

China's Innovation Challenge

The miracle growth of the Chinese economy has decreased from a compound annual growth rate of 10 percent to less than 7 percent by 2015. The two engines of growth – export on a scale never before witnessed and massive infrastructure investments – are reaching the point of diminishing returns. This poses the central question explored in this book – can China escape the middle-income trap? Assuming current political arrangements remain unchanged and that it does not or cannot adopt Western sociopolitical economic regimes, can China develop an indigenous growth model centered on innovation?

This compilation gathers leading Chinese and international scholars to consider the daunting challenges and complexities of building an innovation-driven Chinese growth model. Providing several comprehensive perspectives, it examines key areas such as the institutional system, technology, sociocultural forces, and national policy. The analyses and their conclusions range from strong optimism to deep pessimism about China's future.

ARIE Y. LEWIN is Professor Emeritus of Strategy and International Business at Duke University, and Editor-in-Chief of the journal *Management and Organization Review* as well as Distinguished Visiting Professor at Shanghai Jiao Tong University. His research focuses on organization adaption and renewal, co-evolution, and the globalization of innovation.

MARTIN KENNEY is a professor at the University of California, Davis, and Senior Project Director at the Berkeley Roundtable on the International Economy. His research focuses on entrepreneurship, venture capital, innovation, and university–industry relations in Silicon Valley and East Asia.

JOHANN PETER MURMANN is Professor of Strategic Management at the Australian Graduate School of Management, part of the UNSW Australia Business School. He is a senior editor of the journal *Management and Organization Review*. His research focuses on the role of innovation in the development of industries.

Cambridge University Press
978-1-107-12712-8 — China's Innovation Challenge
Edited by Arie Y. Lewin , Martin Kenney , Johann Peter Murmann
Frontmatter
[More Information](#)

China's Innovation Challenge

Overcoming the Middle-Income Trap

Edited by
ARIE Y. LEWIN
MARTIN KENNEY
JOHANN PETER MURMANN



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
978-1-107-12712-8 — China's Innovation Challenge
Edited by Arie Y. Lewin, Martin Kenney, Johann Peter Murmann
Frontmatter
[More Information](#)

CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

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/9781107566293

© Cambridge University Press 2016

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2016

A catalog record for this publication is available from the British Library

Library of Congress Cataloging in Publication data

Lewin, Arie Y., 1935– editor. | Kenney, Martin, editor. | Murmann, Johann Peter, 1967– editor.

China's innovation challenge : overcoming the middle-income trap / edited by Arie Y. Lewin, Martin Kenney, Johann Peter Murmann.

Cambridge, United Kingdom : Cambridge University Press, 2016.

LCCN 2015047143 | ISBN 9781107127128 (hardback)

LCSH: Technological innovations – Economic aspects – China. | Economic development – China. | China – Economic policy. | China – Economic conditions. | BISAC: BUSINESS & ECONOMICS / International / General.

LCC HC430.T4 C4637 2016 | DDC 338.951–dc23

LC record available at <http://lcn.loc.gov/2015047143>

ISBN 978-1-107-12712-8 Hardback

ISBN 978-1-107-56629-3 Paperback

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.

Contents

<i>List of figures</i>	<i>page</i> vii
<i>List of tables</i>	ix
<i>List of contributors</i>	x
<i>Preface</i>	xvii
1 China's innovation challenge: an introduction ARIE Y. LEWIN, MARTIN KENNEY, AND JOHANN PETER MURMANN	1
2 New structural economics: the future of the Chinese economy JUSTIN YIFU LIN	32
3 Impact of China's invisible societal forces on its intended evolution GORDON REDDING	56
4 The road ahead for China: implications from South Korea's experience MICHAEL A. WITT	87
5 Innovation and technological specialization of Chinese industry KEUN LEE	108
6 China's political economy: prospects for technological innovation-based growth DOUGLAS B. FULLER	121
7 Transforming China's IP system to stimulate innovation MENITA LIU CHENG AND CAN HUANG	152
8 Building the innovation capacity of SMEs in China JOHN CHILD	189

