic of this book to the main strands of literature in organization theory and organizational behavior that deal with the performance of organizational and inter-organizations units, such as TTOs. This chapter too proves a necessary reading to understand the basic theoretical framework on the constructs that surround the notion of capacity building when organizations and individuals are involved. Importantly, the chapter provides a unique opportunity to understand that TTOs do not work in an “empty cabinet”, as the authors say, but in a context that can be extremely volatile, uncertain, complex and ambiguous.

These three chapters lay the ground for the more specific chapters that deal with capacity building and with the purpose to outline a minimum content for actions aimed at improving the capacity of TTOs and other technology intermediaries.

One of the most difficult tasks in devising a capacity building action towards TTOs (PROGRESS-TT, as a pilot, was supposed to assist thirty TTOs over three years, split in two calls) is the kind of support that is expected. Training is typically a one-to-many activity, with the trainer facing an audience and a content that reflects the expertise of the speaker and its knowledge of the field. If the notion of capacity building aims to be something different and not aimed at individuals only, the approach needs to be one that puts the mentor in direct relation with the TTO, in a genuine one-to-one setting.

Even so, an issue arises, since individual actions need some degree of standardization to be both viable and sustainable and, at the same time, consistent. How can this paradigm shift be achieved while ensuring compliance with such other

constraints? Here the PROGRESS-TT comes into play. Andrea Basso, Alan Kennedy and Célia Gavaud in their chapter explain the journey and the efforts to identify a common ground of intervention for the mentors that is the core of PROGRESS-TT and a seminal attempt to make capacity building meaningful from a content perspective. Before that, Alan Kennedy and Pete Frederick illustrate another important component of the overall strategy to frame a capacity building action for TTOs. They explain how the CCODE methodology, once created for SMEs, has been adapted and made validly applicable to TTOs.

There appear to be two distinctive outcomes of PROGRESS-TT in the delivery of capacity building actions to TTOs. One is the idea that effectiveness implies focus and improvement can only become possible if the efforts, both of the mentor and of the TTO, concentrate around critical dimensions, as opposed to framing the intervention more disperse. This led to identify bottom up some critical areas of focus (CAFs).

The second relevant outcome is about using case studies to supply the mentor and the TTOs, even beyond PROGRESS-TT, with a variety of useful materials that, clustered around the single CAFs, become the knowledge platform that should ensure consistency in the individual actions. Moreover, away from the one-model-fits-all approach, the wealth of cases studies is aimed at allowing each TTO to identify itself with other experiences, rather than passively benchmarking with superb, but unmatchable, examples.

It is around one of the CAFs—and particularly that concerning access to finance—that Federico Munari and Laura Toschi in their chapter explain the interface between technology transfer and financial channels that can be accessed to support the maturation and the evolution of the technology towards the market. Relying on their previous studies, the authors provide a fresh insight on how universities try to fund the gap between early stage results and the market, and the experience of proof-of-concept and accelerator programs.

A final section of the book hosts a sample of cases studies, selected for critical area of focus by Marcello Torrisi, and a contribution by one of the mentors of PROGRESS-TT (Tom Flanagan) with his mentee (Elke Piessens), that kindly volunteered to make their experience available in delivering capacity building under the new methodology and using the knowledge platform of PROGRESS-TT and its cases studies.

For the sake of clarity, by no means the section with case studies has the ambition to be complete and exhaustive; it is only there to give tangible example of an experiment that so far seems to be promising in giving content to capacity building and laying the premises for a European way of technology transfer that eventually goes beyond the usual narratives around TTOs and they (in-)capacity to be as performant as their non-European colleagues usually are.

Needless to say, it is not a single book that can deal exhaustively with all the many aspects related to capacity building in technology transfer. This is just one first step towards codifying knowledge and experiences and to try to identify the scientific background for capacity building. Although this book cannot—and it humbly declines to—be considered part of the foreground of PROGRESS-TT, it

nevertheless draws from many contributions and efforts of the project. The editors are grateful to the authors that gently accepted to contribute their chapters, even if sometimes not directly involved in the capacity building action, and to the members of the PROGRESS-TT consortium. Francesca Bonadei and Maria Cristina Acocella at Springer are gratefully acknowledged for their patience and their continued interest for innovative and challenging topics.

Part I

Current Status in Capacity Building

European Commission Initiatives Supporting Technology Transfer

Patrick McCutcheon

Abstract

Since the early 2000's the European Commission has supported technology transfer as a means to facilitate the transfer of knowledge to enhance innovation and the competitiveness of the EU economy. This support has taken a number of forms. Firstly the Commission has convened a number of groups of experts and issued a number of policy statements drawing attention to the importance of improving linkages between public researchers and industry and regulations and guidelines facilitating knowledge and technology transfer from the former to the latter. Secondly the Commission has funded a number of projects to improve the capacity of public research organisations and higher education institutes performing research to engage in more technology transfer. Finally the Commission has, through its funding programme Horizon 2020 and its rules for participation; respectively created instruments to fund and finance technology transfer and facilitated the claiming of patent costs as eligible costs in its framework research programmes.

