



PALGRAVE STUDIES OF
INTERNATIONALIZATION
IN EMERGING MARKETS



Huawei Goes Global

Volume I:
Made in China for the World

Edited by Wenxian Zhang
Ilan Alon · Christoph Lättemann

palgrave
macmillan

Palgrave Studies of Internationalization in Emerging Markets

Series Editors

Marin A. Marinov
Aalborg University
Aalborg, Denmark

Svetla T. Marinova
Aalborg University
Aalborg, Denmark

Emerging market nations such as Russia, Brazil, China, South Africa and India as well as Eastern European territories, are in the process of changes and growth that require specific study and attention. The international business strategies employed in these territories target new opportunities, the study of which provides scholars the opportunity to evolve international business theory.

Covering three main themes - international business, management and marketing –**Palgrave Studies of Internationalization in Emerging Markets** will encompass a multiplicity of topics. Examining the new ways in which firms from emerging economies develop and implement their internationalization strategy, as well as their management and marketing strategies, the series will encompass specific issues such as social entrepreneurship, operations and regional specifics of internationalization. Looking closer at the specifics underlying the development of emerging market nations and their firms, this series aims to shed light on the current and future issues associated with the challenges and opportunities offered by the varying contexts of emerging markets.

The book proposals for this series undergo a single blind peer review by three specialized highly respected established academics out of a pool of 28. The book proposal is sent to the reviewers that are selected based on its specific topic and content taking into consideration the geographic contextual specificity. The reviews with specific comments and recommendations are sent to the authors/editors of the perspectives publication who address them. Afterwards, the revised book proposal is evaluated by the Commissioning Editor of Palgrave Macmillan and Book Series Editor. The final manuscript is single blind peer reviewed. For more information on our peer review policy please see our website: <https://www.palgrave.com/gp/book-authors/your-career/early-career-researcher-hub/peer-review-process?countryChanged=true>

For information on how to submit a book proposal for inclusion in this series please contact Liz Barlow: liz.barlow@palgrave.com. For details on the book proposal process please visit our website: <https://www.palgrave.com/gp/book-authors/publishing-guidelines/submit-a-proposal>

More information about this series at
<https://www.palgrave.com/gp/series/15456>

Wenxian Zhang • Ilan Alon
Christoph Lattemann
Editors

Huawei Goes Global

Volume I: Made in China
for the World

palgrave
macmillan

Editors

Wenxian Zhang
Rollins College
Winter Park, FL, USA

Ilan Alon
University of Agder
Kristiansand, Norway

Christoph Lattemann
Jacobs University
Bremen, Germany

ISSN 2662-1185

ISSN 2662-1193 (electronic)

Palgrave Studies of Internationalization in Emerging Markets

ISBN 978-3-030-47563-5

ISBN 978-3-030-47564-2 (eBook)

<https://doi.org/10.1007/978-3-030-47564-2>

© The Editor(s) (if applicable) and The Author(s), under exclusive licence to Springer Nature Switzerland AG 2020

This work is subject to copyright. All rights are solely and exclusively licenced by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Cover illustration: Getty / Esra Sen Kula

This Palgrave Macmillan imprint is published by the registered company Springer Nature Switzerland AG. The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

From Wenxian Zhang: To Karen, Michelle and Nathan.

From Ilan: To Anna, Kareen, Maya and Noa.

From Christoph Lattemann: To my parents Sieglind and Hermann.

Foreword

World-class companies by definition change the world in some ways. As the Chinese economy becomes the second largest in the world, a small number of Chinese companies such as Alibaba, Tencent, and Xiaomi have become world class. However, a few world-class companies around the world—and none from China—have changed the world to the same extent as Huawei has done.

What is Huawei? What does it do? How does it change the world? These brief questions can strategically summarize these two excellent volumes edited by Wenxian Zhang, Ilan Alon, and Christoph Lattemann. To invite so many scholars around the world and to edit and make sense of their research that deals with only one company are something I have never seen in my three decades of research.

One of the most insightful ways to understand any company, in my admittedly biased view, is to invoke a strategy tripod perspective, leveraging the industry-based, resource-based, and institution-based views. Huawei is an excellent example for a strategy tripod analysis.

From an industry-based view, Huawei's rise from the telecom equipment industry and its recent expansion into the consumer electronics industry can be analyzed from the changing industry dynamics associated with these industries. Some of the Vol. 1 chapters have focused on the fascinating dynamics associated with these two fast-moving industries.

From a resource-based view, the key to Huawei's global success is its development of overwhelming resources and capabilities. Volume 1 has a number of solid chapters on this crucial topic. In global competition, being good enough is not good enough. Given the liability of foreignness, how do world-class companies crack new foreign markets? The answer is to deploy overwhelming resources and capabilities—keyword being *overwhelming*. Imagine overwhelming resources and capabilities to be a lot of value (like pluses + + + +), and liability of foreignness to be some drawbacks (like minuses – – –). Then after offsetting the liability of foreignness (taking out the minuses), there is still a significant number of pluses centered on delivering superb value to customers. Although the U.S. government has banned Huawei from working on installing 5G telecom networks in the United States, governments from major allies such as Britain and Germany defend their decisions of allowing Huawei to do such work in their countries. While British and German governments have their own reservations about Huawei, the advantages that Huawei brings are simply overwhelming. No other firm in the world—and neither Ericsson nor Nokia, two European firms in their home markets (EU)—can deliver such an enviable combination of world-class performance and cost competitiveness.

The debate about Huawei among Western allies is a great example to invoke an institution-based view. From the early founding of The North Atlantic Treaty Organization (NATO) to the ongoing powwows of G7, the Western allies are supposed to have a united front dealing with the Eastern bloc. Both their formal alliance agreements and informal norms over lasting several decades have nurtured such a united front. They generally can find common ground, and disagreements have been papered over. However, it is amazing, surprising, or disturbing—depending on your point of view—to see one company alone has threatened such a united front. The United States has openly threatened Britain and Germany that if they choose Huawei, Britain will no longer enjoy unlimited privileges within the Five Eyes alliance (an intelligence-sharing alliance whose three other members are Australia, Canada, and New Zealand) and Germany within the Fourteen Eyes alliance (a more expansive version of Five Eyes). Other sanctions may be imposed as well. Is the emergence of Huawei worth undermining such precious and enduring allied relationships?

In its debate with allies concerning Huawei, the United States cannot beat something with nothing. As no viable U.S. competitor that can rival Huawei's world-class combination of high capabilities and low prices currently exists, the U.S. government has started entertaining directly investing in and controlling the only two remaining rivals, Ericsson and Nokia, and turning them into state-owned enterprises (SOEs) (like how General Motors [GM] was turned into a state-owned enterprise in the 2009 bailout). The thinking goes, in future negotiations with allied governments, it would be easier to push such U.S. SOEs (formerly Swedish-owned Ericsson and Finnish-owned Nokia)—similar to the way of pushing U.S.-made fighter jets—than to prevent allies governments from using Huawei but to present no viable offerings. In the absence of any expression of interest by the private shareholders of Ericsson and Nokia, the very thought of turning non-U.S. private firms into U.S. SOEs shows both outside-the-box creativity and pulling-out-one's-hair desperation—all triggered by Huawei. Which company can trigger such changes? Regardless of whether one likes or dislikes Huawei, everyone would agree it is a respectable force to reckon with globally.

From an institution-based view, Vol. 2 is devoted to how Huawei has changed—and will change—the rules of the game around the world. Everybody already knows how Huawei is changing the economic (and geopolitical) relationship between China and the United States. The example I give here is about how Huawei is challenging the geopolitical rules of the game governing *intra*-allied relationships among the Western allies. This example is too new to be captured by any chapter. However, this is unlikely to be Huawei's last chapter.

It is cliché to say world-class companies change the world. Another recent world-class disrupter that comes to mind is Uber. Again, a strategy tripod can help us dissect Uber's triumphs and frustrations. It is changing the dynamics of the taxi industry, it certainly has some overwhelming capabilities, and it is causing a lot of cities and countries around the world to change their rules of the game that regulate this industry. However, Uber probably will never be able to change the geopolitical relationship between countries. For the same reason, perhaps that is why I have not seen two volumes of penetrating chapters contributed by scholars worldwide focusing on Uber—or any other company. But

Huawei is different. Even among world-class giants, Huawei seems head and shoulders above the rest.

Lastly, I wish to congratulate Zhang, Alon, Lattemann, and their contributors. Among countless scholarly and news pieces on Huawei, their two volumes are head and shoulders above the rest in both breadth and depth. I highly recommend such world-class scholarship embodied in these two volumes.

Jindal Chair of Global Strategy,
University of Texas at Dallas
Author, *Global Strategy*, *Global Business* and *Global*

Mike W. Peng

Acknowledgments

The publication of *Huawei Goes Global: Made in China for the World* is the result of the collaborative efforts across the globe. Over 50 scholars with roots in five continents—Asia, America, Africa, Europe and Oceania—contributed to this collective undertaking, to whom we are most grateful for their intellectual contributions. Every research project like this requires enormous support and encouragement. We deeply appreciate the patience and good humor of our families, friends and colleagues. In addition, Liz Barlow and Sam Stocker of Palgrave Macmillan and Dr. Marin Marinov of Aalborg University, who have provided professional guidance and helped us move toward the final publication, also have our sincere gratitude. Finally, we would like to acknowledge the strong administrative support provided to this project by Dean Jennifer Cavanaugh of Rollins College.

Praise for *Huawei Goes Global*

“It is amazing from a librarian’s perspective to learn about the Chinese global enterprise Huawei from this well researched two volumes as written by knowledgeable scholars. In view of the current trade conflicts between the U.S. and China, as well as espionage and cybersecurity concerns pointed at Huawei, this scholarly publication about every aspects of Huawei will be a timely addition to all library collections and be eagerly awaited by their readers.”

—Dr. Hwa-Wei Lee, Retired former Chief of Asian Division, Library of Congress; Dean of Libraries Emeritus, Ohio University

*“The mystery surrounding Huawei is thick: Is it a private company, or is it an extension of the state? Is it a typical or atypical firm in the Chinese political and economic systems? Answering these questions is important for the international business community to understand not only Huawei, but also the Chinese business environment. However, due precisely to the lack of publicly available and verifiable information, studying Huawei remains a daunting task. The effort by Wenxian Zhang, Ilan Alon and Christoph Lattemann to edit the 2-volume book, *Huawei Goes Global: Made in China for the World* greatly contributes to fill the glaring gap and therefore is timely and much welcomed. The book critically examines Huawei’s rise and globalization, providing a valuable source for understanding this important and unique organization and its role in the global trade conflict and restructuring.”*

—Shaomin Li, Eminent Scholar and Professor, Old Dominion University Author of *Bribery and Corruption in Weak Institutional Environments*

“Perhaps no companies are more intriguing and mysterious than Huawei Technologies. It has developed from an unknown telecom company focusing on rural businesses in China to a global technology giant facing tremendous geopolitical uncertainty. Is Huawei similar to any other multinational corporation in developing its competitive advantages? Are existing theories in international business sufficient to explain Huawei’s global footprints and global challenges? Professors Zhang, Alon, and Lattemann have edited two timely volumes of studies written by scholars from political science and business to shed light on these questions. I highly recommend these

books to you. The diverse topics and approaches provide new perspectives much needed to understand international business and politics.”

—Dr. Jing Li, Associate Professor of International Business,
Beedie School of Business, Simon Fraser University

“Huawei Goes Global is a scholarly two-volume set, in the new Palgrave Studies of Internationalization in Emerging Economies series, which fills an important knowledge gap in the literature on the internationalization of Chinese enterprises in the midst of significant uncertainties. It provides both a specific in-depth view into the most successful Chinese telecommunications firm to come out of the Chinese economic rebirth, Huawei, and a broad-spectrum perspective on how Chinese firms, state-owned or not, internationalize and overcome global challenges. This scholarly effort sets a high standard for a deeper examination and understanding of the inner workings of Chinese global firms. Importantly, it asks and answers the essential question: what can we learn from the Chinese corporate strategy experience. Rarely is this question posed in the growing Western body of literature on Chinese corporate governance. This two-volume set proves an essential research tool not only to scholars, specialized academics, graduate students in various international business programs but also to public policy makers focused on a proper response to the China challenge and global executives.”

—John R McIntyre, PhD, Professor of International Management,
Founding Director, Georgia Tech Center for International
Business Education & Research, Atlanta, Georgia, USA

“This book offers a comprehensive description of the Chinese rush for innovation supremacy, through the extraordinary case of Huawei. The analysis of the strategic choices, growth paths and the conquered innovation capacity of Huawei, guides the reader in understanding the specificities of the internationalization processes of Chinese companies. It is a must-read book to understand the rush of China towards the 2049 goal of becoming a World leader for Innovation.”

—Dr. Francesca Spigarelli, Prof. of Applied Economics and Director of China
Center at University of Macerata; Vice Rector for European Research Policy
and Third Mission; Member of the Chinese Globalization Association

Contents

1	Introduction	1
	<i>Ilan Alon, Wenxian Zhang, and Christoph Lattemann</i>	
Part I	The Political Economy and the Public Policy Perspectives of Huawei's Globalization	11
2	The International Political Economy of Huawei's Global and Domestic Environment	13
	<i>Thomas D. Lairson</i>	
3	Weaponizing Globalization: Chinese High-Tech in the Crosshairs of Geopolitics	41
	<i>Francis Schortgen</i>	
4	Helping Hands for Huawei: Dialing into China's Technology Policy to Understand Its Contemporary Support for Huawei	65
	<i>Jean-Marc F. Blanchard</i>	

5	All Under Huawei: China's New Vision for a Tech Sinica	87
	<i>Shirley Ze Yu</i>	
Part II The Rise of Huawei as a Chinese Global Enterprise		115
6	A Strategic Assessment of Huawei into the Fast Future	117
	<i>Denise Tsang and David Luigi Fuschi</i>	
7	Huawei's Expansion into the Global South: A Path Toward Alternative Globalization?	147
	<i>Yun Wen</i>	
8	Analyzing Huawei as a Chinese Multinational Operating in Three Worlds: Domestic Policy Instrument, Global Economic Agent, and Foreign Policy Target	171
	<i>Duane Windsor</i>	
9	Huawei's Expansion and Nokia's Retreat: What Lessons Can We Learn?	195
	<i>Anders Kjellman, Xiaohua Yang, Xiaobo Wu, and Sun-Young Park</i>	
Part III Huawei's Development Strategies, Innovations, and Talent Management		223
10	Huawei's Long March to Global Leadership: Joint Innovation Strategy from the Periphery to the Center	225
	<i>Manuel Hensmans and Guangyan Liu</i>	

11 Huawei's Global Quest to Catch-up: An Atypical Approach in R&D Internationalization	247
<i>Kerstin J. Schaefer</i>	
12 Independent or Interdependent Innovation: The Case of Huawei	265
<i>Xingkun Liang and Yue Xu</i>	
13 Huawei at Bay? A View on Dependency Theory in the Information Age	291
<i>Laura Kirste and Dirk Holtbrügge</i>	
14 Managing Foreign High-end Talent at Huawei	309
<i>David W. Hall and Ting Ren</i>	
15 Final Reflections: Global Challenges from Innovation and Connectivity	327
<i>Christoph Lattemann, Ilan Alon, and Wenxian Zhang</i>	
Index	335

Notes on Contributors

Ilan Alon is Professor of Strategy and International Marketing at the University of Agder, Norway, and the editor-in-chief of the *International Journal of Emerging Markets* and *European Journal of International Management*. He is the President of the Chinese Globalization Association which runs an annual conference *China goes Global*. He has published over 100 peer-reviewed articles and 30 books, including *Chinese Culture, Organizational Behavior and International Business Management* (Palgrave 2003); *Chinese Economic Transition and International Marketing Strategy* (Palgrave 2003); *Business and Management Education in China: Transition, Pedagogy and Training* (World Scientific 2005); *The Globalization of Chinese Enterprises* (Palgrave 2008) and *China Rules: Globalization and Political Transformation* (Palgrave 2009).

Jean-Marc F. Blanchard is Founding Executive Director of the Mr. & Mrs. S.H. Wong Center for the Study of Multinational Corporations (USA) and distinguished professor, School of Advanced International and Area Studies, East China Normal University. He also serves as an editor of the “Palgrave Studies in Asia-Pacific Political Economy” series and is an editorial board member of several academic journals. He is a co-author of *Economic Statecraft and Foreign Policy* (Routledge 2015), the editor or co-editor of and a contributor to 17 edited volumes and journal

issues and the author of more than 60 articles, book chapters and other scholarly publications.

David Luigi Fuschi is Associate Professor of Applied Sciences at KiiT University, Project Management Professional (PMP), Projects in Controlled Environments (PRINCE2), Certified Development Project Manager (CDPM) certified chartered manager as well as a chartered engineer, Fellow of the Royal Society for the Encouragement of Arts, Manufactures and Commerce (RSA), Academic of the International Academy of Informatization (KZ), Deputy Director of Management and Business Academy (UK) and Director at BRIDGING Consulting Ltd. He has over 30 years' experience in R&D and Operation Management. He is a member of several advisory boards for charities and corporate, senior member of Institute of Electrical and Electronics Engineers (IEEE) and Association for Computing Machinery (ACM), Science, Technology, Engineering, and Mathematics (STEM) Ambassador, member of Project Management Institute (PMI), Institution of Engineering and Technology (IET), International Council on Systems Engineering (INCOSE), International Society for Technology in Education (ISTE), and International Society for the Systems Sciences (ISSS) and project expert for over 12 International Research Programs. He has successfully managed over 100 projects, rescued a dozen and acquired almost 100 million Euro funds.

David W. Hall holds an MBA from Peking University HSBC Business School. He is a finance senior manager at Walmart Inc. Previously, he worked for The Goldman Sachs Group Inc. and The Vanguard Group.

Manuel Hensmans is Associate Professor of Strategic Management & Innovation at the Solvay Brussels School of Economics and Management, Université libre de Bruxelles (ULB). His research focuses on questions of strategic and institutional transformation as applicable to European and Chinese organizations within a global innovation context. Hensmans' work has been published in journals such as *MIT Sloan Management Review*, *Organization Studies*, *Management International Review* and *Long Range Planning and Organization* as well as in various books and a massive open online course (MOOC) on innovation strategy.

Dirk Holtbrügge is professor and Head of the Department of International Management at the School of Business, Economics and Society, Friedrich-Alexander University of Erlangen-Nürnberg, Germany. His main research interests are in the areas of international management, human resource management and management in emerging markets. He has published 7 books, 8 edited volumes and more than 70 articles in refereed journals. He is also a member of the editorial boards of *International Journal of Cross Cultural Management*, *International Journal of Emerging Markets*, *Journal for East European Management Studies* and *Management International Review*.

Laura Kirste is a teaching and research associate and PhD candidate at the School of Business, Economics and Society, Friedrich-Alexander University of Erlangen-Nürnberg, Germany. Her main research interests are in the areas international and intercultural management.

Anders Kjellman is CEO of AKC Ltd. and lecturer at Novia University of Applied Sciences. He is the author of 11 books and numerous scientific articles on banking, entrepreneurship, innovation and change management. He has previously worked as professor at Hanken School of Economics and as the chairman of the European Investment Bank's activities in Africa, Asia and Latin America. He is working with disruptive innovation management and platform management.

Thomas D. Lairson is Professor Emeritus of Political Science at Rollins College. In 1994, Lairson was the first Ford Foundation Professor of International Relations in Hanoi and he has taught at universities in China and India. His courses and research focus on the political economy and security of China and Asia. With David Skidmore, he is author of *International Political Economy: The Struggle for Power and Wealth in a Globalizing World* (2017). Lairson is completing a book entitled *State Capitalism and Economic Growth in China*.

Christoph Lattemann is Professor of Business Administration and Information Management at Jacobs University Bremen. He is the Director of the Jacobs Center for the Research on China and Globalization, Vice-Director of the Confucius Institute Bremen and Vice President of

the Chinese Globalization Association. He was a visiting scholar at Harvard University and Stanford University, has published more than 150 scientific publications and 10 books, including *Cultural Distance in International Ventures* (Palgrave 2017) and *China Rules: Globalization and Political Transformation* (Palgrave 2009). He is serving as a senior editor for the *International Journal of Emerging Markets*.

Xingkun Liang is Assistant Professor of Information Management in the Department of Information Management at Peking University. Liang holds a PhD from the Department of Engineering, University of Cambridge. His research interests include organizational strategy and innovation, with a special focus on innovation ecosystems (in the Internet industry), public culture studies, informetrics-based knowledge discovery and empirical methods for library and information science. He has published several papers in leading Chinese and English journals, such as *Research Policy*, *Journal of the Association for Information Science and Technology*, and *Journal of Library Science in China*.

Guangyan Liu holds the PhD in Economics and Management Science from Université Libre de Bruxelles. His interest focuses on the theory and practice of multinational enterprises from China. His research has been published in the journal *Management International Review* as well as in various international business conference proceedings.

Sun-Young Park is associate professor at the School of Management and executive board member of the China Business Studies Initiatives of University of San Francisco. She conducts research and teaches courses on strategy, marketing, sustainable business models and corporate social responsibility. As a former management consultant for a leading multinational firm, she has advised global firms and national government agencies in Asia Pacific and the USA. She has also produced reports evaluating Texas State agencies' marketing programs.

Ting Ren is Associate Dean and associate professor at Peking University HSBC Business School. He holds a PhD in Human Resources and Industrial Relations from the Carlson School of Management, University of Minnesota. His research focuses on industrial organization, corporate

governance, human resources and labor studies. He has published broadly in world-class academic journals. His recent research involves the application of big data and smart robotization in organization and people studies. He has led numerous consulting projects in the Greater Bay Area for policy making and business practice. He also serves as advisor to both public and private sectors.

Kerstin J. Schaefer is a research fellow at the Institute of Economic and Cultural Geography at Leibniz University Hannover. Her research focuses on spatial patterns and the role of emerging economies in the creation of new technologies. She graduated from Justus Liebig University Giessen top of her class and finished her doctorate at Leibniz University Hannover in January 2020. During her graduate studies, she spent time at University of Wisconsin–Madison, University of California, Los Angeles, and Utrecht University, receiving scholarships from the Hessen-Wisconsin Program, the Fulbright Program and the German Academic Exchange Service, among others.

Francis Schortgen is associate professor and Chair of the Department of Political Science and International Studies at the University of Mount Union. His research interests include Chinese political economy and enterprise internationalization, China-US and China-North Korea relations, emerging markets, global competition and business strategy. Prior to earning his PhD in Political Science from Miami University (Ohio), he worked as a business consultant in South Korea. He also holds an MBA from the National University of Singapore, an MA in Asia-Pacific Studies from University of San Francisco and a BA in Political Science and History from Miami University (Ohio).

Denise Tsang is a member of the teaching faculty in the Department of Strategy and International Business, Henley Business School, UK. She has previously held visiting positions at the University of Bath, University of Manchester and Shandong University. She is a Certified Business and Management Educator with the Chartered Association of Business Schools in the UK. She was the lead editor of *Routledge Companion to International Management Education*. Her research interests include stra-

tegic issues within multinationals, creativity, institutions and knowledge-based capitalism on which she has written monographs and scientific publications.

Yun Wen is senior economist at Infinite-Sum Modeling Inc., an economic policy research company. Wen holds a PhD from the School of Communication at Simon Fraser University, Canada. Her research interests include international communication, information and communication technology industry, and technology and innovation policy. She has taught a variety of courses in the area of communication at Simon Fraser University and Columbia College, Vancouver. She is the author of the book *The Huawei Model: The Rise of China's Technology Giant* (University of Illinois Press 2020).

Duane Windsor is the Lynette S. Autrey Professor of Management at Rice University's Jesse H. Jones Graduate School of Business. He holds a PhD from Harvard University and a BA from Rice University. His research interests emphasize corporate social responsibility and business ethics, stakeholder theory, anti-corruption reform and sustainable business. A 2019 article in *Asia Pacific Business Review* addresses anti-corruption strategies of multinational enterprises in the Asia Pacific region.

Xiaobo Wu is Professor of Innovation and Strategic Management at the School of Management of Zhejiang University. He is honored as Chang Jiang Scholar Professor by Ministry of Education, China, for his outstanding achievements in innovation and entrepreneurship research and education. He is Director of the National Institute for Innovation Management and Academy of Global Zhejiang Entrepreneurs at Zhejiang University. Wu has been focusing on managing technological innovation and entrepreneurship, global manufacturing and network-based competitive strategy. He has been actively involved in management consulting and was advisor and board member of leading companies including Geely and Siemens China.

Yue Xu is Lecturer in International Business and Management at the Cardiff Business School. She holds a PhD from Cranfield School of Management with full scholarship. She also acts as concurrent visiting

scholar of Wolfson College of University of Cambridge (2012–2018). She promotes research that captures institutional complexities, changes and embeddedness in relation to strategic initiations, investment patterns and performance of emerging market (EM) enterprises. She has published on peer-reviewed journals including *European Journal of Marketing*, *International Business Review*, *Tourism Management*, and *Management and Organization Review* and several book chapters.

Xiaohua Yang is Professor of International Business and the Director of China Business Studies Initiative at University of San Francisco (USF). She has published numerous refereed journal articles on the topics of internationalization of firms, international R&D strategic alliances and corporate social responsibility in multinational corporations. She is a recipient of multiple best conference paper awards and three outstanding research awards from the USF School of Management. She has served as a guest editor of several top journals including *Asia Pacific Journal of Management* and *Business Ethics Quarterly*.

Shirley Ze Yu is a political economist, a senior visiting fellow with the London School of Economics (LSE), and an Asia fellow with the Ash Center of Harvard Kennedy School. She is a former national TV broadcaster, a seasoned global senior executive and board member. She is a frequent guest on the BBC News and a contributor to the *Financial Times*. She holds a PhD in Political Economy from China's Peking University and a Master's degree in Government from Harvard University. She has published three books in Chinese, including *On China, by Ambassadors* (Liaoning People's Press 2013) and *The Rise of the RMB and the Fall of the Yen* (Shanghai Sanlian Bookpress 2016).

Wenxian Zhang is professor at the College of Liberal Arts, Rollins College, Winter Park, Florida, and a recipient of the Cornell Distinguished Faculty Service Award, as well as Arthur Vining Davis Fellow. In addition to many articles on information studies, historical research and Chinese business management, his recent books include *China Visualized by Americans* (Peking University 2017), *China's Belt & Road Initiative: Changing the Rules of Globalization* (Palgrave 2018), *The Biographical Dictionary of New Chinese Entrepreneurs and Business Leaders* (Edward

Elgar 2009), *A Guide to the Top 100 Companies in China* (World Scientific 2010), *The Entrepreneurial and Business Elites of China: The Chinese Returnees Who Have Shaped Modern China* (Emerald Publishing 2011), and *China Through American Eyes: Early Depictions of the Chinese People and Culture in the US Print Media* (World Scientific 2018), which received the Best Research Award from the Chinese American Librarians Association.

List of Figures

Fig. 3.1	Huawei's R&D expenses, 2008–2018. (Source: Author compilation [from Huawei Annual Reports, 2008–2018])	53
Fig. 3.2	Global smartphone market share (%). (Source: Author compilation [from Counterpoint Research data])	55
Fig. 5.1	Global 5G declared patent families. (Source: Pohlmann 2019)	88
Fig. 5.2	Correlation between ICT investment and GDP growth. (Source: Qiang et al. 2009)	94
Fig. 5.3	Huawei's 5G Approval Status with BRI Countries. (Source: Author's own compilation based on open source before Jan 1, 2020. Note: "Ban" is defined by a clear official or public announcement which prohibits Huawei from the country's 5G networks. "No ban" is defined by an official or public announcement with clear expressions of not excluding (banning) Huawei from the country's 5G network. "No news" is defined by unavailability of official or public announcement on the country's decision on Huawei's 5G. "Suspension" is defined by an official or public announcement which states delay or suspension of the country's decision on Huawei's 5G)	95
Fig. 5.4	BRI and Huawei correlation by region. (Source: Author's own public news compilation as of Jan. 1, 2020. Note: Huawei's data are measured by the number of countries in the continent that have signed up to China's BRI and have officially and	

	publicly expressed that Huawei will not be banned from the countries' 5G market)	96
Fig. 5.5	Huawei's 5G status in Europe. (Source: Author's own compilation, March 1, 2020)	96
Fig. 5.6	GDP Per Capita by Region/Country Comparison through Industrial Revolutions. (Source: Bolt et al. Madison Project Database 2018)	106
Fig. 5.7	Global Welfare Disparity as a Function of the Industrial Revolution. (Source: Bolt et al. Madison Project Database 2018)	106
Fig. 6.1	A strategic analysis framework on Huawei. (Source: Authors)	120
Fig. 6.2	Globalization and the rise of Huawei. (Source: Huawei 2012, 2014, 2016, 2019c)	121
Fig. 6.3	Oracle's network era. (Source: Authors)	122
Fig. 6.4	Huawei as a facilitator in connection. (Source: Authors)	123
Fig. 8.1	Three worlds of Huawei	175
Fig. 9.1	The Six-M model and the growth of Huawei	202
Fig. 9.2	The Six-M model and Nokia: global growth followed by retreat, downsizing, sales of mobile phone parts to Microsoft, more M&As, layoffs, and lost value management	210
Fig. 12.1	Numbers of Huawei's partnerships with the top 50 operators worldwide. (Source: Compiled by the author based on Huawei Annual Report (2006–2014)	272
Fig. 12.2	Huawei's memberships in standards related organizations in recent years. (Source: Compiled by the author based on Huawei Annual Report (2006–2014)	274
Fig. 13.1	Amount of 5G patents of leading companies globally in 2019. (Source: Authors' illustration based on IPlytics 2019)	296
Fig. 14.1	Huawei's talent management pillars model	311
Fig. 14.2	Huawei talent management strategies	313
Fig. 14.3	Factors relating to talent utilization. (Notes: * $p < 0.10$, ** $p < 0.05$)	321

List of Tables

Table 2.1	Global market share (%): telecommunications equipment	23
Table 2.2	Huawei's main suppliers (2018, Q3 by revenue, RMB billion)	27
Table 2.3	Forecast Number of 5G Connections, millions	29
Table 3.1	Huawei's R&D commitment	52
Table 3.2	Geographic sales revenue, 2009–2018 (CNY million)	56
Table 5.1	Correlation of infrastructure development and economic growth	93
Table 5.2	Huawei's 5G status in Europe	102
Table 6.1	Huawei's R&D investments in the high-technology context, 2018	124
Table 6.2	Global smartphones competition	126
Table 10.1	Geographical, government, customer, and R&D Foundations	227
Table 10.2	Eight dynamic capability principles of joint innovation centers	231
Table 10.3	Huawei's and Vodafone's co-development of JIC capabilities	234
Table 11.1	Interview IDs	251
Table 11.2	Interviewee characteristics	252
Table 12.1	Some indicators of Huawei's R&D inputs and outputs in recent five years	278
Table 12.2	Huawei's Awards across Different Technological Domains in Recent Years (Selective)	282

xxx **List of Tables**

Table 14.1	Interview questions to sample group	315
Table 14.2	Recruiting strengths and weaknesses at Huawei	316
Table 14.3	Summary guide for foreigners at Huawei	320
Table 14.4	Correlations among retention factors	322



1

Introduction

Ilan Alon, Wenxian Zhang, and Christoph Lattemann

This book is Volume 1 of a two-volume book series on Huawei, one of the most enigmatic and talked about global firms. Huawei, a Chinese firm, is entangled with the US-China trade dispute, its own links to the Chinese government, and its role as a dominant global technology and telecommunications provider.

Huawei is a Chinese private information and communications technology (ICT) company; nevertheless, the founder's military past and

I. Alon (✉)

University of Agder, Kristiansand, Norway

e-mail: ilan.alon@uia.no

W. Zhang

Rollins College, Winter Park, FL, USA

e-mail: wzhang@rollins.edu

C. Lattemann

Jacobs University, Bremen, Germany

e-mail: c.lattemann@jacobs-university.de

former work network along with the initial role as supplier to the military telecommunications have constantly risen doubts about the actual role of the Chinese in Huawei's spectacular growth.

The first volume of our book is divided into three sections, consisting of 15 chapters, including this introduction and a conclusion chapter.

Part I. The Political Economy and the Public Policy Perspectives of Huawei's Globalization.

Part II. The Rise of Huawei as a Chinese Global Enterprise.

Part III. Huawei's Development Strategies, Innovations, and Talent Management.

1 Part I. The Political Economy and the Public Policy Perspectives of Huawei's Globalization

The first four chapters in Part I of this book introduce Huawei, its growth and role in the global competitive environment of technology and telecommunications. The company has achieved prominence in a relatively short time, and a market share rivaling its major Western counterparts.

In the first chapter, to set the context, Prof. Thomas D. Lairson, of Rollins College (USA) describes the political economy context in which Huawei operates. The struggle of Huawei and China with the USA is greatly affected by the nature of the political economy of China's domestic environment of state capitalism, by the deeply interdependent global system of political economy, and by the political economy of strategic interaction between China and the USA. His chapter examines each environment in terms of effects on Huawei and makes three arguments. First, Huawei succeeds due to the interaction of China's system of state capitalism with the global system of deep interdependence. Second, the system of deep interdependence is threatened by, but also pushes back against, the US strategy of economic coercion of China. Third, the global environment of deep interdependence will likely cause the USA to fail to change the Chinese system of state capitalism, Huawei will survive and prosper, and the USA will not improve its competitiveness through a

strategy of economic coercion of China. The chapter predicts a bleak outcome for the USA trade war on Huawei.

Dovetailing with Prof. Lairson's Chap. 2, Francis Schortgen, University of Mount Union (USA), focuses on how the USA has weaponized the tools of economic globalization for geopolitical purposes. His chapter aims to put the challenges facing Chinese technology companies as they aim for autonomy and supremacy in the area of emerging and competitiveness-influencing technologies in the broader context of US-China structural rivalry. Against the backdrop of the "Made in China 2025" blueprint as well as Beijing's "Next Generation Artificial Intelligence Development Plan," which aims to transform China into a global leader in artificial intelligence (AI) by 2030, the chapter begins by tracing Huawei's global ascent in the context of globalization, global competition, and national innovation policy. Next, it elucidates why, how, and to what extent geopolitical and geostrategic consideration have come to influence US reactions to the global ambitions of Chinese technology companies. As the intersection of geopolitics and quest technology leadership has brought the USA and China perilously close to the brink of a Technology Cold War that would have far-reaching implications for global technology development going forward, the chapter concludes that, unless and until the USA and China can find common ground through constructive cooperation in the realm of emerging technologies, Huawei and other Chinese tech companies are bound to squarely remain in the crosshairs of geopolitics.

Staying with political and policy implications, Jean-Marc F. Blanchard, Executive Director Mr. & Mrs. S.H. Wong Center for the Study of Multinational Corporations (USA), suggested that China has aided Huawei for many years, most visibly through multi-billion-dollar loans to support overseas investment, contracting, and sales activities. Recently, the government level of support has reached new heights as evidenced by the harsh tone of official Chinese media coverage of those that malign Huawei, the government's vigorous public defense of Huawei, and its threats and sanctions against countries and companies that make anti-Huawei moves. Chapter 4 shows that China's helping hand for Huawei has roots in its technology policy generally and telecommunications policy specifically, both of which are driven by powerful international and

domestic security, political, economic rationales that are long-standing, albeit fluctuating in importance. Given this, foreign governments and businesses should not expect China to hang up on Huawei absent compelling countervailing forces.

In Chap. 5, Shirley Ze Yu, Ash Center Fellow, the Harvard Kennedy School (USA) and Senior Visiting Fellow, the London School of Economics (UK), also agrees that Huawei's rise is part of a greater initiative of the government to build technological capabilities, linked to other global initiatives, such as the Belt and Road Initiative (BRI), which aims at building infrastructure connectivity through continental Eurasia and maritime Asia, the Middle East, and Africa. Physical infrastructure, such as rails and ports, represents the economic precipitators of the twentieth century. Digital infrastructure, primarily gauged by use of broadband and 5G networks, are symbols of economic impetus of the twenty-first century. Digital infrastructure building is a quintessential part of China's Belt and Road Initiative. Huawei is at the core and a prominent beneficiary of China's global geostrategic reordering through its Belt and Road Initiative.

The premise of Chap. 5 is that Huawei's global leadership in 5G infrastructure and China's ambition to lead a global cutting-edge technological standard for the first time in post-industrial world history are interwoven and one. Huawei is capable of covering the world with digital infrastructure powered by China, and as a result, amass data globally. Further, the leadership in 5G infrastructure provided by Huawei can empower the speed and amount of data collection. Therefore, it can fuel China's AI development to outcompete in the technological supremacy war with the USA, as China anticipates by 2030. Future global technology is led by AI technology, and AI development is conditioned upon 5G infrastructure. Lastly, as witnessed today, Huawei's 5G technology is fast expanding and is warmly accepted across a large part of the developing world. Most of these countries are run by non-full liberal regimes. Governments cite Huawei's censorship capability as a major attribute to contracting Huawei's 5G service. Therefore, Huawei's global expansion will spread China's philosophy of technology, an intrinsic part of China's modern political economic discourse under state capitalism, to all

countries under Huawei's coverage. Adopting Huawei's 5G network is to consent to China's technological philosophy.

What the first four chapters in Part I show is that understanding the rise of Huawei is partly understanding the rise of the Chinese economic and political model. Huawei global success and China's ascendancy in technological capabilities are, in fact, highly linked.

2 Part II. The Rise of Huawei as a Chinese Enterprise

Part II consists of four chapters with a more micro and meso view of Huawei and its analysis. Most of the chapters link the firm-specific capabilities to the state and its policies.

Chapter 6, by Denise Tsang, Henley Business School (UK), and David Fuschi, Kalinga Institute of Industrial Technology (India), assesses Huawei's strategy. The chapter explores the impact of the Trump administration's recent sanction on Huawei, introduces existing literature concerning the liability of foreignness and firm-specific advantages in relation to Huawei's circumstances, discusses the current company crisis within global geopolitical cross-currents, and evaluates the path Huawei can pursue to reconfigure its business model. Huawei has successfully globalized its operation over the decades and has moved from launching products and services that meet the needs of customers initially in emerging economies to successfully utilizing its experience and serving customers in advanced economies. Huawei has been forced to stand to fight for its survival for the first time in its corporate history; it will have to try its best, with little room for maneuver or error. What is known for sure is that Huawei has actively planned for crisis management, which is a characteristic of Chinese management, and it is clear that Huawei's Plan B has enabled it to prepare for the worst-case scenario.

Yun Wen, Senior Economist, Simon Fraser University (Canada) wrote Chap. 7 about Huawei's expansion to the developing world. This chapter combines the political economic approach and industrial studies of global information and communication technology (ICT) to examine the

motive, pattern, and implications of Huawei's expansion in the global South. Moving beyond the firm-specific perspective, this chapter draws particular attention to the state-firm relationship, as well as the geopolitical-economic tensions that underlie Huawei's internationalization. Amid the growing geo-technological rivalry between the USA and China, Huawei's increasing presence as a new source of investment and technological support in the global South exemplifies China's effort to extend the country's control over transnational network infrastructures and to reconstruct an alternative model of globalization toward a multi-polar political economic order in the digital economic era.

Chapter 8, written by Duane Windsor, Rice University (USA), analyzes the tripod effects of Huawei on domestic policy, global agency, and foreign policy. Windsor offers a three-world framework within which to evaluate Huawei Technologies Company as a Chinese multinational. In one world, Huawei is arguably a domestic policy instrument for the Chinese communist regime. In another world, Huawei is an independent global economic agent. In a third world, Huawei is a target of US foreign policy in the context of a trade war, technological competition, and geopolitical competition between the USA and China. Windsor's purpose is to explore how to interpret potentially conflicting information about Huawei and its founder and chief executive officer Ren Zhengfei. The three-world procedure helps to maintain a critical and balanced appraisal of this information. One possible interpretation is that Zhengfei and Huawei attempt to balance Chinese and US pressures in order to maintain autonomy.

In the final chapter of Part II, Chap. 9, Anders Kjellman, CEO of AKC Ltd. and Novia University of Applied Sciences (Finland), Xiaohua Yang, University of San Francisco (USA), Xiaobo Wu, Zhejiang University (China), and Sun-Young Park, University of San Francisco (USA), analyze Huawei in relation to one of its competitors, Nokia. The aim of their study is to compare the globalization strategy of current and former world giants in mobile phones and networks: Huawei and Nokia. To do that, a Six-M model is developed, which provides insights into classic strategic management questions: what makes a company successful and what makes a corporation fail? Disruptive innovation management of an emerging economy multinational (EMNE), Huawei is contrasted with

the retreat of Nokia. One lesson to be learned by managers is that customer focus, meaning, and value management are important factors behind success.

3 Part III. Huawei's Development Strategies, Innovations, and Talent Management

Part III, Chaps. 10 to 14, attempts to investigate Huawei from within, providing a more micro, fine-grained analysis of the company's strategies. The chapters particularly pay attention to the innovative, technological, and people dimensions of the company.

Manuel Hensman and Guangyan Liu of Solvay Brussels School of Economics and Management, ULB (Belgium) write Chap. 10 about the innovative strategies of the firm. The authors explore how Huawei transformed from a tiny telecom importer, considered a “bastard” of a business by the Chinese government, into a global leader in the telecommunications equipment industry and one of the leading smartphone vendors in the world—considered a dangerous misfit by the US government? In its effort to out-innovate established technology equipment suppliers from Europe and the USA, Huawei has aggressively pursued a strategy of joint innovation from the periphery to the center, first with Chinese customers and local governments, and later with leading European customers and governments. This chapter focuses on how Huawei developed its joint innovation strategy in the European Union, allowing it to emerge as a global leader after the Western and European financial crisis.

Chapter 11 by Kerstin J. Schaefer, Institute of Economic and Cultural Geography, Leibniz University Hannover (Germany), follow up on the specific R&D strategies of Huawei. In this chapter, Schaefer takes an in-depth look into Huawei's atypical R&D internationalization strategy to investigate the company's remarkably fast ascent in the telecommunications industry. She uses patent and interview material to examine the emergence of Huawei's offshore activities through the eyes of the R&D

experts the company hired abroad. The material covers eight of Huawei's biggest R&D locations in North America and Europe. The chapter explores the barriers for Huawei's internationalization, the hiring and management of offshore experts, as well as the internal and external cooperation between the employees in China and colleagues or project partners abroad. The chapter shows the importance of reputation, trust, and cultural understanding for managing transnational R&D activities.

Chapter 12, authored by Xingkun Liang, Peking University (China), and Yue Xu, Cardiff Business School (UK), explores the implications of latecomer arrivals for Huawei. Prior studies view interdependence as an important mechanism in achieving innovation through coordination and examined its impacts on innovations. However, it is still not clear how latecomer firms with limited innovation capabilities can strategically manage interdependence in order to catch up in global innovation competition. The authors propose an inductive case study based on a polar case of Huawei and retrieved its innovation history. Focusing on innovation processes, the study provides insights into how firms deliberately manage interdependence and independence. The results help conceptualize and characterize the meaning of interdependence in innovation literature. The chapter also draws implications for latecomer firms that need to shape their own specific approaches to manage interdependence in order to catch up with advanced movers.

Chapter 13 authored by Laura Kirste, Dirk Holtbrügge, and Friedrich-Alexander University of Erlangen-Nürnberg (Germany) evaluated the business-government relations of the firm and its relations to the security apparatus. Recently, allegations of espionage by the Chinese government through devices developed and manufactured by Huawei have emerged and escalated, especially in the USA. The technology used in the most recent smartphone and tablet models developed by Huawei have partly not yet become industry standard, giving the Chinese competitor an advantage in the market. However, the technological lead that Huawei has over other competitors in the telecommunication business has resulted in fear of espionage and cybersecurity-related concerns. This fear is both rooted in the lack of understanding of the technology incorporated in Huawei's devices and the somewhat opaque ties of the company to the Chinese government. Following the allegations, the USA imposed

a ban and added Huawei to the blacklist, which forces all American firms to suspend any business with Huawei without official permission. The most damaging reactions resulting from this ban is the cooperation between Google that supplies Huawei with their operating system Android, followed by Qualcomm's, Intel's, and ARM's boycott. As Huawei holds one of the largest market shares in the telecommunication business globally, this boycott seems grotesque from a business perspective. It seems that these companies are caught in a crossfire between governments, rendering them cue balls in an international trade war that apparently goes way beyond single businesses and their authorization. Building on Vernon's extension of dependency theory, the chapter aims to analyze the dynamic power asymmetries of governments and multinational corporations in the Huawei case. After a short overview of the recent events, the theoretical background is elaborated, followed by a deep analysis and discussion of the Huawei case, and contributing to the understanding of business-government relations in general.

At the most micro level, and at the center of any organizations are people, inventing, creating, and distributing knowledge. In Chap. 14, David W. Hall, Walmart Inc. (USA) and *Ting Ren*, Associate Dean, Peking University HSBC Business School (China), evaluate the management of foreign talent. The main objective of this chapter is to deliver a case study on the talent management practices that attract, utilize, and retain foreign high-end talent at Huawei. They focus on three research questions: (1) Is Huawei effectively able to attract top global high-end talent? (2) Is Huawei able to correctly utilize and develop foreign high-end talent? (3) Can Huawei retain their global high-end talent, or do they want to leave because of cultural or management misalignments? A combination of surveys and interviews were used to gather in-depth data research for this business case study. Interviewees comprised current Huawei foreign senior leaders and executives (Hay Grade 20+). Subject nationalities included North Americans, Europeans, and Asians. This helped to identify responses to highlights and challenges of working in Huawei. We also describe the talent management processes and practices currently used by Huawei. These practices show Huawei's thinking and strategy behind their talent management theory. The Huawei experience

can be instructive to Chinese and non-Chinese firms attempting to attract, develop, and retain talent—specifically foreign high-end talent.

In Chap. 15, we summarize the book contributions and make suggestions for future research. We draw some conclusions about the nature of the company and its relation to the environment.

Part I

**The Political Economy and the
Public Policy Perspectives of
Huawei's Globalization**



2

The International Political Economy of Huawei's Global and Domestic Environment

Thomas D. Lairson

1 Introduction

Much that is written about Huawei and U.S.–China relations distorts and even obscures what really matters. This chapter adopts the perspective of international political economy (IPE) to illuminate the strategic domestic and global environments that define the context for both nations and thereby for Huawei (Lairson and Skidmore 2017). Huawei operates within an extraordinarily complex and dynamic environment that creates opportunities, constraints, and even dangers. The main premise of a political economy perspective is that the domestic and global environment of these actors has a major but not determining effect on the formation of interests, choices, and especially outcomes. Following the perspective of IPE, this chapter focuses on the nature of Chinese state

T. D. Lairson (✉)
Rollins College, Winter Park, FL, USA
e-mail: tlairson@rollins.edu

capitalism as an essential feature of Chinese economic development and a support system for Huawei; on the global system of deep interdependence as it constrains the coercive U.S. strategy toward China and Huawei, even as it provides opportunities and support for Huawei; and on the dynamics, purposes, and likely outcomes of the strategic interactions between China and the United States. We will show how Huawei is indeed closely connected to the Chinese system of state capitalism, how U.S. actions toward Huawei and China are affected by fears of a loss of U.S. technological preeminence, how deep interdependence works against the U.S. strategy of economic coercion, and the substantial mutual losses that will derive from efforts to decouple the Chinese economy from the West.

The distinctive but poorly understood features of Chinese state capitalism and the associated innovation ecosystem provide major support to Huawei and influence its actions. Interestingly, this ecosystem is itself deeply intertwined in the global system of deep interdependence and is also intensely connected to the advancing Chinese economic, political, and military capabilities. From a global perspective, deep interdependence offers Huawei multiple opportunities, including access to global knowledge networks, global markets, and global production networks that have contributed to its emergence as a major global firm. At the same time, asymmetries in dependencies between Huawei and China and the United States create the potential for coercive and even destructive attacks. Associated with these attacks are claims regarding Huawei's theft of intellectual property, as a huge security threat, and actions with negative potential consequences for China's rise. We will see how the system of deep interdependence undermines the effectiveness of the U.S. coercive efforts against Huawei and China.

This chapter will conclude with a discussion of the global strategic environment in relation to a strategy of deep engagement or decoupling. Deep engagement offers the best chance of mutual gain from technological, economic, and political success. Decoupling exacerbates conflict, undermines deep interdependence, and slows global technological progress.

1.1 Huawei's Domestic Environment: Chinese State Capitalism

The domestic environment for Huawei is defined primarily by China's system of authoritarian state capitalism and related innovation ecosystem that has evolved during the process of economic reform beginning in 1978 (Naughton and Tsai 2015; Naughton 2018). The nature of this system is hotly debated, but the result has been an astonishing level of economic growth and development (Bendett 2019). Debate about the Chinese system focuses primarily on violations of the Western model, in particular, the relationship between state authoritarianism and capitalism. China's state capitalism is the most recent version of an Asian system of economic growth and development, with antecedents dating to the Meiji Restoration in Japan, as well as Japan from 1950–1990 (Howe 1996), South Korea (Kim 1997), Taiwan (Greene 2008), and Singapore (McKendrick and Donor 2000). The Chinese system features state economic direction and dominance of capital, direct state ownership of many important firms, sequences of state-directed structural transformation, multiple levels of state involvement in investment, differentiated forms of linkage to the global economy, a significant role for free markets and private firms, a large role for foreign firms, and heavy reliance on exports to boost economic growth and build national capabilities (Lin 2012a).

Huawei is a product of the extraordinary process of rapid economic growth and development in China after 1978, and its importance as a leading-edge global technology firm is magnified by the central role of technology in China's effort to restore its position as an important great power (Ahrens 2013). Indeed, Huawei is a special example of the nature of state capitalism in China. The Chinese technological and innovation ecosystem remains largely behind the West, but has achieved remarkable and rapid improvements. Huawei is a leading-edge domestic and global firm, especially in 5G, a key element of China's political-economic-military strategy. The Chinese system of state capitalism links Huawei to the resources, goals, and policies of the government and the special competitive environment that provides an effective support system for

Huawei's growth. Of special interest is the role of Huawei's products in China's overall political-military-economic strategy, which makes the firm an important target for the United States.

Chinese generally, especially the leadership of the Chinese Communist Party (CCP), see China as rightfully a major, if not the most important, of great powers. Restoring this historical status and preserving the position of the CCP in China were the key motivations for the drive to achieve rapid economic growth and development, extending back to the founding of the CCP in the early twentieth century. In the context of twentieth and twenty-first-century global power, economic growth, technological capability, and military power are deeply intertwined (Feigenbaum 2003).

Huawei dates to 1987 when China was entirely dependent on imports for its telecommunication equipment. Indeed, the development of Huawei reflects the effort of the Chinese government to build a set of domestic firms able to compete with the overwhelming market power of Western firms (Hong 2017, 83–87). The Chinese government, in one of a multitude of efforts at structural transformation, promoted international joint ventures and increased national R&D to build domestic capabilities in telecoms. At an early stage, there were about 200 small Chinese firms which emerged to compete in this market space. Huawei, somewhat uniquely, emphasized building its own in-house technology capabilities focusing on large-scale switches that foreign firms refused to transfer to China. By the early 1990s, Huawei developed its first high capacity switch and became a major supplier for the Peoples Liberation Army's (PLA) first telecoms system. More important was a concentration on becoming a supplier of telecoms equipment to rural areas in China, usually in a joint venture with local governments, a market largely ignored by foreign firms. This scale buildup gave Huawei important advantages when the Chinese government began explicit targeting of the telecoms industry in 1996. The result was more lucrative contracts with the National Railway, a state-owned enterprise, which also provided Huawei with access to loans from state banks (Ahrens 2013, 2–6). In addition, Huawei launched a global strategy of foreign sales and became a supplier to global firms operating in China to build scale economies and better compete in the Chinese home market (Breznitz and Murphree 2011).

Today, Huawei is a global giant, operating in more than 170 countries and employing more than 180,000 persons (Strumpf et al. 2018).

The ownership of Huawei is often said to be with Huawei employees. However, the best evidence indicates this is not correct; instead Huawei is arguably a near-99% indirectly state-owned enterprise, with the founder Ren Zhengfei holding slightly more than 1% of the shares. This hybrid arrangement of state and private ownership, in various forms, is common in China. The present ownership arrangement appears to have happened between 1997 and 2006 when ownership shares for employees were converted into virtual shares that gave employees a right to profits, but not voting control or rights to the liquidated assets of the firm. The actual near-99% ownership shares were vested in a Trade Union Committee that is itself controlled by the local Chinese Communist Party. The 1% shareholder—founder Ren Zhengfei—does retain a veto power over the actions of the Trade Union Committee (Balding and Clarke, 2019).

The rapid catch up in economic and technological capabilities, for China and Huawei, has required a systematic and multifaceted process of capturing, learning, adapting, applying, and innovating foreign knowledge and technology, designed to build local capabilities able to compete in domestic and global markets. China's efforts in this mirror those of many nations, especially Japan, Korea, Taiwan, Singapore, and the United States. Perhaps most important, China's economic catch up is the result of the extraordinary increase in the knowledge intensity of production, services, and finance over the past 75 years. When the primary factor of production is easily and necessarily shared, as is the case with knowledge, building effective capabilities for catch up leads to an accelerated process of development. Further, such a system is embedded in global interdependence through the vast expansion of global knowledge and production networks and the shared nature of knowledge. At the same time, China has expanded and developed a somewhat unique global strategy for knowledge capture, application, and innovation. This system of state capitalism has become the target for criticism by Western firms and governments. Even so, it would be difficult to find any important economy—large or small—that has not used state support to promote economic growth (Breznitz 2007; Kohli 2004).

China's global technology strategy involves leveraging the attractiveness of the Chinese market in combination with the strong interest of transnational firms to find new and profitable production sites, with the bonus of access to the (potentially) vast Chinese market. Often organized and supported by government effort, strategies have included welcoming foreign direct investment with conditions for technology transfer, the globalization of Chinese enterprises, strategic alliances with foreign firms (Huawei-Symantec), developing a higher value-added position within global supply chains, the purchase of knowledge from willing sellers, reengineering technology, domestic innovation, and direct and indirect theft.

This set of processes not only brought knowledge and technology to China but was also used as the basis for learning and innovation. Over a relatively short time, China has moved from the back of national rankings of technology capabilities to the development of national firms as global leaders and a major role in global production and innovation. Even so, the Chinese innovation ecosystem is poorly understood in the West, as demonstrated by the oft-repeated half-truths that China only steals, copies, and produces inferior products. Perhaps the most galling for many Americans is that the Chinese seem to adopt part of what we think is essential for economic success—markets and competition—and reject other parts—limited government and the political dominance of private enterprise. These notions are belied by the success of Chinese firms in global markets and the remarkably dynamic technology startup culture, which results from the combination of state direction and industrial policy, large and free markets, the massive presence of foreign firms, exports from China by domestic and foreign firms, and the very sophisticated system for capturing foreign knowledge and technology. The structure and nature of state direction is itself both dynamic and complex, with a wide variety of actors engaging in an equally wide set of strategies supporting innovation.

Chinese economic growth and restructuring has, from almost the beginning of reform, operated through a distributed system of state actors at the national, provincial, and local levels, acting in experimental, entrepreneurial, yet hierarchical ways (Heilmann 2011; Sun and Cao 2014). The effect of this system is a significant diversity of state-based

experimental and competitive efforts to promote investment, economic growth, and innovation that generate important information about what seems to work and what does not. Further, Chinese firms and research organizations are diverse, dynamic, entrepreneurial, and operate within a highly competitive system of domestic and global markets. One important source of economic dynamism is the large presence of foreign firms, such as Apple and Microsoft, which set a substantial competitive bar and provide knowledge spillovers, legitimate and illegitimate. Another important indicator of the capabilities of this system is the number, diversity, and size of Chinese Unicorns—startups with a value of \$1 billion or more. By 2019, the number of Chinese Unicorns was essentially equal to the number in the United States (Perez 2019). And these Chinese firms are spread across the advanced technology space, including fintech, virtual reality, robotics, autonomous vehicles, and AI (*Economist* 2017).

The Chinese state has engaged in repeated and mostly successful efforts to restructure the Chinese economy after 1978, a process essential for sustaining economic growth. Economic restructuring, however, is a difficult process to replicate, as it involves a somewhat directed and intentional process of the creative destruction discussed at length by Schumpeter. “Economic development is fundamentally about structural change: it involves producing new goods with new technologies and transferring resources from traditional activities to these new ones” (Rodrik 2019; Monga and Lin 2019; Lin 2012b). Perhaps the most difficult and demanding form of structural transformation comes at the point of avoiding the “middle income trap.” This occurs when a nation has broken through the poverty trap and achieved success in low value-added products and services to generate significant economic growth, but is unable to develop capabilities in advanced and knowledge-intensive products and services. Many nations have failed to achieve the restructuring needed for this transformation and have found themselves unable to sustain economic growth (World Bank Group and Development Research Center 2019).

It is also very clear that diminishing returns to the factors sustaining Chinese growth have set in during the years after the Global Financial Crisis. This can be attributed to sclerotic forces in the Chinese economy that either prevent or fail to induce the levels of continuing structural

change needed to sustain growth (World Bank Group and Development Research Center 2019, 11–26). These problems include declining inward FDI and trade surpluses, rapidly diminishing returns from investment, rising debt, and unfavorable demographic trends (World Bank Group and Development Research Center 2019). Resolving these issues will require new forms of economic restructuring in a system that has repeatedly experienced extraordinarily dramatic change for 40 years. It is awareness of these problems and concern for escaping the middle-income trap that produced the dramatic series of state initiatives to push China closer to the forefront of global technology. These efforts included a series of commitments and strategic plans developed between 2013 and 2017 emphasizing investment in 5G, robotics, aerospace, and an acceleration of investment and research efforts in AI (Kania 2019a). These efforts are designed to move China up the value chain in processes and products and into industries previously in the domain of Western firms. Many in the West have seen these actions as a direct challenge to U.S. technological preeminence. This may well be at least partly true, but perhaps for unrecognized reasons.

Most broadly, recent Chinese strategies are motivated by the view that prosperity and security can only come from achieving technological leadership and an acute appreciation of the political risks of falling farther behind in a variety of key emerging technologies that will define many future paths for development. Huawei is perhaps the central firm for promoting Chinese capabilities in the new combination of digital technologies that include the Internet of Things (IoT), cloud computing, and data analytics through its position in 5G. Connected to this set of technologies is artificial intelligence (AI), which promises entirely new forms of information management and innovation. Given China's experience over the past two centuries and especially the growth of the past 40 years, the CCP leadership could not ignore the threat and opportunity this situation presents. Likewise, the U.S. leadership, long accustomed to global technological, economic, and military preeminence could not ignore the potential challenge that China now represents.

China's technological push is not surprising, and its actions are consistent with previous strategies for structural transformation. The dramatic changes, over the last decade, in technology across a wide range of

industries, portend major new opportunities and threats (Hong 2017). The series of public pronouncements about technology initiatives served as a vehicle for political mobilization, establishing directions for the many layers of the state and for SOEs and private firms. Decisions about investment and planning across these actors were refocused, as were the criteria for evaluating performance.

1.2 The Global Environment: Deep Interdependence and Economic Coercion

The global environment is far more complex and dynamic, especially for Huawei, which is deeply engaged with global economic and security relationships. Global networks of production, trade, knowledge, and innovation define much of this environment, within which Huawei has been very successful. Though Huawei has long been engaged in an atypically large level of R&D, it remains highly dependent on global suppliers such as Google and Qualcomm for its products. The three largest sectors for Huawei are telecommunications equipment, smartphones, and cloud computing. But its global economic position is also substantially affected by important strategic changes in the relationship of the United States and China, involving issues of security and technology, U.S. concerns over Chinese power and behavior, and United States–China conflicts over trade.

The turn for the worse in U.S.–China relations came as a result of the shifting trajectory of interests and actions following the Global Financial Crisis, reflecting the continuing emergence of China and the stagnation of the United States. After 2008, U.S. policymakers and analysts have shifted their assessment of China from an emphasis on promoting a strategic engagement in building a global order of deep interdependence to one seeing China as a strategic adversary. China, under Xi Jinping, has redirected its policies away from market-based reform toward enhancing state-owned enterprises and developing more nationalist and mercantilist relationships with the global economy (Lynch 2019; Lardy 2019). Many in the United States were deeply disappointed in the authoritarian turn in China, seeing the end of hope for a more democratic China, however

unrealistic that may have been. Of more realistic concern has been China's assertion of physical control over the South China Sea, the massive extension of Chinese influence through the Belt and Road Initiative, and the large resource commitment to achieving technological primacy. We trace several of the threads of these global developments as they affect Huawei and lead to the emergence of coercive U.S. policies based on asymmetries in interdependence.

The global system is composed of multiple, complex, differentiated, and tightly connected transactions and interactions among states, firms, and organizations, thereby forming a deep interdependence across the system. In terms of power relations, deep interdependence means the security and even the survival of each nation is highly dependent on the actions of other nations. The combination of a deep interdependence in economic and security relations generates strong incentives for cooperation in the establishment of norms, regimes, and rules that coordinate and govern activities in the system. Great powers play a large role in providing these public goods, especially in the form of structural power. At the same time, different forms and degrees—*asymmetries*—in interdependence also create opportunities for the nation holding the upper hand to attempt to coerce a nation with greater dependence to comply with its preferences, a kind of “*weaponizing*” of interdependence (Farrell and Newman 2019). However, until recently, such actions have been quite unusual. This is because economic coercion under deep interdependence engages many countervailing forces that result from the interconnections among nations and firms in the global system. Given these arrangements, the nature and purpose of the United States turn toward coercive and destructive policies that *weaponize* interdependence seems puzzling.

Huawei is a very significant firm in perhaps the most complex, widely globalized, and deeply interdependent of all industries—information and communication technologies (ICT). Virtually all firms—small and large—are intensely interconnected in global supply networks and global knowledge networks. These arrangements have—along with global finance—come to define the fragmentation, specialization, and global distribution of capabilities. Further, these networks have been facilitated by the globalization of finance, through global portfolio markets and foreign direct investment. Perhaps most important, the global ICT industry

is an important part of a global system of deep interdependence that exerts a profound impact on states and firms. This is a global system composed of mutually interacting, cumulating, reinforcing, and tightly connected sets and systems of economic, political, cultural, and military relationships, creating proportionally significant but differentially distributed shared gains and losses on global actors (Kuo 2018). Innovation, production, and markets in ICT are thoroughly globalized and deeply interdependent.

Huawei is an increasingly important global player in ICT markets, particularly telecommunications equipment markets, the very equipment used to construct 5G systems. This can be seen in global market share in telecommunications equipment, which shows Huawei rising to a preeminent position in the 6 years leading up to 2018 (Table 2.1).

The much smaller Chinese company, ZTE, and the U.S. giant, Cisco, each hold about 8% global market share in 2018. The four non-U.S. companies account for about two-thirds of global market share, and with Cisco, about three-quarters. However, Cisco is unable to provide a comprehensive 5G wireless solution, as does Huawei, leaving the United States without any company able to compete in this space with Huawei (Fung 2019; Pongratz 2018).

The data indicate that global markets in telecommunications equipment have shifted dramatically in merely 6 years, from essentially equal market shares among three firms to Huawei surging to a widening lead. Huawei now holds a global market share almost as large as Ericsson and Nokia combined. Telecommunication is a scale economies industry, meaning the average cost per unit of production falls significantly as output rises, which often leads to declining prices that generate additional

Table 2.1 Global market share (%): telecommunications equipment

	2013	2014	2015	2016	2017	2018
Ericsson	19.4	17.5	14.8	13.6	13.1	13.4
Huawei	20.3	20.9	24.1	26.4	27.2	28.6
Nokia	21.0	21.3	20.0	17.5	16.8	17.0

Source: Cassell Bryan-Low, et al. "Hobbling Huawei: Inside the War on China's Tech Giant," *Reuters*, May 21, 2019, <https://www.reuters.com/investigates/special-report/huawei-usa-campaign/>. Accessed November 20, 2019

competitive advantages. The combination of the large scale of the Chinese market—which Huawei dominates—and global markets provides for scale advantages other firms cannot match. Huawei now enjoys a considerable competitive advantage over all other global rivals because its scale makes it able to produce quality products that sell for much less. One can easily imagine this change has played a major role in motivating the U.S. effort to attack Huawei, which may well be on the verge of dominating global markets in an increasingly vital industry, an event that carries significant strategic impact for China and the United States.

Unfortunately, U.S. options for responding to this situation are very limited for ideological and financial reasons, thereby confining the United States to self-defeating policies. One major feature of the indictment of China and Huawei is the essential nature of the Chinese system of political economy. Huawei and China have succeeded by mixing together in creative and innovative ways, real markets, government direction, private firms, rapidly improving innovation capabilities, and government-supported industrial policy. For years, as the nation far behind the leading edge of global technology, China has used various strategies to catch up, some legitimate, some questionable, and some illegal but often practiced by most if not all successful nations (Hvistendahl 2020; Sanger and Perloth 2014).

The United States has also criticized China for the requirement that foreign firms operating in China must share technology with Chinese partner firms. The Chinese see this as an essential obligation of foreign firms who seek to gain access to the Chinese market and other special resources in China. Achieving some balance in the control of knowledge and access to this knowledge certainly can include such an obligation. Another arena of contention is the control over and allocation of capital by the Chinese state. Remembering that the Chinese state includes multiple levels of central to local units, this is part of a process in which the central state defines economic directions and other parts of the state implement specific operational applications of these directions. Such a system creates important, even essential, elements of an effective innovation ecosystem, namely, competition and variation. It is impossible not to appreciate the extraordinary record of growth and development China has achieved from this system, and the Chinese Communist Party is not

going to jettison this system just because the United States doesn't like it. Moreover, we need to understand much better how this Chinese variant of the East Asian development model has succeeded through state direction.

So what can the United States do about countering Chinese state capitalism and Huawei's emerging position in 5G? One option is to adopt a much greater state role in promoting and funding new technological directions, that is, adopt some form of industrial policy (Kania 2019b). However, there are large ideological, political, and fiscal barriers to such an effort. The fiscal legacy of the Global Financial Crisis combined with the latest round of Republican tax cuts has left the United States with a \$1 trillion fiscal deficit that is expected to rise even higher. This puts a brake on new funding initiatives. Even worse, U.S. government funding of research and development (R&D) has been falling in real terms since 2008, and the Trump Administration budget proposal for 2021 calls for steep absolute declines of 9% in military and civilian R&D spending (Tucker 2020). There is no viable strategy for global competition with China that includes such a plan. Also hampering U.S. strategy is a bipartisan consensus that the U.S. government should avoid doing industrial policy, despite the fact that quiet forms of such action have long been practiced (Jacobsen 2015).

With any substantial effort to accelerate the development and improvement of U.S. technological competitiveness effectively off the table, the United States is left with atavistic policies rooted in exploiting U.S. advantages in the interdependent relationship with China. The policies adopted by the United States operate in ways that are contrary to virtually all of the incentives of deep interdependence, especially in the ICT industry, imposing a logic that harks back to the nineteenth and early twentieth centuries, if not earlier. The United States has rejected the mutual gains from interdependence and is instead substituting actions aimed at exploiting and undermining interdependence to obtain mutually shared losses and to achieve some as yet unspecified political gain.

We will consider below whether the endgame for the United States in its actions toward China and Huawei is working to protect American security from nefarious intrusions by Huawei into U.S. communications system, or whether the goal is to damage China's ability to develop 5G by

crippling Huawei. Of course, the two objectives are not incompatible, but securing the U.S. communications system by banning Huawei products from the U.S. market, along with Taiwan and Australia, is qualitatively different from cutting Huawei off from U.S. suppliers, and thereby directly threatening its viability as a firm. The charges against Huawei—intellectual property piracy, violating sanctions against Iran, connections to the Chinese government, and posing a security threat to the U.S. telecommunications system—are a damaging indictment (O’Keeffe et al. 2019).

The Trump Administration’s May 2019 actions against Huawei represent a key turning point in escalating the conflict. These actions are based on the key role of U.S. firms in the global supply networks for Huawei—that is, asymmetric forms of interdependence are being exploited to damage and perhaps destroy Huawei and damage the Chinese economy. These actions include an outright ban on sales of Huawei products in the United States and cutting off Huawei from purchases from U.S. firms. The United States must accept damage to its firms with significant sales to Huawei. But, the ultimate goals of the United States remain unclear. U.S. officials acknowledge the intent to remove Huawei from the 5G infrastructure outside of China and have exerted considerable pressure on allies, including Japan, Australia, Germany, Britain, and France, to follow this policy (Bryan-Low et al. 2019). The Trump Administration has lobbied hard with major allies to ban Huawei from their 5G system, even threatening them with cutoff of special intelligence should they refuse (Pop 2019). Other purposes are also connected to these actions. Especially concerning is the apparent determination to preserve U.S. technological, economic, and military primacy through damaging the Chinese economy and innovation ecosystem, including decoupling the Chinese economy from the global economy.

Huawei is deeply embedded in the global supply network consisting of hardware and software networks (including software updates) and global knowledge networks, a significant and vital part of each comes from the United States. Perhaps most important are the specialized hardware and software tools needed for designing new types of chips. Denial of these tools to Huawei and its suppliers could have a very damaging effect on the firm (Fuller and Trioli 2019). The effect of this U.S. action is to attempt to shut off core elements of the Huawei supply chain and cripple the firm’s near-term ability to supply carriers with reliable and effective

smartphones and 5G equipment. Equally important, Huawei has been cut off from its relationships with many of the most important U.S. universities (McCarthy 2019). The effect of this process could delay China's ability to deploy a 5G system, but it is difficult to see how these actions can have anything but very damaging effects on the reputation of the United States as a reliable supplier of products.

Such is the nature of deep interdependence that U.S. firms have long been major suppliers for Huawei products. The electronics and software industries are especially good examples of the dense networks of collaboration in production based on a global division of labor. Virtually all ICT firms utilize a global space of specialized capabilities, involving network forms of knowledge sharing and trade often with dominant suppliers who are found in the most advanced nations. Some foreign firms, especially those deeply embedded in global networks dominated by U.S. firms, have decided to comply with the U.S. ban. For decades, the United States has encouraged its firms to operate as the organizers of these networks of production, knowledge, and trade because they are the most efficient and effective ways to produce and innovate. Now, the Trump Administration has resorted to exploiting favorable asymmetries in interdependence to "weaponize" these networks for coercive and even destructive goals (*Economist* 2019b) (Table 2.2).

Table 2.2 Huawei's main suppliers (2018, Q3 by revenue, RMB billion)

Firm (nation)	Revenue from Huawei	% Revenue from Huawei
Foxconn (China)	9.1	11
BYD (China)	4.5	13
TSMC (Taiwan)	3.9	8
O-Film (China)	2.9	23
FIH Mobile (China)	2.7	
Flex (United States)	2.4	5
SK Hynix (South Korea)	2.3	5
Broadcom (United States)	2.0	6
Qualcomm (United States)	1.6	5
Sunny Optical (China)	1.5	22

Source: *The Economist*, May 19, 2019, <https://www.economist.com/business/2019/05/25/huawei-has-been-cut-off-from-american-technology?cid=cust/dailypicks/n/bl/n/20190528n/owned/n/n/dailypicks/n/n/NA/246096/n>

Decoupling the Chinese and U.S. economies as part of an effort to reverse the process of globalization and extend for a time U.S. hegemony cannot be dismissed as the endgame of the Trump Administration. Of course, such a disruption of global commerce and the underlying rules and norms of global trade could have catastrophic consequences. Blowing up the global economy will inflict very large and unpredictable costs on everyone, including the United States. This is a one-time option that will push the Chinese and many firms and nations to decouple from the U.S. technological system. And yet, this is the most plausible direction in which we are headed (Fuller and Trioli 2019; Groll 2019). It is the United States, under Donald Trump, that appears to be a revisionist nation—the nation ready and willing to overturn the global order.

Perhaps this is just a Trump tactic to force Chinese acceptance of U.S. terms. Or, Trump may seek to destroy Huawei. Disrupting global supply chains, after encouraging them for many years, may be part of a Trump effort to bring globalization to a halt and recreate the nineteenth-century world of nationalist production. Such extreme actions, which carry potentially disastrous consequences, cannot be dismissed given the ideological thinking that has accompanied the Trump Administration. We need to think seriously about the costs and risks of engineering a return to a bipolar world (Ford 2020).

Of course, deep interdependence brings mutual gains for cooperation and mutual losses for disruptive conflict. U.S. firms may suffer more than \$10 billion per year in lost sales and, even worse, gain the reputation across the world as an unreliable supplier. Without the support of the U.S. government, efforts to sustain and participate in global systems may become too risky (*Economist* 2019a). Along with “America First” we may also get “America Alone.” Consumers stand to lose and will invariably pay higher prices, and short-circuiting global knowledge networks will slow and perhaps halt innovation for all. An eighteenth-century concept of mercantilism—trade is all conflict, with no mutual gain and trade should be managed by political agreements—seems to have gripped the United States, including Democrats.

It is important to recognize both the fragility and the potentially ineffective features of the Trump strategies. China and Huawei may succeed

in 5G even with U.S. actions. The capabilities in state direction of the economy, the integration of civilian and military capabilities in technology development, the ability to mobilize and allocate capital at large levels, the differentiated and distributed system of state actors, and the combination of large and small firms in the innovation ecosystem make China a formidable competitor in 5G development, and especially deployment and standards setting (Kania 2019a). Expenditures in China on 5G are difficult to measure but surely total many billions higher than those of the United States. One estimate is that China plans to spend \$1.5 trillion RMB between 2019 and 2025 for deployment, or about \$215 billion at current exchange rates (EY 2018). Other estimates see much higher levels of spending on telecoms investment as the primary emphasis for technology spending in 2019 (Jing 2019). This level of spending is reflected in estimates of 5G deployment levels into the near future (Table 2.3).

Using this prediction, in 2025, China will have deployed about three times the number of 5G connections as the United States and more than one-third of the 5G connections in the world.

One of the major beneficiaries of this spending by the Chinese government has been Huawei, which engages in exceptionally high levels of spending on R&D. Between 2008 and 2017, Huawei's R&D spending as a percent of revenue rose from 9.1% to 14.9% (Sharma 2018). This is among the highest among large companies. For comparison, consider Amazon, the highest spender in dollar terms on R&D: \$22.6 billion. However, this represents just 8.5% of Amazon's revenue.

Table 2.3 Forecast Number of 5G Connections, millions

Country/region	2020	2021	2022	2023	2024	2025
China	80	300	550	770	940	1040
Developed Asia/Pacific	20	60	140	200	390	420
United States	30	90	200	270	350	380
Western Europe	20	45	100	170	280	300
Rest of World	20	50	120	300	470	700

Source: CCS Insight, <https://www.ccsinsight.com/blog/china-fires-starting-gun-on-5g-scale-game/>; *Economist*, "Communication Breakdown: Huawei Is at the Centre of Political Controversy." April 26, 2019, <https://www.economist.com/briefing/2019/04/27/huawei-is-at-the-centre-of-political-controversy>

The nature of the competition—what some like to call a race—between the United States and China over 5G is poorly understood. To a significant degree, this is a competition between Chinese state capitalism and the U.S. system of limited government. At the same time, in a world of deep interdependence there are unavoidable and important arrangements of international cooperation and coordination associated with the development and production of 5G systems. The combination of global knowledge networks, the fragmentation of supply chains, and the specialization and diffusion of capabilities have created a globalized network of innovation and production based on knowledge sharing and tightly coupled processes of systems integration. Of course, the dominance of the highest ends of 5G supply chains by U.S.-based firms creates the opportunity for manipulating these asymmetries of interdependence to coerce or even damage China and/or Chinese firms. However, such a strategy creates considerable costs that are born more or less equally by China and the United States. Tariffs raise prices for U.S. consumers and invite retaliation that reduces the sales of U.S. firms. Perhaps more important, such actions are likely to disrupt global economic systems and interrupt technological innovation and development. Further, the effort to shift an inherently positive sum system into a zero-sum system turns away from competition based on mutual gain from free markets into a struggle inviting war. In a world of deep security interdependence, where not only the security but also the very survival of nations depends on the actions of each other, such a strategy is fatally flawed (Swanson 2019).

The Trump policies regarding China could become among the greatest strategic failures in U.S. history. Acting to cut China off from U.S. suppliers provides very large incentives to build additional national capabilities in China and to extend those capabilities on a global scale. In addition, by failing to develop and sustain a stronger Western-based 5G equipment industry, the United States will further weaken an already declining set of firms, hasten China's technological surge, and undercut the ability to rebuild a position outside of China. Moreover, such a strategy cannot succeed if the purpose is to build a nationalistic and exclusionary industry within the United States. Rather, a successful strategy must be to augment U.S. capabilities as part of a global system of innovation and production and thereby prevent any one nation from controlling too

great a part of such a vital industry. Reverting to national silos for high technology is a recipe for mutual loss and increasing potential for much more intractable conflict.

The global system of deep interdependence has brought the greatest growth for the largest number in all of human history. The vast expansion of the geographic space of innovation and production has created a much more efficient system as it draws on a specialized and diversified set of capabilities from all over the world. The United States is largely responsible for creating this system and yet stands flat-footed in the face of the Chinese challenge. Developing a successful strategy is nearly impossible because of the ideological and fiscal barriers to effective thinking and policy and because silo thinking has always been strong in the United States. We have become stuck in policies and approaches that were discarded decades ago. As a result, we need to begin thinking seriously about the likely outcomes of the emerging eighteenth-century approach to global affairs that seems in the offing. And we need to consider alternatives that bring the potential for mutual gains and not just lose-lose outcomes.

1.3 The Global Strategic Environment: The Options Space

The global strategic environment affecting both China and the United States consists of the power relations, security relations, and systems of political economy among the greatest powers as these emerge and develop over time. Of equal importance are the policies and actions taken by great powers. Though often students of strategic environments believe relative power determines choices and outcomes, we posit here the existence of a significant options space for choices and outcomes in the conflict over Huawei created by this strategic environment. At the same time, there is a predominant configuration of choices that produce largely positive outcomes. These involve reinforcing the strategic reality created by deep interdependence.

Is the United States justified in its policies toward Huawei? Huawei is a Chinese SOE and though some fears about it may not be justified, the

potential for harm is serious enough to warrant new forms of controls and safeguards. But there are better ways than decoupling. Using the enticement of access to the U.S. market provides leverage to place restrictions on Huawei, and coupled with tight inspections, the United States can gain a position inside Huawei to reduce or even eliminate security concerns. Such a process of negotiation over the terms of Huawei's access to the U.S. market is consistent with the norms of deep interdependence and therefore offers a possible win-win outcome. But security issues, though potentially important, are not likely the most important U.S. concern.

Instead, Huawei has seized such a dominant position in the production of 5G equipment that any arrangement without significant restrictions and controls, leading to an opening of the immense U.S. market to Huawei, would likely have fatal consequences for the position of non-Chinese firms and would place the United States in an untenable technologically dependent position. This is especially true if the United States continues its feeble national efforts to actually compete in 5G and AI. The U.S. system has failed to develop any U.S. firm in this vital space. And the inability of the U.S. government to formulate and implement a national strategy for this emerging set of defining technologies reveals a very serious flaw in the U.S. system of political economy. The proposal to have the United States (or one of its firms) purchase a controlling interest in Nokia and/or Ericsson is an indication of past failures and the limited choices faced by the United States (Benner 2020). Further, the adoption of eighteenth-century mercantilist policies and thinking by the Trump Administration to deal with China and Huawei—especially the use of economic and political coercion to attack competing firms—is linked to this same systemic failure in the United States and offer a glaring indicator of U.S. decline. The United States needs to learn how to compete with the Chinese system of state capitalism.

Trump's policies cannot avoid the fact that technology and innovation linked to military capabilities is embedded in deep interdependence, which imposes losses and complications on all parties engaged in tariff wars and similar forms of disruption of deep interdependence. This has already come in the form of tariff costs borne by the United States, the disruption of supply chains, substantial loss of sales for U.S. technology firms, and the undermining of a rules-based global system based on free

markets (Melzer and Shenai 2020). But, more importantly, extracting these relationships from a global system by decoupling the U.S. and Chinese economies, and substituting an America First system, will be much more costly and will surely damage U.S. capabilities in the near and long term. Falling growth rates and slowing innovation rates will only be the beginning. In addition, there are essentially no historical cases in which hyper-nationalism produces significant outcomes based on peace and prosperity and a multitude of such historical eras in which military and economic conflict are correlated. At best, temporary winners may achieve short-term relative gains but the common pattern is one of repeated wars involving great powers, including large and destructive global conflicts.

Trump's policies cannot avoid the realities of deep interdependence, are very unlikely to produce any lasting positive results for anyone, and have already created substantial costs. The effort to enlist allies in banning the purchase of Huawei's 5G systems has more failures than successes, including the United Kingdom (Graff 2020; Bennhold and Ewing 2020). Though currently supporting the Huawei ban, Japan does not subscribe to the strategy of decoupling from China (Bush 2019). The United States has found implementation of the ban on sales to Huawei to be difficult to implement and somewhat ineffective. Huawei has been able to switch suppliers for many of its smartphone components since the cutoff of U.S. suppliers by the Trump Administration. Wi-Fi and Bluetooth chips, antenna switches, power management chips, and audio and power amplifiers have been replaced in whole or in part by in-house suppliers and suppliers from Taiwan, the Netherlands, and Japan. These replaced previous purchases from North Carolina, Massachusetts, California, and Texas in the United States. Huawei is also turning to Russia and Japan to rebuild its connections to global knowledge networks (McCarthy 2019; Dai and Tao 2019; Swanson 2020). In addition, the May 2019 ban on U.S. sales to Huawei has been loosened by decisions of U.S. companies and license granting by the U.S. government. At the same time, the Trump Administration is considering tightening the rules under which the blacklisting of Huawei is enforced in what may become an even more destructive set of actions (Fitch and Strumpf 2019; Alper and Freifeld 2019). In the end, what we may find is the scale and density of deep

interdependence is such that control of this system has passed from the United States and resides in the multitude of tightly connected global networks. And Huawei has a well-financed supporter in China to cushion the pain of this transition.