9	Who benefits when MNEs partner with local enterprises in China? SIMON C. COLLINSON	219
10	Advantages and challenges for Chinese MNEs in global competition YVES DOZ AND KEELEY WILSON	248
11	Emerging trends in global sourcing of innovation SILVIA MASSINI, KEREN CASPIN-WAGNER, AND ELIZA CHILIMONIUK-PRZEZDZIECKA	267
12	Why is China failing to leapfrog India's IT outsourcing industry? WEIDONG XIA, MARY ANN VON GLINOW, AND YINGXIA LI	298
13	Barriers to organizational creativity in Chinese companies ZHI-XUE ZHANG AND WEIGUO ZHONG	339
14	Institutional and cultural contexts of creativity and innovation in China CHI-YUE CHIU, SHYHNAN LIOU, AND LETTY Y.-Y. KWAN	368
15	Reframing research for cross-cultural management ROSALIE L. TUNG	394
16	China's innovation challenge: concluding reflections ARIE Y. LEWIN, MARTIN KENNEY, AND JOHANN PETER MURMANN	418
	<i>Bibliography</i>	426
	<i>Index</i>	469

For further information on the project, please see:
<http://chinas-innovation-challenge.news>
<http://www.facebook.com/china.innovation.challenge/>

Figures

1.1 USPTO utility patents granted for selected countries (1963–2014)	<i>page 7</i>
1.2 Chinese government funding for R&D in universities and research institutes (in billions of yuan) (2004–2013)	9
1.3 Domestic S&T papers by higher education, and Chinese S&T papers published in international journals and indexed by SCI and EI (in thousands of papers) (2001–2013)	10
1.4 Bachelor's degrees awarded in natural sciences and engineering in the United States and various countries by year (2000–2010) (in thousands)	13
1.5 PhDs awarded in natural sciences and engineering in the United States and various countries by year (2000–2010)	14
3.1 Summary of findings from the World Values Surveys overlapped with development implications and religious or other identifying heritages	65
4.1 Per capita GDP and institutional quality for 166 economies (2013)	88
4.2 Business system model	93
4.3 A simplified representation of the Chinese business system	94
4.4 A simplified presentation of the Korean business system	97
4.5 Per capita GDP and democracy for 141 economies	100
5.1 Cycle time of technology shown in US patents by China and Korea/Taiwan	116
7.1 Invention patent applications for country office statistics (1995–2013)	155
7.2 Volume of patent applications (1995–2013)	169
7.3 Case volume of utility model patents examined by China's patent reexamination board (2000–2013)	174

9.1	Recombinations of location-specific and firm-specific assets leading to new ownership advantages	229
9.2	The respective innovation benefits for MNEs and their local partners in China	232
11.1	Location of service providers, by region, (a) 2007 and (b) 2012	274
11.2	Locations of R&D processes (2012) (top 15 locations, % of all locations)	274
11.3	Locations of engineering processes (2012) (top 15 locations, % of all locations)	275
11.4	Locations of product design (2012) (top 15 locations, % of all locations)	275
11.5	Evolution of offshoring processes in (a) India (1985–2012) and (b) China (1992–2012)	276
11.6	Number of researchers in selected countries (2000–2013)	280
11.7	Gross domestic expenditure on R&D in total (PPP dollars – current prices)	282
11.8	Gross domestic expenditure on R&D from foreign business enterprises (PPP dollars – current prices)	282
11.9	R&D intensity (GERD as % GDP) (2003 and 2013)	283
11.10	Company and other nonfederal funds for industrial R&D performed in China and India by majority-owned US foreign affiliates (in million USD)	283
11.11	Technology creation in China and India: dependence on developed economies	284
11.12	Patent applications filed under the Patent Cooperation Treaty by Chinese and Indian residents and non-residents (1990–2012)	285
11.13	Patent applications filed under the Patent Cooperation Treaty by countries in selected technologies – change in 2011 compared to 2003 (2003 = 100)	286
13.1	Comparisons between Jiangsu and Guangdong on innovation (patent application)	352
14.1	Four country clusters identified by the differences and similarities of six types of innovation outputs	371
14.2	Differences among the four clusters of countries in their performance on knowledge creation, knowledge impact, and knowledge diffusion based on GII-2013 data	373