See <https://ec.europa.eu/programmes/horizon2020/>.

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1 Political and Policy Framework on Knowledge and Technology Transfer

In various policy statements, the Commission has frequently addressed technology transfer (TT) through the broader lens of knowledge transfer (KT) where the latter is considered to include the former as well as other vectors whereby knowledge is transferred from one sector to the other. The other vectors are mobility of researchers and different forms of collaboration including collaboration agreements as well as contract research and consultancy.

1.1 Expert Groups

In the context of European Research Area activities aimed at implementing the 3% action plan,¹ the Commission convened a group of experts to draw up a set of recommendations regarding the management of intellectual property in publicly-funded research organisations which could serve as a basis for the development of European guidelines. The report of this group identified many of the issues that have been addressed by subsequent initiatives described below.

In their report in 2004² the experts identified the processes, good practices and the implications of a more active involvement in the innovation process and interaction with industry and the creation of new companies. The experts reviewed the KT processes and their evolution from an “Open Science” and a “Licensing Model” to the emergence of the “Innovation Model”, whereby the Licensing Model, is supplemented by a more active policy of collaborative research with industry, in particular through EC Framework Programmes (FP), and by a pro-active involvement in the creation of spinout companies. One of the main recommendations of the Group was that the adoption of the Innovation Model by European Public Research Organisations (PROs) should be encouraged as the most effective way to produce significant socioeconomic benefits at European level from publicly funded research results.

The report addressed some of the practical issues faced by PROs when negotiating collaborative research and consortium agreements with industry and made some recommendations including that mutually acceptable guidelines be developed by common agreement between representative associations of industry and PROs to facilitate and expand collaborative research opportunities. Whereas the group submitted a tentative set of guidelines on collaborative research addressing the issues of ownership, use rights, access to background, management of IPR and

¹In the context of the EU’s Lisbon strategy, the European Council set an objective to raise overall R&D investment to 3% of GDP by 2010.

²<http://ec.europa.eu/research/era/pdf/iprmanagementguidelines-report.pdf>.

³<http://www.desca-2020.eu/about-desca/what-is-desca/#>.

⁴<http://www.desca-2020.eu/latest-version-of-desca/desca-2020-version-12/>.

compensation is submitted as a starting point, this work was carried further by a specific project DESCA.³

DESCA 2020 (Development of a Simplified Consortium Agreement) is a comprehensive Model Consortium Agreement for Horizon 2020. The latest version dates from February 2016.⁴ It was initiated by key stakeholders in the EC's 7th Framework Programme for Research and updated for its successor programme Horizon 2020 in consultation with the Research community. DESCA offers a reliable frame of reference for project consortia and enjoys broad support within the FP community.

The Group also recommended that the involvement of PROs in the creation of sustainable spinout companies be further encouraged at European level by a number of public policies and support, including downstream support for these companies after they have left the nurturing environment of a PRO. The group was of the view that the missions of the Knowledge Transfer Office (KTO) must be very well defined and the objectives must be realistic and both must be unequivocally endorsed by the PRO management and supported by the researchers and must be communicated and explained to all the parties involved, industry, government and the public.

Whereas the previously described group of experts was convened by the Commission, the European Council in 2003 called for the Open Method of Coordination (OMC)⁵ to be applied to research policy under the aegis of the Committee for Scientific and Technical Research (CREST) which regrouped into different themes 25 recommendations of the 3% Action Plan⁶ where OMC could be applied. The expert group convened on the topic in its report *"Encourage the reform of public research centres and universities, in particular to promote transfer of knowledge to society and industry"*,⁷ recommended in its report in 2006 reform of public research centres and universities to promote KT.

Their core message was to integrate demand driven approaches into the planning of research activities as well as into the redefinition of the operational management of the organisation. To enable more efficient contribution to the innovation process, the expert group recommended that universities should see knowledge transfer as an important mission and entrust the management of this set of activities to a professional, well organised and well supported, knowledge transfer unit with a proper knowledge transfer infrastructure and a system of performance assessment.

As KT is not a self-sustaining activity in the early stages it requires dedicated funding. Since successful knowledge transfer cannot be achieved without the cooperation of individual researchers, the expert group recommended that there

⁵OMC is a soft governance tool, agreed between MS at the Lisbon European Council in March 2000 as an instrument for coordinating national policies by collectively defining objectives and indicators in specific areas. The OMC aimed at ensuring satisfactory progress in policy areas that are primarily within MS competence, involving an exchange of information and best practice, fixing European guidelines and translating them into national and regional policies, establishing indicators and benchmarks, periodic monitoring, evaluation and peer review organised as mutual learning processes.

⁶http://ec.europa.eu/invest-in-research/action/2003_actionplan_en.htm.

⁷http://ec.europa.eu/invest-in-research/pdf/download_en/final_crest_report_march2006.pdf.