The combined effects of existing policy ineffectiveness, the significant losses from these actions, and the murky endgame of the Trump “strategy” suggest the need for an alternate approach. The risks of poor policy in a context where U.S. preeminence and China’s rise are at stake cannot be accepted. From the perspective of the incentives created by a global economic system of deep interdependence, the economic conflict between China and the United States should not be happening. Deep interdependence is a global system that generates mutual gains from competition, through shared, cooperative, and collaborative processes across global knowledge and production networks. Likewise, deep interdependence generates shared costs—in the form of mutual losses that cannot be avoided—that emerge from efforts to force other states to bear the costs of interdependence. The most effective option for the United States in its struggle with Huawei would be a combination of enhanced competitive efforts (despite the political obstacles) and a tightly and continuously negotiated access to the U.S. market for Huawei and other Chinese firms—that is deep engagement. This approach has multiple benefits, from rebuilding U.S. competitiveness, to reinforcing and strengthening deep interdependence, and developing an important point of U.S. leverage for affecting the nature of Chinese state capitalism. Co-opetition is the reality of global production already and the potential for shared gains is a powerful incentive for cooperation (Brandenberger and Nalebuff 1996). The alternative now being implemented is sure to lead to a dead end.

In the contemporary world, the global networks of deep interdependence have mostly been fashioned by the United States and link through a vast array of giant hubs in the United States. This reality confers an immense form of structural power on the United States, a source of influence poorly understood by eighteenth-century thinkers. The structural power enjoyed by the United States is difficult to translate into coercive power. Rather, this global system draws other nations into the U.S. sphere due to the gains obtained by linking here. It is this system and the global

benefits and the U.S. position of global power that is threatened by current policies. The wasting of this resource would be a strategic blunder of enormous proportions.

Acknowledgments The author is grateful to Dr. Thad Smith and Dr. Kenna Taylor for research assistance, as well as the three anonymous reviewers for their comments and suggestions.

References

- Ahrens, Nathaniel. 2013. China's Competitiveness: Myth, Reality, and Lessons for the United States and Japan, Case Study: *Huawei*, Center for Strategic and International Studies. https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/130215_competitiveness_Huawei_casestudy_Web.pdf. Accessed November 20, 2019.
- Alper, Alexandra, and Karen Freifeld. 2019. U.S. Weighs New Regulations to further Restrict Huawei Suppliers. *Reuters*, November 29, 2019. <https://finance.yahoo.com/news/exclusive-u-weighs-regulations-further-174124204.html>. Accessed December 1, 2019.
- Balding, Christopher and Donald C. Clarke. 2019. Who Owns Huawei? April 17, 2019. <https://poseidon01.ssrn.com/delivery.php?ID=435099002092124088124087100078125107105086054036036018076005012025122031006111117023119126122100023056020088102125098023101000006074049005029101067087106071020106073002048123091085000125102005021067121065086082094101018103097108120127021064004093068&EXT=pdf>. Accessed November 21, 2019.
- Bendett, Samuel. 2019. "Russia's AI Quest Is State-Driven, Even more than China's: Can It Work?" *Defense One*, November 25. https://www.defenseone.com/ideas/2019/11/russias-ai-quest-state-driven-even-more-chinas-can-it-work/161519?oref=defense_one_breaking_nl. Accessed November 25, 2019.
- Benner, Katie. 2020. China's Dominance of 5G Puts U.S. Economic Future at Stake, Barr Warns. *New York Times*, February 6. <https://www.nytimes.com/2020/02/06/us/politics/barr-5g.html?searchResultPosition=11>. Accessed February 9, 2020.
- Bennhold, Katrin and Jack Ewing. 2020. In Huawei Battle, China Threatens Germany Where It Hurts: Automakers. *New York Times*, January 16. <https://>

- www.nytimes.com/2020/01/16/world/europe/huawei-germany-china-5g-automakers.html?searchResultPosition=10.
- Brandenberger, Adam M., and Barry J. Nalebuff. 1996. *Co-Opetition*. New York: Doubleday.
- Breznitz, Dan. 2007. *Innovation and the State*. New Haven: Yale University Press.
- Breznitz, Dan, and Michael Murphree. 2011. *Run of the Red Queen: Government, Globalization and Economic Growth in China*. New Haven: Yale University Press.
- Bryan-Low, Cassell, Colin Packham, David Lague, Steve Stecklow, and Jack Stubbs. 2019. Hobbled Huawei: Inside the War on China's Tech Giant. *Reuters*, May 21, 2019. <https://www.reuters.com/investigates/special-report/huawei-usa-campaign/>. Accessed November 20, 2019.
- Bush, Richard. 2019. *The Stress Test: Japan in an Era of Great Power Competition*. Washington: Brookings. https://www.brookings.edu/wp-content/uploads/2019/10/FP_20191021_japan_competition.pdf. Accessed December 12, 2019.
- Dai, Sarah, and Li Tao. 2019. Huawei Seeks Closer Ties with Japan After Creating 46,000 Jobs and Amid Plan to Spend \$10 Billion. *South China Morning Post* (November 22) <https://www.scmp.com/tech/big-tech/article/3038878/huawei-chairman-seeks-closer-ties-japan-supply-chain-and-research>. Accessed December 1, 2019.
- Economist. 2017. The Next Wave: China's Audacious and Inventive Generation of Entrepreneurs. September 23. <https://www.economist.com/briefing/2017/09/23/chinas-audacious-and-inventive-new-generation-of-entrepreneurs>. Accessed September 22, 2019.
- . 2019a. Circuit Breaker: Big Tech and the Trade War. May 23. <https://www.economist.com/leaders/2019/05/25/big-tech-and-the-trade-war>. Accessed November 11, 2019.
- . 2019b. Technology and Politics: Huawei Has Been Cut off from American Technology. May 19. <https://www.economist.com/business/2019/05/25/huawei-has-been-cut-off-from-american-technology?cid1=cust/dailypicks/n/bl/n/20190528n/owned/n/n/dailypicks/n/n/NA/246096/n>. Accessed November 11, 2019.
- EY. 2018. China Is Poised to Win the 5G Race. [https://www.ey.com/Publication/vwLUAssets/ey-china-is-poised-to-win-the-5g-race-en/\\$FILE/ey-china-is-poised-to-win-the-5g-race-en.pdf](https://www.ey.com/Publication/vwLUAssets/ey-china-is-poised-to-win-the-5g-race-en/$FILE/ey-china-is-poised-to-win-the-5g-race-en.pdf). Accessed November 26, 2019.
- Farrell, Henry, and Abraham Newman. 2019. Weaponized Interdependence: How Global Economic Networks Shape State Coercion. *International Security* 44 (1): 42–79.

- Feigenbaum, Eric. 2003. *China's Techno-Warriors*. Stanford: Stanford University Press.
- Fitch, Asa, and Dan Strumpf. 2019. Huawei Manages to Make Smartphones Without American Chips. *Wall Street Journal* (December 1) <https://www.wsj.com/articles/huawei-manages-to-make-smartphones-without-american-chips-11575196201>. Accessed December 3, 2019.
- Ford, Lindsey. 2020. Refocusing the China Debate: American Allies and the Question of US-China Decoupling. Brookings, February 7. <https://www.brookings.edu/blog/order-from-chaos/2020/02/07/refocusing-the-china-debate-beijings-ideological-exports-and-the-question-of-who-lost-china/>. Accessed February 10, 2020.
- Fuller, Douglas, and P. Trioli. 2019. The Ripple Effects of a Complete Ban on Huawei Access to US Tech Will Be Huge. *SupChina* (May 21) https://sup-china.com/2019/05/21/the-ripple-effects-of-a-complete-ban-on-huawei-access-to-u-s-tech-will-be-huge/?utm_source=SupChina+Free+Newsletter&utm_campaign=87c68123d7-January+24+2019+free+email_COPY_01&utm_medium=email&utm_term=0_96063830a5-87c68123d7-165387001. Accessed December 1, 2019.
- Fung, Brian. 2019. How China's Huawei Took the Lead over U.S. Companies in 5G Technology. *Washington Post*, April 10. <https://www.washingtonpost.com/technology/2019/04/10/us-spat-with-huawei-explained/>. Accessed November 22, 2019.
- Graff, Garrett M. 2020. The US Is Losing Its Fight Against Huawei. *Wired* (January 29) https://www.wired.com/story/uk-huawei-5g-networks-us/?bxdid=5bea120224c17c6adf1cf033&cndid=54031698&utm_brand=biz&utm_campaign=auddev&utm_mailing=Themaitc_Business_02032020&utm_medium=email&utm_source=nl&utm_term=Thematic_Business. Accessed February 4, 2020.
- Greene, J. Megan. 2008. *The Origins of the Developmental State in Taiwan*. Cambridge: Harvard University Press.
- Groll, Elias. 2019. 5 Takeaways from Mike Pence's Hawkish China Speech. *Foreign Policy* (October 24) <https://foreignpolicy.com/2019/10/24/mike-pence-hawkish-china-speech-hong-kong/>. Accessed November 2, 2019.
- Heilmann, Sebastian. 2011. "Policy-Making through Experimentation: The Formulation of a Distinctive Policy Process." in *Mao's Invisible Hand: The Political Foundations of Adaptive Governance in China*, ed. Sebastian Heilmann and Elizabeth Perry, 62–101. Cambridge: Harvard University Press, 2011.
- Hong, Yu. 2017. *Networking China*. Urbana: University of Illinois Press.

- Howe, Christopher. 1996. *The Origins of Japanese Trade Supremacy*. Chicago: University of Chicago Press.
- Hvistendahl, Mara. 2020. *The Scientist and the Spy*. New York: Riverhead.
- Jacobsen, Annie. 2015. *The Pentagon's Brain*. New York: Little Brown.
- Jing, Meng. 2019. China to Push 5G Commercialization even as Huawei Faces US-Led Resistance in the West. *South China Morning Post*, March 25, 2019. <https://www.scmp.com/tech/big-tech/article/3003104/china-push-5g-commercialisation-even-huawei-faces-us-led-resistance>. Accessed November 25, 2019.
- Kania, Elsa. 2019a. Made in China, 2025 Explained. *The Diplomat*., <https://magazine.thediplomat.com/#/issues/-LXH-qfPG3ESjrJtUmlu/preview/-LXH1ovWSkvCzxeWvMA6>. Accessed November 27, 2019.
- . 2019b. Securing Our 5G Future. Center for New American Security, November. <https://www.cnas.org/publications/reports/securing-our-5g-future>. Accessed November 20, 2019.
- Kim, Linsu. 1997. *Imitation to Innovation*. Boston: Harvard Business School Press.
- Kohli, Atil. 2004. *State-Directed Development*. Cambridge: Cambridge University Press.
- Kuo, Mercy A. 2018. US-China Trade: Future of ICT Governance and Global Security: Insights from William Plummer. *The Diplomat* (June 5) <https://thediplomat.com/2018/06/us-china-trade-future-of-ict-governance-and-global-security/>. Accessed November 1, 2019.
- Lairson, Thomas D., and David Skidmore. 2017. *International Political Economy: The Struggle for Power and Wealth in a Globalizing World*. New York: Routledge.
- Lardy, Nicholas. 2019. *The State Strikes Back: The End of Economic Reform in China?* Washington: Petersen Institute.
- Lin, Justin Y. 2012a. *Demystifying the Chinese Economy*. Cambridge: Cambridge University Press.
- . 2012b. *New Structural Economics*. Washington: World Bank.
- Lynch, David J. 2019. In Pursuing a Trade Deal, The U.S. May Be Asking China to do the Unthinkable. *Washington Post*, February 14. https://www.santafenewmexican.com/news/in-pursuing-a-trade-deal-the-u-s-may-be/article_ddb7f2cc-30dc-5a02-aea0-ce0604689983.html. Accessed November 1, 2019.
- McCarthy, Simone. 2019. Shunned in the U.S., Huawei Looks to Russia to Invent an AI Future. *South China Morning Post*, December 3. <https://www.scmp.com/news/china/diplomacy/article/3040264/shunned-us-huawei-looks-russia-invent-ai-future>. Accessed December 4, 2019.
- McKendrick, David G., and Richard F. Donor. 2000. *From Silicon Valley to Singapore*. Stanford: Stanford University Press.

- Melzer, Joshua P., and Neena Shenai. 2020. Why the Purchase Commitments in the US-China Trade Agreement Should Not be Replicated, Ever. *Brookings*, February 4. https://www.brookings.edu/blog/up-front/2020/02/04/why-the-purchase-commitments-in-the-us-china-trade-deal-should-not-be-replicated-ever/?utm_campaign=Global%20Economy%20and%20Development&utm_source=hs_email&utm_medium=email&utm_content=83149721. Accessed February 10, 2020.
- Monga, Celestin, and Justin Y. Lin. 2019. *The Oxford Handbook of Structural Transformation*. Oxford: Oxford University Press.
- Naughton, Barry. 2018. *The Chinese Economy: Adaptation and Growth*. 2nd ed. Cambridge: MIT Press.
- Naughton, Barry, and Kelli Tsai, eds. 2015. *State Capitalism, Institutional Adaptation and the Chinese Miracle*. Cambridge: Cambridge University Press.
- O’Keeffe, Kate, Aruna Viswanatha and Dustin Volz. 2019. U.S. Authorities Unveil a Sweeping Set of Charges Against China’s Huawei. *Wall Street Journal*, January 29. <https://www.wsj.com/articles/u-s-authorities-unveil-sweeping-set-of-actions-against-chinas-huawei-11548711284>. Accessed February 10, 2020.
- Perez, Bien. 2019. “China Tops World in Unicorns.” South China Morning Post, October 22. <https://www.scmp.com/tech/start-ups/article/3033902/china-tops-world-unicorns-ant-financial-bytedance-didi-chuxing-lead>. Accessed December 1, 2019. Accessed February 10, 2020.
- Pongratz, Stefan. 2018. Worldwide Telecom Equipment Market, 2018. Del’Oro Group, March 4. <https://www.delloro.com/telecom-equipment-market-2018-2/>. Accessed November 23, 2019.
- Pop, Valantina. 2019. Huawei Fails to Impress EU Officials With New Security Center. *Wall Street Journal* (March 5) <https://www.wsj.com/articles/huawei-fails-to-impress-eu-officials-with-new-cybersecurity-center-11551803395>. Accessed November 3, 2019.
- Rodrik, Dani. 2019. Where Are We in the Economics of Industrial Policies? VOXDEV, January 21. <https://voxdev.org/topic/public-economics/where-are-we-economics-industrial-policies>. Accessed November 2, 2019.
- Sanger, David, and Nicole Perlroth. 2014. N.S.A. Breached Chinese Servers Seen as Security Threat. *New York Times*, March 22, <https://www.nytimes.com/2014/03/23/world/asia/nsa-breached-chinese-servers-seen-as-spy-peril.html>. Accessed January 11, 2020.
- Sharma, Parv. 2018. 5G Ecosystem: Huawei’s Growing Role in 5G Standardization. *Counterpoint* (August 20) <https://www.counterpoint>

- [tresearch.com/huawei-role-5g-standardization/](https://www.tresearch.com/huawei-role-5g-standardization/). Accessed September 10, 2019.
- Strumpf, Dan, Ming Jun Kim, and Yifan Wang. 2018. How Huawei Took over the World. *Wall Street Journal* (December 25) <https://www.wsj.com/articles/how-huawei-took-over-the-world-11545735603>. Accessed November 2, 2019.
- Sun, Yutao, and Cong Cao. 2014. Demystifying Central Government R&D Spending in China. *Science* 345.6200 (August 29): 1006–1008. <https://science.sciencemag.org/content/345/6200/1006>. Accessed December 1, 2019.
- Swanson, Ana. 2019. Trump's Made for TV Trade War Has Few Entertained. *New York Times* (November 18) <https://www.nytimes.com/2019/11/18/business/trump-trade-war-china.html?action=click&module=Top%20Stories&pgtype=Homepage>. Accessed November 23, 2019.
- . 2020. Tougher Huawei Restrictions Stall After Defense Department Objects. *New York Times* (January 24) <https://www.nytimes.com/2020/01/24/business/economy/huawei-restrictions.html?searchResultPosition=7>. Accessed February 2, 2020.
- Tucker, P. 2020. US Defense R&D Funding Falls as China's Keeps Growing. *Defense One* (February 10) <https://www.defenseone.com/technology/2020/02/us-defense-rd-funding-falls-chinas-keeps-growing/163021/>. Accessed February 12, 2020.
- World Bank Group and Development Research Center. 2019. *Innovative China: New Drivers of Growth*. Washington: IBRD and DRC. <https://openknowledge.worldbank.org/handle/10986/32351>. Accessed November 15, 2019.



3

Weaponizing Globalization: Chinese High-Tech in the Crosshairs of Geopolitics

Francis Schortgen

1 Introduction

Competition is an ineluctable reality of great-power politics. In *The Tragedy of Great Power Politics*, John Mearsheimer states: “Although the intensity of their competition waxes and wanes, great powers fear each other and always compete with each other for power ... Great powers are rarely content with the current distribution of power; on the contrary, they face a constant incentive to change it in their favor ... Since no state is likely to achieve global hegemony, however, the world is condemned to perpetual great-power competition” (2001: 2). The accelerating twenty-first-century great-power competition between the United States and China has thus been largely framed in geopolitical terms (Dyer 2014; Goldstein 2015; Pillsbury 2016).

Contributing to the geopolitical aspect of U.S.-China rivalry are an intense debate about the relative weakening of U.S. global power and

F. Schortgen (✉)

Department of Political Science & International Studies, University of Mount Union, Alliance, OH, USA

hegemony (Cooley and Nexon 2020; Luce 2012; McCoy 2017; Rachman 2016; Walt 2018) and rising concerns about the viability of the U.S.-dominated liberal international order amid China's rising assertiveness on the global stage (Breslin 2013; Schweller and Pu 2011; Shambaugh 2013). Over the course of the last decade, and despite a deepening albeit uncomfortable interdependence (Karabell 2009; Roach 2014), the prevailing narrative surrounding U.S.-China relations has gradually, yet inexorably, shifted from strategic partnership to strategic competition (Yan 2010; Wang and Hu 2019; Zhao 2019).

With the world on the brink of a consequential power shift, the competition between the United States and China has largely been assessed through a geopolitical/geostrategic lens, much as prior great-power rivalries have been. As such, it has also prompted the question of whether conflict between the established and rising powers might be inevitable (Allison 2017; Coker 2015). Yet, this single-minded emphasis on the geopolitical and geostrategic ramifications of China's rise obscures the "growing significance of geoeconomics in contemporary power rivalries" (Csurgai 2018: 38). Indeed, the geoeconomics—if not "geostrategic economics" (Schortgen 2017)—of China's rise appear to compel a more focused and sophisticated analysis of U.S.-China relations. Speaking at a Center for Strategic and International Studies (CSIS) event on 15 May 2019, Singapore's Foreign Minister, Dr. Vivian Balakrishnan, reinforced that message by saying that "...viewing China purely as an adversary to be contained, will not work in the long term given the entire spectrum of issues that will require cooperation between the US and China. Without active cooperation between the two superpowers, all the global challenges of the next century cannot be solved. So competition with China is inevitable, but it does not have to be a zero-sum game. *Constructive competition* should take place within the bounds of established international norms and an adherence to international law" (MFA 2019, emphasis added).

Since 2017, the hope of a *constructive* competition between the world's two largest economies has quickly given way to a much more *destructive* variant with the launch of a tit-for-tat trade war—which, in fact, may be just a smoke-screen, albeit a non-negligible one, for a much more consequential challenge: innovation and technology leadership in the

twenty-first century. Not only is China successfully climbing up the development ladder from imitation to innovation (Tan 2011; Yip and McKern 2014; Van Someren and van Someren-Wang 2014; Zhou et al. 2016), which has nurtured a wave of industry disruptors (Tse 2015), but, combined with national-level innovation policies and strategic plans, it is also mounting a credible bid for twenty-first-century technology innovation and leadership (Fannin 2008, 2019; Lee 2018). This trend, combined with the argument that “[A] lead state’s rise to and fall from systemic preeminence are very much tied into the long-term fluctuations in innovation and production” (Thompson 1990: 202), reinforces the notion that, viewed from a broader systems-level perspective, the U.S.-China tensions are more the result of heightened technological competition from, than ballooning trade deficits with, China.

Put simply, China and the United States are competing for dominance on global economic, innovation, and technology levels. This chapter assesses China’s quest for the commanding heights of the twenty-first-century disruptive technologies—including fifth-generation (5G) wireless technology and artificial intelligence (AI)—and technological autonomy against the backdrop of Sino-U.S. great-power rivalry, as well as China’s *Made in China 2025* (中国制造2025) blueprint and the *New Generation Artificial Intelligence Development Plan* (新一代人工智能发展规划), which aims to transform China into a global leader in AI by 2030. Specifically, it offers a broad overview of the complex dynamics that have landed Chinese technology companies in the crosshairs of geopolitics.

2 Chinese Tech: Globalization, Competition, and Innovation Policy

Addressing a group of Russian students in September 2017, Russian president Vladimir Putin painted a more consequential picture of AI leadership. “Artificial intelligence is the future,” he said. “...comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world.” At

the same time, though, he also cautioned that “it would be strongly undesirable if someone wins a monopolist position” (Meyer 2017).

Washington’s reaction to China’s efforts to converge disruptive technologies, ostensibly for “digital transformation success” (*The Wall Street Journal* 2018), can best be elucidated by reflecting on three distinctive aspects: globalization, global competition, and national innovation policy.

2.1 Globalization and Competition

Notwithstanding rising anti-globalization sentiment in recent years, it is difficult to deny that the forces of globalization have triggered a global wave of knowledge and technology diffusion that “generates positive network effects through cross-pollination, as it enables technology-receiving countries to advance their own research and development” (Canuto 2018), thus reshaping the global innovation landscape and national innovation systems in consequential ways.

While foreign competition is shown to have positively impacted innovation in emerging market economies (Fu et al. 2011; Gorodnichenko et al. 2010), the disruptive potential of innovation offshoring for industrial countries can be very real indeed. A 2006 East-West Center Special Report argues that it “has created a competitive challenge of historic proportions for the United States. There are concerns that innovation offshoring may extend the ‘hollowing-out’ of the U.S. economy beyond manufacturing to include research and development, the most precious source of economic growth. Some fear that a loss of knowledge worker jobs to Asia may erode the nation’s innovative capabilities. These concerns may feed into increasing technological protectionism” (Ernst 2006: 2).

In China, as in many other emerging markets, the dissemination of technology and knowledge, over time, supported the evolution from adoption and adaptation—if not, more blatantly, imitation—to innovation (Yip and McKern 2016). Irrespective of the type of Chinese innovator (Greeven et al. 2019), however, most if not all entities also benefit from a conducive national innovation ecosystem.

2.2 National Innovation Policy

In its 13th Five-Year Plan (2016–2020), the Chinese government emphasizes the implementation of an innovation-driven development strategy (实施创新驱动发展战略) aimed at strengthening the leading role of scientific and technological innovation (强化科技创新引领作用) through, among other things, (1) the promotion of innovation and breakthroughs in strategic frontiers (推动战略前沿领域创新突破), (2) the optimization of the innovation organization system (优化创新组织体系), (3) the enhancement of innovation-based capabilities (提升创新基础能力), and (4) the creation of a regional innovation height (打造区域创新高地) (Law Info China 2016).

The goal of the *Made in China 2025* initiative is to see China transition from an export-oriented manufacturing superpower into an innovation-driven “advanced technology superstate” (Preeg 2005) by “(1) improving manufacturing innovation, (2) integrating technology and industry, (3) strengthening the industrial base, (4) fostering Chinese brands, (5) enforcing green manufacturing, (6) promoting breakthroughs in 10 key sectors, (7) advancing restructuring of the manufacturing sector, (8) promoting service-oriented manufacturing and manufacturing-related service industries, and (9) internationalizing manufacturing.” The industrial priority sectors, meanwhile, encompass: “(1) next-generation information technology, (2) high-end numerical control machinery and robotics, (3) aerospace and aviation equipment, (4) maritime engineering equipment and high-tech maritime vessel manufacturing, (5) advanced rail equipment, (6) energy-saving and new energy vehicles, (7) electrical equipment, (8) agricultural machinery and equipment, (9) new materials, and (10) biopharmaceuticals and high-performance medical devices” (Congressional Research Service 2019: 1). With its *New Generation Artificial Intelligence Development Plan*, Beijing has effectively committed itself to “make China the center of fundamental AI research and AI theory development; lead applied research and the development of cutting-edge AI products and services; build a world-leading domestic AI industry and dominate global markets for AI; and leverage AI to increase efficiency in traditional industries and move up the global value chain” (Carter and Crumpler 2019: vii).

In the most tangible ways, China's twenty-first-century national innovation policy lies unquestionably at the heart of Chinese President Xi Jinping's effort to "realize the great revival of the Chinese nation" (实现中华民族伟大复兴)—the centerpiece of his much-touted *China Dream* (中国梦). The emerging nexus between state and private industrial innovation (Zenglein and Holzmann 2019: 41–46) suggests the presence of a "technological developmental state" determined to dominate the industries and technologies of the future, with obvious implications for the landscape of global competition—particularly as far as advanced industrial economies are concerned (Wübbecke et al. 2016). Put differently, China's twenty-first-century industrial and innovation policy framework resembles the roll-out of a public-private partnership with Chinese characteristics designed to sustain the Chinese miracle into the 4th Industrial Revolution.

3 The Geopolitics/Geostrategy of U.S.-China Tech Rivalry

To date, U.S. strategy of sustaining a technology and innovation leadership role has largely failed to deliver concrete gains (Atkinson and Ezell 2012). Instead, it has merely added fuel to the simmering fire of Chinese techno-nationalism, if not actually pushing both sides to the brink of a Technology Cold War and/or technology decoupling. Either outcome would be counterproductive, not only for both parties but for the global economy and twenty-first-century innovation and technology landscapes more broadly.

The present situation compels a comparison with the 1980s when techno-globalism gave way to renewed techno-nationalism in the face of Japanese technological competition. Writing at the time, Robert Reich pointedly noted that "Americans are correct to worry about national technological prowess, but not about Japanese access to our technology. The emerging debate over how to restore America's technological pre-eminence misconstrues the problem and thus advances the wrong solutions. The underlying predicament is not that the Japanese are exploiting

our discoveries but that we can't turn basic inventions into new products nearly as fast as they can" (1987: 63). Over 30 years later, with the world on the cusp of the 4th Industrial Revolution, the United States ironically is confronting a similar predicament. "While our universities and tech firms still lead in cutting-edge innovation—from artificial intelligence to 5G wireless technology—it is China that has deployed them," argued former U.S. Treasury Secretary, Hank Paulson. "The United States is losing the commercialization race, a failure of our own making ... We need a catch-up strategy to close this gap quickly. And it's time for an honest assessment of how our government has let our innovators and businesses down" (Paulson 2019).

Reinforced by a long-standing post-Cold War status as an unrivaled global superpower, the United States appears to have gradually been caught in a downward spiral of hubris, arrogance, and complacency, in both a geopolitical and industrial competitiveness sense. The inevitability of sustained structural dominance of the Western international order—and unquestioned U.S. leadership thereof, buoyed by economic, military, and technological supremacy—has seemingly come to be taken at face value; more often than not on account of an ideological belief in the unwavering universality of the political and economic tenets of the post-Cold War Western-dominated international order. The structural fallacy of this worldview, however, is that it assumes a static perspective of world order where supremacy and competitive advantages can be sustained indefinitely without the need for dynamic adaptation. That belief, however, is as naïve as it is irresponsible and has increasingly begun to be called into question in concrete ways by irrefutable realities on the ground.

Krugman (1994) may have (in)famously dismissed the obsession with competitiveness as "not only wrong but dangerous, skewing domestic policies and threatening the international economic system ... Thinking in terms of competitiveness leads, directly and indirectly, to bad economic policies on a wide range of issues, domestic and foreign" (p. 30) and argued furthermore that "countries do not compete with each other the way corporations do" (p. 34). Research in international political economy, however, offers clear evidence that in fact "[C]ountries do compete to develop. This is one result of globalization. They compete for markets, for technology, for skills and investments ... In this competitive

environment, it is *government*, invariably, that provides distinctive advantages to firms” (Vietor 2007: 1; emphasis added). Indeed, the role and importance of government is oftentimes reflected in specific national innovation systems. At the same time, it is important to recognize that “[S]ystem’, in this context is historically contingent and *dynamic* rather than deterministic” (Miozzo and Walsh 2006: 141, emphasis added). Consequently, it should be readily apparent to industry leaders as well as national governments that indefinite enjoyment of a competitive edge over one’s rivals is highly improbable without clear awareness of dynamic changes in the business environment and/or broader international system, and correspondingly, the need for tangible strategic adjustment.

Yet, competitive challenges and fears of losing one’s dominance, whether in business or in geopolitics, are more often than not the result of an unwillingness or inability to recognize and accept the inherently dynamic nature of business or geopolitical environments, and the implications thereof for sustained competitive advantage or dominance in the international system. McGrath (2013) aptly reinforces that point in *The End of Competitive Advantage*, when she notes:

[T]he assumption of sustainable advantage creates a bias towards stability that can be deadly ... the presumption of stability creates all the wrong reflexes. It allows for inertia and power to build up along the lines of an existing business model. It allows people to fall into routines and habits of mind. It creates the conditions for turf wars and organizational rigidity. It inhibits innovation. It tends to foster denial reaction rather than proactive design of a strategic next step ... A long track record of relatively stable success caused the ambition to hungrily search for new opportunities to atrophy. Once that’s gone, it’s hard to regain quickly in the face of fast competitive onslaughts. (pp. 7–8)

America’s ability to aspire for continued and dominant technological leadership has also been constrained by broad-based, cumulative, and corrosive arrogance and hubris. Indeed, the sources of America’s deteriorating innovation capacity are not so much the result of collusive and nefarious practices by Chinese state capitalism to engineer industrial upgrading and secure a competitive advantage in emerging technology

platforms. Instead, it is largely an outgrowth of “underinvestment in R&D; an underperforming education system, particularly in science, technology, engineering, and math (STEM) fields; a decaying physical infrastructure; and an increasingly middling (by global standards) digital infrastructure—all within a public policy framework that does not comprehend the essential role of innovation and innovation policy in driving economic growth” (Atkinson and Ezell 2012: 33).

Adding to the pressures of innovation competitiveness is the fact that industrial economies no longer hold a monopoly on the building blocks of innovation success as Silicon Valley, talent, capital, and government investment in military and aerospace can now be found everywhere (Kao 2007: 65–75). Indeed, the growing global capability for (disruptive) innovation “is casting doubt that past U.S. first-mover advantages will continue to be realized ... As a result of global convergence ... multiple economies are competing on equal footing to be first-movers” (Tassey 2007, quoted in Atkinson and Ezell 2012: 88). Consequently, the relative erosion of America’s edge in technological innovation in the face of increasing Chinese competition is unlikely to be a transitory phenomenon.

A recent Independent Task Force Report on *Innovation and National Security* by the Council on Foreign Relations concluded that, in the areas of technological innovation and development, “...the United States risks falling behind its competitors, principally China” and that “China is closing the gap with the United States and will soon be one of the leading powers in emerging technologies” (Council on Foreign Relations 2019: vi). And yet, the tectonic shifts in the economic, industrial, and technological spheres appear to have been met with a widespread delusion of sustainable competitive advantage, fueled by political populism and economic nationalism/protectionism. President Trump might even be forgiven a touch of political hyperbole—“China has taken advantage of our country for 30 years and we can’t do that anymore” (April 5, 2019)—but the fact remains that America’s ideological and near-exclusive commitment to market dynamics at the expense of concerted national policies aimed at creating a comprehensive national innovation system and nurturing the industries of the future has contributed as much to the threat of the United States losing the race for global innovation as China’s state-led capitalist model and lingering concerns over forced technology

transfer and intellectual property (IP) theft. Indeed, at a broader structural level, U.S. innovation strategy has been extremely shortsighted. The U.S. government may well have “always acknowledged the importance of the broad technology ecosystem to AI development in theory, early USG [U.S. government] AI efforts focused almost exclusively on supporting AI research,” but it fell woefully short in laying the foundations for strategic success compared to China, which “invested significant resources and political capital in building a broad and deep foundation of human capital, supporting the development of enabling technologies, and creating incentives to support AI adoption, in addition to providing strong funding for research” (Carter and Crumpler 2019: 7).

Faced with the distinct reality of a relative decline in global power and influence—and the implications for structural rivalry—the United States has been engaged in a concerted effort to thwart the global ambitions of China, Inc. Huawei is but the latest, albeit most prominent target, of a concerted campaign by Washington to sustain the status quo. Citing national security concerns has become a default mechanism to defuse the competitive pressures of Chinese business globalization (Schortgen 2009). Chinese tech companies’ advances and the U.S. reactions thereto have in recent months prompted heightened speculation about the prospects of a “digital iron curtain” and led China’s ambassador to the United States to declare in December 2019 that “[S]ome people in this country are pointing fingers at the governing party and the national system of China, trying to rebuild the Berlin Wall between China and the US in the economic, technological, and ideological fields” (Cui 2019).

4 Caught in the Crosshairs: The Huawei Case

As the global economy embraces the disruptive technologies, Huawei is focusing on the notion of digitalization and intelligent connectivity—structured around the convergence of 5G, AI, and the Internet-of-Things (IoT). With regard to AI development, Huawei emphasizes technical innovation (by building full-stack technical capabilities through

sustained R&D), collaborative business practices (by providing customer-specific solutions), and open cooperation (Huawei 2018). The vision is nothing short of creating an “open, collaborative, and sustainable ecosystem” aimed at “establishing long-term competitiveness” (Huawei 2017: 7).

In recent months, Huawei has emerged as a critical, and arguably most visible, pawn in the unfolding great-power chess game between the United States and China for competitive advantage—indeed, dominance—of the technologies of the future. Meanwhile, Washington’s approach has been as erratic and transactional as it has been uncoordinated and lacking a coherent strategy. A recent publication from Oxford Innovation Labs offered an especially critical assessment of the situation, noting:

The fight threatens to undermine the evolving global dialogue on legitimate national security concerns related to the deployment of 5G networks and the critical services they will support. Enveloping 5G in the wider power struggle risks drowning out significant and documented concerns of particular companies’ security practices and accountability structures—most notably Huawei and ZTE.

The US strategy in this diplomatic chess match is unclear. Thus far the white noise from trade negotiations, IP theft, detainments and sanctions have prevented the US from articulating a convincing “clear and present danger” regarding 5G technologies. This impairs the country’s ability to make the case for an American-led international order as it did in the Cold War (Trubowitz and Harris 2019). The US has also failed to recognize that for other countries, the reality of an outright Huawei ban may not be practical, or even possible, due to existing networks and nations’ bilateral trade and diplomatic relationships. As a result, the US is impairing wider, internationally-coordinated engagement on the issue. (Hoffmann et al. n.d.: 4)

Established in 1987 in Shenzhen by former People’s Liberation Army (PLA) engineer Ren Zhengfei, Huawei has grown from a producer of Private Branch Exchange (PBE) switches into the world’s largest telecom equipment manufacturer in just over three decades, surpassing US\$100 billion in annual revenues for the first time in 2018. Its success, however,

has in large part been attributed to generous financial support from the Chinese government, amounting to as much as US\$75 billion over that time period, according to a *Wall Street Journal* review. Just over 60% of the total state financial support came between 1998 and 2008—US\$30.6 billion in credit lines by Chinese policy banks and another US\$15.7 billion in state loans, export credits, and other sources of financing (Yap 2019).

Huawei's determination to secure a competitive edge in 5G is underscored by an unrelenting commitment to research and development (R&D). Huawei's 2018 R&D budget only trailed those of Amazon, Alphabet, and Samsung Electronics. As a percentage of its annual sales, meanwhile, it has come close to rivaling that of Alphabet (see Table 3.1). Over the 2008–2018 period, Huawei's annual percentage of sales devoted to R&D averaged 12.6% for an average annual growth rate of 25.6% (see Fig. 3.1).

The annual R&D expenditure growth rate peaked in 2015 at nearly 46%. This milestone coincided with the announcement by Chinese Premier Li Keqiang in May of that year of *Made in China 2025*; an initiative that has since become a major lightning rod in U.S.-China relations and has squarely contributed to Huawei's global ambitions being caught in the crosshairs of geopolitics. Indeed, the company's international activities and prominence in 5G have consistently fueled perceptions of Huawei as posing a considerable risk to the security of global telecommunications networks; an alarmist view that is widely held by the U.S. government and at times reinforced by Huawei's threat of retaliation if foreign governments should implement policies to ban the company's 5G technology.

Table 3.1 Huawei's R&D commitment

	Value	Ranking
R&D Expenses (% of annual sales, 2018)	14	2
R&D Expenses (% Change, 2014 vs. 2018)	149	2
R&D Expenses (2018), US\$ billion	15.3	4
R&D Expenses (2014–2018), US\$ billion	58.2	7

Source: Author compilation (from [Bloomberg.com](https://www.bloomberg.com). "No Pay, No Gain: Huawei Outspends Apple on R&D for a 5G Edge," April 25, 2019)

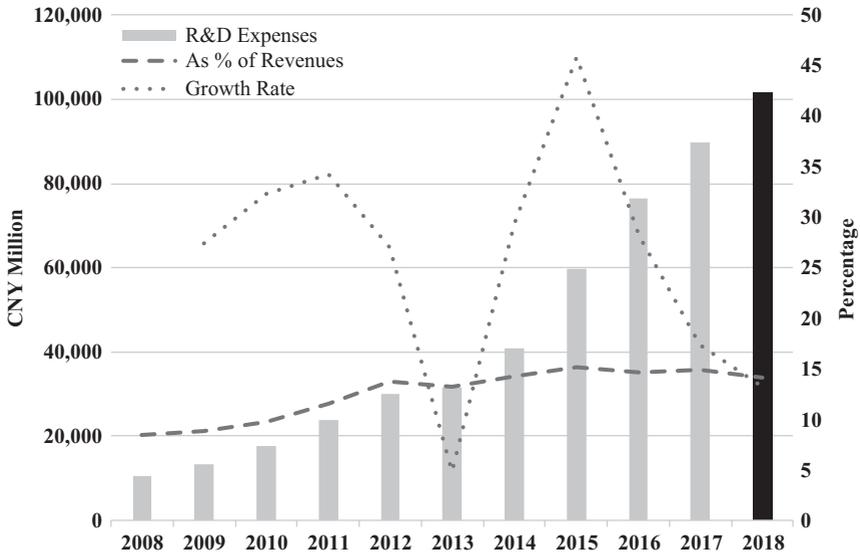


Fig. 3.1 Huawei's R&D expenses, 2008–2018. (Source: Author compilation [from Huawei Annual Reports, 2008–2018])

Announcing a new round of retaliatory measures against Chinese imports in response to China's purported unfair trade practices related to intellectual property theft and forced technology transfer, United States Trade Representative (USTR) Amb. Robert Lightizer accused the Chinese government of “aggressively working to undermine America's high-tech industries and our economic leadership through unfair trade practices and industrial policies like Made in China 2025” (United States Trade Representative 2018). Less than 4 months later, Vice President Mike Pence doubled down on U.S. criticism in a speech at the Hudson Institute, declaring: “Now, through the ‘Made in China 2025’ plan, the Communist Party has set its sights on controlling 90% of the world's most advanced industries, including robotics, biotechnology, and artificial intelligence” (Hudson Institute 2018). A former senior official at the U.S. National Security Agency, meanwhile, dismissed the alarmist view as a “black and white cartoon, and it really doesn't have to be that way ... It would be really hard for Huawei to do some of these nefarious things, and we can take simple and prudent steps to prevent it” (Dilanian 2020).

Beyond the alarmist rhetoric, the United States government has also stepped up efforts to discourage its allies from adopting Huawei's 5G equipment on account of purported national security concerns. Writing in a *Politico* op-ed on December 2, 2019, U.S. Secretary of State Mike Pompeo issued a blunt warning about the use of Huawei equipment in emerging 5G wireless networks by European allies:

Thanks to the way 5G networks are built, it's impossible to separate any one part of the network from another. With so much on the line, it's urgent that trustworthy companies build these twenty-first-century information arteries. Specifically, it's critical that European countries not give control of their critical infrastructure to Chinese tech giants like Huawei, or ZTE ... European companies like Ericsson and Nokia produce high-quality, price-competitive 5G equipment, as does the South Korean company Samsung. These firms are legitimate commercial actors that compete fairly. Even more importantly, they are headquartered in democracies that abide by the rule of law, and are accountable for their actions. The United States respects each nation's right to set technology policy, and decide how it will protect its people. But our friendships and alliances with EU states—ones ultimately built on a common love of freedom—demand that we raise our concerns when we see threats to our shared security. (Pompeo 2019)

Persistent warnings—especially from the United States—about the inherent security risks from the use of Huawei equipment, meanwhile, cast doubt on Huawei's future prospects. The UK government's decision in April 2019 to grant Huawei approval to build non-core parts of the UK's 5G network, for example, prompted America's National Security Agency to describe the decision as effectively giving the Chinese government "a loaded gun" (Swinford et al. 2019). And yet, looking at Huawei's overseas sales revenue growth over the last decade, it is not immediately apparent that Washington's May 2019 blacklisting of Huawei and stepped-up efforts to dissuade its allies to distance themselves from it have had a far-reaching impact on Huawei's sales. In fact, apart from being the world's leading telecom equipment manufacturer, Huawei has also established itself as a key player in the global smartphone market. As the world's second-largest smartphone producer, it appears increasingly poised to rival South Korea's Samsung Electronics for global leadership

position (see Fig. 3.2). In Q1 2019, Chinese smartphone manufacturers were the only ones to register year-on-year (YoY) shipment volume increases, with Huawei leading the way with 50% YoY growth.

Source: Author compilation (from Huawei Annual Reports, 2009–2018)

A closer look at the data does indicate that following the official announcement of the *Made in China 2025* plan, overseas sales revenue has decreased from an average 64% of overseas revenue between 2009 and 2014 to just over 50% between 2015 and 2018 (see Table 3.2), suggesting that sustained international growth is not immune to voiced security concerns—mostly in advanced economies—about the company's network equipment.

Even so, Huawei still managed to close 2019 with a record US\$122 billion in revenue, marking an 18% YoY increase, and thus highlighting

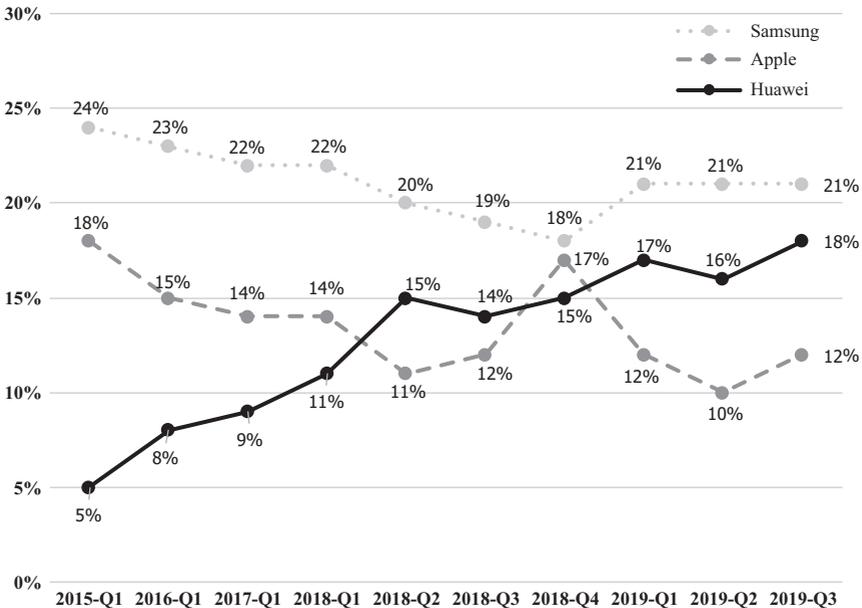


Fig. 3.2 Global smartphone market share (%). (Source: Author compilation [from Counterpoint Research data])

Table 3.2 Geographic sales revenue, 2009–2018 (CNY million)

	Total	China	%	Overseas	%
2009	149,059	59,038	39.6	90,021	60.4
2010	185,176	64,771	35.0	120,405	65.0
2011	203,929	65,565	32.2	138,364	67.8
2012	220,198	73,579	33.4	146,619	66.6
2013	239,025	82,785	34.6	156,240	65.4
2014	288,197	108,674	37.7	179,523	62.3
2015	395,009	167,690	42.5	227,319	57.5
2016	521,574	236,512	45.3	285,062	54.7
2017	603,621	312,532	51.8	291,089	48.2
2018	721,202	372,162	51.6	349,040	48.4

the limitations of Washington’s efforts to constrain the global ambitions of Chinese tech companies. In fact, as reported by the *Wall Street Journal*, “Many American companies assemble chips overseas, allowing them to continue selling to Huawei. At the same time, Huawei turned to alternate sources—including its in-house chip supplier, HiSilicon—for many components. The company now is capable of building 5G equipment entirely free of any U.S. parts” (Strumpf 2019).

5 Destructive or Constructive Competition?

Over the last two decades, China has begun a subtle yet irrefutable process of gradual distancing from Deng Xiaoping’s “24-character strategy”—“observe calmly, secure our position, cope with affairs calmly, hide our capacities and bide our time, be good at maintaining a low profile, and never claim leadership” (冷静观察, 稳住阵脚, 沉着应付, 韬光养晦, 有所作为, 决不当头). Instead, it has capitalized on a “period of strategic of opportunity” (战略机遇期) to push for a new type of great-power relations (新型大国关系) by, among other things, aiming for steady upgrading of its economic and technological competitiveness and globalizing presence.

In hindsight, the decision by the Chinese leadership to officially announce its technology ambitions—through the release of the *Made in China 2025* vision in 2015 and the *New Generation Artificial Intelligence*

Development Plan in 2017—might have been ill-advised. Former U.S. Secretary of State John Kerry suggested as much in May 2019, opining that “[I]t would have probably been smart to go try to do it and not announce it, because the announcement was heard in Washington and elsewhere” (South China Morning Post 2019). The announcements unquestionably contributed to the drawing of increasingly rigid battle lines in the U.S.-China competition for the commanding heights of the industries and technologies of the future, as China’s declared quest for autonomy and supremacy in emerging technologies has been perceived by Washington as a clear and present threat to its national security and economic competitiveness going forward.

At the same time, the rise of Huawei and other Chinese tech giants also offers a cautionary tale about the dangers of strategic complacency and lack of strategic policy—trends that have only been exacerbated by the forces of deglobalization and protectionism that have assumed increasing political and economic prominence in many advanced industrial economies in recent years. It is this reality, combined with China embarking on what Princeton University historian Harold James described as a “road to new globalization” (James 2019) with the 2013 launch of its Belt and Road Initiative (一帶一路), that has effectively landed the Chinese technology companies squarely in the crosshairs of geopolitics.

The goal of this chapter has been to put the challenges facing Chinese technology companies as they aim for autonomy and supremacy in the area of emerging and competitiveness-influencing technologies in the broader context of U.S.-China structural rivalry. The race for global innovation constitutes a critical inflection point in U.S.-China relations on account of the consequential implications for international politics and the global distribution of power. And yet, the comparative lack of a coherent U.S. strategic approach to innovation in emerging technologies should not become grounds for engaging in geopolitically motivated, and ultimately counterproductive, efforts to stymie the growth of China’s tech industry. How will the forces of techno-nationalism shape U.S.-China relations going forward? In innovation studies, the concept of “open innovation” had been described as “a necessary organizational adaptation to changes in the environment” (Fu 2015: 141) for firms. At

the national level, it retains a similar relevance considering that the globalization of innovation and innovation leadership involve collaboration with other countries (Kennedy 2018). Global innovation networks can be expected to thrive through open innovation in much the same way as global production networks capitalized on the dynamics of globalization and global convergence. At the same time, however, it has also been argued that national economies' propensity to systemic openness and protectionism flow from an "alternating pattern by the ascent of system leaders and the subsequent successful attempt of technological followers to catch up with the leaders" (Thompson and Vescera 1992: 493). At this juncture, it would appear as though China's catch-up wave of technological competitiveness, coinciding as it does with a relative decline of U.S. hegemony, has the distinct potential of ushering in an era of heightened techno-nationalism and economic/industrial protectionism, thus casting doubt on the near-term sustainability of open innovation.

Yet, the cost of closing the door on open innovation would be significant for "China, whatever its advances in technological research, because it still relies heavily on foreign knowhow and imports. The US, meanwhile, in pursuing a protectionist agenda under president Donald Trump, may end up spurring innovation in China rather than hindering its progress. There is also a wider significance. The decoupling of the technology sectors between the two countries is becoming a reality. The danger is that this decoupling turns into a giant rift—one that splits the internet between dominant US and Chinese spheres" (Financial Times 2019).

Alas, the longer-term costs (for both parties) from such a course would far outweigh its potential short-term gains. The intersection of geopolitics and quest for technology leadership, however has brought the United States and China perilously close to the brink of a Technology Cold War that would have far-reaching implications for global technology development going forward. Whether it can be averted through *constructive* competition in the emerging technologies realm remains to be seen. Up until such time, Chinese technology companies are bound to squarely remain in the crosshairs of geopolitics.

References

- Allison, Graham. 2017. *Destined for War: Can America and China Escape Thucydides's Trap?* New York: Houghton Mifflin Harcourt.
- Atkinson, Robert D., and Stephen J. Ezell. 2012. *Innovation Economics: The Race for Global Advantage*. New Haven: Yale University Press.
- Breslin, Shaun. 2013. China and the Global Order: Signaling Threat or Friendship? *International Affairs* 89 (3): 615–634.
- Canuto, Otaviano. 2018. How Globalization Is Changing Innovation. *World Economic Forum* (August 17) <https://www.weforum.org/agenda/2018/08/globalisation-has-the-potential-to-nurture-innovation-heres-how>. Accessed December 16, 2019.
- Carter, William A. and William D. Crumpler. 2019. *Smart Money on Chinese Advance in AI*. A Report of the CSIS (Center for Strategic and International Studies) Technology Policy Program. September. https://csis-prod.s3.amazonaws.com/s3fs-public/publication/190930_SmartMoneyChinaAdvancesInAI_interior_v3_WEB.pdf. Accessed December 19, 2019.
- Coker, Christopher. 2015. *The Improbable War: China, The United States and Logic of Great Power Conflict*. New York: Oxford University Press.
- Congressional Research Service (CRS). 2019. *The Made in China 2025 Initiative: Economic Implications for the United States*. April 12. <https://fas.org/sgp/crs/row/IF10964.pdf>. Accessed December 21, 2019.
- Cooley, Alexander, and Daniel Nexon. 2020. *Exit from Hegemony: The Unraveling of the American Global Order*. New York: Oxford University Press.
- Council on Foreign Relations (CFR). 2019. *Innovation and National Security: Keeping Our Edge*. Independent Task Force Report No. 77. https://www.cfr.org/report/keeping-our-edge/pdf/TFR_Innovation_Strategy.pdf. Accessed December 24, 2019.
- Csurgai, Gyula. 2018. The Increasing Importance of Geoeconomics in Power Rivalries in the Twenty-First Century. *Geopolitics* 23 (1): 38–46.
- Cui, Tiankai. 2019. Cui Tiankai: There Is No 'Thucydides Trap.' *Caixin*, December 5. <https://www.caixinglobal.com/2019-12-05/cui-tiankai-there-is-no-thucydides-trap-101491098.html>. Accessed December 29, 2019.
- Dilanian, Ken. 2020. Does China's Huawei Really Pose a Threat to National Security? *NBC News*, January 28. <https://www.nbcnews.com/politics/national-security/does-china-s-huawei-really-pose-threat-national-security-n1124746>. Accessed February 25, 2020.

- Dyer, Geoff. 2014. *The Contest of the Century: The New Era of Competition with China—And How America Can Win*. New York: Alfred A. Knopf.
- Ernst, Dieter. 2006. *Innovation Offshoring: Asia's Emerging Role in Global Innovation Networks*. East-West Center Special Report No. 10. July.
- Fannin, Rebecca A. 2008. *Silicon Dragon: How China Is Winning the Tech Race*. New York: McGraw-Hill.
- Fannin, Rebecca A. 2019. *Tech Titans of China: How China's Tech Sector Is Challenging the World by Innovating Faster, Working Harder, and Going Global*. Boston: Nicholas Brealey Publishing.
- Financial Times*. 2019. The World Should Beware a Technology Cold War. December 11. <https://www.ft.com/content/0685c976-1b64-11ea-97df-cc63de1d73f4>. Accessed December 30, 2019.
- Fu, Xiaolan. 2015. *China's Path to Innovation*. New York: Oxford University Press.
- Fu, Xiaolan, Carlo Pietrobelli, and Luc Soete. 2011. The Role of Foreign Technology and Indigenous Innovation in the Emerging Economies: Technological Change and Catching-Up. *World Development* 39 (7): 1204–1212.
- Goldstein, Lyle J. 2015. *Meeting China Halfway: How to Defuse the Emerging US-China Rivalry*. Washington, DC: Georgetown University Press.
- Gorodnichenko, Yuri, Jan Svejnar, and Katherine Terrell. 2010. Globalization and Innovation in Emerging Markets. *American Economic Journal: Macroeconomics* 2 (2): 194–226.
- Greeven, Mark J., George S. Yip, and Wei Wei. 2019. *Pioneers, Hidden Champions, Changemakers, and Underdogs: Lessons from China's Innovators*. Cambridge: MIT Press.
- Hoffman, Stacie, Samantha Bradshaw and Emily Taylor. n.d. Networks and Geopolitics: How great power rivalries infected 5G. Oxford Information Labs. https://oxil.uk/publications/geopolitics-of-5g/Geopolitics_5G_Final.pdf. Accessed January 10, 2020.
- Huawei. 2017. *Digitalization: Think, Act, Accomplish*. White Paper. <https://www.huawei.com/en/media/CORPORATE/PDF/white%20paper/embrace-digitalization-en-v2.pdf>. Accessed December 15, 2019.
- . 2018. AI + 'Cloud-Pipe-Device' Promotes Smart Society. *ICT Insights* 23. https://e.huawei.com/en/publications/global/ict_insights/201806041630/focus/201808170838. Accessed December 15, 2019.
- Hudson Institute. 2018. Vice President Mike's Remarks on the Administration's Policy Towards China. October 4. <https://www.hudson.org/events/1610->

[vice-president-mike-pence-s-remarks-on-the-administration-s-policy-towards-china102018](#). Accessed December 15, 2019.

- James, Harold. 2019. China's Road to New Globalization. *World Finance*. Summer: 38–39.
- Karabell, Zachary. 2009. *Superfusion: How China and America Became One Economy and Why the World's Prosperity Depends on It*. New York: Simon & Schuster.
- Kao, John. 2007. *Innovation Nation: How America Is Losing Its Innovation Edge, Why It Matters, and What We Can Do to Get It Back*. New York: Free Press.
- Kennedy, Andrew B. 2018. *The Conflicted Superpower: America's Collaboration with China and India in Global Innovation*. New York: Columbia University Press.
- Krugman, Paul. 1994. Competitiveness: A Dangerous Obsession. *Foreign Affairs* 73 (2): 28–44.
- Law Info China. 2016. *Outline of the 13th Five-Year Plan for the National Economic and Social Development of the People's Republic of China*. March 16. <http://www.lawinfochina.com/display.aspx?id=3fe76ec605b256e9bdfb&lib=law>. Accessed December 19, 2019.
- Lee, Kai-Fu. 2018. *AI Superpowers: China, Silicon Valley, and the New World Order*. New York: Houghton Mifflin Harcourt.
- Luce, Edward. 2012. *Time to Start Thinking: America in the Age of Descent*. New York: Atlantic Monthly Press.
- McCoy, Alfred W. 2017. *In the Shadows of the American Century: The Rise and Decline of U.S. Global Power*. Chicago: Haymarket Books.
- McGrath, Rita. 2013. *The End of Competitive Advantage: How to Keep Your Strategy Moving as Fast as Your Business*. Boston: Harvard Business School Publishing.
- Mearsheimer, John J. 2001. *The Tragedy of Great Power Politics*. New York: W. W. Norton.
- Meyer, David. 2017. Vladimir Putin Says Whoever Leads in Artificial Intelligence Will Rule the World. *Fortune* (September 4) <https://fortune.com/2017/09/04/ai-artificial-intelligence-putin-rule-world/>. Accessed December 15, 2019.
- MFA (Ministry of Foreign Affairs). 2019. Edited transcript of remarks by Singapore's Minister of Foreign Affairs, Dr. Vivian Balakrishnan, on 'Seeking Opportunities amidst Disruption—A View from Singapore' at the Center for Strategic & International Studies. https://www.mfa.gov.sg/Newsroom/Press-Statements-Transcripts-and-Photos/2019/05/20190516_FMV-Washington%2D%2D-CSIS-Speech. Accessed December 5, 2019.

- Miozzo, Marcela, and Vivien Walsh. 2006. *International Competitiveness and Technological Change*. New York: Oxford University Press.
- Paulson, Henry M. 2019. We're Letting China Win the 5G Race. It's Time to Catch up. *The Washington Post*, December 16.
- Pillsbury, Michael. 2016. *The Hundred-Year Marathon: China's Secret Strategy to Replace America as the Global Superpower*. New York: St. Martin's Griffin.
- Pompeo, Mike. 2019. Europe Must Put Security First with 5G. *Politico* (December 2) <https://www.politico.eu/article/europe-must-put-security-first-with-5g-mike-pompeo-eu-us-china/>. Accessed December 15, 2019.
- Preeg, Ernst H. 2005. *The Emerging Chinese Advanced Technology Superstate*. Arlington: Manufacturers Alliance for Productivity and Innovation (MAPI).
- Rachman, Gideon. 2016. *Easternization: Asia's Rise and America's Decline from Obama to Trump and Beyond*. New York: Other Press.
- Reich, Robert B. 1987. The Rise of Techno-Nationalism. *The Atlantic Monthly*. May: 63–69.
- Roach, Stephen. 2014. *Unbalanced: The Codependency of America and China*. New Haven: Yale University Press.
- Schortgen, Francis. 2009. A Contextual View of Chinese Enterprise Internationalization. In *China Rules: Globalization and Political Transformation*, ed. Ilan Alon, Julian Chang, Marc Fetscherin, Christoph Lattemann, and John R. McIntyre, 15–45. New York: Palgrave Macmillan.
- . 2017. Geostrategic Economics in the 21st Century: China, America and the Trans-Pacific Partnership. In *Advances in Geoeconomics*, ed. J. Mark Munoz, 123–131. New York: Routledge.
- Schweller, Randall L., and Pu. Xiaoyu. 2011. After Unipolarity: China's Visions of International Order in an Era of US Decline. *International Security* 36 (1): 41–72.
- Shambaugh, David. 2013. *China Goes Global: The Partial Power*. New York: Oxford University Press.
- South China Morning Post. 2019. China declaring AI ambitions wasn't 'wisest decision' as it alarmed the US, former secretary of state John Kerry says. May 18. <https://www.scmp.com/tech/article/3010773/chinadeclaring-ai-ambitions-wasnt-wisest-decision-it-alarmed-us-kerry-says>. Accessed December 19, 2019.
- Strumpf, Dan. 2019. Huawei's Revenue Hits Record \$122 Billion in 2019 Despite U.S. Campaign. *The Wall Street Journal*, December 30.
- Swinford, Steven, Ben-Riley-Smith, and James Cook. 2019. Theresa May's Decision to Let Huawei Help Build 5G Network Risks Handing China a 'Loaded Gun,' US Warns. *The Telegraph*, April 24. <https://www.telegraph>.

- [co.uk/politics/2019/04/24/theresa-may-warned-risks-damaging-special-relationship-us-huawei/](https://www.co.uk/politics/2019/04/24/theresa-may-warned-risks-damaging-special-relationship-us-huawei/). Accessed December 20, 2019.
- Tan, Yinglan. 2011. *Chinnovation: How Chinese Innovators Are Changing the World*. Singapore: John Wiley & Sons.
- Tassey, Gregory. 2007. *The Technology Imperative*. Northampton: Edward Elgar.
- The Wall Street Journal*. 2018. Huawei Drives Convergence of Disruptive Technologies for Digital Transformation Success. May 7. <https://partners.wsj.com/huawei/news/digitally-advanced-traditional-enterprises-will-lead-digital-era/>. Accessed December 15, 2019.
- Thompson, William R., and Lawrence Vescera. 1992. Growth Waves, Systemic Openness, and Protectionism. *International Organization* 46 (2): 493–532.
- Thompson, William R. 1990. Long Waves, Technological Innovation, and Relative Decline. *International Organization* 44 (2): 201–233.
- Trubowitz, Peter, and Peter Harris. 2019. Will Dysfunctional Politics Finally End the American Century? <https://www.chathamhouse.org/expert/comment/will-dysfunctional-politics-finally-end-american-century>. Accessed January 10, 2020.
- Tse, Edward. 2015. *China's Disruptors: How Alibaba, Xiaomi, Tencent, and Other Companies Are Changing the Rules of Business*. New York: Penguin.
- United States Trade Representative (USTR). 2018. USTR Issues Tariffs on Chinese Products in Response to Unfair Trade Practices. *Press Release* (June 15) <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/june/ustr-issues-tariffs-chinese-products>. Accessed December 20, 2019.
- Van Someren, Taco C.R., and Shuhua van Someren-Wang. 2014. *Innovative China: Innovation Race between East and West*. Heidelberg: Springer Science & Business Media.
- Victor, Richard H.K. 2007. *How Countries Compete: Strategy, Structure, and Government in the Global Economy*. Boston: Harvard Business School Press.
- Walt, Stephen M. 2018. *The Hell of Good Intentions: America's Foreign Policy Elite and the Decline of U.S. Primacy*. New York: Farrar, Straus and Giroux.
- Wang, Jisi, and Ran Hu. 2019. From Cooperative Partnership to Strategic Competition: A Review of China–US Relations 2009–2019. *China International Strategy Review* 1 (1): 1–10.
- Wübbecke, Jost, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad. 2016. *Made in China 2025: The Making of a High-Tech Superpower and Consequences for Industrial Countries*. *MERICs (Mercator Institute for China Studies) Papers on China*, No. 2. December.

- Yan, Xuetong. 2010. The Instability of China–US Relations. *The Chinese Journal of International Politics* 3 (3): 263–292.
- Yap, Chuin-Wei. 2019. State Support Helped Fuel Huawei’s Global Rise. *The Wall Street Journal*, December 25. <https://www.wsj.com/articles/state-support-helped-fuel-huaweis-global-rise-11577280736>. Accessed December 27, 2019.
- Yip, George, and Bruce McKern. 2014. Innovation in Emerging Markets—The Case of China. *International Journal of Emerging Markets* 9 (1): 2–10.
- . 2016. *China’s Next Strategic Advantage: From Imitation to Innovation*. Cambridge: MIT Press.
- Zenglein, Max J., and Anna Holzmann. 2019. *Evolving Made in China 2025: China’s Industrial Policy in the Quest for Global Tech Leadership*. MERICS (Mercator Institute for China Studies) Papers on China, No. 8. July.
- Zhao, Minghao. 2019. Is a New Cold War Inevitable? Chinese Perspectives on US–China Strategic Competition. *The Chinese Journal of International Politics* 12 (3): 371–394.
- Zhou, Yu, William Lazonick, and Yifei Sun, eds. 2016. *China as an Innovation Nation*. New York: Oxford University Press.



4

Helping Hands for Huawei: Dialing into China's Technology Policy to Understand Its Contemporary Support for Huawei

Jean-Marc F. Blanchard

1 Introduction

It seems hardly a day goes by that Huawei is not in the news.¹ This is hardly surprising. Huawei is a leading global telecommunications firm, patent powerhouse, and, per most, is at the technological frontier in terms of 5G, a wireless telecommunications standard promising revolutionary changes in speed, capacity, and efficiency (Zhang 2013; Ernst 2017; Fund 2019). Huawei is also a symbol of the spread of non-resource-related outward foreign direct investment (FDI) from the People's Republic of China (PRC/China) and China's penetration of the developing world. In addition, as will be documented, over the past 5 years or so the United States has prominently targeted Huawei. What is different from the past is the PRC's intensified backing for Huawei, in terms of not only strong words but threatening sanctions against firms from countries like the United States, as well as states such as Germany and the United

J.-M. F. Blanchard (✉)

Wong Center for the Study of Multinational Corporations,
Los Gatos, CA, USA

Kingdom that appear willing to shun Huawei (Bennhold and Ewing 2020; Chen 2020). This, too, should not surprise, even though Huawei is a private enterprise, albeit one many believe has multiple, close links with the Chinese government (US House 2012; Balding and Clarke 2019).

Huawei is an extensively studied company. Business scholars have chronicled its features. Former employees, political and economic commentators, and specialists in the PRC's political economy have detailed the factors—for example, business culture, employee compensation, research and development (R&D) spending, and marketing strategy—responsible for its successes (Low 2007; Harwit 2007; Lairson 2010; Zhang 2013; Pawlicki 2017). Yet others have discussed Huawei within the context of government policies toward the information and communication technology (ICT) sector and Huawei's situation abroad.² Few, though, have examined Huawei within the broader politico-economic milieu. Put differently, they have not considered how variables such as security, political, economic, status, and domestic political considerations operate in tandem to produce the Chinese government policies toward Huawei that we have seen and witness today. This chapter makes use of a qualitative approach, reviewing Chinese government actions and statements, Chinese official media, foreign government documents in the public domain, think tank reports, and leading secondary source literature to identify and expound upon these causal factors.

Huawei is “in the news” ubiquitously and thus warrants attention. Even if it were not, analyzing it within the context of China's high-technology policies has enduring policy/business value. One reason is that it provides a solid basis for understanding China's contemporary patronage and protection of *Chinese* high-tech companies. A second is that it helps us forecast Beijing's future stance toward Huawei and other Chinese high-tech companies as well as non-PRC multinational corporations (MNCs). A third is that it identifies causal variables that would need to change for China's policies toward Huawei to change. From an analytical standpoint, probing the Huawei case within a broader context reveals the multitude of factors that shape China's high-tech policy and its support of its MNCs. It further shows the power of security and political considerations in shaping Chinese domestic and foreign *economic* policy.

This chapter highlights three powerful factors propelling Beijing's intense support of technology firms like Huawei. First, the technology sector is critical for China's international security. Second, advanced technology companies like Huawei are reflections of China's effort to move up the value-added chain and one component of its effort to address economic challenges such as rising labor costs. Third, the ICT sector has domestic import given the Chinese Communist Party (CCP)/government's anxieties about domestic information control. Other reasons, not analyzed herein, are that ICT FDI, sales, and services are one of the political tools China is exploiting to deepen its ties with and soft power in other countries (Ellis 2011; Li and Ronning 2013; Cody 2017). In addition, attacks against companies like Huawei are status issues for China as Huawei is a leading Chinese global MNC and top Chinese technology company, and China seems embarrassed by its current place in global value-added chains (China Daily 2014).

This chapter consists of five parts. The next (second) section provides an overview of the PRC's technology policy including one of its major recent initiatives ("Made in China 2025") while identifying various drivers of Chinese policy. The third delves into some of Beijing's measures with respect to the telecommunications sector and some of the specific variables fueling such measures. The part on the telecommunications sector also proffers some material illustrating the ways the Chinese government has supported Huawei. The fourth discusses the contemporary "assault" against Huawei, concentrating on the United States, and reaction of Huawei and the PRC, with a focus on the latter. The fifth section constitutes the conclusion.

2 China's Technology Policy

The PRC's technology policy from 1949 through the 1970s embodied two central elements, a military (dominant) one focusing on the development of nuclear weapons and missiles/rockets and an economic one involving simple industrial technologies. Relevant drivers include the need to meet the American and Soviet challenge, the desire to boost China's hard power, the quest for geopolitical influence, the Sino-Soviet

split (which led to an end to Soviet assistance to China), and status considerations (Suttmeier and Yao 2004; Feigenbaum 2017; Gewirtz 2019). After Deng Xiaoping took power in the 1970s, he launched the Four Modernizations, of which Science & Technology (S&T) was one key component. At this time, Chinese elites viewed S&T as a pathway to economic development and strengthening national power and greater status for the country and CCP. Due to resource constraints and China's relatively backward state with respect to economic and S&T, Beijing's main foci were setting priorities, supporting practical and realistic innovation ventures, and acquiring technology and know-how from abroad through strategic purchases, enhancing education and research, and boosting exchanges (Fingar et al. 1984; Simon 1989; Gu 1999).

In the 1980s, Beijing put new stress on S&T, seeking progress in spheres such as agriculture, automation, biotech, energy, information technology (IT), robotics, software, among others, to spur economic development and reduce China's resource needs. China's measures for improving S&T included increased R&D spending, greater support for as well as the reform of research institutes and university research, and new incentives for more useful R&D. Beijing also welcomed FDI, acquired technology, maintained a porous intellectual property (IP) rights regime (which facilitated the exploitation of foreign technology), and encouraged international exchanges. Finally, it created space for the emergence of private Chinese technology companies, among which were Lenovo (then called Legend) and Huawei (Gu 1999; Larçon and Barré 2009; Feigenbaum 2017). The 1980s witnessed the launch of several major S&T initiatives, among which the most well-known are the 863 Project and the Torch Program. These programs entailed heightened levels and new forms of R&D funding, further changes to the S&T system, efforts to focus research programs, the privatization of S&T, the purchase of foreign technologies, and the creation of high-tech development zones (HTDZs) (Gu 1999; US DOS 2006; Larçon and Barré 2009). In the 1990s, military, not economic, factors gave new impetus to China's quest for technological development. Among other things, the rapid defeat of Saddam Hussein after his invasion of Kuwait in 1990 highlighted the value of technology because the United States and its allies extensively used it to crush Iraq (Lindsay 2014/15). The marquee government

program for the 1990s clearly was the 973 Program. This and other initiatives reflect Beijing's continuing efforts to privatize S&T, support basic and applied research, and augment funding for S&T. Aside from military and economic objectives, China sought to leverage S&T for social ends such as healthcare (US DOS 2006).

The 2000s represented a watershed for the PRC's technology policy, with China intensifying its focus on domestic S&T. One driver was China's accession to the World Trade Organization (WTO), which escalated competitive pressures on Chinese firms by opening the floodgates to foreign goods and MNCs. It also increased China's obligations to honor foreign IP rights (IPR) and technical standards. Commensurately, China found itself paying huge amounts in licensing fees, which sliced the already razor-thin profit margins of many Chinese products. These developments provided strong incentives for China to develop Chinese tech and standards. Another cause was the sense among Chinese elites that foreign MNCs would not transfer their best technology to China for access to the China market and indeed that Western MNCs would exploit IPR and standards to dominate markets and Chinese companies (Suttmeier and Yao 2004; Kennedy 2006; Brandt and Thun 2010; Zhao 2010; Williams et al. 2011). Consequential security and political drivers this period including the Color Revolutions in Eastern Europe, South/Southeast Asia, and elsewhere and Edward Snowden's revelations of extensive American spying activities in conjunction with Chinese leaders dismay at their country's continuing dependence on foreign technology which they "consider unseemly for a great nation" and unacceptable from a national security standpoint. These represented potent stimuli for China to strengthen its S&T as well as control over ICT and communication networks (Rowen 2008; Chen 2010; Lindsay 2014/15). On a related note, American military modernization, pressure on others not to sell arms to China, democracy promotion, torpedoing of China National Offshore Oil Corporation's attempt to buy Unocal, and efforts to exclude Huawei from projects fueled a sense that United States was trying to limit China's rise and that Chinese tech was needed to counter this (Craig 2007; Ernst 2011; Nathan and Scobell 2012).

The general features of China's technology policy in the 2000s mirrored what had been done in the past. Top CCP and government leaders

at the central and subnational level continuously stressed the importance of improving China's S&T and developing Chinese technology. Beijing significantly and continuously boosted R&D funding, built large numbers of large HTDZs, and leveraged government procurement funds to support domestic tech. Furthermore, it forced foreign MNCs to transfer technology, launched aggressive industrial espionage initiatives, and pursued numerous initiatives (e.g., participation in international standard setting bodies) to promote Chinese technical standards within and without China. Aside from these measures, Beijing provided rising support for education, particularly science and engineering programs, coordinated private and public S&T actors, and aggressively pursued international cooperation (Suttmeier and Yao 2004; Larçon and Barré 2009; Ernst 2011; Segal 2008; Williams et al. 2011). It should not be overlooked that Beijing enthusiastically supported outward FDI by Chinese technology companies as a pathway to, among other things, acquire IP and know-how, access markets, and gain scale. Support came in the form of easier access to foreign exchange, simplified approval processes, preferential loans, tax breaks, and information services (Blanchard 2019).

The marquee government program for the 2000s was the Medium- and Long-Term Program on Scientific and Technological Development (2006–2020) (hereafter “MLP”). It called for China to become an innovation-oriented society by 2020 and a world leader in S&T by 2050 and emphasized “indigenous innovation” (自主创新). Indigenous innovation meant China should inter alia: increase growth from domestic technology; reduce its dependence on imported technology; garner more patents; set more standards; and have more cited scientific papers in quality journals. The MLP targeted general areas such as agriculture, energy, public security, transportation, and high-tech. Within the realm of high-tech, the government sought progress in aerospace, large integrated circuits (IC), wireless mobile telecommunications, pharmaceuticals, and software. Specific MLP elements included more R&D spending, tax breaks, new standards setting efforts, better IPR (albeit strategically), and more HTDZs. The MLP stressed using government procurement as a way to support domestic technology. The government also squeezed foreign MNCs to transfer technology, establish R&D centers in China, and license IP cheaply. Additionally, the MLP involved S&T system

improvements. The roots of the MLP included an interest in promoting growth and higher incomes, the quest for more sustainable development, a desire to break the monopoly of Western tech MNCs, a stronger sense that foreign companies would not transfer tech, and the perceived demands of twenty-first-century warfare (Cao et al. 2006; Ernst 2011; Wolff 2011).

The early part of the 2010s witnessed the emergence of a new CCP Secretary and President Xi Jinping and other top Chinese party and government leaders. Irrespective, Chinese elites' strong interest in moving up the ranks of S&T powers, developing more Chinese technology, and reducing their country's dependence on foreign technology remained powerful. Xi has given numerous speeches stressing the need for China to innovate and control core technologies as well as achieve technological independence. These are pathways to China's national rejuvenation (read: greater power, glory, and wealth), information security (which has external and internal aspects), countering US pressures (against it as well as Chinese companies), and economic development. To realize these aspirations, the government, at all levels, has been spending more money on R&D, especially in frontier technologies such as artificial intelligence (AI), biotechnology, integrated circuits (ICs), new energy vehicles, and robotics; making strategic equity investments; supporting the growth of Chinese patent portfolios; running numerous S&T megaprojects such as in quantum computing; and undertaking yet more improvements to China's S&T education system. Beijing further has taken various steps to leverage its rule-making powers, public procurement budget, and technical and diplomatic assets to advance Chinese technology. These include limiting the place of foreign hardware and software in government office; mandating domestic technology in banking, finance, and healthcare when certain information security thresholds are reached; and continuing with industrial espionage activities. Aside from the above, Beijing is pressing other countries to keep their borders open to Chinese FDI and goods and vociferously defending globalization in international venues (Economist Intelligence Unit 2019; Ernst 2017; Segal 2019; Huang 2019; Gewirtz 2019).

The most noteworthy initiative of the 2010s, indisputably, is Beijing's Made in China 2025 initiative which appeared in 2015. In addition to

the factors previously enumerated above (e.g., a desire to undercut the position of other economic and political powers and ensure information security), the policy draws inspiration from the newest industrial revolution involving AI, big data, cloud computing, robotics, smart sensors in both production and products, and fears of the so-called Middle Income trap (emanating from competitive pressures from both developed and developing countries). This initiative follows in the footsteps of previous programs, but involves a new intensity of leadership rhetoric, massive numbers of demonstration projects, yet more measures to coordinate and focus R&D through the integration of projects, and the setting of ambitious targets regarding R&D spending, the acquisition of innovation patents, use of digital design tools, and domestic versus foreign core technology. Drawing the most attention to date is the government's allocation of tens of billions of dollars for soft loans and investment funds, creation of informal local content requirements, and strategic use of public procurement to favor the goods and services of domestic firms (Wübbecke et al. 2016).

3 China's Telecommunication Sector Policies

For Beijing, the telecommunications sector is one having the utmost importance for political and economic reasons.³ With respect to the former, Chinese leaders have viewed it as critical for national security and survival as well as part of their toolbox for maintaining domestic stability through control of information flows. Illustrative of this, when Huawei founder Ren Zhengfei told former Chinese President/CCP leader Jiang Zemin, “switching equipment was related to national security ... a nation that did not have its own switching equipment was like one that lacked its own military,” Jiang replied “Well said”! (Harwit 2007: 326–327). As for economic considerations, China's domestic telecommunications sector is huge with China having the most wireless and Internet users in the world and, correspondingly, a huge market for telecommunications equipment and services. In addition, a thriving sector

presents opportunities for import substitution (particularly important when China was more capital constrained) and limiting the dominance of foreign firms and licensing fees, boosting exports, and job creation. Beyond this, a healthy ICT sector meant more R&D activities and China's advancement up the value-added chain, which, in turn, would allow it to capture greater profits.

In line with the above, Beijing has tightly managed the realm of ICT, creating regulatory institutions and domestic telecommunications firms, funding and coordinating R&D, and subsidizing domestic companies. Furthermore, it has controlled and manipulated the entry and involvement of foreign players in telecommunications sub-sectors, such as network equipment and value-added services, and allowed competition as it deems appropriate given China's needs, domestic capacity, and WTO obligations. Beijing's aims have included *inter alia* building up the country's ICT infrastructure, protecting and nurturing domestic players, attracting capital, garnering technology and know-how, and developing and promoting Chinese standards. Beijing's specific sectoral measures have included pressuring Chinese telecom firms to use domestic equipment, pushing foreign companies to participate in JVs with designated Chinese partners, and using its anti-monopoly law to force foreign telecommunication sector players to license technology on more liberal terms. Many observers specifically have highlighted how the Chinese government pressured domestic operators to use China's 3G standard (TD-SCMDA) and delaying the licensing of foreign wireless standards to give TD-SCMDA more space to thrive (Tan 2002; Low 2007; Harwit 2007; Larçon and Barré 2009; Williams et al. 2011; Hsueh 2016).

Interestingly, the telecommunications sector does not appear to garner explicit mention in *Made in China 2025*. However, the "nine tasks" and "ten key sectors" associated with the plan clearly tie to it, even if indirectly (PRC State Council 2015). As for the "nine tasks," "improving manufacturing innovation," "integrating technology and industry," "strengthening the industrial base," "fostering Chinese brands," and "internationalizing manufacturing" all link in some way to the hardware, software, and components of China's leading advanced telecommunications firms. As for the "ten key sectors," "new information technology" and "high-end numerically controlled machine tools and robots" likewise do. It also

seems apparent that the smart manufacturing ambitions (e.g., Cloud and big data, smart sensors, and information security) that are integral part of Made in China 2025 relate in some measure to telecommunications (Wübbeke et al. 2016). Beyond this, Made in China 2025 specifically lists domestic content goals for mobile devices (Morrison 2019).

Huawei itself has benefited from government support in numerous ways. First, some of Huawei's earliest sales were to government customers (Harwit 2007). Second, as numerous analysts have reported, Beijing has provided the company with billions of dollars in loans and export credits through institutions such as the Export-Import Bank of China, China Development Bank, and Sinosure (Harney 2005; Cissé 2012; Zhang 2013). Third, the government has opened doors for Huawei abroad by providing market intelligence; facilitating meeting with relevant government and political elites in countries like Brazil, Ethiopia, and Russia; and supporting the visit of foreign officials to China to Huawei offices (Zhang 2013). Fourth, the government facilitated JVs and marketing and distribution alliances (Low 2007). Fifth, Huawei previously profited from government-orchestrated industry alliances that shared IP and government research institutes designed to exploit telecommunication JVs for technology and knowledge (Lairson 2010). Relatedly, Huawei potentially obtained IP as a result of the PRC's hacking of other telecommunications companies such as Canada's Nortel (Scissors and Bucci 2012).

Two years ago, in an interview with *Nikkei Asian Review*, Ken Hu Houkun, one of Huawei's rotating chairman, stated, in regards to Made in China 2025, "we used to have some discussions [about it] over the past few years, but what we are doing now does not have much to do with the 2025 agenda," adding "Huawei 'did not do much research on the Made in China 2025 policy.'" This seems implausible, though, since Made in China 2025 aims for advances in 5G, AI, and semiconductors and Huawei "is deeply invested in the research and development of 5G, AI, and semiconductor technologies," and Made in China 2025 also seeks Chinese leadership in telecommunications (Li 2018).

4 Hammering Huawei and China's Responses

An abundant number of publications argue Huawei's troubles with the United States began in 2003 because of its IP dispute with Cisco, a huge American firm specializing in networking hardware and software. Specifically, Cisco sued Huawei for infringing on five of its patents and copying its operating source code, among other violations. Two years later, RAND Corp., a think tank with close US defense community connections, issued a report stating that Huawei had close links to China's military, which included obtaining staff and funding from and conducting joint research with it. Several years later, the US Federal Bureau of Investigations interviewed Huawei founder Ren in conjunction with an investigation of Huawei's suspected violations of the sanctions regime against Iran, which the US later concluded Huawei broke. In 2008, the US government blocked Huawei from acquiring a minority stake in 3Com, which had a long-standing JV with Huawei, reportedly because 3Com sold anti-hacking software to the US military. That same year, evidence emerged Huawei may have helped North Korea build its wireless mobile system in violation of US sanctions directed at Pyongyang (Lahiri and Hui 2019; Pearlstine et al. 2019).