Tables

5.1 US patents granted to selected countries (1981–2010)	<i>page</i> 113
7.1 China's gross national expenditure on R&D (GERD) and Government S&T Appropriation Fund Statistics (2004–2013)	160
7.2 Sources of university gross national expenditure on R&D (GERD) (2009–2013) (in CNY 100 million and percent)	161
7.3 Volume of university technology transfers (2003–2013)	162
7.4 Value of university technology transfers (2003–2013)	163
7.5 Statistics on patent invalidation (2008–2013)	172
7.6 Statistics on patent invalidation cases and resolution (2008–2011)	173
7.7 Utility model patent statistics on patent invalidation cases and distribution of outcomes (2000–2013)	174
9.1 Four types of firm-specific advantage	228
11.1 Sourcing models	269
11.2 Cooperation in innovation by enterprise manufacturing sector (average EU28) and company size (2010–2012) (in %)	272
11.3 Innovation systems and policies of India and China	278
11.4 Use of freelancers in China and India (data of one online marketplace for 2011–2013)	291
12.1 Evolution of global outsourcing	299
12.2 Model cities' three- to five-year goals and policies	309
13.1 Differences in factors related to entrepreneurial spirit across representative regions	350
13.2 Summary of Tencent and Huawei strategies aimed at developing innovation	361

Contributors

Keren Caspin-Wagner is a research associate at Duke University, USA, and Director of Research at ORN (Offshoring Research Network). Her research interests include open innovation and crowdsourcing, creativity and innovation, behavioral strategy, and entrepreneurship. Her current research is focused on the effects of online marketplaces for STEM (science, technology, engineering, and mathematics) talent on individuals, organizations, and society.

John Child is a professor of commerce at the Birmingham Business School, University of Birmingham, and is also a professor at Lingnan University College, Sun Yat-sen University, and the Plymouth Business School, University of Plymouth. He has been Editor-in-Chief of *Organization Studies* and a Senior Editor of *Management and Organization Studies*. His areas of research are organization studies and international business. He is currently working on the internationalization of small and medium-size enterprises (SMEs) and the negative social consequences of hierarchy.

Eliza Chilimoniuk-Przedziecka is an assistant professor at the Institute of International Economics, Warsaw School of Economics, Poland. Her research is focused on foreign direct investment as well as offshoring, and their effects in home and host economies. She regularly teaches International Economics in Warsaw School of Economics, Poland, and Offshoring from Business Perspective in Trier University, Germany.

Chi-Yue Chiu is Choh-Ming Li Professor of Psychology and Dean of Social Science at the Chinese University of Hong Kong. His current research focuses on cultures as knowledge traditions and the social-cognitive processes and evolution of social consensus. He is also interested in the dynamic interactions of cultural identification and cultural knowledge traditions and the implications of such interactions on cultural competence and intercultural relations.

Simon C. Collinson is the Dean of Birmingham Business School and Professor of International Business and Innovation at the University of Birmingham. He is a council member of the UK ESRC and sits on the executive board of the Chartered Association of Business Schools. His research spans the fields of regional systems of innovation, China, organizational complexity, and international comparisons of multinational enterprises. Until recently, he was a visiting professor at Zhejiang University, China.

Yves Doz is the Solvay Chaired Professor at INSEAD and a professor of strategic management. He has researched and published widely on the strategy and organization of multinational companies. His books include *The Multinational Mission*, with C.K. Prahalad, *From Global to Metanational*, with Jose Santos and Peter Williamson, *Fast Strategy*, with Mikko Kosonen, and most recently *Managing Global Innovation*, with Keeley Wilson. He is a Fellow of the Academy of Management, of the Academy of International Business, and of the Strategic Management Society.

