

## PREFACE

Universities and public research institutes play a key role in enabling the application of scientific breakthroughs and innovations in the marketplace or by government organizations. Their present and potential future contribution to the production and application of knowledge to innovation is undeniable.

To further leverage this role, many countries – developed and developing alike – have implemented national strategies to support the application or commercialization of knowledge produced by public research organizations. In addition, individual universities and public research institutes have introduced practices to support these activities, for instance, by including knowledge transfer to promote innovation as a core part of their mission.

As a result, a vital question for policymakers – and the enquiry of this book – is how to improve the efficiency of these knowledge transfer practices to help maximize innovation-driven growth and/or to seek practical solutions to critical societal challenges.

Unfortunately, it is not straightforward for policymakers or knowledge transfer practitioners to access information on what works and what does not. Countries and institutions have garnered substantial experience with diverse approaches. Yet this information has not been distilled in a way that can provide policy guidance for specific sectors or for countries at varying levels of economic development.

With this in mind, the book pursued the following three objectives:

- to develop a conceptual framework to evaluate knowledge transfer practices and outcomes
- to improve knowledge transfer metrics, surveys, and evaluation frameworks, resulting in a standardized method to assess national or institutional strategies in an internationally comparable way
- to generate findings on what works and what does not, and to propose related policy lessons.

In pursuit of these objectives, we, as the editors of this book, laid particular emphasis on three important realities.

Number one: Public–private knowledge transfer occurs through a large number of formal channels, such as licensing intellectual property (IP), contract research, and contracting, as well as through informal channels, such as the sharing of research results via personal contacts or by “open science” methods, including conferences and publications. It is important to avoid casting these channels in a mutually exclusive way. Indeed, the many forms and facets of these two channels are often not in contradiction; they have fuzzy boundaries in many cases, and they can be complementary and mutually reinforcing.

Number two: Mirroring the above point, policy options are also more numerous and less binary than implied by commentaries that either focus single-mindedly on knowledge transfer policies based on IP as the only way forward or caution that the formalization of knowledge transfer – and, to some extent, the privatization of the application of knowledge – are serious threats to the functioning of a science system based on the free flow of knowledge. In reality, institutions and countries do not have to choose between these two opposites or two radically distinct policy options. Many nuanced policy approaches are possible.

Number three: No country or institution has yet to uncover the ultimate law or tool that provides a silver bullet for achieving effective knowledge transfer to potential users. Economies and institutions worldwide still have untapped potential to better harness the role of public research for innovation. Knowledge of possible relevance to critical topics such as food security, climate change, or health remains tied to books, journals, and the scientific realm without making sufficient impact on innovation and the realities around us. Much of this knowledge may not be being used for other reasons, for example, because the right regulatory systems are not in place or because multiple other complementary activities are needed before it can be put to use. But the potential is clearly there. This is a source of frustration but, first and foremost, also of important hope for the years to come as we get better at making public research more useful to economies and societies worldwide.

These three points are recurrent themes that underlie this book. They also make the topic of this book timely and particularly important.

Many institutions and individuals deserve thanks for their contributions. The main trigger for this book was a discussion and agreement in 2016 among the then minister of the Ministry of Science and Technology

of the People's Republic of China (MOST), Wan Gang, and WIPO's director general, Francis Gurry, that more international work is needed in the field of knowledge transfer practices.

Under the minister of MOST, Wang Zhigang, this book's work with respect to China and a workshop were subsequently financially supported and coordinated by Lin Xin, DG, Zhang Jiejun, (Deputy Director General, DDG), Sun Yongjian (former DDG), and Zhang Bingqing (DDG), all from the Department of Policy, Regulation, and Innovation System within MOST.

For their steady support to this the project, we are also indebted to the Chinese Academy of Science and Technology for Development (CASTED) and its President Hu Zhijian. In particular, we thank Chen Baoming, DDG, and Juan Yang, who was supported by CASTED to work as a WIPO fellow for more than a year on this project, and the staff of the CASTED Institute of Comprehensive Development.

In addition, there are many individuals and other organizations to thank for their help with this book – too many to list. First and foremost, special thanks go to the outstanding authors of the country studies that accompanied this project for close to four years. It is rare to be able to work with such an outstanding cast of academics from Asia, Europe, and Latin America. This rollcall was complemented by notable experts from IP offices, by knowledge transfer practitioners, and by leading policy-makers. Particular thanks to the South African National IP Management Office, the IP Office of the United Kingdom, and the Korean IP Office, as well as the Brazilian Ministry of Science, Technology, Innovations, and Communications. Rosa Fernandez at the Department for Business, Energy, & Industrial Strategy, Adrian Day, Lorena Rivera León, and Antanina Garanasvili provided data and analysis for Chapter 1.

We would also like to thank all participants for their contributions to two associated workshops on the International Comparison of Knowledge Transfer Policies and Practices. The first was held with MOST and CASTED in Beijing, July 2016, and the second at the United Nations University, Maastricht Economic and Social Research Institute, on Innovation and Technology (UNU-MERIT) in March 2017.

This collaboration also showed that knowledge can flow in all directions. While high-income economies and their institutions have extensive experience with knowledge transfer policies and practices, many new experiences are emerging in middle-income economies such as Brazil, China, India, and others. These innovative experiences are a possible source of learning for all other countries.

Thanks for substantive comments go to the editorial advisory board of this book series, Mark Wu, Megan Macgarvie, and Beth Webster, as well as the academic reviewers of this project, Fabio Montobbio and Bhaven Sampat, and also to Carsten Fink, WIPO's chief economist.

Excellent editing was provided by Tobias Boyd, then at WIPO. The project management support and oversight by Charlotte Beauchamp, Head of Publications and Design at WIPO is acknowledged with thanks.

We hope that this book will open a window to future work assessing the diversity of knowledge transfer policies and practices. Its purpose is to lay the groundwork for future empirical work, for the development of appropriate metrics, and for crafting new innovation policy approaches. Ideally, the survey and evaluation framework can also be deployed by WIPO or by other organizations to yield comparable data from multiple countries over time.

*Anthony Arundel, Suma Athreye, and Sacha Wunsch-Vincent  
Maastricht, Southend-on-Sea, and Geneva*