During Barack Obama's tenure in office, the United States upped its effort to contain Huawei, with the Committee on Foreign Investment in the United States (CFIUS) preventing Huawei, in spring 2010, from buying 3Leaf, a bankrupt server technology company, and even hiring former 3Leaf staff! In early winter, then US Secretary of Commerce Gary Locke requested Sprint Nextel not to give Huawei a chance to bid on a multi-billion-dollar network upgrade contract (Ibid). Two years later, a bipartisan Congressional report recommended banning the use of Huawei products in US government systems and recommended US government contractors not to use Huawei equipment. It further advised that CFIUS block M&A, takeovers, or mergers involving Huawei and recommended that private-sector firms reconsider using goods and services from Huawei (US House 2012). In 2013, the United States banned a select number of government agencies from buying Huawei products

absent verification by designated government bodies that the products presented no security risk (Selyukh and Palmer 2013). During Obama's tenure in office, we also saw Australia taking action against Huawei by banning the firm from participating in its nationwide broadband initiative (Pearlstine et al. 2019).

In January 2018, Washington's concerns allegedly led AT&T and Verizon to drop plans to offer Huawei phones in the United States. The following month, President Donald Trump's Director of National Intelligence issued the startling recommendation that Americans should not buy Huawei products. In May, the US Department of Defense banned the sale of Huawei products on military bases. Starting in early January 2019, the United States launched a pressure campaign to prevent EU countries like Germany and the United Kingdom from involving Huawei in their 5G networks. In May, the Trump Administration barred US companies from supplying components and software to Huawei and its affiliates without government permission and authorized US government officials to block US companies from doing business with foreign firms (read: Huawei) believed to represent a security threat. Three months later, it was decided that government agencies would have no dealings with Huawei. In November, the US Federal Communications Commission (FCC) denied funds designated for improving communication infrastructure to carriers that use Huawei. One month later, the US House of Representatives passed a bill barring the government from using Huawei's gear (Lahiri and Hui 2019; Lohr 2019; Stewart 2019; Pearlstine et al. 2019; Keane 2020). Beyond the United States, in February 2018, Australia's Defense Department stated it would phase out Huawei smartphones, and 5 months later Australia decided not to allow Huawei a role in its 5G networks. Six months after this, New Zealand banned Huawei from participating in its 5G rollout. Around the same time, Japan announced it would not buy equipment from Huawei (Pearlstine et al. 2019; Keane 2020).

By way of background, Huawei response to US government measures has taken multiple forms. For instance, it has filed lawsuits to overturn the US ban against its products and services and the FCC's refusal to provide funding to carriers using Huawei equipment. It also has routinely criticized the US government for its failure to provide any concrete

evidence of Huawei's nefarious activities (actual or planned) and, relatedly, has repeatedly denied, in media interviews, public statements, and appearances at international fora, any special links with the Chinese government. Beyond this, it has warned of possible job losses and laid off workers at its US offices (Nakashima and Fund 2019; Lahiri and Hui 2019; Stewart 2019; Keane 2020). Our focus, though, is on Beijing's response to the assault against Huawei and it is to this topic that we now turn.

The first prong of Beijing's championing of Huawei entails critical statements of US policy and actions by government spokespeople and in official Chinese media such as *Global Times*. An illustration of the former was a PRC Ministry of Foreign Affairs (MOFA) statement in March 2013, with a spokesperson charging the US action (i.e., the ban on Huawei) "uses Internet security as an excuse to take discriminatory steps against Chinese companies. It is not beneficial to mutual trust between China and the United States nor to the development of trade and economic relations" (Selyukh and Palmer 2013). An example of the latter was a January 2020 editorial in *Global Times* following the United Kingdom's decision to allow Huawei a role in its 5G networks. Among other things, the piece touted how the United Kingdom's decisions constituted a US setback, stressed that US claims about Huawei representing an information security threat were "blatant lies," and noted the United States should reflect on the error of its ways and cooperate with Huawei to improve its 5G network (Global Times 2020). The second prong consists of threats. For instance, in May 2019, a MOFA spokesperson say China "opposed countries imposing unilateral sanctions on Chinese companies and would take action" (BBC News 2019). The same month, Beijing announced it was preparing an "unreliable entities list" of foreign companies that did not fulfill contracts, stopped supplying Chinese companies for noncommercial reasons, and damaged the "rights and interests of Chinese companies" (Stevenson and Mozur 2019). Similarly, reports indicate Beijing summoned the heads of American technology companies and warned them they would face serious ramifications if they cooperated with Washington against Huawei (Konish 2019). The third prong consists of actual sanctions. For instance, Cisco has found it hard to develop a meaningful business in China, and in 2011 Motorola found its

planned sale of IP to NSN delayed by China after the United States blocked Huawei's acquisition of 3Leaf (Wagstaff et al. 2013).

5 Conclusion

The motivation for this piece has been to shed light on China's strong support of Huawei, which is reflected not only in the support it has given Huawei to become the powerhouse it is today but also in Beijing's three-pronged response to the measures taken against Huawei. It has done this by discussing the features of China's technology policy generally and with respect to the telecommunications sector specifically. This narrative, though, went beyond detailing the facts to identifying the myriad factors driving Chinese words and deeds. Subsequently, it extensively chronicled US measures against Huawei as well as the reactions of Beijing and, to a lesser extent, Huawei.

This chapter demonstrates that China's technology policy entails a large number of elements ranging from the programmatic to the regulatory to the financial to the educational to the exploitation of foreign MNCs. More importantly, it demonstrates that the factors driving the PRC's technology policy are wide-ranging and powerful. They include international political/military considerations such as security, power, and national independence. They encompass economic motivations such as promoting economic growth, gaining export revenues, and capturing a higher share of the value-added chain. They also entail domestic security drivers such as maintaining control over the cybersphere.

The implications of my analysis for businesspeople, policymakers, and students of Chinese political economy are significant. First, it shows the importance of considering *security and political* factors to understand what is shaping China's technology policy, its sectoral policies, and its stance toward high-tech companies like Huawei. Second, it implies Beijing will continue to strongly support Huawei and other Chinese high-technology firms and will take action against states and foreign businesses that undermine such Chinese companies. In this respect, the news is not good for foreign companies and states that do not deliver what Beijing wants. Third, my analysis reveals that foreign governments,

international organizations, and/or foreign players would have to address a large number of Chinese concerns, a daunting task, if they want to change the PRC's policies.

There are a number of issues that this chapter could not address for reasons of space and time and which represent fertile areas for further research. One is the role of ideological/ideational considerations such as status concerns, nationalism, and state-capitalism in shaping Beijing's technology policy and its measures toward specific technology sectors. Another is the relative importance of the variables identified and the drivers of this. Yet another is whether Beijing would be willing to go as far as it does for Huawei with respect to other Chinese technology companies. After all, many Chinese firms are not in Huawei's league. Finally, while Beijing has threatened sanctions against others that obstruct Huawei, it does not always follow through. It would be interesting to investigate why as well as to probe what are the circumstances under which Chinese decision-makers opt for more intense responses.

One expert on Chinese technology policy opined state-backed Chinese industrial policies, top-down projects, and strategic schemes are a "pretty consistent theme," that "such approaches have persisted and cohered across seven decades amid very diverse conditions," and that "we should expect these 'strategic' approaches to remain a persistent feature of the Chinese policy landscape" (Feigenbaum 2017). This chapter has enumerated many reasons supporting these assessments. China's decision to keep operating a semiconductor factory in Wuhan at the height of the 2020 coronavirus scare brings into ever starker relief the importance China affords to high-technology and why it will continue to support Huawei.

Notes

1. Background on Huawei *qua* company is available in Larçon and Barré (2009: 146–148); Lairson (2010); and Pawlicki (2017).
2. For examples of the former, see Harwit (2007) and Higgins (2015). This edited volume represents an example of the latter.

3. Except as noted, this paragraph is based on Tang and Lee (2003); Harwit (2007: 316–318); Larçon and Barré (2009: 141, 143); Cissé (2012: 1); Hsueh (2016: 91–95).

References

- Balding, Christopher, and Donald C. Clarke. 2019. Who Owns Huawei? 17 April. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3372669. Accessed November 30, 2019.
- BBC News. 2019. Huawei: China Threatens to Retaliate over US Sanctions. 16 May. <https://www.bbc.com/news/world-us-canada-48299522>. Accessed May 25, 2019.
- Bennhold, Katrin, and Jack Ewing. 2020. In Huawei Battle, China Threatens Germany ‘Where it Hurts.’ *The New York Times*, 16 January. <https://www.nytimes.com/2020/01/16/world/europe/huawei-germany-china-5g-auto-makers.html>. Accessed January 20, 2020.
- Blanchard, Jean-Marc F. 2019. Chinese outward foreign direct investment (COFDI): A Primer and Assessment of the State of COFDI. In *Handbook on the International Political Economy of China*, ed. Ka Zeng, 76–97. Cheltenham: Elgar.
- Brandt, Loren, and Eric Thun. 2010. The Fight for the Middle: Upgrading, Competition, and Industrial Development in China. *World Development* 38: 1555–1574.
- Cao, Cong, Richard P. Suttmeier, and Denis Fred Simon. 2006. China’s 15-Year Science and Technology Plan. *Physics Today*: 38–42.
- Chen, Titus S. 2010. China’s Reaction to the Color Revolutions. *Asian Perspective* 34: 5–51.
- Chen, Qingqing. 2020. Blocking Huawei will Harm China-UK Relations: Ambassador. *Global Times*, January 20. <https://www.globaltimes.cn/content/1177479.shtml>. Accessed January 20, 2020.
- China Daily. 2014. Silent Revolution of ‘Made-in-China’. 14 January. http://www.chinadaily.com.cn/china/2014-01/13/content_17233282.htm. Accessed November 30, 2019.
- Cissé, Daouda. 2012. ‘Going Global’ in Growth Markets: Chinese Investment in Telecommunications in Africa. Centre for Chinese Studies Policy Briefing, April. <http://scholar.sun.ac.za/handle/10019.1/21145?show=full>. Accessed May 17, 2019.

- Cody, Sacha. 2017. A New Brand of Chinese Soft Power? *East Asia Forum*, 12 August. <http://www.eastasiaforum.org/?p=81492>. Accessed May 17, 2019.
- Craig, Susan L. 2007. China Perceptions of Traditional and Nontraditional Security Threats. *SSI Studies*, March.
- Economist Intelligence Unit. 2019. Tracking China's Tech Policies. 14 June. <http://www.eiu.com/industry/article/478123231/tracking-chinas-tech-policies/2019-06-14>, Accessed November 30, 2019.
- Ellis, R. Evan. 2011. Chinese Soft Power in Latin America. *JFQ* 60: 85–91.
- Ernst, Dieter. 2011. China's Innovation Policy is a Wake-Up Call for America. *East-West Center Asia Pacific Issues* 100 (May).
- . 2017. *China's Standard-Essential Patents Challenge*. CIGE Special Report.
- Feigenbaum, Evan A. 2017. The Deep Roots and Long Branches of Chinese Technonationalism. *Carnegie Endowment for International Politics*, 12 August. <https://carnegieendowment.org/2017/08/12/deep-roots-and-long-branches-of-chinese-technonationalism-pub-72815>. Accessed May 17, 2019.
- Fingar, Thomas, Denis F. Simon, Richard P. Suttmeier, and Leo A. Orleans. 1984. Science & Technology in China. *Bulletin of the Atomic Scientists* 40: 1S–15S.
- Fund, Brian. 2019. How China's Huawei Took the Lead over the U.S. Companies in 5G Technology. *The Washington Post*, 11 April. <https://www.washingtonpost.com/technology/2019/04/10/us-spat-with-huawei-explained>. Accessed May 17, 2019.
- Gewirtz, Julian Baird. 2019. China's Long March to Technological Supremacy. *Foreign Affairs*, 27 August. <https://www.foreignaffairs.com/articles/china/2019-08-27/chinas-long-march-technological-supremacy>. Accessed November 30, 2019.
- Global Times. 2020. US Should Repent over Its Foiled Plot against Huawei. 29 January. <https://www.globaltimes.cn/content/1177923.shtml>. Accessed February 1, 2020.
- Gu, Shulin. 1999. *China's Industrial Technology: Market Reform and Organizational Change*. London: Routledge.
- Harney, Alexandra. 2005. Huawei-The Challenger from China. *Financial Times*, 11 January.
- Harwit, Eric. 2007. Building China's Telecommunications Network: Industrial policy and the Role of Chinese State-Owned, Foreign and Private Domestic Enterprises. *The China Quarterly* 190: 311–332.
- Higgins, Victoria. 2015. *Alliance Capitalism, Innovation, and the Chinese State*. Houndmills: Palgrave.

- Hsueh, Roselyn. 2016. State Capitalism, Chinese-Style. *Governance* 29: 85–102.
- Huang, Tianlei. 2019. Government-Guided Funds in China: Financing Vehicles and State Industrial Policy. *PIIE China Economic Watch*, 17 June. <https://www.piie.com/blogs/china-economic-watch/government-guided-funds-china-financing-vehicles-state-industrial-policy>. Accessed November 30, 2019.
- Keane, Sean. 2020. Huawei Ban: Full Timeline as Britain Gives Huawei Approval to Build its Non-Core 5G Network. *CNet*, 30 January. <https://www.cnet.com/news/huawei-ban-full-timeline-us-government-britain-approves-non-core-5g-china-trump-ban-security-threat-mate-x>. Accessed February 1, 2020.
- Kennedy, Scott. 2006. The Political Economy of Standard Coalitions. *Asia Policy* 2: 41–62.
- Konish, Lorie. 2019. China Reportedly Summoned Tech Giants-and Warned against Cooperating with Trump’s Sales Ban. *CNBC*, 8 June. <https://www.cnn.com/2019/06/08/china-reportedly-summoned-tech-giants-and-warned-against-cooperating-with-trumps-sales-ban.html>. Accessed February 1, 2020.
- Lahiri, Tripti and Mary Hui. 2019. How Huawei Became America’s Tech Enemy No. 1. *Quartz*, 28 May. <https://qz.com/1627149/huaweis-journey-to-becoming-us-tech-enemy-no-1>. Accessed November 30, 2019.
- Lairson, Thomas D. 2010. Huawei Technologies. In *A Guide to the Top 100 Companies in China*, ed. Weixian Zhang and Ilan Alon, 174–176. Hackensack, NJ: World Scientific.
- Larçon, Jean-Paul, and Geneviève Barré. 2009. Technology-Based Competition and Chinese Multinationals. In *Chinese Multinationals*, ed. Jean-Paul Larçon, 127–149. Singapore: World Scientific.
- Li, Tao. 2018. Huawei’s Ken Hu Says Company Has Little to Do with Beijing’s Ambitious 2025 Blueprint. *South China Morning Post*, 8 November, <https://www.scmp.com/print/tech/enterprises/article/2172158/huaweis-ken-hu-says-company-has-little-do-beijings-ambitious-2025>. Accessed February 20, 2020.
- Li, Shubo, and Helge Ronning. 2013. Winning Hearts and Minds: Chinese Soft Power Foreign Policy in Africa. *CMI Brief* 12, <https://www.cmi.no/publications/4906-winning-hearts-and-minds>. Accessed May 17, 2019.
- Lindsay, Jon R. 2014/15. The Impact of China on Cybersecurity. *International Security* 39: 7–47.

- Lohr, Steve. 2019. U.S. Moves to Ban Huawei From Government Contracts. *New York Times*, 7 August. <https://www.nytimes.com/2019/08/07/business/huawei-us-ban.html>. Accessed August 7, 2019.
- Low, Brian. 2007. Huawei Technologies Corporation. *Journal of Business & Industrial Marketing* 22: 138–144.
- Morrison, Wayne M. 2019. The Made in China 2025 Initiative: Economic Implications for the United States. *Congressional Research Service in Focus*, April 12, 2019. <https://fas.org/sgp/crs/row/IF10964.pdf>. Accessed February 20, 2020.
- Nakashima, Ellen and Brian Fund. 2019. U.S. Allies Differ on Difficulty of Containing Huawei Security Threat. *The Washington Post*, 7 March. <https://www.washingtonpost.com/technology/2019/03/06/us-allies-are-skeptical-trump-administrations-huawei-argument>. Accessed January 20, 2020.
- Nathan, Andrew J., and Andrew Scobell. 2012. How China Sees America. *Foreign Affairs* 91: 32–47.
- Pawlicki, Peter. 2017. Challenger Multinationals in Telecommunications. *European Trade Union Institute Background Analysis*, January. <https://www.etui.org/Publications2/Background-analysis/Challenger-multinationals-in-telecommunications-Huawei-and-ZTE>. Accessed May 17, 2019.
- Pearlstone, Norman, Priya Krishnakumar, and David Pierson. 2019. The War against Huawei. *Los Angeles Times*, 19 December. <https://www.latimes.com/projects/la-fg-huawei-timeline>. Accessed January 20, 2020.
- People's Republic of China, State Council (PRC State Council). 2015. Made in China 2025 Plan Issued. english.www.gov.cn/policies/latest_releases/2015/05/19/content_281475110703534.htm. Accessed February 20, 2020.
- Rowen, Henry S. 2008. Introduction. In *Greater China's Quest for Innovation*, ed. Henry S. Rowen, Marguerite Gong Hancock, and William F. Miller, 9–31. Stanford: Walter H. Shorenstein Asia-Pacific Research Center.
- Scissors, Derek and Steven Bucci. 2012. China Cyber Threats. *The Heritage Foundation Issue Brief*, No. 3761, <https://www.heritage.org/defense/report/china-cyber-threat-huawei-and-american-policy-toward-chinese-companies>. Accessed May 17, 2019.
- Segal, Adam. 2008. China and the Emerging Regional System of Technological Entrepreneurship. In *Greater China's Quest for Innovation*, ed. Henry S. Rowen, Marguerite Gong Hancock, and William F. Miller, 337–356. Stanford: Walter H. Shorenstein Asia-Pacific Research Center.

- . 2019. Seizing Core Technologies: China Responds to U.S. Technological Competition. *China Leadership Monitor*, 1 June. <https://www.prclleader.org/segal-clm-60>. Accessed November 30, 2019.
- Selyukh, Alina and Doug Palmer. 2013. U.S. Law to Restrict Government Purchases of Chinese IT Equipment. *Reuters*, 28 March. <https://www.reuters.com/article/us-usa-cybersecurity-espionage/u-s-law-to-restrict-government-purchases-of-chinese-it-equipment-idUSBRE92Q18O20130328>. Accessed May 17, 2019.
- Simon, Denis Fred. 1989. China's Drive to Close the Technology Gap. *The China Quarterly* 119: 598–630.
- Stevenson, Alexandra and Paul Mozur. 2019. China Steps Up Trade War and Plans Blacklist of U.S. Firms. *The New York Times*, 31 May. <https://www.nytimes.com/2019/05/31/business/china-list-us-huawei-retaliate.html>. Accessed November 30, 2019.
- Stewart, Emily. 2019. The US Government's Battle with Chinese Telecom Giant Huawei, Explained. *Vox*, 19 August. <https://www.vox.com/technology/2018/12/11/18134440/huawei-executive-order-entity-list-china-trump>. Accessed November 30, 2019.
- Suttmeier, Richard P. and Yao Xiangka. 2004. *China's Post-WTO Technology Policy*. NBR Special Report 7.
- Tan, Zixiang Alex. 2002. Product Cycle Theory and Telecommunications Industry. *Telecommunications Policy* 26: 17–30.
- Tang, Harina Suk-Ching and Paul S.N. Lee. 2003. Growth in Adversity: Non-Economic Factors in Telecommunications Development in China. *Telematics and Informatics* 20: 319–331.
- United States, Department of State [US DOS], Office of Science & Technology Cooperation. 2006. United States-China Science and Technology Cooperation. December. <https://2001-2009.state.gov/documents/organization/96437.pdf>. Accessed November 30, 2019.
- United States, House of Representatives [US House]. 2012. Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE. 8 October, <https://intelligence.house.gov/news/documentsingle.aspx?DocumentID=96>. Accessed November 30, 2019.
- Wagstaff, Jeremy, Sinead Carew, and Jim Finkle. 2013. Insight: For Cisco and Huawei, a Bruising Rivalry Reaches Stalemate. *Reuters*, 22 November. <https://www.reuters.com/article/us-cisco-huawei-insight/insight-for-cisco-and-huawei-a-bruising-rivalry-reaches-stalemate-idUSBRE9AL0NO20131122>. Accessed May 17, 2019.

- Williams, Robin, Ian Graham, Kai Jakobs, and Kalle Lyytinen. 2011. China and Global ICT Standardization and Innovation. *Technology Analysis and Strategic Management* 23: 715–724.
- Wolff, Alan Wm. 2011. China's Indigenous Innovation Policy. Testimony before the U.S. China Economic and Security Review Commission. 4 May. <https://www.uscc.gov/sites/default/files/5.4.11Wolff.pdf>. Accessed May 17, 2019.
- Wübbecke, Jost Mirjam Meissner, Max J. Zenglein, Jacqueline Ives, and Bjorn Conrad. 2016. Made in China 2025: The Making of a High-Tech Superpower and Consequences for Industrial Countries. *MERICs Papers on China* 2. https://www.merics.org/sites/default/files/2017-09/MPOC_No.2_MadeinChina2025.pdf. Accessed May 17, 2019.
- Zhang, Guanqing. 2013. *Providing Global IT Solutions from China: The Huawei Story*. Reading, UK: Paths International Ltd.
- Zhao, Yuezhi. 2010. China's Pursuits of Indigenous Innovations in Information Technology Developments. *Chinese Journal of Communications* 3: 266–289.



5

All Under Huawei: China's New Vision for a Tech Sinica

Shirley Ze Yu

1 Introduction

Huawei (华为) literally means “China’s Making.” Huawei has indeed been the crystallization of China’s modern industrial achievements, the pioneer of China-led phase of globalization underpinned in Chinese technological and economic morality, and the symbol of China’s ethno-national Chinese dream.

1.1 Huawei at a Glance

Founded in 1987, Huawei became the world’s sixth largest technology company by revenue in 2019 (Fortune 2019), and the world’s largest smartphone maker in 2020 (Kharpal 2020). Huawei currently leads

S. Z. Yu (✉)

The Ash Center, Harvard Kennedy School, Cambridge, MA, USA

e-mail: shirley_yu@hks.harvard.edu

© The Author(s) 2020

W. Zhang et al. (eds.), *Huawei Goes Global*, Palgrave Studies of Internationalization in Emerging Markets, https://doi.org/10.1007/978-3-030-47564-2_5

globally in the number of 5G commercial contracts. As of September 2019, Huawei had earned 50 commercial 5G contracts (Karpal 2019). Among its closest competitors by comparison, Ericsson has earned 43 contracts (Ericsson 2019) and Nokia, 30 contracts (Nokia 2019). Chinese company ZTE also declared to have earned 25 contracts (Li 2019a). Huawei also holds a clear leadership in global 5G patent race. Along with ZTE, the two Chinese companies own 34.3% of global 5G patents. Samsung and LG of the Republic of Korea own 30%, whereas Qualcomm and Intel, the US counterparts, own 13% of the global patent share (Pohlmann 2019). Thus, Huawei can declare itself both as a clear global 5G market leader with the largest number of commercial 5G contracts, and the de facto global 5G infrastructure standard-bearer with the greatest number of global 5G patent families (Fig. 5.1).

Huawei currently operates in 172 countries and regions globally (Huawei 2020), sweeping across large parts of the developing world. Leaving only a handful of sovereign nations in the world without its

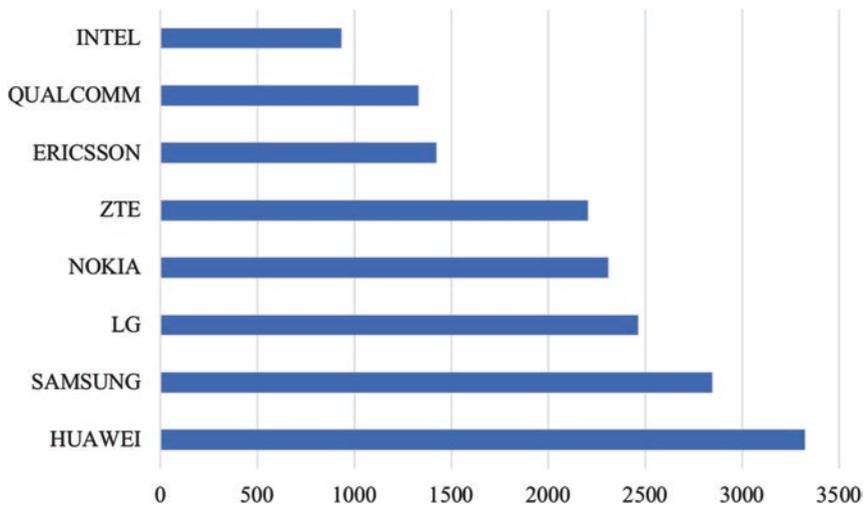


Fig. 5.1 Global 5G declared patent families. (Source: Pohlmann 2019)

footprint, Huawei's significance goes beyond a single-dimensional commercial success.

1.2 How Significant Is 5G?

The fifth-generation wireless technology is the digital cellular infrastructure enabling Internet of Things (IoT), smart cities, driverless cars, artificial intelligence (AI), and other technological applications to develop. Some hold the view that 5G technology may itself be a general-purpose technology (GPT), typically associated with every round of the Industrial Revolutions, with its technological significance analogous to that of the steam engine or the internet. Many assess that 5G is merely an upgraded version over world's 4G and 4.5G networks, and may be seen only as an incremental, rather than a revolutionary technological breakthrough. There are reasons to suggest that mobile wireless technology may itself be closer to the definition of a GPT, with 5G representing a substantial improvement in what mobile technology can offer (Australia 2018). 5G can enable transformation of mobile technology into a true GPT (Campbell et al. 2017). Siding with the latter view, this chapter defines 5G as a global technological breakthrough, and mobile wireless technology as a GPT.

Although 5G may not singularly spur a wave of industrial take-offs, the early adopters of 5G technology may witness the economic take-off effects, indirectly caused by 5G's enabling capabilities to a GPT, and similar to those triggered by the Industrial Revolution. Therefore, the early adopters of 5G technology are likely to experience economic accelerations against the rest. Consequently, a global development disequilibrium favoring the 5G early adopters will commence.

1.3 Huawei's Implications to Global Shifts and Order, Beyond Technology

Broadband has been widely documented to bring positive economic benefits at the firm level, community level, and macroeconomic level (Minges

2015; Qiang et al. 2009; Scott 2012). Huawei's 5G capability plausibly brings three profound transformations to the global political economic order, beyond technology.

One, Huawei's 5G leadership expedites China's vision to turn itself into a global AI superpower and China's economic ascendance into data capitalism, a long-run economic growth model predicated on data as the fundamental factor of production. This further solidifies China's rise to global digital and economic preeminence.

Two, due to Huawei's strategic positioning of its 5G technology foremost and primarily across the developing world, global economic re-convergence between the Global North and South may occur for the first time since the Industrial Revolution. Global development disparity between the two economic worlds was ignited and has only widened following every subsequent round of technological breakthroughs since 1750. Therefore, Huawei's global strategy will reset modern global development pattern and narrow global income disparity, both of which unprecedented in the modern industrial era.

Three, rapid AI development and big data amassment by the world's two advanced industrial economies, the United States and China, are segregating the world, rather than integrating the world. The two countries are pursuing two distinctive political ends, with its digital means. Huawei's 5G symbolizes a digitally divided future world, between digital liberalism and digital authoritarianism (Wright 2019).

1.4 Huawei Is China's Way to Tech Sinica

Throughout world political history since the birth of sovereign nations, global order has interchanged between hegemony and anarchy. Long global peace order established by a global hegemon is best exemplified by periods of *Pax Romana*, *Pax Britannica*, and *Pax Americana*. World order has definitively moved beyond *Pax Americana*, in the third decade of the twenty-first century and perhaps decades beyond, caused fundamentally by the power disequilibrium between

the United States and China. Competition over impending global order between an incumbent and a rising global power will center around their digital might.

This study defines China's vision for a digital global order as Tech Sinica, a China-centric global order postulating China's digital power as its means, and economic predominance and authoritarian regime stability as its parallel ends. "The Way that can be comprehended is not the real Way," as China's ancient philosophy *Tao Te Ching* illuminates. Huawei is China's Way to Tech Sinica.

2 China's Digital Global Ambition

The Belt and Road Initiative (BRI), Chinese President Xi Jinping's signature foreign policy, conceives infrastructure connectivity across continental Eurasia, the maritime Pacific, the Middle East, and Africa, developed and financed by China. I equate it characteristically to China's transitory *grand strategy* from when the idea first arose in 2013, to around the midpoint of the century when China reaches modernity. By 2050, China's ultimate *grand strategy* will be to govern the world with a set of global institutional architecture with China at the center, a revival of the ancient notion of *All under Heaven*—or in its modern interpretation by Mr. Xi Jinping—a *Community of Common Destiny* as humankind (Mardell 2017).

The Belt and Road Initiative encompasses both conventional and digital infrastructure expansions led by China. BRI 1.0 focuses on physical and conventional infrastructure, including roads, rails, ports, and so on. Activities of this phase have been primarily undertaken by Chinese state-owned enterprises and state financial institutions. BRI 1.5 expanded BRI 1.0's spatial coverage to every continent including Antarctica, and pivoted strategically towards the Nordic region. BRI 2.0 is to expand China's digital infrastructure connectivity, powered by broadband and 5G networks. BRI 2.0 will be primarily led by Huawei and will continue to be financed through China's state financial institutions. Digital infrastructure expansion is a quintessential component of China's BRI since its

inception. Huawei is at the core, a strategic contributor and a prominent beneficiary of the BRI, China's global geostrategic ambition.

2.1 Digital Silk Road: Belt and Road Initiative 2.0

In this grand strategic initiative predicated upon a transition toward a China's vision for a *Community of Common Destiny* by the second half of the century, infrastructure expansion is the means for China's rise to its global leadership. Empirical researches in development economics widely document that infrastructure investment leads to positive economic growth for the overall economy (Sanchez-Robles 1998; Calderon and Burns 2004).

An empirical examination has been engaged to test the significance of the positive correlation between infrastructure and economic development (Yu 2017). Two independent variables were used to measure country's infrastructure development. One is the logistics performance index of quality of trade and transport-related infrastructure from World Bank's databank. The other variable is fixed broadband subscription per 100 people, with data extracted from World Bank's development index. Although fixed broadband data is gauged due to a lack of readily traceable mobile broadband data, the assumption is that mobile broadband will have an even more significant and positive effect on the economy than fixed broadband. The reason for the assumption is that wider mobile broadband applications due to device portability and multiple devices per household will only amplify the directional impacts fixed broadband already has on the economy. The first variable measures traditional infrastructure development such as railways, ports, roads, and airports. The second variable measures telecommunications infrastructure fit for the digital century, such as broadband and internet access. The dependent variable is GDP per capita in current US dollars. Data are based on 159 countries in 2015.

Regression outcome in Table 5.1 shows that digital infrastructure, gauged by fixed broadband access per 100 people, is a significant contributor to per-capita GDP growth of countries; whereas physical infrastructure, gauged by rail and road infrastructure development,

Table 5.1 Correlation of infrastructure development and economic growth

```
. regress GDPpercapitacurrentUSD infrastructure bbandper100
```

Source	SS	df	MS	Number of obs	=	159
Model	2.8437e+10	2	1.4219e+10	F(2, 156)	=	99.20
Residual	2.2361e+10	156	143336879	Prob > F	=	0.0000
				R-squared	=	0.5598
				Adj R-squared	=	0.5542
Total	5.0798e+10	158	321506197	Root MSE	=	11972

GDPpercapita~D	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
infrastructure	-20.06103	69.13629	-0.29	0.772	-156.6251	116.503
bbbandper100	1080.283	94.39707	11.44	0.000	893.8212	1266.744
_cons	1476.759	5436.439	0.27	0.786	-9261.77	12215.29

Source: Author's own data regression based on World Bank data (2015)

does not show a significant contribution to per-capita GDP growth. The compounded effect of both digital and conventional infrastructures to per-capita GDP growth is significant at 95% confidence level. Adjusted R2 of 0.55 indicates a moderately robust empirical model. This empirical evidence also seems to suggest that for every dollar of capital input, an incremental dollar of investment into digital infrastructure will be more economically impactful than a dollar invested in conventional physical infrastructure.

It is also empirically evidenced, as shown in Fig. 5.2, that per dollar of investment in broadband generates a higher percentage of economic growth than per dollar of investment in the other categories of ICTs (Internet and communications technology), such as fixed telecommunications, mobile, and the internet (Qiang et al. 2009). Meanwhile, per dollar of investment in broadband in low and middle-income countries generate a higher percentage of economic growth than in high-income countries (Ibid.).

Therefore, all of the above empirical outcomes validate that China's focus on building digital broadband, primarily through the developing economies, is a well-conceived rational economic vision.

In addition to the economic benefits, China's BRI also delivers strong strategic and geostrategic outcomes. BRI 1.0 secures China's strategic oil

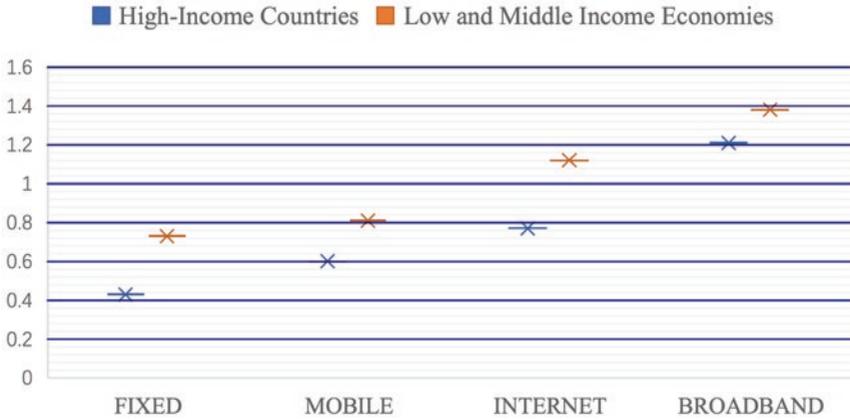


Fig. 5.2 Correlation between ICT investment and GDP growth. (Source: Qiang et al. 2009)

assets and builds vital alternative oil transportation routes away from China’s geopolitical choke point, the Strait of Malacca. BRI 1.0 builds China’s alternative oil shipping route through Myanmar, partially via ocean shipping and partially through land pipelines. Although BRI 1.0 begins China’s economic expansion as a major global power, it is highly unlikely for China to achieve its ambition of constructing a *Community of Common Destiny* as humankind with infrastructure connectivity fit for the twentieth-century development model. BRI 2.0, primarily led by Huawei, will be the means to China’s end-a Tech Sinica-a global order born from and fit for the digital century. Huawei’s global leadership in 5G infrastructure and China’s global ambition in creating a future Tech Sinica are interwoven and one.

2.2 The Expansion of Huawei and BRI in Lock Steps

In the original conception of the Belt and Road Initiative in 2013, China unilaterally mapped 66 countries along continental Eurasia and maritime Asia Pacific into its economic sphere of connectivity (Boffa 2019). By 2019, 137 countries have signed up to China’s BRI (Belt & Road Portal 2019). The vision and execution of the BRI has gone way beyond its

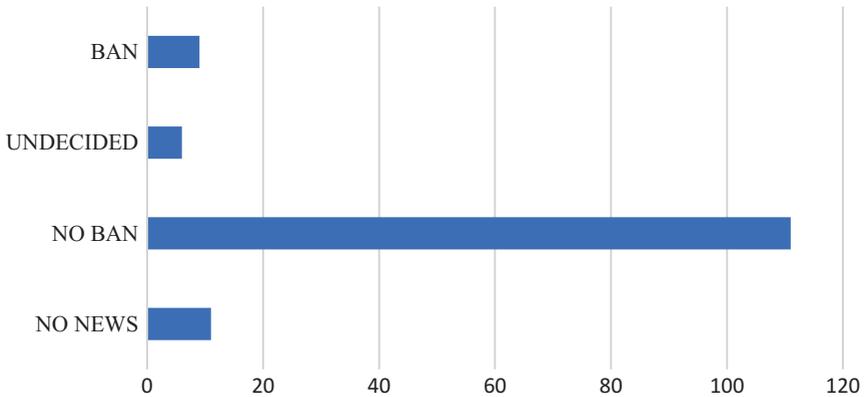


Fig. 5.3 Huawei's 5G Approval Status with BRI Countries. (Source: Author's own compilation based on open source before Jan 1, 2020. Note: "Ban" is defined by a clear official or public announcement which prohibits Huawei from the country's 5G networks. "No ban" is defined by an official or public announcement with clear expressions of not excluding (banning) Huawei from the country's 5G network. "No news" is defined by unavailability of official or public announcement on the country's decision on Huawei's 5G. "Suspension" is defined by an official or public announcement which states delay or suspension of the country's decision on Huawei's 5G)

original conception. Of the 137 countries currently signed up to China's BRI, only have Albania, Chad, New Zealand, Poland, Solomon Islands, Vietnam, Estonia, and Czech Republic clearly banned Huawei from the country's 5G networks. Not all countries who have unbundled their decisions on China's BRI and Huawei are key US allies, developed economies, or democracies. The motivations behind the Huawei rejection are multivariate.

As shown in Fig. 5.3, 111 out of 137 countries who have signed up to China's BRI have allowed Huawei to access the country's 5G market, representing 81% of current BRI countries. As Fig. 5.4 shows, Huawei's access to a country's 5G network is highly correlated with China's partnership with the country on the BRI. Huawei is also more prone to secure 5G contracts in respective countries either as a part of the Chinese state visit or after the state visit.

Figure 5.5 brings two important observations to light. One, unlike the previous rounds of major technological breakthroughs, this round,

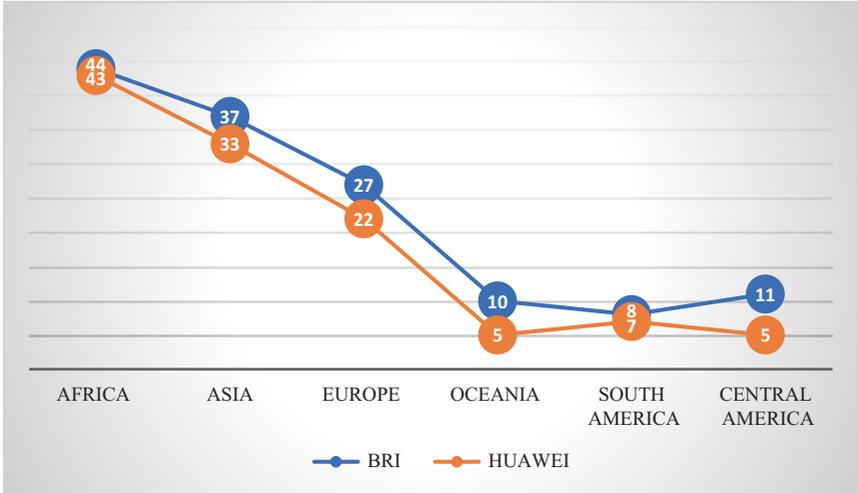


Fig. 5.4 BRI and Huawei correlation by region. (Source: Author’s own public news compilation as of Jan. 1, 2020. Note: Huawei’s data are measured by the number of countries in the continent that have signed up to China’s BRI and have officially and publicly expressed that Huawei will not be banned from the countries’ 5G market)

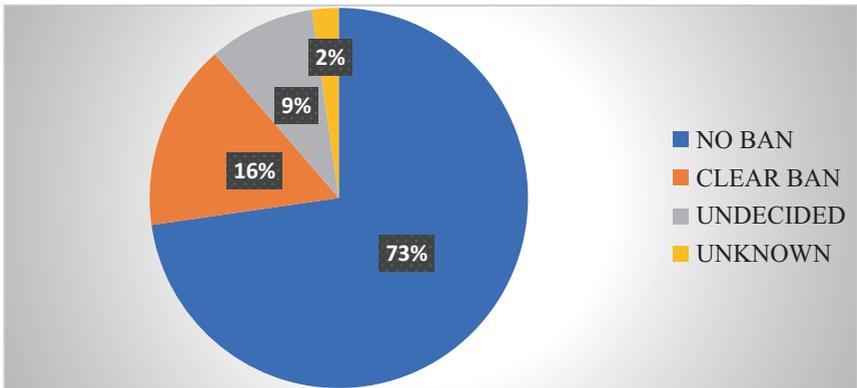


Fig. 5.5 Huawei’s 5G status in Europe. (Source: Author’s own compilation, March 1, 2020)

empowered by Huawei's 5G, starts first and has a more significant presence in the developing world, most prominently in Africa, Asia, and South America. All African countries who have signed up to China's BRI, except Chad, have allowed Huawei to participate in the country's 5G networks. Across all major continents, Africa by far represents the biggest number of sovereign market access for Huawei's 5G. As a result, the biggest market potential for Huawei's 5G lies with some of the least developed regions in the world. This brings to light a new economic paradigm for both China's digital order and Africa's economic future empowered by Huawei's digital infrastructure.

Two, across all major continents, Huawei's market access closely trails BRI partnerships on the continent. There is a high degree of correlation and synchronization between BRI participation by a country and Huawei's 5G market access in the country. There is a wider gap between the BRI and Huawei decisions in Oceania, led by rejections of Huawei's 5G network by staunch allies of the United States—Australia and New Zealand. There is also a reasonably wide gap in Central America, due to its geographical proximity and geopolitical affinity with the United States.

3 The Political Economy of Huawei

At the North Atlantic Treaty Organization's (NATO) 70th Summit in December 2019, US President Donald Trump's alarming speech to American allies effectively dropped the 5G Iron Curtain on Huawei. NATO further concluded in the Summit declaration that "NATO and allies are committed to secure communications, including 5G, on secure and resilient systems" (Hanschke 2019).

Huawei's 5G network has become the symbol of a new global digital divide between countries increasingly fallen into China's economic and digital orbit and countries outside. Digital technology may enable "large and industrially sophisticated states to make their citizens rich while maintaining rigid control. China is now building core components of such a system of digital authoritarianism. Such systems are already being emulated in global competition with liberal democracy" (Wright 2019, VII).

Huawei's 5G expansion globally is seen by the United States and some members of the West as a quadruple threat: a national security threat, an economic threat, a geopolitical threat, and an ideological threat. The rudimentary causes of this perception are two. One, China's authoritarian and state-led economic model and its clash with liberal market systems. Two, China's Communist political ideology and its clash with beliefs of liberal democracy and individual freedom. Therefore, it is essential to understand the political economy of China, in the context of Huawei, in order to deduce some levels of truth to the magnitude of the perceived threats on Huawei.

When Ren Zhengfei, Huawei's founding chairman, declared that Huawei would go to the global technological zenith and come back alive (Moynihan and Hamada 2019), he was not speaking as a corporate man against the most powerful individual on earth, US President Donald Trump. Huawei is the pride and symbol of the modern Chinese nation. Huawei's rise is deeply contextualized in the strategic ascent of China.

3.1 How Private Can Huawei Remain?

Huawei, 61st on the Fortune Global 500 list, remains privately held. It boasts its company as employee-owned via an employee stock ownership program (Huawei 2020). As of 2018, Huawei tallied 96,768 shareholding employees (Ibid.). Simultaneously, Huawei rejects the allegation that the company is owned or controlled by or affiliated with the government (Ibid.). Although it would be impossible to authenticate Huawei's ownership structure, Huawei's allegiance to the Chinese state, and its financial intimacy with the state sector, can be sufficiently and logically deduced. According to Chikermane (2019):

Along with ZTE, Huawei sits on the Chinese government review boards, which tested and approved foreign telecommunications equipment for the large, growing and underserved Chinese market. "Sitting on these boards, Huawei and ZTE learned how to copy foreign designs while testing and opening the equipment of foreign vendors as part of the approval process."

Following the logic, Huawei's technological development has benefited from the country's telecom regulatory review process. It is reasonable to postulate, given Chinese corporates' loyalty to the party state, that Huawei would be obliged to share its R&D innovation outcomes with the Chinese state and critical state sectors in reciprocity.

Following the recent rise of China's vibrant technology industry, there has been a renewed zest in boosting mixed-ownership structures in the Chinese economy, a hybrid form of corporate ownership, partially owned by the state, and partially, by the private companies.

State-owned enterprises will invest and take ownerships in failing private companies that are viewed as critical to the nation's strategic development. HNA's fall into state receivership in early 2020 may signal another wave of state bailouts of private companies engulfed in financial distress. Meanwhile, China's most successful private companies are encouraged to invest or form joint ventures with leading state companies to upgrade the technological competitiveness of state-owned enterprises in international competition. Tencent and Alibaba were urged by the State-Owned Assets Supervision and Administration Commission (SASAC) to invest in state-owned companies to boost mixed-ownership structures (Shi 2019).

Mixed-ownership structure is a unique corporate species arbitrarily created through China's partial reform process. They are neither private, nor state-owned. Private companies' joint ventures with state companies can be seen as a form of forced IP (intellectual property) transfer within the Chinese economic territory. Huawei is no different from other private companies operating in China (Li 2019b). It would be only reasonable to assume that Huawei is or will be urged by the Chinese state to either invest in state companies or form joint ventures, in a mixed-ownership structure, to upgrade the overall state capability on technology.

"Alipay belongs to the country. When the country needs it, I can donate it immediately" (Sohu 2018). When Alibaba's founder Jack Ma made this open pledge in 2018, Ant Financial (now Ant Group), Alibaba's fintech arm that owns Alipay, was valued at \$150 billion. Likewise, it is reasonable to assume that Huawei's Ren Zhengfei would conceive a strong level of patriotic devotion similar to Alibaba's Jack Ma, and stand ready to hand in a portion of corporate ownership to the country upon request. Huawei's corporate ownership structure ultimately becomes

inconsequential, considering that the Chinese state has the absolute control and authority over the corporate destiny, despite the actual state ownership within it.

3.2 Is Huawei Subservient to Socialist Values?

ByteDance, the parent company of popular social media app TikTok, ordered its company to self-censor to ensure that contents “promote the core values of socialism” in 2018 (Pham 2019). If Chinese technology company’s business strategy comes into conflict with core Chinese nationalist and socialist values, Chinese technology companies would undoubtedly subordinate their business missions to core Chinese socialist values. Such a choice could be necessitated by business or political considerations.

Huawei, although not making a deliberate statement on such a position, would undoubtedly submit the corporate strategies to the overarching Chinese state objectives, and align corporate values to the Communist Party-mandated core socialist values. Huawei’s ultimate success in the global marketplace may outlast but cannot deviate from the path of Chinese national resurrection.

3.3 Would Huawei Be as Successful If Not a Chinese Company?

Huawei was revealed to have received up to \$75 billion dollars in state financial assistance by 2019 (Yap 2019). Although Huawei denied receiving any preferential treatment compared to other technology companies from the state, it did not categorically deny the receipt of financial support as a matter of fact. US intelligence also supported that the Chinese government has helped finance Huawei (Vidalon 2019).

The significance of Huawei’s unique business model, or China’s state capitalist model, cannot not be understood entirely by focusing on financing provided to Huawei, the supplier. The focus should equally be placed on financing provided to Huawei’s customers, in some instances, nation-states. According to SAIS-CARI (China Africa Research Initiative,

School of Advanced International Studies), a Johns Hopkins think tank, Chinese state financing support enabled Huawei to offer more appealing packages due to its access to funding. With appealing financing offers from state policy banks, Huawei has been able to enter African markets with subsidized prices that easily edge out competitors (Link 2019).

SAIS-CARI further identified 47 different loan-backed projects across Africa involving Huawei contracts during the 2000–2017 period. China's EXIM Bank (The Export–Import Bank), its state policy bank, financed 45 of these. The remaining two involved seller's credit finance from Huawei. Loans for African projects involving Huawei totaled nearly \$3.4 billion. Countries signing the largest Huawei-related loans were Ethiopia with \$834 million; Cameroon with \$337 million; Angola with \$336 million; Guinea with \$273 million; and Zimbabwe with \$219 million (Link 2019).

Huawei's 5G offer, particularly financial offers to capital-constrained African countries, creates mutual strategic advantages to both China and the recipient countries. It is also possible that the Chinese state may in turn gain a political and geopolitical leverage over countries that borrowed from Chinese banks. Even more consequentially, Huawei's operating strategy globally may be under the influence of the Chinese state when the political economic relationship is intricately interlaced between the state and Huawei, between finance and technology, and between economics and geopolitics.

Based on the qualitative analyses, we can attest the absolute state authority over the corporate sector in China, the clear state push for the development of a mixed-ownership corporate model among the strongest Chinese private technology companies and the largest state-owned companies, and Huawei's receipt of state-level financing not only to itself but to its customers, many of whom being financially unviable states. Therefore, it is challenging to definitively conclude, even with an explicit employee ownership plan in place, how privately owned and privately directed Huawei is, and if Huawei would be able to remain as competitive in the global marketplace, should the favorable financing offer from the state policy banks be removed.

4 Huawei's Strategic Future Lies with Europe

Whether Huawei's push through Western Europe can succeed will be a fundamental test of not only China's technological capability but of the transatlantic Western solidarity.

The developed economies in Western Europe can collaborate with Huawei on critical innovations and supply China with world class intellectual capital. While Huawei can no longer gain access to the US market given the structural economic rivalry between the two economies, core US allies in the Euro-Atlantic region, particularly NATO member-states that have not yet decided on Huawei's 5G, become crucial to Huawei's global success.

Of the 44 countries in Europe, 31 countries have permitted Huawei's access to their 5G networks. The UK, Spain, Albania, Poland, Czech Republic, Estonia, and Iceland have overtly disfavored Huawei's access in its 5G infrastructures. Montenegro, Liechtenstein, Lithuania, and Luxembourg have not made decisions on Huawei's 5G (Table 5.2).

The hurdle Huawei faces in securing significant European market access has less to do with an outright market ban, which it faces overtly in the United States, Australia, and New Zealand. The main European hurdle for Huawei lies with the regulatory approval process (Turner 2019). So far, although Germany (Karpal 2019) or France has not

Table 5.2 Huawei's 5G status in Europe

Decision	Countries
No Ban	Russia, Germany, France, Italy, Slovakia, Norway, Ireland, Ukraine, Croatia, Moldova, Bosnia and Herzegovina, Romania, Netherlands, North Macedonia, Belgium, Slovenia, Latvia, Greece, Portugal, Malta, Hungary, Belarus, Austria, Serbia, Andorra, Monaco, Switzerland, Bulgaria, San Marino, Denmark, Finland
Clear Ban	UK, Spain, Poland, Albania, Czech Republic, Estonia, Sweden, Iceland
Undecided	Lithuania, Montenegro, Luxembourg, Liechtenstein
Unknown	Holy See

Source: Author's own compilation, August 1, 2020

overtly banned Huawei's commercial access, the country's regulatory approval process adds an additional layer of restrictions, based on national security review, post-Huawei's winning of the commercial contracts (Turner 2019).

Smaller European states, including Luxembourg (Perawongmetha 2019) and Lithuania, have called for an EU-wide regulatory decision on Huawei. The EU has made it clear it is unlikely to issue a blanket ban on Huawei (Crisp 2019).

Eurasian powers have long aspired to connect the two ends of Eurasia, from Alexander the Great to Genghis Khan. China's ambition to connect the two ends of Eurasia is not innovative in itself. The digital and economic tools China deploys are innovative, within a modern sovereign context. Europe's deeper economic integration with the continental landmass to the East, seen through the economic forces of geography, is a natural one.

Euro-Atlantic West, thus, may be digitally divided based on the choices of Huawei. The stakes over Huawei's 5G for Europe is more than national security. The stakes are about which global technology sphere it chooses to belong to, between a Tech Sinica and a Tech Americana, and the irreversible technological integration process that ensues within each technology sphere. The stakes are between a deeper Eurasian economic integration and a deeper Western ideational integration. The strategic stakes on the 5G choice for the Euro-Atlantic West is high for Huawei, for China, for the United States, and for the digital world order.

5 Huawei Empowers Future Tech Sinica

5.1 Huawei's 5G Is the Enabler of China's Vision 2030 as an AI Superpower

China's Vision 2030 (O'Meara 2019) aspires to turn China into a global AI superpower in a decade. Vision 2030 delivers key technological breakthroughs in the areas of artificial intelligence and is only made possible with China's advance in 5G infrastructure at home and beyond. The 5G

network could carry data up to 100 times that of 4G (Chikermane 2019). Huawei's 5G enables critical digital infrastructure, on which data can be generated, collected, analyzed, and connected.

Huawei's investment in R&D in 2018 was \$15 billion, surpassing Apple, Microsoft, and Intel over the same period (*China Daily* 2019). Beyond Huawei's in-house R&D, a more significant amount of R&D investments by the Chinese state is also put in place. Among them, a \$29 billion state-backed fund to invest in chip innovations was announced in October 2019 (Bloomberg 2019). Huawei and the state are highly unlikely to innovate in silos, given China's political economic structure. The innovation processes and the research outcomes between Huawei and the state will be synchronized. Huawei's innovation will deeply incorporate into the overarching Chinese state vision to drive AI supremacy.

5.2 Huawei Expedites China's Economic Transcendence into Data Capitalism

In the fourth plenum communique of the 19th Party Congress of the Communist Party of China, data was listed for the first time as a factor of production (Wang 2019), alongside neoclassic economic growth factors—capital and labor. This marks clearly China's transcendence in its economic thinking and development discourse from the twentieth-century economic growth model, primarily driven by labor premium and capital surplus, to a twenty-first-century economic growth model, driven intrinsically by data as a significant economic input. China's top leadership has, therefore, articulated its conscious choice on the country's economic direction by embracing data capitalism (Tarnoff 2018).

In summary, empowered by Huawei's 5G, the rise of AI and the amalgamation of big data will form the two quintessential pillars of China's digital superpower. Tech Sinica will be executed on Huawei's 5G and future 6G infrastructures. In theory, Tech Sinica will be as broad a global digital framework as Huawei's 5G infrastructure reaches. Therefore, Huawei is the necessary condition, if not a sufficient condition, to the culmination of future Tech Sinica.

6 Huawei Transforms Global Order Beyond Technology

Huawei transforms future global order in two profound dimensions beyond technology. First, Huawei will enable the least developed Global South with a technological first mover advantage, thereby creating an economic take-off effect in these economies relative to the Global North. This economic take-off effect will narrow the global development disparity, for the first time in world economic history.

Second, Huawei becomes the symbol and frontier of a future global divide between two digital economic blocs, built upon two distinctive philosophies of technology. Huawei-induced global digital divide is analogous in its significance on future world order to the Communism-induced global political divide during the Cold War, thus carving the digital globe into two parallel ecosystems.

6.1 Opportunity to Reverse Global Development Gap Between the Global North and South

Over millennia of human development, the first global income divergence only appeared with the onset of the first Industrial Revolution (Baldwin et al. 1998). Within the wider frame of human history, “the current wide disparities—between rich and poor countries—are recent” (Kuznets 1966; Baldwin et al. 1998). The most striking feature coupled with the Industrial Revolution concerns the increase in growth rates for the early adopters of breakthrough technologies. Over the previous three rounds of the Industrial Revolutions, rates of growth have spiked prominently for the United Kingdom, Western Europe, and the United States, or the Global North, against the rest of the world.

Coupled with the rapid economic take-offs seen in the early European technology adopters post the Industrial Revolution, welfare of the Global South was reduced on an absolute basis while that of the Global North rose. As shown in Fig. 5.6, on a real GDP per capita basis, China, India, and Mexico, major trading countries at the time, have all become economically worse off as the Global North became economically better off.

Real GDP per capita
in international-\$ in 2011 prices

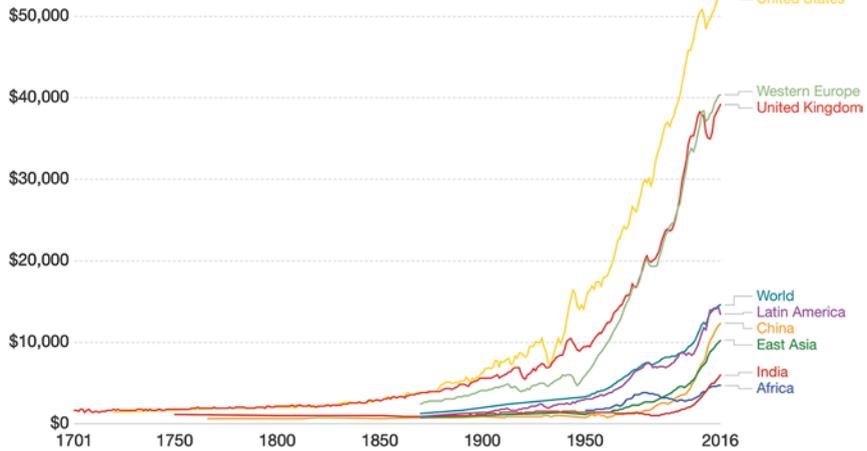


Fig. 5.6 GDP Per Capita by Region/Country Comparison through Industrial Revolutions. (Source: Bolt et al. Madison Project Database 2018)

Change in real GDP per capita
in international-\$ in 2011 prices

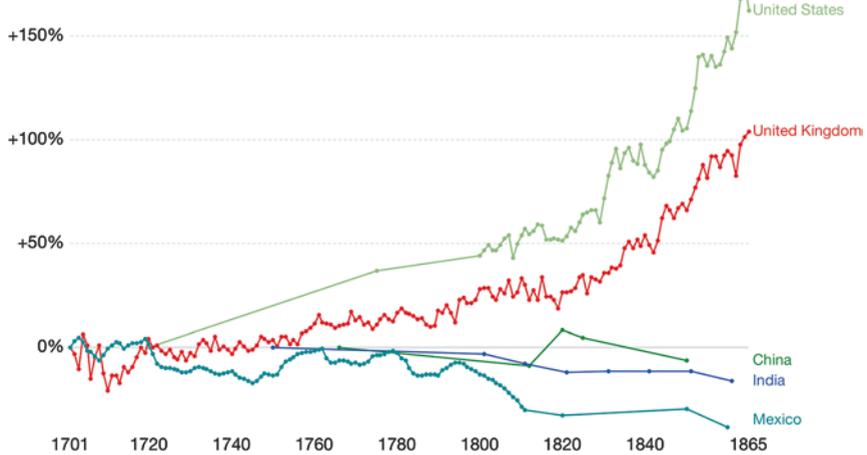


Fig. 5.7 Global Welfare Disparity as a Function of the Industrial Revolution. (Source: Bolt et al. Madison Project Database 2018)

The bifurcating gap in global welfare only exacerbated with every subsequent round of technological breakthroughs throughout the industrial era, as the Global North continues to be the originators and predominant economic beneficiaries of technological breakthroughs (Fig. 5.7).

Assuming 5G capability can transform mobile into a GPT, we can see a clear distinction in the ensuing wave of global development pattern from the one seen throughout the industrial era. Huawei will enable the Global South to experience a rapid economic take-off on both absolute and relative basis against the Global North. Consequently, global income disparity will converge for the first time since the great economic divergence was created by the Industrial Revolution.

Huawei's 5G competitors will not be able to deliver this economic paradigm shift expected for the Global South, as their global strategies continue to prioritize developed and mature markets. Huawei will be the only viable and feasible global 5G player to deliver this global economic re-convergence.

As Huawei continues to successfully deliver its 5G infrastructure from Ethiopia to Cambodia, from Saudi Arabia to Cuba, the developing world will have an opportunity to rise collectively on a standardized and common digital framework executed by Huawei and China. The digitally unified Global South will challenge the Global North, not only on its technological merits but on its economic vitality.

From this perspective, Huawei's success will bring major paradigm shifts in world's geo-economics. It will reset the global economic center of gravity from the world's oceanic "outer crescent" to the Eurasian "inner crescent," from the developed world to the developing world.

6.2 The Fall of a Digital Iron Curtain

AI-related technologies have accelerated in scale and speed since 2012. Humanity's usage and cohabitation with AI is a relatively new phenomenon. A digitally sophisticated AI superpower that can deliver both economic prosperity and political stability defines the fundamental characteristics of digital authoritarianism.

Through the BRI 2.0, China's digital authoritarianism will expand to countries that have subscribed to its digital superiority, and by definition, consenting to its digital governance rules within the digital multilateral framework. Digital authoritarianism seems rather attractive to many authoritarian governments (Thu 2019). China's technological philosophy legitimizes censorship, can restrict data flow, and enables surveillance of information and behaviors, all of which can become more expedient and efficient with Huawei's 5G infrastructure. Huawei is documented to have provided surveillance technology to help illiberal regimes within the BRI to reinforce regime stability by using the internet censorship and increasingly facial recognition technologies (Parkinson et al. 2019).

The political profile of the BRI countries are predominantly characterized from failed democracies, quasi-democracies, hybrid regimes, autocracies to theocracy, with very few as full liberal democracies (Yu 2019). The appeal of surveillance for the majority of the BRI countries is not the result of China's deliberate effort to export authoritarian technologies. Conversely, China's digital authoritarian philosophy in maintaining regime stability while developing the economy resonates with many non-full liberal democracies in the Global South.

Adopting Huawei's 5G network is equal to an implicit consent to China's technological philosophy and economic values, thus subscribing to an abiding membership in future Tech Sinica. Huawei's expansion will ensure the collective digital and economic rise of the authoritarian world against liberal democracies in the new digital age.

Ultimately, Huawei is the fault line between digital authoritarianism and digital liberalism, a renewed human battle for freedom in the twenty-first century. What Huawei is able to accomplish for the collective rise of the digital authoritarian bloc over the next three decades will be the most crucial variable in defining technology and human destiny in the twenty-first century.

7 Conclusion

Huawei has a clear edge in today's global 5G competition, attested by its leadership in both current 5G market share and declared global 5G patents. Huawei's technological impact will be amplified by 5G's

empowerment of mobile technology, considered by some as a general-purpose technology, similar in significance to the steam engine or the Internet. Huawei is a quintessential component and a strategic beneficiary of China's grand strategic Belt and Road Initiative, which aims to build conventional and digital infrastructure connectivity across all world continents. Huawei's 5G will enable China to transcend its economic growth model into data capitalism and execute China's vision as a global AI superpower by 2030.

Huawei's global expansion will fundamentally transcend global economic paradigm and political order beyond technology. Huawei's prioritized expansion and presence across the Global South will deliver economic take-offs for the region, and subsequently narrow the bifurcating global development disparity against the Global North ever since the economic divergence was created by the Industrial Revolution. Huawei will become the digital Berlin Wall, separating future digital global order into two parallel digital ecosystems, the digital authoritarian bloc and the digital liberal democracy bloc.

Most of the Global South are characteristically developing economies and non-full liberal regimes. Huawei's success can bring forward the collective economic rise and enforcement of the global authoritarian bloc relative to the global industrial democracies, causing a fundamental global political economic reset.

China, on Huawei's digital infrastructure, can effectively create a digital global order, defined as Tech Sinica. Tech Sinica will deploy China's digital power as its means, and achieve China's global economic predominance and authoritarian political stability as its parallel ends. Huawei is China's Way to Tech Sinica.

References

- "Australia: Impacts of 5G on Productivity and Economic Growth." 2018. *TendersInfo News*, April 9. <https://www.communications.gov.au/departmen-tal-news/impacts-5g-productivity-and-economic-growth>. Accessed 14 March 2020.

- Baldwin, Richard E, Philippe Martin, and Gianmarco I.P. Ottaviano. 1998. *Global Income Divergence, Trade and Industrialization: The Geography of Growth Take-Offs*. NBER Working Paper 6458, National Bureau of Economic Research.. <https://www.nber.org/papers/w6458.pdf>. Accessed 13 March 2020.
- Belt & Road Portal. 2019. List of Countries That Have Signed the Cooperation Agreements with China for the Belt and Road Initiative. April 12. <https://www.yidaiyilu.gov.cn/xwzx/roll/77298.htm>. Accessed January 9, 2020.
- Bloomberg. 2019. China to Funnel \$29Billion towards Its Chip Ambitions. *Bloomberg*, October 29. <https://www.bloomberg.com/news/articles/2019-10-29/china-to-funnel-29-billion-towards-its-chip-ambitions>. Accessed March 13, 2020.
- Boffa, Mauro. 2019. *Trade Linkages between the Belt and Road Economies*. Policy Research Working Paper 8423, World Bank Group. <http://documents.worldbank.org/curated/en/460281525178627774/pdf/WPS8423.pdf>. Accessed 13 March 2020.
- Bolt, Jutta, Robert Inklaar, Herman de Jong, and Jan Luiten van Zanden. 2018. *Rebasing 'Maddison': New Encome Comparisons and the Shape of Long-Run Economic Development*. Maddison Project Working paper 10. Maddison Project Database, Version 2018.
- Calderon, Cesar, and Ken Burns. 2004. *The Effects of Infrastructure Development on Growth and Income Distribution*. Policy Research Working Papers, World Bank Group: Washington, DC.
- Campbell, Karen, Jim Diffley, Bob Flanagan, Bill Morelli, Brendan O'Neil, and Francis Sideco. 2017. The 5G Economy: How 5G Technology Will Contribute to the Global Economy. *IHS Economics & IHS Technology*, January. <https://cdn.ihs.com/www/pdf/IHS-Technology-5G-Economic-Impact-Study.pdf>. Accessed 14 March 2020.
- Chikermame, Gautam. 2019. 5G Infrastructure, Huawei's Techno-Economic Advantages and India's National Security Concerns: An Analysis. ORF Occasional Paper No. 226, *Observer Research Foundation*, December 10. <https://www.orfonline.org/research/5g-infrastructure-huaweis-techno-economic-advantages-and-indias-national-security-concerns-58644/>. Accessed 14 March 2020.
- China Daily. 2019. Huawei's R&D Investment in 2018 Exceeds \$15Billion. April 9. <https://www.chinadaily.com.cn/a/201904/09/WS5cac0859a3104842260b5265.html>. Accessed 13 March 2020.
- Crisp, James. 2019. EU Unlikely to Call for Blanket Ban on Huawei Building 5G Networks. *The Telegraph*, December 9. <https://www.telegraph.co.uk/>

- business/2019/12/02/eu-unlikely-call-blanket-ban-huawei-building-5g-networks/. Accessed 13 March 2020.
- Eadicicco, Lisa. 2019. Huawei Has Surpassed Apple as the World's Second Largest Smartphone Maker. *Business Insider Australia*, August 1. <https://www.businessinsider.com.au/huawei-is-the-worlds-second-largest-smartphone-maker-2018-8>. Accessed 13 March 2020.
- Ericsson. 2019. Ericsson Extends 5G Leadership with New Agreements. <https://www.ericsson.com/en/news/2019/2/ericsson-extends-5g-leadership-with-new-agreements>. Accessed 13 March 2020.
- Fortune. 2019. Fortune Global 500 2019. *Fortune*. <https://fortune.com/global500/2019/search/>. Accessed 8 August 2020.
- Hanschke, Hannibal. 2019. Trump Says Huawei Is a Security Risk as NATO Seeks Secure 5G. *Reuters*, December 4. <https://www.reuters.com/article/us-nato-summit-huawei/trump-says-huawei-is-a-security-risk-as-nato-seeks-secure-5g-idUSKBN1Y81U1>. Accessed 13 March 2020.
- Huawei. 2020. Huawei Leaps 11 Spots on 2019 Fortune 500 List. <https://consumer.huawei.com/en/press/news/2019/huawei-leaps-11-spots-on-2019-fortune500/>. Accessed 13 March 2020.
- Karpal, Arjun. 2019. Huawei Touts More Than 50 Contracts for 5G as US Pressure Continues to Mount. *CNBC*, September 3. <https://www.cnbc.com/2019/09/03/huawei-touts-more-than-50-contracts-for-5g-as-us-pressure-mounts.html>. Accessed 13 March 2020.
- Kharpal, Arjun. 2020. Huawei Overtakes Samsung to be No. 1 Smartphone Player in the World Thanks to China as Overseas Sales Drop. *CNBC*, June 29. <https://www.cnbc.com/2020/07/30/huawei-overtakes-samsung-to-be-no-1-smartphone-maker-thanks-to-china.html>. Accessed 8 August 2020.
- Kuznets, Simon. 1966. *Modern Economic Growth, Rate Structure and Spread*, P373. New Haven: Yale University Press.
- Li, Tao. 2019a. ZTE Secures more than 25 Commercial 5G Network Contracts as It Steps up Turnaround Efforts. *South China Morning Post*, June 25. <https://www.scmp.com/tech/gear/article/3016032/zte-secures-more-25-commercial-5g-network-contracts-it-steps-turnaround>. Accessed 13 March 2020.
- . 2019b. Huawei Says Relationship with Chinese Government 'No Different' from any Other Private Company in China. *South China Morning Post*, December 26. <https://www.scmp.com/tech/big-tech/article/3043558/huawei-says-relationship-chinese-government-no-different-any-other>. Accessed 13 March 2020.

- Link, Jordan. 2019. How Huawei Could Survive Trump. *Washington Post*, June 10. <https://www.washingtonpost.com/politics/2019/06/10/what-do-we-know-about-huaweis-africa-presence/>. Accessed 13 March 2020.
- Mardell, Jacob. 2017. The 'Community of Common Destiny' in Xi Jinping's New Era. *The Diplomat*, October 25. <https://thediplomat.com/2017/10/the-community-of-common-destiny-in-xi-jinpings-new-era/>. Accessed 13 March 2020.
- Minges, Michael. 2015. *Exploring the Relationship between Broadband and Economic Growth*. Background paper Digital Dividends, World Development Report 2016. Washington, DC: World Bank. <http://pubdocs.worldbank.org/en/391452529895999/WDR16-BP-Exploring-the-Relationship-between-Broadband-and-Economic-Growth-Minges.pdf>. Accessed 13 March 2020.
- Moynihan, Ruqayyah, and Keiko Hamada. 2019. Following Trump's Blacklist, Huawei CEO Ren Zhengfei Says We'll Climb to the Top and Come Back Alive. *Business Insider*, May 23. <https://www.businessinsider.com/huawei-ceo-ren-zhengfei-interview-trump-trade-tariffs-ban-black-listed-2019-5?r=US&IR=T>. Accessed 13 March 2020.
- Nokia. 2019. Nokia Celebrates 30th Commercial 5G Deal. <https://www.nokia.com/about-us/news/releases/2019/03/28/nokia-celebrates-30th-commercial-5g-deal/>. Accessed 13 March 2020.
- O'Meara, Sarah. 2019. Will China Lead the World in AI by 2030? *Nature*, August 21. <https://www.nature.com/articles/d41586-019-02360-7>. Accessed 13 March 2020.
- Parkinson, Joe, Nicholas Bariyo, and Josh Chin. 2019. Huawei Technicians Helped African Governments Spy on Political Opponents. *The Wall Street Journal*, August 15. <https://www.wsj.com/articles/huawei-technicians-helped-african-governments-spy-on-political-opponents-11565793017>. Accessed 13 March 2020.
- Perawongmetha, Athit. 2019. Luxembourg PM Wants European Solutions on Huawei. *Reuters*, February 13. <https://www.reuters.com/article/us-huawei-europe-germany/luxembourg-pm-wants-european-solution-on-huawei-idUSKCN1Q21L4>. Accessed 13 March 2020.
- Pham, Sherisse. 2019. Here is How China Deals with Big Social Media Companies. *CNN Money*, April 12. <https://money.cnn.com/2018/04/12/technology/toutiao-app-bytedance-china/index.html>. Accessed 13 March 2020.

- Pohlmann, Tim. 2019. Who Is Leading the 5G Patent Race? *Iplytics Platform-The IP Intelligence Tool*. https://www.iblytics.com/wp-content/uploads/2019/01/Who-Leads-the-5G-Patent-Race_2019.pdf.
- Qiang, Christine Zhen-Wei, Carlo Rossotto, and Kaoru Kimura. 2009. Economic Impacts of Broadband. In *Information and Communications for Development*. Washington, DC: World Bank. http://siteresources.worldbank.org/EXTIC4D/Resources/IC4D_Broadband_35_50.pdf. Accessed 13 March 2020.
- Rauhala, Emily. 2018. What to Know about China's Huawei Technologies. *Washington Post*, December 6. <https://www.washingtonpost.com/world/2018/12/06/what-know-about-chinas-huawei-technologies/>. Accessed 13 March 2020.
- Sanchez-Robles, Blanca. 1998. The Role of Infrastructure Investment in Development: Some Macro-Economic Considerations. *Rivista Internazionale Di Economia Dei Trasporti/International Journal of Transport Economics* 25 (2): 113–136.
- Scott, Colin. 2012. Does Broadband Internet Access Actually Spur Economic Growth? December 7. https://colin-scott.github.io/personal_website/classes/ictd.pdf. Accessed 14 March 2020.
- Shi, Jianlei. 2019. What Signals Did the Director of SASAC Reveal When He Met Ma Yun Ma Huateng in Succession? *JQKNews*, August 1. https://www.jqknews.com/news/239440-What_signals_did_the_director_of_SASASAC_reveal_when_he_met_Ma_Yunma_Huateng_in_succession.html. Accessed 13 March 2020.
- Sohu. 2018. Jack Ma: Alipay Belongs to the Country. When the Country Needs It, I Can Donate It Immediately. (马云, 支付宝是国家的, 如果国家需要, 随时双手奉上). June 8. https://www.sohu.com/a/234647356_100191171. Accessed 13 March 2020.
- Tarnoff, Ben. 2018. Data Is the New Lifeblood of Capitalism-Don't Hand Corporate America Control. *The Guardian*, February 1. <https://www.theguardian.com/technology/2018/jan/31/data-laws-corporate-america-capitalism>. Accessed 13 March 2020.
- Thu, Huong L. 2019. Cybersecurity and Geopolitics: Why Southeast Asia Is Wary of a Huawei Ban. *Australian Strategic Policy Institute*, October 5. <https://www.aspistrategist.org.au/cybersecurity-and-geopolitics-why-southeast-asia-is-wary-of-a-huawei-ban/>. Accessed 13 March 2020.
- Turner, Giles. 2019. Huawei Has Skirted Outright Bans in Europe. But Not 5G Regulations. *Bloomberg*, April 15. <https://www.bloomberg.com/news/articles/2019-04-15/huawei-s-avoiding-outright-bans-but-not-5g-regulations-in-europe>. Accessed 13 March 2020.

- Vidalon, Dominique. 2019. France Will Not Exclude China's Huawei from 5G Rollout: Minister. *Reuters*, November 25. <https://www.reuters.com/article/us-france-huawei-minister/france-will-not-exclude-chinas-huawei-from-5g-rollout-minister-idUSKBN1XZ1U9>. Accessed 13 March 2020.
- Wang, Feng. 2019. Decision Made during the Fourth Plenary Session of the 19th National Congress of the Chinese Communist Party: Data Elements Will be Main Factors in Determining Compensations based on Contributions, with Supports from both the Central Government and Local Initiatives. (十九大四中全会《决定》：数据要素按贡献决定报酬,发挥中央和地方两个积极性), *21st Century Business Herald*, November 6. <https://m.21jingji.com/article/20191106/be62202be9a03fd2debe2074abb7332b.html>. Accessed January 9, 2020.
- Wright, Nicholas D. 2019. *Artificial Intelligence, China, Russia, and the Global Order: Technological, Political, Global, and Creative Perspectives*. Fairchild Series. Maxwell Air Force Base, Alabama: Air University Press. https://www.airuniversity.af.edu/Portals/10/AUPress/Books/B_0161_WRIGHT_ARTIFICIAL_INTELLIGENCE_CHINA_RUSSIA_AND_THE_GLOBAL_ORDER.PDF. Accessed 14 March 2020.
- Yap, Chuin-Wei. 2019. State Support Helped Fuel Huawei's Global Rise. *The Wall Street Journal*, December 25. <https://www.wsj.com/articles/state-support-helped-fuel-huaweis-global-rise-11577280736>. Accessed 13 March 2020.
- Yu, Shirley Ze. 2017. *Belt and Road Initiative: Defining China's Grand Strategy and the Future World Order*. Master's Thesis, Harvard University.
- Yu, Shirley. 2019. The Belt and Road Initiative: Modernity, Geopolitics and the Developing Global Order. *Asian Affairs* 50 (2): 187–201.

Part II

The Rise of Huawei as a Chinese Global Enterprise



6

A Strategic Assessment of Huawei into the Fast Future

Denise Tsang and David Luigi Fuschi

1 The Making of Huawei

Huawei's recent research study has unveiled a fast future where humanity will reach an unprecedented level of integration with technology in daily lives, enabled by the Fifth-Generation (5G) telecommunication technology. The 5G-related technological innovations that are changing our ways of life are the Internet of Things (IOT), artificial intelligence (AI), augmented and virtual reality (AR/VR), as well as connected technologies. Given Huawei's significant role in 5G development, its global profile has risen prominently as a result of the recent trade war between the

D. Tsang (✉)

Department of Strategy and International Business, Henley Business School,
Whiteknights, Reading, UK
e-mail: d.tsang@henley.ac.uk

D. L. Fuschi

KiiT University, Bhubaneswar, Odisha, India
e-mail: d.fuschi@ieee.org

United States and China, which traces back to President Donald Trump's 2016 campaign promise concerning the Sino-American trade imbalance. The trade war officially began on 6 July 2018 when the United States implemented the first 25% tariff on 818 Chinese products under List 1. A month later, the US National Defense Authorization Act for Fiscal Year 2019 stopped the federal government from procuring information and communication technology (ICT) equipment from Chinese companies such as Huawei on the ground of national security concerns (Young 2019). Since then, the trade war progressed and deepened, and on 16 May 2019, the US Department of Commerce's Bureau of Industry and Security placed Huawei on its Entity List, a list that relates to individuals or businesses that are barred from doing business in the United States; consequently, US companies could only sell high-tech components and software to Huawei with prior state approval. The US government has further adopted a licensing scheme since 9 July 2019 to provide a formal approval process for firms selling to Huawei on the basis that the sales activities would not create a threat to US national security (Wong and Koty 2019).

Huawei is a private ICT company founded by Ren Zhengfei. Ren graduated from Chongqing University in 1963 and joined the Chinese army in 1974, where job allocation under the planned economy was the official requirement (Wagstaff and Yee 2012). Nevertheless, Ren and the entire engineering brigade of the People's Liberation Army in Shenzhen was made redundant in 1983, as Deng Xiaoping embarked on economic reform making cuts on military expenditure (Tsang 2006). Shenzhen, which was in the early stage of transformation from a small fishing village to a global technological hub, provided Ren the opportunity for a new career. He found a managerial job in an electronic firm before establishing his entrepreneurial venture Huawei in 1987. During its early days, Ren took advantage of his former work network and tapped into the military telecommunications supply market, and established Huawei as a sales agent for a Hong Kong company. He also pursued a strategy to invest heavily in research and development (R&D) within the new company. Huawei grew in China over the 1990s. As Huawei built up its technological capability during the 2000s, it began to search for new opportunities abroad. In particular, it was able to transfer its practical

experience within the emerging Chinese market and deployed its capability overseas with a similar technological requirement. Over the decades, it has gained competitive advantages from launching products and services meeting the needs of customers, initially in emerging economies, then successfully utilizing its experience and serving customers within advanced economies. In growing its business, Huawei endeavored to listen to its customers and examine their needs. For example, in early 2010s, Ren discussed the requirement with LG in relation to its LTE network in South Korea. Huawei provided LG the 300 Mbps LTE network requested specifically by the Chairman. This enabled a very successful experience during the visit of Pope Francis in 2014 with 300,000 users in a confined area taking and sending photos across the LG network without any technical issues (Huawei 2019b).

Huawei has been described recently by industry commentators as the world's number 1 telecom supplier, number 2 smartphone manufacturer (CNET 2019), and the global leader in 5G telecommunication network business (Araya 2019). With its focus on a better connected world, Huawei could be considered as one of the most important technology companies. It currently employs over 180,000 employees, operates in more than 170 countries, and serves more than three billion people around the world (Huawei 2019a). Huawei is also a globally oriented company, with approximately half of its sales revenues generated from outside China; it derived 48% of its revenues from the consumer sector, 42% from telecommunication carrier network equipment, and 10% from the business sector (Huawei 2019c).

This chapter examines the impact of the Trump Administration's recent sanction on Huawei using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) framework shown in Fig. 6.1. We will first discuss the firm-specific and country-specific advantages underpinning the strengths and opportunities of Huawei from the international business strategy perspective. We will then elaborate Huawei's business within the context of China's rise and the geopolitical crosscurrents, which will be followed by a discussion of the liability of foreignness that has shaped Huawei's predicament. Finally, we will evaluate the path Huawei can pursue to reconfigure its business model and the potential implications.

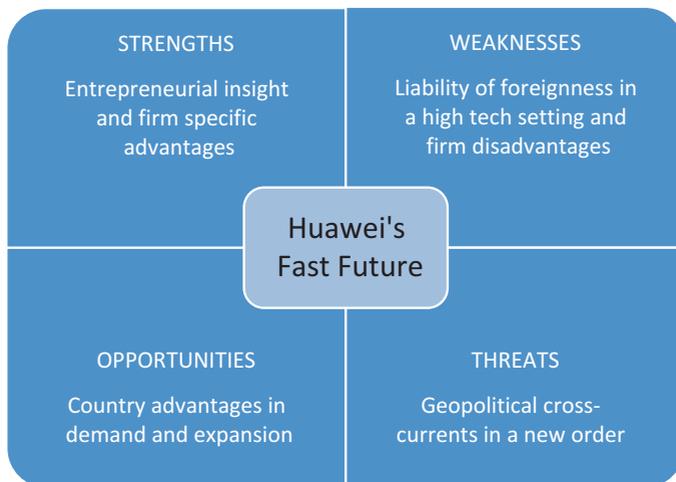


Fig. 6.1 A strategic analysis framework on Huawei. (Source: Authors)

2 Entrepreneurial Insight and Firm-Specific Advantages

By the end of the global financial crisis in 2009, Huawei achieved worldwide revenues of approximately US\$20 billion. It has grown at a phenomenal rate in the past 5 years with its command of the 4G and the 5G telecommunication infrastructure; its revenues grew to US\$110 billion by 2018 (Huawei 2019c). Figure 6.2 shows the growth of sales revenues in Huawei, which has risen rapidly since the mid-2010s with its globalization. As of 2018, Huawei obtained approximately half of its sales revenues outside China and over one-third of its sales outside its home region of Asia Pacific (Huawei 2019c).