Douglas B. Fuller is a Zhejiang Province One Thousand Talents Program Professor in the Department of Business Administration of Zhejiang University's School of Management. His research interests include technology policy, technology strategy, comparative political economy, East Asian politics, and international business. He has a book (forthcoming) – *Paper Tigers, Hidden Dragons* – on how China's uneven institutional terrain shapes firm and national technological trajectories.

Can Huang is a professor and co-director of the Institute for Intellectual Property Management at the School of Management, Zhejiang University, China. His research interests include innovation management, intellectual property rights, and science and technology policy. He was a senior research fellow at the United Nations University-MERIT in Maastricht, the Netherlands, and holds a PhD in Industrial Management from the University of Aveiro, Portugal, an MS in Engineering, and a BA in Economics from Renmin University of China.

Martin Kenney is a professor in Community and Regional Development at the University of California, Davis, and a senior project director at the Berkeley Roundtable on the International Economy.

His interests are in entrepreneurship, venture capital, innovation, university–industry relations, and the evolution of Silicon Valley. His books include *Biotechnology: The University-Industrial Complex* (1986), *Breakthrough Illusion* (1990), *Beyond Mass Production* (1993), *Understanding Silicon Valley* (2000), *Locating Global Advantage* (2004), and *Public Universities and Regional Growth* (2014). He has been a visiting professor at Cambridge, Hitotsubashi, Kobe, Osaka City, Stanford, and Tokyo universities and the Copenhagen Business School.

Letty Y.-Y. Kwan is a research assistant professor in the Department of Psychology at the Chinese University of Hong Kong. Her research focuses on how individuals perceive their own and others' cultures and the psychological implications of such perceptions. Her research explicates the different social functions of culture, specifically on trust relations and creative processes.

Keun Lee is a professor of economics at the Seoul National University. He obtained PhD degree from the University of California, Berkeley. He has been awarded the 2014 Schumpeter Prize for his monograph on Schumpeterian Analysis of Economic Catch-up by the International Schumpeter Society. He is also the president-elect of this Society.

Arie Y. Lewin is Professor Emeritus Strategy and International Business Duke University. He has been a visiting scholar at Hitotsubashi, Rotterdam School of Management, Uppsala Business School, St. Gallen University, and University of Manchester Business School. He is a Fellow Academy of International Business and has received the Inaugural Academy of Management Trail Blazer Award, the Academy of Management Distinguished Service Award. He was the founding editor of *Organization Science* and the editor-in-chief of the *Journal of International Business Studies* and presently is the editor-in-chief of *Management Organization Review*. His research focuses on organization adaptation and renewal, co-evolution and the globalization of innovation.

Yingxia Li is an associate professor at Beijing Union University. Her research is focused on project management in outsourcing context. She is a member of the Expert Council of the Occupational Skill Testing Authority of the Chinese Ministry of Human Resources and Social Security.

Justin Yifu Lin is a professor and honorary dean at the National School of Development, Peking University. He was the chief economist of the World Bank, 2008–2012, and founding director of the China Center for Economic Research (CCER) at Peking University. He is a corresponding fellow of the British Academy and a fellow of the Academy of Sciences for the Developing World.

Shyhnan Liou is an associate professor at the Institute of Creative Industry Design, National Cheng Kung University, Taiwan. His research interests are innovation, entrepreneurship, and organizational behavior.

Menita Liu Cheng is a post-doctoral research fellow at Zhejiang University School of Management's Institute for Intellectual Property Management in China. Her research interests include national technology and innovation policies and their effects on corporate strategies. She holds a PhD in business strategy from Peking University and a bachelor's in science from Purdue University. She is recognized as a distinguished international scholar by the PRC Government and was awarded a full scholarship for her research on corporate entities in China during her doctorate career.

Silvia Massini is a professor of economics and management of innovation at the Alliance Manchester Business School, University of Manchester, and a director of the Manchester Institute of Innovation Research. Her research focuses on adoption, adaptation, and diffusion of technological, organizational, and management innovations; dynamics of innovators and imitators; absorptive capacity routines and capabilities; intellectual property strategies; and global sourcing of innovation. She has published her research in such journals as *Research Policy*, *Organization Science*, *Journal of International Business Studies*, *Organization Studies*, *Regional Studies*, *Academy of Management Perspectives*, *Industry and Innovation*, and *Small Business Economics*. She is a senior editor of the journal *Management and Organization Review*.

