## GLOBAL CHALLENGES FOR INNOVATION IN MINING INDUSTRIES

People have been digging in the ground for useful minerals for thousands of years. Mineral materials are the foundation of modern industrial society. As the global population grows and standards of living in emerging and developing countries rises, the demand for mineral products is increasing. Mining ensures that we have an adequate supply of the raw materials to produce all the components of modern life, and at competitive prices. Innovation is central to meeting the diverse challenges faced by the mining industry. It is critical for developing techniques for finding new deposits of minerals, enabling us to recover increasing amounts of minerals from the ground in a cost-effective manner, and ensuring it this is done in a way that is environmentally responsible. This book provides the first in-depth global analysis of the innovation ecosystem in the mining sector. This book is Open Access.

ALICA DALY is an experienced IP professional, currently working as a Senior Policy Officer in the Division of Artificial Intelligence Policy of the World Intellectual Property Organization (WIPO). Prior to her time at WIPO, she spent ten years working at IP Australia. Her most recent position there was as its first Head of Patent Analytics. During this time, she was responsible for co-authoring a number of reports published by the Patent Analytics Hub.

DAVID HUMPHREYS is an Honorary Lecturer at the University of Dundee, Scotland, and former Chief Economist at Norilsk Nickel and Rio Tinto. David has written and lectured extensively on the economics of the mining industry, authoring over 200 articles and papers on subjects ranging from commodity markets, trends in the mining sector, resource availability, sustainable development, Russian mining and the impact of China on mining, to national minerals policy.

JULIO D. RAFFO is Head of the Innovation Economics Section at the Department for Economics and Data Analytics of the World Intellectual Property Organization (WIPO). His research interests include the economics and metrics of innovation and intellectual property, with a particular focus on their intersection with socioeconomic development.

GIULIA VALACCHI is based in the Department for Economics and Data Analytics of the World Intellectual Property Organization (WIPO). Before joining WIPO, she worked for the Centre of International Environmental Studies as a Research Assistant in the Sinergia Project. Her research interests include innovation, technology diffusion, climate change and environmental economics.

# INTELLECTUAL PROPERTY, INNOVATION AND ECONOMIC DEVELOPMENT

Intellectual property is at the heart of modern economic life. In many countries, investment in intangible assets is growing faster than investment in tangible assets. Policy makers – whether in rich or poor economies – seek to promote an intellectual property framework that is conducive to innovation and economic growth.

The series Intellectual Property, Innovation, and Economic Development intends to inform such policy initiatives through rigorous scholarship. Each book in the series examines a major aspect of the interface between IP, innovation, and economic development. Economic analysis is complemented by contributions from other academic disciplines to present the latest scholarship and consider its real-world implications. The series builds on studies by the World Intellectual Property Organization, reflecting the research interests of the international policy-making community.

#### Series Editor

Carsten Fink, Chief Economist, World Intellectual Property Organization

#### Books in the Series

- The Informal Economy in Developing Nations Hidden Engine of Innovation? Edited by Erika Kraemer-Mbula and Sacha Wunsch-Vincent
- The International Mobility of Talent and Innovation New Evidence and Policy Implications Edited by Carsten Fink and Ernest Miguelez
- Harnessing Public Research for Innovation in the 21st Century Edited by Anthony Arundel, Suma, Athreye and Sacha Wunsch-Vincent
- Global Challenges for Innovation in Mining Industries Edited by Alica Daly, David Humphreys, Julio D. Raffo and Giulia Valacchi

# GLOBAL CHALLENGES FOR INNOVATION IN MINING INDUSTRIES

### Edited by

#### ALICA DALY

World Intellectual Property Organization

#### DAVID HUMPHREYS

University of Dundee

JULIO D. RAFFO

World Intellectual Property Organization

#### GIULIA VALACCHI

World Intellectual Property Organization



# **CAMBRIDGE**UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom
One Liberty Plaza, 20th Floor, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025. India

79 Anson Road, #06-04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781108842785
DOI: 10.1017/9781108904209

© World Intellectual Property Organisation 2022

This work is in copyright. It is subject to statutory exceptions and to the provisions of relevant licensing agreements; with the exception of the Creative Commons version the link for which is provided below, no reproduction of any part of this work may take place without the written permission of Cambridge University Press.

An online version of this work is published at doi.org/10.1017/9781108904209 under a Creative Commons Open Access license CC-BY-NC-ND 4.0 which permits re-use, distribution and reproduction in any medium for non-commercial purposes providing appropriate credit to the original work is given. You may not distribute derivative works without permission. To view a copy of this license, visit https://creativecommons.org/licenses/by-nc-nd/4.0

All versions of this work may contain content reproduced under license from third parties.

Permission to reproduce this third-party content must be obtained from these third-parties directly.

When citing this work, please include a reference to the DOI 10.1017/9781108904209

First published 2022

A catalogue record for this publication is available from the British Library.

ISBN 978-1-108-84278-5 Hardback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.