Huawei's ability to become a successful global leader in ICT, to a great extent, is shaped by its technology capability as fostered by historical investment in research and development, which has generated leading-edge, firm-specific advantage over time (Rugman 1981). By consistently investing approximately 10% of its total sales in research and development, Huawei has over the decades accumulated technology capability as a leading provider of ICT infrastructure and related smart devices. It

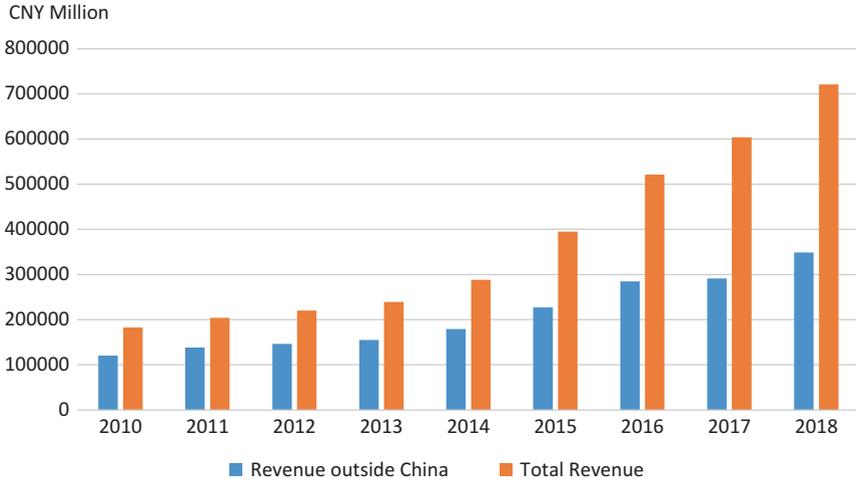


Fig. 6.2 Globalization and the rise of Huawei. (Source: Huawei 2012, 2014, 2016, 2019c)

launched its first proprietary technology in 1993, which was a digital telecommunication switching system called the C&C08. This switching system was reliable and much cheaper than competing products and consequently enabled the company to expand quickly and gained commercial use in China. Huawei built on its domestic strength and since 2000 expanded further to other emerging economies. It was able to serve customers in the emerging economies with the knowledge and experience from working with similar customers at home. Apart from the core telecommunication technology, it has also developed cables in China that are resistant to rodents chewing through them; such products are popular in countries with pest control problems. It should also be noted that Huawei's R&D employees, consisting of over 40% of the workforce, are also required to undertake marketing functions as Ren did in the early days of Huawei. By doing so, Huawei engineers have first-hand knowledge of the customers and fully understand their requirements and the most appropriate technical solution. As its founder Ren explicitly states Huawei's mission is to "stay customer-centric and create value for customers. This is because our money comes from our customers pockets" (Huawei 2019c). Ren therefore has shown significant entrepreneurial

insight regarding the drivers of growth within high-tech sector, which is a critical firm-specific advantage (Rugman 1981). The consistency of R&D investment enables Huawei to capture market opportunity with the fast-evolving telecommunication market.

The scale and scope of Huawei’s upgrade of its technology and product quality is consistently high; its current technological development and achievement means Huawei is the only company that could soon possibly start deploying the vision of Oracle CEO Larry Ellison in terms of global connectivity. In 1996, Ellison envisioned a world where users would only need a network personal computer to authenticate and connect anywhere to the Internet in order to access the data and software needed at their workplace; this is now a realistic vision (Yarow 2011; Bjarin 2011). Figure 6.3 illustrates the future of computing as depicted by Oracle that was not achieved for over two decades.

Oracle’s vision preceded the advent of cloud computing and was conceived in an era of inadequate capability within the telecommunication infrastructure. Additionally, users were rather reluctant to trust a system where software would be provided as a service and the data would not be stored locally but located in servers out of their direct control. At present,

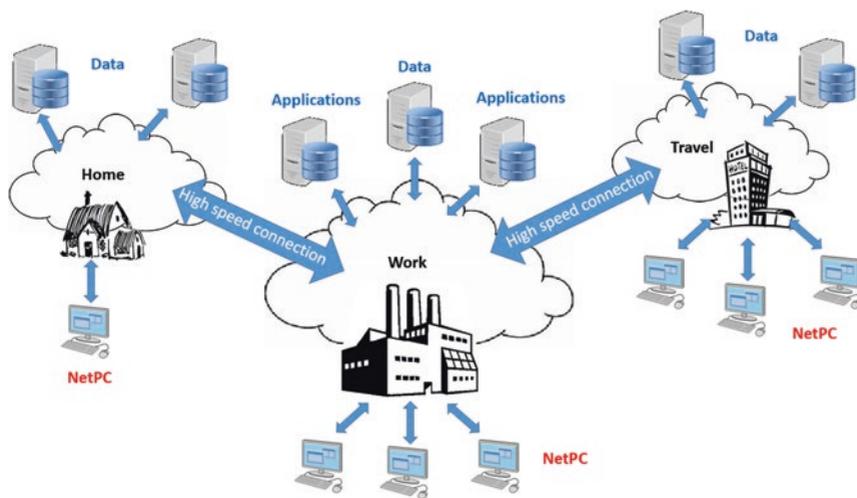


Fig. 6.3 Oracle’s network era. (Source: Authors)

Huawei is the only industry actor building the 5G as well as providing the associated hardware devices such as notebook computers and smart-phones that could finally enable the Oracle model. Huawei is vertically integrated; it offers cloud services, produces core infrastructure components, designs and manufactures Internet-of-Things appliances, and integrates the complete system into a simple, interoperable solution with a single operating system—the *Hongmeng* operating system (Harmony OS). Huawei’s involvement in different aspects of the technology ecosystem suggests that it is the only company that has a holistic perspective on the future of connectivity. Figure 6.4 illustrates the transfer of data with Huawei technology.

Ramamurti and Singh (2009) discuss the global first-mover strategy of Huawei, which combines China’s country-specific advantages and Huawei’s firm-specific advantages. We will discuss the notion of country-specific advantages in the next section. The strategy relates to Huawei operating at the global technology frontier or a trailblazer in a new segment such as the 5G wireless network, supported by a substantial number of important patents. Huawei holds the largest number of leading patents concerning 5G technology (IPlytics 2019). Table 6.1 shows Huawei’s emphasis on R&D investment as compared to its counterparts.

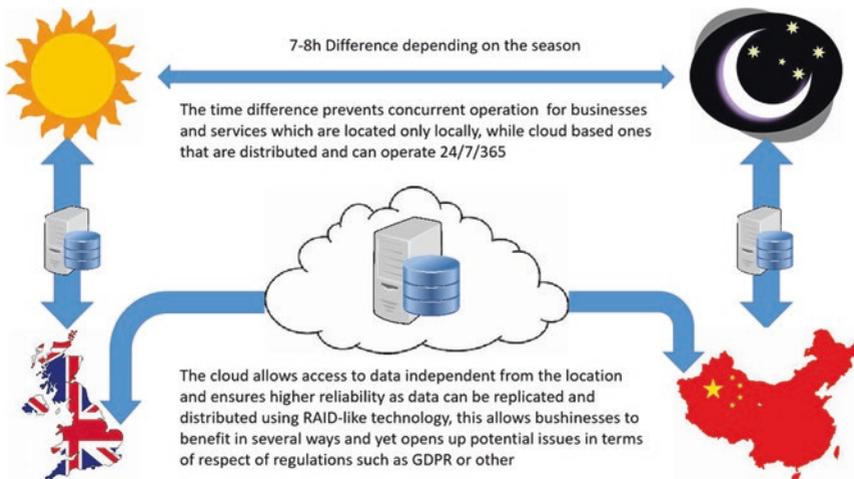


Fig. 6.4 Huawei as a facilitator in connection. (Source: Authors)

Table 6.1 Huawei's R&D investments in the high-technology context, 2018

	US\$ (billions)
Google	21.4
Samsung	16.7
Huawei	15.3
Microsoft	14.7
Apple	14.2
Intel	13.5
Cisco	6.3
Nokia	5.5
Ericsson	4.5

Source: Hooker and Palumbo (2019)

Huawei also has a strong emphasis on academic collaboration. The Huawei Innovation Research Program funded research projects around the world, which include basic scientific projects in Mathematics and core disciplines such as Physics and Chemistry.

Unlike most US companies that simply focus on design and branding, Chinese competitors such as Huawei emulate their Korean counterparts' backward integration into final assembly and component manufacturing. Huawei excels in efficient and effective production processes, employing leading technological standards and practices. Ren also abides by economic logic concerning the extent of Huawei's backward integration and points out the importance of transaction cost (Williamson 1979): "We can buy things that we are not good at making ourselves. Why bother making things we are not good at?" (Huawei 2019b). Huawei diversifies its risk of disruption in the supply chain with a combination of internal and external sourcing. Ren recalls that, "We are open to parts from outside the company. Half of our parts are produced by other companies. I once said in an article that we should buy at least 50 million chipsets from Qualcomm every year" (Huawei 2019b).

Huawei also understands the importance of industry collaboration in the fast-changing telecommunication industry. Ren emphasizes that, "we must understand that we need to stand on the shoulders of our predecessors to promote scientific and technological innovation Our innovations are intertwined with others, and we have produced our own innovations building on those of others" (Huawei 2019b). Using the

example of its wholly owned HiSilicon, he elaborates that the subsidiary has paid substantial fees involving cross-licensing in order to access critical intellectual property concerning production (Huawei 2019b). Huawei has also pursued alliances with technology leaders over other core components to provide the best experience to its customers. Just as an example, its joint effort with the German camera producer Leica has added new dimensions to digital photography through the use of smartphones; as a result, the quality of the camera in smartphones has gone beyond purely amateur photographic standard into the world of professional photography under knowledgeable and skillful users (Cipriani 2019; Cuthbertson 2019). The fact that companies like Leica (a known name in photography along with Hasselblad) have partnered with Huawei could be understood in terms of Huawei's innovation and market share, which enables the setting of a new standard in consumer photography that is close to the standard of professional photography.

How did Huawei catch up with the legendary US company Apple? As mentioned in Table 6.1 earlier, Huawei invested substantially in R&D which resulted in innovative products. Indeed, Huawei's R&D expenditure was higher than Microsoft, Apple, Intel, Cisco, Nokia, and Ericsson in 2018. It might be argued that Apple has been far less innovative in recent years with just marginal improvements to the previous line of smartphones; its iPhone 8 is seen as marginally improving on the iPhone 7 model (McCann 2019). Against this background, Huawei, along with Samsung, Oppo, Xiaomi, and One+, has come up with a series of effective devices and a range of costs that have exceeded buyers' expectations and hence is able to gain market shares in low-income and middle-income economies. Table 6.2 shows that among the top eight smartphone players, Huawei is the second and behind the leader Samsung in terms of sales volume. Some have even concluded that Apple's vision to be the leading smartphone producer in the world has now been crushed by Samsung and Huawei, relegating Apple to the third place (Kingsley-Hughes 2019). To a great extent, the success of Huawei's P20 and P30 families smartphones (which launched 6 months apart from each other) has illustrated its technology capability relative to Apple.

Nevertheless, one might argue that the ultimate firm-specific advantage of Huawei is its human capital. To begin with, Huawei has a

Table 6.2 Global smartphones competition

	Third quarter 2018 market share (by volume)	Third quarter 2017 market share (by volume)
Samsung	20.30%	22.10%
Huawei	14.60%	10.40%
Apple	13.20%	12.40%
Xiaomi	9.70%	7.50%
Oppo	8.40%	8.10%
Others	33.80%	39.60%

Source: *Forbes* (2018)

reflective, entrepreneurial founder with a long-term vision. On the trade war and Huawei's relationship with US technology companies, Ren remarks during an interview with the Chinese media: "I would like to take this opportunity to express my gratitude to the U.S. companies that we work with. Over these 30 years, they have helped us to grow into what we are today. They have made many contributions to us. They have taught us how to get on the right track and run the company. As you know, most of the companies that provide consulting services to Huawei are based in the U.S., including dozens of companies like IBM and Accenture" (Huawei 2019b).

Second, born in an adverse environment, Ren has exhibited the personal characteristics of resilience, which is associated with successful entrepreneurship (Ayala and Manzano 2014; Hayward et al. 2010). Ren's resilience is probably shaped by his upbringing where Vaswani (2019) states: "Ren was born in 1944 in Southern China—a tumultuous, chaotic place, one of the poorest regions in an already destitute country. For a long time, hardship was all he ever knew. He was from a family of seven children." As for Ren's entrepreneurial venture, Ren states that: "Suddenly, I began to work in a market economy. I was at a total loss. So I too suffered losses, I too was deceived, and I was cheated" (Vaswani 2019). Despite the initial setback, Ren began to travel outside China and offered Huawei's products and services to new users, which drove Huawei's expansion and its foundation as a truly global company (Rugman and Verbeke 2004).

Schein (1983) discusses the founders' role in creating the cultures of organizations. Ren indeed cultivated an organizational culture embodying his vision of the company, which is referred to as the “wolf culture,” encompassing innovation, entrepreneurship, and team spirit. Since its early days, Ren has stipulated a customer-centric vision in Huawei's Basic Law Article 3: “On the basis of independent effort, we will develop leading core technology systems with open cooperation, we will become the top information and communication technology company with our excellent products” (Xu 2018: 10). The innovation is clearly spelled out in Article 10: “Our goal is to develop a world leading electronic and technology support system with independent intellectual property rights” (ibid.). Huawei then selects candidates who fit into its culture; Tang (2019) reports that its employees are among those with a strong work ethic in China where they typically finish work in Huawei facility at 20:21 as an average. Ren acknowledges the efforts of the employees and states that R&D employees should purchase luxuries for their spouses as conspicuous consumption will provide incentives for their wealth accumulation. The work ethic echoed Ren's own sacrifice in Huawei where he missed the opportunity to see his children at a young age due to work commitment at home and abroad. He recalls: “Life wasn't very easy for my young daughter either. The company was struggling to survive at that time, so I had to spend over 10 hours at the company every day or go on business trips for months” (Huawei 2019b). Huawei reinforces its strong culture through frequent communication, ranging from Ren's letters in *Huawei People* to technical updates in *ICT Insights*. His recent letter to the employees advised them to “prepare for the worst” with the ongoing trade war (Associated Press 2017).

3 Country-Specific Advantages in Demand and Expansion

Lu (2000) reports that in 1989 there was one telephone terminal per 100 people in China compared with the recent World Bank data of 13 fixed telephone line subscriptions per 100 people by the 2010s. To a great

extent, Huawei's growth leveraged on China's country-specific advantages in terms of the size of domestic market, the rapid modernization of its telecommunication infrastructure, and the Belt and Road Initiative (BRI). The three factors provided Huawei and its indigenous state-owned and privately owned competitors opportunity in a rapidly expanding sector.

China has continuously targeted the building and upgrading of its telecommunication infrastructure since the Sixth Five-Year Plan in 1981. Consequently, the country has leapfrogged to mobile technology and attracted 1.3 billion mobile-phone subscribers by the end of 2015 (EIU 2016). The scale of digital development within market reform means that the industry environment was considerably favorable for companies such as Huawei competing in the fast-changing market during the 1990s and the 2000s. Deloitte (2018: 80) further reports China as the world's largest base of fixed and mobile Internet users, with 802 million Internet users in June 2018; it states that "with a population of 1.4 billion, China still has scope to connect hundreds of millions of more users." This is especially the case where the provincial governments have encouraged electronic devices in relation to the provision of services such as taxation within their functional departments.

By 2018, China's geographical expanse and huge population formed the basis of demand for telecommunication; furthermore, there is also a high degree of IT literacy where all age groups and socio-economic classes have a good grasp of high-tech usage. The extent of IT usage has enabled Chinese cities such as Beijing and Shenzhen to transform into smart cities. The IT policy in China also enables Huawei to build a vast network that includes not only indigenous suppliers but also international leaders such as IBM, Accenture, GE, and Honeywell. Finally, the underlying sentiment of consumer nationalism also benefits Chinese companies such as Huawei. Indeed, the entrenched position of Huawei in its home market could be seen in the plight of foreign players' market entry. Despite it being the most powerful technology company in the world, Google's Pixel 2 did not generate the success it expected in China in 2017 due to design issues including "a bluish tint" on the screen, "periodic clicking sounds and occasionally unresponsive touch commands" (Associated Press 2017).

The official Chinese policy concerning the Belt and Road Initiative that was launched in 2013, which complements the “Going Global” strategy since 1999, has facilitated Huawei’s expansion into new markets. The data collected by the China Investment Global Tracker indicates that among the US\$662.3 billion Chinese MNEs’ investment of at least US\$100 million in value, 57% were along the BRI countries between 2014 and 2019. The Chinese state has a comprehensive policy to assist high-profile state-owned firms as well as leading private firms to exploit emerging markets such as the African continent. Indeed, Huawei’s foreign market entry has been benefited from the centrally orchestrated policy through the state-owned and state-funded Export-Import Bank of China (EXIM Bank). As a policy bank, the EXIM Bank’s mandate is to implement the “Going Global” strategy. It has lent, since 2015, US\$338 million to Huawei buyers in Cameroon, US\$107 million in Kenya, and US\$98 million in Zimbabwe to undertake the second stage of their fiberoptic network (ICA 2020).

4 Geopolitical Crosscurrents in the New World Order

The Huawei ban mentioned earlier relates to the sanction concerning US companies selling technological components that are critical in Huawei’s production chain as well as its business activities with US telecommunication providers or government agencies. A precedent parallel to this case is the British intelligence’s suspicion of Siemens spying on behalf of Nazi Germany during the 1930s (Rath 2010). It also mirrors the tension during the Cold War where Huawei like the special agents of East Germany may be spying for a Communist regime and is therefore the enemy of Western Capitalism (Adams 2014). The intention of the Trump Administration is to stop the economic exchange with companies that are perceived to be within the enemy camp. At this point of conjecture, it is useful to point out that despite all its critics, the Chinese one-party Communist state has managed to conjure an economic miracle since the 1980s, arguably unprecedented in human history, lifting its population out of poverty. Its model of governance combining parental benevolence

and authoritarianism within a powerful state, however, has been subjected to scrutiny (Beeson and Li 2015). Its political ideology of democratic centralism, which it adopted from the Soviet Communist, is the contesting point with the liberal ideology of the United States.

However, the Huawei ban could be seen as a way to divert attention concerning the progressive erosion of US country advantages within technological superiority (Karatasli and Kumral 2017). The United States is a historic leader in telecommunications, where firms such as the Bell Telephone Company and AT&T have monopolized the industry for a century. After its formation in 1987, Huawei has grown steadily in China. It further globally expanded with competitive products and services across the following decade, allowing the company to reap the high economies of scale in the industry. Huawei has been developing and producing equipment for different telecommunication carriers and became the largest manufacturer in 2012 (*The Economist* 2012). Though the US-based Verizon's CEO states that his company does not use Huawei product, patent disputes in the summer of 2019 involved 230 Huawei patents, worth billions of US dollars, highlighting that the world's largest telecommunication network was to an extent reliant on Huawei technology (Klein 2019; CNBC 2019). Huawei began its research in 5G telecommunication in the 2000s, enabling it to become the first company that could commercially deploy the new standard in large scale based on proprietary patented technology. At the end of 2018, Huawei was granted 87,805 patents, 44,434 of them granted outside China (Huawei 2019c: 42). Additionally, one-third of these patents were critical for 5G development (Huawei 2019b). A 5G patent analysis conducted by the European IT consultancy IPlytics confirmed Huawei's leading position relative to its competitors (IPlytics 2019).

In terms of smart devices that function within the fast-evolving telecommunication environment, the earlier Table 6.2 shows that Huawei has surpassed Apple in terms of global smartphone market share in total units shipped since 2018. Huawei's success in branding is not a stand-alone case; other Chinese brands that successfully established in the smart device and mobile computing segment in the past decade include Lenovo, Vivo, Oppo, and Xiaomi (Jones 2019). Though Apple sustained its leadership in high-end smartphones, it had to reconsider a catch-up

strategy in its global position by launching a new low-cost iPhone in early 2020; the new model will succeed its last low-cost model iPhone SE in 2016 (Li 2019). Overall, the globalization of Chinese multinational enterprises (MNEs) coupled with the relative decline of US MNEs and the challenge from the Chinese state in the new global order have been seen as unfavorable by the Republicans. President Trump indeed states that “Huawei is something that’s very dangerous. You look at what they’ve done from a security standpoint, from a military standpoint, it’s very dangerous” (*Al Jazeera* 2019). The perception of the national security threat, however, builds on the assumption that clashes and wars among the powerful global players are inevitable. It follows that as China has become a global economic power and has built up its military capability, it will clash with the United States and hence engage in cyber warfare to undermine the democratic world. Therefore, Huawei could contribute to the military operation. By expounding an agenda concerning China’s intention to threaten and challenge the American hegemony (e.g., Mearsheimer 2006; Layne 2008), US policy makers elaborate their legitimate attempts to consolidate America’s historical positions by all means.

It is true that China has moved away from Deng Xiaoping’s “bide and hide” policy and is pursuing a “strike for achievement” policy under Xi Jinping in the 2010s accompanied by its growing economic power (Huang 2016; Yan 2014). Within the new foreign policy focus, China has continued its peaceful rise and sustainable development as one of its national goals. Against the proclamation of peaceful rise by Hu Jintao and Xi Jinping (Callahan 2016), existing literature has continued to discuss the prospect of China’s ascendancy in the global world order (Ciccantell and Bunker 2004; Gulick 2011; Hung 2015). Karatasli and Kumral (2017: 7) argue that the continuous nationalist/secessionist movements within China including Tibet, Taiwan, Xinjiang, and Hong Kong mean that “China has emerged as a global power, which does not attempt to alter the geopolitical configuration of the inter-state system but one, which attempts to preserve the status quo.” This centrifugal force underpinning the Chinese defined territory supports the notion of peaceful rise from a different political perspective. Nevertheless, the emphasis on American hegemony and the subsequent security concern has placed Huawei in a Catch 22 situation.

5 Liability of Foreignness in a High-Tech Setting

Zaheer (1995: 342) conceptualizes the liability of foreignness as “the costs of doing business abroad that result in a competitive disadvantage for an MNE subunit.” Though the United States and China share the belief in the functioning of the capitalist economic system, they differ to the extent they intervene with the market. The United States advocates the Washington Consensus while China proposes the Beijing Consensus. The case of Huawei illustrates the divergent political ideology mentioned in the preceding section as the underlying cause of its predicament. On one hand, the United States is concerned with limiting the power of government and securing the liberty of its citizens and those in the free world. This diametrically contrasts with the one-party state in China operating under the Communist model. Indeed, the Worldwide Governance Indicators show that the two countries differ substantially in terms of voice and accountability, the rule of law, control of corruption, regulatory quality, and government effectiveness (The World Bank 2019). As Beaulieu (2019) points out, the European technology leaders Nokia and Ericsson have led the previous telecommunication breakthroughs and have kick-started product and service innovation utilizing smartphone technology and infrastructure in the Silicon Valley, and the only reason Huawei is considered not a legitimate company to lead the 5G is because it is headquartered in Shenzhen, China. The liability of foreignness, in this sense, means that despite its technological superiority, Huawei suffers competitive disadvantage associated with its country of origin. The implication is that the Chinese model of economic freedom does not entail political freedom, and thus departs from the US economic and political governance, which is the source of Huawei’s liability of foreignness that has led to it being placed on the Entity List.

Additionally, Huawei’s liability of foreignness (which South Korea does not suffer from) derives from the US hegemony and alliance in post-Second World War East Asia, which the Chinese Communist Party did not take part in. Inkeberry (2004: 357) states that the export-oriented development path of the East Asian tigers was fostered along the presence

of their close security ties to the United States. In other words, the economic success of South Korea, Taiwan, Singapore, and Hong Kong were critical as they serve “as a security asset to America.” Though Sino-American relationship has been on functional diplomatic terms since the 1980s, the lack of Chinese participation in the US-led regional security network in East Asia since the 1950s means that Chinese MNEs such as Huawei are portrayed as outsiders rather than insiders compared to its Taiwanese or Korean counterparts. Additionally, the two countries’ transition to democracy in the past two decades have reinforced their positions in the Free World as the United States and the United Kingdom.

Huawei is specifically penalized under two much debated rationales—perceived state control and alleged spying activities. Davies (2018) stresses the fact that it is the profile, standing, and connection within the Communist Party and the suspicion of espionage that create the basis for Huawei’s lack of legitimacy under the Trump Administration. We have pointed out that Huawei’s founder was assigned to serve in the Chinese army prior to his redundancy during the economic reform. It should also be highlighted that Ren was not invited to join the army for some 10 years since his father fought for the Nationalist Party (which fled to Taiwan in 1949); furthermore, similar to those in his generation, Ren’s father was sent for exile during the Cultural Revolution. Ren was eventually enlisted in 1974 due to a severe shortage of engineers in China as the education system had been disrupted for nearly a decade. After he left the army, Ren grasped the opportunity to become an entrepreneur in Shenzhen. To a great extent, Ren’s connection with the army was unplanned and was a result of the political events beyond his control.

Another commonly discussed link between Huawei and the Chinese state was through the employee ownership system in the form of the union committee. Huawei explains that the company is 99% owned by its employees globally through an Employee Shareholding Scheme involving 96,768 employee shareholders; “this scheme is limited to employees and no government agency or outside organization holds shares in Huawei” (Huawei 2019c). Huawei has elaborated the origin of the scheme on the ground that “Chinese banks wouldn’t lend to a private start-up company, so it had no choice but to distribute shares to employees as a way to attract talent and generate capital” (Coleman 2019). Its

chief secretary elaborates the ownership systems as “while Huawei employees are not registered shareholders as defined by law, they are the actual owners of the company. Their shares generate dividends, give employees a voting interest in the company’s governance and would translate to a share of the company’s assets if it were liquidated” (Coleman 2019). The employee ownership scheme as exercised through the union committee fulfills the requirement of Chinese Law and has been adopted by other private companies in the growing Chinese economy, characterized with institutional voids. In other words, the union committee has managed to by-pass the maximum number of 50 shareholders among private companies under the Company Law as well as fulfilling the requirement of Labor Law to set up a government-led trade union. Peng and Hoffmire (2015) suggest that the unique scheme has raised the productivity of Huawei employees. However, this view is not shared by all. Blading and Clarke (2019) consider the existence of the union committee, overseen by the governmental organization All Chinese Federation of Trade Union, as evidence that Huawei is controlled by the Chinese state. Building on this link, Garsd (2018) also suggests that companies like Huawei that are embedded in the Chinese system would unlikely refuse working with the Chinese intelligence agencies in the current autocratic regime.

The interest in spying is probably as old as the human race, the Caesar cryptography algorithm takes its name by the method used by Julius Caesar for enciphering his messages (Savarese and Hart 2010). The claim concerning the US National Security Agency collaboration with IBM to deliberately weaken the Data Encryption Standard during the 1970s is a modern version of spying via a technology trapdoor (Kelly 2006; Schiller 2014; Chalmers 2019). More recent high-profile technology spying includes US Central Intelligence Agency’s hacking into Cisco as leaked by Assange (Menn 2017). It is speculated Huawei spied for the Chinese government for nearly a decade. Adopting an impartial view concerning Huawei spying for the Chinese state, BBC (2020), Vaswani (2019) and others point out that there is a lack of a smoking gun. Haridy (2019) also writes that “Over the last decade these spying allegations have consistently hounded Huawei, however, no clear evidence has ever been presented to prove there are backdoors or surveillance spyware installed on

any Huawei devices. An expansive 18-month security review from US government agencies was reported to have concluded in 2012 that there was no evidence that Huawei worked with the Chinese government to spy on US citizens.” McCrave (2019) adds that “The reality is that there is zero evidence of hacking, and the intelligence agencies in the US and other countries are coming back and saying ‘well there’s no evidence now but there could in the future’... Back doors are difficult to detect but there are investments in R&D that detect backdoors.”

6 Huawei’s Possible Paths: *A Will to Fight till the End*

Our strategic assessment concerning Huawei in the digital future seems to suggest that its growth is predominantly imposed by the external political economy (De Wit and Meyer 2010). The unfolding of events since the summer of 2018 was beyond the control of the company, which left Huawei with limited feasible strategic options. Its response could be compared to the Chinese proverb story of 破釜沉舟 (i.e., Smashing the cauldrons and sinking the boat) where the only way to survive is to fight against the enemy with all your capability. Huawei has been forced to stand to fight for its survival for the first time in its corporate history; it will have to try its best, with little room for maneuver or error. But could a relatively smaller company prevail among the cash-rich US technology giants?

Huawei has actively planned for crisis management, which is a characteristic of Chinese management (Redding 1993). Its Plan B has enabled Huawei to prepare for the worst-case scenario. In terms of its smartphone devices, Huawei has found some alternatives that have ranged from internal suppliers (Tao 2019; Mott 2019; Udin 2019) to external suppliers (Doffman 2019; Padla 2019; RT 2019). As to semiconductors, Huawei has increased the volume procured from Mainland Chinese and Taiwanese companies, including TSMC, Win Semiconductors, Semiconductor Manufacturing International, Jiangsu Changjiang Electronics Technology, and so on. (Cheng and Li 2019). Some have even speculated that Huawei could switch from Android to the Russian version of Sailfish operating

system (RT 2019); this could, however, pose concerns given the Russian influence over global politics and the friction between the West and Russia's state capitalism (Torres 2019).

However, Huawei's Silicon Valley suppliers such as Micron, Qualcomm, Seagate, Google, Microsoft, and Intel are specialist suppliers at the forefront of their technological niches. The question arises whether Huawei's replacement of these suppliers would impact on the design and quality of its products. For instance, Huawei launched its first 5G chipset in 2018 whereas Qualcomm has accumulated rich expertise over the decades. As Contreras and Hildenbrand (2019) state "nearly all 5G products are currently powered by a Qualcomm modem" and its new X55 modem "is truly global" as it supports all three frequency bands for mmWave communications as used in different continents. Having said that, Samsung and Media Tek unveiled competitive products to catch up with Qualcomm and are expected to gain market shares (Horwitz 2019). The intense competition among these suppliers also pose the question whether Huawei could internalize key components successfully in the long run due to the extremely high level of research intensity.

The ongoing Chinese Belt and Road Initiative in the expanding African market might also be able to compensate Huawei's loss in terms of its business in countries such as the United States and the United Kingdom. Indeed, Huawei has been undertaking corporate social responsibility activities in Africa for over a decade and is a well-known brand. For example, it donated US\$13,000 worth of ICT equipment to Ghanaian schools and provided scholarship for talented but underprivileged students to attend universities in China in 2010 (Huawei 2011). Huawei also donated KES9.4 million to support the Red Cross for humanitarian relief when Kenya was hit by the worst drought in six decades, affecting 3.5 million people (Huawei 2012). In 2013, Huawei supported the ICT training of 1000 girls in Nigeria in addition to providing funding to Christmas celebration organized by the Nungtso Charity Foundation in Nigeria (Huawei 2014). The ICT training program was also offered to 2000 unemployed young people in 2017 in practical skills such as website design, computer repair, and the Huawei Certified Datacom Associate (HCDA) program enhancing employability (Huawei 2018).

Perhaps what we have observed in terms of Huawei's firm-specific advantage is the tip of the iceberg. The branding and the trust it has built in the African continent is invaluable. The trajectory of Huawei's growth in the emerging world might suggest the damage inflicted by the trade war could be short-term and might propel the company to pursue opportunity beyond the United States at a faster pace. Overall, the trade war means that we might be seeing diversification in terms of 5G infrastructure, where the American and the Chinese standard diverge. Worstall (2019), however, considers a technology standard competition as inefficient; he states that "Economic nationalism has serious problems in competing in a world in which the efficient size of a supplier—or technology—is the entire globe."

7 Discussion and Conclusion

According to Rockman (2019), the present trade war that escalates between the United States and China has created a situation where companies including Ericsson, Nokia, MediaTek, Samsung, and Cisco are gaining while others such as Qualcomm, Google, Apple, and Vodafone are losing. More specifically, Ericsson, Nokia, and Cisco are able to provide infrastructure equipment in the United States, without the key competitor Huawei. Samsung can regain market share in the smart device domain (albeit this is no more than their core target market) intensifying activities in components (memories and other semiconductors), infotainment, and life-care as explained in Vision 2020 (Samsung 2017). MediaTek as a semiconductor producer will also benefit from supplying components to furnish Qualcomm's requirement in the supply chain. On the other end, Qualcomm will lose Huawei as one of its main customers; Google will have to face the threat of the Harmony operating system and the build-up of a Chinese App ecosystem that could grow fast and quickly expand to neighboring India and other parts of the world on the basis of the huge installed user base. Apple has suffered from Chinese consumer boycott whereas Vodafone is highly dependent on Huawei equipment and could find it difficult to switch to another provider after having substantially planned all 5G roll-out on equipment that now may not be

available. Overall, we might just be witnessing the beginning of the end of an American/European-led technology century in telecommunication.

For youthful companies, the current crisis as faced by Huawei will pose severe challenges. But the discussion in this chapter suggests that Huawei is not in a dire situation based on its lead in telecommunication innovation, its strong home base, and its pre-empting of the current crisis. Huawei has responded strategically. Overall, Huawei may utilize the present situation as a commercial challenge and fully exploit its internal know-how and skills, developing its own operating system for smartphones, mobile computing, and the Internet of Things as they have done for their smartwatches and fitness trackers. Huawei should also further invest in the brain of smart devices, the central processing unit, to tailor design and optimize hardware performance.

Like Africa, China has built a digital ecosystem where the mobile smartphone device is the key pillar. The extremely extensive and pervasive use of WeChat for services such as economic transaction, telecommunication, learning, services, and social media would not be possible unless advanced connectivity existed with multi-media capacities. The constantly growing demand for services and the adoption of an almost cashless economy have been pushing the expectations and the almost unaffordability of Apple products for the mid-low-income consumers, which in turn has been a major driver for Chinese smart device producers to develop devices that are aesthetically pleasant, functionally capable, and economically affordable. Similarly, the surge of Oppo, OnePlus, Huawei, and their penetration in other medium-low-income countries is a testimony of their success in fulfilling the needs of the customers in this niche with quality, performance, and appealing devices. Having said that, the growing economic challenge facing Huawei that originated from China is the global pandemic of COVID-19 and should not be underestimated; the economic shock of the COVID-19 could devastate the emerging economies where Huawei aims to achieve business growth.

The biggest threat that could be posed for Huawei outside its home market is, however, the enemy within. We have highlighted the divergence of ideology in the United States and China as the underlying cause of the trade war that has placed Huawei under severe strain. Globalization implies that consumers in a liberal democracy might oppose Huawei as a

result of political challenges within China, be it in Xinjiang, Taiwan, or Hong Kong, China's political risk has been somewhat intertwined with Huawei's business risk due to the one-party political system and its negative connotation on the company. The shareholder perspective in business has been increasingly replaced by the stakeholder perspective and contemporary customers in advanced economies which have questioned companies and governments from their prevailing standard of justice. Examples include campaigns concerning fair trade, sustainability, labor exploitation, living wages, and other issues; indeed, non-governmental organizations have successfully mobilized large number of consumers using unconventional means and direct actions. Hence, the threat to Huawei could be from the ideological differences of users from other advanced economies or the globally connected middle class in emerging economies; therefore, Huawei's threat ultimately relates back to the differences in the polity within liberal democracy and democratic centralism. For better or worse, Huawei has become truly a global brand with a sensational controversy embedded within the Sino-US trade war. Huawei's growth in China and other emerging economies could be strengthened despite the trade war as the company focused more intensely on this market. The pace and speed of ICT development in these countries will, therefore, serve as the engine for the growth of Huawei within the next decade.

References

- Adams, Jefferson. 2014. *Strategic Intelligence in the Cold War and Beyond*. London: Routledge.
- Al Jazeera*. 2019. Andy Purdy: Why the US is so concerned about Huawei. <https://www.aljazeera.com/programmes/talktojazeera/2019/11/andy-purdy-concernedhuawei-191101095721235.html>. Accessed August 11, 2020.
- Araya, Daniel. 2019. Huawei's 5G Dominance in the Post-American World. *Forbes*. <https://www.forbes.com/sites/danielaraya/2019/04/05/huaweis-5g-dominance-in-the-post-american-world/#3696bec148f7>. Accessed August 11, 2020.

- Associated Press. 2017. Google Pixel Gadgets Disappoint Users After a Month of Use. *South China Morning Post*, December 1. <https://www.scmp.com/tech/leaders-founders/article/2122368/google-runs-problems-its-phones-and-other-gadgets>. Accessed November 20, 2019.
- Ayala, Juan-Carols, and Guadalupe Manzano. 2014. The Resilience of the Entrepreneur. Influence on the Success of the business. *Journal of Economic Psychology* 42: 126–135.
- Bajarin, Tim. 2011. What Larry Ellison Got Wrong About the Cloud. *P.C. Magazine*. <https://www.pcmag.com/commentary/265841/what-larry-ellison-got-wrong-about-the-cloud>. Accessed October 1, 2019.
- . 2015. How Lenovo Became a Global PC Powerhouse after IBM Deal. <https://time.com/3845674/lenovo-ibm/>. *Time*. Accessed October 1, 2019.
- BBC. 2020. Huawei: ‘No Smoking Gun’ in US’s 5G Dossier. <https://www.bbc.co.uk/news/technology-51112232>. Accessed August 11, 2020.
- Beaulieu, Norman C. 2019. *Can 154 Years of Disruptive Innovation in Wireless Communications Be Continued into Fifth Generation 5G and Beyond*. Keynote Speech in the 6th Annual Global Congress of Knowledge Economy, Qingdao, China.
- Beeson, Mark, and Fujian Li. 2015. What Consensus? Geopolitics and Policy Paradigms in China and the United States. *International Affairs* 91: 93–109.
- Blading, Christopher, and Donald C. Clarke. 2019. Who Owns Huawei? *SSRN*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3372669. Accessed October 10, 2019.
- Callahan, William A. 2016. China’s Asia Dream: The Belt and Road Initiative and the New Regional Order. *Asian Journal of Comparative Politics* 1: 1–18.
- Chalmers, Ross. 2019. DES: The Story of the Data Encryption Standard. <https://coinrivet.com/des-the-story-of-the-data-encryption-standard/>. Accessed October 1, 2019.
- Cheng, Ting-Fang, and Lauly Li. 2019. Inside Huawei’s Secret Plan to Beat American Trade War Sanctions. *Nikkei Asian Review*, September 11.
- Ciccantell, Paul S., and Stephen G. Bunker. 2004. The Economic Ascent of China and the Potential for Restructuring the Capitalist World-Economy. *Journal of World Systems Research* 10: 564–589.
- Cipriani, Jason. 2019. 7 Things to Know About Leica and Huawei’s Partnership. <https://www.zdnet.com/article/7-things-to-know-about-leica-and-huaweis-partnership/>. Accessed October 1, 2019.
- CNBC. 2019. Huawei Asks Verizon to Pay More Than \$1 Billion for Over 230 Patents. <https://www.cnn.com/2019/06/13/huawei-asks-verizon->

- [to-pay-more-than-1-billion-for-over-230-patents-source.html](#). Accessed October 1, 2019.
- CNET. 2019. Huawei Ban: Full Timeline as FCC Says It'll Cut off Carriers Using Chinese Company's Gear. <https://www.cnet.com/news/best-early-black-friday-2019-deals-available-today-199-ps-or-xbox-airpods-pro-discounts-and-more/>. Accessed November 28, 2019.
- Coleman, Zach. 2019. Huawei Hits Out at Claims of State Control through 'Employee' Stake. *Nikkei Asian Review*. <https://asia.nikkei.com/Business/Companies/Huawei-hits-out-at-claims-of-state-control-through-employee-stake2>. Accessed August 11, 2020.
- Contreras, Samuel, and Jerry Hildenbrand. 2019. Qualcomm X50 vs X55 Modem: Why the X55 Is So Important for 5G's Future. *Android Central*, August 20.
- Cuthbertson, Anthony. 2019. Huawei Has Made an Incredible Camera Phone That 'Sees Better than the Human Eye.' <https://www.independent.co.uk/life-style/gadgets-and-tech/news/huawei-p30-pro-camera-leica-iphone-xs-galaxy-s10-comparison-a8840481.html>. Accessed November 12, 2019.
- Davies, Rob. 2018. The Giant That No One Trusts: Why Huawei's History Haunts It. *The Guardian*, December 8. <https://www.theguardian.com/technology/2018/dec/08/the-giant-that-no-one-trusts-why-huaweis-history-haunts-it>. Accessed November 12, 2019.
- De Wit, Bob, and Ron Meyer. 2010. *Strategy: Process, Content, Context*. London: Cengage Learning.
- Deloitte. 2018. China, By Design: World-Leading Connectivity Nurtures New Digital Business Models. *Deloitte Insights*, December 12.
- Doffman, Zak. 2019. Huawei Testing Russia's Aurora OS as Complete Android Replacement, Report Claims. *Forbes*, June 13. <https://www.forbes.com/sites/zakdoffman/2019/06/13/huawei-testing-russias-aurora-os-as-complete-android-replacement-report-claims/>. Accessed November 12, 2019.
- The Economist*. 2012. Who's Afraid of Huawei? <https://www.economist.com/leaders/2012/08/04/whos-afraid-of-huawei>. Accessed November 24, 2019.
- EIU. 2016. China Telecommunications China's Infrastructure Leap. *The Economist Intelligence Unit*, February 12.
- Forbes*. 2018. Huawei Fortifies #2 Spot in Global Smartphone Market, Beating Apple Again. <https://www.forbes.com/sites/jeanbaptiste/2018/11/02/huawei-fortifies-2-spot-in-global-smartphone-market-beating-apple-again/#2cf969581305>. Accessed November 12, 2019.

- Garsd, Jasmine. 2018. The History of Tech Giant Huawei and the Chinese Government. <https://www.npr.org/2018/12/07/674467994/huawei-and-the-chinese-government?t=1570182155107>. Accessed November 12, 2019.
- Gulick, John. 2011. The Long Twentieth Century and Barriers to China's Hegemonic Accession. *Journal of World Systems Research* 17: 4–38.
- Haridy, Rich. 2019. Huawei, the US Ban, and Links to Chinese Spying Explained. *New Atlas*. <https://newatlas.com/huawei-ban-us-what-spy-evidenceexists/59772/>. Accessed August 11, 2020.
- Hayward, Matthew L.A., William R. Foster, Saras D. Sarasvathy, and Barbara L. Fredrickson. 2010. Beyond Hubris: How Highly Confident Entrepreneurs Rebound to Venture Again. *Journal of Business Venturing* 25: 569–578.
- Hooker, Lucy, and Daniele Palumbo. 2019. Huawei: The Rapid Growth of a Chinese Champion in Five Charts. *BBC News*. <https://www.bbc.co.uk/news/business-46480208>. Accessed February 2, 2020.
- Horwitz, Jeremy. 2019. Samsung and Mediatech Emerge as Qualcomm's Top 5G Chip Rivals in 2020. *VenturBeat Newsletters*, November 8.
- Huang, Yufan. 2016. Q and A: Yan Xuetong Urges China to Adopt a More Assertive Foreign Policy. *New York Times*, February 9.
- Hung, Ho-fung. 2015. *The China Boom: Why China Will Not Rule the World*. New York: Columbia University Press.
- Huawei. 2011. *2010 Sustainability Report*. Shenzhen, China.
- . 2012. *2011 Sustainability Report*. Shenzhen, China.
- . 2014. *2013 Sustainability Report*. Shenzhen, China.
- . 2016. *2015 Annual Report*. Shenzhen, China.
- . 2018. *2017 Sustainability Responsibility Report*. Shenzhen, China.
- . 2019a. Corporate Information. <https://www.huawei.com/en/about-huawei/corporate-information>. Accessed October 11, 2019.
- . 2019b. Ren Zhengfei's Interview with Chinese Media. *Voice of Huawei*, May 21.
- . 2019c. *2018 Annual Report*. Shenzhen, China.
- ICA. 2020. The Infrastructure Consortium of Africa – Topic Programmes. <https://www.icafrica.org/en/topics-programmes/ict/africa%E2%80%99s-ict-sector-and-china/>. Accessed February 2, 2020.
- Inkeberry, G. John. 2004. American Hegemony and East Asian Order. *Australian Journal of International Affairs* 58: 353–367.
- IPLYtics. 2019. Who Is Leading the 5G Patent Race? https://www.iplytics.com/wp-content/uploads/2019/01/Who-Leads-the-5G-Patent-Race_2019.pdf. Accessed November 24, 2019.

- Jones, Connor. 2019. Samsung Sails Past Apple's Market Share Despite Smartphone Market Slump. *IT PRO*, November 28.
- Karatasli, Sahan Savas, and Sefika Kumral. 2017. Territorial Contradictions of the Rise of China. *Journal of World-Systems Research* 23: 5–35.
- Kelly, Scott. 2006. Security Implications of Using the Data Encryption Standard (DES). <https://tools.ietf.org/html/rfc4772>. Accessed November 12, 2019.
- Kingsley-Hughes, Adrian. 2019. Samsung and Huawei Crush Apple's Smartphone Global Market Share. <https://www.zdnet.com/article/samsung-and-huawei-crush-apples-smartphone-global-market-share/>. Accessed November 12, 2019.
- Klein, Jodi Xu. 2019. Verizon CEO Warns Against Separate 5G Standards. *South China Morning Post*, October 11. <https://www.scmp.com/news/world/united-states-canada/article/3032434/verizon-ceo-warns-against-separate-5g-standards>. Accessed November 20, 2019.
- Layne, Christopher. 2008. China's Challenge to US Hegemony. *Current History* January: 13–18.
- Li, Tao. 2019. Huawei Targets 50 Per Cent Smart-Phone Market Share in China on Way to Wresting Global Crown from Samsung. <https://www.scmp.com/tech/big-tech/article/3001799/huawei-targets-50-cent-smartphone-market-share-china-way-wresting>. Accessed November 12, 2019.
- Lu, Ding. 2000. China's Telecommunications Infrastructure Buildup. In *Deregulation and Interdependence in the Asia-Pacific Region*, ed. Takatoshi Ito and Anne O. Krueger. Chicago: University of Chicago Press.
- McCann, John. 2019. iPhone 8 Review. *Tech Radar*, July 15. <https://www.techradar.com/uk/reviews/iphone-8-review>. Accessed November 12, 2019.
- McCrave, Conor. 2019. Huawei Continues to Grow in Ireland while Countries like the US and Australia are Trying to Keep it Out. *The Journal*. <https://www.thejournal.ie/huawei-in-ireland-growth-4789574-Sep2019/>. Accessed August 11, 2020.
- Mearsheimer, John J. 2006. China's Unpeaceful Rise. *Current History* April: 160–162.
- Menn, Joseph. 2017. A Scramble at Cisco Exposes Uncomfortable Truths About U.S. Cyber Defenses. *Reuters*. <https://www.reuters.com/article/us-usa-cyber-defense-idUSKBN17013U>. Accessed November 12, 2019.
- Mott, Nathaniel. 2019. Huawei's Ready but Unwilling to Replace Android and Windows (Update). <https://www.tomshardware.com/news/huawei-ready-replace-android-windows,39396.html>. Accessed November 12, 2019.
- Padla, Rei. 2019. Huawei May Use the Aurora OS from Russia. <https://android-community.com/huawei-may-use-the-aurora-os-from-russia-20190614/>. Accessed November 12, 2019.

- Peng, Alexander, and John Hoffmire. 2015. Huawei's Employee Stock Ownership Plan and Its Effect on Productivity. *Curriculum Library for Employee Ownership*, School of Management and Labor Relations, Rutgers. <https://cleo.rutgers.edu/articles/huaweis-employee-stock-ownership-plan-and-its-effect-on-productivity-a-comparative-analysis-of-the-2010-2014-financial-data-of-huawei-and-zte/>. Accessed February 2, 2020.
- Ramamurti, Ravi, and Jitendra V. Singh. 2009. *Emerging Multinationals in Emerging Markets*. London: Cambridge University Press.
- Rath, Kayte. 2010. MI5 Feared Siemens Staff Had Nazi Spy Links During WWII. *BBC News*, August 26. <https://www.bbc.co.uk/news/uk-11081786>. Accessed February 10, 2020.
- Redding, Gordon. 1993. *The Spirit of Chinese Capitalism*. Berlin: Walter de Gruyter.
- Rockman, Simon. 2019. Huawei: Winners and Losers. *Forbes*. <https://www.forbes.com/sites/simonrockman1/2019/05/21/huawei-winners-and-losers/>. Accessed November 12, 2019.
- RT. 2019. Huawei Looks to Russian Technology to Replace Google's Android on Its Smartphones. <https://www.rt.com/business/461583-huawei-russia-android-replace/>. Accessed November 12, 2019.
- Rugman, Alan. 1981. *Inside the Multinationals: The Economics of Internal Markets*. New York: Columbia University Press.
- Rugman, Alan, and Alain Verbeke. 2004. A Perspective on Regional and Global Strategies of Multinational Enterprises. *Journal of International Business Studies* 35: 3–18. <https://link.springer.com/article/10.1057/palgrave.jibs.8400073>.
- Samsung. 2017. Vision 2020: Samsung Electronics: About Us: Samsung. <https://www.samsung.com/uk/aboutsamsung.html/aboutsamsung/>. Accessed October 3, 2019.
- Savarese, Chris, and Brian Hart. 2010. The Caesar Cipher. <http://www.cs.trin-coll.edu/~crypto/historical/caesar.html>. Accessed October 3, 2019.
- Schein, Edgar H. 1983. The Role of the Founder in Creating Organizational Culture. *Organizational Dynamics* 12: 13–28. <https://www.sciencedirect.com/science/article/abs/pii/0090261683900232>. Accessed November 24, 2019.
- Schiller, Dan. 2014. *Digital Depression: Information Technology and Economic Crisis*. Chicago: University of Illinois Press.
- Tang, Renyu. 2019. *Leng Yan Kan Huawei* (冷眼看华为). Shenzhen: Haitian Publishing House.

- Tao, Li. 2019. Huawei Confirms It Has Its Own OS on Back Shelf as a Plan B. <https://www.scmp.com/tech/big-tech/article/3001685/huawei-confirms-it-has-built-its-own-operating-system-just-case-us>. Accessed November 12, 2019.
- Torres, J.C. 2019. Huawei Could Use Russian Aurora OS Based on Jolla's Sailfish. <https://www.slashgear.com/huawei-could-use-russian-aurora-os-based-on-jollas-sailfish-13580398/>. Accessed November 12, 2019.
- Tsang, Denise. 2006. *The Entrepreneurial Culture: Network Advantage Within Chinese and Irish Software Firms*. Cheltenham: Edward Elgar.
- Udin, Efe. 2019. Yu Chengdong: Huawei Could Abandon Windows and Android If Need Be. <https://www.gizchina.com/2019/03/11/huawei-could-abandon-windows-and-android/>. Accessed November 12, 2019.
- Vaswani, Karishma. 2019. Huawei: The World's Most Controversial Company. *BBC*, March 6. <https://www.bbc.co.uk/news/resources/idt-sh/Huawei>. Accessed October 11, 2019.
- Wagstaff, Jeremy, and Lee Chyen Yee. 2012. Insight: Outsider Ren Pits Huawei against the World. *Reuters*, April 23.
- Williamson, Oliver. 1979. Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics* 22: 233–261. https://econpapers.repec.org/article/ucpjlawec/v_3a22_3ay_3a1979_3ai_3a2_3ap_3a233-61.htm. Accessed November 24, 2019.
- Wong, Dorcas, and Alexander Chipman Koty. 2019. US China Trade War. *China Briefing*, Last Updated October 24. <https://www.china-briefing.com/news/the-us-china-trade-war-a-timeline/>. Accessed November 12, 2019.
- The World Bank. 2019. *Worldwide Governance Indicators*. <https://databank.worldbank.org/source/worldwide-governance-indicators>. Accessed March 8, 2020.
- Worshall, Tim. 2019. 5G Standards Show How Tech Increasingly Needs One Global Market. *Computer Weekly*, August 28. <https://www.computerweekly.com/opinion/5G-standards-show-how-tech-increasingly-needs-one-global-market>. Accessed November 24, 2019.
- Xu, S. 2018. *Analysis of China's CSA and Huawei's FSA*. Unpublished Master Project. School of Economics, Shandong University.
- Yan, Xuetong. 2014. From Keeping a Low Profile to Striving for Achievement. *Chinese Journal of International Politics* 72 (2): 153–184.
- Yarrow, Jay. 2011. Larry Ellison: How He Tried to Disrupt Microsoft and Failed. *Business Insider*. <https://www.businessinsider.com/larry-ellison-2011-5?r=US&IR=T>. Accessed November 12, 2019.

- Young, Chris. 2019. Huawei Phones Could Regain Google Apps with Special Exemption. *Interesting Engineering*, November 4. <https://interestingengineering.com/huawei-phones-could-regain-google-apps-with-special-exemption>. Accessed November 20, 2019.
- Zaheer, Srilata. 1995. Overcoming the Liability of Foreignness. *Academy of Management* 38: 341–363.



7

Huawei's Expansion into the Global South: A Path Toward Alternative Globalization?

Yun Wen

1 Introduction

Huawei Technologies Co.—China's foremost technology champion—was caught in the vortex of US-China technological rivalry amid growing trade tensions between Washington and Beijing. In light of controversies surrounding Huawei, a close scrutiny of Huawei's development has become increasingly important. As an exemplar of China's "going-out" strategy, Huawei's internationalization, which is marked by the path marching from developing countries to developed markets, demonstrates some distinct features and ramifications. Huawei's expansion into the Global South not only served as a springboard of the company's global reach (Luo and Tung 2007) but also generated mixed geopolitical, economic and technological implications.¹ This chapter examines the initiatives and patterns of Huawei's outward expansion in the Global South. It also provides a discussion on broader implications of China's role in

Y. Wen (✉)

Infinite-Sum Modeling Inc., Vancouver, BC, Canada

© The Author(s) 2020

W. Zhang et al. (eds.), *Huawei Goes Global*, Palgrave Studies of Internationalization in Emerging Markets, https://doi.org/10.1007/978-3-030-47564-2_7

reshaping global information infrastructure through the globalization of Chinese corporate power.

Current studies of firm internationalization have been dominated by the mainstream tradition of neoclassical economic theories, a common theme of which mainly deals with corporate efficiency and resource allocation (Dunning 1993; Narula and Dunning 2000). This analytical framework is inadequate to construct a holistic picture of the political economic context in which multinationals grow and expand. In addition, traditional theories primarily placed the analysis of transnational corporation (TNC) in the context of advanced industrialized countries, which tends to simplify a common pattern of internationalization and abstract the uniqueness of emerging market firms that go global. Although the rise of Chinese multinationals has raised growing attention in the field of international business to seek a more “China-specific” theory (Alon et al. 2013), a large number of existing studies are still based on micro-level firm strategies of internationalization. For example, the current literature on Huawei mainly focuses on the firm’s international marketing strategies, business management, leadership skills and technological entrepreneurship (Sun 2009; Tian et al. 2016; Wu and Zhao 2007). These studies are not only limited to descriptive analyses of Huawei’s business activities but also grounded in celebratory accounts for the international expansion of Chinese high-tech companies.

Another group of studies take the institutional approach to the globalization of Chinese firms by focusing on the impact of China’s institutional change on a firm’s strategy and performance (Alon and McIntyre 2008; Buckley et al. 2007; Deng 2004, 2007; Larcon 2009). This starting point premises either the state as an agent of Chinese corporate power or the Chinese firm as a passive recipient of the state’s institutional changes. This dichotomous state-capital framing, however, neglects the dynamic processes and forces that shape China’s integration into global capitalism and the complicated interrelations between the state and capital.

Moving beyond either the firm-specific perspective or the institutional approach to firm internationalization, this chapter combines the critical political economic approach and industrial studies of global information and communication technology (ICT) to examine Huawei’s international expansion, with a particular focus on the firm’s presence in the

Global South. By applying the critical approach to the international political economy, this chapter allows us to characterize the dynamics of power structures and geopolitical economic tensions generating from the expansion of China's multinationals. By charting the "inside-out" path of Huawei's internationalization, this chapter also seeks to place Huawei's spectacular growth in the political economic context of China's integration into global digital capitalism and shed the light on the broader implications of China's approach of internationalization. In short, the critical approach of the political economy provides a holistic and historical perspective to examine power relations and uneven development resulted from the increasing power of multinational corporations (Hymer 1970), which significantly differs from neoclassical economic approaches.

2 Domestic Roots: The Political Economy of China's ICT Industry

In traditional internationalization theory, a TNC usually turns to the strategy of internationalization only when it has already established their dominance at home (Hymer 1976; Krugman 1979). This model is useful to explain a grown-up TNC, especially those from developed countries in their domestic business cycle. In contrast, most China-based ICT firms chose to launch internationalization in their immature stage of development as a direct reaction to the increasingly competitive domestic market. In the same vein, Huawei has encountered the most crucial competition in China's telecommunications market from the outset. The firm's decision to expand internationally was compounded with structural imbalances of China's telecommunications industry. To better understand Huawei's internationalization strategy, it is necessary to trace back the firm's domestic origins that revealed the entangled relations between the Chinese state, Chinese companies and transnational capital.

Founded in 1987, Huawei's growth has been deeply intertwined with China's economic restructuring toward a digital economy. Shortly after the country's opening-up strategy, the national economic structure was shifted away from military-oriented heavy industry to consumer,

labor-intensive light industry and consumer goods production. In this process of the policy shift, electronics and telecommunication industries were given greater weight in the national economy. Moreover, the post-Mao Chinese technocratic elite's thirst for reintegration into the global capitalist system converged with the Western vision of the information society that views informatization as a fetish of social development as well as an inevitable path toward modernization. During the initial stage of the economic reform, demand for advanced telecommunications services has exploded. China's underdeveloped ICT products and technologies, however, were unable to match the ever-increasing market growth. To leapfrog into the market-driven "digital revolution," an "attracting-in" strategy through the acquisition of Western technology and foreign capital was used as the most efficient means to jumpstart the domestic ICT capital accumulation and capacity buildup (Hong 2011; Ning 2009). The field of ICTs hereby became one of the most popular sectors for the inflow of FDI.

In concordance with the Chinese state's initiative, local governments also played a critical role in nurturing ICT-led developmental strategies at the subnational level. Shenzhen, the headquarters of Huawei and many other Chinese high-tech companies like Tencent, served as the vanguard of China's digital revolution. Starting in 1986, Shenzhen Municipal Government scaled up investment in and policy support for the high-tech sector. In February 1987, Shenzhen government issued the *Tentative Provisions on Encouraging Technology and Science Personnel to Establish Non-state-owned Technological Enterprises*, officially lifting control on private ownership in the high-tech sector. This directive stipulated that science and technology personnel were allowed to invest in a high-tech company in the forms of intellectual property, copyrights or other property rights. At the same time, the government promised to provide these start-ups with a series of preferential policies such as exemption from enterprise income taxes. This policy stimulated a rapid growth of non-state-owned high-tech enterprises and an influx of private capital into the ICT sector in Shenzhen. Benefited from Shenzhen government's preferential policies, Ren Zhengfei founded Huawei in the same year. The local-oriented, "bottom-up" approach created a distinct institutional environment for indigenous high-tech companies like Huawei, which

also forged multi-layered state-firm relationship in China's digital economy.

Huawei's initial stage of development witnessed China's telecommunications boom, which brought unprecedented opportunities as well as challenges to the company. From the late 1980s onward, China's telecommunications market has experienced an exponential rate of growth in the scale of investment and user base. The fixed-asset investment in telecommunications surged from ¥ 2.14 billion in 1987 to ¥ 85.6 billion in 1995 with a 40-fold increase, while fixed-line subscribers also increased from 3.9 million to 40.7 million (MEI 1996). In the early 1990s, the initial installation fees for a fixed-line telephone were as high as ¥ 3000–5000 and sales prices of telecommunications transmission equipment could reach ¥ 1000–2000 per port. Massive market demand as well as huge profit returns have turned the telecommunications equipment sector into one of the most commercialized and lucrative industries in the reform era.

However, under the government's "trading market for technology" strategy, China's telecommunications equipment market had been dominated by foreign companies including Japan's NEC and Fujitsu, the American company Lucent, Canada's Nortel, Sweden's Ericsson, Germany's Siemens, Belgium BTM and France's Alcatel, which was known as domination by "seven countries and eight product systems" (*qiguobazhi*). Apart from the wholesale import of foreign standardized products, local telecommunications companies also relied heavily on technology transfer by setting up jointly owned companies with their foreign partners. Huawei, from its inception, had to face the fiercest competition not only directly from foreign vendors but also from China-based competitors backed by the Chinese government. However, Ren clearly recognized that technological import and adoption were unlikely to make the country gain independent industrial and innovation capability. To forge an alternative path of development, the company rearticulated the state's nationalistic discourse with the company's growth mission and insisted on its independent approach of research and development (R&D) (Huawei Basic Law 1998). This approach allows Huawei to focus on innovation activities driven by local needs and to invest

heavily in its in-house R&D, which laid a solid foundation for the company's rapid growth.

From the 1980s to mid-1990s, China's unprecedented growth of telecommunications infrastructure was compounded by an extremely uneven pattern of network expansion and service provision, leading to the widening urban-rural divide. Inspired by Mao's military tactic in the guerrilla war, Ren adopted the strategy of "encircle cities from the countryside" to target rural markets as well as small cities and towns in remote provinces that multinational giants had neglected. The strategy of exploring an alternative market had palpable influence on the company's future development, especially on its global expansion. In 1992, the company started the innovation and development of digital switches based on the needs of building telecommunications infrastructure in underdeveloped areas. In 1995, the company launch its self-developed digital switch C&C08 ("C" stands for countryside), marking a milestone in the company's history as well as in China's telecommunication technology development. Huawei's market and technology experience in exploring domestic marginalized markets played an important role in its later expansion into underdeveloped nations.

The strategy of "encircle cities from the countryside" helped Huawei gain a firm foothold in marginalized markets. Starting in 1997, Huawei was designated as a national champion by the central government due to the company's significant contribution to China's indigenous ICT development, becoming the largest manufacturer of digital automatic switches in China. However, under the pervasive urban bias in network buildup, demand for network infrastructure equipment in rural areas was largely ignored by telecommunications operators, which further squeezed Huawei's market growth and revenues. Meanwhile, Huawei had to face the speedy decline of profit in the fixed-line telephone segment and new technological barriers in the rapidly growing mobile sector (Tan 2002).

As part of the negotiations on its accession to WTO, China promised to eliminate import duties on a large number of ICT products including mobile telecommunication equipment. This rule led to a considerable influx of foreign advanced mobile communication products that neither indigenous companies nor joint ventures had capacity to produce at that time (Tan 2002). In the 2G and 3G era, foreign vendors possessed a

compelling advantage in the market, ranging from standard technologies to consumer devices. This allowed foreign players to use extremely high profits from sales of handset products to cross-subsidize high costs of the network equipment sector. The cost-competitive advantage Chinese indigenous manufacturers had enjoyed in the fixed-line digital switching market appeared to be irrelevant in the emerging mobile communications market. Huawei even had to face the most crucial price wars from foreign rivals. Under the fierce market competition, Chinese manufacturers only acquired 3%, 5% and less than 7% of the home market share for GSM transmission towers, mobile switches and handsets, respectively (Zhang 2001). In the enclosed CDMA market, Huawei's growth was much slower than its North American-based licensed manufacturers such as Qualcomm, Motorola, Lucent and Nortel and its crosstown competitor ZTE. By 2007, the company's home market share in the CDMA market had been less than 2%.

Though Huawei has undergone unprecedented growth since the early 1990s, the FDI-dependent policy underpinning China's neoliberal-oriented telecom reform became the greatest challenge to the company. Especially the "historical loss of the domestic 2G market" utterly exemplified the failure of China's liberalized industrial policy, which made it more difficult for the country and its domestic players to reverse technological dependence (Hong et al. 2012). The eroding market space as well as competitive pressure forced Huawei to explore overseas markets to evade foreign rivals at home and create a new growth engine abroad. In this sense, Huawei's choice of internationalization at the beginning was merely a defensive strategy against transnational capital power rather than a preemptive or aggressive strategy driven by an expansionary initiative. This "inside-out" strategy constituted one of the distinct characteristics of Huawei's internationalization. Despite Huawei's defensive initiative in its initial stage of internationalization, the company later went hand in hand with the country's "going-out" strategy and established a close alliance with the Chinese state to forge a distinct path of internationalization.

3 External Accumulation: The Initiative and Pattern of Huawei's Outward Expansion

Huawei's first step of internationalization started in 1996 when the company obtained its first overseas contract in Hong Kong. Following Huawei's entry into Hong Kong, the company's international business was later extended to Russia in the late 1990s, the process of which was facilitated by the Chinese government's involvement. As Ren stressed, Huawei's entry into Russia was not only driven by the corporate profit-seeking motive but was also in accordance with the state's geopolitical interests to undercut US hegemony and its client states' influence in Asia-Pacific areas (Ren 1997). In Ren's words, "Huawei's transnational marketing should follow the path of China's foreign policy (ibid)." This strategy helped the company win the state's support in its initial stage of internationalization by forming a state-firm alliance.

As in China's domestic market, Huawei's outward expansion had to face head-to-head competition from a handful of leading telecommunications TNCs which have already established entrenched positions in developed countries and regions. To escape from the dilemma existing in both the domestic and foreign markets, Ren reiterated the strategy of "encircling cities from the countryside," namely "encircling developed markets from developing countries," in the company's trajectory of internationalization. At the same time, China's foreign diplomatic relationship with developing countries provided favorable external conditions for Huawei's extraterritorial expansions in the Global South. The company began its business ventures in the Middle East, South-East Asia, Africa and Latin America in the late 1990s. In 1998, Huawei entered other Asian countries including Yemen and Laos via international bidding. In 1999, Huawei set up its first office in Brazil, starting business projects in Latin America. Beyond these regions, Huawei's expansion into Africa represented a significant part of the company's broader global expansion and generated a mixture of outcomes in relation to the presence of China's corporate power in the Global South.

Since the 2000s, Huawei has accelerated its pace of outward expansion. This move was largely motivated by the restructuring of China's industrial strategy moving from the "attracting-in" to "going-out" policy. In 2001, the Chinese government set the "going-out" policy as a national strategy and incorporated it in the Tenth Five-Year Plan (2001–2005) for the first time. Under this strategy, the state encouraged Chinese companies with "competitive advantages" to invest and set up multinational operations abroad, fully taking advantage of "two resources and two markets" (domestic and foreign resources and markets). China's ICT sector was promoted as one of these strategic industries to fulfill the state's "going-out" initiatives. In 2005, the Ministry of Commerce (MOC) and the Ministry of Industry and Information Industry (MII) jointly launched a directive to promote Chinese information industry's "going-out" projects, with an aim to change the growth mode of China's foreign trade and to explore international markets for domestic ICT firms. Chinese leading ICT firms including Huawei, ZTE and Lenovo were at the forefront of the country's "going-out" policy in the realm of information industry.

At the same time, Huawei's large-scale international expansion began at the threshold of the new twenty-first century when the global ICT industry was beset by a deep crisis of overcapacity. From 2000 to 2002, major Western telecom equipment giants all experienced a sharp decline in revenue and profit margin after the burst of the dot-com bubble. As a response to this deep crisis, these companies underwent extensive corporate restructuring, including withdrawing from low-profit markets, cutting R&D spending and slashing employment.

In view of sharp declining profits in the telecom market, Ren Zhengfei explicitly warned that Huawei was facing a "chilly winter" in the domestic market (Ren 2001). In contrast with strategic downsizing plans adopted by Western rivals, Huawei instead made an aggressive strategy to explore new international markets as a major driver of sales growth and expand spending on the company's R&D activities. This strategy actually drew lessons from Mao's military guerrilla warfare tactic of "the enemy retreats yet we advance (*dijinwotui*).” Meanwhile, to support the company's large-scale overseas expansion and to mobilize more employees to work in overseas branches, especially in underdeveloped countries with extremely harsh conditions, Ren applied the nationalist rhetoric as a

means of political legitimacy and a corporate PR strategy. The revolutionary tradition of thrift and hard work (*jiankufendou*) was also evoked as a fundamental work ethos to constitute Huawei's distinct corporate culture.

Along with the path of Huawei's internationalization, the company's presence and success in Africa have increasingly obtained global visibility, which also presents certain typical characters of Huawei's expansion into the Global South. Huawei's entry into Africa since the late 1990s has coincided with sweeping neoliberal transformations across the continent. The large-scale liberalization led to the influx of transnational telecom operators, most from Europe and the Middle East, into African telecom markets. On the side of the telecom equipment market, major traditional Western TNCs such as Ericsson, Alcatel-Lucent and Nokia-Siemens Networks dominated the market with their well-established "incumbent advantages," which were built upon generations of their engagement on the continent. Moreover, their close strategic partnership with Europe-backed telecom operators further consolidated their leading positions in the market. African telecom operators, especially those backed by Europe-based FDI, were more willing to hand over purchase contracts to European telecom equipment manufacturers.

Under the domination of European telecom equipment vendors, Chinese companies as latecomers were completely excluded from the market at the beginning. However, the telecom infrastructure buildup across the African continent often requires huge investment yet ends up with low profit return. This made African telecom markets less attractive to Western companies. The lack of European vendors' market imperatives, on the contrary, provided Chinese companies with an opportunity to enter the market. In contrast with Western companies' profit-making motive, Chinese capital is more interested in long-term returns through in-depth engagement, or the "encompassing logic of accumulation" (Lee 2014). For Huawei, the company has been pursuing other types of strategic objectives instead of short-term profit-making activities: that is, to open up new markets dominated by Western multinationals first and further extract surplus value from subsequent network upgrades and services in the long term.

Chinese vendors including Huawei and ZTE have significantly challenged Western giants through price competitiveness. An interviewee, a

senior Huawei market manager in overseas market, revealed that Huawei managed to achieve tremendous margins by offering 10–15% lower prices than that of Western rivals (Huawei Technologies Senior Marketing Manager, interview by author, November, 2013). For example, in Nigeria, one of the largest telecom markets in Africa, Huawei's products were more than 40% lower than the prices of Ericsson and Alcatel-Lucent (Huawei Technologies Senior Marketing Manager, interview by author, November, 2013). Huawei's pricing advantage can be attributed to the company's low costs of labor input. At the same time, Huawei treated African telecom markets as an outlet of its surplus products exports from China, which allowed Huawei to export outdated, low-cost surplus products to those underdeveloped countries and yield high profit to sustain its hyper-growth in Africa.

Beyond firm-specific advantages and corporate initiatives, Huawei's engagement in Africa incarnated part of China's geopolitical-economic strategy on the continent, with a manifest firm-state nexus in place. The government's role in facilitating Chinese ICT corporate expansion is institutionalized through many venues, which can be seen as part of China's "going-out" endeavor. At the policy level, the Forum on China Africa Cooperation (FOCAC) was formed to facilitate China's new political economic engagement with Africa, while telecommunications infrastructure was proposed as a focal area to strengthen China's "infrastructure connectivity initiative" on the African continent. The Chinese government acted as a mediator and a bargainer to assist Chinese companies to reach a great deal of business contracts under the state-firm alliance. In 2000 when the FOCAC was founded, Ren Zhengfei accompanied Vice Premier Wu Bangguo on a diplomatic tour to a number of African countries, which laid the groundwork for the company's future business expansion in Africa. Benefited by such well-established political links, in 2005, Huawei was awarded a contract worth \$200 million to build a CDMA network in Nigeria. In addition, the Beijing Summit of FOCAC in 2006 saw the deals of Huawei and ZTE with Ghana to build the country's national communication backbone infrastructure. In the same year, the Ethiopia government signed contracts with Huawei, ZTE and China International Telecommunication Construction Corporation to undertake three major telecom service expansion projects nationwide. These

projects, which were also the largest ICT infrastructure construction projects in Africa, were designated to increase these countries' optical fiber deployment, mobile network expansion capacity and rural telecom coverage (Li and April 2013).

Meanwhile, the Chinese state also acts as a financier for Chinese ICT companies' "going-out" activities. The state-backed institutions and financing mechanism provided Huawei with cheap finance to invest in capital-intensive ICT projects. These preferential loans were not directly granted to Chinese companies but to their foreign clients for which foreign governments acted as guarantors of loans. For example, Nigeria received \$200 million in low-interest loans from CDB to buy Huawei equipment in 2004. In 2010, Exim Bank offered Ghana two concessionary loans worth \$30 million and \$150 million to construct its e-government projects in which Huawei was awarded the contract as a key ICT service provider (Executive Research Associates 2009). Across the African continent, Ethiopia was the primary beneficiary receiving the Chinese government's financial support. The country's loans from China for upgrading its ICT projects were estimated at more than \$3.5 billion, with ZTE and Huawei serving as primary contractors (Gagliardone and Geall 2014). Along with preferential loans, Chinese companies were also able to provide host countries with packages of aid for infrastructure constructions. This state-backed financing mode, as part of "no strings attached policy," made Chinese companies more appealing than Western investors in African markets.

Although the Chinese government asserted non-conditionality of these loans, Chinese policy banks would take lenders' future capacity into account when making lending decisions to manage debt sustainability (Brautigam 2009). This mechanism can largely reduce solvency risk for Chinese firms as the risk is being passed to foreign governments and corporate lenders. In addition, to offset potential risks of repayment, the debt-equity swap was implemented by Chinese investors to secure their status in the process. A Huawei employee also explained that some African countries that had low repayment capability usually signed agreements on resource-backed infrastructure loans with which natural resources were used as guarantee to repay debts (Huawei Technologies Senior Marketing Manager, interview by author, November 2013). From

product exports to capital exports, the state capital-backed financing model has become one of the key features of Chinese firms' "going-out" strategy. It not only functioned to fund Chinese ICT companies' overseas expansion but also represented a new "loan-driven growth model" to export China's domestic overcapacity through "exchanging loans for markets."

Although Chinese firms share some common characters of internationalization, Huawei's patterns of outward expansion and its logic of capital accumulation are not identical to other Chinese vendors. As sociologist Ching Kwan Lee argues, the generic term "Chinese capital" is not a unified concept (Lee 2014). It actually "masks a hierarchy of capitals of varying status, resourcefulness and connection to the Beijing government" (ibid. 34). At the top of such a pecking order are those state-owned or state-controlled companies. Below these are private companies of varying sizes. Such hierarchical differences are illustrated in the story of Huawei and ZTE. In fact, Huawei's business model was far different from ZTE due to their different ownership status. The state-controlled shareholding company ZTE generally had more policy support from the Chinese government than that of Huawei. There were some cases that the Chinese government directly helped ZTE introduce new foreign clients and negotiate for their contracts. Inter-government cooperative projects were more likely granted to ZTE instead of Huawei. ZTE also enjoyed the privilege in accessing state-backed funding. Such a state-backed status also determined that ZTE's business activities had to assume certain political tasks.

In comparison with ZTE which focused more on public relations with foreign governments, Huawei's business activities were client-oriented (Huawei Technologies Senior Marketing Manager, interview by author, November 2013). Instead of dependence on the government's grants for foreign contracts, Huawei's sales teams often directly targeted on potential clients—mostly telecom operators—to enter the short list of suppliers and then form long-term strategic relations with local telecom carriers. When the company acquired contracts, Huawei sales would persuade buyers to apply for Chinese PR concessional loans. Then the company's PR teams in Beijing would propose the projects to the MOC and policy banks to appraise and approve the request-based loans. Such a bottom-up

business model made Huawei's overseas contracts and revenue less secure and stable than ZTE.

Although Huawei and ZTE both represent the rise of Chinese ICT multinationals, the expansion of these two Chinese telecom giants did not necessarily lead to the cluster and synergic effects. Otherwise, they were always in direct competition with each other in multiple business areas and markets. In some cases, these two firms have even tried every means to undercut the other's prices to win contracts. For instance, Huawei seized a large share of the telecom market from ZTE which had been the "sole provider" of Ethiopia's telecom carriers. In Kenya, ZTE's contracts for providing IT security solution to Kenya's "Safe City" program—an artificial-intelligence-enhanced system for police surveillance and monitoring—were handed over to Huawei (Nyabiage 2019). The domicile of TNCs in the same "home country" does not necessarily mean the formation of unified class interests or identical business patterns. On the other hand, the Chinese state made an effort to strengthen the solidarity of "Chinese capital" in their "going-out" process to advance China's political agenda. In some cases, the Chinese government mediated in vicious competitions between Huawei and ZTE and persuaded them not to launch price wars against each other but to unite and resist against foreign rivals together. The Chinese government not only served to ease the tensions and conflicts existing in the segments of Chinese capitalist groups but also played an important role to organize and mediate varieties of Chinese capital for advancing China's nation-state interests.

4 Geopolitical-Economic Implications

The Huawei story reflects the fact that China is rising as a key actor in restructuring the global ICT infrastructure networks via exporting China's experience and undercutting the Western dominance in the traditional political economic order. Taking the African telecom market for instance, the continent has become one of the fastest growing telecommunications markets in the world, a boom largely powered by Chinese ICT companies' engagement on the continent. Huawei, in particular, has noticeably built 50% of African's wireless base stations, 50 3G networks

in 36 African countries, 70% of the continent's 4G networks and 50,000 kilometers of fiber cables across the continent (Chen 2016). The company not only served as an important provider of digital infrastructure in the region but also fundamentally reshaped these countries' developmental agenda toward digitization and informatization.

Inspired by China's massive success in the ICT sector, some African countries were enthusiastic to copy the same feat to improve local telecommunications infrastructure and to increase the capacity of transmission networks. For instance, China's "Eight Vertical and Eight Horizontal" (*bazong baheng*) backbone networks, the country's "Great Digital Leap Forward" project that connected all provincial capitals and dozens of medium- and large-size cities through Eight Vertical and Eight Horizontal routes, have set an example for Africa's ICT development. Africa's information superhighway projects, which were also dubbed as the "Eight Vertical and Eight Horizontal" plans, proposed to invest \$15 billion to build terrestrial cable networks across the continent to connect 48 countries along 82 large cities with 200,000 kilometers of optical fiber (Chinese Firm Hopes to Wire Continent with Same Strategy That Boosted Internet Access across China 2017). Chinese ICT companies including Huawei became major contractors of such ambitious projects. This project to some extent will undercut Western telecom companies' dominance and business operations by projecting the political economic power of Chinese capital on the continent.

Huawei's engagement in underdeveloped countries' network construction has significantly addressed the issues of ICT-related inequality in the region. For example, Ethiopia had the second most expensive broadband services in the world before Chinese companies entered the market. With the participation of Chinese telecom equipment vendors in the country's broadband program, the country's rates of the Internet cost have been reduced considerably along with increasing penetration rates of Internet access (Lian 2014). In Guinea, one of the least connected Western African countries, the local government chose to cooperate with Huawei to build the country's every first fiber-optic cable network. This project will not only make Guinea the first West African nation to benefit from broadband coverage but also expand the country's ICT applications to public services such as education, public health, local administration and others.

By participating in these social programs, Huawei not only helped these underdeveloped countries strengthen their local autonomy in owning and building the ICT backbone infrastructure but also empowered local communities in their social development.

Despite the unprecedented growth of landlines in underdeveloped nations, a huge digital divide still exists due to the unequal distribution of submarine cables. Since 2008, a resurgence of capital investment (\$2.9 billion) has been directed to new cables to and around Sub-Saharan Africa (Winseck 2017). In this new wave of investment, Chinese firms have emerged as active investors and builders in new cable projects, contributing to redistribution and rerouting of transnational material infrastructure. From 2008 to 2018, Huawei Marine—Huawei’s joint venture with the British company Global Marine Systems—has deployed over 50,000 kilometers of submarine cable, including 12 submarine cable systems in Africa (Huawei 2018). In 2015, backed by investment from China Unicom and Cameroon telecommunication operator Camtel, Huawei Marine was awarded the contract to construct Cameroon-Brazil Cable System (CBCS). The trans-Atlantic CBCS became the first direct submarine cable that connected Africa and South America without diverting to Europe. Another of the flagship projects Huawei Marine was involved in was the Pakistan East Africa Cable Express (PEACE) cable system connecting China, Pakistan, Middle East, Europe and Africa. As part of China’s Belt and Road Initiative (BRI), this project reflects China’s quest to offer a China-centered extraterritorial communications network along the Belt and Road route. The deployment of fiber backbone systems in the least connected, worst served regions also made Internet service more affordable and accessible in these countries.

In the global submarine cable market, Huawei gained the market share rapidly in conjunction with other Chinese telecommunications vendors to form a new cable consortium partnership (Lee 2017). As digital media scholar Nicole Starosielski (2015) argues, intense competitions in cable technologies “involved negotiation between existing routes of empire, emerging forces of infrastructural decentralization, and a new club system of cable laying” (p. 30). There is no doubt that Chinese companies’ growing presence in this “new club” has fundamentally changed the traditional order of global digital economy and constructed a relatively

independent infrastructure for global connectivity. However, amid US sanctions, Huawei was about to sell its shares of Huawei Marine Network to China-based optical-cable manufacturer Hengtong Optic-Electric Co. (Jiang 2019), which symbolizes the company's strategic retreat from some sensitive areas under the geopolitical tensions.

Likewise, Huawei's engagement in Latin American countries also generated complicated geopolitical-economic implications. Especially for the ALBA (Bolivarian Alliance for the Peoples of Our America) countries, their growing economic ties with China are able to help them fuel an orientation of trade and essential infrastructure away from United States. At the same time, growing export revenues, loans and foreign direct investments from China, especially its financial support linked to the provision of Chinese products and services, have also allowed these countries to finance and sustain their "Bolivarian Socialist" projects in the region (Ellis 2014). In the strategically high-value-added ICT sector, the Chinese telecommunications firms Huawei and ZTE have come to occupy a major role in serving these ALBA nations' public service programs with local governments' support. For example, Huawei was awarded multiple large contracts by Venezuela's state-owned telecom enterprise CANTV to extend the national fiber-optic network to remote rural areas of the country. The company has also worked with Digitel to develop rural telecommunications infrastructure in the central region of Venezuela to deploy 3G and 4G networks in the country (*ibid.*). In Bolivia, Huawei acquired the contract from the Bolivian national telecommunications firm in 2011 to build wireless infrastructure in underdeveloped areas. In addition, Huawei has also made important advances in Ecuador by winning 61.4% of contracts from the National Telecommunications Corporations of Ecuador (*ibid.*, p. 104), becoming a primary provider of the country's 3G and 4G infrastructure services.