Johann Peter Murmann is a professor of strategic management at the Australian Graduate School of Management UNSW Australia Business School. Earlier he was on the faculty of Northwestern University's Kellogg School of Management and has held visiting scholar positions at many universities around the world, such as the Wharton School, University of Pennsylvania, Harvard Business School, and Fudan

University. He is a senior editor of the journal *Management and Organization Review*. A key focus area in his research is the role of innovation in the development of industries. His book *Knowledge and Competitive Advantage: The Coevolution of Firms, Technology and National Institutions* received the 2004 Joseph Schumpeter Prize.

Gordon Redding is based in London as Visiting Professorial Fellow at University College London and is former director of the University of Hong Kong Business School, the INSEAD Euro-Asia Centre, and the HEAD Foundation, Singapore. His work has been mainly on the comparison of systems of capitalism, with a special interest in those of the Chinese. He is now working on a general theory of the role of education in societal progress. His work is within socio-economics, with a bias toward the inclusion of cultural influences.

Rosalie L. Tung is the Ming and Stella Wong Professor of International Business at the Beedie School of Business, Simon Fraser University. She also held the Wisconsin Distinguished Professorship at the University of Wisconsin and was on the faculty at the Wharton School. She served as the 2003–2004 President of the Academy of Management and is the 2015–2016 President of the Academy of International Business. She has published widely on the subjects of international management and organizational theory and is the author or editor of eleven books.

Dr. Mary Ann Von Glinow is the Knight Ridder Eminent Scholar Chair in International Management at Florida International University. A former President of both the Academy of Management and the Academy of International Business, her research has ranged from *U.S.-China Technology Transfer* (1990, Prentice Hall), to her current work on China's outsourcing software development industry to cross-cultural contexts, or polycontextuality. A Fellow of the Academy of Management, the Academy of International Business, and the Pan Pacific Business Association, she also serves on several animal welfare boards, and is on the Advisory Board of Volvo-Geely.

Keeley Wilson is a consultant and senior researcher in the strategy area at INSEAD, Fontainebleau. Her field of expertise is innovation and her research on global innovation focuses on optimizing innovation footprints, managing collaborative innovation, leveraging dispersed knowledge, establishing and integrating sites in China and India, and innovation regime change.

Michael A. Witt is a professor of Asian Business and Comparative Management at INSEAD. His area of specialty is international business and, in particular, comparative institutional analysis (national business systems, varieties of capitalism) and the impact of institutional differences on firm behavior and outcomes. He is the lead editor of the *Oxford Handbook of Asian Business Systems* (2014) and the editor-in-chief of *Asian Business & Management*, a major journal in the field.

Weidong Xia is Knight Ridder Research Fellow and Director of PhD Program in Healthcare Management and Information Systems in the College of Business Administration, Florida International University. Prior to that, he was on the faculty of the Carlson School of Management at the University of Minnesota. One of his research interests relates to organizational transformation and internationalization.

Zhi-Xue Zhang is a professor of organization and strategy and the director of the Center for Research in Behavioral Science at Guanghua School of Management, Peking University. He received his PhD in social psychology from the University of Hong Kong. Dr. Zhang's research interests include Chinese leadership, team process, negotiation, and conflict management. He has published papers in leading English and Chinese journals. He got the National Natural Science Funds for Distinguished Young Scholar of China in 2009, and received the Best Micro Paper Award from the International Association of Chinese Management Research in 2012. He is currently the senior editor of *Management and Organization Review*.

Weiguo Zhong is an assistant professor of Organization and Strategy at the Guanghua School of Management, Peking University. He received his PhD in strategy and marketing from the City University of Hong Kong. Dr. Zhong's research interests include technology innovation, interorganizational relationships, top management team dynamics, and internationalization strategy of firms from emerging markets. His papers have been published in scholarly journals and won several international recognitions such as Best Paper Awards from the Academy of Management and Emerald/IACMR Chinese Management Research Fund Award.