As researcher Evan Ellis (2011) argues, beyond commercial interests, the position of China in Latin America has been publicly trumpeted as a "geopolitical alternative" to the United States by the new generation of Latin American populist leaders (p. 88). Although the presence of Chinese telecommunications firms in Latin American markets is still relatively weak in comparison with the traditional Western players at the current stage, there is no doubt that the growing engagement of China's

corporate power in this region's strategic ICT sector will increasingly play an important role in reshaping these countries' economic policies and political projects.

5 Concluding Remarks

Huawei's expansion into the Global South provides a rich context for a broader discussion of China's role in globalization. On the one hand, Huawei was hailed as an egalitarian economic partner by the Chinese government to advance China's "win-win" development model and to forge an alternative path of globalization. On the other hand, Chinese firms' extensive global expansion also raised criticism from the West, which condemned the rise of "global corporate China" as a new force of neo-colonialism. Huawei's close connections with the Chinese government also became the primary barriers for the company to seek acceptance and entry into the Western markets. It is important to bear in mind that neither biased nor idealist rhetoric is adequate to grasp the nature of Chinese capital's outward expansion. The complexity of "Chinese capital" should be understood in terms of its peculiar logics and practices.

To some extent, the Huawei case exemplifies that Chinese firms behaved in a similar way to their Western counterparts in extracting natural resource, displacing local industries and markets, and establishing oppressive labor regimes. These particular patterns of capital accumulation represented the destructive logic of capitalist growth and revealing contradictions of Chinese capital's expansion.

But, Chinese firms also distinguished themselves from Western investors in their business patterns. Instead of pure interest in pursuing profitability, the outward expansion of Chinese firms conveyed a compelling geopolitical aim—that is to assist the country to regain its political and economic influence in the new era of globalization. Such an initiative coincided with China's strategic goal to shape the country into a responsible stakeholder of the global system. Serving as an "arm" of China's global reach, Chinese capital as such is highly "politicized" with strong nationalistic identity.

Despite its strong political economic initiative, China's approach to global expansion is not necessarily associated with colonialism or imperialism. First, far from extraction of massive "imperialist rent," returns for Chinese companies' overseas investment in developing nations remained relatively low compared to their business in other regions (Sautman and Yan 2007). Moreover, Chinese telecom companies, especially those technology and market leaders like Huawei and ZTE, actually filled the vacuum by providing more cost-efficient ICT infrastructure to those less connected regions despite low return on telecommunication infrastructure investment. Therefore, the presence of Chinese corporate power in the Global South countries is not a "zero-sum" game. Rather, China's historical experience and development model resonated powerfully with developing nations, which made China's distinct approach more appealing and practical to them than their past experiences with the West.

Huawei's engagement in the Global South is also built upon the cooperation with local states. This approach ensured the capacity of local states in implementing national ICT strategies and the application of ICT in a variety of socio-economic spheres (Gagliardone 2018), which significantly facilitated these developing countries' digital transformation. In this sense, China's investment and foreign aids can be seen as responses to a variety of requests and needs from host countries' governments.

Second, unlike other conditional FDI from the West, Chinese FDI often comes in a package of aid, including debt cancellation, soft loans, technological aid and investment in public infrastructure construction (Brautigam 2008). Besides financial support, other innovative forms of cooperation, such as human resources training, education resource input and technological transfer, were implemented to developing countries' development. The combination of foreign aid and business investment in underdeveloped countries provided an alternative model of South-South cooperation. This principle was also articulated in Huawei's official corporate discourse, particularly in its *Corporate Social Responsibility* statement which highlights the goal of "building an equitable, sustainable and balanced model of information society" with local stakeholders (Huawei 2014). Since the early 2000s, Huawei has increasingly engaged in some countries' social programs such as establishing training centers, investing in green ICT technologies and improving telecom network capabilities in

rural areas. There is no doubt that the presence of Chinese ICT firms like Huawei has significantly addressed local needs for economic and social development.

But, Huawei's expansion into the Global South countries was full of frictions. Ongoing labor protests against Chinese investors were on the rise within some host countries. Inter-state competition within the Southern bloc also generated obstacles to Chinese companies' cross-border operations. The profound division within the Southern bloc might pose a serious challenge to the presence of Chinese capital in the Global South. At the same time, the increasing presence of Chinese capital in the Global South heightened tensions between China and Western countries. The US reorientation toward a new approach to Africa—a strategy to counter China's influence in this region—signals US policy shift toward China on multiple geopolitical and economic fronts. There is no doubt that the current US-China confrontation will create more obstacles to the expansion of China-based capital.

The case of Huawei illustrated a peculiar logic, pattern and ramification of Chinese capital's outward expansion. We can hardly say it provided an alternative mode of transnational capital accumulation to the neoliberal logic or merely acted as an agent of the Chinese state's imperialist power. Nevertheless, it is for sure that Huawei, which has emerged on the world stage as a major player at par with the world's leading firms and an equal partner in local communities, constituted a significant force in forging a new multipolar political economic order.

Note

1. The Global South/North are the terms used by the World Bank to refer to the low/high-income countries in the world. This chapter mainly focuses on Huawei's expansion into the low- and middle-income countries, including African and Latin American countries.

References

- Alon, Ilan, and John R. McIntyre. 2008. *Globalization of Chinese Enterprises*. Palgrave Macmillan.
- Alon, Ilan, Orly Yekeskel, Miri Lerner, and Wenxian Zhang. 2013. The Internationalization of Chinese Entrepreneurial Firms. *Thunderbird International Business Review* 55 (5): 495–512. http://scholarship.rollins.edu/as_facpub/101. Accessed September 1, 2013.
- Brautigam, Deborah. 2008. China's Foreign Aid in Africa: What Do We Know? In *China into Africa: Trade, Aid, and Influence*, ed. R.I. Rotberg, 197–216. Washington: Brookings Institution Press.
- . 2009. *The Dragon's Gift: The Real Story of China in Africa*. Oxford University Press.
- Buckley, Peter J., L. Jeremy Clegg, Adam R. Cross, Xin Liu, Hinrich Voss, and Ping Zheng. 2007. The Determinants of Chinese Outward Foreign Direct Investment. *Journal of International Business Studies* 38 (4): 499–518.
- Chen, Baoliang. 2016. China's Telecom Companies Invest US\$15 Billion in Africa to Build 'Eight Vertical and Eight Horizontal' Network. *21st Century Business Herald*, June 8. http://epaper.21jingji.com/html/2016-06/08/content_41293.htm. Accessed June 8, 2016.
- “Chinese Firm Hopes to Wire Continent with Same Strategy That Boosted Internet Access across China.” 2017. *Global Times*. <http://www.globaltimes.cn/content/1037500.shtml>. Accessed March 13, 2017.
- Deng, Ping. 2004. Outward Investment by Chinese MNCs: Motivations and Implications. *Business Horizons* 47 (3): 8–16.
- . 2007. Investing for strategic resources and its rationale: The case of outward FDI from Chinese companies. *Business Horizons* 50 (1): 71–81.
- Dunning, John H. 1993. *Multinational Enterprises and the Global Economy*. New York: Addison Wesley.
- Ellis, R. Evan. 2011. Chinese Soft Power in Latin America: A Case Study. *Joint Forces Quarterly* 60 (8).
- . 2014. *China on the Ground in Latin America: Challenges for the Chinese and Impacts on the Region*. Springer.
- Executive Research Associates. 2009. China in Africa: A Strategic Overview. https://www.ide.go.jp/English/Data/Africa_file/Manualreport/cia.html. Accessed September 12, 2010.
- Gagliardone, Iginio. 2018. China and the Building of Africa's Information Societies. *AsiaGlobal Online*. Hong Kong: Asia Global Institute, The

- University of Hong Kong, <https://www.asiaglobalonline.hku.hk/china-africa-information-society/>. Accessed April 26, 2018.
- Gagliardone, Iginio, and Sam Geall. 2014. *China in Africa's Media and Telecommunications: Cooperation, Connectivity and Control*. Norwegian Peacebuilding Resource Centre.
- Hong, Yu. 2011. *Labor, Class Formation, and China's Informationized Policy of Economic Development*. Lexington Books.
- Hong, Yu, François Bar, and An Zheng. 2012. Chinese Telecommunications on the Threshold of Convergence: Contexts, Possibilities, and Limitations of Forging a Domestic Demand-Based Growth Model. *Telecommunications Policy* 36 (10): 914–928.
- Huawei. 2014. Huawei 2014 Sustainability Report. https://www.huawei.com/ilink/cn/download/HW_437607. Accessed June 5, 2015.
- . 2018. The 4th Asia-Pacific Submarine Networks Forum Successfully Held in Shenzhen. Huawei.com. <https://www.huawei.com/en/press-events/news/2018/8/4th-asia-pacific-submarine-networks-forum>. August 30, 2018.
- Huawei Basic Law. 1998. Chapter 7. Huawei Technologies Senior Marketing Manager. Interview by Yun Wen, Shenzhen, November 2013.
- Hymer, Stephen H. 1970. The Multinational Corporation and the Law of Uneven Development. In *Economics and World Order*, ed. J.N. Bhagwati. London: Macmillan.
- . 1976. *The International Operations of National Firms: A Study of Direct Foreign Investment*. Cambridge: MIT Press.
- Jiang, Sijia. 2019. China's Huawei to Sell Undersea Cable Business, Buyer's Exchange Filing Shows. *Reuters*. <https://www.reuters.com/article/us-huawei-tech-usa-cable/chinas-huawei-to-sell-undersea-cable-business-buyers-exchange-filing-shows-idUSKCN1T40BS>. Accessed June 3, 2019.
- Krugman, Paul R. 1979. Increasing Returns, Monopolistic Competition, and International Trade. *Journal of International Economics* 9 (4): 469–479.
- Larcon, Jean-Paul. 2009. *Chinese Multinationals*. World Scientific.
- Lee, Ching Kwan. 2014. The Spectre of Global China. *New Left Review* 89: 29–65.
- Lee, Stacia. 2017. The Cybersecurity Implications of Chinese Undersea Cable Investment. <https://jsis.washington.edu/eacenter/2017/02/06/cybersecurity-implications-chinese-undersea-cable-investment/>. Accessed February 6, 2017.
- Li, Anshan, and Funeka Yazini April. 2013. *Forum on China-Africa Cooperation: The Politics of Human Resource Development*, p. 85. The Africa Institute of South Africa.

- Luo, Yadong, and Rosalie L. Tung. 2007. International Expansion of Emerging Market Enterprises: A Springboard Perspective. *Journal of International Business Studies* 38: 481–498.
- MEI. 1996. *The Annual Yearbook of the Electronics Industry*. Beijing: The Electronics Industry Press.
- Narula, Rajneesh, and John H. Dunning. 2000. Industrial Development, Globalization and Multinational Enterprises: New Realities for Developing Countries. *Oxford Development Studies* 28 (2): 141–167.
- Ning, Lutaο. 2009. *China's Rise in the World ICT Industry: Industrial Strategies and the Catch-up Development Model*. Vol. 10. New York: Routledge.
- Nyabiage, Jevans. 2019. Kenya Says It Supports Chinese Tech Giant Huawei Regardless of US Policy. *South China Morning Post*. <https://www.scmp.com/news/china/diplomacy/article/3020074/kenya-says-it-supports-chinese-tech-giant-huawei-regardless-us>. Accessed July 25, 2019.
- Ren, Zhengfei. 1997. Walking across the Boundary of Asia and Europe. <http://www.iceo.com.cn/zazhi/2003/1021/187040.shtml>. Accessed May 8, 1997.
- . 2001. “Huawei's Winter.” *Huawei People*.
- Sautman, Barry, and Hairong Yan. 2007. Friends and Interests: China's Distinctive Links with Africa. *African Studies Review* 50 (3): 75–114.
- Starosielski, Nicole. 2015. *The Undersea Network*. Durham: Duke University Press.
- Sun, Sunny Li. 2009. Internationalization Strategy of MNEs from Emerging Economies: The Case of Huawei. *Multinational Business Review* 17 (2): 129–156.
- Tan, Zixiang Alex. 2002. Product Cycle Theory and Telecommunications Industry—Foreign Direct Investment, Government Policy, and Indigenous Manufacturing in China. *Telecommunications Policy* 26 (1): 17–30.
- Tian, Tao, David De Cremer, and Chunbo Wu. 2016. *Huawei: Leadership, Culture and Connectivity. Book, Whole*. Los Angeles: SAGE.
- Winseck, Dwayne. 2017. The Geopolitical Economy of the Global Internet Infrastructure. *Journal of Information Policy* Vol. 7: 228–267.
- Wu, Donglin, and Fang Zhao. 2007. Entry Modes for International Markets: Case Study of Huawei, a Chinese Technology Enterprise. *International Review of Business Research Papers* 3 (1): 183–196.
- Zhang, Luyi. 2001. CDMA Development in China. *China Business*, <http://www.people.com.cn/GB/it/49/4695/20010601/479744.html>. Accessed July 1, 2001.



8

Analyzing Huawei as a Chinese Multinational Operating in Three Worlds: Domestic Policy Instrument, Global Economic Agent, and Foreign Policy Target

Duane Windsor

1 Introduction

This chapter offers a critical and balanced appraisal of the situation of Huawei Technologies Company. Huawei, an employee-owned Chinese enterprise, operates in multiple countries and thus is not a purely domestic enterprise within China. The global expansion of Huawei makes the company a matter of US concern and Chinese pride. In the conventional Anglo-American worldview, a multinational is an enterprise, regardless of ownership status or government influence, that operates in at least two and typically more countries. In a Chinese worldview, however, Huawei may be still a family business in which many employees receive ownership shares. For the US, Huawei may be presently or could become at

D. Windsor (✉)

Jesse H. Jones Graduate School of Business, Rice University,
Houston, TX, USA

e-mail: odw@rice.edu

China's sole discretion a state-dominated enterprise and thus indirectly a form of "state-owned" enterprise. What this chapter seeks to explore is how these interpretations may interact.

The research rationale for this chapter is how to evaluate true motives and likely conduct of Huawei executives. The author seeks to formulate reasonably neutral criteria for assessment of conflicting information, interests, and perspectives. How to evaluate conflicting interpretations has broader applications in a global economy well beyond the Huawei case. The reason is that enterprises from state-dominated economies may become increasingly important and specifically in vital sectors of the global economy such as 5G technology.

Three specific research questions are important. First, what is the worldview of the Chinese regime? Is Huawei simply a Chinese domestic policy instrument—Independently of its ownership status and aspirations to operate as a true multinational? China may want Huawei to succeed in foreign and domestic markets without becoming too independent of regime control. Second, what is the worldview of Huawei? In particular, is Huawei's public posture believable? Huawei's motives and likely conduct are the most elusive to evaluate from publicly available information. Huawei might be an instrument of Chinese policy and a risk to US and allied security, or Huawei might be seeking to operate as a multinational business reasonably independent of Chinese policy. Third, is the worldview of the US reasonable? The US expresses reasonable concerns that Huawei is or can prove to be an instrument of Chinese domestic policy and a serious risk to the security of the US and its allies. Some allies do not concur with the US view. US suspicions might be unfounded, and even if Huawei is an instrument of Chinese policy, Huawei is not much of a security risk. However, the present conditions could change dynamically in the future.

The chapter formulates a two-step approach for providing an appraisal of Huawei's situation. The first step is to describe neutrally three different perspectives or worldviews against which to assess publicly available information and arguments. The three worlds are Chinese domestic policy instrument, independent global economic agent, and US foreign policy target. The chapter adapts the basic idea of using multiple interpretive perspectives or lenses from Allison's classic study of the Cuban

Missile Crisis of 1962 (Allison and Zelikow 1999). China, Huawei, and US have different worldviews. The Allison framework was internal to the US government. The framework's three perspectives are frames of reference: rational actor (a unitary government), organizational behavior or processes (emphasizing standard operating procedures as outputs), and governmental (or bureaucratic) politics (conflicting views and interests across governmental units). Each of these perspectives might be at work within the three worlds explored in this chapter, but the interest here is with the three worlds.

The second step is to consider criteria for assessing the reasonableness and persuasiveness of available information and associated judgment in each perspective. The US views Huawei as a domestic policy instrument and not an independent global economic agent (US House 2012): it is then a legitimate foreign policy target. This concern can be about future possibilities that China might exercise increased control over Huawei's conduct. Present or past evidence does not fully resolve a reasonable future concern. A criterion of prudence dictates that the US maintains a posture of reasonable concern requiring Huawei to prove itself worthy of trust. Huawei's public posture is complicated. On the one hand, it must argue that it is an independent global economic agent, as a private company, and is not a domestic policy instrument of the Chinese regime. Huawei contends that it is not a legitimate US foreign policy target. On the other hand, it must argue its compliance with Chinese policies. It is to Huawei's advantage to take this posture outside China, while maintaining within China some posture that it is pro-Chinese. Huawei does not state that it is simply independent of China and may not have an accurate forecast of China's power to control the enterprise. A criterion of neutrality suggests that Huawei's position is reasonable enough for a business in its situation but hardly definitive concerning the future. A criterion of objectivity suggests that China is plainly a communist dictatorship intent on maintaining power at home and expanding influence abroad. Taking these criteria into account can help shape understanding of the future possibilities for Huawei's situation. Neither the neutrality nor objectivity criteria serve to override the prudence criterion as the problem concerns an uncertain future.

The US and European Union (EU) do not share consistent views of Huawei or the People's Republic of China (PRC). However, Bown and Hillman (2019) suggest that the US, EU, and Japan are entering a trilateral process to counter Chinese policies, including subsidies and state enterprises. There are some debates within NATO (The North Atlantic Treaty Organization) about problems of intelligence sharing that would arguably arise from collaboration between Germany and Huawei on 5G. The NATO Supreme Allied Commander in Europe, US general Curtis Scaparrotti, reportedly stated that one option for NATO was to sever communications with Germany to preserve cybersecurity if Germany elected to work with Huawei to develop 5G technology (Brzozowski and Stolton 2019).

Following this introduction, the chapter is structured as follows. The next section formalizes the interpretive framework for logical manipulation. The third, fourth, and fifth sections discuss the three dimensions of the framework: Chinese domestic policy instrument, independent global economic agent, and US foreign policy target. The conclusion emphasizes research implications.

2 The Interpretive Framework

This section formalizes the proposed interpretive framework in terms of simple Venn space logic. (A Venn space delimits or bounds all elements of any description included in a set.) Each space represents one of the three potentially overlapping worlds. One relationship is thus between domestic instrument and global agent. Another is between domestic instrument and foreign target. A third is between global agent and foreign target. How to weigh these relationships separately and then in combination is the essence of a neutral analysis aimed at identifying the truth.

Figure 8.1 depicts possible relationships among the proposed three worlds of Huawei. The idea behind this depiction is to help the reader visualize the situation in terms of conflicting positions and potential overlaps in interpretations. The figure labels the three worlds or Venn spaces as (A), (B), and (C)—labeling which is not automatically a specific ordering such as 1, 2, and 3. Certain logical variations in the figure are

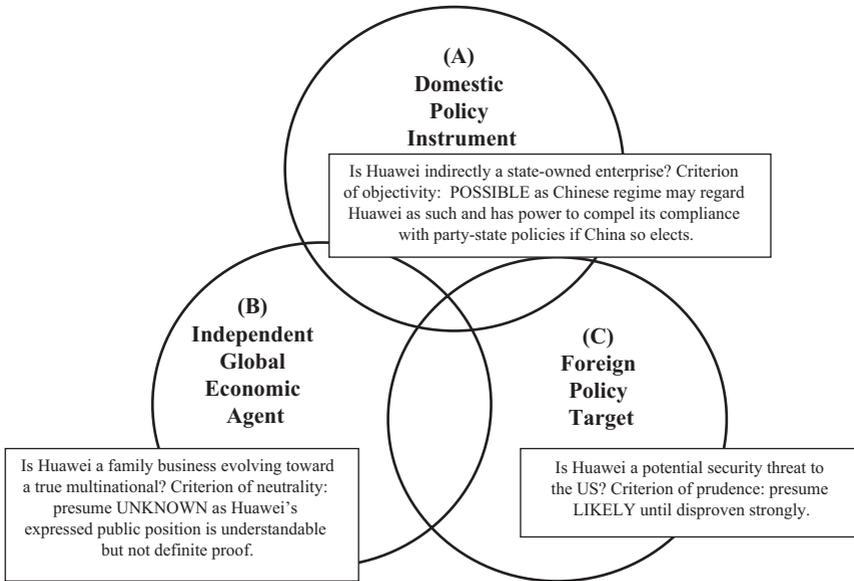


Fig. 8.1 Three worlds of Huawei

feasible. Overlap of the Venn spaces permits various combinations to be valid, including that all three worlds are simultaneously true to some degree. The Chinese, Huawei, and US views might all be partially correct or reasonable.

- A specific ordering of the three spaces can reflect positioning within the figure depiction. The topmost Venn space then indicates the dominant consideration. The present Fig. 8.1 for purposes of illustration makes (A) also 1, (B) also 2, and (C) also 3. The three spaces can be rotated so that (B) or (C) rather than (A) is the topmost consideration. The US position asserts (A) and (C). Huawei asserts (B). This chapter is not concerned with the posture of the Chinese regime, but rather describes the regime.
- These spaces can be merged in the sense that if (A) is empirically the topmost consideration, then (A) arguably absorbs (B). The US position is that either (A) dominates (B), or possibly that (B) can influence (A) in a trade war. The US and China have adverse interests. The EU

position is that either (B) dominates (A), or possibly that even if (A) dominates (B) the EU is indifferent. The EU and China may have non-adverse interests.

- Spaces can further separate in the sense that (C) might be isolated from (A) or (B) so that Huawei is not a target of foreign policy—this posture is presently the basic position of the EU. Greater overlap between (A) and (C) depicts greater foreign policy targeting of Huawei—this posture being the basic position of the US. It is not possible for (A) and (B) strictly to be both true. However, there can be a conflict between (A) and (B): Huawei might seek independence from PRC domination. The greater the separation between (A) and (B), the greater is this conflict over Huawei independence.

3 Chinese Domestic Policy Instrument

As illustrated in Fig. 8.1, a criterion of objectivity suggests that the Chinese regime may regard Huawei as indirectly a state-owned enterprise and has the power to compel Huawei's compliance with party-state policies if the regime so elects. The procedure using Fig. 8.1 is to assess available evidence and arguments against each perspective. If a Chinese domestic policy instrument, then Huawei is indirectly a state enterprise through state influence or domination rather than direct ownership. It seems reasonable to infer that the Chinese regime views Huawei as such—subject to government orders or suggestions. Evidence that China is a one-party communist regime is strong, whereas evidence concerning the regime's view of and intentions for Huawei is unclear.

In the first world, Huawei is a politically connected and domestically important instrument of PRC domestic policy. That Huawei is one of the world's largest technology providers must be of key concern to the PRC one-party communist regime with a president for life (Bursztynsky 2019). The vital question is whether the PRC is in transition to a peaceful global economic player or aiming at regional and then global political and military domination (Windsor 2017b). Uniquely to China, rule of law arguably may not be necessary for sustained economic growth (Mazur and Ursu 2017).

Houlin Zhao, the elected secretary-general of the International Telecommunications Union (ITU), stated that he had seen no evidence to support the American position concerning Huawei (Miles 2019). While Zhao is a PRC national, this circumstance does not automatically contradict his technical view: he might be correct about absence of evidence. It is the evidence that matters. However, there is a fundamental difference between evidence to date and possible change in future conduct and outcomes. The US policy concern could be about the future rather than the past. Zhao could be incorrect about the future, even if correct about the absence of past evidence. The EU precautionary principle (concerning environmental, health, and safety impacts) adopts the opposite posture to Zhao: to wait for evidence may be to invite irreversible damage. Any evidence, however limited, is sufficient to support strong suspicion; and it is this evidence that must be offset by concrete demonstration of actual better conduct.

Taking the position just explained in the previous paragraph, there is sufficient reason to think that China could assert control over Huawei if the regime decided to do so. The PRC is a monopoly one-party communist dictatorship, of which Xi Jinping is president for life. The year 2019 is the 70th anniversary of the communist state (1949). Ringen (2016, 2017) makes the case that China is in reality a new form of thus far highly successful neo-totalitarianism (Béja 2019). Ringen (2017) argues that expecting China to evolve toward constitutional democracy in some form is an “illusion.” Relative to other autocratic regimes—Russia and Turkey being cited as instances—China is truly “a neo-totalitarian party-state” (Ringen 2017).

There is no rule of law in China: the communist party sets and is above or beyond the law (Albert 2014). There is no convincing reason to expect evolution toward a constitutional regime. Yao (2008, 2013) has argued that rule of law is not necessary to economic development and growth. Rather, a regime like China can limit judiciary and rule of law and simply focus on development and growth. Yao terms this approach “disinterested government,” which explains what is happening in China. Despite the body of research prescribing rule of law as a necessary condition for economic development and growth, the alternative model in China is simply to focus the state on development and growth. Because there is no

independent judiciary, the state can ignore conflicting social interests and drive development and growth (Mazur and Ursu 2017).

Chinese communist government historically has been corrupted in significant degree relative to parts of Western Europe; and political connections and favoritism appear to be important. In 2012, however, the communist party launched a serious and continuing anti-corruption campaign which may be genuine in motive or simply aimed at power consolidation (Li and McElveen 2014). Possibly both interpretations are correct, and the anti-corruption campaign is widely popular as the people may be quite aware of official corruption. Based on the Transparency International's Corruption Perceptions Index (CPI) data, China is somewhat more corrupt than India and somewhat less corrupt than Russia, Mexico, or Brazil (Transparency International 2018). The 2011 Bribe Payers Index (BPI) report of Transparency International ranks Russian multinationals lowest and then Chinese multinationals second lowest as the most corrupt of 28 major economies studied (Transparency International 2011).

There is a useful distinction between actual (exercised) and potential (latent) power or influence of a regime. The PRC may not attempt presently to exercise actual power or influence over Huawei. The issue is whether the PRC has the potential power or influence to do so under some change in future conditions. Two demonstrations of this potential were underway in 2019. One demonstration was hostility to the street-level resistance in Hong Kong. The other demonstration was swift PRC reaction against a Twitter statement of support for the Hong Kong resistance by an NBA general manager (for the Houston Rockets). To access China, the NBA must conform with Chinese requirements (Anderson 2019; Bremmer 2019). The confrontation reveals that the NBA is about profit and not about principle (Serazio 2019).

Assuming that Huawei is an independent global economic agent, then it similarly will default to a profit motive under regime pressure and that default is simply to follow regime requirements as if a domestic political instrument. There would have to be a demonstration that Huawei is more independent than is the NBA. Otherwise, there is little difference in behavior between a Chinese domestic enterprise and a Chinese multinational enterprise, or even by a foreign entity like the NBA.

Chen (2016) characterizes the Xi regime as “rule by law” rather than “rule of law”: law is only a flexible instrument of communist party control. Chen illustrates with the June 2016 criticism of the government propaganda department by the corruption watchdog entity the Central Commission for Discipline Inspection (CCDI). The criticism emphasized failure of the department’s Marxism interpretation and weakness in emphasizing party control of the media (Chen 2016).

4 Independent Global Economic Agent

As Fig. 8.1 illustrates, a criterion of neutrality suggests that Huawei’s stated public position is understandable. Huawei’s options are (1) declare independence of China; (2) declare full compliance with China; (3) or position between China and the US in some way. Since positioning between China and US is strategically reasonable, the criterion of neutrality suggests that proof is not about the present positioning but about future actions by Huawei or China that either reinforce or reduce US concerns. It is not automatically in China’s interest to control Huawei more directly. As a result of these several considerations, evidence concerning Huawei is awkward to interpret.

In the second world, Huawei is simply an independent global economic agent aiming at profit maximization—just like any other multinational, regardless of home country. That is, Huawei’s leadership seeks to be free of domestic political influence and will protect the rights of all customers worldwide (Ho 2019). Assessing the Huawei CEO’s statements involves evaluating both the individual’s moral character and motives and the logic of the situation in which the individual must operate (Windsor 2013). The vital question is whether Chinese multinationals are reasonably independent organizations, or their executives have to pretend to be independent economic actors for both domestic political consumption and global reputation. Ultimately, the matter may be simply a policy choice of the PRC regime which can legally control and punish Huawei (Mikhailova and Swinford 2019). The PRC is not a constitutional regime with an independent judiciary or legislature, except to the degree permitted by the party leadership.

Although Huawei asserts its autonomy from the Chinese regime, political connections are known to be quite important in China. Considerable empirical research being published provides substantial evidence (Hung et al. 2015; Xie et al. 2017; Zheng et al. 2015); and this situation arguably has not changed with “economic liberalization” (Frick 2014: 1). However, much of this political interaction is at the provincial and local levels rather than at the central government level (Frick 2014). A 2004–2008 panel data study concludes that both state-owned enterprises and non-state-owned enterprises in China make equally effective use, measured in terms of firm performance, of political connections (Su and Fung 2013). It may be that political connections are important at the provincial and local levels, while demonstration of national contribution is important at the central level (Paine 2010). A difficulty with this general information is that it may or may not apply to Huawei, for which a detailed case study is desirable.

The exact nature of political connections, including changes if any due to the anti-corruption campaign launched in 2012 seems unclear. Some evidence based on a survey of 241 Chinese firms suggests that business ties can be more important than political ties in affecting firm performance, and the relationships are contingent (Sheng et al. 2011). Business ties are more important when there is inefficient legal enforcement and rapidly changing technology, while political ties are more important when government support is weak and technological change is low. Therefore, contingently, impacts on firm performance depend on “changing institutional and market environments” (Sheng et al. 2011: 1). The relationship may be evolving with changing conditions for economic growth, political turbulence, trade war, and other factors (Shi et al. 2014). A recent study develops a multidimensional framework for studying in more detail various aspects of political connections because scholars know much less about how such connections are developed in practice (Yang et al. 2018). In reality, we know relatively little about Huawei’s political connections inside China.

Ren Zhengfei, founder and CEO of Huawei, gave an interview in which he explained his biography (including service in the Chinese military and membership in the communist party) and asserted his independence of the regime (Ho 2019). Huawei’s position is that it is a private

company and politically independent of the Chinese government. This chapter labels the position as a claim to be an independent global economic agent. Huawei operates globally and, in this sense, may not be economically dependent on the China domestic market. If so, Huawei may operate in accord with some version of the capitalist profit-seeking principle.

Huawei Technologies Company, a telecom enterprise, is reportedly the largest private company in China and has about 180,000 to 194,000 employees (depending on the Huawei source accessed). Founded in 1987 in Shenzhen, Guangdong, Huawei is now the world's largest telecommunications equipment supplier and the world's second largest maker of smartphones (Huawei [n.d.-a](#), [n.d.-b](#)). Shareholding employees (who are about half of total employees) elect a Representatives' Commission of presently 115 members, which in turn elects the board chair and presently 16 other board directors. The board in turn elects presently four deputy chairs and three executive directors (Huawei [n.d.-a](#)). Huawei is explicit in an online statement that it is a private and employee-owned company: there are no outside shareholders (*ibid.*). While the Employee Stock Ownership Plan (ESOP) dates from 2003, Ren holds certain defined veto powers over company decisions (Huawei [n.d.-c](#)). That the CFO, a deputy chair, is a daughter of Ren Zhengfei seems more in keeping with a typical family-owned business in China.

More importantly, formal ownership is different from external influence or legal control. There are those who may regard Huawei as at least indirectly a state-owned, state-controlled, or state-influenced enterprise. One critical test is whether Huawei would act in fact against the interests and instructions of the Chinese government. The term "government" is somewhat misleading in the Chinese context as the regime is a one-party communist dictatorship in which the "state" apparatus is subordinated to the communist party. The true issue is not whether Ren Zhengfei believes himself to be independent and is presently permitted to act independently in China's national interest, but whether he or subsequently Huawei can resist regime pressures if the regime's posture changes. If he can resist, then he might be a moral exemplar (Windsor 2013): the essential principle of being a moral exemplar is demonstration in crisis, not in ordinary conditions. Scissors and Bucci (2012) point out that Huawei

and ZTE are dependent on the decision of the Chinese regime as to whether to leave them any degree of autonomy.

5 US Foreign Policy Target

As Fig. 8.1 illustrates, the criterion of prudence suggests that the US regard Huawei as a potential security risk until there is strong evidence disproving the concern. There may need to be a continuing improvement in US-China relations in order to begin reducing the concern. Huawei's conduct as distinct from its public position is important. Absent a better settlement with China, the US cannot prudently ignore the potential security risk posed by Huawei.

In this third world, Huawei is the target of sanctions and other negative actions by other countries—especially at present the US, including tariff increases. The US is seeking to marshal international resistance to Huawei technology (specifically 5G network installation that might be accessed by China). Both trade war and marshaling international resistance to the PRC are controversial within the US, as well as within the OECD (The Organization for Economic Co-operation and Development) community of nations. Other major countries are not aligned with this US approach (Barnes and Satariano 2019). There are two basic positions for other countries: (1) there is no valid concern or (2) there is concern, but security risks can be handled by supervision, a view reportedly held by Britain (Barnes and Satariano 2019). There is a similar split between the US and Western Europe concerning Iran. The situation means that the third world around Huawei is highly fragmented. The vital question is whether one favors confrontation or constructive engagement with China. Confrontation (the present US view) means that Chinese multinationals are caught between countries; constructive engagement (the present European view) means that Chinese multinationals receive favorable treatment by home and host countries. Huawei attempted to sue the US government concerning exclusion from public contracts for technologies and networks. The overall situation in the world economy is likely to continue to deteriorate with the rise of economic nationalism and patriotism.

Foreign policy formulation and application involve two levels of political games (Putnam 1988): international politics, as between China and the US; and domestic interest conflicts and struggles within both China and the US. Domestic politics is about who gains and who loses from international policies. The US Department of Defense reportedly blocked further restrictions on US sales to Huawei as undermining national security (Swanson 2020). US actions against Huawei (or ZTE) may generate gains and losses for foreign competitors (Gross 2019). If Huawei gains relative to competitors despite US restrictions (Pierson 2020), such gain increases its perceived independence from the Chinese regime and undermines US lobbying of its allies. The UK approved Huawei for a limited equipment supply role (Chan and Kirka 2020). China is moving to replace all foreign computers at state agencies with domestic products (Bloomberg News 2019). The theoretical point is that relationships among and within the three worlds change dynamically as various actors make interacting choices. Description of each world and their relationships must take account of future changes.

The US and China have adverse interests in several dimensions: ideological, geo-strategic, and economic. A key issue concerns transfer, legitimately or otherwise, of intellectual property rights from the US to China (Contractor 2019). China's leadership may view the communist party path as a political and national development model superior to any other model and particularly to all capitalist and Western democratic models (Windsor 2017b). China asserts ideological superiority to Western values and democratic governance; and Xi Jinping is the driver of that claim (Barron 2019 quoting an interviewee Lam). As the interviewee points out (Barron 2019), the situation in Hong Kong reflects a local rejection of the China model. However, communist ideology appears to be still an important factor among city mayors according to a recent study (Wang et al. 2019).

The Cold War has been succeeded recently by a new, or revived, geo-strategic competition between the US and both China and Russia (Sciutto 2019). The competition with China is for the US both technological in a new dimension including cybersecurity and more traditional geo-strategic with focus on regional dominance in the western Pacific (Gros 2019). In the geo-strategic competition, Japan, North Korea, the Philippines, and

Taiwan (Republic of China) are also important players. China and Russia may increase their collaboration in this new geo-strategic competition. The posture of the EU and NATO remains presently unclear: the US and the EU have divided positions on China, Iran, and Russia; and arguably increasingly are also economic competitors.

In early November 2019, US federal authorities charged a US firm Aventura Technologies with selling Chinese-made equipment to the US military services (Air Force, Army, and Navy) labeled falsely as “made in the USA” (Dienst et al. 2019). Such equipment might possibly be used by Chinese authorities to violate US cybersecurity in the future. Recently reported cases indicate possibly systematic Chinese spying and also Chinese and American researchers allegedly stealing US intellectual property for China (Kelly 2020).

A related instance of US foreign policy targeting is ZTE, a publicly traded Chinese multinational telecommunications equipment and systems company. Founded in 1985 by Hou Weigui, ZTE is also headquartered in Shenzhen (ZTE n.d.-a). ZTE had about 75,000 employees in 2017 and 68,000 in 2018 (Statista Research 2019). ZTE trades on the Hong Kong and Shenzhen stock exchanges (ZTE n.d.-a). ZTE emphasizes corporate social responsibility and is a member of the UN Global Compact (ibid.); and a ZTE online statement is explicit that the company, encompassing all subsidiaries and affiliates, asserts it operates with “integrity” and “ethical standards” (ZTE n.d.-b). In 2017, the US fined ZTE for exporting US technology to Iran and North Korea in violation of sanctions (US Department of Justice 2017). Subsequently, in April 2018, the US Department of Commerce banned US semiconductor companies from exporting to ZTE for a period of 7 years because ZTE had failed to reprimand employees involved in the sanction violations. The Commerce Department lifted the ban in June 2018 after ZTE replaced senior management, agreed to further fines, and agreed to set up an internal compliance unit for 10 years (Borak 2018). Within the definitions adopted in this chapter, ZTE was definitely an extension of the Chinese state and thus much closer to be a state enterprise than may be Huawei. If so, ZTE is a reasonable benchmark for assessing Huawei’s situation.

The issue is whether Huawei executives other than Ren may have violated US and EU sanctions on dealing with Iran. Meng Wanzhou, the daughter of Ren Zhengfei, is a deputy board chair and CFO. On December 1, 2018, Canadian authorities arrested her at the Vancouver (British Columbia) International Airport for requested extradition to the US. The US Department of Justice alleged financial frauds of several financial institutions occurring in connection with ban violations. Charges stated that money moving through banks was represented as being for Huawei but was in fact for Skycom Tech (Hong Kong), a wholly controlled entity of Huawei that tried to sell US equipment to Iran. The defendant was released on \$10 million bail to house arrest with electronic surveillance and several passports confiscated. A likely lengthy extradition hearing was begun in January 2020.

6 Conclusion

While the chapter is focused on analysis and interpretation of Huawei, the approach explained here can have broader implications and applications. The basic problem is not restricted to China, which however may exhibit relatively unique features. Just as one concern about multinationals may be about how they can operate more effectively as anti-corruption change agents; on the flip side some multinationals may operate to the disadvantage of institutional improvements in host countries (Windsor 2017a, 2019).

The independent global economic agent perspective appears the most appropriate for Huawei's situation. Huawei seems more independent from China than ZTE and US allies seem less concerned about Huawei security risks than is the US. Huawei is arguably edging away from the Chinese regime as it expands operations globally. The issues are whether China will ultimately exercise more control over Huawei, especially when 5G networks are widely installed, and thus increase security risks to the US and its allies. Some of the evidence available is direct while other evidence is really circumstantial. On balance, it is too early to judge Huawei to be indirectly a state-controlled enterprise but equally too early to judge Huawei to be no future security threat to the US and its allies. The US

should act prudently in this situation, while Huawei should seek to demonstrate (to the extent permitted by China) that it is not and will not be a security risk to the US.

A report quotes William Plummer, a former head of the Huawei US government and public relations department, as stating that Huawei in 2014 instructed company executives to take a public relations posture that in China Huawei supports the communist regime while outside China Huawei follows “key international trends.” Plummer also reported that Ren stated that this public relations posture is the “truth” (Hille 2019: 17). An interpretation most favorable to Ren would be that he meant what he said (as quoted by Plummer): Huawei is both pro-regime and pro-business. This position is not automatically inconsistent: it represents a balancing of considerations. The future question is whether China will become disposed to influence Huawei to be more pro-regime and less pro-business. China’s posture concerning business is pragmatic and always subject to communist ideology and national policy requirements.

The issue is how to fit this proposed dual truth into a scale of useful evidence concerning Huawei and Ren. We should not simply ignore Ren’s dual truth as simply pure rhetoric. We must decide whether the two statements (effectively pro-regime and pro-global) are compatible or necessarily in conflict. If the two statements are in conflict, then either Ren is temporizing or does not understand the conflict. If the two statements are compatible, this condition is good in the sense that it helps minimize Huawei’s risk to US interests. The condition permits Ren and Huawei to move away from the Chinese regime toward international trends without moving too far to cause negative regime reaction. Then the Huawei problem becomes to convince the US and its allies that it is sufficiently far away from the Chinese regime not to be a threat to other countries. This strategy is having some partial success with Germany and the UK.

If so, then this posture might be a strategy for balancing between within China and without China pressures to maintain Huawei autonomy. Within China, Huawei and ZTE would have little choice in any case. China provides key markets for Huawei and ZTE sales. Outside China, Huawei would also have little choice of public relations posture.

In August 2019, China added Huawei and Hikvision Digital Technology (a video surveillance firm), as well as other firms, to its AI (artificial intelligence) initiative launched in 2017 (Dai 2019). Twin purposes of this AI initiative are to increase public surveillance including facial recognition and to catch up to the US in AI technology by 2030 (Allen 2019). Catching up to the US emphasizes military applications and strategic domination of semiconductors (Allen 2019).

This recent information loops back to the US foreign policy perspective. China is an active opponent and competitor of the US, especially in the western Pacific. The competition, or even struggle, between China and the US is ideological, technological, and geo-political. Here the posture of the Chinese regime does become quite important. Available information suggests that China is a neo-totalitarian regime in process of strengthening control and that the regime regards itself as superior to Western (i.e., US and European Union) approaches to relatively free markets and democratic governance. The fundamental question concerns whether—whatever its present outlook and situation—Huawei especially under new leadership in the future can maintain viable autonomy. A definite answer cannot be given. Huawei elects not to move its headquarters out of China. It operates in China subject to a neo-totalitarian regime which thus far may have elected simply not to control or influence Huawei in any explicit way. In China, things can change—and sometimes quickly.

There are important research implications of the Huawei situation. Research should focus on how to characterize motives and likely conduct of businesses like Huawei. The key conditions are that Huawei is a globally important technology business that is legally subordinate to a communist dictatorship. What do we know about how Huawei can move from being indirectly a state enterprise or even just a traditional family business in China to a multinational enterprise that is reasonably independent to pursue business objectives? How can we assess a future security threat to other countries? What happens when Ren leaves the CEO position? Will the ongoing China-US trade dispute affect Huawei in significant ways? Most importantly, research should address how to formulate a neutral framework for evaluating conflicting information from different perspectives.

References

- Albert, Eleanor (Interviewer). 2014. Is China Committed to Rule of Law? China's Leaders Have Made a Renewed Call for Rule of Law Reforms, but It Is Important to Stress the Ruling Communist Party Remains Above the Law, Says CFR's Elizabeth C. Economy. *Council on Foreign Relations*, October 28. <https://www.cfr.org/interview/china-committed-rule-law>. Accessed November 9, 2019.
- Allen, Gregory C. 2019. Understanding China's AI Strategy: Clues to Chinese Strategic Thinking on Artificial Intelligence and National Security. *Center for a New American Security*, February 6. <https://www.cnas.org/publications/reports/understanding-chinas-ai-strategy>. Accessed November 10, 2019.
- Allison, Graham T., and Philip Zelikow. 1999. *Essence of Decision: Explaining the Cuban Missile Crisis*. 2nd ed. New York: Longman.
- Anderson, Mae. 2019. [Houston] Rockets Learning Hard Truth About Dealing with China. *Houston Chronicle* 118 (361): B3 (Business), October 9.
- Barnes, Julian E., and Adam Satariano. 2019. U.S. Campaign to Ban Huawei Overseas Stumbles as Allies Resist. *New York Times*, March 17. <https://www.nytimes.com/2019/03/17/us/politics/huawei-ban.html>. Accessed November 9, 2019.
- Barron, Laignee. 2019. Will Hong Kong Unrest Spoil China's Big Day? *TIME* 194 (14): 8, October 7.
- Béja, J.P. 2019. Xi Jinping's China: On the Road to Neo-Totalitarianism. *Social Research: An International Quarterly* 86: 203–230. <https://www.muse.jhu.edu/article/725994>. Accessed November 9, 2019.
- Bloomberg News. 2019. China Moving to Replace Foreign Computers. *Houston Chronicle* 119 (58): B7 (Business), December 10.
- Borak, Donna. 2018. ZTE Pays \$1 Billion Fine to US over Sanctions Violations. *CNN*, June 22. <https://money.cnn.com/2018/06/22/news/companies/zte-us-fine-trade-case/index.html>. Accessed November 10, 2019.
- Bown, Chad P., and Jennifer Hillman. 2019. WTO'ing a Resolution to the China Subsidy Problem. *CEPR Discussion Paper*, No. DP14076. <https://ssrn.com/abstract=3478772>. Accessed November 11, 2019.
- Bremmer, Ian. 2019. China Has the NBA in a Full-Court Press. *TIME* 194 (16–17): 36, October 21–28.
- Brzozowski, Alexandra, and Samuel Stolton. 2019. NATO Assessing Huawei Security Risk, [NATO Secretary General Jens] Says. *EUROACTIV*, March

14. <https://www.euractiv.com/section/cybersecurity/news/nato-assessing-huawei-security-risk-stoltenberg-says/>. Accessed November 1, 2019.
- Bursztynsky, Jessica. 2019. Secretary of State Pompeo: Huawei's CEO 'Isn't Telling the American People the Truth' on China Government Ties. *CNBC*, May 23. <https://www.cNBC.com/2019/05/23/secretary-of-state-pompeo-huawei-saying-that-it-does-not-work-with-the-chinese-government-is-false.html>. Accessed October 31, 2019.
- Chan, Kelvin, and Danica Kirka. 2020. In Snub to U.S., U.K. Gives Huawei Go-Ahead. *Houston Chronicle* 119 (108): B8 (Business), January 29.
- Chen, Michelle. 2016. Xi Is Committed to 'Rule by Law' not 'Rule of Law.' <https://fcpublog.com/2016/7/7/michelle-chen-xi-is-committed-to-rule-by-law-not-rule-of-law/>. Accessed November 10, 2019.
- Contractor, Farok. 2019. Can a Firm Find the Balance Between Openness and Secrecy? Towards a Theory of an Optimum Level of Disclosure. *Journal of International Business Studies* 50: 261–274. <https://doi.org/10.1057/s41267-018-0204-2>. Accessed November 9, 2019.
- Dai, Sarah. 2019. China Adds Huawei, Hikvision to Expanded 'National Team' Spearheading Country's AI Efforts: The Latest Batch of 10 New National AI Champions Include Xiaomi, JD.com, Qihoo 360, Megvii and Yitu. *South China Morning Post*, August 30. <https://www.scmp.com/tech/big-tech/article/3024966/china-adds-huawei-hikvision-expanded-national-team-spearheading>. Accessed November 10, 2019.
- Dienst, Jonathan, Joe Valiquette, and Rich Schapiro. 2019. New York Tech Firm [Aventura Technologies] Sold Chinese Equipment to U.S. Military, Feds Say: Seven People Were Charged with Selling Cameras and Other Products to the Army, Navy and Air Force – And Falsely Claiming They Were 'Made in the USA.' *NBC News*, November 7. <https://www.nbcnews.com/news/us-news/feds-raid-new-york-tech-firm-suspected-selling-chinese-equipment-n1078191>. Accessed November 7, 2019.
- Frick, Walter. 2014. In China, the Right Political Ties Count. *Harvard Business Review*, July. <https://hbr.org/2014/07/in-china-political-ties-are-keeping-poorly-performing-firms-a-float>. Accessed October 31, 2019.
- Gros, D. 2019. This Is Not a Trade War, It Is a Struggle for Technological and Geo-Strategic Dominance. *CESifo Forum*, 20 (1): 21–26. München: ifo Institut–Leibniz-Institut für Wirtschaftsforschung an der Universität München. <https://www.econstor.eu/bitstream/10419/199024/1/CESifo-Forum-2019-1-p21-26.pdf>. Accessed November 9, 2019.

- Gross, E. 2019. Who Benefits from the U.S. Crackdown on Huawei? Rival Companies Could Get a Boost—or Face a Backlash from China. *Foreign Policy*, January 31. <https://foreignpolicy.com/2019/01/31/who-benefits-from-the-u-s-crackdown-on-huawei/>. Accessed October 31, 2019.
- Hille, Kathrin. 2019. The Hidden PR Disaster That Led to Huawei's Crisis. *OZY*, February 28. https://www.ozy.com/fast-forward/the-hidden-pr-disaster-that-led-to-huaweis-crisis/92811/?utm_term=OZY&utm_source=Sailthru&utm_medium=email&utm_campaign=PDB_08302019. Accessed November 10, 2019.
- Ho, Chua Kong. 2019. Huawei Founder Ren Zhengfei on Why He Joined China's Communist Party and the People's Liberation Army: Ren Speaks of His Time in the Military and How He Came to Join the Chinese Communist Party. *South China Morning Post*, January 16. <https://www.scmp.com/tech/big-tech/article/2182332/huawei-founder-ren-zhengfei-why-he-joined-chinas-communist-party-and>. Accessed November 9, 2019.
- Huawei. n.d.-a. About Huawei. <https://www.huawei.com/us/about-huawei/corporate-information>. Accessed November 9, 2019.
- . n.d.-b. Facts. <https://www.huawei.com/en/facts>. Accessed November 9, 2019.
- . n.d.-c. Minisite. <https://www.huawei.com/minisite/who-runs-huawei/en/>. Accessed November 9, 2019.
- Hung, Mingyi, T.J. Wong, and Fang Zhang. 2015. The Value of Political Ties Versus Market Credibility: Evidence from Corporate Scandals in China. *Contemporary Accounting Research* 32: 1641–1675. <https://doi.org/10.1111/1911-3846.12134>. Accessed November 9, 2019.
- Kelly, Mary Louise. 2020. Harvard Chemistry Professor Arrested and Accused of Lying About Ties to China. *NPR*, January 28. <https://www.npr.org/transcripts/800559393>. Accessed February 2, 2020.
- Li, Cheng, and Ryan McElveen. 2014. Debunking Misconceptions About Xi Jinping's Anti-Corruption Campaign. *Brookings*, July 17. <https://www.brookings.edu/opinions/debunking-misconceptions-about-xi-jinpings-anti-corruption-campaign/>. Accessed November 9, 2019.
- Mazur, Joseph, and Anca-Elena Ursu. 2017. China's Disinterested Government and the Rule of Law. *Asia & the Pacific Policy Studies* 4: 376–382. <https://doi.org/10.1002/app5.176>. Accessed October 19, 2019.
- Mikhailova, Anna, and Steven Swinford. 2019. Huawei Is Legally-Obligated to Co-operate with Chinese Intelligence Services, Jeremy Hunt Warns. *The Telegraph*, April 28. <https://www.telegraph.co.uk/politics/2019/04/28/hua->

- [wei-legally-obliged-co-operate-chinese-intelligence-services/](#). Accessed November 9, 2019.
- Miles, Tom. 2019. Huawei Allegations Driven by Politics not Evidence: U.N. Telecoms Chief. *Reuters*, April 5. <https://www.reuters.com/article/us-usa-china-huawei-tech-un-idUSKCN1RH1KN>. Accessed November 9, 2019.
- Paine, Lynn S. 2010. The Globe: The China Rules. *Harvard Business Review*, June. <https://hbr.org/2010/06/the-globe-the-china-rules>. Accessed October 31, 2019.
- Pierson, David. 2020. Huawei Cites Revenue Growth Despite U.S. Restrictions. *Houston Chronicle* 119 (80): B2 (Business), January 1.
- Putnam, Robert D. 1988. Diplomacy and Domestic Politics: The Logic of Two-Level Games. *International Organization* 42: 427–460. <https://doi.org/10.1017/S0020818300027697>. Accessed November 9, 2019.
- Ringen, Stein. 2016. *The Perfect Dictatorship: China in the 21st Century*. Hong Kong: Hong Kong University Press.
- . 2017. A Dazzling Spectacle of China's Totalitarianism. *Washington Post*, October 17. https://www.washingtonpost.com/opinions/a-dazzling-spectacle-of-chinas-totalitarianism/2017/10/17/364bf8e4-b296-11e7-9e58-e6288544af98_story.html. Accessed November 9, 2019.
- Scissors, Derek, and Steven Bucci. 2012. China Cyber Threat: Huawei and American Policy Toward Chinese Companies. *The Heritage Foundation*, October 23. <https://www.heritage.org/defense/report/china-cyber-threat-huawei-and-american-policy-toward-chinese-companies>. Accessed October 31, 2019.
- Sciutto, Jim. 2019. *The Shadow War: Inside Russia's and China's Secret Operations to Defeat America*. New York: Harper.
- Serazio, Michael. 2019. For the NBA, It's All About the Benjamins. *Houston Chronicle* 118 (361): A15, October 9.
- Sheng, Shubin, Kevin Zheng Zhou, and Julie Juan Li. 2011. The Effects of Business and Political Ties on Firm Performance: Evidence from China. *Journal of Marketing* 75: 1–15. <https://doi.org/10.1509/jm.75.1.1>. Accessed November 9, 2019.
- Shi, Weilei (Stone), Livia Markóczy, and Ciprian V. Stan. 2014. The Continuing Importance of Political Ties in China. *Academy of Management Perspectives* 28: 57–75. <https://doi.org/10.5465/amp.2011.0153>. Accessed November 9, 2019.

- Statista Research. 2019, September 23. Number of Employees at ZTE Corporation from 2010 to 2018. <https://www.statista.com/statistics/233051/number-of-employees-at-zte-corporation/>. Accessed November 16, 2019.
- Su, Zhong-qin, and Hung-Gay Fung. 2013. Political Connections and Firm Performance in Chinese Companies. *Pacific Economic Review* 18: 283–317. <https://doi.org/10.1111/1468-0106.12025>. Accessed November 9, 2019.
- Swanson, Ana. 2020. Pentagon Blocks Restrictions on Sales to Huawei. *Houston Chronicle* 119 (104): B5 (Business), January 25.
- Transparency International. 2011, November 2. Bribe Payers Index 2011. https://www.transparency.org/whatwedo/publication/bpi_2011. Accessed November 9, 2019.
- . 2018. Corruption Perceptions Index 2018. <https://www.transparency.org/cpi2018>. Accessed November 9, 2019.
- US Department of Justice. 2017, March 7. ZTE Corporation Agrees to Plead Guilty and Pay Over \$430.4 Million for Violating U.S. Sanctions by Sending U.S.-Origin Items to Iran: Combined Penalty of \$1.19 Billion with Department of Commerce and Department of Treasury Actions Shows All of Government Approach to Sanctions Enforcement. <https://www.justice.gov/opa/pr/zte-corporation-agrees-plead-guilty-and-pay-over-4304-million-violating-us-sanctions-sending>. Accessed November 10, 2019.
- US House of Representatives. 2012. *Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE*. House Permanent Select Committee on Intelligence, 112th Congress, 2nd Session, October 8. [https://republicans-intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20\(fnal\).pdf](https://republicans-intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20(fnal).pdf). Accessed October 31, 2019.
- Wang, Danqing, Du Fei, and Christopher Marquis. 2019. Defending Mao's Dream: How Politicians' Ideological Imprinting Affects Firms' Political Appointment in China. *Academy of Management Journal* 62: 1111–1136. <https://doi.org/10.5465/amj.2016.1198>.
- Windsor, Duane. 2013. A Typology of Moral Exemplars in Business. In *Moral Saints and Moral Exemplars*, Research in Ethical Issues in Organizations, ed. Michael Schwartz and Howard Harris, vol. 10, 63–95. Bingley, UK: Emerald Group Publishing.
- . 2017a. Conducting Business Through Corrupt Means: Studying the Black Arts of Management. In *Organization Social Responsibility: Tools and Theoretical Insights*, ed. Agata Stachowicz-Stanusch, Gianluigi Mangia, Adele

- Caldarelli, and Wolfgang Amann, 205–234. Charlotte, NC: IAP – Information Age Publishing.
- . 2017b. Interpreting China’s Model for Business: Roles of Corruption, Favoritism, Reliability, and Responsibility. In *The China Business Model: Originality and Limits*, ed. Elizabeth Paulet and Chris Rowley, 41–69. Cambridge, MA and Kidlington, UK: Chandros Publishing.
- . 2019. Influencing MNC Strategies for Managing Corruption and Favoritism in Pacific Asia Countries: A Multiple-Theory Configurational Perspective. *Asia Pacific Business Review* 24: 501–533. <https://doi.org/10.1080/13602381.2019.1589769>. Accessed November 9, 2019.
- Xie, Wenjing, Keji Liu, Fei Xie, and Haoyuan Ding. 2017. Political Ties and Firm Performance in China: Evidence from a Quantile Regression. *Journal of East Asian Studies* 17: 331–341. <https://doi.org/10.1017/jea.2017.12>. Accessed November 9, 2019.
- Yang, Jie, Jieqiong Ma, Yong Zhang, and Jung Hwa Hong. 2018. With Whom Should You Have Dinner? A Multidimensional Framework for Understanding Political Ties in China. *Business Horizons* 61: 891–898. <https://doi.org/10.1016/j.bushor.2018.07.010>. Accessed November 9, 2019.
- Yao, Yang. 2008. The Disinterested Government: An Interpretation of China’s Economic Success in the Reform Era. *China Center for Economic Research, Peking University*, October 31. http://policydialogue.org/files/events/Yao_Disinterested_Government_China.pdf. Accessed November 11, 2019.
- . 2013. The Disinterested Government: An Interpretation of China’s Economic Success in the Reform Era. In *Achieving Development Success: Strategies and Lessons from the Developing World*, ed. Augustin K. Fosu, 152–175. Oxford: Oxford University Press.
- Zheng, Weiting, Kulwant Singh, and Will Mitchell. 2015. Buffering and Enabling: The Impact of Interlocking Political Ties on Firm Survival and Sales Growth. *Strategic Management* 36: 1615–1636. <https://doi.org/10.1002/smj.2301>.
- ZTE. n.d.-a. Information. https://www.zte.com.cn/global/about/corporate_information. Accessed November 16, 2019.
- . n.d.-b. Legal. <https://www.zte.com.cn/global/about/citizenship/Legal-and-Compliance>. Accessed November 10, 2019.



9

Huawei's Expansion and Nokia's Retreat: What Lessons Can We Learn?

Anders Kjellman, Xiaohua Yang, Xiaobo Wu,
and Sun-Young Park

1 Introduction

The emergence of Huawei Technologies as one of the global mega-players in the mobile phones and networks industry is a fascinating story. Huawei, which literally translates to “China can,” has not only fulfilled its meaning through the development of pioneering equipment and services but has also become a symbol of innovation inside and out of China. Huawei, starting out as a sales agent company, focused on distributing

A. Kjellman (✉)
AKC Ltd, Parainen, Finland

Novia University of Applied Sciences, Vaasa, Finland
e-mail: anders.kjellman@akc.fi

X. Yang • S.-Y. Park
School of Management, University of San Francisco, San Francisco, CA, USA
e-mail: xyang14@usfca.edu

X. Wu
School of Management, Zhejiang University, Hangzhou, China

telephone switches for another business based in Hong Kong. Today, this corporate titan has become one of the leading telecommunication solutions providers around the globe.

Why, how, and what is Huawei doing better than most of its competitors? Many scholars have attempted to provide an answer. We believe that no answer is complete without putting the story in an institutional context and without comparing and contrasting the firm with another similar one in the industry, Nokia in Finland. Therefore, the aim of this chapter is to develop a holistic framework for globalization strategy to understand the factors behind the success of Huawei and compare it to the development of a Nokia, which was once the highest valued firm in Europe and the world's leading giant in the mobile phones and network industry.

Nokia was the undisputed giant of the mobile phones industry with a global market share of about 40% in 2007 (Cord 2014). Nobody saw then, that after 8 years into the future, Nokia would have lost the entire mobile phones market share, despite its remarkable research and development (R&D) activity. The sale of the mobile phones and devices part of Nokia to Microsoft in 2013 was a blow to the future of Nokia as a mobile phone giant, albeit not the end of Nokia. The world market share of the “former Nokia mobile phone business division” was down to 1% in 2015, and in the subsequent year, Microsoft announced that it would stop manufacturing mobile phones, indicating the demise of the Nokia's former mobile phone business. This development is a good example of disruptive innovations—modern designed smartphones with touchscreens and apps—that push out old-fashioned mobile phones such as those of Nokia.

While much has been written about the failure of Nokia as well as the success of Huawei (Peltonen 2019), it is unclear what explains the contrasting trajectories of the two giants. In order to gain an in-depth understanding of the dynamic factors that led to the different paths of these two firms, we have developed a theoretical framework, which we label as the “Six-M model,” based on the strategy tripod approach by Peng (2006). The Six-M model illustrates a more integrated analysis of factors driving the two paths to expansion and retreat, as a result of not only their internal capacity to leverage resources or capabilities but also the

effects from the industry and institutional factors (Dierks et al. 2013; Peng et al. 2008; Yang et al. 2009).

This exploratory study makes a few theoretical contributions. First, we extended the literature on globalization strategy, especially, concerning the growth of emerging market multinational enterprises (EMNEs) by using the more integrative strategy tripod approach. Second, we developed the Six-M model as an analytical tool to accentuate the factors that affect globalization strategy. Third, we provided evidence based on two MNEs to illustrate the drivers and mechanisms for when globalization or de-globalization could take place.

In the following, we will discuss the strategy tripod approach and how it is applied in our analysis of Huawei and Nokia, followed by a discussion of our Six-M model and how it is related to their globalization strategies. We conclude by discussing the implications for future research, and lessons to be learned by corporate managers.

2 Strategy Tripod and Global Expansion

Three views, often separately, have been used to examine firm and globalization strategies, based on industry, firm resources, or institution. For example, Porter's (1990) industry-based view asserts that industry factors shape a firm's competitive advantage in the global market. Barney's (1991) resource-based view argues that firm's internal resources and capabilities determine the firm growth and performance. Whereas institutional factors have often been treated as contextual factors and been taken as exogenous factors by management scholars, Peng and Delios (2006) suggest that institutions determine the international expansion strategies of firms from emerging economies.

The strategy tripod is an approach to combine the above three views on firm performance to explain what determine firms' success or failure in the globalized business environment (Peng 2006), providing a more holistic picture in management research (Peng 2003; Wright et al. 2005). This approach has been used to analyze corporate strategies at the firm level (Chen et al. 2018; Yang et al. 2009). We build on Peng's (2006)

strategy tripod approach to explore the global expansion strategies of Huawei and Nokia.

2.1 Industry-Based View

In Porter's diamond model (1990), he points out that firm internationalization is influenced by underlying industry structures, whereas competitive advantage of an industry derives from the national conditions: domestic factor conditions, domestic demand conditions, related and supporting industries, and firm rivalry in the industry. In addition, high competition from informal and unregistered firms in domestic market can motivate them to seek new foreign markets (Pérez et al. 2019). A change in demand conditions may propel a firm to seek foreign markets, as evidenced in the flattened demand and oversupply of products in the Chinese market. Related and supporting industries in the case of established global supply chains provide a network for firms to grow abroad.

The findings by Hang et al. (2015) support the importance of supply chain innovations and networking. A key part of the opportunity creation process is the opportunities detected by "innovators involved in building relations with participants in their supply chain." To build outside network, Partanen and Möller (2012) suggest focusing on creating customer value. In the smartphone sector, it is important to pay ongoing "attention to the value-creating system, architecture of the targeted new business concept and its customer value offering." Furthermore, the role of selecting partners, trust, and flexibility is stressed in the fast-changing information technology sector. Who should you include in your potentially disruptive innovation network? Why should you include them, and how will this improve your customers' satisfaction and/or increase your profit potential? Aarikka-Stenroos et al. (2017) analyze seven key management activities—motivating, resourcing, goal setting/refining, consolidating, coordinating, controlling, and leveraging—which are needed throughout a successful innovation process. These enable the diversity of an innovation network to turn into an opportunity, rather than an obstacle.

Innovation networks are a relatively “new” phenomenon. Möller and Halinen (2017) note that it is first during the last decade that we have started discussing innovative networks, although they had existed before. The innovations may come from a wide range from subcontractors to customers. The challenge is to create and maintain robust and vivid innovative networks. Kjellman et al. (2019) note that platforms provide a natural answer. Platforms can be closed, within one firm, financial institution, government or entity, or open, which can be divided into subgroups, depending on who sponsors and manages the platform. Nokia has traditionally leaned more toward closed platform thinking, while Huawei lately has leaned the opposite way. There is no clear answer as to the superior business or network model. As often in business, there is not a one-size-fits-all situation. However, digital technology, the Internet, and different platform types have created a revolution concerning how we should look at businesses and the consequences.

2.2 Resource-Based View

Resource-based view (RBV) informs us that firm-specific resources are the source of sustained competitive advantage and growth strategies when resources are unique, rare, and difficult to imitate, and within an effective organization (Barney 1991). These firm-specific resources can be a unique corporate management system, such as the value-based management and the philosophy of manic product development at Huawei and Nokia. Huang (2019) notes Huawei is “built on value” and its most valuable asset is “an enduring management system.” Firms need to deploy their firm-specific resources to overcome inherent disadvantages in the new environment to operate successfully in a foreign country (Hymer 1976).

RBV promotes the deployment of resources in new markets and provides insights to globalization strategies such as market entry, subsidiary capability development, global networks (Peng 2001), and global supply chains. “Talent management” plays an important role in MNE since human capital is both valuable and imperfectly imitable and can create firm-specific competitive advantages (Barney 1991). Top management’s

global experience leads to greater knowledge for the firm in a new market (Calori et al. 1994) and are more likely to succeed internationally.

MNEs from emerging markets search for markets and technologies to compete in the global economy. This is consistent with RBV which recognizes knowledge flows within the MNEs through subsidiary capability building (Barney et al. 2001). Hoskisson et al. (2000) also recognize the importance of using a RBV framework to understand MNEs in the context of emerging economies, such as Huawei from China.

2.3 Institution-Based View

The institution-based view sees national institutions as the rules of the game that shape firm behavior (North 1990). Government policies and regulations, changes in tariff barriers in the host country (e.g., the current US-China trade war), are formal institutions that affect foreign direct investment, whereas cultural distances, norms, and values are the informal institutions that can also affect globalization strategies (Hofstede 2007). The formal regulations and informal norms in host countries affect the firm's decision to internationalize and strategy to enter (Yang et al. 2009).

Home country governments (e.g., China) may have regulations encouraging companies to seek international expansion. Buckley and Casson (1976) suggest that global expansion strategy is a response to the changes in institutional environment and believe that a nation with a comparative advantage in entrepreneurship will be able to renew firm-specific advantages through sustained innovation and global expansion. Firms in emerging economies encounter rapid institutional transition, including changes in the role of government involvement, ownership structures, and enforcement of intellectual property laws (Wright et al. 2005). These institutional uncertainties may explain the strategic decisions of firms from emerging economies (Yang and Stoltenberg 2014).

2.4 Strategy Tripod Approach

Although each of the views based on industry, resource, and institution provides helpful insight about how firms rise and fall, a more comprehensive view is needed to fully understand the globalization strategy of firms. Strategy tripod (Peng 2006) offers an integrated approach of all the three views discussed above. Based on this integrated approach, we develop a new Six-M model to understand and characterize the phenomenal rise of Huawei and retreat of Nokia, and lessons we can learn from both companies.

The characterization of the rise of Huawei and retreat of Nokia is derived from the extensive research conducted based on publicly available data as well as personal communication that the authors have had with executives at the companies over the years. To map the intricate internationalization (or de-internationalization) processes, we used a case study method and cross-case comparison, which are utilized when the study context is both important and complex, and the context is in different and diverse settings (Silverman and Marvasti 2008). The case study method also enabled us to develop the Six-M model based on empirical evidence as well as theoretical arguments.

3 The Huawei Versus Nokia Story and Six Ms

Huawei's ascendance to global dominance in telecommunication industry sent shockwaves throughout the global market. How did a company you would never have heard of before 1988 rise to the pinnacle in an industry that only the fittest could survive? What are the driving forces behind Huawei's growth? On the other hand, why did the former global market leader Nokia, a 155-year-old Finish firm, retreat from its mobile phone business? How and why did this happen?

In order to put this in a more comprehensible way, we have developed a new Six-M model to map the six crucial growth stages of Huawei vis-à-vis Nokia. Both companies share patterns of success, which is a focus on

technological development and customers. Patterns, that most US and EU corporations would find useful in their own strives for survival. We call these stages, the “Six Ms”: (1) Manic focus on product development, (2) Markets or a clear focus on the core markets, (3) Management, (4) Money, (5) Meaning, and (6) Me. The order of these crucial factors behind the sales growth is not important and could in fact be seen as simultaneously emerging and evolving (Fig. 9.1).

3.1 Manic Product Development

Both Nokia and Huawei can be characterized as companies that have a clear engineer-like focus on what we call a “Manic product improvement.” Both Nokia and Huawei have had, during their way to become top international businesses, a pricing strategy which has had a focus on making cheaper and better products than their competitors, and the previous generations of products. A brief look at the annual reports over the years of both Nokia and Huawei gives an undisputable outspoken focus on product and service development, as well as on financial resources put on product development. Both Nokia and Huawei have an impressive focus on product development and being manic about getting improved products into the market. This is in line with the resource-based view that stresses the importance of knowledge creation. Both companies are and

Understanding the growth of Huawei

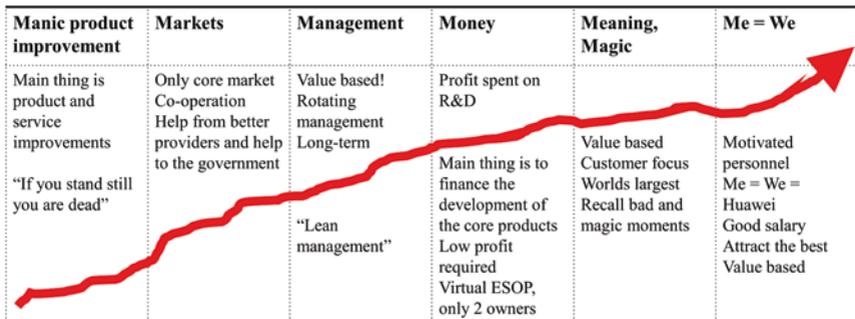


Fig. 9.1 The Six-M model and the growth of Huawei

have been focused on “competing for the future,” to use a phrase used by Gary Hamel, a former Nokia advisor (Hamel and Prahalad 1994). The basic quest is what the customers of tomorrow want. What will sell in the future and how can we develop those products?

A small difference between Nokia and Huawei is that at Huawei profitable growth has been stressed, thereby products that are not in the core business area have been left out. Another difference is that Nokia was more of a manic in-house developer building up patent portfolios, while Huawei in its pre-globalization time can be seen as more of a copycat that improves and makes things both better and cheaper. While Nokia was known for in-house development, there are exceptions to this rule. The 3G standards and the Symbian cell phone operating system had been built in cooperation with rival Ericsson.

Huang (2019) notes that Huawei only exists to serve its customers. All available financial resources are allocated for product development. At Huawei there is an urge to constantly move forward because if you stand still and try to utilize “cash-cow products,” you are dead! In its early development stage, Huawei regarded customer orientation as the company's core value (Huang 2016). The employees of Huawei tried to meet all of the customers' needs to build up a pragmatic image and reputation. This strategy helped Huawei break through new markets and gain many new customers in the beginning (Wu 2014).

Hira (2012) and Cord (2014) point toward the high level of Finnish state R&D spending into the universities and Nokia, as well as the high educational level, as one of the factors behind the rise of Nokia during the 1990s and the first decade of the twenty-first century. Hira (2012) argues even that more important was Nokia's taking advantage of the windows of opportunity by the deregulation of telecommunications markets. The issue of luck is always important. Are you or are you not going to be the receiver of state contracts? The coordination of state-private sector efforts toward national goals is unmistakable and deliberate in the case of Nokia. Many are the Finnish army officers and other government authorities that have used products developed in cooperation with Nokia. The same can be noted about Huawei that has managed to take advantage of the rise of state-capitalism in China and has used China as a national development market for its mobile phones and network

development. The openness to adjustment, rise in education, a governmental will to develop and learn through mistakes were clearly a lucky break for Huawei's manic product development.

Both Huawei and Nokia are companies that focus on customers and what they want in combination with fierce investments in product improvement and technology development. A will to improve the processes is necessary but far from sufficient in order to maintain successful operations. For example, the paradox between customer-centricity and efficiency may appear as the number of Huawei's customers grew, the high customer-centricity became a heavier burden for the R&D department. At the early stage, Huawei did not have effective methods to manage customers' needs and product. As a result, the products Huawei provided for different customers seemed unique but were actually similar (Zhang 2012). In addition, you also need the skills, capabilities, and the ability to combine these in order to create value. This is what Christensen (2019) calls "the jobs to be done theory." When a company has both the will and skill to adapt to, or create and maintain a disruptive innovation, it is hard for competitors to catch up. The extent to which this penetrates the market is decisive as to whether an innovation turns out to be disruptive, or merely an incremental non-dramatic innovation. Successful innovations help consumers to solve problems—to make the progress needed, while addressing any anxieties or inertia that might be holding firms back. It is an emotional and social event that is driven by the customers who need to solve a problem or improve a situation. Cheaper, easier, better, or faster are positive and powerful catalysts for changing customer behavior.

Weiwei Huang (2019), the author of *Built on Value: The Huawei Philosophy of Finance Management* states: "A company must have a clear business goal. Huawei's business goal is to make itself more competitive, build trust among its customers, and survive market competition." Huang (2019) further notes that Huawei only exists to serve its customers. However, the book with 456 pages is also a story of the values that drive Huawei. In brief, one can say that the main value is a manic drive to improve the products and services of the core business. This ongoing effort to improve the core products is customer driven and limited to the financial resources and strategic markets of Huawei.

3.2 Market Focus on Core Business and Strategic Internationalization

It is a market focus on the core business and strategic internationalization that will transform Nokia into a world leader in mobile phones and potentially do the same for Huawei in the future. Huawei is currently the world's second largest producer of mobile smartphones after Samsung, and the world's largest producer of telecom network equipment before Nokia and Ericsson (Pongratz 2019).

Nokia was founded in 1865 as a wood and paper mill factory. Nokia transformed into a conglomerate of business activities in a variety of areas during the twentieth century: electronics, rubber, pulp, cable, and telecom businesses. Nokia also consolidated its business around mobile phones (Hira 2012). In 1979, Nokia and Salora created a joint 50–50 owned company, Mobira, to set up radio telephone technology. In 1983, Nokia took over Salora, making it Scandinavia's largest producer of TV sets. After that, Nokia acquired Luxor AB, a Swedish state-owned electronics and computer company, followed by Oceanic, a French TV producer. As a result, Nokia became the world's third largest TV manufacturer. Nokia got into the cellular industry in the 1970s when it helped design the world's first international cellular system or the Nordic Mobile Telephone (NMT) network, a system that in 1980 linked Sweden, Denmark, Norway, and Finland into a mobile system. In the 1980s, Nokia was still limited to OEM production on the international market—for example, Nokia and Tandy Corporation built a factory in South Korea in order to manufacture mobile telephones. These “mobile phones” were sold under the Tandy name in Tandy's 6000 Radio Shack stores throughout the United States.

It was in 1992, after a severe economic crisis and a close bankruptcy, partly due to internationalization, that Nokia became a mobile phones company with two main divisions: Network and Devices and Services along with a small third unit that had not yet been sold off. Also in 1992, Jorma Ollila became the CEO of Nokia, which at that point was a company in severe distress. During the ensuing years under Ollila's helm, a bumpy road toward world leadership in cellular phones technology was

achieved by focusing on the core business development as well as strategic intent to internationalize. The road to becoming the world market leader in mobile phones was rocky with evident production, subcontractor, and logistic problems in 1995–1996 (Ollila and Saukkomaa 2016). By late 1998, Nokia had surpassed Motorola and claimed the top position in cellular phones worldwide. The Nokia path of going global had started already in the 1980s, with acquisitions in the electronics industry, but it was in 1993 with the first digital cellular phone that Nokia's own mobile phone international sale in Europe and America took off, followed by India, the Middle-East, Africa, and then China in 1998.

Huawei was founded as a sales agent company by a fired officer of the Chinese People's Liberation Army, Ren Zhengfei in 1987. Huawei later started out to distribute and produce telephone switches for another business based in Hong Kong and thereafter grew into the telecom industry, particularly inside China. By 1995, Huawei's product diversification was increasing, and Huawei was ranked 26th in the Chinese electronics industry. At that time, the domestic communications equipment market was in the ascendant, and Huawei's market position and industry influence were burgeoning. However, competition in the Chinese communications market at that time had changed dramatically. A large number of domestic equipment manufacturers had developed. Nonetheless, owing to the depression of the international market during these years, the world's major telecom equipment manufacturers competed more aggressively on the Chinese market to compensate for their losses in other markets. At this point, Huawei was facing major difficulties, such as the increasingly saturated domestic market, their large underused manufacturing capacity, and high R&D costs. Under such circumstances, Huawei began its internationalization journey to enhance its chances of "survival."

In addition to the fierce market environment at home, the reason that Huawei began its internationalization journey is connected to Ren Zhengfei's strategic vision. In 1994, Ren Zhengfei said that "In the next ten years, there will be three main players dominating global telecommunications markets. Huawei will be one of them" (Tian and Wu 2012). In 1998, "Huawei will be a world-class leading enterprise" was written into "Huawei Basic Law," which stated that "the pursuit of Huawei is to realize the customers' dream in the field of electronic information, and

Huawei is to become a world-class leading enterprise, namely, the world's first-class equipment suppliers through relying on the dribs and drabs and the perseverance of hard pursuit" (Cheng 2007).

From the perspective of cultivating the people at Huawei, Huawei's internationalization can promote Huawei people's ability to withstand risks and control a crisis (Cheng 2007). Additionally, Ren Zhengfei thought that a huge country with 1.3 billion people must have its own communication manufacturing industry. As a member of the national communication industry, Huawei must strive to become a major international company (Cheng 2007). It is first around 2000 that Huawei began to look outside the Chinese market, even though Huawei initially managed to grow with the market in China. Vaswani (2019) notes that in the early 1990s, Huawei won a government contract to provide telecoms equipment for the People's Liberation Army. In 1995, the company was generating sales mainly from selling to the rural China. In 1996, Huawei was given the status of a Chinese "national champion." This meant the government closed the market to foreign competition in certain segments. At a time when China's economy was growing at an average of 10% per year, this was a considerable advantage for Huawei.

In 2005, Huawei's international market contracts exceeded its domestic business for the first time. The road to international success is as rocky as Nokia's road. However, it is a different road of internationalization beginning in Africa with Ethiopia and expanding into Europe through Russia and onward as the product quality improved. One reason for this is most likely that Huawei had been copying technology from abroad for the domestic market and choosing to expand internationally into countries where price was more important than WTO rules and patents. Given Huawei's accomplishments around the globe, the company has certainly met its fair share of struggles and difficulties when it attempted to break into the US market since 2001. Concerns such as lack of transparency, cheap subsidized loans from China Development Bank, and Ren Zhengfei's historical ties with the People's Liberation Army have been raised by Western political officials that have often resulted in lawsuits filed against Huawei. Furthermore, the company has been denied a number of bids when it failed to acquire patents and enterprise businesses from 3-Leaf System, 2Wire, Motorola Wireless, 3Com Corp, and so on.

Despite different backgrounds, both Nokia and Huawei have focused on the core business of (1) mobile phones/smartphones and (2) telecom networks, followed by a clear will to internationalize and grow into global leaders.

3.3 Management

Both at Nokia and Huawei the myth around the CEO is crucial, but the rotating management at Huawei might be one explanation why Huawei has risen and not fallen like Nokia. Jorma Ollila was the Nokia Corporation CEO from 1992 to 2006 and chairman from 1999 to 2012. It was during this time that Nokia rose to world leadership in the mobile phones industry in 1998 and expanding to global market share of around 40% in 2007. In the autobiography by Ollila and Saukkomaa (2016) is a picture of a CEO that gets things done. That is not different from the picture that is painted of Ren Zhengfei by Huang (2019). Both the CEO of Nokia and Huawei hired the best. However, there are huge differences in the philosophical approaches of Zhengfei that more or less argues that Huawei is built on value and that the middle management is the company's greatest asset (Huang 2019).

At Nokia, CEO Ollila stresses the role of the superior technological development and products as well as production knowledge as crucial. Peltonen (2019) calls this a superior technological competence within the mobile phone sector. However, in 2007, two non-mobile phones companies transformed the market. A computer company Apple introduced the iPhone and a search engine company Google introduced the Android operating system (which ironically is built on an open source system, Linux, initiated by a Finn, Linus Torvalds). The mobile phone focus now shifted toward smart touch phones with apps.

Nokia and its leadership were not able to respond in a way that customers were moving, and the downfall of Nokia was accelerating. One reason for this lack of response by Nokia is the fact that very few of the managers and board members at Nokia dared to challenge Ollila as noted by the new 2012 Nokia Board Chairman Risto Siilasmaa. In hindsight one can understand that it probably was not good to have Ollila acting as

both CEO and Chairman for such a long time. The new Chairman Silasmaa criticizes Ollila and implies that his heated behavior was one reason why the once-mighty mobile phone company suffered a dramatic downfall (Cord 2014; Silasmaa and Freedman 2018; Peltonen 2019).

Meanwhile, Huawei (2020) describes its founder and CEO in the following way: “Mr. Ren retired from the army in 1983 when the Chinese government disbanded the entire Engineering Corps. He then worked in the logistics service base of the Shenzhen South Sea Oil Corporation. As he was dissatisfied with his job, he decided to establish Huawei with a capital of CNY21,000 in 1987. He became the CEO of Huawei in 1988 and has held the title ever since.” The manuals for how Huawei is run are full of quotes by CEO Ren. The title of Huawei’s philosophy is “Built on Value.”

One of the important lessons is that one should always expect the unexpected Black Swan—remain flexible to seize opportunities amidst uncertainties (Huang 2019). Ren paid a lot of attention on the routinization management at Huawei and said: “If management did not start from small changes, then nothing could be achieved. The only thing that does not change is change itself; and the only thing that we need to implement constantly is management improvement”. This is a different way of thinking than in a company with a faired leader. In fact, one of the fascinating aspects of Huawei is its rotating management team positions every 6 months at Huawei—except that Ren has been the CEO since 1988. Although having a rotating board and management team has both drawbacks and advantages, it seems that the latter outweighs the former. Huang (2019) indicated that failing managers are rolled out, and about one in ten managers fail. This must be a scary thing for a current Huawei manager.

Thus far, the expansion of Huawei resembles that of Nokia. However, in Fig. 9.2, we note that the management of Nokia was not able to respond to the changing technological environment. So, “the same” management that had led Nokia to success would also lead its retreat. Markets are evolving ecosystems. Firms must embrace complexity as noted at Huawei. Recognizing markets as complex adaptive systems spells innovative forward thinking, industry foresight, including forward market influencing. Sadun et al. (2017) in their studies of core management

Understanding the growth and retreat of Nokia



Fig. 9.2 The Six-M model and Nokia: global growth followed by retreat, downsizing, sales of mobile phone parts to Microsoft, more M&As, layoffs, and lost value management

practice in 34 countries highlights yet another issue: Why do we under-value competent management?

In 1998, Nokia became the global market leader in mobile phones. In 2007, Nokia was the undisputed world champion in the mobile phone business with a market share of 40%. However, something happened in 2007 that Nokia could not respond to: Apple launched iPhone with a touch screen and Google presented a new operating system, Android for smartphones. Cord (2014) and Peltonen (2019) note that the Symbian operating system, which Nokia had developed together with Ericsson, was limited and was at the end of its lifecycle when iPhone was introduced. However, Nokia had one of the world’s largest R&D budget access to the best consultants and technical knowledge. Still the management at Nokia could not respond to the new competitive environment. Why? The device mass-producing Nokia had become arrogant, scared, controlling, and rigid. In addition, its top management and board lacked technical vision. Peltonen (2019) note that Nokia’s management and board had become finance driven.

Laamanen et al. (2016) and Peltonen (2019) note that the management at Nokia was seen as celebrated leaders when things went well and as the weakness of Nokia when the management was unable to respond to the transformed competitive environment after 2007. Peltonen (2019)

notes that the management problem was bureaucracy and that the management believed that careful analysis would provide the best basis for successful decision-making. However, the top management and board ended out missing a few turns toward the smartphone future that the customers took.

Therefore, we see the value management at Huawei as one of the key factors behind its success, while the value management at Nokia of “connecting people” was lost sometime around 2005–2010, triggering the retreat of Nokia. This retreat is transforming Nokia into a rigid castle of clay focused on control and shareholder value that will evolve in joint ventures, sales, and buy-backs (e.g., Siemens) and several mergers and acquisitions (e.g., with Motorola in 2011 and with Alcatel Lucent in 2015).

3.4 Money

Both Huawei and Nokia have faced scarce financial resources since 1988. Huang (2019) notes that the main task at Huawei is not to make the shareholders, the managers, or the stakeholders rich but to invest to seize strategic opportunities. The financial focus of Huawei seems different from the many companies listed in the United States or European Union in that it prioritized the long-term goals of the core business over the short-term shareholder value creation. In contrast, at Nokia, the managers and shareholders wanted their fair share of the profits. The first three Employee Stock Option Programs (ESOP) during the late 1990s were offered only to the managers at Nokia, which had a considerable dilution effect of around 5% of new shares (Ikäheimo et al. 2004). When the share price soared—Nokia became the highest valued company in Europe—the option programs created a lot of wealthy Nokia managers. Nonetheless, due to tax laws in Finland, almost all option holders were forced to sell around 50% of the stock options to cover for the personal taxes, which made the managers less likely Nokia owners. When the working atmosphere at Nokia became more controlling or less attractive, some of the managers opted to leave Nokia, since they could afford it, or were offered more appealing jobs outside Nokia.

Nokia had been a listed company in Finland for a long time, but when Nokia was listed on the New York Stock Exchange in 1994, the shareholder value mentality started to influence Nokia more and more. Finnish owners started to sell out their ownership as the Nokia share price rose. The new Nokia shares from the option programs were usually bought by institutional US owners who wanted a dividend. At the same time, as the Finnish ownership in Nokia declined, the real power shifted toward the management. In 1999, the CEO Jorma Ollila also became the Chairman of the Board, thereby arguably creating a control problem at Nokia.

At Huawei, there are as far as we can see only two shareholders. Zhong (2019) writes that Huawei Technologies is wholly owned by a holding company called Huawei Investment & Holding. That holding company has two shareholders, CEO Ren, who owns a little more than 1% of shares and the rest are owned by an entity called the Union of Huawei Investment & Holding or Huawei's labor union. Tao (2019) notes that Huawei has long promoted itself as a company owned by its current and former employees. Huawei employees own the company through an Employee Stock Ownership Program (ESOP), which we would call a virtual ESOP. As of 2018, there were 96,768 employee shareholders, and no one can own a share of the company without working there, the company insists (Tao 2019).

However, foreign employees were not able to participate in the ESOP due to restrictions under Chinese law. Additionally, many retired employees still possessed Huawei's stocks. By owning the company's stocks, they could share in Huawei's profit without any continuous dedication. This contradicted the core value of the company, that is, inspiring dedication. To address these problems, Huawei started to implement the Time Unit Plan (TUP) in 2014. The TUP is a profit-sharing and bonus plan based on employee performance for all eligible employees, including foreign employees. Under TUP, time-based units are granted to the eligible employees, which entitle them to receive a cash incentive calculated based on the annual profit-sharing amount and the cumulative end-of-term gain amount (De Cremer and Tao 2015). Using the TUP, Huawei aimed to avoid rewarding employees who hold a large amount of stock but contribute less and offer long-term incentives to all contributing employees who will be then motivated to act upon the core value of inspiring

dedication. ESOP and TUP will both serve as Huawei's incentive schemes in the years to come, although it is expected that the share of the profit allocated to the TUP out of the total profit will gradually increase, while the share of profit allocated to the ESOP will accordingly decline (Wu 2015).

These different shareholder compositions at the two companies meant that Huawei has relied on internal equity capital growth and debt financing because of its limited capability to raise capital from the stock market, while Nokia typically has applied a form of target-capital-structure policy in which equity should be at least 40% of total assets. According to the 2018 annual reports of the two companies, the estimated ratio for equity to total assets was 35.0% at Huawei and 38.9% at Nokia. Although it is difficult to directly compare a Finnish and a Chinese company report and decode what really lies behind the numbers, it can be argued that the shareholder value mentality at Nokia is different from value management at Huawei. One interesting finding is that both companies seem to rely on debt financing to obtain capital for investments and product development, which could be a dangerous financial strategy. For example, on October 24, 2019, Nokia announced that it would pause dividends to: (a) guarantee Nokia's ability to increase 5G investments, (b) continue investing in growth in strategic focus areas of enterprise and software, and (c) strengthen Nokia's cash position (Nokia 2019b). The market reaction was harsh and 1 month later about one-third of the market value of Nokia was lost. Nokia has also lost deals due to the fact that they have not had strong contacts to financial institutions that could offer the potential buyers of mobile networks a financial package.

3.5 Meaning and Magic

Both Nokia and Huawei have a focus on satisfying customer needs. The issue of helping others is always a good narrative to start with. Connecting people is a good story to motivate yourself with, and to be able to sell positive experiences is a great way toward a successful outcome. Neither great leadership nor brilliant strategy matters without operational

excellence and satisfied customers. Execution of potentially disrupting ideas is a huge problem in most firms.

The initial values guiding Nokia from 1992 to 2007 were respect, achievement, renewal, and challenge (Ollila and Saukkomaa 2016). After the US campaign “connecting people,” the mission of Nokia was set. However, in 2007, with the new CEO Kallasvuo, the values of Nokia became more blurred; “achieving together,” “engaging you,” “passion for innovation,” and “very human,” and today we could not find out from the Nokia (2019a) home page nor Nokia (2018) annual report what the values or mission of Nokia are. Instead, Nokia (2018, 2019a) emphasizes responsibility, sustainability, corporate governance, and control issues. It seems like value management and the meaning of “connecting people” is no longer a part of Nokia. A Nokia that consists of people from former companies: Lucent-Alcatel, Motorola, Siemens, and so on, companies that have failed and fallen into the history books!

Huawei can be translated into “China can” or “China is able to.” Most Chinese employees would be happy and proud to be able to work for any telecom giant. And who would not feel good if you are participating in making the world better by making the world’s best and most advanced telecom product? Friedrich Nietzsche once said, “People will do almost any what, if you give them a good why.” The story of “why” in Nokia and in Huawei is to be part of something greater good. Something magic! It feels rewarding to be able to improve the lives of people. EU Media and Communication Manager at Huawei, Jakub Hera Adamowicz (2020), notes that the Huawei’s core values are “customer centricity, dedication, continuous improvement, openness & initiative, integrity and teamwork,” which are values that most US and EU companies would find appealing. Adamowicz (2020) continues “As Ren Zhengfei puts it: “The essence of Huawei’s culture can be described with one word: integrity. As our most valuable intangible asset, integrity is the key to our survival and the source of individual and corporate growth.” The EU and US reader with an insight into the telecom industry might at this point have a concerned smile on their face. However, it is no laughing matter. Huawei is—like Nokia in a way—built on values.

Huang (2019) also notes that Huawei is built on values. Every new employee will get a letter from the Huawei founder Ren Zhengfei. His

2019 letter reads: “Our corporate culture aims to be open and inclusive, and incorporate the best cultural elements and management practices from around the globe. If we become closed-off, proud, and dismissive of other cultures, Huawei is destined to fail. As a global company, we never favor one country over another. If you are assigned overseas, you must abide by the laws of the host country as well as represent Huawei and its core values” (Adamowicz 2020). In the very early stage of Huawei's development in 1994, Ren instilled a good vision to all the staff by saying: “Huawei must and will be one of three companies in the global communications industry a decade later.” Aligned with this meaningful vision, Huawei achieved second position in the 2000s and ranked the top one in the 2010s.

To sum-up on meaning, we note that Huawei is built on values and has remained values-driven, while Nokia lost its values of “connecting people” and became a rigid control organization in the early twenty-first century.

3.6 Me = We = Huawei

At Nokia, the rise to global leadership in the mobile phones sector was a great source of pride, and Nokia could attract the best university graduates even if it paid less than the competitors. However, a culture of greed followed in the footsteps of success, and the top management at Nokia was the highest paid in Finland due to the three management option programs (Ikäheimo et al. 2004). Another problem relates to the fact that Nokia has failed to retain its employees, and it has recruited relatively young people. For example, in 2010, 60% of the recruited employees were less than 30 years old, whereas only 2% were 45 years or older (Pajarinen and Rouvinen 2013). The share of young recruits was the highest during the intensive growth cycle during the late 1990s when 64% of newcomers were under 30 years old and almost 40% were under 25 years old. Among the samples from 1989 to 2010 by Pajarinen and Rouvinen (2013), employees chose to, or were forced to, leave Nokia before the age of 45. Surprisingly, Finnish employees seldom retire from Nokia, or at an age later than 60 years. Usually, a high personnel turnover

is a negative sign. It is hard to create a corporate culture of trust if employees are forced to leave. We argue that Nokia lately has had a hard time to create a spirit of me = we in Nokia.

We live in a self-centered world of greedy individuals, so does in China in the 2000s. China can and Huawei has been a master at taking advantage of the pride in a rising China in the world economy, as well as exploiting the opportunities arising from a more capitalistic China. In a world of me, me, me, and other “me’s,” and some mess, a hard and crucial issue for good companies is to create meaning and belonging among co-workers, customers, and owners. Huawei and CEO Ren have managed to maintain the spirit of can-do and belonging to a greater innovative organization. This is not an easy task, especially not over a long period of time. Although it is impressive, it is questionable as to how long the situation “that I am equal to us at Huawei” will last. At Nokia, in the international growth phase of 1994–2007, pride was a key trigger for attracting the best and brightest people to Nokia. However, with problems starting to rise, the attraction faded. In addition, when people were fired or transferred to other companies, the pride of belonging to Nokia started to fade. We are not sure when or if the same thing will start to happen at Huawei. It may be a likely development that most global companies will be facing. Rosenzweig (2007) notes that lasting success is almost impossible to achieve—almost all high-performing companies regress over time, regardless of what they do.

4 Discussions and Conclusions

The choice of technology platform and place in the Internet and telecom eco-system are strategic choices under a high degree of uncertainty. As often in business, there is no quick fix, nor does one-size-fit-all solutions, which force both Huawei and Nokia and their boards to enable capable teams that can come up with viable solutions for the future. It seems like a simple core business strategy is a winning way forward in the history of the telecom business; that is, to know and serve your customers with better and cheaper products. However, it is no guarantee for success, as evidenced by Nokia’s failure in the global market of mobile phone business

from a 40% global market share in 2007 to 0% in 2016. Nokia was unable to respond to the disruptive innovations of smartphones and apps. Lasting success is, as Rosenzweig (2007) notes, extremely hard to sustain, and luck often plays a crucial role in success.

The issue of luck in the case of Huawei is linked to the growth of China in the world economy and the institutional environment in China, as well as the rise of “surveillance capitalism” and platform economies. Both Huawei and Nokia leveraged the institutional changes of their times for business growth. However, it also seems that the founder of Huawei, Ren Zhengfei has applied a bundle of schoolbook strategies concerning successful growth and internationalization, which is to focus on the core business, customer orientation, and an urge for constant innovation as well as growth (Peters and Waterman 1983; Hamel and Prahalad 1994; Kjellman et al. 1996).

Our effort was about understanding the development of Nokia and Huawei, which was a journey into the evolving world of traps and halo effects. And it is an endeavor, which is complex, multi-dimensional, and challenging. Nobody knows what the future will bring. Machine learning, virtual reality, and artificial intelligence are only starting to affect the world of wireless communication, and it is still unknown how 5G and further technological advancement will twist the market. Nonetheless, we argue that Huawei has been better than Nokia in handling the Six-M model and its six crucial stages of growth: (1) Manic focus on product development, (2) Markets or a clear focus on the core markets, (3) Management, (4) Money, (5) Meaning, and (6) Me = We. However, both companies share patterns of success such as a focus on technological development and customers.

One reason behind the retreat of Nokia is clearly the mistakes made by the board as well as the top management of Nokia, when they failed to respond to the consumers' path into the world of smartphones. How Nokia and Huawei will respond to the demands of the consumers in a data-driven world remains to be seen. In addition, based on resource-based view and institutional theory, we argue that Huawei's fierce strategy of talent development and leveraging of institutional environment, in contrast to the missteps that Nokia took in those areas, may have led to the ultimate different directions of the corporate development of these

two companies and their fate. It is recommended that future research should test our Six-M model in other cases of corporate strategy and development in order to enhance our understanding about how companies grow, prosper, and/or struggle or retreat in the global business.

Our study of Huawei and Nokia of growth and internationalization strategies based on the Strategy Tripod contributes to the literature in a number of ways. First, we have developed a Six-M model to depict how two MNEs in the same industries could depart from each other in their growth and internationalization strategies and how firm-specific, industry, and institutional factors influenced such divergent paths. This exploratory and case-based study provides insights and nuances into a classic strategic management question: what makes a company successful and what makes a company fail? Second, we enrich the current literature on emerging economy multinationals by providing a rich description by comparing an EMNE and a traditional MNE using our Six-M model to unpack some myth and puzzles about the rise of a highly controversial EMNE and retreat of a former world-class telecom giant.

One lesson to be learned by corporate managers is that value management and meaning are important factors behind success. Our study also provides other lessons. Learn how to avoid missteps and how to contribute to thriving corporate cultures. Today's success is no guarantee for tomorrow's success.

References

- Aarikka-Stenroos, Leena, Elina Jaakkola, Debbie Harrison, and Tiina Mäkitalo Keinonen. 2017. How to Manage Innovation Processes in Extensive Networks: A Longitudinal Study. *Industrial Marketing Management* 67: 88–105.
- Adamowicz, Jakub A. 2020. Why Huawei Is Different – Core Values That Matter. <https://www.huawei.eu/story/why-huawei-different-core-valuesmatter>. Accessed February 12, 2020.
- Barney, Jay. 1991. Firm Resources and Sustained Competitive Advantage. In *Economics Meets Sociology in Strategic Management*, ed. Joel A.C. Baum and Frank Dobbin, 203–227. Emerald Group Publishing Limited.

- Barney, Jay, Mike Wright, and David J. Ketchen Jr. 2001. The Resource-Based View of the Firm: Ten Years After 1991. *Journal of Management* 27 (6): 7.
- Buckley, Peter J., and Mark Casson. 1976. *The Future of the Multinational Enterprise*. London: Macmillan.
- Calori, Roland, Gerry Johnson, and Philippe Sarnin. 1994. CEOs' Cognitive Maps and the Scope of the Organization. *Strategic Management Journal* 15 (6): 437–457.
- Chen, Liang, Yi Li, and Di Fan. 2018. How Do Emerging Multinationals Configure Political Connections Across Institutional Contexts? *Global Strategy Journal* 8 (3): 447–470. <https://doi.org/10.1002/gsj.1187>.
- Cheng, D. 2007. *Ren Zhengfei's Talk About International Operation*. Hangzhou, Zhejiang: Zhejiang People Press.
- Christensen, Clayton. 2019. Disruptive Innovation. <http://www.claytonchristensen.com/key-concepts/>. Accessed November 19, 2019.
- Cord, David. 2014. *The Decline and Fall of Nokia*. Helsingfors: Schildt & Söderström.
- De Cremer, David, and Tian Tao. 2015. Huawei: A Case Study of When Profit Sharing Works. *Harvard Business Review Digital Articles*, September 2–5.
- Dierks, Alexander, Christian Paul Jian Wei Kuklinski, and Roger Moser. 2013. How Institutional Change Reconfigures Successful Value Chains: The Case of Western Pharma Corporations in China. *Thunderbird International Business Review* 55 (2): 153–171. <https://doi.org/10.1002/tie.21533>.
- Hamel, Gary, and C.K. Prahalad. 1994. *Competing for the Future*. Boston: Harvard Business School Press.
- Hang, Chang, Elizabeth Garnsey Chieh, and Yi Ruan. 2015. Opportunities for Disruption. *Technovation* 39–40: 83–93.
- Hira, Anil. 2012. Secrets Behind the Finnish Miracle: The Rise of Nokia. *International Journal of Technology and Globalisation* 6: 38–64.
- Hofstede, Geert. 2007. Asian Management in the 21st Century. *Asian Journal of Management* 24 (4): 411–420.
- Hoskisson, Robert E., L. Eden, C.M. Lau, and M. Wright. 2000. Strategizing in Emerging Economies. *Academy of Management Journal* 43: 249–267.
- Huang, Weiwei. 2016. *Customers First: Huawei's Business Management Philosophy*. Beijing: China CITIC Press.
- . 2019. *Built on Value: The Huawei Philosophy of Finance Management*. Singapore: Palgrave Macmillan.
- Huawei. 2020. Mr. Ren Zhengfei. <https://www.huawei.com/en/about-huawei/executives/board-of-directors/ren-zhengfei>. Accessed February 13, 2020.

- Hymer, Stephen H. 1976. *The International Operations of National Firms: A Study of Direct Foreign Investment*. Cambridge, MA: MIT Press.
- Ikäheimo, Seppo, Anders Kjellman, Jan Holmberg, and Sari Jussila. 2004. Employee Stock Option Plans and Stock Market Reactions: Evidence from Finland. *European Journal of Finance* 10: 105–122.
- Kjellman, Anders, Sefan Långström, and Tage Vest. 1996. Successful Firms Through Hard Times: The '90's Depression in Finland. *Journal of General Management* 22: 76–89.
- Kjellman, Anders, Tom Björkroth, Taisto Kangas, Risto Tainio, and Thomas Westerholm. 2019. Disruptive Innovations and the Challenges for Banking. *International Journal of Financial Innovation in Banking* 2: 232–249.
- Laamanen, Tomi, Juha-Antti Lamberg, and Eero Vaara. 2016. Explanations of Success and Failure in Management Learning: What Can We Learn from Nokia's Rise and Fall? *Academy of Management Learning and Education* 15: 2–25.
- Möller, Kristian, and Aino Halinen. 2017. Managing Business and Innovation Networks—From Strategic Nets to Business Fields and Ecosystems. *Industrial Marketing Management* 67: 5–22.
- Nokia. 2018. Annual Report 2018. <https://www.nokia.com/about-us/investors/reports-filings/>. Accessed October 3, 2019.
- . 2019a. www.nokia.com. Accessed August 8, 2019.
- . 2019b. Financial Report for Q3 and January–September 2019. <https://www.nokia.com/about-us/news/releases/2019/10/24/nokia-corporation-financial-report-for-q3-and-january-september-2019/>. Accessed October 24, 2019.
- North, Douglass C. 1990. *Institutions, Institutional Change, and Economic Preference*. New York: Norton.
- Ollila, Jorma, and Harri Saukkomaa. 2016. *Against All Odds: Leading Nokia from Near Catastrophe to Global Success*. Palmyra, VA: Maven House.
- Pajarinen, Mika, and Terti Rouvinen. 2013. Nokia's Labor Inflows and Outflows in Finland: Observations from 1989 to 2010. *ETLA Reports*. <http://pub.etla.fi/ETLA-Raportit-Reports-10.pdf>. Accessed October 5, 2019.
- Partanen, Jukka, and Kristian Möller. 2012. How to Build a Strategic Network: A Practitioner-Oriented Process Model for the ICT Sector. *Industrial Marketing Management* 41: 481–494.
- Peltonen, Tuomas. 2019. Case Study 4: The Collapse of Nokia's Mobile Phone Business. In *Towards Wise Management*. Cham: Palgrave Macmillan.
- Peng, Mike W. 2001. The Resource-Based View and International Business. *Journal of Management* 27 (6): 803–829.

- . 2003. Institutional Transitions and Strategic Choices. *Academy of Management Review* 28 (2): 275–296.
- . 2006. *Global Strategy*. Thomson-South-Western, OH: Mason.
- Peng, Mike W., and Andrew Delios. 2006. What Determines the Scope of the Firm over Time and Around the World? An Asia Pacific Perspective. *Asia Pacific Journal of Management* 23: 385–405.
- Peng, Mike W., Dennis Wang, and Jiang Yi. 2008. An Institution-Based View of International Business Strategy: A Focus on Emerging Economies. *Journal of International Business Studies* 39: 920–936.
- Pérez, Jorge A. Heredia, Xiaohua Yang, Ou Bai, Alejandro Flores, and Walter Heredia Heredia. 2019. How Does Competition by Informal Firms Affect the Innovation in Formal Firms? *International Studies of Management & Organization* 49 (2): 173–190.
- Peters, Thomas, and Robert H. Waterman. 1983. *In Search of Excellence*. New York: Harper & Row.
- Pongratz, Stefan. 2019. Key Takeaways – Worldwide Telecom Equipment Market 2018. *Dell'Oro Group*. <https://www.delloro.com/telecom-equipment-market-2018-2/>. Accessed September 19, 2019.
- Porter, Michael E. 1990. *The Competitive Advantage of Nations*. London: Macmillan.
- Rosenzweig, Phil. 2007. *The Halo Effect: ... and the Eight Other Business Delusions That Deceive Managers*. New York: Free Press.
- Sadun, Raffaella, Nicholas Bloom, and John Van Reenen. 2017. Why Do We Undervalue Competent Management? Neither Great Leadership nor Brilliant Strategy Matters Without Operational Excellence. *Harvard Business Review* 95: 120–127.
- Silasmaa, Risto, and Chatrine Freedman. 2018. *Transforming NOKIA: The Power of Paranoid Optimism to Lead Through Colossal Change*. New York: McGraw-Hill.
- Silverman, David, and Amir Marvasti. 2008. *Doing Qualitative Research: A Comprehensive Guide*. Thousand Oaks, CA: Sage.
- Tao, Li. 2019. Who Controls Huawei? Here's an Explainer on Its Ownership Structure. <https://www.techinasia.com/explainer-huawei-ownership-structure>. Accessed July 9, 2019.
- Tian, Tao, and Chunbo Wu. 2012. *Will Huawei Be the Next to Fall?* Beijing: China CITIC Press.
- Vaswani, Karishma. 2019. Huawei: The Story of a Controversial Company. *BBC*, March 6.

- Wright, Mike, Igor Filatotchev, Robert E. Hoskisson, and Mike W. Peng. 2005. Strategy Research in Emerging Economies: Challenging the Conventional Wisdom. *Journal of Management Studies* 42 (1): 1–33.
- Wu, Chun. 2014. *Huawei Have No Secret*. Beijing: China CITIC Press.
- Wu, J. 2015. Why the Implementation of Simply TUP Is Not Easy? <http://www.builast.com/zhuanyewenzhang-195321-15879-item-108269.html/>. Accessed October 24, 2019.
- Yang, Xiaohua, and Clyde D. Stoltenberg. 2014. A Review of Institutional Influences on the Rise of Made-in-China Multinationals. *International Journal of Emerging Markets* 9 (2): 162–180.
- Yang, Xiaohua, Yi Jiang, Rongping Kang, and Yinbin Ke. 2009. A Comparative Analysis of the Internationalization of Chinese and Japanese Firms. *Asia Pacific Journal of Management* 26 (1): 141–162.
- Zhang, Lihua. 2012. *Huawei R&D*. Beijing: China Machine Press.
- Zhong, Raymond. 2019. Who Owns Huawei? The Company Tried to Explain. It Got Complicated. *New York Times*, April 25. <https://www.nytimes.com/2019/04/25/technology/who-owns-huawei.html>. Accessed July 8, 2019.

Part III

**Huawei's Development Strategies,
Innovations, and Talent
Management**



10

Huawei's Long March to Global Leadership: Joint Innovation Strategy from the Periphery to the Center

Manuel Hensmans and Guangyan Liu

How did Huawei transform from a tiny telecom importer, considered a “bastard” of a business by the Chinese government, into a global leader in the telecommunications equipment industry and one of the leading smartphone vendors in the world—considered a dangerous misfit by the US government? In its effort to out-innovate established technology equipment suppliers from Europe and the USA, Huawei has aggressively pursued a strategy of joint innovation from the periphery to the center, first with Chinese customers and local governments, and later with leading European customers and governments. This chapter focuses on how Huawei developed its joint innovation strategy in the European Union (EU), allowing it to emerge as a global leader after the Western and European financial crisis.

M. Hensmans (✉) • G. Liu
Solvay Brussels School of Economics and Management, Université Libre de
Bruxelles, Bruxelles, Belgium
e-mail: mhensman@ulb.ac.be

1 Visionary Leadership from the Periphery to the Center

Although a dominant Western view is that China's culture of innovation is constrained by cultural and political/government forces, the reality is that China has a strong entrepreneurial side as well (Hensmans 2017; Phan et al. 2010). Many Chinese entrepreneurs have global leadership aspirations that are aligned with their North American and European counterparts. Barely six years after the company was founded 1988, Huawei announced that it wanted to become one of the world's leading players in telecommunications (Tao and Wu 2014). Huawei's founder Ren Zhengfei, who was raised in a rural town and who distinguished himself in his first career at the China's People's Liberation Army as an outstanding engineer and scientist, made the bold decision that outcompeting Western multinationals would mean recruiting talented engineering graduates from top Chinese universities with competitive salaries and employee bonuses. It also meant out investing Western technology multinationals, with more than 10% of its sales allocated to research and development (R&D) projects.

Overall, Huawei's from the periphery to the center approach to joint innovation focuses on overcoming four types of entry barriers: geographical, customer, government, and R&D related (see Table 10.1).

In the early days, Huawei's strategy was to target rural townships far away from the centers of power and multinational attention. Local operators, hotels, and factories needed customized networking gear and central office switches that could withstand adverse local conditions such as poor transmission quality or rats chewing electrical wires. Because Huawei could not get access to capital from national banks or government, its earliest R&D efforts focused on innovating jointly with these local customers on customized, cost-effective solutions. By taking the time and making the necessary investments to address the requirements of local customers, Huawei was able to overcome the entry barriers in China despite being a private company that doggedly asserted its independence. Local bureaucrats who felt left out by their remoteness to centers of capital and power began to view Huawei as a new role model for public-private

Table 10.1 Geographical, government, customer, and R&D Foundations

Joint Innovation foundations

Innovating from the periphery to the center

- From being an adaptive Chinese imitator of Western innovation practices
- **To building an independent R&D path via neglected, peripheral customers**
- From being disadvantaged by central State intervention
- **To developing a model citizenship relation with government from the periphery**

Customer entry barriers

Target challenger before mainstream customers

- From contractually fixed specifications and agreements
- **To a long-term Freemium relationship**
- From targeting mainstream customers with low-cost adaptations
- **To first building quality challenger partnerships**

Government entry barriers

Target challenger before central governments

- From optimize R&D investments and pay as few taxes as possible
- **To invest extra in R&D and pay more taxes to legitimize access to political center**
- From keeping government and the public good at arm's length
- **To actively engage with neglected government priorities and the public good to influence innovation direction of political center**

Customer Innovation
leadership*From technology push to Joint Innovation pull*

- From pushing great technologies and products, with a competitive aftersales package
- **To "solve practical customer problems no one else can and keep solving them"** through joint innovation centers
- From "Include customers to increase your revenues"
- **To become a global solutions leader by enhancing customers' bottom line**

cooperation. Huawei's local backing eventually persuaded China's central government to join in the praise, although it, to this day, privileges State-owned firms. Through its work with local operators in China, Huawei learned how to collaborate successfully with other parties (including governments) to provide the modern telecommunications equipment they needed. Eventually, it was able to leverage this capability to gain a foothold with China's largest telecom customers in the major cities.

2 Building Joint Innovation Capabilities in the European Union

In order to make inroads in Europe, Huawei has typically used the same four stages it used to become the telecommunication leader in China: Stage (1) target peripheral, challenge customers with a practical innovation model, that is, a model of customizing technologies to the practical needs and resource constraints of operators; Stage (2) capture leading customers by enhancing practical innovation with longer-term joint innovation partnerships (formalized as “Joint Innovation Centers”); Stage (3) use successful European Business-to-Business cooperation and establish telecommunications and media relations as a springboard to launch a globally leading Business-to-consumer brand; and Stage (4) extend joint innovation capabilities to wider stakeholders such as governments, universities, and wider industry stakeholders.

2.1 Stage 1: Practical Customization at No Extra Charge

Anticipating significant customer and government entry barriers in Western Europe, Huawei sent expatriates to Western Europe starting in 2001. Even with direct support from top management support, Huawei employees from China had a difficult time persuading European operators that a Chinese company was capable of producing anything but simple products, certainly not the state-of-the-art, high-tech equipment they sought. The first breakthrough occurred in 2004 with Telfort B.V., a Dutch mobile telecommunications provider. At the time, Telfort billed itself as a no-frills challenger to the established norms of the mobile industry (Huawei Corporate 2004). Lacking the financial strength of bigger operators such as Vodafone or France Telecom, and looking for a way to go up against established equipment suppliers such as Ericsson and Alcatel-Lucent, Telfort was willing to take a bet on Huawei’s products. Huawei demonstrated a refreshing willingness to listen closely to Telfort’s requests and find smart solutions to its unmet needs. By working closely with Telfort, Huawei was able to produce a distributed base

station (DBS) 2004 that realized large economic and energy savings for the likes of Telfort by replacing the traditional European one-piece macro base stations with a dual and distributed base station. Learning how to win over challenger customers such as Telfort was no easy feat. To do so, Huawei had to present skeptical operators a low-risk alternative to what the established vendors provided. It achieved this by offering free testing and technical support. The hardware itself undercut the products of established competitors by 30% to 95%. What's more, in contrast to the industry norm, where companies operate eight hours a day Monday thru Friday, Huawei promised service availability 24/7 and along with equipment transportation, installation, and maintenance at no extra charge. Finally, if the initial freemium stage is satisfactory, the customer is offered to commit to Huawei's premium solution services for advanced technologies at very competitive terms.

Huawei's practical innovation model of providing a customized test version almost for free and locking customers in with further customization is convincing for three reasons. First, during the last 15 years the company has invested more than 10% of its revenues in R&D (Huawei Corporate 2006 2008, 2013, 2018). Combined with the relatively low Chinese engineering labor costs, this allows it to assign more engineers to a prospective customer. For instance, when the company had its first conversations with prospective customers in Western Europe in 2000, it already employed 10,000 university-trained engineers, at least twice as many as leading competitors. Today, it employs more than 194,000 employees (Huawei Corporate 2019), more than 50,000 of which are developers and engineers, a number higher than Ericsson and Nokia combined (Hensmans 2017).

Second, since 2001 Huawei has played a long game in international standardization bodies, it has been determined to be best of class by making massive investments in technology testing and working out protocol exchanges with researchers from Western competitors. Its employees now lead many of the major standardization bodies. By occupying top positions Huawei's engineers signal that their company has become a bearer of quality as much as any leading Western firm represented in the bodies. Finally, like other Chinese technology companies including Alibaba and Xiaomi, Huawei has gained significant experience with the

“customization lock-in” approach to convincing customers, which has become more popular in China than it is in the West. Given that Huawei’s earliest rural customers in China were not willing to pay for standard technologies and expected practical results in adverse conditions, Huawei has focused its attention on cultivating customers with solutions configured specifically for them.

On its own, Huawei’s long-term customer perspective is only able to take the company so far. Indeed, Huawei has had to work hard to counter the perception that its products are cheap and infringe on other companies’ patents. Hence, Huawei does not try to present itself as the cheapest provider anymore but more as the vendor offering the best quality/value ratio. While still offering very competitive prices, it emphasizes its ability to solve complex problems for customers in a more practical way than currently on offer. Given the number of specialist engineers it has on staff, Huawei has prided itself in being able to design and implement smart solutions quickly.

The practical innovation strategy has paid off. In 2005, Huawei signed a deal with London-based Vodafone, its first mainstream customer. One of the largest mobile telecommunications companies in the world, Vodafone wanted to preempt Telefonica’s bid to lock-in Spanish operators by quickly installing a large numbers of wireless network base stations. What distinguished Huawei’s bid against Western competitors vying for the Vodafone business was its quality of execution rather than the cost: it offered to install 10,000 stations within one year, two to three times faster than competitors (Hensmans 2017). Based on its performance, Vodafone named Huawei its most outstanding supplier.

In 2008, Telenor, a large Norwegian mobile telecommunications company that operates in Scandinavia, Eastern Europe, and Asia, became another one of Huawei’s breakthrough customers. It was seeking an equipment provider to build a high-speed wireless base station in one of the remotest and most frigid parts of Norway. Other equipment providers shunned the project, leaving Telenor with Huawei as its only option; Huawei completed the 4G wireless base stations project in a matter of days.

2.2 Stage 2: Establishing Joint Innovation Centers

In recent years, Huawei has formalized its emerging relationships of trust and risk-sharing with leading European operators such as Vodafone and Telenor using Joint Innovation Centers (JICs). The purpose of the joint innovation centers is to offer a more collaborative way to manage the customer-supplier relationships and do away with long-term uncertainties about the direction of capability-development (see also Hensmans 2019). For operators the major incentive to participate in JICs is to turn historical technology investments into platforms for long-term innovation and money generation. Table 10.2 summarizes Huawei's eight key principles of Joint Innovation Center capability development.

Huawei developed and refined eight joint innovation principles whilst developing and renewing its capabilities in dedicated centers with Vodafone. The first principle 0centers on the importance of establishing a preliminary level of trust and willingness to share/mutualize risks with operators (and their suppliers or customers) through a practical innovation project—such as Huawei's installation of 10,000 GSM (Global System for Mobile Communications) sites for Vodafone in 2005.

Table 10.2 Eight dynamic capability principles of joint innovation centers

-
- i) Use practical innovation to grow into a mutual risk/trust bond with customers
 - ii) Launch a JIC with strong bilateral top management involvement (50/50% ownership)
 - iii) Uphold strict intellectual property rights protection, and strict secrecy of information
 - iv) Structurally facilitate customers' transition from present to future technologies: turn technologies into platforms for long-term money generators for customers
 - v) Maintain continuously high levels of attention and input by bilateral Steering board
 - vi) Focus on one type of technology per center, start a new JIC for each new technology
 - vii) Connect all JIC knowledge processes to learn to develop global solution capabilities
 - viii) Timely connect Joint Innovation Centers to government priorities and model citizenship
-

The aim of each joint innovation center is to raise operator collaboration to the level of a bilateral strategic partnership. As such, a JIC can only be established if operators are willing to dedicate continued high levels of top management attention and inputs. Bilateral top management involvement also ensures a strategic framework for protecting intellectual property rights with clear contractual rules from the onset. This is necessary to increase initial levels of trust and risk-sharing. It is also necessary to turn an initial practical innovation project into a long-term path to transition from the present network to future network technologies and applications.

Each JIC focuses on one specific technological problem. In each JIC the operator's strategy, ideas, requirements and Huawei's innovation, philosophy, technology interact in successive bilateral meetings between top managers and experts. Eventually innovative solutions are formulated and launched as soon as possible with customers and suppliers—to realize the JIC's trend-setting potential.

To appreciate how joint innovation centers work and how they can enhance strategic partnerships with operators (and their customers/suppliers), consider how Huawei developed a radio access technology with Vodafone that enables [mobile telecommunications operators](#) to support multiple [mobile communications standards](#) and wireless telephone services on a single network. It did so through a first ever joint innovation center, the Mobile Innovation Center launched in Madrid in 2006 with Vodafone under a 50/50 ownership agreement. Andy MacLeod, Vodafone's global network director, and Ding Yun, a director of Huawei's Enterprise Management Team, acted as presidents of the Steering Board of the JIC. The Board meets in so-called Innovation Summits every six months. In these meetings, the presidents and all members of the Steering Board listen to the report of the joint innovation team of experts and decide on the further innovation direction and allocated resources.

At one of these innovation summits, the joint innovation team of experts (composed of Vodafone and Huawei engineers) identified a major strategic problem: Vodafone needed to retire 110,000 GSM sites over the next three years and replace them with the next generation of mobile technology. Mindful of how disruptive this transition might be, the joint innovation team proposed to investigate a less complicated (and less

expensive) way to achieve the network upgrade with software as opposed to hardware. The Steering Board agreed, committing substantial bilateral resources to solving the problem—amongst which a Huawei team of top engineers in Shanghai to explore alternative solutions.

The project involved significant risks for both companies. Although there was the possibility that Huawei could beat back the technological threat that loomed over GSM network owners, it would require a significant amount of investment at a time when its role in the European network infrastructure was extremely limited. For Vodafone, there was a question of whether it made sense to cast its lot with Huawei, a relative upstart, at a time when maneuvering over the future industry standard was fierce. At this juncture, the two companies recognized that they needed to move beyond the traditional supplier-buyer model to embrace joint innovation.

This also involved sorting out any intellectual property rights issues that may ensue, most notably from the co-development of a distributed base station. After several joint innovation rounds, Huawei delivered the first SingleRAN (radio access network) in 2008. This solution increased wireless coverage by 25%, reduced the number of required base station sites by 40%, and reduced its total cost of ownership by one-third (Hensmans 2017). In 2010, SingleRAN became the industry standard.

Between 2006 to 2012, Huawei and Vodafone established six different joint innovation centers, yielding more than 40 innovation achievements (see Table 10.3 for an overview of the JICs). It did so across a large spectrum of innovations for wireless access, network communications, and business supporting systems.

While each Joint Innovation center with Vodafone focuses on one technological challenge, Huawei's competitive advantage with operators ultimately relies on connecting learnings across JICs to develop global solution capabilities. Specifically, Huawei and Vodafone in 2011 launched a Transmission Innovation Center to improve cooperation among JICs. For instance, when Huawei and Vodafone decided to co-develop a distributed base station, both parties agreed to protect each other's intellectual property rights (Hensmans 2017). Based on the terms of their overall agreement, the two parties were better able to trust each other and share long-term joint innovations.

Table 10.3 Huawei's and Vodafone's co-development of JIC capabilities

JIC1	The first JIC of Huawei with Vodafone was set up in Madrid, Spain in 2006 : a Mobile Innovation Center (MIC). This project focused on facilitating the technological and business model transition between 2G (GSM) and 3G (UMTS) wireless access technologies.
JIC2	Based on the success of the MIC, Huawei and Vodafone set up an Application Innovation Center (AIC) in Madrid in 2007 . The AIC provides Vodafone with innovative software applications, ensuring that application innovations can be fully applied to Vodafone's diverse sub-nets.
JIC3	In 2008 , both sides anticipated the IT and communications integration trend with a Core-net Innovation Center (CIC). By cooperating with the MIC and the AIC, the CIC developed End-To-End solutions. Six rounds of joint research within the CIC framework facilitated a smooth evolution of Vodafone's core net policy.
JIC4	In 2010 , both parties launched a mutual Fixed-Mobile Convergence Center (FMC). Its goal is to expand joint innovation procedures to comprehensive E2E solutions.
JIC5	In 2011 , Huawei and Vodafone launched a Transmission Innovation Center (TIC). This center serves to improve cooperation among JICs, increase transmission capacity and reduce transmission costs. TIC has three bases: in Milan, Madrid, and Basingstoke (UK). The TIC has yielded innovations such as IP bearer, IP microwave, IP backbone network, coordinated optical network, etc.
JIC6	In 2012 , the Enterprises Innovation Center (EIC) was launched. It focuses on: i) joint technology, solutions, and service innovation; ii) jointly developing enterprise networks market; iii) aligning bilateral strategy and technological direction decisions in enterprise networks; and iv) supporting other relevant bilateral strategy activities connected with enterprise networks. For example, both companies signed two collaboration projects: LTE Enabled Office and Policy as a Service. EIC serves as a strategic base to mutually incubate business solutions.

Initially, European equipment competitors had not seen Huawei's joint innovation initiatives with Vodafone as a serious threat. By 2016, however, Huawei had 18 joint innovation centers with all the leading Western European operators including Vodafone, Deutsche Telekom, British Telecom (BT), Orange, Telefonica, Telecom Italia, Swisscom, KPN, Proximus, Telenor, TDC, and TeliaSonera; in all, the company had 34 innovation centers around the globe (in Europe, North America, China, Latin America, Southeast Asia, and the Middle East). The response

of competitors such as Ericsson was to engage in similar joint innovation partnerships with Vodafone, Swisscom, TeliaSonera, and China Mobile.

2.3 Stage 3: Building a Global B2C Brand on B2B Accomplishments

Lately, Huawei has been making a strong push to expand beyond telecommunications equipment into consumer products. After several years of supplying operators such as Vodafone and Orange with unbranded handsets, Huawei in 2011 set up a consumer division to launch branded smartphones and more recently, smartwatches. By the summer of 2016, the company's consumer division made up more than 30% of revenues (in the first half of 2016, revenue was \$60.8 billion in 2015), and it was the first Chinese company to sell more than 100 million smartphones in a year (Lee 2016). So far, Huawei has focused on the high end of the market. For example, it worked with luxury-car maker Porsche on the design of a top-of-the-line Android phone called the Mate 9, equipped such features as two SIM (subscriber identity module) cards, 256 gigabytes of storage, fast charging capability, and Leica camera lenses; it is on sale in Europe and the Middle East for \$1600. It is also moving aggressively into watches. As a result, by 2018 Huawei's B2C (business-to-consumers) revenues exceeded these of its B2B (business-to-business) activities (Huawei Corporate 2018).

While Huawei had hoped to avoid the US government's suspicions of its equipment business with seemingly innocuous smartphones and smartwatches, recent reports alleged that Huawei smartphones had built-in backdoor that enables data gathering leave it open to renewed charges that its products are Trojan horses for Chinese espionage activities (Chen 2019). These concerns were apt to renew calls for greater transparency concerning Huawei's ties with the Chinese government and Chinese software vendors.

Things took a turn for the worst in 2018 and 2019, however. Under the leadership of Donald Trump, a longstanding antagonist and critic of China's rise in the world, a protracted trade war between China and the USA broke out, with Huawei as one of its focal points. As of May 2019,

the US Commerce Department's Bureau of Industry and Security (BIS) added Huawei and its 68 non-US Huawei affiliates to the BIS Entity List (Federal Register, 2019). This means that the USA imposes an export license requirement on all exports, reexports, and transfers of items subject to the US Export Administration Regulations (EAR) to Huawei or the 68 listed affiliates. This ruling is particularly problematic for Huawei's partnership with Google: Huawei will not be able to preload future phones with Google apps like Maps and YouTube, the Play Store or Google Assistant.

Consequently, Huawei has done some work on a proprietary operating system—called Ark OS or *Hongmeng* OS in China—but can its phones survive with these Android barriers of entry? Huawei was confident it could so, evoking Chinese President Xi's rhetoric on the country's new Long March in the face of protracted US antagonism.

2.4 Stage 4: Overcoming EU Government and Stakeholder Resistance

The extent to which the US intelligence concerns will influence Huawei's position with other governments remains to be seen. While staunch US allies Australia, Japan, and New Zealand have followed the US government closely (Grubb 2015; Smyth 2019; Tao 2018; Tobin 2019), EU policymakers have raised concerns without going as far as banning Huawei altogether.

Ultimately, the success of Huawei's Joint Innovation Centers also depended on governments and larger industry players' acceptance of the Chinese innovator in its midst (Hensmans 2017). As early as 2012, in the wake of a 2012 investigative report by the US Congress on the security threat posed by Huawei and ZTE (US House of Representatives 2012), EU policymakers had voiced their security concerns about Huawei's increasingly pervasive role in European telecommunications infrastructure. In response, Huawei revamped its innovation strategy enhancing commercial JIC initiatives with non-market corporate citizenship investments. Although it is common for multinationals to try to curry favor with governments in the countries they seek to do business in (Cherry

2001; Hamada 2007; Mason 1994)—for example, by establishing local manufacturing facilities, hiring well-connected local representatives, and launching PR campaigns—Huawei's efforts went further. It set out to play an integral role in shaping the governments' innovation plans.

When it comes to policies involving innovation, R&D investment, and taxation, Western companies tend to maintain an arm's length relation with government's public good priorities. However, Huawei has taken an approach that stood apart from competitors at a time when the global financial crisis and the resulting economic downturn put great pressure on governments and other stakeholders' abilities to realize public good ambitions. Rather than avoid as many fiscal constraints as possible, offshore R&D jobs and slash European spending in favor of lower wage and higher growth destinations, Huawei went all out to customize further innovation investments to the public good priorities of national governments and the EU Commission. In anticipation of a European Commission investigation, Huawei set up a European Public Affairs and Communications Office at the end of 2011 to couch all its further investments in the language of public-private joint innovation. Huawei's goal was to become a model European citizen that would allow European governments and wider industry players to keep abreast of the global innovation challenges of the twenty-first century.

In 2013, Huawei vowed to create 5500 new R&D jobs in Europe by 2019, increasing its number of EU employees by more than 50% (Fu 2013). Furthermore, Huawei took a leading role in helping the EU realize its Digital Agenda of becoming the leading ICT (Information and Communications Technology) region in the world and helping manufacturers catch up in the global race for the fourth Industrial Revolution by 2021. With the EU budget falling short of €50 billion, Huawei promised to take the lead in two major developments: help the EU take a leading role in the development of 5G technology applications, and put European manufacturing industries (most notably the car industry) at the heart of the Internet of Things (IoT) revolution. To that aim, Huawei in 2014 launched a European R&D Center close to the EU Commission in Brussels. Besides coordinating 5G research efforts, this Center champions the cause of European industry players wishing to occupy a leading position in global Internet of Objects developments but being held back

by a lack of European public investments. One realization of this center is a new IoT platform in alliance with European industry players such as car manufacturer Audi (Volkswagen) and IT specialist SAP, as well as European telecom operators and research organizations.

Huawei's European joint innovation rhetoric was the culmination of a non-market strategy commenced much earlier. It followed the same "convert the mainstream by first conquering the challengers" strategy for governments as for customer-operators (see Table 10.1). The two challenger countries Huawei pursued most directly were the UK and Hungary. Both governments seemed especially open to hedging their bets away from the EU towards China and China-based companies. A first non-market breakthrough came in 2005, when Huawei won a contract to provide transmission equipment for British Telecom's 21st Century Network project. British Telecom's £10 billion project aimed to provide the enabling infrastructure for the entire UK telecommunications industry—putting the UK at the cutting edge of global innovation. BT's recognition of Huawei as a European supplier boosted the Chinese upstart's entry strategy in two ways. As European rules do not allow any discrimination of suppliers from any European countries, BT's recognition meant that Huawei Europe had become a European supplier on a par with the likes of Ericsson, Nokia, and Alcatel Lucent. Second, Huawei's participation in a project with as much public-private resonance as BT's 21st Century Network added to its non-market legitimacy.

Similarly, whilst taking an increasingly detached stance towards EU mainstream policy, Hungary vowed to become the main bridgehead between China and EU (*Daily News Hungary* 2014). Poland in 2015 followed suit, vowing to become the main hub of China-EU trade (Polish Development Fund 2015). When Huawei chose the country as the location for major investments in European distribution centers, the Hungarian government in particular became a staunch defender of the Chinese firm's job and industry-creating role at a time of financial crisis. Together with Poland, and other leading nation of the Visegrad group¹ which has an equal number of weighted votes to Germany and France put together in the European Council, Hungary helped open the way for Huawei's governmental acceptance in the European Union.

Going from the EU periphery to the center, Huawei then took aim at its fiercest critics, most notably the French government. In 2014, at a time global companies such as Google came under fire for making lots of money in the country but paying very few taxes, Huawei took an unusual position. Huawei France's management disassociated itself from the tax loopholes pursued by Western competitors by instructing its accountants to find a way to pay a significant amount of taxes on revenues—whilst it was due none given the net losses the company makes in the country.

In addition, Huawei embarked on a “Made in France” spree by committing to \$1.9 billion investments in the crisis-struck country by 2019: committing to the creation of four new R&D centers that would be integrated in the French Tech ecosystem of local suppliers, universities, research centers, and start-ups (Gavois 2014).

3 Appraising Huawei's Joint Innovation Strategy

All in all, Huawei's from the periphery to the center entry approach to joint innovation has worked very well in the European Union, heartland of Huawei's major telecommunications equipment rivals. Several competitive factors enhance or diminish the success of a joint innovation strategy from the periphery to the center.

3.1 Stealth: Stay Under the Radar of Established Multinationals

In many ways, Huawei's strategy is another version of the Trojan horse mechanism (Hensmans 2015), in which incumbents (Western multinationals and governments) let in an apparently innocuous, friendly player to find out belatedly that this peripheral player is a strategic transformer (Hensmans et al. 2012) conquering their heartland from within. Indeed, the cultural and technological specificities at the heart of a joint innovation strategy are hard to understand and can remain underestimated by established multinationals until it is too late (Hensmans and Liu 2018).

When Huawei first entered Europe, it did not possess clear technology or brand advantages, leading European equipment providers to discredit it prematurely. The “from the periphery to the center” approach of first targeting challengers and then the mainstream adds to the relative invisibility of a joint innovation strategy—as established providers tend to disregard challengers’ unmet needs. In sum, when looking for a credible Chinese threat, Western managers tend to focus too much on established conceptions of technological and brand advantages, instead of being on the lookout for tokens of practical innovation with challenger customers.

3.2 The Most Dangerous Point of Entry of a Joint Innovation Strategy Is B2B

B2C Western customers still harbor great doubts about the quality and reliability of Chinese technology products. Hence, it does not make sense for an emerging competitor to immediately launch a B2C brand. Marketing expenses count for less in B2B markets, making it an easier target for C2B innovation. As soon as a Chinese firm has established a solid C2B reputation and an insider market position, it will be able to launch a credible B2C threat. This is exactly what Huawei did, with its global launch of Huawei branded smartphones on the back of obtaining a leading B2B industry position. Hence, Western managers should worry less about losing B2C than B2B customers. The most effective barriers of entry are those based on practical, joint innovation initiatives in the B2B realm.

3.3 Joint Innovation Works Best in Crisis-Struck Advanced Markets

Enlisting the support of governments, universities, and wider industry stakeholders for a joint innovation strategy is easier when public funds for the realization of innovation objectives are drying up, as in the aftermath of the EU financial crisis. For Huawei, Western crises often are

opportunities. A context of budget deficits and declining trade possibilities opens up joint innovation possibilities from the periphery to the center, with some local governments challenging policy orthodoxy in favor of new foreign sources of investment and trade. In sum, the success of a joint innovation strategy is greatly accelerated in industry crises that challenge the status quo, ultimately supporting industry transformation in the direction favored by next-generation alternative leaders (Hensmans et al. 2001, 2012; Hensmans, 2003, 2010; Johnson et al. 2012; Sakuma and Hensmans 2013).

3.4 A Friendly Government Attitude Is a Precondition to Joint Innovation

When political entry barriers are high, for instance due to suspicions of illicit home government involvement, a joint innovation strategy should first focus on recognition as a model citizen before attempting to gain favor of local customers (see Table 10.1). This is where Huawei went astray in the USA. Despite its increasing market acceptance in Europe, Huawei had struggled to make major inroads in the USA. Although the company has had cooperative research relationships with several major US companies including IBM, Intel, Lucent Technologies, Microsoft, and Qualcomm, it continues to face questions regarding intellectual property and espionage. Equipment providers, including Cisco and Motorola, have charged Huawei with intellectual property theft. And Huawei continues to be under suspicion by the US government for participating in state-sponsored cyber espionage. In 2008, a US government panel rejected Huawei's attempt to acquire 3Com, a maker of Internet router and networking equipment, over concerns about national security. 3Com made anti-hacking computer software for the military, among other things, and Huawei had ties to the Chinese military (Weisman 2008). Three years later Huawei was forced to abandon plans to purchase 3Leaf Systems, which specialized in building servers to run together as more powerful mainframe computers (Kan 2011). Company executives including CEO Ren have flatly denied espionage allegations, saying that Huawei has no ties to the Chinese government and that it has never

received a request from the Chinese government to spy on the USA. Yet the security concerns continue to undermine Huawei's ability to gain traction, as does the current climate of nationalist populism (Hensmans and Van Bommel 2020).

4 Conclusions

Embroided in a trade and security war with the USA on the future of 5G, Huawei has taken a four-track approach. It has tried to defuse the situation by providing a grand "joint innovation" deal with the US government and its technology companies. In September 2019, Huawei's founder Ren Zhengfei offered to license his company's 5G technology to a US company to create a powerful new competitor that could develop its own large-scale market (Li 2019). No US company had stepped forward at the time of this writing. Simultaneously, in face of the US government's ban, Huawei accelerated steps to reduce its dependence on US suppliers, although the challenge of replacing Google as a supplier of mobile operating systems and an application ecosystem would be no mean feat. The most recent move of the US administration to block shipments of semiconductors to Huawei from global chipmakers using US technology further complicates matters, threatening to decouple the Chinese technology champion from Western and Japanese 5G developments. In a context of geopolitical protectionism, acerbated by a particularly populist brand of Sinophobia in the wake of the Covid19 world health crisis, Huawei is facing severe headwinds. Yet, for Huawei historical successes cannot stand in the way of a dynamic capability to prepare for the future (Hensmans and Johnson 2007). Typical of Huawei's forward-looking character is that its leaders have already turned their gaze to winning the next generation technology battle, having begun research on 6G a number of years ago (Tomás 2019). To sum up, to get his employees into "battle mode" in this "live and die moment," Ren Zhengfei announced a reform plan to beat the US crisis: "In 3–5 years time, Huawei will be flowing with new blood. After we survive the most critical moment in history, a new army would be born. To do what? Dominate the world" (Jiang 2019).

Note

1. The Visegrad Group of 4 consists of Hungary, Poland, Slovakia, and Czech Republic.

References

- Chen, Stephen. 2019. Could Huawei Be Using Trojan Circuits to Help Beijing Spy on US? *South China Morning Post*. July 11.
- Cherry, Judith. 2001. *Korean Multinationals in Europe*. Vol. 10. New York: Psychology Press.
- Daily News Hungary*. 2014. Beijing Considers Hungary Bridgehead to Europe, Says Chinese Foreign Minister. <https://dailynewshungary.com/beijing-considers-hungary-bridgehead-to-europe-says-chinese-formin/>. Accessed October 16, 2019.
- Federal Register. 2019. Addition of Certain Entities to the Entity List and Revision of Entries on the Entity List. <http://www.federalregister.gov/documents/2019/08/21/2019-17921/addition-of-certain-entities-to-the-entity-list-and-revision-of-entries-on-the-entity-list>. Accessed November 7, 2019.
- Fu, Jing. 2013. Huawei to Create 5,500 New Jobs in Europe. *China Daily* (September 20).
- Gavois, Sébastien. 2014. Huawei va Investir 1,9 Milliard de Dollars en France. *Next Inpact* (September 30).
- Grubb, Ben. 2015. Telcos Could Face Huawei Ban, Malcolm Turnbull Confirms. *The Sydney Morning Herald*, July 27.
- Hamada, Yukihiro. 2007. The Impact of the Traditional Business–Government Relationship on the Europeanization of Japanese Firms. In *EU Lobbying: Empirical and Theoretical Studies*, ed. David Coen, 72–89. Oxford: Routledge.
- Hensmans, M. 2003. The Territorialization of Common Sense. *Organization* 10 (3): 561–564
- . 2010. A Republican settlement theory of the firm: applied to retail banks in England and the Netherlands (1830–2007) (No. EPS-2010-193-ORG).
- . 2015. The Trojan Horse Mechanism and Reciprocal Sense-Giving to Urgent Strategic Change. *Journal of Organizational Change Management* 28 (6): 1038–1075.

- Hensmans, M., and Johnson, G. 2007. Can history be a dynamic capability? Traditions of imprinted dynamic capabilities of transformation. In annual meetings of the Academy of Management, Philadelphia.
- . 2017. Competing Through Joint Innovation. *MIT Sloan Management Review* 58 (2): 26–34.
- . 2019. A New Matrix for Building Platform Portfolios: How Companies Can Sustain Their Leadership. *Journal of Business Strategy*. Vol. ahead-of-print. <https://doi.org/10.1108/JBS-08-2019-0162>. Accessed March 8, 2020.
- Hensmans, M., Van Den Bosch, F. A., & Volberda, H. W. 2001. Clicks vs. bricks in the emerging online financial services industry. *Long Range Planning* 34 (2): 231–247.
- Hensmans, Manuel, and Guangyan Liu. 2018. How Do the Normativity of Headquarters and the Knowledge Autonomy of Subsidiaries Co-evolve? Capability-Upgrading Processes of Chinese Subsidiaries in Belgium. *Management International Review* 58 (1): 85–119.
- Hensmans, Manuel, and Koen van Bommel. 2020. Brexit, the NHS and the Double-Edged Sword of Populism: Contributor to Agonistic Democracy or Vehicle of Resentment? *Organization* 27 (3): 370–384. <https://doi.org/10.1177/1350508419855699>. Accessed March 8, 2020.
- Hensmans, Manuel, Gerry Johnson, and George Yip. 2012. *Strategic Transformation: Changing While Winning*. London: Palgrave Macmillan.
- Huawei Corporate. 2004. Huawei Technologies Has Been Selected by Dutch Operator Telfort B.V. for Its UMTS Roll-Out. <http://pr.huawei.com/en/news/hw-088437-news.htm#.VZpSQPkvsn0>. Accessed October 16, 2019.
- . 2006. *Annual Report 2006*. https://www.huawei.com/ucmf/groups/public/documents/annual_report/092586.pdf. Accessed November 6, 2019.
- . 2008. *Annual Report 2008*. https://www.huawei.com/ucmf/groups/public/documents/annual_report/hw_083590.pdf. Accessed November 6, 2019.
- . 2013. Build a Better Connected World. https://www.academia.edu/35282117/Huawei_Corporate_Presentation_Build_a_better_connected_world. Accessed November 6, 2019.
- . 2018. *Annual Report 2018*. https://www-file.huawei.com/-/media/corporate/pdf/annual-report/annual_report2018_cn.pdf?la=zh. Accessed November 6, 2019.
- . 2019. Corporate Introduction. <https://www.huawei.com/en/about-huawei/corporate-information>. Accessed November 11, 2019.
- Jiang, Sijia. 2019. Huawei Founder Details ‘Battle Mode’ Reform Plan to Beat U.S. Crisis. *Reuters*, August 20.

- Johnson, G., Yip, G. S., and Hensmans, M. 2012. Achieving successful strategic transformation. *MIT Sloan Management Review* 53 (3): 25–32.
- Kan, Michael. 2011. China's Huawei to Reverse Controversial Deal for 3Leaf. *PC World*. February 19.
- Lee, Yimou. 2016. China Huawei's 2015 Smartphone Shipments Jump 44 Percent, Cross 100 Million. *Reuters*, January 6.
- Li, Tao. 2019. Huawei's Founder Offers 5G Tech to US Company to Create 'Strong Competitor.' *South China Morning Post*, September 26.
- Mason, M. (1994). Elements of consensus: Europe's response to the Japanese automotive challenge. *JCMS: Journal of Common Market Studies* 32 (4): 433–453.
- Phan, Phillip H., Jing Zhou, and Eric Abrahamson. 2010. Creativity, Innovation, and Entrepreneurship in China. *Management and Organization Review* 6 (2): 175–194.
- Polish Development Fund. 2015. President Duda in China: Poland - China Trade and Investment Forum. https://www.paih.gov.pl/20151123/president_duda_in_china_pl_china_investment_forum/. Accessed October 16, 2019.
- Sakuma-Keck, K., and Hensmans, M. 2013. A motivation puzzle: Can investors change corporate behavior by conforming to ESG pressures. *Institutional Investors*, 367–393.
- Smyth, Jamie. 2019. Australia Banned Huawei over Risks to Key Infrastructure. *Financial Times*, March 27.
- Tao, Li. 2018. Japan Latest Country to Exclude Huawei, ZTE from 5G Roll-out over Security Concerns. *South China Morning Post*, December 10.
- Tao, Tia, and Chunbo Wu. 2014. *The Huawei Story*. New Delhi: SAGE Publications India.
- Tobin, Meaghan. 2019. New Zealand Bans Huawei from 5G, China Has Message for New Zealand. *This Week In Asia*, February 17.
- Tomás, Juan Pedro. 2019. Huawei Started Research on 6G 'a Long Time Ago,' CEO says. *RCR Wireless News*, November 8.
- US House of Representatives. 2012. Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE. [https://stacks.stanford.edu/file/druid:rm226yb7473/Huawei-ZTE%20Investigative%20Report%20\(FINAL\).pdf](https://stacks.stanford.edu/file/druid:rm226yb7473/Huawei-ZTE%20Investigative%20Report%20(FINAL).pdf). Accessed 8 November 2019.
- Weisman, Steven R. 2008. Sale of 3Com to Huawei Is Derailed by U.S. Security Concerns. *The New York Times*, February 21.



11

Huawei's Global Quest to Catch-up: An Atypical Approach in R&D Internationalization

Kerstin J. Schaefer

1 R&D Internationalization: The Huawei Way

Over the last decade, knowledge-intensive industries have witnessed a growing number of players from regions that had, in the past, been economically more peripheral. Huawei is a contemporary example of an Asian latecomer company that managed to become competitive on a global scale in the telecommunications industry. Huawei's ascent to global leadership in the telecommunications industry has for some time now attracted the attention of researchers from various disciplines. One characteristic part of Huawei's globalization strategy is its focus on internationalizing its research and development (R&D) activities. Once a technological leader in China, Huawei had little to learn in its home country and was strongly motivated to access technology abroad.

K. J. Schaefer (✉)

Institute of Economic and Cultural Geography, Leibniz University Hannover,
Hannover, Germany

e-mail: schaefer@wigeo.uni-hannover.de

Therefore, Huawei started very early on, setting up smaller R&D outposts abroad in locations such as Silicon Valley in the 1990s (Fan 2011). The strategy picked up speed when the company started to set up multiple laboratories at locations in North America and Europe between 2004 and 2010. This R&D internationalization has been successful insofar as Huawei now conducts its most impactful R&D abroad instead of in its home country (Schaefer and Liefner 2017). Therefore, the case provides particularly interesting insights into the international fragmentation of R&D activities, which Papanastassiou et al. (2019) identify as one of the three key concepts that researchers should study more closely in the future.

The atypical feature of Huawei's R&D internationalization is that the company uses mostly greenfield investments to set up new R&D laboratories abroad. This is remarkable, as other Chinese companies have been extensively focused on acquisitions, in particular when investing in established markets (Haasis and Liefner 2019; Amendolagine et al. 2018; Rui and Yip 2008). Compared to acquisitions, greenfield investments are a soft-touch approach in which the company's presence and embeddedness in the host market can grow more incrementally and attract fewer questions regarding legitimacy (Meyer et al. 2014). Therefore, one of the aims of this chapter is to provide insights on how using a greenfield strategy helped Huawei to cope with external host-country barriers.

Another important part of successful greenfield investment is managing as well as integrating offshore R&D successfully. For instance, Luo and Tung (2018) point out that more research is needed on the cultural difficulties of managing offshore experts. Tarique et al. (2006) claim that it is also important to look at the cultural background of employees hired abroad, as the staffing composition abroad reflects the company's overall strategy. As greenfield investment is still an under-researched mode of internationalization when it comes to latecomer companies (Luo and Tung 2018; Kumar et al. 2019), Huawei's case can help us gain insights into the topic. Therefore, this chapter will also take a closer look at the internal barriers, which the company encountered while trying to integrate the new locations into the company's transnational R&D network.

In terms of observation, this chapter focuses on the emerging phase of Huawei's development, as findings about this development stage are not just applicable to the context of emerging companies, but also to the early

stages of established companies (Hernandez and Guillén 2018). Because of the rapid development of the company, many findings about this emerging phase of the company might not apply to Huawei's operation today, but taking a closer look at the past will help our understanding of how the company was able to achieve the status it has today.

2 Theory

The internationalization of R&D activities from latecomers is a rather new phenomenon that has co-evolved with an increasing activity of companies from emerging markets in knowledge-intensive tasks. As those companies often lack access to knowledge and innovation capability at home, they are strongly motivated to engage in R&D activities in technologically advanced locations (Hsu et al. 2015; Chen et al. 2012; Buckley and Hashai 2014). In the key literature on the spatial organization of R&D internationalization, such as Gassmann and von Zedtwitz (1998) and von Zedtwitz and Gassmann (2002), the focus is on industrialized country multinational companies, while only eight percent of the analyzed R&D investments in advanced markets came from emerging markets (von Zedtwitz 2005). These articles point out that conducting core R&D away from the company's headquarters is non-trivial and risky due to the spatial distance that decreases quality and frequency of communication, increases transaction costs, and creates potentially diverging interests between offshore and domestic management (von Zedtwitz and Gassmann 2002). Latecomers, in comparison to mature multinationals, are often even more inexperienced in managing global activities, while at the same time are often forced to engage in R&D internationalization earlier in their development (Luo and Tung 2018). If they want to survive against global players (Hsu et al. 2015), these internal barriers might be even more problematic for them compared to mature multinationals.

Besides these internal barriers, companies operating abroad face a range of external barriers that have been found to impact the success of R&D internationalization (Sofka 2006; Miller and Eden 2006). The original concept in research is that of so-called *liabilities of foreignness*, which are costs that all kinds of non-domestic firms face for entering

foreign markets (Zaheer 1995), determined by cultural distance, institutions, language and spatial distance (Denk et al. 2012). Based on this original concept, the literature discusses *liabilities of outsidership* as the disadvantage of not being embedded in local networks that hold knowledge about the market and the business environment (Johanson and Vahlne 2009). Others have added the importance of embeddedness in *global* networks for latecomers entering established industries (Schaefer 2020). In the case of latecomers, and in particular for Huawei, yet another concept of liabilities plays an important role. The term *liabilities of origin* describes cases in which foreign companies suffer from stereotypes abroad that were built on the behavior of other firms from the same origin or their home governments (Asmussen 2009; Fiaschi et al. 2017). This is particularly the case for many latecomers from emerging economies entering Western locations and even more so for R&D activities, which are often viewed with suspicion, as Western firms fear losing their core competences to foreign competitors (Meyer et al. 2014).

In summary, while R&D internationalization plays a key role for late-comer companies, there is a range of possible drawbacks from internal and external barriers against it. In the case of Huawei, we know that R&D internationalization played an important role in its dynamic development. This chapter therefore investigates which internal and external barriers Huawei faced during its greenfield R&D expansion and what strategies the company used to tackle them.

3 Research Design and Method

This chapter portrays Huawei's successes and struggles in internationalizing its R&D activities from the perspective of its offshore employees; a viewpoint that provides an outsider as well as an insider perspective on the company and adds the interviewees' long-term experience from working in the telecommunications industry. This approach allows for a bottom-up perspective on the company's development and helps to avoid the "dark side" of firm-centric interviews, for example reporting back an unbalanced management-created narrative (Tokatli 2015). However, it should be noted that although this approach provides a good

Table 11.1 Interview IDs

ID	Region of employment	Current or former employee?	ID	Region of employment	Current or former employee?
EU01	Europe	Former	US07	USA	Former
EU02	Europe	Former	US08	USA	Former
EU03	Europe	Former	US09	USA	Former
EU04	Europe	Former	US10	USA	Former
EU05	Europe	Former	US11	USA	Former
EU06	Europe	Former	US12	USA	Former
EU07	Europe	Former	US13	USA	Current
EU08	Europe	Current	US14	USA	Current
EU09	Europe	Former	US15	USA	Current
EU10	Europe	Current	US16	USA	Current
EU11	Europe	Former	US17	USA	Current
EU12	Europe	Current	US18	USA	Former
EU13	Europe	Current	US19	USA	Current
EU14	Europe	Current	US20	USA	Former
US01	USA	Former	US21	USA	Former
US02	USA	Former	CA01	Canada	Current
US03	USA	Current	CA02	Canada	Former
US04	USA	Former	CA03	Canada	Current
US05	USA	Former	CA04	Canada	Current
US06	USA	Former	CA05	Canada	Current

understanding of Huawei's R&D internationalization, it mostly takes a culturally Western perspective. Moreover, it is also limited because it does not take into consideration the perspective of the Chinese management, and therefore does not provide the intentions of management decisions and strategies, but only the effects on the offshore activities.

The interview material stems from 40 interviews conducted between February and October 2017 with experts currently or formerly employed at Huawei's offshore locations in San Jose, San Diego, Dallas, Chicago, Ottawa, Bridgewater, Stockholm and Munich. The interviewees were identified by their contribution to patents or publications affiliated with Huawei, and their employment at Huawei was verified through network platforms such as LinkedIn or Research Gate (Ge et al. 2016). Table 11.1 lists the interview IDs, the broader region in which the interviewees were employed and the status of their employment at Huawei at the time of the interview. In order to ensure the anonymity of the interviewees,

Table 11.2 Interviewee characteristics

	Categories	Number of interviewees
Length of employment at Huawei	<4 years	16
	4–7 years	15
	>7 years	9
Period of employment (not disjoint)	<2009	15
	2009–2013	34
	>2013	22
Cultural background	Chinese	6
	Non-Chinese	34

additional information on the characteristics of the interviewees is provided separately in Table 11.2. The questions asked in the semi-structured interviews concerned the interviewees' personal education and career history, their reasons for joining Huawei, the work environment, their regular tasks, the internal communication as well as external barriers they might experience while working for Huawei.

The data was analyzed through qualitative content analysis using the coding software MaxQDA that allows rearrangement of information in cross tables and via interview variables in order to find new patterns and structures from the material. The first round of coding favored a deductive approach following the main interview questions in order to pre-sort the material into five broader categories: personal background, reasons for joining Huawei, offshore barriers and internal cooperation. From there, the material was coded inductively in order to maintain the offshore experts' perspective and to be able to follow common themes that emerged from their answers. The coding was then repeated from the beginning after a 3-month break in order to compare the coding schemes and assess the reliability of the codes. A merged version of codes was used to create cross tables of the material, which also allowed the consideration of interviewee variables such as location or current employment status at Huawei, in order to be able to pay attention to possible biases of the interviewees. The results are a display of the interviewees' perception of Huawei's early internationalization steps, which provides insights into Huawei's struggles and successes during its emerging phase abroad.

4 External Barriers for Internationalizing R&D

The interviewees explained that one of the main barriers for Huawei's R&D internationalization was that it had to face a negative reputation abroad from early on. As a Chinese company, Huawei particularly struggled with liabilities of origin. The interviewees reported that Chinese companies in the telecommunications industry had the reputation of being bad workplaces because of a high work intensity, low wages and limited worker participation. Moreover, many assumed that the quality of the Chinese products would be rather low, and that working for the company would therefore be less prestigious than for competitors. Some of the employees pointed out that they feared that working for Huawei would look bad on their résumé for this reason. An interviewee even reported having had to justify the decision to work for Huawei to future employers after leaving the company. Another factor that contributed to the negative reputation was rumors that Huawei has close ties to the Chinese government and even the military, which further damaged the company's image abroad. Another point made by the interviewees was that the company itself "broke some glass" at the beginning of its international activities because of a demeanor that was perceived as aggressive by industry stakeholders and cooperation partners.

Another barrier was the lack of trust in the telecommunications industry toward the Chinese company because of allegations of espionage and copying technology. One interviewee reported that his former employer saw his departure for Huawei as a security issue for the firm, whereas going to a more established telecommunications company such as Ericsson, Nokia or Samsung would have been no problem. This reflects the skeptical position of many established players toward Huawei. A few interviewees reported that after they started working at Huawei, engineers from other companies or even former colleagues tried to avoid conversations about topics such as new technologies with them. Another point was that some interviewees felt that their applications to participate in several telecommunications conferences were categorically declined because they worked for Huawei. This lack of trust from the industry also

affected the potential cooperation with external partners. In the beginning, it was difficult for Huawei to set up joint projects with their intended partners.

Besides liabilities of origin, there were also liabilities of outsidership for Huawei. Before the company started to internationalize into the core regions of the established telecommunications industry, it was unknown to many stakeholders of the global industry. Huawei's strategic R&D internationalization into key locations of the telecommunications industry contributed to conquering outsidership of the industry by providing access to parts of the industry that would not have been accessible for the company from China. Nevertheless, Huawei initially struggled to gain embeddedness abroad. Hiring employees abroad or finding cooperation partners in research were difficult tasks at the beginning because people in the telecommunications industry did not know the company. Furthermore, in industry standard setting, which is a particularly important part of the industry, Huawei was initially not taken seriously as a contributor. Through its outsider position, Huawei lacked insights into industry politics between established players that were required to navigate standard setting procedures in order to participate. Nevertheless, there was considerable pressure on Huawei to participate in standardization in order to limit license fees paid to follow the standard as well as to market its own technical solutions. Moreover, the company lacked contacts to suppliers and customers abroad, while its liabilities of origin made it more difficult to establish them itself. Therefore, the lack of embeddedness in local as well as global networks of the telecommunications industry made it difficult for Huawei to operate in an international environment.

5 Hiring Offshore Experts

A very successful tool to mitigate liabilities of origin and increase embeddedness abroad was hiring experts there. As Huawei's R&D internationalization strategy focused on greenfield investment, the company built its own offshore locations from scratch. Therefore, hiring the right employees abroad played a crucial role for the success of the offshore location. In the beginning, Huawei was very eager to hire highly skilled and

well-connected experts abroad, and actively recruited employees with the specific experience that the company desired. Some experts were hired from lists of desired candidates by external recruiters in order to be more discreet. One interviewee explained that Huawei's management had found his name on standardization documents and contacted him so he could support the company in becoming more influential in standardization. The interviewees reported that Huawei even hired people in specific technology areas or with specific contacts without actually knowing how to fit their skills into the existing research teams. Some of those experts were never involved in any actual projects, but Huawei paid some of those misplaced experts high salaries, which shows that the company's financial resources were not scarce during this time.

The employees whom Huawei sought for their offshore R&D activities were senior researchers and engineers with a lot of experience and connections in the telecommunications industry—either from competitors or from academia. They provided the international industry experience that Huawei was lacking at its domestic locations, where the company was mostly able to hire excellent but still inexperienced college graduates. The graduates in China were often the best of their cohorts and for many, a job at Huawei was a very promising start for their career. Abroad, meanwhile, Huawei would not hire employees without extensive industry or research experience. For Huawei's management, having long-term employment at one of the major players of the telecommunications industry seemed to be the most important quality attribute for potential offshore employees. Therefore, many offshore experts had been working for one of Huawei's large competitors for more than five years, and some interviewees perceived the average age of their colleagues as being higher than at their former employers. In particular, the interviewees who lived and worked in Silicon Valley before Huawei had recruited them stated that Huawei's targeting was different from other companies around. Many firms in Silicon Valley would see shorter employment periods at very young companies such as start-ups as being more valuable experience than staying for a long time with an established company. Another point that the interviewees raised was that Huawei's management did not offer professional development opportunities to its offshore hires, but only to the domestic employees in China. Some interviewees reported

that they could participate if they wanted to, but most workshops would be in Chinese, and the company was not encouraging them to attend. This was different from their experiences at Huawei's more established competitors, which invested in the training of all of their employees.

The offshore employees helped Huawei overcome some of the external barriers that it was facing. They helped to overcome liabilities of outsidership through their contacts in the industry as well as their profound knowledge of industry politics. The interviewees also explained that some offshore experts urged Huawei's management to make the company contribute more actively to the research community through increasing participation in conferences and publication of research results. Being more open and involved in the industry community helped Huawei to overcome some of the distrust from the telecommunications industry that it had faced in the beginning. Moreover, it was often easier for the offshore experts to negotiate and cooperate with local stakeholders because of their cultural proximity to them. Therefore, they also contributed to lowering Huawei's liabilities of origin. Nevertheless, hiring through green-field investments also brought the challenge of integrating the new offshore hires into the company, which required overcoming internal barriers.

6 Internal Barriers for Managing the Offshore Experts

One internal barrier for Huawei's offshore activities was a perceived lack of management skills for operating in the foreign environment, as Huawei's management style caused frictions in some cases with its offshore employees. Some of the management problems originated from cultural differences between the Chinese company and its foreign environment, while others were caused by lack of experience in managing international activities.

For instance, management initially used precisely the same strategies for its offshore activities that had worked in China, causing a relatively high fluctuation of employees at some of its locations abroad. The point

raised by the interviewees was dissatisfaction with the high intensity of competition within the company and the amount of double development they observed. This resulted from Huawei's strategy of having two or three R&D teams at different locations work on the same technology in a race for the best results. An interviewee reported that the winning team would be awarded more resources to further develop the technology, while the losing teams faced budget cuts and had to shift their focus to a different research area. This kind of competition inhibited the sharing of information between the competing locations. Many interviewees explained that this was part of why they did not perceive the working environment to be very collaborative. A few of them even felt they had to protect their ideas from being stolen by colleagues or saw a danger of being sabotaged by others. Moreover, the interviewees reported that the company's work environment was even more competitive for their younger colleagues in China, who were under a lot of pressure to deliver high performance.

Besides facing competition, many of the interviewees mentioned the tight surveillance within the company. Some interviewees claimed that they were tightly monitored at work and were not allowed to work from home, which was different from the experiences they had had with their previous employers. The offshore employees had to meticulously report on their work, while colleagues from China had to confirm their reports. Therefore, some of the interviewees felt that there was a lack of trust from the company's management.

Further barriers from the perspective of the offshore experts were the abrupt change of tasks, slow and non-transparent decision-making processes as well as the strict hierarchy in the company, which caused some frustration among them. An additional hurdle was communication problems with China because of the language barrier between the offshore experts, most of whom spoke English besides the national language but in many cases no Chinese, and the decision-making management personnel in China, who in many cases did not speak English very well. This, in combination with the spatial distance, often made the communication difficult and fostered misunderstandings.

7 The Role of Expatriates

One means of integrating the offshore locations more smoothly into the company was sending employees from China to the locations abroad. Chinese expatriates played an important role in setting up the offshore locations and facilitating communication with Huawei's locations in China. The expatriates came directly from China to stay at the offshore location for a limited time, some for a management position, and others for an even shorter term to work on technical products. The former were often assigned to lead the offshore location together with a local employee and to represent Huawei's Chinese management abroad, particularly in the early phase of setting up a new location. The latter were engineers who were sent abroad to work with the offshore experts on technical products and gain international experience and contacts, which they then took home to China after their assignment abroad. This strategy helped to build ties between the employees at the offshore and at the domestic R&D locations, which made working together across the distance easier.

Even if the approach helped the integration of the offshore location in many cases, there were also challenges involved. The interviewees reported that they often faced language barriers when working with this group of Chinese-speaking employees. The interviewees explained that in some cases, a whole group of expatriates would come to the offshore location and often keep to themselves, therefore being less exposed to the foreign culture and language as well as the offshore experts themselves. In the context of the locations' development, the interviewees observed that in the early phase, the proportion of Chinese expatriates was higher and decreased as the locations became more established. Some interviewees also stated that Huawei's management changed its strategy regarding the expatriates and over time started to send fewer of them abroad.

8 The Role of Chinese-Speaking Offshore Experts

Another means of assuring smooth cooperation with its offshore offices was to favor Chinese-speaking offshore experts. This important group consisted of experts with a Chinese origin who had already lived abroad for a longer time and had received a university education in one of the global hotspots of the telecommunications industry. Hiring these employees was more common for the locations in North America, because the number of Chinese immigrants was higher than at the European locations. Huawei was heavily targeting this group not only for their professional skills, but also for their language skills in Chinese and English as well as for their cultural understanding of Huawei's home and host environment. They were needed as intermediaries between the offshore and domestic locations. A Chinese-speaking interviewee pointed out that his knowledge of the Chinese culture helped him to better navigate working with the R&D departments in China. The Chinese-speaking offshore-educated experts had additional tasks such as translating between Chinese and English in transnational meetings and attending late-night conference calls with China, which was not an obligation for the non-Chinese-speaking employees. Another observation that some interviewees made was that they felt that Huawei was more demanding of their Chinese-speaking colleagues, comparable to the employees in China, than of the offshore hires. It was also implicit in the interviews that Huawei's headquarters in Shenzhen had given this group of experts more responsibility because they had more trust in them. One interviewee described the Chinese-speaking offshore experts as "the guys that really understand what is going on" and stated that these colleagues have a significantly larger network within the company than other employees. The interviewees claimed that colleagues with knowledge of Chinese culture and language had much higher chances for promotions within the company, in particular in management, which was also the case in other foreign-based companies for which they had worked before.