Preface

Technological Innovation to Play Decisive Role in Driving China's Economic Transformation

Premier Li Keqiang, Seminar on Sixtieth Anniversary of the Establishment of the Academic Division of the Chinese Academy of Sciences, July 28, 2015

The chapters in this volume originated at the Inaugural *Management and Organization Review* (MOR) Research Frontiers Conference held at the Hong Kong University of Science and Technology in December 2014. The guiding approach to this collection is the concern articulated eloquently by the World Bank and the Development Research Centers of the Chinese State Council in their joint 2013 report *China 2030*. The questions this book and its authors explore are whether China needs the massive social and political structural reforms that some authors believe are necessary or whether China can undertake a transition to continue its economic growth to become a wealthy nation using indigenous solutions that eschew reforms based on models adapted from developed countries. While there continues to be a debate about whether “middle-income traps” truly exist (Bulman, Eden, and Nguyen 2014), we accept the basic proposition that continuing significant economic growth represents a daunting challenge for China, as the portfolio of highly effective policies that created surplus labor in the rural economy that made China the manufacturing hub of the world, and created the resources for building infrastructure (roads, railroads, ports, airports, electric power, telecommunications, etc.), new cities, and massive residential housing projects, runs its course.

As China considers various combinations of policy options and reform initiatives, it is clear that it faces policy challenges at every level, from macroeconomics to invigorating new sources of innovation and growth, energizing technological upgrading of existing industrial and service sectors, exploiting and entering new industrial and service sectors, galvanizing a new culture of entrepreneurship and entrepreneurial startup companies, reforming higher education, decreasing debilitating institutional interdependencies, and dramatically lowering intra-economic

transaction costs, while improving its quality of life and expanding social welfare and health care and environmental sustainability.

Policy-makers and economists in China have been analyzing and evaluating lessons from earlier economic development experiences in Japan, Taiwan, Israel, and Korea and of the city-states of Singapore and Hong Kong. Although lessons can be learned, these experiences cannot be easily replicated by China. Founding conditions, history, sheer scale, and the government system raise serious questions as to their applicability in China. The chapters in this book explore the arguments as to why, why not, and how China might evolve a combination of economic development industrial and sociopolitical policies to continue and sustain its trajectory of development and avert the World Bank angst of not being able to escape the middle-income trap. What is unique about this book is its timely exploration of multifaceted elements of the China future economic development quandary. The book incorporates micro-organizational behavior, macro-organization and strategy, knowledge creation and innovation, and industrial policies, as well as the imprinting role of founding conditions and history.

The book frames a dialectic that contrasts two scenarios. The first, optimistic scenario argues that China can build ever-stronger innovation capability and catch up with the most advanced economies in the gross domestic product (GDP) per capita. The second, more pessimistic scenario makes the case that, without radical reforms, existing Chinese political and economic institutions will inexorably relegate China to the middle-income trap. These two scenarios structure the analyses and contributions in the book. It would be foolish to try to predict which of these scenarios will unfold in China over the next twenty years. The book, however, illuminates the hurdles China faces and what needs to be done to surmount them. We are certain that policy-makers are acutely aware that the “new normal” of slower economic development presents complex and difficult challenges that demand new ideas and new directions for change that can take Chinese firms and society beyond incremental improvements in quality and efficiency.

References

Bulman, David, Eden, Maya, and Nguyen, Ha. 2014. Transitioning from low-income growth to high-income growth: Is there a middle-income

Cambridge University Press
978-1-107-12712-8 — China's Innovation Challenge
Edited by Arie Y. Lewin , Martin Kenney , Johann Peter Murmann
Frontmatter
[More Information](#)

Preface

xix

trap? Policy Research Working Paper 7104. Washington, DC: World Bank.

World Bank & Development Research Center of the State Council, P. R. C. 2013. *China 2030: Building a Modern, Harmonious, and Creative Society*. Washington, DC: World Bank.