9 Leveraging R&D Internationalization: A Summary

In summarizing the perspective of the offshore employees, it becomes clear that Huawei's offshore R&D activities initially struggled with liabilities abroad, such as cultural barriers, a negative reputation and its status as an outsider. Nevertheless, the company's greenfield strategy was very effective for quickly learning to navigate the global telecommunications industry dominated by culturally Western actors. The company's hiring strategy played an important role in overcoming these external barriers. Through hiring foreign experts, the cultural barriers between Huawei's offshore locations and the local environment were reduced more quickly. They helped to establish local contacts and worked closely with the Chinese employees, for example in external projects or standardization. Regarding reputation, hiring offshore experts who were trusted in the industry helped to improve Huawei's credibility. While Huawei's offshore hires helped the company to overcome distrust and cultural barriers abroad, some of the hired experts reported that they experienced exclusion from professional networks when they started working for the Chinese multinational.

A considerable internal barrier that Huawei faced for its R&D internationalization was the management of its offshore employees. One means of integrating the offshore experts into the company particularly at the beginning was to send Chinese expatriates to the host locations. One part of this group set up the new location and represented the Chinese management abroad, while the other part was supposed to gain experience in a foreign environment and establish contacts with the offshore experts in joint research projects to ensure productive collaboration once they went back to China. Another means of integration was hiring offshore experts with an understanding of the Chinese as well as the host country's culture and language, which helped to reduce friction within the company. These Chinese-speaking offshore experts were able to work as intermediaries between their offshore colleagues and management in China. They were trusted with more tasks than their offshore colleagues and played an important part in integrating activities at the home and host locations.

Overall, using a greenfield approach enabled Huawei to strategically build offshore teams of experts with a variety of skills and contacts in the industry not accessible to the company in China, including Chinese-speaking offshore-educated experts who were able to mediate between the home and host locations. Tailoring the composition of employees at its offshore locations like this would not have been possible through acquiring previously existing firms abroad. Therefore, Huawei's atypical approach of using greenfield investments instead of acquisitions contributed, among other factors, to Huawei's current position as one of the technological and market leaders in the telecommunications industry. Nevertheless, these efforts did not convince some of the political actors, in particular in the USA or Australia, where Huawei was not able to sell its infrastructure products because of government-declared security concerns. Other Western markets, in particular in Europe, are putting Huawei's 5G equipment under close scrutiny before deciding on whether to allow Huawei's components in the next generation of their national telecommunications infrastructure. It remains to be seen whether Huawei can maintain the status it has achieved in the telecommunications industry today despite the political headwind it faces.

References

- Amendolagine, Vito, Elisa Giuliani, Arianna Martinelli, and Roberta Rabellotti. 2018. Chinese and Indian MNEs' Shopping Spree in Advanced Countries. How Good Is It for Their Innovative Output? *Journal of Economic Geography* 18 (5): 1149–1176. <https://doi.org/10.1093/jeg/lby049>.
- Asmussen, Christian Geisler. 2009. Local, Regional, or Global? Quantifying MNE Geographic Scope. *Journal of International Business Studies* 40 (7): 1192–1205. <https://doi.org/10.1057/jibs.2008.85>.
- Buckley, Peter J., and Niron Hashai. 2014. The Role of Technological Catch up and Domestic Market Growth in the Genesis of Emerging Country Based Multinationals. *Research Policy* 43 (2): 423–437. <https://doi.org/10.1016/j.respol.2013.11.004>.
- Chen, Victor Z., Jing Li, and Daniel M. Shapiro. 2012. International Reverse Spillover Effects on Parent Firms: Evidences from Emerging-Market MNEs

- in Developed Markets. *European Management Journal* 30 (3): 204–218. <https://doi.org/10.1016/j.emj.2012.03.005>.
- Denk, Nikola, Lutz Kaufmann, and Jan-Frederik Roesch. 2012. Liabilities of Foreignness Revisited: A Review of Contemporary Studies and Recommendations for Future Research. *Journal of International Management* 18 (4): 322–334. <https://doi.org/10.1016/j.intman.2012.07.001>.
- Fan, Peilei. 2011. Innovation, Globalization, and Catch-up of Latecomers: Cases of Chinese Telecom Firms. *Environment and Planning A* 43 (4): 830–849. <https://doi.org/10.1068/a43152>.
- Fiaschi, Davide, Elisa Giuliani, and Federica Nieri. 2017. Overcoming the Liability of Origin by Doing No-Harm: Emerging Country Firms' Social Irresponsibility as They Go Global. *Journal of World Business* 52 (4): 546–563. <https://doi.org/10.1016/j.jwb.2016.09.001>.
- Gassmann, Oliver, and Maximilian von Zedtwitz. 1998. Organization of Industrial R&D on a Global Scale. *R&D Management* 28 (3): 147–161. <https://doi.org/10.1111/1467-9310.00092>.
- Ge, Chunmian, Ke-Wei Huang, and Ivan P.L. Png. 2016. Engineer/Scientist Careers: Patents, Online Profiles, and Misclassification Bias. *Strategic Management Journal* 37 (1): 232–253. <https://doi.org/10.1002/smj.2460>.
- Haasis, Timon Immanuel, and Ingo Liefner. 2019. Reviewing the Research on the Internationalization of Chinese Firms. *International Journal of Emerging Markets* 14 (1): 24–50. <https://doi.org/10.1108/IJoEM-03-2017-0094>.
- Hernandez, Exequiel, and Mauro F. Guillén. 2018. What's Theoretically Novel About Emerging-Market Multinationals? *Journal of International Business Studies* 49 (1): 24–33. <https://doi.org/10.1057/s41267-017-0131-7>.
- Hsu, Chia-Wen, Yung-Chih Lien, and Homin Chen. 2015. R&D Internationalization and Innovation Performance. *International Business Review* 24 (2): 187–195. <https://doi.org/10.1016/j.ibusrev.2014.07.007>.
- Johanson, Jan, and Jan-Erik Vahlne. 2009. The Uppsala Internationalization Process Model Revisited: From Liability of Foreignness to Liability of Outsidership. *Journal of International Business Studies* 40 (9): 1411–1431. <https://doi.org/10.1057/jibs.2009.24>.
- Kumar, Vikas, Deeksha Singh, Anish Purkayastha, Manish Popli, and Ajai Gaur. 2019. Springboard Internationalization by Emerging Market Firms: Speed of First Cross-Border Acquisition. *Journal of International Business Studies* 43 (5): 909. <https://doi.org/10.1057/s41267-019-00266-0>.
- Luo, Yadong, and Rosalie L. Tung. 2018. A General Theory of Springboard MNEs. *Journal of International Business Studies* 49 (2): 129–152. <https://doi.org/10.1057/s41267-017-0114-8>.

- Meyer, Klaus E., Yuan Ding, Jing Li, and Hua Zhang. 2014. Overcoming Distrust: How State-Owned Enterprises Adapt Their Foreign Entries to Institutional Pressures Abroad. *Journal of International Business Studies* 45 (8): 1005–1028. <https://doi.org/10.1057/jibs.2014.15>.
- Miller, Stewart, and Lorraine Eden. 2006. Local Density and Foreign Subsidiary Performance. *Academy of Management Journal* 49 (2): 341–355. <https://doi.org/10.5465/AMJ.2006.20786081>.
- Papanastassiou, Marina, Robert Pearce, and Antonello Zanfei. 2019. Changing Perspectives on the Internationalization of R&D and Innovation by Multinational Enterprises: A Review of the Literature. *Journal of International Business Studies* 23 (1): 76. <https://doi.org/10.1057/s41267-019-00258-0>.
- Rui, Huaichuan, and George S. Yip. 2008. Foreign Acquisitions by Chinese Firms: A Strategic Intent Perspective. *Journal of World Business* 43 (2): 213–226. <https://doi.org/10.1016/j.jwb.2007.11.006>.
- Schaefer, Kerstin J. 2020. Catching Up by Hiring: The Case of Huawei. *Journal of International Business Studies*. <https://doi.org/10.1057/s41267-019-00299-5>.
- Schaefer, Kerstin J., and Ingo Liefner. 2017. Offshore Versus Domestic: Can EM MNCs Reach Higher R&D Quality Abroad? *Scientometrics* 113 (3): 1349–1370. <https://doi.org/10.1007/s11192-017-2533-5>.
- Sofka, Wolfgang. 2006. Innovation Activities Abroad and the Effect of Liability of Foreignness: Where It Hurts. *ZEW Discussion Paper* 6 (29). Accessed November 11, 2015. <ftp://ftp.zew.de/pub/zew-docs/dp/dp06029.pdf>.
- Tarique, Ibraiz, Randall Schuler, and Yaping Gong. 2006. A Model of Multinational Enterprise Subsidiary Staffing Composition. *The International Journal of Human Resource Management* 17 (2): 207–224. <https://doi.org/10.1080/09585190500404424>.
- Tokatli, Nebahat. 2015. Single-Firm Case Studies in Economic Geography: Some Methodological Reflections on the Case of Zara. *Journal of Economic Geography* 15 (3): 631–647. <https://doi.org/10.1093/jeg/lbu013>.
- Zaheer, Srilata. 1995. Overcoming the Liability of Foreignness. *Academy of Management Journal* 38 (2): 341–363. <https://doi.org/10.2307/256683>.
- von Zedtwitz, Maximilian. 2005. International R&D Strategies in Companies from Developing Countries: The Case of China. In *Globalization of R&D and Developing, Part II: Case Studies*, 117–141. Geneva: United Nations Publication.
- von Zedtwitz, Maximilian, and Oliver Gassmann. 2002. Market Versus Technology Drive in R&D Internationalization: Four Different Patterns of Managing Research and Development. *Research Policy* 31: 569–588.



12

Independent or Interdependent Innovation: The Case of Huawei

Xingkun Liang and Yue Xu

1 Introduction

Despite pressure from innovation competitions, Chinese firms have gained benefits from national policies which expose them with tremendous opportunities to access, absorb, and develop their own innovation capabilities. For example, the “opening-door” policy since 1978 attracted a large number of foreign invested enterprises that have been oriented by the Chinese government to transfer technologies to Chinese domestic firms (Buckley et al. 2007b). It also intensified competitions faced by these Chinese firms, as they are usually latecomers. Since 2001, the “go-global” national policy has encouraged both state-owned and privately owned firms to invest abroad for seeking various strategic assets that are

X. Liang (✉)
Peking University, Beijing, China
e-mail: lxk@pku.edu.cn

Y. Xu
Cardiff Business School, Cardiff, UK
e-mail: xuy63@cardiff.ac.uk

not available in domestic markets (Anderson et al. 2015; Cui et al. 2017). Consequently, Chinese firms become more integrated and interconnected with established multinational enterprises (MNEs) in the global arena for advancing innovation capabilities (Buckley et al. 2019).

Prior studies on innovation management paid attention to the concept of interdependence (Adner and Kapoor 2010; Fredrich et al. 2019; Frenz 2005; Fuentelsaz et al. 2016). Since coordination becomes increasingly important in innovation, these studies viewed interdependence as an important mechanism in achieving innovation through coordination and examined its impacts on innovations at various levels, such as individual, group, organization, and innovation systems. However, it is still not clear that how latecomer firms, such as those from emerging markets (EMs), with limited innovation capabilities could strategically manage interdependence in order to catch up in such an environment. This motivated us to question: *How can latecomer firms manage interdependence in order to catch up with innovations?*

The question is raised with important implications for firms from EMs. Taking China as an example, in order to react to the intensified international competition and support the endogenous growth of the national economy, the Chinese government has been long promoting the “independent innovation” policy. With this policy, Chinese MNEs are encouraged to become “independent”, in the sense that they can develop enabling technologies and original innovations by themselves and rely less on foreign firms (Huang et al. 2017; Huang et al. 2013). Meanwhile, in order to make Chinese firms more global, Chinese firms were also encouraged to be integrated into global value chains (Buckley et al. 2019; Buckley and Hashai 2014), thus, inevitably becoming more interdependent with foreign players. It brings a dilemma for Chinese firms as these latecomer firms need to become independent as well as interdependent with foreign players.

Accordingly, we conducted an exploratory and inductive study to answer this question. By doing so, it can enrich our understanding of interdependence in innovation theory. Meanwhile, it also provides a new perspective to understand the catch-up of EM-MNEs. Practically, it contributes to clarifying the concept of interdependence (relative to the

concept of independence) in innovation activities for managers and guiding latecomer MNEs to manage interdependence for innovation.

2 Theoretical Background

Co-evolving with global integration of their home economies, EM-MNEs become increasingly connected with global partners in advancing innovation capabilities. For example, since the Chinese government promulgated the “go-global” strategy in 2001, not only state-owned enterprises (SOEs) are mandated to act as the key outward investors (Buckley et al. 2007a; Duanmu 2014; Morck et al. 2008) but also the privately owned enterprises are encouraged and supported to compete with leading MNEs in the global arena (Liang et al. 2012; Lu et al. 2011; Wei et al. 2014). Outward foreign direct investment (FDI) provides Chinese MNEs with an international platform for sourcing strategic assets (Anderson et al. 2015; Cui et al. 2017). Chinese MNEs also directly internationalize their research and development (R&D) function in the global market as did by other EM-MNEs (Awate et al. 2015). Critics suggest that these foreign R&D subsidiaries are featured with stronger motives of learning rather than innovating (Di Minin et al. 2012). Nevertheless, some positive effect is evidenced suggesting subsidiaries of EM-MNEs in host developed markets enable reserve knowledge transfer to home markets (Chen et al. 2012; Driffield et al. 2016) and China is not exceptional (Cozza et al. 2015; Zhao et al. 2010).

Existing literature suggests that network, connectivity, and collaboration are necessary conditions for innovation in global innovation competition (Adner and Kapoor 2010; Kapoor and Adner 2012). For example, Hobday et al. (2000) argue that the complexities and dynamics of innovations require new forms of industrial coordination. In recent years, digitalization has accelerated the emergence of open innovation, not only changing the boundary of firm but also altering how firms compete (see abundant literature on open innovation published in recent years) (e.g., Dahlander and Gann 2010; Fu 2012; Mortara and Minshall 2011). Internally, while boundary spanning (Ancona and Caldwell 1992; Carlile 2002; Marrone 2010) can be potentially fruitful, it also requires

overcoming various resistances for innovation. The resistances may arise from different organizational dimensions, such as cultural issues (Buckler and Zien 1996; Hogan and Coote 2014; Knight and Cavusgil 2004) and/or structural issues (Cho 1996; Cobo-Benita et al. 2016). Whether latecomers are equipped with dynamic capabilities (Dosi et al. 2000; Teece 2009; Winter 2006) and how they cope with external and internal pressures remain under-explored.

While innovation capabilities are increasingly built on firms' interdependence (Bruche 2009; Turkina 2018), independence in innovation is also addressed by EMs such as China. Independent innovation, though not defined conclusively, has been promoted by the Chinese government as a national strategy (e.g., Huang et al. 2013; Wu et al. 2012; Yuan and Lv 2011). Considering our current status of understanding, we refer to independent innovation as a notion. The notion of independent innovation may find its theoretical root in the argument of path dependence by evolutionary economists in the 1980s (e.g., Arthur 1989; David 1985). Accordingly, the active pursuit of independent innovation by Chinese MNEs demonstrates both determination and practices in breaking constraints from the old path of development in order to succeed MNEs from advanced economies. We find support for this argument from Hu and Mathews (2008: 1466). They raise a similar concern by questioning: "Is it [China] likely to stay stuck in catch-up mode as a perpetual imitator, or can it build its absorptive capacity to the point that it can sustain genuine innovation? To what extent is it building sustainable innovation capacity?"

Two typical patterns of catch-up experienced by EMs are recorded in literature which may explain why latecomers address both interdependence and independence in innovation processes. A linear model or "flying geese model" (Hobday 1995b) derived from the experience of the Asian Tigers. This model captures the fact that latecomers may catch up with advanced economies through gradually participating in global production networks. Following this model, innovation capability plays an essential role only until the later stages of catch-up (Hobday 1995a:1180). In contrast, a direct model or "leapfrogging model" (Perez and Soete 1988) has been evidenced by the fast development of certain industries of some EMs (Hobday 1994; Lee and Lim 2001). Typically, EM firms may

capture opportunities from radical new innovations, which give rise to the destruction of industries. The leapfrogging model suggests that latecomers can catch up with advanced countries by direct innovation at the technological frontier (Perez 1985). Whether these models can be referred to China is still doubted. Additional empirical evidence suggests that catch-up patterns are contingent on the nature of the production technology (Kim 1997; Kim and Lee 1987) as well as specific conditions of the industry (Lee and Lim 2001) or products (Hobday et al. 2004), thus cannot be replicated directly. Due to uncertainties and dynamics, as manifested by EMs, latecomers may need to shape their new and own path for upgrading innovation capabilities. We, therefore, propose a latecomer's perspective to explore interdependence in innovation processes.

3 Methodology

We adopt the case study method for two main reasons. First, the nature of this research is to explore a less discovered topic in theory. The explorative nature indicates this research needs to build up a new theory from the grounds. Additionally, a case study will benefit the researchers to collect qualitative data to understand processes, which help to cover the rich context of the subjects studied (Eisenhardt 1989). We followed Eisenhardt's (1989) approach to developing theories with case studies. Followed Siggelkow's (2007) approach we picked up Huawei for our case study. This is because Huawei has been regarded as the most successful and innovative Chinese firm in catch-up and Huawei effectively solved the dilemma mentioned earlier. Particularly, our case analysis focused on its catch-up process, from 2G to 4G technologies, which could reveal how interdependence matters in developing a latecomer firm's own innovation capabilities.

3.1 Data Collection and Data Collection Protocol

Before collecting data, a data collection protocol was developed according to the research questions and relevant literature. This protocol can

guide the data collection and ensure the reliability and consistency of the case study (Yin 2009). We developed this protocol with four sections: (1) drivers, processes and key events of R&D internationalization; (2) intra-firm R&D system: innovation strategy, processes and global structure, outcomes, and achievements; (3) inter-firm R&D system: management and operational mechanism of innovation collaboration; and (4) changes of the company's intra-firm and inter-firm R&D systems. For section (2) and (3), we also traced sample projects during the interview.

The primary data is collected with (1) three-month on-site fieldwork in Huawei's headquarter in Shenzhen, China, and (2) interviews with managers in its overseas subsidiaries in Europe and Latin America. We collected data through both fieldwork and interviews because this research traces the historical and contemporary issues in Huawei's independent innovations. It is more reliable to have fieldwork in headquarters to ensure rich data collected. In total, we interviewed 13 employees and 3 managers in R&D, marketing, and supply chain departments in headquarters and 8 managers from the European and Latin American subsidiaries. All interviews are semi-structured and guided by the data collection protocol. Meanwhile, we also find out complementary secondary data for triangulation purposes. These secondary data include company websites, annual reports, and internal archives, industry reports, and news. In particular, as there are no interviews with managers in other firms that are collaborating with Huawei, we, alternatively, traced patent datasets and analyzed some collaborative patents to identify the Interdependence of innovation and to understand how Huawei engage these foreign players.

3.2 Data Analysis

The data collected are embedded with the company's internationalization and innovation processes. We followed Langley's (1999) strategy to analyze process data (including events, activities, and strategic choices), in order to understand how the firm develops independent innovations. Meanwhile, we also followed the coding approach suggested by Miles and Huberman (1994) to processing the data as well as using analytic

techniques, such as pattern matching and cross-case synthesis, as suggested by (Yin 2009) to dig out patterns in the data.

We realize that we should not take the whole innovation history of the company as the unit of analysis. This is simply because not every innovation necessarily involves interdependence across firms. Therefore, it is more desirable to focus on those innovation activities claimed or perceived to be interdependent by the company. As a consequence, four specific cases of those innovation activities emerged under Huawei's settings. We then deployed comparisons, triangulation, and consolidation on each case to enrich our understanding of those innovation activities and see how interdependence is managed respectively. We also linked these four cases to the company's catch-up process, which enabled us to further understand how those innovation activities matter in developing innovation capabilities endogenously.

4 Findings: Four Strategies to Manage Interdependence in Innovation

4.1 Transforming Internal Interdependence to Leverage External Interdependence

While there are numerous examples suggesting that Huawei actively benefits and learns from interdependence with foreign firms, few have revealed Huawei's internal transformations to make its innovation activities interdependent with other value chain activities. Such transformation enabled Huawei to better leverage external interdependence for innovation.

Firstly, Huawei developed integrated R&D process to engage marketing, supply chain, and other functional departments into its R&D, which means the internal interdependence of innovation. To achieve this process, Huawei transformed its supply chain by introducing the supplier certification procedures. This procedure helps Huawei seamlessly integrate principal suppliers to its innovation process and enables Huawei to quickly respond to its customers. As stated in official documents and by

senior managers, Huawei has been consistently promoting its customer-centered innovation strategy in recent years. Under this strategy, Huawei's responses to customers' needs should be beyond satisfying their technology needs. This is because many leading operators, such as British Telecom and Vodafone, have their own standardized R&D process and service models. With an integrated R&D process, Huawei can fit its R&D process with those standardized ones of operators. These integrated processes enabled Huawei to quickly identify customer needs from partnerships with them and efficiently turn these needs into specific directions of innovation for solving customers' business problems. The following Fig. 12.1 shows Huawei's partnerships with the top 50 operators worldwide in recent ten years.

The integrated R&D process also enables Huawei to tailor its innovation initiatives to their customers' needs. For example, Huawei launched capability center programs and global training centers to scale up the understanding of customers. These capability center programs enable Huawei to search for innovation needs and opportunities together with partners. A capability center usually focuses on building up one capability for customers with Huawei's solution and technologies. For example, Huawei recently established a Big Data Capability Center in Dublin,

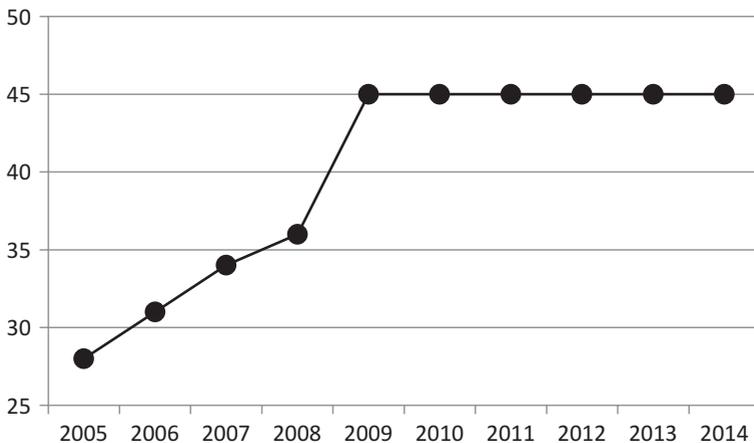


Fig. 12.1 Numbers of Huawei's partnerships with the top 50 operators worldwide. (Source: Compiled by the author based on Huawei Annual Report (2006–2014))

Ireland aimed to help customers to create value from the big data capability. In another example, Huawei upgraded its Network Operation Center to Service Operation Center in Indonesia, which supports operators to transform from pure network providers to network service providers that offer value-added services and user-led content-based services, such as network-based TV service.

Internal interdependence of innovation also enables Huawei to dynamically develop its idiosyncratic strategy in partnering with foreign firms. Unlike equity-based alliances such as joint ventures, Huawei shapes its own flexible and dynamic partnering strategy. To Huawei, a partnership does not provide strategic resources in a general term. Instead, it provides Huawei with appropriate technological resources for innovation independently. These technological resources can be patents, market information, or even methods of innovating. For instance, Huawei kept subtle relationships with competitors, such as Motorola. They shared 3G patents and co-developed some core technologies.

Besides managing interdependence relationships with foreign firms, Huawei also shapes its own way to manage other stakeholders to develop independent innovations. Among them, two types of foreign institutions are important in particular: industrial associations and international standardization organizations. For instance, the number of Huawei's membership in international standards related organizations has climbed significantly in recent years. As showed in Fig. 12.2, from 2006 to 2014, Huawei reached over 250% increase in annual membership, rising from 70 to 177. Through leveraging these memberships, Huawei learned the rules of applying, communicating, and leading industrial standards, which are an important part of its efforts in achieving and protecting independent innovations.

4.2 Learning and Adapting

We find there are dynamic features of Huawei's strategies to manage interdependence in innovation and catch-up. As many other references may point out (Ritala and Hurmelinna-Laukkanen 2013), absorptive capabilities are the key in managing interdependent innovation. We also

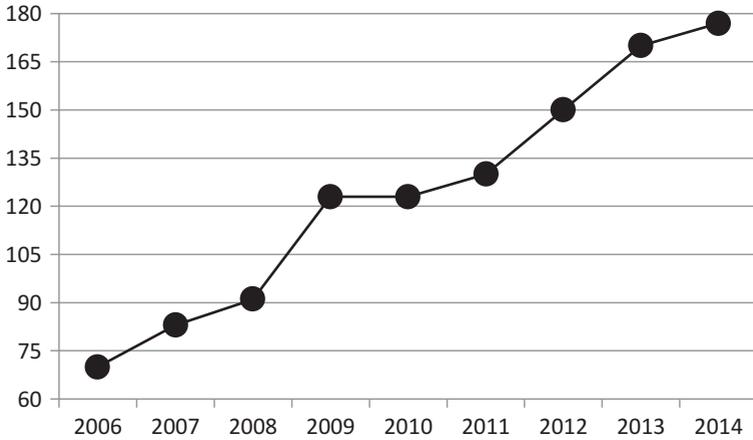


Fig. 12.2 Huawei's memberships in standards related organizations in recent years. (Source: Compiled by the author based on Huawei Annual Report (2006–2014))

find the importance of absorptive capabilities in Huawei. Meanwhile, we found strategic adaption to environmental changes is crucial in managing interdependence in Huawei's innovation.

The market of the global telecommunication industry is rather diverse, fast moving with tense competitions. For example, Huawei faced the problem, as many industrial experts anticipated, inequity in industry development across different regions. Inequities bring about heterogeneous market needs. For instance, when 2G communication technologies are largely applied in African markets, the European markets are requesting for the 4G technologies. In this sense, as an emerging global player established for less than 30 years, an immediate challenge for Huawei is how to innovate in order to respond to heterogeneous market needs and integrate global market needs at the same time. Our analysis showed that Huawei managed both ends through learning. For example, on one hand, Huawei learned from the market. Huawei's innovation is customer centric focusing on value added to customers. With such a strategy, Huawei keeps delivering customized products and solutions with its self-developed technology and modular design of its products. It innovatively integrated several generations of telecommunication

technologies into a single base transceiver station to enable global efficiency. On the other hand, Huawei learned technologies very fast to deal with heterogeneous market needs. For instance, Huawei developed the Distributed Base Station (DBS) by learning from traditional base transceiver station technologies. DBS products, although have a standard bill of material, is extremely configurable with thousands of configurations that can fit different physical environment and networking requirements. Each time the marketing staff bid with this product, staff in the R&D department needs to reconfigure the modules that can best fit with customers' needs. In this process, they need to conduct further engineering and testing to get customers satisfied. Later, this product has been one of the award-winning and leading products of Huawei.

Considering the above findings, we argue that managing independence in innovations needs to be adaptable to markets, in terms of global, local, as well as customization needs. Besides market-related factors, the industry itself evolves also, especially when core technologies and industrial policies change. This is particularly true for the telecommunication industry, as exemplified by the quick evolution of different generations of telecommunication technology. It also requires firms to learn quickly in order to keep pace with the fast changes in the industry.

Meanwhile, there are also adaptations internally in Huawei. There are several rounds of major changes in Huawei's organizational structure and process, such as integrated supply chain and integrated financial services as well as transformations of global organization structures. Here, we focused on explaining its adaptations in R&D structure, R&D process, and human resource related issues for innovation.

Firstly, Huawei adjusted organizational structures in pace with the accumulation of innovation capabilities. Most obviously, Huawei has launched many new R&D centers year after year. These new centers were set with different roles and objectives for achieving Huawei's global R&D strategy. Specifically, Huawei established over ten overseas research centers and distributed domestic development centers in recent ten years. Meanwhile, Huawei set up inTouch Lab to engage customers in and facilitate operational testing for new products and solutions. Capability centers have also been established to help customers to develop capabilities with Huawei's products or solutions.

Secondly, the introduction of integrated product development (IPD) revolutionized the whole R&D process of Huawei. The IPD integrated various processes for innovation and changed traditional workflow and department-based divisions of labor. IPD is achieved through collaboration of cross-functional teams, consisting of R&D, marketing, production, and supply chain staff. Each member has the right to modify the whole NPD project in the planning stage. An IPD unit is an independent firm that functions within the boundary of Huawei. This unit will be responsible for its own profitability, as the bonus is determined by the market performance of the new products developed.

Thirdly, to support adjustments in organizational structure and processes, Huawei also deployed new human resource practices. Corresponding human resource policies have been adjusted to both retain innovation focus and reduce confusion brought from a matrix structure. For example, Huawei launched a new certification system for employees who can choose managerial or professional careers in the company. Meanwhile, Huawei's managers regard human resource development as the key to achieving strategic transformations of the company.

Finally, the internal adjustment also relies on many soft techniques. In the company, they gradually cultivated organizational culture of *fendou*. Originally, *fendou* is a Chinese verb that means working hard or to make much effort to achieve certain goals. Literally, *fendou* can be equal to the meaning of striving for. However, considering the context of Huawei, we decided to choose the original Chinese words, because there are many contexts bounded meanings to this word. The concept of *fendou* has not been well established. However, during our interviews, we heard many interviewees mentioned this word, frequently, even for those overseas staffs hired locally, as they thought *fendou* "is the symbol of their organizational culture". We also find multiple supportive evidence from secondary data to illustrate the importance of *fendou* to Huawei. In this sense, we think *fendou* may represent *the* spirituality of managing independence in innovation (Buckler and Zien 1996), as it means to work hard to achieve a collective goal by taking advantage of oneself independently while remaining flexible to collaborate with others interdependently.

4.3 Continuous Improving

Managing interdependence in innovation relies on continuously improving. The continuity presents a time horizon in the temporal feature of managing independence in innovation. It indicates managing independence in innovation may not be a static action. Instead, such management can be an on-going process and embraces continuously innovative efforts made in diverse ways to improve, as illustrated by several typical examples in Huawei.

First, Huawei has been investing continuously in technological breakthroughs that create value for customers. Since its establishment, Huawei has set up the rule in continuity in R&D investment; a minimum of 10% of the annual revenue is invested into R&D, 10% of which is used to conduct basic research that advances new technologies. Huawei has been continuously investing in telecommunication technologies innovation from the 2G era and now toward the 5G. The accumulation of each generation of technologies also enabled Huawei's to innovate and manage interdependence and independence. Since Huawei's innovation has its footprint on each generation, it allows specific technologies developed over different generations easily integrated.

The following Tables 12.1 summarized key indicators of Huawei's innovation inputs and outputs. We could see Huawei's R&D expenditures increased annually. This is a similar trend for the percentage of R&D expenditures in total annual revenue, with an exception for 2013. As a result, Huawei has continuously generated technological breakthroughs, which are evidenced by increasing growths of patents both applied and actually granted. According to internal sources, nearly 90% of Huawei's recent patents are new inventions. Although most of these indicators are measurements of the overall innovation inputs and outputs, not necessarily relate to independent innovation directly, they provide a general picture of Huawei's continuity in investing technological breakthroughs.

In addition, we find a path dependency on Huawei's innovation, which means the continuity of technological improvements pertains alongside a trajectory. Huawei's innovation on the 3G technologies can be an

Table 12.1 Some indicators of Huawei's R&D inputs and outputs in recent five years

	2010	2011	2012	2013	2014
R&D Spending (billion RMB)	16.56	23.70	29.75	30.67	40.85
Annual Revenue (billion RMB)	182.5	203.9	220.2	239	288.2
% of R&D in Revenue	9.07%	11.62%	13.51%	12.83%	14.17%
Number of R&D Staff (approx.)	51,000	62,000	70,000	70,000	76,000
Number of overseas R&D Centers	12	15	16	16	16
Number of Patents Applied	31,869	36,344	41,948	44,168	48,719
Number of Patents Granted	17,765	23,522	30,240	36,511	38,825
Number of Industrial Standards Submitted (approx.)	5000	5000	5000	5000	4800

Source: Compiled by the author based on Huawei Annual Report (2006–2014)

example to illustrate this pattern. Initially, Huawei's innovation focused on 3G based soft-switch technology that can help smoothly upgrade from 2G to 3G. However, as for the construction cost of the 2G network, many operators hoped to have a solution that can reduce the new construction as much as possible and to take advantage of the existing 2G network infrastructure to achieve the upgrade to 3G. To deal with such demands, Huawei first introduced soft-switch technology into global system for mobile communications (GSM, 2G) networks. Then, Huawei introduced IP based transmission systems to further reduce the construction cost. The soft-switch based GSM technology has further been improved with distributed features and finalized during networking projects with Telfort and China Mobile, respectively. This technology has later been continuously enriched through adding user application features, such as mobile security service. The consistency in improving this technology alongside the trajectory helped Huawei to stand out in the 3G markets, suggesting that current innovations are highly dependent on the path formed by previous innovative efforts.

Lastly, we find a clear continuity in Huawei's input into diversified innovation fields. It is known that firms could benefit from focusing innovations on a few technological areas, with continuous improvement and breakthroughs. Meanwhile, firms with good management of interdependence in innovation could also consider benefitting from innovations in diverse areas that complement or relate to each other. Huawei continuously diversified the technological domains of innovation once it

becomes mature in one domain. For instance, Huawei traced the telecommunication industry from 2G, to 3G and to 4G and 5G. Each generation has different technology and standards as a particular technological domain. In order to better serve customers, Huawei also builds up strong capabilities not only to deal with different standards within the domain but also a smooth shift between different domains. Meanwhile, rather than only focusing on providing telecommunication equipment, Huawei also joined the smartphone, tablet, and personal computer markets.

4.4 Proactivity

Finally, managing interdependence in innovation also involves leading and impacting the innovation environment. Firms with leading innovation capabilities usually can impact the industry and society. Therefore, to maximize the benefits of managing interdependence in innovation, particularly for those firms that can make breakthrough innovations, firms may need to lead the market, technology, or industry proactively. This does not mean that firms need to compete to occupy more market shares. Rather, firms can shape the future of an industry by developing leading technology and industry standards, in order to make better contributions to advancing the industry.

Huawei's history of catching up and developing its innovation capabilities illustrates how a firm can grow from a latecomer to be an industrial leader. The construct "proactivity" has been merged from this feature which relates to leadership and the wide impacts of its innovations. Not surprisingly, the notion of impacts from innovation is also not very explicit in the traditional innovation literature. However, this notion is a critical feature to understand how to manage independence in innovation, since proactivity indicates the firm's attitudes and strategic position in an interdependent innovation network.

First and foremost, Huawei, in its development of technological capabilities, realizes the importance of leading the industry by proactively applying for technology patents and standards. Since the 3G era, Huawei owned over 7% for Wideband Code Division Multiple Access (WCDMA) essential patents and 5% of Universal Mobile Telecommunications

System (UMTS) patents, ranked top five globally. In Code Division Multiple Access (CDMA) area, Huawei owns over 1000 patents. The strong technological capabilities enabled Huawei to become a core member of 3rd Generation Partnership Project 2 (3GPP2), an industrial standard associate for 3G technology. Huawei shows an even stronger leadership in the industry for 4G era, as the company occupies over 25% of core Long Term Evolution or System Architecture Evolution (LTE/SAE) standards as well as 20% of essential patents, and ranked number one among the industry. Furthermore, according to the World Intellectual Property Organization (WIPO), since 2007, the number of patents applied by Huawei has ranked world top five under the Patent Cooperation Treaty among all industries and ranked first in the telecommunication industry. In 2008 and 2014, Huawei also topped the WIPO's patent filing. Huawei's proactivity in applying for new patents and industrial standards shows the impacts of its innovation capabilities and indicates that Huawei is taking advantage of its technology to make other firms' (even the industry's) innovation more dependent on Huawei's innovation.

Besides, Huawei also takes up leadership positions in various organizations dedicated to industrial standards. As we mentioned earlier, Huawei has membership in various industrial standard organizations. The company has not only become a member but also tried to make its own impacts in the standardization of the industry. For instance, Huawei has employees serving as vice president of the Study Group 11 of the International Telecommunication Union (ITU) Telecommunication Standardization Sector, president of ITU Radiocommunication Sector 8F Technology Group, vice president of the Service and System Aspects Working Group 2 of the Technical Specification Groups at the 3rd Generation Partnership Project (3GPP TSG SA2), vice president of Open Mobile Alliance (OMA) Mobile Commerce and Charging (MCC) as well as directors of China Communications Standards Association, European Telecommunications Standards Institute, Alliance for Telecommunications Industry Solutions, World Interoperability for Microwave Access forums, Organization for the Advancement of Structured Information Standards, Telecommunication Management Forum and Wi-Fi Alliance. Huawei has also proactively participated in standardization activities in cloud technology, including becoming

directors of Distributed Management Task Force and leading the working group for cloud computing and data center in the Internet Engineering Task Force.

The achievement and impacts of Huawei's innovation can also be traced from the awards and rankings Huawei received, which are too many to name all. Here, we listed several most influential awards, in the following Table 12.2 in different technological domains to demonstrate the proactivity of Huawei's independent innovation. From the table, it is easy to find that Huawei's innovation is not just aimed at advancing technologies alone. Each of these innovations can be interdependent over other firms (e.g., customers of Huawei) but based on Huawei's own technologies.

Considering the fact that many of these recognitions of Huawei are not awarded for the technology but for the product or solution first launched in the industry, which deployed the advanced technology and can be applied in industry practices. In this sense, we also argue that proactivity should not be narrowly understood as the attitude to pursue patents and industrial standards. Instead, proactivity also indicates the firm should be able to commercialize and profit from these technological innovations and, therefore, benefit a wide range of firms, similar to establishing an innovation network whereas positioning as the hub.

5 Conclusion

The rising of innovation from EMs calls for explorative studies to understand how latecomer firms catch up and exceed in global innovation competition. The study critically and comprehensively retrieved the innovation history based on a polar case of Huawei. We identified four different innovation strategies and proposed theoretical arguments based on our iterative analysis. This in-depth case study provides a holistic understanding of the concept of interdependence in innovation.

Different from prior studies, we emphasize contextual fabrics in latecomers' innovation processes. This approach allows us to explain how interdependence was planted internally to the innovative firm and how interdependence was leveraged, shaped, and developed further in

Table 12.2 Huawei’s Awards across Different Technological Domains in Recent Years (Selective)

Domains	Awards
2G	GSM Association recognized Huawei with the Best Service Delivery Platform award, 2009
3G	IPTime won InfoVision Awards, 2008
4G	<p>Huawei won the “LTE Innovation and Commercialization” award at the LTE World Summit</p> <p>Best Contribution to R&D for LTE in North America award at LTE North America 2010.</p> <p>Six top LTE awards: the Best LTE Commercial Performance Award and the Best LTE Network Elements Award received at the LTE World Summit 2011, the Best Contribution to LTE R&D Award and the Best Contribution to LTE Standards Award at the LTE North America Awards 2011, the LTE Network Infrastructure Innovation Award received at the Global Telecoms Business Innovation Awards 2011, and the Most Innovative Mobile Broadband Deployment Award received from RCR Wireless News.</p>
Networking	<p>Huawei’s MSAN HONET UA5000 won the InfoVision Award 2005 2010, Huawei received three honors at the Global Telecom Business Innovation Awards including Green base station innovation, Wholesale network innovation and Consumer voting innovation awards with Vodafone, BT and TalkTalk, respectively</p> <p>Huawei’s SingleRAN@Broad solution won the InfoVision Award in the category of “Broadband Access Network Technologies and Services” at the Broadband World Forum 2010.</p> <p>Huawei unveiled the world’s first 200G high-speed line card for routers, which was awarded the Broadband Innovation of the Year Award by InfoVision in 2011</p> <p>2012 Global Excellent Telecom Cloud Solution Provider of the Year by Frost & Sullivan</p>
Cloud and Data Service	<p>Data Center Blueprint Award at the DatacenterDynamics Great China Awards 2012</p> <p>The Enterprise Data Center, The Internet Data Center and The Modular Deployment awards at the DatacenterDynamics Asia Pacific Awards 2015.</p> <p>OFC/NFOEC 2012, Petabit/s Photonic Cross-Connect (PPXC) technology awarded most innovative and outstanding prototype</p>

(continued)

Table 12.2 (continued)

Domains	Awards
Optical Fiber	Institute for International Research awarded Huawei Best Optical Equipment Product – Optical Transport Network award at the Next Generation Optical Awards program InfoVision Awards, 2009
Soft-switch	Huawei received the 2009 Corporate Award from the IEEE Standards Association
Industrial Standards	2010 Corporate Use of Innovation Award by The Economist
Others	2013 National Science and Technology Progress Award, China CommunicAsia 2012 Green Technology Award 2010 Outstanding Contribution and Leadership Award from Open Mobile Alliance 2010, Frost & Sullivan recognized Huawei in the contact center application market with the 2010 Asia Pacific Growth Strategy Leadership Award

Source: Compiled by the author based on Huawei Annual Report (2006–2014)

connection with external partners with specific innovation conditions. The four strategies as identified by this study, namely leveraging from the internal to the external, learning and adapting, continuous improving, and proactivity, do not exist separately. Rather they intertwine, which contribute to inimitable, network-based innovation capabilities.

To our dilemma raised at the beginning, the study also presents how interdependence and independence co-relate and co-evolve. The concept of interdependence provides a new perspective on understanding organizational issues in innovation. We argue that innovation partners located in global networks provide crucial resources for latecomers to develop a competitive advantage and latecomer firms can access these resources for innovation from deliberately managing interdependence and independence. Interdependence and independence are actually not contradictory in latecomer's catch-up process.

Inevitably, our case study also has limitations that may lead to further studies. This study only focused on one single setting of Huawei. It can be relatively limited in terms of generalizability, despite figuring out key

innovation strategies as showed by Huawei's innovation history. In this sense, our findings need to be further examined in large sample sizes. Meanwhile, our cases are embedded very much within the contexts of China and its telecommunication industry. Further replications may also be necessary to identify the role of context-based factors in our understanding of interdependence in innovation.

References

- Adner, Ron, and Rahul Kapoor. 2010. Value Creation in Innovation Ecosystems: How the Structure of Technological Interdependence Affects Firm Performance in New Technology Generations. *Strategic Management Journal* 31 (3): 306–333.
- Ancona, Deborah G., and David F. Caldwell. 1992. Bridging the Boundary—External Activity and Performance in Organizational Teams. *Administrative Science Quarterly* 37 (4): 634–665.
- Anderson, John, Dylan Sutherland, and Sean Severe. 2015. An Event Study of Home and Host Country Patent Generation in Chinese MNEs Undertaking Strategic Asset Acquisitions in Developed Markets. *International Business Review* 24 (5): 758–771. <https://doi.org/10.1016/j.ibusrev.2015.01.007>.
- Arthur, W. Brian. 1989. Competing Technologies, Increasing Returns, and Lock-in by Historical Events. *Economic Journal* 99 (394): 116–131.
- Awate, Snehal, Marcus M. Larsen, and Ram Mudambi. 2015. Accessing vs Sourcing Knowledge: A Comparative Study of R&D Internationalization between Emerging and Advanced Economy Firms. *Journal of International Business Studies* 46 (1): 63–86. <https://doi.org/10.1057/jibs.2014.46>.
- Bruche, Gert. 2009. The Emergence of China and India as New Competitors in MNCs' Innovation Networks. *Competition & Change* 13 (3): 267–288. <https://doi.org/10.1179/102452909X451378>.
- Buckler, Sheldon A., and Karen Anne Zien. 1996. The Spirituality of Innovation: Learning From Stories. *Journal of Product Innovation Management* 13 (5): 391–405. [https://doi.org/10.1016/0737-6782\(96\)00056-2](https://doi.org/10.1016/0737-6782(96)00056-2).
- Buckley, Peter J., and Niron Hashai. 2014. The Role of Technological Catch up and Domestic Market Growth in the Genesis of Emerging Country Based Multinationals. *Research Policy* 43 (2): 423–437. <https://doi.org/10.1016/j.respol.2013.11.004>.

- Buckley, Peter J., L. Jeremy Clegg, Adam R. Cross, Xin Liu, Hinrich Voss, and Ping Zheng. 2007a. The Determinants of Chinese Outward Foreign Direct Investment. *Journal of International Business Studies* 38 (4): 499–518. <https://doi.org/10.1057/palgrave.jibs.8400277>.
- Buckley, Peter J., Chengqi Wang, and Jeremy Clegg. 2007b. The Impact of Foreign Ownership, Local Ownership and Industry Characteristics on Spillover Benefits From Foreign Direct Investment in China. *International Business Review* 16 (2): 142–158. <https://doi.org/10.1016/j.ibusrev.2006.12.006>.
- Buckley, Peter J., Thomas D. Craig, and Ram Mudambi. 2019. Time to Learn? Assignment Duration in Global Value Chain Organization. *Journal of Business Research* 103: 508–518. <https://doi.org/10.1016/j.jbusres.2018.01.011>.
- Carlile, Paul R. 2002. A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development. *Organization Science* 13 (4): 442–455.
- Chen, Victor Zitian, Jing Li, and Daniel M. Shapiro. 2012. International Reverse Spillover Effects on Parent Firms: Evidences from Emerging-Market MNEs in Developed Markets. *European Management Journal* 30 (3): 204–218. <https://doi.org/10.1016/j.emj.2012.03.005>.
- Cho, Namshin. 1996. How Samsung Organized for Innovation. *Long Range Planning* 29 (6): 783–796. [https://doi.org/10.1016/S0024-6301\(97\)82816-6](https://doi.org/10.1016/S0024-6301(97)82816-6).
- Cobo-Benita, José Ramón, Enrique Rodríguez-Segura Isabel Ortiz-Marcos, and Luis Ballesteros-Sánchez. 2016. Innovation Projects Performance: Analyzing the Impact of Organizational Characteristics. *Journal of Business Research* 69 (4): 1357–1360. <https://doi.org/10.1016/j.jbusres.2015.10.107>.
- Cozza, Claudio, Roberta Rabbellotti, and Marco Sanfilippo. 2015. The Impact of Outward FDI on the Performance of Chinese Firms. *China Economic Review* 36: 42–57. <https://doi.org/10.1016/j.chieco.2015.08.008>.
- Cui, Lin, Di Fan, Xiaohui Liu, and Yi Li. 2017. Where to Seek Strategic Assets for Competitive Catch-Up? A Configurational Study of Emerging Multinational Enterprises Expanding into Foreign Strategic Factor Markets. *Organization Studies* 38 (8): 1059–1083. <https://doi.org/10.1177/0170840616670441>.
- Dahlander, Linus, and David M. Gann. 2010. How Open Is Innovation? *Research Policy* 39 (6): 699–709. <https://doi.org/10.1016/j.respol.2010.01.013>.

- David, Paul A. 1985. Clio and the Economics of Qwerty. *American Economic Review* 75 (2): 332–337.
- Di Minin, Alberto, Jieyin Zhang, and Peter Gammeltoft. 2012. Chinese Foreign Direct Investment in R&D in Europe: A New Model of R&D Internationalization? *European management journal* 30 (3): 189–203. <https://doi.org/10.1016/j.emj.2012.03.004>.
- Dosi, Giovanni, Richard R. Nelson, and Sidney G. Winter. 2000. *The Nature and Dynamics of Organizational Capabilities*. Oxford: Oxford University Press.
- Driffield, Nigel, James H. Love, and Yong Yang. 2016. Reverse International Knowledge Transfer in the MNEs: (Where) Does Affiliate Performance Boost Parent Performance? *Research Policy* 45 (2): 491–506. <https://doi.org/10.1016/j.respol.2015.11.004>.
- Duanmu, Jing-Lin. 2014. State-Owned MNCs and Host Country Expropriation Risk: The Role of Home State Soft Power and Economic Gunboat Diplomacy. *Journal of International Business Studies* 45 (8): 1044–1060. <https://doi.org/10.1057/jibs.2014.16>.
- Eisenhardt, Kathleen M. 1989. Building Theories from Case Study Research. *Academy of Management* 14 (4): 532–550.
- Fredrich, Viktor, Ricarda B. Bouncken, and Sascha Kraus. 2019. The Race Is on: Configurations of Absorptive Capacity, Interdependence and Slack Resources for Interorganizational Learning in Coopetition Alliances. *Journal of Business Research* 101: 862–868. <https://doi.org/10.1016/j.jbusres.2018.11.038>.
- Frenz, M. 2005. R. Narula *Globalization and Technology: Interdependence, Innovation Systems and Industrial Policy*, Polity Press, Cambridge, UK (2003). Article in *Research Policy*, 34 (6): 978–980. <https://doi.org/10.1016/j.respol.2005.05.003>.
- Fu, Xiaolan. 2012. How Does Openness Affect the Importance of Incentives for Innovation? *Research Policy* 41 (3): 512–523. <https://doi.org/10.1016/j.respol.2011.12.011>.
- Fuentelsaz, Lucio, Jaime Gómez, and Sergio Palomas. 2016. Interdependences in the Intrafirm Diffusion of Technological Innovations: Confronting the Rational and Social Accounts of Diffusion. *Research Policy* 45 (5): 951–963. <https://doi.org/10.1016/j.respol.2016.02.001>.
- Hobday, Mike. 1994. Technological Learning in Singapore: A Test Case of Leapfrogging. *The Journal of Development Studies* 30 (4): 831–858. <https://doi.org/10.1080/00220389408422340>.

- . 1995a. East Asian Latecomer Firms: Learning the Technology of Electronics. *World Development* 23 (7): 1171–1193. [https://doi.org/10.1016/0305-750X\(95\)00035-B](https://doi.org/10.1016/0305-750X(95)00035-B).
- . 1995b. Innovation in East Asia: Diversity and Development. *Technovation* 15 (2): 55–63. [https://doi.org/10.1016/0166-4972\(95\)96610-6](https://doi.org/10.1016/0166-4972(95)96610-6).
- Hobday, Mike, Howard Rush, and Joe Tidd. 2000. Innovation in Complex Products and System. *Research Policy* 29 (7): 793–804. [https://doi.org/10.1016/S0048-7333\(00\)00105-0](https://doi.org/10.1016/S0048-7333(00)00105-0).
- Hobday, Michael, Howard Rush, and John Bessant. 2004. Approaching the Innovation Frontier in Korea: The Transition Phase to Leadership. *Research Policy* 33 (10): 1433–1457. <https://doi.org/10.1016/j.respol.2004.05.005>.
- Hogan, Suellen J., and Leonard V. Coote. 2014. Organizational Culture, Innovation, and Performance: A Test of Schein's Model. *Journal of Business Research* 67 (8): 1609–1621. <https://doi.org/10.1016/j.jbusres.2013.09.007>.
- Hu, Mei-Chih, and John A. Mathews. 2008. China's National Innovative Capacity. *Research Policy* 37 (9): 1465–1479. <https://doi.org/10.1016/j.respol.2008.07.003>.
- Huang, Yongming, David B. Audretsch, and Megan Hewitt. 2013. Chinese Technology Transfer Policy: The Case of the National Independent Innovation Demonstration Zone of East Lake. *Journal of Technology Transfer* 38 (6): 828–835. <https://doi.org/10.1007/s10961-012-9292-5>.
- Huang, Kenneth, Xuesong Geng, and Heli Wang. 2017. Institutional Regime Shift in Intellectual Property Rights and Innovation Strategies of Firms in China. *Organization Science* 28 (2): 355–377. <https://doi.org/10.1287/orsc.2017.1117>.
- Huawei Annual Report. 2006–2014. <https://www.huawei.com/en/press-events/annual-report>. Accessed December 30, 2015.
- Kapoor, Rahul, and Ron Adner. 2012. What Firms Make vs. What They Know: How Firms' Production and Knowledge Boundaries Affect Competitive Advantage in the Face of Technological Change. *Organization Science* 23 (5): 1227–1248.
- Kim, Linsu. 1997. *Imitation to Innovation: The Dynamics of Korea's Technological Learning*. Boston, MA: Harvard Business School Press.
- Kim, Linsu, and Hosun Lee. 1987. Patterns of Technological Change in a Rapidly Developing Country: A Synthesis. *Technovation* 6 (4): 261–276. [https://doi.org/10.1016/0166-4972\(87\)90074-5](https://doi.org/10.1016/0166-4972(87)90074-5).

- Knight, Gary A., and S. Tamar Cavusgil. 2004. Innovation, Organizational Capabilities, and the Born-Global Firm. *Journal of International Business Studies* 35 (2): 124–141.
- Langley, Ann. 1999. Strategies for Theorizing from Process Data. *The Academy of Management Review* 24 (4): 691–710.
- Lee, Keun, and Chaisung Lim. 2001. Technological Regimes, Catching-Up and Leapfrogging: Findings from the Korean Industries. *Research Policy* 30 (3): 459–483. [https://doi.org/10.1016/S0048-7333\(00\)00088-3](https://doi.org/10.1016/S0048-7333(00)00088-3).
- Liang, Xiaoya, Xiongwen Lu, and Lihua Wang. 2012. Outward Internationalization of Private Enterprises in China: The Effect of Competitive Advantages and Disadvantages Compared to Home Market Rivals. *Journal of World Business* 47 (1): 134–144. <https://doi.org/10.1016/j.jwb.2011.02.002>.
- Lu, Jiangyong, Xiaohui Liu, and Hongling Wang. 2011. Motives for Outward FDI of Chinese Private Firms: Firm Resources, Industry Dynamics, and Government Policies. *Management and Organization Review* 7 (2): 223–248. <https://doi.org/10.1111/j.1740-8784.2010.00184.x>.
- Marrone, Jennifer A. 2010. Team Boundary Spanning: A Multilevel Review of Past Research and Proposals for the Future. *Journal of Management* 36 (4): 911–940. <https://doi.org/10.1177/0149206309353945>.
- Miles, Matthew B., and Michael Huberman. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. 2nd ed. Thousand Oaks: Sage Publications.
- Morck, Randall, Bernard Yeung, and Minyuan Zhao. 2008. Perspectives on China's Outward Foreign Direct Investment. *Journal of International Business Studies* 39 (3): 337–350. <https://doi.org/10.1057/palgrave.jibs.8400366>.
- Mortara, Letizia, and Tim Minshall. 2011. How Do Large Multinational Companies Implement Open Innovation? *Technovation* 31 (10/11): 586–597. <https://doi.org/10.1016/j.technovation.2011.05.002>.
- Perez, Carlota. 1985. Microelectronics, Long Waves and World Structural Change: New Perspectives for Developing Countries. *World Development* 13 (3): 441–463. [https://doi.org/10.1016/0305-750X\(85\)90140-8](https://doi.org/10.1016/0305-750X(85)90140-8).
- Perez, Carlota, and Lyc Soete. 1988. Catching-Up in Technology: Entry Barriers and Windows of Opportunity. In *Technical Change and Economic Theory*, ed. Dosi et al., 458–479. New York: Francis Pinter.
- Ritala, Paavo, and Pia Hurmelinna-Laukkanen. 2013. Incremental and Radical Innovation In Coopetition—The Role of Absorptive Capacity and Appropriability. *Journal of Product Innovation Management* 30 (1): 154–169. <https://doi.org/10.1111/j.1540-5885.2012.00956.x>.

- Siggelkow, Nicolaj. 2007. Persuasion with Case Studies. *The Academy of Management Journal* 50 (1): 20–24. <https://doi.org/10.5465/AMJ.2007.24160882>.
- Tece, David J. 2009. *Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth*. Oxford, UK: Oxford University Press.
- Turkina, Ekaterina. 2018. Global Connectedness and Local Innovation in Industrial Clusters. *Journal of International Business Studies* 49 (6): 706–728. <https://doi.org/10.1057/s41267-018-0153-9>.
- Wei, Yingqi, Nan Zheng, Xiaohui Liu, and Lu. Jianguo. 2014. Expanding to Outward Foreign Direct Investment or Not? A Multi-Dimensional Analysis of Entry Mode Transformation of Chinese Private Exporting Firms. *International Business Review* 23 (2): 356–370. <https://doi.org/10.1016/j.ibusrev.2013.06.001>.
- Winter, Sidney G. 2006. Toward a Neo-Schumpeterian Theory of the Firm. *Industrial and Corporate Change* 15 (1): 125–141. <https://doi.org/10.1093/icc/dtj006>.
- Wu, Wei-Wei, Bo Yu, and Wu. Chong. 2012. How China's Equipment Manufacturing Firms Achieve Successful Independent Innovation. *Chinese Management Studies* 6 (1): 160–183. <https://doi.org/10.1108/17506141211213915>.
- Yin, Robert K. 2009. *Case Study Research: Design and Methods*. 4th ed. London, UK: SAGE.
- Yuan, Yi-jun, and Cui-jie Lv. 2011. A Study of the Evolutionary Path of Technological Innovation Modes in the Equipment Manufacturing Industry of China. *Journal of Technology Management in China* 6 (3): 257–266. <https://doi.org/10.1108/17468771111157463>.
- Zhao, Wei, Ling Liu, and Ting Zhao. 2010. The Contribution of Outward Direct Investment to Productivity Changes within China, 1991–2007. *Journal of International Management* 16 (2): 121–130. <https://doi.org/10.1016/j.intman.2010.03.003>.



13

Huawei at Bay? A View on Dependency Theory in the Information Age

Laura Kirste and Dirk Holtbrügge

1 Introduction

Surgeons working from home, cars that no longer crash, people experiencing situations that are actually taking place miles away—examples that seem like a sci-fi movie script will become true with 5G. The newest generation of the Universal Mobile Telecommunications System (UMTS), 5G, is a technological revolution that will allow data transfer so fast that it will feel like real-time due to its extremely small latency period. While smartphone users may perceive 4G/LTE as very fast, there is still a considerable lag between sending data and receiving it. Therefore, 5G is more than just the next standard of mobile communications, it will virtually eliminate lag, giving humans endless possibilities to bridge geographic space in close to real-time. By linking potentially any object with one another, a big network of communicating devices is shaped—the

L. Kirste (✉) • D. Holtbrügge

Department of International Management, Friedrich-Alexander University of Erlangen-Nürnberg, Nürnberg, Germany

e-mail: laura.kirste@fau.de; dirk.holtbruegge@fau.de

Internet of Things (IoT). For example, a surgeon could transfer his movements directly to an operation robot. This way, it would not matter if patient and physician were in the same room or not. They would not even necessarily have to be in the same building, city, or even on the same planet. Another example is self-driving cars that would be communicating with one another constantly, not only avoiding accidents, but also optimizing the transportation system—for example by predicting peak times and interacting with traffic lights.

Naturally, with technology this powerful come security concerns, as it can also be used for socially less desirable means, such as espionage, manipulation, or war. This fear has recently sparked a global debate on the 5G network expansion and the companies involved in it. One of the biggest manufacturers of 5G components is the Chinese multinational enterprise (MNE) Huawei (IPLYtics 2019). Through an early adopter strategy and rigorous research and development (R&D) investment, Huawei has managed to sell components around the world. Although the company claims to be owned by its employees, its ties to the Chinese government have been a topic of discussion, not least due to the opaque ownership structure. Recently, allegations of espionage by the Chinese government through devices developed and manufactured by Huawei have emerged and escalated, especially in the USA (Zhong 2019a). The technological lead that Huawei has over other competitors in the telecommunication business has resulted in fear of espionage and cybersecurity-related concerns. This fear is both rooted in the lack of understanding of the technology incorporated in Huawei's devices and the non-transparent ties of the company to the Chinese government. Following these allegations, the USA has recently imposed a ban and added Huawei to the blacklist, which forces all US-American firms to suspend any business with Huawei without official permission (Shepardson 2019). The USA has been making efforts to persuade other states to follow their initiative and ban Huawei from their 5G rollouts (Emmott 2019).

The case of Huawei shows how technological leaders can get into the crossfire between governments, rendering them cue balls in an international trade war that apparently goes way beyond single businesses and their authorization. Building on Vernon's (1971) extension of dependency theory, this book chapter aims to analyze the dynamic power

asymmetries of governments and multinational corporations in the Huawei case. The analysis will contribute to our understanding of dependency theory in a globalized world and highlight its relevance in the context of fundamental technological innovations such as 5G.

2 Sovereignty at Bay in the Age of Digitalization

Vernon's (1971) notion of MNEs as a driver for power asymmetries on a national level and loss of sovereignty of single countries is grounded in dependency theory. This school of thought arose in the 1950s and has commonly been used to explain national differences in economic development. The main notion of dependency theory is that underdeveloped nations are positioned in the periphery of the global economy. Since these nations typically offer low-cost labor and are rich in raw materials, they would put these goods up for sale on the world market. Developed nations have the means, that is knowledge and technology, to transform labor and raw materials into finished goods, which they in return offer on the world market. As these goods are desired by all societies, underdeveloped nations wind up purchasing them at high prices. Due to this dynamic, underdeveloped nations spend capital on finished goods, which otherwise would have been invested in R&D activities. This leads to a vicious cycle, keeping developed (or rich) nations in the center of the global economic circle and underdeveloped nations at the periphery with no way of piercing the inner sphere. According to this, underdeveloped nations would stay dependent on developed states forever (Ghosh 2019).

Globalization and the continuous reduction of trade barriers, however, have caused the global economic circle to close ranks. International trade has evolved from shifting finished goods to intermediate trade. Subsequently, R&D activities can be outsourced and trade with knowledge-intensive assets (e.g., patents) has increased (Lin et al. 2018). A very prominent example of a nation that has seemingly managed to move from a provider of cheap labor and raw materials to a nation rich in innovation is the People's Republic of China. In his seminal work, Vernon

(1971) states that the root of this phenomenon lies in the emergence and nature of MNEs. While nationally operating companies are subject to the legal and political environment of the respective nation, and are therefore controllable by the state, MNEs operate in many nations at once, subjecting them to a variety of legal and political systems. According to Vernon (1981), sovereignty is consequently “at bay” since MNEs have global interests and can therefore never respond to one single nation’s jurisdiction as this may threaten their international success. However, the MNE’s network-like nature makes it prone to serve as a channel for states to exert power over other states. Based on this argument, Kobrin (2001) discusses three challenges states are confronted with in regard to MNEs. While national jurisdiction is inherently bound to geographic borders, the MNE and its network structure lead to a jurisdictional asymmetry. This results in jurisdictional overlap and underlap, and finally to “a weakening of national control over the economy and economic actors” (Kobrin 2001: 186). What can be observed here is a conflict between cost and benefit of the MNE as an entity—for one, it seems to limit national control and threaten states’ power monopoly. At the same time, however, MNEs pose powerful tools for states to extend their influence across national borders by exploiting the MNE’s hierarchy. Through the national headquarters, states can exert power on foreign subsidiaries, thereby taking influence on other states within their own jurisdiction.

The Internet is the technological equivalent of an MNE. Its network structure subjects it to a large variety of jurisdictions, simultaneously making it almost impossible for single nations to subject it to only their laws, values, rules, and norms. While MNEs reflect certain economic interests and values held by their principals and agents, the Internet is a product of the social values and interests of the engineers who implement its infrastructure (Bradshaw and DeNardis 2018). The same is true for the 5G network of the future, but to an even larger extend. 5G technology has the potential to connect virtually any area of life with another, including critical infrastructure such as healthcare, connected utilities, transportation, or power line communication (IEEE 2017). When and how nations employ 5G technology will not only determine their economic power position for decades to come, but also have great influence on their sovereignty over other states, their independence, and their

political power. Those developing and supplying the network infrastructure are the ones whose values it will reflect, disregarding geographical borders and jurisdictions (Hoffmann et al. 2019). As a conclusion, those MNEs building and controlling these networks will have a significant influence on what the 5G technology of the future will look like. The norms and values of an MNE are significantly influenced by its home country. The stronger the ties between the MNE and the national government, the larger the influence that state can exert through the network of the MNE. Consequently, the more control the state exerts on 5G technology MNEs, the larger their power and influence over other states will be in the future.

3 A Brief Status Quo of Huawei's 5G Efforts

Like all wireless communication systems, 5G is vulnerable to cyber-attacks and therefore poses great security-related challenges that need to be managed. It will connect infrastructure that is critical to societies' safety as a whole, such as power supply systems (Ahmad et al. 2017). It is therefore vital for nations to guard their systems from unauthorized access by third parties. This could not only lead to data theft and leak of critical information, but to severe threats to national peace, such as cut-off from energy sources or failure of supply chain systems and resulting shortage of goods. Consequently, there is a great need for absolute trust in companies that supply, manage, and run 5G systems. Those that provide wireless wide area networking are the carriers. At this point in time, the leading carriers within a state are typically regional-based companies, e.g., Deutsche Telekom in Germany, T-Mobile U.S. Inc. and Verizon in North America, or China Mobile and SK Telecom in Asia (Townsend 2019). Carriers partner with infrastructure companies who supply them with the necessary equipment for implementing 5G rollouts.

In 2019, the Chinese corporation Huawei Technologies Co. Ltd. is the second most important holder of 5G patent families after South Korean Samsung Electronics and before the Swedish company Ericsson (Fig. 13.1). The transformation of the networking telecommunications industry through fast innovation has created a "dramatically new and

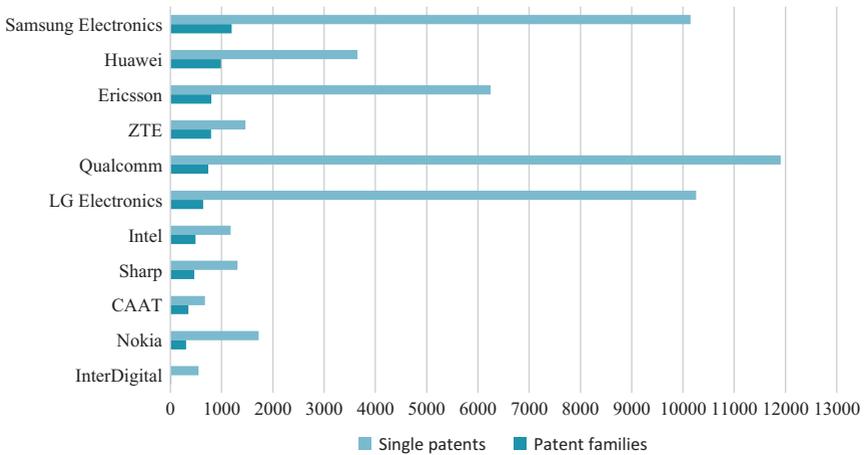


Fig. 13.1 Amount of 5G patents of leading companies globally in 2019. (Source: Authors' illustration based on IPlytics 2019)

dynamic competitive environment, from which Huawei has become one of the most important firms” (Zhang and Alon 2010: 174).

As the company currently leading the race of providing 5G components, Huawei has secured over 50 contracts for 5G rollouts, roughly 60% of which will be completed in Europe (McGregor 2019; Tao 2019). Huawei currently employs about 188,000 people who are simultaneously the exclusive shareholders of the company, according to official company information (Huawei 2019b). Huawei operates 36 joint innovation centers and 14 R&D institutes, centers/offices (Huawei 2019b). According to its annual report, 45% of workforce is employed in the R&D sector and R&D expenditure accounted for 14.1% of total revenue in 2018 (Huawei 2019c). From 2009 until 2018, Huawei has invested roughly US\$70.4 billion in R&D activities ranging from smart devices to 5G components (Huawei 2019a). In comparison, smart devices manufacturer Apple has invested around \$63.4 billion in R&D in the same period of time (Apple 2018) and 5G technology competitor Samsung has invested \$117.5 billion (Samsung 2019a). Undoubtedly, Huawei's growth over the last decade is not only a product of its innovative strength, but also of China's entire digital strategy.

4 The Battle for the Core: An Analysis of National Interests and Positions in the Huawei Case

The prevailing approach to digitalization in many Western countries, such as the USA, the UK, Germany, and France, was born into “a rule-based capitalistic system that relies on verifiable public information and accepted legal processes” (Alon 2003: 246). It has been informed by the idea of collaboration, open innovation, and open-source software development. One example is the smart devices operating system Android, which originated from an alliance of several companies led by Google and is published as an open-source platform, i.e., as a software adaptable to the respective manufacturer’s device (Android and Google LLC 2019). This approach was implemented to establish secure operating systems as the open-source character makes it extremely difficult to add software code for deviant purposes such as espionage, data theft, or unauthorized device access. Western countries, with their traditionally strong focus on liberal values, have been pursuing a joint network. Analyzing this approach from the theoretical perspective, it can be characterized as forfeit of sovereignty of the single state over the Internet. The globally spanning network makes it extremely difficult for single countries to enforce jurisdiction and censorship. This, however, can be seen as a reflection of traditional Western values, such as freedom of information and press.

On the other hand, the Chinese approach to digital networks is very mismatched with these Western perspectives. While the Internet was long dominated by US-American firms such as Alphabet Inc. (Google), China sealed its version of the Internet off from the rest of the world by the Great Firewall, which creates a national intranet for Chinese access only and simultaneously blocks the majority of foreign Internet sites and applications (such as Google services, social media, etc.). The Great Firewall, established since 2003, keeps over 600 million users behind “the world’s most sophisticated and pervasive censorship system” (Ensafi et al. 2015: 61). However, this firewall does not only keep users from accessing

an uncensored version of the Internet—it also restricts access to the large Chinese market for foreign firms, strengthening Chinese companies' position and giving them an advantage through economies of scale in the home market. Furthermore, the Chinese government has been implementing a national-scale innovation strategy since 2006, which is backed by government subsidies and R&D investment (Kaska et al. 2019). In addition to the continuously successful implementation of this strategy, China has moved from being an imitator in the tech industry to becoming a highly important innovator (Liu et al. 2012). The foundation of this development is laid by demand-driving factors, such as rapid economic growth and an ever increasing consumer income (Yip and McKern 2014). Simultaneously, the establishment of price ceilings for products and the selective grant or withdrawal of rights to sell for foreign MNEs has put domestic companies at an advantage (Rottig 2016). Evaluating this approach through the lens of extended dependency theory (Vernon 1971), it can be seen that China has opted for a sovereignty-preserving approach. This is achieved by restricting the access reciprocally—Chinese users cannot access the World Wide Web and, simultaneously, foreign users are kept from penetrating the Chinese Intranet. Consequently, this mechanism gives the Chinese government power over information flows and allows for a high extend of control and influence.

China has been working on establishing a data-driven society, a meritocracy that rewards those that obey and punishes those that do not follow the rules (Rühlig et al. 2019; Bell 2018). This has become clear since at least the establishment of the Chinese Social Credit System, which, fed with big data on virtually everyone, does not only calculate scores for Chinese citizens and companies, but also for foreign firms (Giesen 2019; Stevenson and Mozur 2019). This state-surveillance infrastructure is characterized as “state-sponsored and big data-enabled surveillance efforts that are increasingly instrumentalized by state powers to surveil and regulate the political, economic, and social dominions” (Liang et al. 2018: 416). Moreover, China's Internet politics are characterized by opaque relationships between private and public entities. These non-transparent ties between the government and MNEs make it extremely difficult, if not impossible, to distinguish between the MNE's motives

and those of the Chinese government. While dependency theory argues that no state has full control over an MNE due to its diverse set of interests in different jurisdictions (Vernon 1971), this may not apply to some Chinese MNEs. This strategy has made it hard to believe for foreign firms and governments that Huawei, which has been denying ties to the Chinese government, is in fact an independent entity. Huawei's ties to the government are uncertain to this date—opaque.

In business research, the term *opaqueness* refers to the lack of credible company information for stakeholders, which occurs when a company does not disclose information, or available information cannot be validated (Bushman et al. 2004; Li et al. 2019). This lack of transparency can lead to exclusion of the respective company from business activities such as mergers and acquisitions. As Li et al. (2019) show in their recent study, this is an especially great liability for Chinese state-owned firms.

Huawei has stressed on numerous occasions in the past years that it is not affiliated with the Chinese government (Zhong 2019b). While the official statement of Huawei, as can be read on their website, asserts that Huawei is 100% owned by its employees (Huawei 2019b), Balding and Clarke (2019) paint a very different picture. According to their study, “the Huawei operating company is 100% owned by a holding company, which is in turn approximately 1% owned by Huawei founder Ren Zhengfei and 99% owned by an entity called a ‘trade union committee’ for the holding company” (Balding and Clarke 2019: 2). The exact structure, ownership, and tasks of this committee is entirely unclear, leading to the conclusion that the ownership of Huawei is entirely unknown. One approach for companies to reduce opaqueness, especially lack of transparency of ownership structures, is to become publicly listed on foreign stock exchange (Li et al. 2019), a step that Huawei has not taken so far.

Ownership-related opaqueness has led to Huawei's exclusion from important markets. Consequently, the line between the classification of being a state-owned or private-owned firm becomes blurred (Cuervo-Cazurra 2018). The USA have imposed a ban on Huawei due to legislators' consideration of the firm being under the influence of the Chinese government and are urging other countries they foster diplomatic relationships with to do the same (Barnes and Satariano 2019; Booth et al.

2020; Zöttl 2020)—ostensibly due to security-related concerns. While some countries, such as Australia, have followed the USA's advice and imposed bans on Huawei specifically or Chinese firms in general (Hoffmann et al. 2019), other countries are reluctant to do so. Very recently, the German government published its security checklist for the advancement of 5G network expansion. Contrary to expectations, the paper does not explicitly exclude Huawei, or other companies for that matter, from participating (Zeit Online 2019). The paper is even toned down when it comes to trustworthiness of suppliers of 5G components. While an earlier version of the paper clearly stated that suppliers must be trustworthy, the now newly published version only specifies that suppliers must ensure trustworthiness by making a statement—a crucial difference, which allows the conclusion that there is, at least to some degree, awareness of some suppliers potentially not being able to pass extensive tests of their trustworthiness. While the USA is headquarters to a very successful 5G component manufacturer, namely Qualcomm who currently holds 11.907 5G patents (IPlytics 2019), Germany is in a less comfortable position. Germany that has long profited from its strong position in the economy of exports has failed to invest in 5G technology in a timely manner. Consequently, the country now finds itself in a cross-fire between the USA on the one side, fiercely fighting Huawei and its global expansion, and China on the other side, enabling a fast and cost-effective entrance into the 5G network.

In his speech during the Munich Security Conference in February 2018 then German foreign minister Sigmar Gabriel (2018) argued:

China's rise will result in a massive shift in the balance of power. The initiative for a new Silk Road is not what some people in Germany believe it to be—it is not a sentimental nod to Marco Polo, but rather stands for an attempt to establish a comprehensive system to shape the world according to China's interests. This has long since ceased to be merely a question of economics. China is developing a comprehensive systemic alternative to the Western model that, in contrast to our own, is not founded on freedom, democracy and individual human rights.

Similar to its new Silk Road initiative, China's aggressive strategy to contribute substantial parts to the global 5G rollout is a symptom of the global battle for the core of economic welfare in the digital age. Western powers, such as the USA and the European Union have long understood themselves as ambassadors of liberalism, free trade, human rights, and democracy. While there are some legitimate cyber-security-related indications published by the UK's HCSEC report that Huawei actually lacks good security practices and the equipment manufactured by the company has several serious shortcomings (Hoffmann et al. 2019), the USA's initiative to ban Huawei is additionally rooted in protectionist motives and power-related concerns. For example, Japan has banned Huawei and ZTE from participating in their national 5G rollouts, officially due to security concerns (Kyodo 2018). However, it should be kept in mind that Japan's 5G component manufacturer Sharp currently ranks eighth in the patent race and it may not be too farfetched to assume that Japan is retaliating upon China for their own protectionist measures by blocking up access to the Japanese market.

Generally, the interests in the Huawei case are threefold. Firstly, there might be legitimate security concerns related to Huawei's internal practices and gear (Hoffmann et al. 2019). Simultaneously, the smart devices industry has had several cases of security issues. Most recently, Samsung had to address a major fingerprint recognition issue in their smartphones that allowed unauthorized access to smartphone devices by their brand Galaxy (Samsung 2019b). However, security concerns related to 5G rollouts are extremely sensitive due to the large scope of application across areas of life, industries, and society as a whole. Secondly, there are concerns that the Chinese government might exploit Huawei's 5G participation in other countries' 5G network for their own interests. Espionage has been a growing concern, especially with regard to China's establishment of the Social Credit System. Furthermore, 5G technology will connect vital national resources such as power supplies, which is why fear of meddling is a legitimate issue that needs to be addressed. However, this is the case for all nations. Those who are home countries to the MNEs supplying 5G gear will inevitably come under suspicion of data theft,

espionage, and unauthorized interference. Simultaneously, those who are unable to task domestic MNEs with the 5G rollout may forever be haunted by paranoia if they cannot trust that their supplier shares or at least respects the values their network shall reflect. In practical terms, Huawei's 5G gear is feared to reflect the Chinese approach to digitalization, for example by enabling espionage or gathering data in order to gain advantages and control over other states.

At the same time, those countries that have failed to become early 5G adopters like South Korea and China did, are under pressure to secure their position in tomorrow's global economic system. Being able to move fast has now become more important than ever, pressuring countries to move forward. However, considering recent events, this does not seem like enough to disregard the ongoing security debate—while German carrier Deutsche Telekom had stated in January that a ban would lead to Europe lagging the USA and China an estimated two years (Donahue et al. 2019), the company just announced its plans to exclude Huawei equipment from their 5G rollout within the next two years (Berke and Wettach 2019).

5 Conclusion

Vernon's (1971) extension of dependency theory illustrates impressively how 5G technology has become the new battleground for power and welfare today. In the "battle for the core," late-adopter countries need to make tough calls whom to depend on and, more importantly, whom to be reliant on. Inherently to its nature, the 5G network threatens national control over important resources. Combined with the nature of the MNE, which can be a tool for states to exert power across their boarder, the 5G network expansion questions the current distribution of power in the digital age.

The case of Huawei demonstrates that countries that fail to keep up with technological innovation will forfeit their sovereignty over network participants at least partially. The nature of 5G technology and the general trend of evermore increasing interdependence of physical and virtual

space have caused non-producing states to find themselves at crossroads. Huawei, a symbol for China's digital innovation strategy with opaque ties to the Chinese government, poses both a threat and opportunity to those who have failed to innovate for 5G at an early stage. These latecomers now require a strategy to position themselves in the digital future, to secure welfare, and to control foreign access to their networks.

With two of Huawei's major competitors, namely Ericsson from Sweden and Nokia from Finland, the European Union does have local manufacturers to supply 5G components to carriers. However, Huawei has been benefitting from enormous economies of scale and scope within China due to governmental support, subsidies, and unlimited access to the largest markets. This has led to Huawei being able to establish itself not only as a competent, but also fast and cheap supplier. As many countries in Europe have already been using Huawei's components for their network, it would cause losses if these components needed replacement by other suppliers (Townsend 2019). Nevertheless, the security aspects still play a vital role in nations' decision-making whether or not to include Huawei in their rollout. In order to stay competitive in foreign markets, Huawei might need to take additional measures to enhance their global image. Sooner or later, Huawei will need to address the allegations of espionage and reveal their ownership structure and proposed ties to the Chinese government at least partially. Certainly, becoming a publicly listed enterprise would help in European and American markets (Li et al. 2019).

In conclusion, we can see that Huawei is both the beneficiary and victim of protectionist actions. While the Chinese digitalization strategy has helped Huawei's growth and internationalization through subsidies, arranged joint ventures, and further efforts to integrate telecommunication equipment innovation into domestic firms rather than relying on imports (Zhang and Alon 2010), it has also sparked mistrust in important international market environments. Furthermore, protectionist measures of other countries to advance their domestic companies' competitiveness has led to a partial exclusion of Huawei.

The development and implementation of 5G networks seems to move the globalized world further apart instead of closer together—ironically.

References

- Ahmad, Ijaz, Tanesh Kumar, Madhusanka Liyanage, Jude Okwuibe, Mika Ylianttila, and Andrei Gurtov. 2017. 5G Security: Analysis of Threats and Solutions. In *2017 IEEE Conference on Standards for Communications and Networking (CSCN)*: 193–199.
- Alon, Ilan. 2003. *Chinese Culture, Organizational Behavior, and International Business Management*. Westport, CT: Praeger.
- Android and Google LLC. 2019. Governance Philosophy. <https://source.android.com/setup/#governance-philosophy>. Accessed November 22, 2019.
- Apple. 2018. Ausgaben Von Apple Inc. Für Forschung Und Entwicklung in Den Geschäftsjahren 2007 Bis 2018 (in Milliarden US-Dollar). <https://de.statista.com/statistik/daten/studie/186168/umfrage/ausgaben-von-apple-fuer-forschung-und-entwicklung/>. Accessed October 16, 2019.
- Balding, Christopher, and Donald C. Clarke. 2019. Who Owns Huawei? *SSRN Journal*. <https://doi.org/10.2139/ssrn.3372669>. Accessed October 3, 2019.
- Barnes, Julian E., and Adam Satariano. 2019. U.S. Campaign to Ban Huawei Overseas Stumbles as Allies Resist. *New York Times*, March 17. <https://www.nytimes.com/2019/03/17/us/politics/huawei-ban.html>. Accessed October 25, 2019.
- Bell, Daniel. 2018. China's Political Meritocracy Versus Western Democracy: Chinese Meritocrats Support Democratic Values but Not Elections, Says Daniel Bell of Shandong University. *The Economist*, June 12. <https://www.economist.com/open-future/2018/06/12/chinas-political-meritocracy-versus-western-democracy>. Accessed October 10, 2019.
- Berke, Jürgen, and Silke Wettach. 2019. Deutsche Telekom Will Binnen Zwei Jahren Auf Huawei Im Kernnetz Verzichten. *WirtschaftsWoche*, November 20. <https://www.wiwo.de/unternehmen/dienstleister/sicherheitsrisiken-befuerchtet-deutsche-telekom-will-binnen-zwei-jahren-auf-huawei-im-kernnetz-verzichten/25249096.html>. Accessed November 24, 2019.
- Booth, William, Jeanne Whalen, and Ellen Nakashima. 2020. Britain, Resisting U.S. Pressure, to Allow Some Huawei Equipment in 5G Networks. *The Washington Post*, January 28. https://www.washingtonpost.com/world/europe/britain-resisting-us-pressure-to-allow-some-huawei-equipment-in-5g-networks/2020/01/28/52e708b4-4145-11ea-99c7-1dfd4241a2fe_story.html. Accessed February 04, 2020.

- Bradshaw, Samantha, and Laura DeNardis. 2018. The Politicization of the Internet's Domain Name System: Implications for Internet Security, Universality, and Freedom. *New Media & Society* 20: 332–350.
- Bushman, Robert M., Joseph D. Piotroski, and Abbie J. Smith. 2004. What Determines Corporate Transparency? *Journal of Accounting Research* 42 (2): 207–252.
- Cuervo-Cazurra, Alvaro. 2018. Thanks but No Thanks: State-Owned Multinationals from Emerging Markets and Host-Country Policies. *Journal of International Business Policy* 1 (3, September): 128–156. <https://doi.org/10.1057/s42214-018-0009-9>.
- Donahue, Patrik, Stefan Nicola, and Brian Parkin. 2019. Deutsche Telekom Warns Huawei Ban Would Hurt Europe 5G. *Bloomberg*, January 28. <https://www.bloomberg.com/news/articles/2019-01-28/deutsche-telekom-is-said-to-warn-huawei-ban-would-hurt-europe-5g>. Accessed November 24, 2019.
- Emmott, Robin. 2019. U.S. Warns European Allies Not to Use Chinese Gear for 5G Networks. *Reuters*, February 5. <https://www.reuters.com/article/us-usa-china-huawei-tech-eu/u-s-warns-european-allies-not-to-use-chinese-gear-for-5g-networks-idUSKCN1PU1TG>. Accessed November 24, 2019.
- Ensafi, Roya, Philipp Winter, Abdullah Mueen, and Jedidiah R. Crandall. 2015. Analyzing the Great Firewall of China over Space and Time. *Proceedings on Privacy Enhancing Technologies* 1: 61–76. <https://doi.org/10.1515/poets-2015-0005>.
- Gabriel, Sigmar. 2018. Speech by Foreign Minister Sigmar Gabriel at the Munich Security Conference. Munich, February 17. <https://www.auswaertiges-amt.de/en/newsroom/news/rede-muenchner-sicherheitskonferenz/1602662>. Accessed October 20, 2019.
- Ghosh, B.N. 2019. *Dependency Theory Revisited*. London: Routledge. <https://doi.org/10.4324/9781315187389>.
- Giesen, Christoph. 2019. China führt Sozialkredit für Unternehmen ein. *Süddeutsche Zeitung*, August 28. <https://www.sueddeutsche.de/wirtschaft/china-sozialkreditsystem-eu-1.4578593>. Accessed February 03, 2019.
- Hoffmann, Stacie, Samantha Bradshaw, and Emily Taylor. 2019. Networks and Geopolitics: How Great Power Rivalries Infected 5G. *Oxford Information Labs*, August 22. <https://oxil.uk/publications/geopolitics-of-5g/>. Accessed October 25, 2019.
- Huawei. 2019a. Ausgaben Von Huawei Für Forschung Und Entwicklung Von 2009 Bis 2018 (in Milliarden Yuan/Milliarden US-Dollar). <https://de>.

- statista.com/statistik/daten/studie/525549/umfrage/ausgaben-von-huawei-fuer-forschung-und-entwicklung/. Accessed October 16, 2019.
- . 2019b. Corporate Introduction. <https://www.huawei.com/en/about-huawei/corporate-information>. Accessed October 16, 2019.
- . 2019c. Huawei Investment & Holding Co., Ltd., 2018 Annual Report. <https://www.huawei.com/en/download?rid={762E723A-BAF2-48C3-904A-8B0149043200}>. Accessed October 16, 2019.
- IEEE. 2017. IEEE 5G and Beyond Technology Roadmap: White Paper. <https://futurenetworks.ieee.org/images/files/pdf/ieee-5g-roadmap-white-paper.pdf>. Accessed October 20, 2019.
- IPLYtics. 2019. Anzahl Der 5G-Patente Der Führenden Unternehmen Weltweit Im Jahr 2019. <https://de.statista.com/statistik/daten/studie/967168/umfrage/anzahl-der-5g-patente-der-fuehrenden-unternehmen-weltweit/>. Accessed October 25, 2019.
- Kaska, Kadri, Henrik Beckvard, and Tomas Minarik. 2019. Huawei, 5G and China as a Security Threat. <https://www.ccdcoe.org/uploads/2019/03/CCDCOE-Huawei-2019-03-28-FINAL.pdf>. Accessed November 24, 2019.
- Kobrin, Stephen J. 2001. Sovereignty@bay: Globalization, Multinational Enterprise, and the International Political System. *The Oxford Handbook of International Business*. 181–205. Oxford: Oxford University Press.
- Kyodo. 2018. Japan Sets Policy That Will Block Huawei and ZTE from Public Procurement as of April. *The Japanese Times*, December 10. https://www.japantimes.co.jp/news/2018/12/10/business/japan-sets-policy-will-block-huawei-zte-public-procurement-april/#.Xdk_BEFCeM9. Accessed October 07, 2019.
- Li, Jiatao, Peixin Li, and Baolian Wang. 2019. The Liability of Opaqueness: State Ownership and the Likelihood of Deal Completion in International Acquisitions by Chinese Firms. *Strategic Management Journal* 40 (2, November): 303–327. <https://doi.org/10.1002/smj.2985>.
- Liang, Fan, Vishnupriya Das, Nadiya Kostyuk, and Muzammil M. Hussain. 2018. Constructing a Data-Driven Society: China's Social Credit System as a State Surveillance Infrastructure. *Policy & Internet* 10 (4, August): 415–453. <https://doi.org/10.1002/poi3.183>.
- Lin, Xuejun, Bingqian Liu, Jiaxu Han, and Xiangyue Chen. 2018. Industrial Upgrading Based on Global Innovation Chains: A Case Study of Huawei Technologies Co., Ltd. Shenzhen. *International Journal of Innovation Studies* 2 (3, September): 81–90. <https://doi.org/10.1016/j.ijis.2018.08.001>.

- Liu, X., X. Zheng, and W. Wei. 2012. From Technological Imitators to Technological Leaders: Evidence from Huawei Case Study. In *2012 IEEE International Conference on Management of Innovation & Technology (ICMIT)*, 11–16. Bali, Indonesia: IEEE.
- McGregor, Grady. 2019. China Is Launching Its 5G Network Ahead of Schedule and on a Spectrum the U.S. Can't yet Match. *Fortune*, October 31. <https://fortune.com/2019/10/31/china-5g-rollout-spectrum/>. Accessed November 20, 2019.
- Rottig, Daniel. 2016. Institutions and Emerging Markets: Effects and Implications for Multinational Corporations. *International Journal of Emerging Markets* 11 (1, January): 2–17. <https://doi.org/10.1108/IJoEM-12-2015-0248>.
- Rühlig, Tim, John Seaman, Daniel Voelsen, and Stiftung Wissenschaft und Politik. 2019. 5G and the US-China Tech Rivalry – A Test for Europe's Future in the Digital Age: How Can Europe Shift Back from Back Foot to Front Foot? *Stiftung Wissenschaft und Politik (SWP) German Institute for International and Security Affairs*. Last modified October 10. <https://doi.org/10.18449/2019C29>.
- Samsung. 2019a. Ausgaben Von Samsung Electronics Für Forschung Und Entwicklung Weltweit Von 2009 Bis 2018 (in Billionen Südkoreanische Won/Milliarden US-Dollar). <https://de.statista.com/statistik/daten/studie/235402/umfrage/ausgaben-von-samsung-electronics-fuer-forschung-und-entwicklung/>. Accessed October 25, 2019.
- . 2019b. Statement on Fingerprint Recognition Issue. <https://news.samsung.com/global/statement-on-fingerprint-recognition-issue>. Accessed October 30, 2019.
- Shepardson, David. 2019. U.S. Agency Votes 5-0 to Bar China's Huawei, ZTE from Government Subsidy Program. *Reuters*, November 22. <https://www.reuters.com/article/us-usa-china-huawei-tech/u-s-agency-votes-5-0-to-bar-chinas-huawei-zte-from-government-subsidy-program-idUSKBN1XW1TC>. Accessed November 24, 2019.
- Stevenson, Alexandra, and Paul Mozur. 2019. China Scores Businesses, and Low Grades Could Be a Trade-War Weapon. *The New York Times*, September 22. <https://www.nytimes.com/2019/09/22/business/china-social-credit-business.html>. Accessed October 03, 2019.
- Tao, Li. 2019. Nearly 60 Per Cent of Huawei's 50 5G Contracts Are from Europe. *South China Morning Post*, July 19. <https://www.scmp.com/tech/>

- big-tech/article/3019248/nearly-60-huaweis-50-5g-contracts-are-europe. Accessed October 10, 2019.
- Townsend, Will. 2019. Who Is 'Really' Leading in Mobile 5G, Part 5: Global Carriers. *Forbes*, July 29. <https://www.forbes.com/sites/moorinsights/2019/07/29/who-is-really-leading-in-mobile-5g-part-5-global-carriers/#47468ce577df>. Accessed October 03, 2019.
- Vernon, Raymond. 1971. *Sovereignty at Bay: The Multinational Spread of U.S. Enterprises*. New York: Basic Books.
- . 1981. Sovereignty at Bay Ten Years After. *International Organization* 35 (3, July): 517–529.
- Yip, George, and Bruce McKern. 2014. Innovation in Emerging Markets – The Case of China. *International Journal of Emerging Markets* 9 (1, January): 2–10. <https://doi.org/10.1108/IJoEM-11-2013-0182>.
- Zeit Online. 2019. Regierung Plant Keine Regeln Gegen Huawei. <https://www.zeit.de/wirtschaft/2019-10/5g-netz-huawei-deutschland-mobilfunkausbau>. Accessed October 25, 2019.
- Zhang, Wenxian, and Ilan Alon. 2010. *A Guide to the Top 100 Companies in China*. Singapore: World Scientific.
- Zhong, Raymond. 2019a. 'Prospective Threat' of Chinese Spying Justifies Huawei Ban, U.S. Says. *The New York Times*, July 5. <https://www.nytimes.com/2019/07/05/technology/huawei-lawsuit-us-government.html>. Accessed October 25, 2019.
- . 2019b. Who Owns Huawei? The Company Tried to Explain. It Got Complicated. *The New York Times*, April 25. <https://www.nytimes.com/2019/04/25/technology/who-owns-huawei.html>. Accessed October 16, 2019.
- Zöttl, Ines. 2020. Trumps Huawei-Desaster. *Der Spiegel*, February 01. <https://www.spiegel.de/wirtschaft/soziales/wie-die-usa-geschaefte-mit-huawei-verhindern-will-a-eeec4f427-2982-4525-8914-b23e5acea5e2>. Accessed February 04, 2020.



14

Managing Foreign High-end Talent at Huawei

David W. Hall and Ting Ren

1 Introduction

One of the greatest difficulties global organizations face today is obtaining solid talent pipelines (Cascio and Boudreau 2016). Global organizations choose from the top talent around the world; however, this can create challenges such as adjusting talent management strategies to different cultures and conditions (Allen et al. 2015). Building a competitive advantage through human capital has become more noteworthy since the global recession (Collings and Mellahi 2009). However, the corporate world is still struggling with managing talent effectively on a global scale (Cascio and Boudreau 2016).

D. W. Hall
Walmart Inc., Bentonville, AK, USA

T. Ren (✉)
Peking University HSBC Business School, Shenzhen, China
e-mail: renting@phbs.pku.edu.cn

According to the World Bank (2019), China is now the world's second largest economy. Over the past decade, the country has experienced tremendous gross domestic production (GDP) growth. Despite the current economic slowdown, China's doors continue to open to the world and new investment continues to pour into and out of China, making it desirable for not only youth to work in China, but also high-end talents with their unique backgrounds. As China continues to grow and markets continue to open, talent will continue to enter the country.

In this chapter, we will follow the theoretical framework of the academic literature on "global talent management" to account for the potentially important issues of high-end global talent working at Huawei. According to Collings et al. (2018), global talent management can be defined as "the attraction, selection, development, and retention of the highest-performing employees in the most pivotal positions globally." Using this framework, we seek to find the origins of motivation that drive the world's best talent to come to Huawei and why that talent might leave the organization. We hope that the findings from this chapter will help other Chinese companies develop practices learned from Huawei's practices.

We explore Huawei and its current human resource (HR) practices that help it maintain its global market strength. We seek to answer the question of how Huawei, China's top international company, has been able to effectively attract, utilize, and retain the top foreign high-end talent. Huawei may be one of the most successful, non-state-owned companies to come out of China and play on the international arena. But why aren't other privately held companies succeeding like Huawei? Based on models developed by Vaiman et al. (2012) and Collings et al. (2018), we create a talent management pillar model, as shown in Fig. 14.1, to provide insight to what successful talent management practice system has been used in the Huawei case.

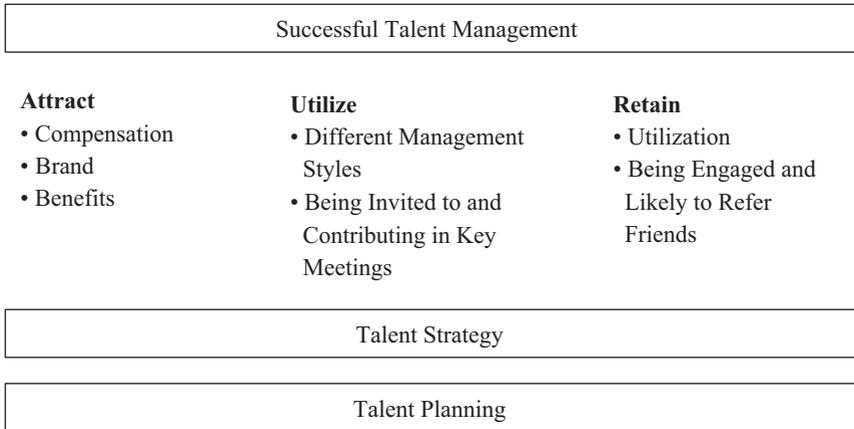


Fig. 14.1 Huawei's talent management pillars model

2 Background of Huawei's Talent Management

Talent development, according to the Huawei website, is defined by the employee's technical talent requirements and Huawei's best practices. Leadership and professional skill development solutions provide professional management (e.g., HR, Marketing, Sales, Operation Management, Project Management), and leadership development helps support the customer while sustaining business development and improving the organizational management skills. Huawei's current breakdown of employees is as follows (Prajna 2018): R&D employees, 45%; marketing, sales, and technical service employees, 35%; and production line employees, 10%. To serve the current development need of the workforce, Huawei has created a talent development learning solution to help its employees improve talent competence and to better support business development. The talent development learning solution includes three segments: (1) Talent Development, (2) Leadership & Professional Skill Development Solution, and (3) Managed Learning (Huawei 2013).

Huawei is continuing to innovate, go global, and further expand into new business areas. Throughout this process, Huawei has continually maintained an open mind while embracing an inclusive approach toward

welcoming superb talent from all fields. This approach strengthens Huawei as it develops key capabilities that will pave the way towards present and future successes. Huawei puts great emphasis on the talent capital value, as much as the financial capital value (Huang 2019). There is common consensus among Huawei executives that talent has a critical component that will pay long-term dividends and will continue to contribute to the long-term success of the company.

In discussions with Huawei executives, the perception of talent at Huawei can be characterized by candidness, initiative, and diversity. Huawei pursues both internal and external talent that can help better create exceptional value within their scope of business. For foreign high-end talent this rings especially true, and Huawei is investing significant resources to attract and help retain them. Internal talent at Huawei is evaluated by: (1) integrity, (2) values, (3) contribution, and (4) experience or competence. This assessment is aligned with the strategic guidelines specified in Huawei's Talent Management White Paper (Huawei 2017), which describes a circular process involving with multiple stages including planning, selection, deployment, mobility, development, incentivization, and supervision. Figure 14.2 presents the framework that is adapted from the White Paper.

3 Managing Foreign High-End Talent: The Huawei Way

For this study, we collected quantitative and qualitative data from 20 Huawei current and former foreign high-end talents. We used interviews, questionnaires, and other openly available reports to closely examine Huawei HR policies and their effectiveness. Huawei's HR department is loaded with tremendous talent, hiring some of the best and brightest individuals in the world, but are their practices working? Does foreign high-end talent want to come to Huawei? Are they making a big impact on the business? Is there a turnover trend about why these individuals are (potentially) leaving? We attempt to examine these questions to better understand how Huawei executes global high-end talent management.

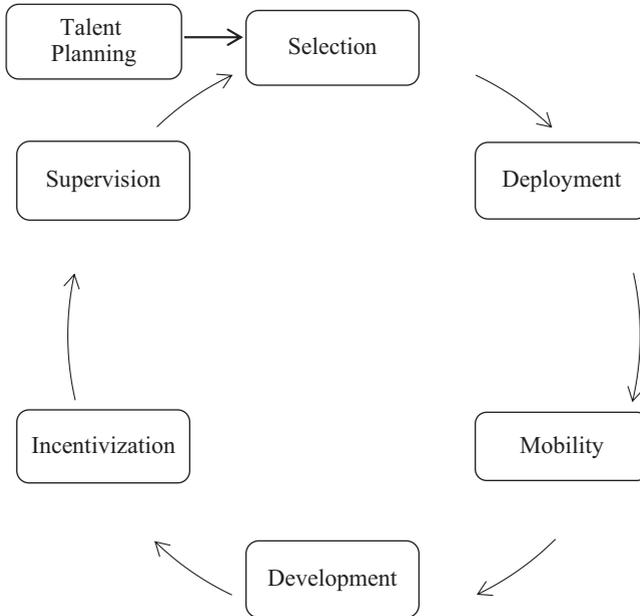


Fig. 14.2 Huawei talent management strategies

3.1 Data Collection

We interviewed 20 foreign high-end talents at Huawei. These participants were not randomly selected; in fact, we asked all foreign high-end talents to volunteer and 20 agreed. In Huawei, virtually all foreign high-end talents are classified as experts and hired for their world-leading professional expertise, and the vast majority are between 50–60 years old. Over the past ten years, the total number of foreign high-end talents at Huawei's headquarters has gradually decreased. Ten years ago, most high-end talents were from Europe and the U.S.A., and few spoke Chinese. Today at Huawei, there are almost no U.S. high-end talents at headquarters and very few from Europe. The turnover rate for high-end talents at Huawei's headquarters is now closer to the global average for foreigners.

The data for this case study was collected from October 2018 to February 2019. The main data collection method was structured interviews with current Huawei global high-end talent (Hay Group Bands 20

and above). Each participant was given the same brief overview of the research without going into details about the propositions. They were told we would ask questions about the recruitment process, time spent at Huawei, and personal engagement levels. Also, each was told that their answers would be completely anonymous and their individual answers would never be identified from the aggregated analysis. It was important to make each individual feel as comfortable as possible so they could freely talk and express their opinion (whether positive or negative). Being mindful of the especially valuable high-end talent's time, interviews were limited to no longer than 30 minutes. The interview questions are listed in Table 14.1.

To examine open-ended interview questions, key words were documented. For example, with the question pertaining to how they ended up at Huawei, we listened for words like "career change," "better opportunity," or "international experience," and so on. After each interview, participant answers were documented to see if keywords matched interview responses. This allowed us to identify common trends between answers. Additionally, verbatim quotes were used as qualitative data to further elucidate quantitative results. For survey questions, we decided to use a 7-point Likert scale. Psychometric research points out that more scale points tend to be better but after 11 points there begin to be diminishing returns (Nunnally 1978).

3.2 Attracting Foreign High-End Talents to Huawei

Questions 21 and 22 are related specifically to the strengths and weaknesses of the recruiting practices in Huawei. Table 14.2 shows the distributions of the interview responses to the two questions.

From Table 14.2, Huawei's recruiting strengths come from both their total compensation and Huawei brand, confirming the company's talent proposition. It also indicates that Huawei's talent incentivization and attraction strategy is functioning appropriately. Other interview responses indicated that quick decisions led to a faster offer and more positive initial work experience at Huawei. Another strength mentioned by multiple respondents was the quality of recruiters. These recruiters were Huawei's

Table 14.1 Interview questions to sample group

#	Question	Dimension
1	Employment length (in years)	Retention
2	How did you end up at Huawei?	Attraction
3	How satisfied are you in joining Huawei?	Retention
4	How would you rank yourself in terms of utilization against peers?	Utilization and development
5	How well does Huawei support your learning environment?	Utilization and Development
6	How important is Huawei's controlled development for you?	Utilization and Development
7	How likely are you to refer a friend to Huawei?	Retention
8	How satisfied are you with your total compensation and benefits?	Retention
9	How frequently are you invited to and actively involved in key meetings?	Utilization and Development
10	What are your contributions to these key meetings?	Utilization and Development
11	What percentage of your capabilities is Huawei utilizing?	Utilization and Development
12	How excited are you to come to work on Monday morning?	Retention
13	How engaged are you in your daily work and key responsibilities?	Utilization and Development
14	Describe the level of satisfaction of your recruiting process at Huawei.	Attraction
15	Did Huawei have you formally go through a pre-set on-boarding process?	Attraction
16	How effective is Huawei in taking foreign high-end talent and making them 100% effective by end of year one?	Utilization and Development
17	How satisfied are you with coaching and mentoring you receive at Huawei?	Utilization and Development
18	How would you rank the difficulty of being in a Chinese company culture?	Retention
19	What are some internal challenges you face on a daily basis working at Huawei?	Retention
20	How effective is Huawei's foreign high-end talent recruitment process from attraction to day-one employment?	Attraction
21	What are two or three strengths of Huawei's recruiting practices?	Attraction
22	What are two or three weaknesses of Huawei's recruiting practices?	Attraction

(continued)

Table 14.1 (continued)

#	Question	Dimension
23	If an employment opportunity at similar compensation was offered, how likely are you to entertain this prospect?	Retention
24	How important was the Huawei brand in motivating you to join?	Attraction
25	How personally satisfied are you with the management direction and support at Huawei?	Retention
26	How many times, in one calendar year, did you meet one-on-one with your immediate supervisor/ manager?	Retention

Table 14.2 Recruiting strengths and weaknesses at Huawei

Panel I		
Recruiting Keyword Response—Strengths	Frequency of use	Percentage
Compensation	7	30%
Brand	7	30%
Great recruiters	3	13%
Quick decision	3	13%
Strong mentor relationship	1	4%
Proactive communication	1	4%
New Employee Orientation (NEO)	1	4%
Total	23	100%
Panel II		
Recruiting Keyword Response - Weaknesses	Frequency of use	Percentage
Lack of information/miscommunication	8	30%
Lack of transparency	7	26%
Process took too long	5	19%
Lack of benefits information	3	11%
Pay recruiting expenses (airfare, hotel, etc.)	2	7%
No signing bonus until after probation period	1	4%
Chinese company culture	1	4%
Total	27	100%

gatekeepers from the initial contact to the first day. Additional strengths mentioned by only a few were strong mentor relationships, proactive communications, and quality of new-employee orientation. The few mentions indicated that although these are good practices, they may not be well-used across Huawei and individual experience may differ.

Huawei desired to assign mentors during the final stages of the recruiting process to ensure individuals feel more comfortable upon entry and to better help them integrate into the company. However, the lack of participant responses indicates that this was not executed well. It may be a good practice, but needs good execution. At least one individual felt he had a strong relationship with a mentor and that he was well cared for. This point of being assigned a mentor during recruiting process may be different from the on-going mentoring, which is better correlated with utilization and retention.

A related question (Question 17) asked the satisfaction level with coaching and mentoring that respondents received at Huawei. Only 26% of respondents gave either a 1 or 2 to this answer, indicating low satisfaction level. In addition, from the qualitative data, several respondents (even those who gave 3's and 4's) mentioned the following: "Lot of turnover in mentors." "I don't receive mentoring/coaching." "Can't recall the last conversation I had with my mentor." "Mentors leave and rotate often." From these responses, it's clear that there is a performance gap in the quality and frequency of mentoring and coaching received at Huawei. However, correlating the mentoring question with Question 14, which describes the level of satisfaction of recruiting at Huawei, shows very little, if any, correlation (0.22).

One big question surrounding mentoring and coaching at Huawei is what type of person to be assigned to the foreign executive. Maybe the easiest solution would be to assign another foreign executive, but that might leave both executives essentially siloed together. Another solution may be to have one foreign and one local Chinese mentor on day one. In a piece on retaining and developing high potential talent, the National Human Services Assembly provided best practices to build a more effective mentor program and one of the initiatives mentioned was to encourage training mentors across different silos, encouraging employee participation, and evaluating participation and involvement (Key and

Jeyasekar 2018). It may be beneficial for all parties to have a local Chinese executive and a foreign executive jointly serve as mentors for new high-end talent at Huawei.

At the weaknesses end, a few noteworthy responses were captured from the interviews. Per Table 14.2, the most common weaknesses mentioned were lack of information and miscommunication, lack of transparency, process taking too long, and lack of benefits information. Lack of information and transparency seems to go hand-in-hand in the results. Since the issue has been brought up so frequently in the interviews, it appears to serve as the red flag in Huawei's recruiting process. The specific example of this lack of information and transparency often pointed us to the same issue—Saturday work. At Huawei, the last Saturday of the month is a mandated work day. Unfortunately, Huawei recruiters do not share this key information with foreign recruits who typically do not work Saturday and Sunday. This information of Saturday work often comes to new foreign employee after they sign their contract and leads to tremendous frustration. It is clear that Huawei needs to be up-front about this expectation. Saturday work at Huawei, however, does have monetary or vacation benefits. Even though it is required by Huawei, work on Saturday can be either double-pay or employees can acquire an extra day of vacation.

Another issue that was cited in the recruiting process at Huawei was the process taking too long. This is not consistent with three respondents who cited quick decision making as a recruiting strength. However, some respondents said it took around six months from initial point of contact to the time they signed their Huawei contract. They mentioned that there were periods of time where they wouldn't hear back for weeks at a time and felt left out in the dark about the whole recruiting process.

Finally, another area for improvement pertains to benefits information. In our initial propositions, it was thought that one of the three reasons why individuals would be attracted to Huawei were (1) brand, (2) compensation, and (3) benefits. The first two seemed to be supported through our interview survey data. The last, benefits, proved to be an area for improvement. Expectations about annual leave, which Huawei doesn't offer for foreign talent at headquarters, unclear medical and insurance

benefits, and retirement funding expectations were all among the answers that our foreign Huawei executives mentioned.

Some other weaknesses were paying recruiting expenses (airfare and travel to/from China), no signing bonus until after six-month probation period, and Chinese company culture. These three reasons do not carry as much weight as they were less significant than other improvement areas. It is important to note these weaknesses as some of them overlap on prior areas of improvement (for example, paying recruiting expenses may have been tied to key improvement area #1—lack of information or miscommunication). Integrating to the Chinese company culture is a challenge for some foreign high-end talent.

With all the weaknesses previously mentioned, how can Huawei better attract global high-end talent? One of the basic guidelines in Huawei's talent selection is matching the best HRs with the best opportunities. This being a fundamental guideline, Huawei should improve its communication process during the recruiting phase. Foreign high-end talent sees the reluctance to share bad information as dishonesty. They feel it is not a good way to begin a relationship. As a result, Huawei needs to be open and honest about the process, how long it typically takes to sign the final contract, what to expect as a work schedule—working on the last Saturday of the month, what benefits to expect as a foreigner working in Shenzhen, and so on. It would improve the recruiting process if these items were clear from the beginning and it would be beneficial for Huawei to invest in a sort of foreigner recruiting and on-boarding plan.

The foreigner recruiting and on-boarding plan can be a document to help distinguish Huawei from other international companies. It can be a document that serves as an FAQ compiled by current Huawei executives on things these executives wished they had known prior to joining Huawei and after they signed the contract to come to Huawei. Being open and honest about these weaknesses in the recruiting process would help better clarify expectations for prospective employees and could turn weaknesses identified in our survey into strengths. New employees would now join Huawei better informed of what the company culture is like.

Table 14.3 is a summary guide to foreigners working at Huawei. Content and topics for this were vetted by several foreign Huawei executives from the data collection. Ideally, this would be distributed to foreign

Table 14.3 Summary guide for foreigners at Huawei

Culture and background	Core values
Year one	Working Time
	Communication
	Horse Racing
	Punishments and Fines
	Winning Attitude
Implementing change	Earning Trust
	Advice from Chinese Huawei Managers
	Getting Support from Key Decision Makers
	Initial Solution
Bosses, peers, and subordinates	Pilot
	Rollout
	Boss is "King"
	Have Good Relationships with Peers
	Balanced Control of Bad Behavior

candidates as they begin progressing through the interview process. All foreign high-end talent isn't cut out for Huawei and Huawei should find the best global talent; however, these candidates need to understand the culture, history, and expectations that Huawei has for them.

3.3 Utilizing Foreign High-End Talent at Huawei

A few factors may influence the utilization of foreign high-end talent at Huawei. Question 11 explicitly asks the respondents "In your overall Huawei employment, what percentage of capabilities is Huawei utilizing?" We found that, on average, our sample group of foreign Huawei high-end talent felt they were using 56.6% of their total capabilities while working at Huawei. This suggests that Huawei may not fully utilize global high-end talents. We correlate this item with antecedent questions to identify potential causes. It turns out the correlations with the items about "contribution and invitation to key meetings" and "engagement in daily work and responsibilities" are both strong ($r = 0.429$, $p < 0.10$, and $r = 0.550$, $p < 0.05$, respectively), suggesting different management styles may negatively affect talent utilization. Relating Question 11 "capabilities utilization" to Question 7 asking "How likely are you to refer Huawei

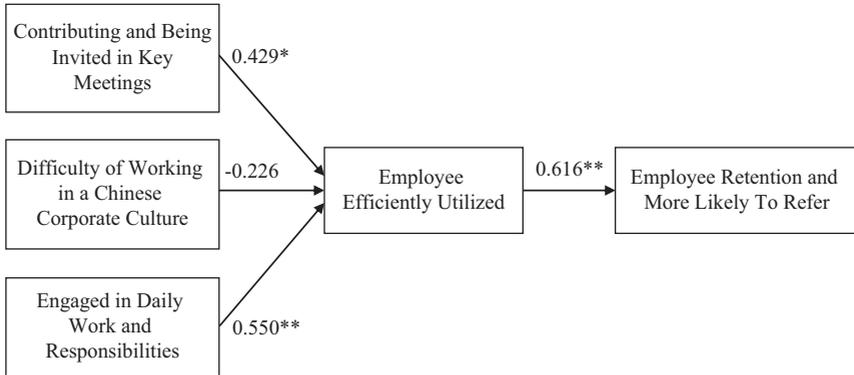


Fig. 14.3 Factors relating to talent utilization. (Notes: * $p < 0.10$, ** $p < 0.05$)

to a friend?”, the consequence can be substantial given the strong correlation between the two items ($r = 0.616$, $p < 0.05$).

Figure 14.3 shows the three factors we noticed that positively correlated with utilization: (1) contributing in meetings, (2) not seeing the Chinese company culture as a difficulty, and (3) being engaged in daily work. From the interview questions, foreign Huawei executives mentioned they were exactly neutral (neither yes nor no) when asked if they were invited to key meetings. Additionally, their response about personal contributions when invited to meetings was also neutral. This leads to the conclusion that foreign high-end talent *needs* to be invited to key meetings to be better utilized at Huawei. In subsequent discussions regarding this interview question of whether or not they are invited to key meetings, one of the big factors of not being invited was lack of translation services available. For Huawei, it may be worth the investment to provide the translation services given the money invested in bringing these individuals to Huawei. Being invited to key meetings allows foreign talent to be better informed and stay more connected.

Another simple factor that can help increase foreign high-end talent utilization is having pre-read materials distributed before meetings and translated. Because Huawei has world-class translation services this can be easily done. In the interview Question 19 regarding internal challenges that foreign talents face, 42% mentioned English documents or

communication as some of their issues. If Huawei is able to better utilize their translation services and translate documents more seamlessly, their foreign counterparts would also be able to utilize their professional capabilities to positively impact Huawei's growth. This would make meetings with Chinese PowerPoint more efficient, as foreign talent would be able to better prepare for key stakeholder meetings and voice their opinions at the meetings.

3.4 Retaining Foreign High-End Talents in Huawei

Huawei has struggled to retain high-end foreign talent because of utilization issues, for example, not being involved in key meetings. The correlation data shown in Table 14.4 powerfully demonstrates this situation. There is a strong negative correlation when using intention to leave role for similar compensation as one end of the association and measuring against refer a friend, percentage of capabilities utilized, excited for work, and employment length. This allows for a reasonable conclusion that as foreign talents are more likely to leave, they are less likely to refer their friends, less excited to attend work, less likely to stay employed with Huawei, and less likely to have their capabilities utilized. These data also

Table 14.4 Correlations among retention factors

	Intention to leave for similar compensation	Refer a friend	% of capabilities utilized	Excited for work	Employment length
Intention to leave for similar compensation	1				
Refer a friend	-0.812**	1			
% of capabilities utilized	-0.613**	0.616**	1		
Excited for work	-0.701**	0.723**	0.504**	1	
Employment length	-0.752**	0.508**	0.420*	0.506**	1

Note: * $p < 0.10$, ** $p < 0.05$

confirm the strong positive correlations between refer a friend as one end of the association and percentage of capabilities utilized, foreign talents excited to come to work, and employment length at the other end.

The final question posed to our subject group was about meeting with their managers on a yearly basis. From the responses, the numbers of yearly meetings with supervisors/managers were put into one of three groups—0-5 times, 6-11 times, and more than 12 times in a one-year period. Among all the responses, ten reported 0-5 times of meeting with supervisors/managers, six reported 6-11 times, and only three reported 12 times above, suggesting monthly meeting with their supervisors/managers could be a rather rare case for these foreign high-end talents. This validates the previous discovery that not involving foreign high-end talent in the key daily activities and connecting them to other people in the company, especially their supervisors will complicate talent retention at Huawei.

A high proportion of responses from our last question regarding yearly one-on-one meetings with their managers were negative. In one response, the interviewee quoted the following, “Too many boss changes. I’ve been at Huawei for four years and I’m on my 5th boss. I’ve been unable to establish any healthy relationship with my boss over the last four years.”

4 Conclusion

Huawei is among the most important companies in both China and the world. The company leads the world in producing telecommunications equipment and has recently become second in global smartphone sales. Huawei’s growth over the past decade has been remarkable and its lessons should be a blueprint for all companies trying to become successful globally. As Huawei has expanded globally, it has increased its foreign talent pool. This brings both solutions and challenges to Huawei’s talent management practices.

From this case study in interviewing foreign Huawei executives, we can reasonably conclude with the following key findings. First of all, with regard to attracting top talent, Huawei leverages its brand and compensation to pull in the best international talent; however, there may be a

significant concern regarding the culture and working conditions of Huawei that needs to be addressed. Foreign talent coming in the organization are very frustrated by the lack of information of the true working environment, and many of them mentioned they may have not come if actual information was given to them. Huawei needs to be upfront with foreign interviewees about expectations and better explain the differences between Western and Chinese corporate cultures. A foreigners' guide to working at Huawei would be a stepping stone in resolving this issue.

Second, top foreign talents are not being invited, and ultimately are not contributing, to key meetings due to language barriers. This inhibits utilization of foreign executives and has lowered their capabilities to being utilized to just over 50% on average. For Huawei to increase foreign talent utilization, Huawei should invest more significantly in having translation services available in key meetings and leverage translation before meetings so foreign executives can better prepare for these meetings.

Finally, as Huawei increases the utilization rate of its foreign executives, retention will likely improve. Huawei can help utilization and, ultimately, retention by ensuring more information is given to new foreign high-end talent through managers regularly meeting with these individuals (recommended on a monthly basis). There is virtually no foreign high-end talent in middle or senior management. All are experts. Senior management requires relationships and political skills. It requires being deeply embedded in the Huawei information communication network. That is virtually impossible for a foreigner. A foreigner can rarely, if ever, win a political battle with a Chinese who has these advantages. Thus, this makes the manager far more important than ever before to address complex situations. The manager needs to shield the foreign high-end talent from challenging cultural environments. As of right now, the foreign high-end talent does not feel they are meeting on a regular basis with their managers, only 15% of our interviewees said they meet *at least* once a month with their supervisor. Huawei should give their foreign talent better access to the key decision makers which will better enable utilization. The data suggests that if utilization is fine, then there will be no need to be concerned about retention.

This was not a tightly designed empirical study. Interview participants were volunteers. We did not have a reference group to make quantitative

comparisons. For example, is the attraction power of compensation more or less than that of other companies? From Huawei's data, we did know that the pay packages of Huawei were very high versus global IT companies. Also, our sample size was small; but it still represented a substantial proportion of the total foreign high-end talent population at headquarters.

Huawei's foreign high-end talent headcount at its headquarters dropped gradually from a high in 2010–2014 to a low in 2020. Ten years ago, Huawei was focused on finding the best Western talent. The company tried, but failed to successfully employ Western high-end talents into management positions. This is because a primary role of managers is vertical alignment to strategic objectives and horizontal alignment between teams and departments. Western managers with no Chinese language skills were at a disadvantage comparing with Chinese managers who, through their interpersonal networks, could sense and shift to changing priorities. Over time, foreign high-end talent “managers” were replaced with foreign high-end talent “experts.” As the company's professional experience improved, foreign high-end talents in accounting, HR, marketing, and so on became less prominent. This also resulted in fewer foreign high-end talent positions based in headquarters.

China is becoming one of the largest consumer markets in the world, and from the findings of the present case study, aspiring Chinese companies can learn how to better bring foreign talent on board. This is first done by setting clear expectations of what to expect in the company culture during the recruiting process. Clear expectations will facilitate bringing in the right talent with a positive mindset and these individuals will not see the Chinese company culture as a challenge. Additionally, these upcoming companies will better understand of how to utilize their talents and make sure the international talents' capabilities are better utilized and, ultimately, retained. Eventually, investments in foreign high-end talents need to be smart, and rising companies need to feel that their international talents provide significant return on investment.

References

- Allen, David, Yih-teen Lee, and Sebastian Reiche. 2015. Global Work in the Multinational Enterprise: New Avenues and Challenges for Strategically Managing Human Capital across Borders. *Journal of Management* 41 (7): 2032–2035.
- Cascio, Wayne F., and John W. Boudreau. 2016. The Search for Global Competence: From International HR to Talent Management. *Journal of World Business* 51 (1): 103–114.
- Collings, David G., and Kamel Mellahi. 2009. Strategic Talent Management: A Review and Research Agenda. *Human Resource Management Review* 19 (4): 304–313.
- Collings, David G., Kamel Mellahi, and Wayne F. Cascio. 2018. Global Talent Management and Performance in Multinational Enterprises: A Multilevel Perspective. *Journal of Management*. <https://doi.org/10.1177/0149206318757018>.
- Huang, Weiwei. 2019. *Built on Value: The Huawei Philosophy of Finance Management*. Singapore: Palgrave Macmillan.
- Huawei. 2013. *Talent Development Learning Solution*. Huawei Technologies, Inc.
- . 2017. *Huawei Talent Management White Paper VI.0*. Huawei Technologies, Inc.
- Key, Karen, and Elma Jeyasekar. 2018. Retaining and Developing High Potential Talent. National Human Services Assembly.
- Nunnally, Jum C. 1978. *Psychometric Theory*. New York, NY: McGraw-Hill.
- Prajna, Soumya Smita. 2018. Talent Is Key, Says Huawei. *CommsMEA*, April 22.
- Vaiman, Vlad, Hugh Scullion, and David G. Collings. 2012. Talent Management Decision Making. *Management Decision* 50: 925–941.
- World Bank. 2019. The World Bank in China. <https://www.worldbank.org/en/country/china/overview>. Accessed March 23, 2020.



15

Final Reflections: Global Challenges from Innovation and Connectivity

Christoph Lattemann, Ilan Alon, and Wenxian Zhang

We started this book project in early 2019 when nobody had any idea about the consequences of the covid-19 crisis. While writing this final reflection chapter in April 2020 the world has completely changed. The coronavirus is now spreading around the world. In the urge of defeating the coronavirus drastic measures have been taken by various countries. Some of these measures rely on new Internet technologies such as GPS tracking, facial recognition, contact tracing, drive-through testing, etc.

C. Lattemann (✉)
Jacobs University, Bremen, Germany
e-mail: c.lattemann@jacobs-university.de

I. Alon
University of Agder, Kristiansand, Norway
e-mail: ilan.alon@uia.no

W. Zhang
Rollins College, Winter Park, FL, USA
e-mail: wzhang@rollins.edu

South Korea has been coined as a role model in handling the coronavirus outbreak. South Korea, like for example China, Iran, Singapore, and Taiwan, has been quick to use innovative IT tools and techniques to fight against the virus. Wireless communication technologies, such as 4G—and the new 5G—play a major role in managing the crises and in tracking peoples' movements. Today, tracking the smart phones of coronavirus patients ranging from anonymized aggregated data to monitor the movement of people more generally. Until today, tracking the movements and activities of people is restricted by limited technologies and strict regulations. The 5G standard, heavily pushed by Chinas multinational enterprise Huawei, will be much more powerful than the current 4G standard. The 5G standard leads to a crossroad that will most likely either end in digital liberalism or in digital authoritarianism. The latter will cause ideological, geopolitical, economic, and national security conflicts between China and other countries. This edited book discusses the intertwined relationships between Huawei, China, global standard setting and the implied threats.

1 Huawei: 5G and the Link to the Chinese Government

Are we at a crossroad that could lead either to digital authoritarianism or to digital liberalism? What are the consequences of a global technology leader in communication standards? What is the role of the Communists Party of China in this game? What are the answers from other countries to these questions? The 13 chapters of this book, written by scholars from different countries (e.g. U.S.A., China, European countries) and with different academic backgrounds, take a deep look into these questions.

The closest denominator to summarize the in-depth discussions in this book lies in the question about consequences and threats of power over physical and technological connectivity in combination with liberal vs. authoritarian regimes.

Huawei plays a key role in this game because of two reasons. First, Huawei is a leading global telecommunication firm in the 5G

technology, a wireless telecommunications standard, which promises revolutionary changes in speed, capacity, and efficiency. In combination with new technologies such as artificial intelligence (AI), big data, cloud computing, robotics, and smart sensors this technology becomes a superpower to control people in every aspect of their lives. Second, as intensely discussed in this book, Huawei is a Chinese company with very close ties to the Communist Party of China. Yu (Chap. 5) states that “Huawei’s global leadership in 5G infrastructure and China’s global ambition ... are ... one.” And it is well known that China has a quite different understanding of privacy, freedom, democracy, and human rights than that of many other countries.

2 Huawei as a Threat?

Huawei’s global 5G expansion is described in this book as a multidimensional threat to the Western world: (1) as a national security threat to non-Chinese countries (Chaps. 2, 3, 4, 5, and 8); (2) as an economic threat (Chaps. 2, 3, 4, 7, and 8); (3) as a geopolitical threat (Chaps. 2, 3, 4, 6, 7, and 8); and finally (4) as an ideological threat (Chaps. 5 and 8). But Chaps. 4, 5, 6, and 9 show that the Huawei case hides another very interesting and important aspect, which is beyond industry leadership (Chaps. 10, 11, and 14), geopolitics, and companies’ competencies and resources (Chaps. 10–14). It is about the globalization of the high-tech world, where autocracy is much more prominent than ever. New technologies such as the 5G standard enables the systematic domination, regulation, and control of every detail of human life. As Zhao (2016) point out in his book *A Possible World of All-under-Heaven System*, we should not underestimate the possible threats a technological based dictatorship. In this context, Shortgen (Chap. 3) refers to Russian President Putin when describing the threat of AI leadership: “Artificial intelligence is the future ... Whoever becomes the leader in this sphere will become the ruler of the world” (Meyer 2017).

Consequently, we need to ask if it is true that we now face the threat of establishing a new technological standard that is set by a non-transparent, and probably ideologically driven company, which is used by the

Communist Party in China. Ultimately, this is the core of the controversy debate in this book.

3 The Threat of Technology Standard Setting

The key issue with standard setting and new Internet technologies is that there is a tendency toward a monopoly due to the underlying characteristics of a winner-takes-all market. Firms can shape the future of an industry by developing a leading technology and an industry standard (Tsang & Futschi—Chap. 6). Huawei's proactivity in applying for new patents and industrial standards shows the impacts of its innovation capabilities (Chaps. 10–12) and indicates that Huawei is taking advantages of its technology to make other firms' innovation more dependent on its innovations (Tsang & Futschi—Chap. 6).

Connecting the technology leadership with geopolitical aspects, Kirste and Holtbrügge (Chap. 13) write: “When and how nations employ 5G technology will not only determine their economic power position for decades to come, but also have a great influence on their sovereignty over other states, their independence, and their political power... those [enterprises] ... building and controlling these networks will have a significant influence on what the 5G technology of the future will look like.” Furthermore, “... [t]he stronger the ties between the ... [enterprise] ... and the national government, the larger the influence that state can exert ... the larger their [the state's] power and influence over other states will be in the future.”

4 China Dream and BRI and 5G Technology

Drilling into the Huawei case, it is striking how Huawei's technology rise is complementing the global “China Dream” objective and how it is supporting China's *Going Global* strategy. Blanchard and Yu (Chaps. 4 and 5) point out that China's ultimate strategy will be to govern the world by

2050 with a set of global institutional architecture, emphasized on “indigenous innovation.”

China’s Belt Road Initiative (BRI)—as part of the China Dream—is a very good depiction of China’s claim. Taking “the Silk Road Economic Belt” and “the 21st Century Maritime Silk Road” as axis, the BRI now is the largest platform for international cooperation. The BRI is a massive project involving the funding and construction of a system of physical infrastructure such as roads, railways, oil and natural gas pipelines, ports, and airports (Zhang, Alon and Lattemann 2018). But with Huawei’s worldwide fiber-optic and 5G technology projects BRI is becoming far more comprehensive since it also covers the standard setting of the future communication technology.

Although Huawei is coined officially as a privately owned company, there is a high correlation between Huawei’s market access in a country’s 5G network with China’s partnership with the country on the BRI. Until spring 2020, China has built infrastructure connectivity in every continent including the Arctic region. Further, Huawei’s market access seems to be heavily financed through China’s state financial institutions. This very well coincides with China’s offer of an own idea about global governance. There is no doubt that BRI starts a worldwide competition about influence, power, and standard settings. These new networks and initiatives show that China is triggering a change towards a new world order.

5 China’s 2030 Vision and 5G as a “Cooperative Winner Takes-All-Market”

China’s 2030 vision, to drive key technological breakthroughs in areas of AI, is only possible with China’s early adoption of 5G infrastructure within the country and globally, which provides the 5G network infrastructure to enable China’s AI industry to develop. According to (Yu—Chap. 5), this development leads to a global economic re-convergence between the Global North and the Global South and will divide the world (East vs. West), rather than integrating it. Supporting Yu’s

standpoint, Tsang and Fuschi (Chap. 6) draw a direct parallel between the trade war between China and the U.S.A. and point to “... a diversification in terms of 5G infrastructure, where the American and the Chinese standard diverge.”

This competition about influence, power and standard setting let many countries ban Huawei and push other telecom providers such as Samsung or Ericsson. It further brought up regional connectivity initiatives, such as Russian’s Eurasian Economic Union in 2014, South Korea’s Eurasian “Silk-Road Express” project, India’s Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), and the EU’s Euro-Asian Connectivity Mapping Exercise.

But there seems to be a light of liberalism at the end of the technology war. Some authors in this book point out that there is not only a path towards trade war and competition but also a path towards a cooperative solution, because it might well be that the 5G technology turns out to become a “cooperative-winner-takes-all market” and not a “winner-takes-all market.”

For example, Huawei is a member of various industrial standard organizations and proactively participates into standardization activities (Tsang and Futsch—Chap. 6). This indicates that the 5G technology has a chance to become a “cooperative-winner-takes-all market” and there will and must be a collaboration between standard setters in the market. Such a constructive competition and deep interdependences is, further, the key to solve conflicts (Lairson and Shortgen—Chaps. 2 and 3).

Huawei’s transition toward a multinational enterprise, described in Chaps. 10–14, indicates this path of a constructive competition. Huawei follows a strong service-oriented strategy (Hensman and Liu—Chap. 10), where the technology for the partner companies and operators is co-created (including sharing of patents and licenses) by integrating the users and customers, telecommunication providers as well as other businesses in the development of new solutions. This service-orientation is going hand-in-hand with Huawei’s open innovation approach. This includes the building of longer-term joint innovation partnerships and service ecosystems with joint innovation capabilities to wider stakeholders such as governments, universities, and wider industry stakeholders (Chaps. 10, 11, and 12).

6 Conclusion

This discussion shows that this edited volume on Huawei is much more than just a collection of case studies on Huawei. This book greatly contributes to the current debate about the tensions between China and the Western world, about global leadership, geopolitical power, national security, ideological, and economic threats, global connectivity, and last but not least about the shape of the upcoming technological world order. The future will show if Huawei's global expansion will fundamentally transcend global economic paradigm towards a Chinese digital authoritarianism (Yu—Chap. 5) or if cooperative, user- and partner-centered solutions with digital liberalism will dominate. Probably, the current covid-19 crisis will show that co-operation is the best way to solve world problems.

References

- Meyer, David. 2017. Vladimir Putin Says Whoever Leads in Artificial Intelligence Will Rule the World. *Fortune*, September 4. <https://fortune.com/2017/09/04/ai-artificial-intelligence-putin-rule-world/>. Accessed April 1, 2020.
- Zhang, Wenxian, Ilan Alon, and Christoph Lättemann. 2018. *China's Belt and Road Initiative: Changing the Rules of Globalization*. Cham, Switzerland: Palgrave Macmillan.
- Zhao, Tingyang. 2016. *A Possible World of All-under-Heaven System: The World Order in the Past and for the Future*. Beijing: CITIC Press Group.

Index¹

A

Adamowicz, Jakub Hera, 214, 215

Africa

FOCAC and, 157

geopolitical-economic
implications, 131

Huawei Marine Network and, 163

neoliberal transformation in, 156

PRC-backed financing and,
158, 159

price competitiveness in, 156

SAIS-CARI report on, 100, 101

social responsibility
activities in, 136

AI, *see* Artificial intelligence

AIC, *see* Application

Innovation Center

Alibaba, 99, 229

Allison framework, 173

Apple

low-cost iPhone of, 131

R&D investment by, 104

smartphone competition and, 104

smartphone market share, 130

Application Innovation Center
(AIC), 234

Artificial intelligence (AI), 3, 20, 43,
47, 53, 71, 89, 103, 117, 187,
217, 329

development, 43

digital iron curtain and, 107–108

5G and, 32

Hikvision Digital Technology
and, 187

*New Generation Artificial Intelligence
Development Plan*, 43, 45

Putin on, 43, 329

Vision 2030 and, 103

¹Note: Page numbers followed by 'n' refer to notes.

Augmented and virtual reality
(AR/VR), 117

Aventura Technologies, 184

Awards

- cloud and data service, 226
- domains, 278
- interdependent innovation
and, 279
- networking, 226

B

B2B, *see* Business-to-business

B2C, *see* Business-to-consumers

Balakrishnan, Vivian, 42

Belt and Road Initiative (BRI), 4,
22, 57, 91–97, 109, 128, 129,
136, 162, 330–331

China Dream objective
and, 330–331

countries signed up to, 94–97
digital infrastructure and, 4,
91–93, 109

digital iron curtain and, 108
economic benefits, 93

5G approval status, 95

Huawei expansion and, 94–97

political profile of countries, 108

by region, 96

strategic benefits, 93

version 1.0, 91, 93, 94

version 1.5, 91

version 2.0, 91–94, 108

BIS, *see* Bureau of Industry and
Security

BRI, *see* Belt and Road Initiative

British Telecom (BT), 234, 238, 272

Built on value (Huang), 199, 208,
209, 214, 215

Bureau of Industry and Security
(BIS), 118, 236

Business-to-business (B2B),
228, 235–236

Business-to-consumers (B2C),
228, 235–236, 240

ByteDance, 100

C

Cameroon-Brazil Cable System
(CBCS), 162

Capitalism, 14–21, 30, 34, 48, 90,
104, 109

See also Chinese state capitalism;
Data capitalism

CBCS, *see* Cameroon-Brazil
Cable System

CCP, *see* Chinese Communist Party
C&C08 (switching system),
121, 152

CFIUS, *see* Committee on Foreign
Investment in the
United States

China, 65, 174

See also People's Republic
of China

China Dream objective, 330

Chinese Communist Party (CCP),
16, 17, 20, 24, 67–69,
71, 72, 132

aims of, 178

domestic policy instrument and,
6, 172–174, 176–179

5G link to, 20

Chinese Social Credit System, 298

Chinese state capitalism

Asian influences on, 15
debates surrounding, 15

- diminishing returns and, 19, 20
 - distributed system of state
 - actors, 18
 - domestic environment
 - and, 15–21
 - features, 14
 - Huawei success and, 5, 21
 - middle income trap, 19, 20
 - overview, 13–14
 - SOEs and, 10–11
 - strategies of, 15, 20
 - structure of, 18
 - views motivating, 20
 - Chinese technology
 - globalization and
 - competition in, 44
 - innovation policy in, 45–46
 - New Generation Artificial Intelligence Development Plan and*, 45
 - Chinese Unicorns, 19
 - Ching Kwan Lee, 159
 - Cisco, 23, 75, 77, 125, 134, 137, 241
 - IP dispute with, 75
 - R&D investment by, 104
 - telecommunication equipment
 - market share of, 16
 - Committee on Foreign Investment in the United States (CFIUS), 75
 - Competition
 - Chinese technology and, 57
 - countries and, 44
 - destructive or constructive, 42, 56–58, 332
 - experts and, 208
 - geo-strategic, 183, 184
 - globalization and, 44
 - Krugman on, 41
 - PRC and, 42–43, 57
 - price, 54, 156, 157, 230
 - R&D internationalization and, 208
 - smartphone, 105
 - US and, 42–43, 57
 - Core-net Innovation Center (CIC), 234
 - Corporate Social Responsibility* statement (Huawei), 165
 - Corruption Perceptions Index (CPI), 178
 - Council on Foreign Relations, 49
 - COVID-19, 138, 327
 - CPI, *see* Corruption Perceptions Index
 - Crisis management, 5, 135
 - Customer entry barriers, 227
 - Customer innovation leadership, 227
 - Customization lock-in, 230
 - Customization, practical
 - benefits of, 230
 - at no extra charge, 228–230
 - standardization bodies and, 229
 - Telfort and, 228
 - Cybersecurity, 8, 174, 183, 184
- D**
- Data capitalism
 - defined, 90
 - Huawei expediting, 104, 109
 - DBS, *see* Distributed base station
 - Deep interdependence
 - asymmetries in, 22, 27, 30
 - economic coercion and, 2, 3, 14, 22
 - global environment and, 2
 - ICT and, 23
 - options space and, 31–35

- Deep interdependence (*cont.*)
 overview, 14
 silo thinking and, 31
 US undermining, 32
 weaponizing of, 22
- Deng Xiaoping, 56, 68, 118, 131
- Dependence, 22, 69–71, 153, 159, 242, 268
- Dependency theory
 background related to, 292–293
 conclusions, 302–303
 MNEs and, 294, 295, 298, 299, 302
 national interests and, 297–302
 overview, 9
 power asymmetries and, 9, 292, 293
 sovereignty at bay and, 293–295
 sovereignty-preserving approach, 298
- Diamond model, 198
- Digital global ambition
 BRI 1.0–1.5, 91
 BRI 2.0, 92–94
 economic growth and, 92, 93
 infrastructure development and, 92, 93
 of PRC, 91–97
 of Xi, 91
- Digital iron curtain, 50
- Ding Yun, 232
- Distributed base station (DBS)
 heterogeneous market needs and, 274, 275
 Telfort and, 229
- Domestic environment, 2, 13–35
- Domestic policy
 internationalization strategy and, 149–153
 overview, 6
- Domestic policy instrument
 objectivity criterion and, 173, 176
 rule by law and, 179
 rule of law and, 176, 177, 179
 three-world framework and, 6, 172–175, 183
 Zhao and, 177
- E**
- Economic coercion
 deep interdependence and, 2, 3, 14, 21–31
 May 2019 actions of, 26
- Economy
 BRI benefits to, 93
 digital global ambition and, 92, 93, 95
See also Geopolitical-economic implications; Independent global economic agent; Political economy
- 863 Project, 68
- Ellison, Larry, 122
- Emerging market multinational enterprises (EMNEs), 197, 218
See also Interdependent innovation; Six-M model
- Employee ownership system, 133
- Employee Stock Option Programs (ESOP)
 of Huawei, 181, 212, 213
 of Nokia, 211
 TUP, 213
- Encircle cities from countryside strategy, 152
- The End of Competitive Advantage* (McGrath), 48

Enterprises Innovation Center (EIC), 234

Ericsson
 5G national security and, 54, 88, 303
 5G patents, 88, 295
 R&D investment by, 125, 210
 telecommunication equipment market share, 151

ESOP, *see* Employee Stock Option Programs

European Union (EU)
 B2C brand building, 235–236
 BT and, 234
 digitalization approach of, 297
 establishing JIC, 236
 5G and, 54, 76, 237, 303
 IOT and, 237
 joint innovation strategy and, 7, 225, 239–242
 overcoming resistance in, 236–239
 R&D and, 237
 Silk Road initiative and, 301
 strategic future laying with, 102–103
 Telfort and, 229

EXIM Bank, *see* Export-Import Bank of China

Experts
 Chinese-speaking offshore, 259, 261
 communication and, 257
 competition and, 257
 internal barriers for managing offshore, 256–257
 liabilities of origin and, 254
 offshore hiring of, 8, 254–256, 260
 surveillance from within and, 257

Export-Import Bank of China (EXIM Bank), 74, 101, 129, 158

F

Fast future
 backward integration and, 124
 country specific advantages, 119, 123, 127–129
 discussion and
 conclusions, 137–139
 entrepreneurial insights, 120–127
 firm specific advantages, 119–127, 137
 geopolitical crosscurrents, 119, 129–131
 Huawei as connection facilitator, 123
 human capital and, 125
 liability of foreignness, 119, 132–135
 making of Huawei and, 117–120
 organizational culture and, 127
 possible paths, 135–137

FBI, *see* Federal Bureau of Investigations

FCC, *see* Federal Communications Commission

Federal Bureau of Investigations (FBI), 75

Federal Communications Commission (FCC), 76

Fendou (working hard), 276

Fifth Generation (5G)
 AI and, 4, 20, 50, 74, 89, 90, 103–104, 109, 117, 329, 331
 approval status with BRI countries, 95
 BRI and Huawei correlation by region, 96
 China Dream objective and, 330–331
 Cisco and, 23

- Fifth Generation (5G) (*cont.*)
 cooperative winner-takes-all market and, 331–332
 covid-19 crisis and, 327, 333
 EU and, 76, 237
 forecast number of connections, 29
 global patent families, 88
 GPT and, 89
 Huawei as threat related to, 26, 329–330
 Huawei efforts regarding, 33, 54, 295–296
 impacts beyond technology, 89–90, 105–108
 IOT undergirded by, 117
 link to Chinese government and, 301, 303, 328–329
 May 2019 actions impacting, 54, 77
 Nokia and, 213
 overview, 4–5
 patents of leading companies, 296
 PRC spending on, 29
 Qualcomm and, 136
 real-time interaction via, 291
 security concerns, 51, 54, 301
 significance of, 32, 51, 89, 97, 109, 117, 295, 330
 sovereignty and, 294, 330
 US and, viii, 29, 30, 51, 56, 77, 98, 242, 300, 332
 Vision 2030 and, 103–104, 331–332
- First-mover strategy, 123
 Five Eyes alliance, viii
 5G, *see* Fifth Generation
 Fixed—Mobile Convergence Center (FMC), 234
- Flying geese model, 268
 FOCAC, *see* Forum on China Africa Cooperation
 Foreign high-end talent attracting, 314–320
 conclusions, 321–325
 data collection and, 313–314, 319
 headcount, 325
 interview questions, 314–316, 321
 managing, 309–325
 mentoring and coaching, 317
 overview, 314
 recruiting strengths, 314, 316, 318
 recruiting weaknesses, 314, 316, 319
 retaining, 322–323
 summary guide to, 319, 320
 utilizing, 320–322
- Foreignness, *see* Liability of foreignness
 Foreign policy, 6, 91, 131, 154, 172–174, 176, 183, 184, 187
 geo-strategic competition and, 183, 184
 Huawei as target of, 171–187
 Meng and, 185
 other countries views of, 182
 overview, 182–185
 political games and, 183
 prudence criterion and, 173
 Ren on, 185
 spying and, 184
 ZTE and, 184
- Forum on China Africa Cooperation (FOCAC), 157
 Fourteen Eyes alliance, ix

G

- Gabriel, Sigmar, 300
- General-purpose technology (GPT), 89, 107, 109
- Geopolitical-economic implications
 - Africa and, 160–162
 - Latin America and, 163
- Geopolitics
 - ban on Huawei, 77, 103, 299
 - Huawei in crosshairs of, 3, 41–58
 - of internationalization
 - strategy, 160–164
 - new world order and, 129–131
- Geo-strategic competition, 183, 184
- Global environment
 - deep interdependence and, 21–31
 - economic coercion and, 21–31
 - 5G rebalancing, 23, 25–27, 29, 30
 - ICT and, 22, 23, 25, 27
 - May 2019 actions in, 26
 - options space and, 31
 - scale advantages in, 24
 - silos thinking about, 31
 - technology sharing and, 24
 - telecommunications equipment
 - markets and, 21, 23
 - Trump Administration
 - impeding, 25–28
- Globalization
 - competition and, viii, 3, 25, 44, 46, 97
 - halting, 28
 - industry-based view and, 198
 - institution-based view and, 200
 - RBV and, 199
 - rise of Huawei and, 121
 - strategy tripod and, 197, 198, 201
- Global North
 - development gap reversal
 - and, 107
 - GDP per capita by region, 106
 - welfare disparity and, 105, 106
- Global South
 - conclusions, 164–166
 - development gap reversal
 - and, 107
 - FOCAC and, 157
 - GDP per capita by region, 106
 - geopolitical-economic
 - implications, 160–164
 - going-out policy and, 155
 - outward expansion pattern
 - in, 154–160
 - overview, 6, 147–149
 - PRC-backed financing and, 65
 - price competitiveness in, 156
 - welfare disparity and, 106
- Global supply networks, 22, 26
 - Huawei's main suppliers, 22, 26
 - May 2019 actions in, 26
 - weaponizing of, 27
- Global System for Mobile
 - Communications (GSM), 153, 231–233, 278
- Going Global strategy, 129, 330
- Going-out strategy
 - Chinese, 148, 159
 - conclusions, 137–139
 - FOCAC and, 157
 - geopolitical-economic
 - implications, 160–164
 - Huawei as exemplar of, 147
 - PRC-backed financing and, 65
 - price competition and, 156

- Google, 9, 21, 128, 136, 137, 208, 210, 236, 239, 242, 297
- Government entry barriers, 228
- GPT, *see* General-purpose technology
- Great Firewall, 297
- Greenfield investments, 248, 254, 256, 261
- GSM, *see* Global System for Mobile Communications
- H
- Hamel, Gary, 203, 217
- Harmony OS, *see* *Hongmeng* operating system
- Hikvision Digital Technology, 187
- Historical background
 - China demand and expansion advantages, 128
 - of Huawei, 9
- Hongmeng* operating system (Harmony OS), 123
- Huang, Weiwei, 199, 203, 204, 208, 209, 211, 214, 311
- Huawei, *see specific topics*
- Huawei Innovation Research Program, 124
- Huawei Marine Network, 163
- Human resource practices, 276
- Hungary, 238
- Hussein, Saddam, 68
- I
- ICT, *see* Information and communication technologies
- Independent global economic agent business ties and, 180
- neutrality criterion and, 173, 179
- ownership and, 181
- political connections and, 180
- in three-world framework, 180
- Independent innovation
 - catch-up patterns and, 269
 - continuous improvement and, 278
 - fendou and*, 276
 - flying geese model and, 268
 - leapfrogging model and, 268
 - path dependence and, 268
 - theory and, 266
- Industry-based view
 - of Huawei, 198–199
 - innovation networks and, 198
 - Nokia and, 197, 199, 201
 - strategy tripod, 201
 - of Uber, ix
- Information and communication technologies (ICT)
 - deep interdependence and, 22
 - economic growth and, 148
 - geopolitical-economic implications, 160–164
 - political economy of Chinese, 24, 149–153
 - telecommunications equipment markets and, 23
 - telecommunications sector policies and, 73
- Innovation
 - capabilities, 8, 24, 48, 151, 228–239, 249, 265–269, 271, 275, 279, 280, 283, 330, 332
 - challenges from, 327–333
 - conditions for, 267

- customer-centered, 272
- disruptive, 6, 49, 196, 198, 204, 217
- Huawei Innovation Research Program, 124
- networks, 58, 198, 199, 279, 281
- open, 57, 58, 267, 297, 332
- overview, 7
- Xi policy of, 21, 91, 131
- See also* Independent innovation; Interdependent innovation; Joint innovation; Joint Innovation Centers
- Innovation and National Security report* (Council on Foreign Relations), 49
- Institution-based view
 - of Huawei, 200
 - strategy tripod, 201
 - of Uber, ix
- Integrated Product Development (IPD), 276
- Intel
 - 5G patents, 70
 - R&D investment by, 104
- Intellectual property (IP)
 - Cisco dispute, 75
 - dependencies asymmetries and, 14
 - forced transfer of, 50
 - JIC and, 237
 - porous rights regime and, 68
 - Ren on, 127
 - Vodafone and, 233
 - WIPO and, 280
- Interdependent innovation
 - absorptive capabilities and, 273
 - awards and, 281
 - case study method and, 269
 - catch-up patterns and, 201
 - conclusions, 281–284
 - continuous improvement and, 277–279
 - customer-centered innovation and, 272
 - data analysis method, 270–271
 - data collection protocol, 269–270
 - fendou and*, 276
 - findings, 275
 - flying geese model and, 268
 - Huawei partnerships and, 272
 - human resource practices and, 276
 - IPD and, 276
 - latecomer firms and, 266, 281
 - leapfrogging model and, 268
 - learning and adapting for, 273–276
 - leveraging external, 271–274
 - market adaptability and, 274, 275
 - methodology related to, 269–271
 - overview, 266
 - partnering strategy and, 273
 - proactivity and, 279–282
 - R&D centers and, 275
 - R&D inputs and outputs and, 277
 - soft-switch based GSM and, 278
 - standardization organizations and, 273
 - strategies to manage, 271–283
 - theoretical background and, 267–269
 - transforming internal, 271–274
- InterDigital, 296

Internationalization, R&D
 Chinese-speaking offshore experts
 role, 259
 communication and, 249
 competition, internal, and, 257
 expatriates role in, 258
 external barriers for, 253–254
 greenfield investments and,
 248, 256
 Huawei way of, 247–249
 internal barriers and, 256–257
 latecomers in, 249, 250
 leveraging, 260–261
 liabilities of origin and, 250,
 253, 254
 liabilities of outsidership and,
 250, 254
 offshore experts hiring
 and, 254–256
 perspectives related to, 250,
 251, 260
 research design and method
 and, 250–252
 surveillance from within
 and, 257
 theory and, 249–250
 trust and, 260
 Internationalization strategy
 conclusions, 164–166
 domestic roots and, 149–153
 external accumulation, 154–160
 geopolitical-economic
 implications, 160–164
 outward expansion, 154–160
 Internet
 Great Firewall and, 297
 MNEs compared with, 294
 standard setting and, 330
 technology decoupling and, 46

Internet of Things (IOT)
 EU and, 237
 5G undergirding, 20, 50, 89, 117
 IP, *see* intellectual property
 IPD, *see* Integrated Product
 Development

 J
 James, Harold, 57
 Japanese technology, 46
 Jiang Zemin, 72
 JIC, *see* Joint Innovation Centers
 Joint innovation
 appraising Huawei strategy
 of, 239–242
 B2B and, 240
 BT and, 238
 conclusions, 242
 crisis-struck markets and, 240–241
 customer innovation
 leadership, 226
 customized test version and, 229
 entry barriers and, 226, 228, 241
 EU and, 228–239
 foundations, 226
 friendly government attitude
 and, 241–242
 overcoming EU resistance, 236–239
 overview, 226
 point of entry, 240
 practical customization
 and, 228–230
 stealth and, 239–240
 strategy, 225, 239–242
 Telenor and, 230, 231, 234
 Telfort and, 228, 229
 visionary leadership and, 226–227
 Vodafone and, 228, 230–235

Joint Innovation Centers (JIC)
 establishing, 231–235
 examples of, 237
 IP and, 231
 key principles, 231
 purpose, 231
 strategic partnership and, 232
 Telenor and, 231
 Vodafone and, 231

K

Ken Hu Houkun, 74
 Kerry, John, 57
 Krugman, Paul, 47, 149

L

Latin America, 154, 163, 166n1,
 234, 270
 Leapfrogging model, 268, 269
 Leica, 125, 235
 LG Electronics, 88, 119
 5G patents, 88, 296
 Huawei assisting, 119
 Li Keqiang, 52
 Liabilities of origin, 254, 256
 defined, 250
 experts, 254, 256
 R&D internationalization
 and, 253–254
 Liabilities of outsidership, 250, 256
 defined, 250
 R&D internationalization and,
 249, 254
 Liability of foreignness, viii, 5, 119,
 132–135, 249
 defined, 119

employee ownership system and,
 133, 134
 in high-tech setting, 132–135
 political ideology and, 132
 spying and, 133
 Lightizer, Robert, 53

M

Ma, Jack, 99
 MacLeod, Andy, 232
Made in China 2025 initiative
 goals of, 45
 Ken on, 74
 R&D expenditure and, 52
 technology ambitions
 announced via, 56
 telecommunication sector
 policies and, 74
 Management
 crisis, 135
 Huawei growth and, 202
 Nokia and, 199, 208–215, 217
 Ren and, 209
See also Talent
 management, global
 Manic product development
 Huawei growth and,
 199, 202–204
 Nokia and, 199, 202–204
 Market focus
 on core business and
 internationalization, 202
 Huawei growth and,
 207, 208
 Nokia and, 205–208
 Mate, 9, 164
 McGrath, Rita, 48

- Me = we
 Huawei growth and, 217
 Nokia and, 215–217
- Meaning and magic
 Huawei growth and, 214
 Nokia and, 213–215
- Mearsheimer, John, 41, 131
- Medium- and Long-Term Program
 on Scientific and Technological
 Development (MLP), 70
- Meng Wanzhou, 185
- MIC, *see* Mobile Innovation Center
- Microsoft, 19, 104, 125, 136, 196,
 210, 241
- Middle income trap, 19, 20, 72
- Ministry of Foreign Affairs, PRC
 (MOFA), 77
- MLP, *see* Medium- and Long-Term
 Program on Scientific and
 Technological Development
- MNEs, *see* Multinational enterprises
- Mobile Innovation Center
 (MIC), 232
- Mobile phone industry, *see* Nokia;
 Smartphone
- Money
 Huawei growth and, 202,
 211–213, 217
 Nokia and, 211–213, 217
- Multinational enterprises (MNEs)
 dependency theory and, 299
 Internet compared with, 294
 nature of, 294, 302
 RBV and, 199, 200
 sovereignty at bay and, 294
 talent management and, 199
See also Emerging market
 multinational enterprises
- N
- National Basketball Association
 (NBA), 178
- NATO, *see* North Atlantic Treaty
 Organization
- NBA, *see* National Basketball
 Association
- Networking awards, 157
- Neutrality criterion, 173, 179
- New Generation Artificial
 Intelligence Development
 Plan (China)
 goal of, 43
 technology ambitions
 announced via, 56
- Nietzsche, Friedrich, 214
- Nokia
 discussion and conclusions, 197
 disruptive innovation and,
 196, 217
 employee demographics, 215–216
 ESOP of, 211
 5G, 213
 5G national security and, 54
 5G patents, 88, 296
 growth and retreat of, 7, 195–218
 history of, 206
 Huawei story versus, 201–216
 industry-based view, 197–199
 institution-based view, 200
 management and, 6, 199,
 208–211, 213–215, 217
 manic product development and,
 199, 202–204
 market focus and, 205–208
 me = we and, 216, 217
 meaning and magic
 concerning, 213–215

- money and, 211–213, 217
 - overview, 6
 - phone industry market share of, 196, 208
 - R&D and, 125, 196, 203
 - RBV and, 199–200, 202
 - Six Ms and, 201–216
 - strategy tripod and, 197–201, 218
 - telecommunication equipment market share of, 23
 - values of, 196, 211–215
 - “No Pay, No Gain” (Bloomberg.com), 52
 - North Atlantic Treaty Organization (NATO), viii, 97, 102, 174, 184
- O**
- Obama, Barack, 75, 76
 - Objectivity criterion, 173, 176
 - Ollila, Jorma, 205, 206, 208, 209, 212, 214
 - Opaqueness, 299
 - Oppo, 125, 130, 138
 - Oracle, 122, 123
 - Ownership, 15, 17, 98–101, 133, 134, 150, 159, 171, 172, 176, 181, 200, 212, 232, 233, 292, 299, 303
- P**
- Pakistan East Africa Cable Express (PEACE), 162
 - Patents
 - annual report on, 270
 - global 5G, 88, 108
 - PEACE, *see* Pakistan East Africa Cable Express
 - Pence, Mike, 53
 - People’s Republic of China (PRC)
 - advantages in demand and expansion, 127–129
 - capital allocation and, 24
 - Chinese Social Credit System, 298
 - competition and, 6, 24, 25, 34, 42, 73, 149, 154, 183, 207, 266, 331
 - corruption in, 132, 178
 - destructive or constructive competition and, 14, 42, 56, 58, 164
 - digital global ambition of, 91–97
 - digitalization approach of, 303
 - domestic policy instrument and, 6, 172, 173, 176
 - domestic roots and, 149–153
 - entrepreneurial side of, 226
 - financial support of, 158, 163
 - 5G spending of, 29
 - geographic sales revenue of, 55, 119, 120
 - global strategic environment and, 31
 - Great Firewall and, 297
 - helping Huawei, 3, 65–79
 - Huawei championed by, 147, 152, 207
 - Huawei hammering response of, 75–78
 - Huawei ownership and, 299–300
 - Huawei privacy and, 329
 - Huawei support by, 186
 - ICT industry political economy and, 149–153

People's Republic of China
 (PRC) (*cont.*)
 Innovation and National Security
 report on, 49
 liability of foreignness and, 119, 132
 MLP of, 70
 as neo-totalitarian party-state, 177
 new world order crosscurrents
 and, 130, 331
 1949-1970s policies of, 67
 1980s policies of, 151, 152
 political connections and,
 178, 180
 rule of law and, 132, 176, 177
 scale advantages of, 23–24
 Silk Road initiative, 301
 silo thinking about, 31
 technology policy, 3, 65–79
 technology sharing and, 24
 technology support factors of, 127
 tech rivalry strategy of, 46–50
 telecommunication sector
 policies, 72–74
 2000s policies of, 216
 2010s policies, 71
 2030 vision and, 103–104, 331–332
 ZTE and, 157, 185, 186
 Periphery to center, 7, 225–242
 Plummer, William, 186
 Poland, 95, 102, 238
 Political economy
 of Huawei, 13–35, 97–101
 of ICT industry in China, 149–153
 mixed-ownership structures and, 99
 overview, 2–5, 13
 privacy of Huawei, 98–100
 socialist values and, 100
 success if not Chinese
 company, 100–101

Pompeo, Mike, 54
 Privately held, 98, 310
 Proactivity
 awards and, 281
 interdependent innovation
 and, 279–281
 patents and, 279–281, 330
 standardization organizations
 and, 280
 Prudence criterion, 173
 Putin, Vladimir, 329

Q
 Qualcomm, 9, 88, 124, 136, 137,
 153, 241, 300

R
 Radio access technology, 232
 RBV, *see* Resource-based view
 R&D, *see* Internationalization,
 R&D; Research and
 development
 Reich, Robert, 46
 Ren Zhengfei
 background of, 208
 China ascent and, 98
 on collaboration, 124
 dual truth statement of, 186
 encircle cities from countryside
 strategy of, 152, 154
 FBI, 75
 on Huawei culture, 127, 214
 independence of, 180
 on IP, 126
 on marketing and foreign
 policy, 154
 management and, 208, 209

- military background, 75, 118, 152, 155, 180
 - on mission of Huawei, 121
 - on national security, 72, 241
 - new employee letter by, 214
 - organizational culture and, 127
 - on part sourcing, 124
 - Plummer and, 186
 - SOE and, 17
 - spying and, 133
 - strategic vision of, 206
 - on US tech companies, 126
- Research and development (R&D)
 - C&C08 and, 121
 - commitment to, 52, 127
 - EU and, 237
 - firm specific advantage and, 121, 122
 - government entry barriers and, 227
 - Huawei's spending on, 29, 237
 - inputs and outputs in, 277, 278
 - integrated process of, 272
 - interdependent innovation and, 267, 270–272, 275–277
 - investment in, 71, 72, 122–124, 135, 237, 248, 277, 292, 298
 - joint innovation strategy and, 226, 229, 237, 239
 - Made in China 2025 initiative and*, 52
 - Nokia and, 125, 196, 203
 - overview, 7–9
 - PRC S&T and, 68, 70, 71
 - 2010s policies in, 72, 119
 - US funding of, 25
 - vision 2030 and, 103
 - See also* Internationalization, R&D
- Resource-based view (RBV)
 - of Huawei, 199
 - manic product development and, 199
 - Nokia and, 199
 - strategy tripod, vii, 197
 - of Uber, ix
- Revenue
 - growth of, 120
 - PRC geographic sales, 56
- S
- SAIS-CARI, *see* School of Advanced International Studies, China Africa Research Initiative
- Samsung
 - 5G national security and, 46
 - 5G patents, 295
 - R&D investment by, 296
 - smartphone competition and, 296, 332
 - smartphone market share, 137
- School of Advanced International Studies, China Africa Research Initiative (SAIS-CARI), 101
- Science and Technology (S&T)
 - Deng and, 68
 - 863 Project, 68
 - 1980s policies, 68
 - 2000s policies of, 69–70
 - 2010s policies of, 71
 - Torch Program, 68
- Sharp, 301
- Shenzhen, 51, 118, 128, 132, 133, 150, 181, 184, 259, 270, 319
- Siilasmaa, Risto, 208
- Silk Road initiative, 301
- Silo thinking, 31

- Six-M model, 210
 discussion and conclusions,
 217, 218
 Huawei *vs.* Nokia story, 201–216
 management, 208–211, 217
 manic product development,
 202–204, 217
 market focus, 205–208, 217
 me = we, 215–217
 meaning and magic,
 213–215, 217
 money, 211–213, 217
 overview, 196–197
- Smartphone
 competition, 126
 Leica and, 125
 market share, 55, 130
- Snowden, Edward, 69
- Socialism, subservience to
 values of, 100
- SOE, *see* State-owned enterprise
- Spying
 evidence for, 134, 135
 foreign policy and, 184
 Ren and, 242
- S&T, *see* Science and
 Technology (S&T)
- Standardization, 255, 260,
 280, 332
- Starosielski, Nicole, 162
- State-owned enterprise (SOE), ix,
 16, 17, 21, 31, 91, 99, 176,
 180, 267
 Chinese state capitalism and, 17
 Ren and, 17
 US and, ix
- Strategy tripod
 approach, 196–198, 201
 discussion and
 conclusions, 216–218
 globalization and, 197
 Huawei and, vii, 197, 198, 201
 industry-based view, vii, 197–199
 institution-based view, vii,
 197, 200
 Nokia and, 197, 198, 201
 overview, 195–197
 resource-based view (RBW), vii,
 197, 199–200
 Six-Ms and, 196, 197, 201
 of Uber, ix
- Strengths, Weaknesses,
 Opportunities and Threats
 framework (SWOT)
 backward integration and, 124
 country specific advantages,
 119, 127–129
 entrepreneurial insights
 and, 120–127
 firm specific advantages, 119–127
 geopolitical crosscurrents and,
 119, 129–131
 Huawei as connection
 facilitator, 123
 human capital, 125
 liability of foreignness and,
 119, 132–135
 overview of, 119
 possible paths for Huawei,
 119, 135–137
- Submarine cable market, 162
- Supply networks, *see* Global supply
 networks
- SWOT, *see* Strengths, Weaknesses,
 Opportunities and Threats
 framework (SWOT)

T

- Talent management, global
 background of Huawei, 311–312
 conclusions, 321, 322
 defined, 15, 95, 310, 311
 Huawei pillars model of, 310, 311
 planning and, 312
 strategies, 309, 313
See also Foreign high-end talent
- Technology
 Aventura Technologies, 184
 5G impacts beyond, 54, 90, 103
 GPT, 89
 Hikvision Digital Technology, 187
 Japanese, 46
Made in China 2025 initiative,
 45, 52, 67, 71
 MLP, 70, 71
 radio access, 232
 sharing of, 257
*Tentative Provisions on Encouraging
 Technology and Science
 Personnel to Establish Non-state-
 owned Technological
 Enterprises*, 150
 trading market for technology
 strategy, 151
See also Chinese technology;
 Information and
 communication technologies
 (ICT); Science and Technology
- Technology decoupling
 brink of, 3, 46, 58
 Internet and, 46, 58
- Technology policy
 background, 67
 1949–1970s, 67
 1980s, 68
 overview, 67
 PRC, 67, 69, 78
 2000s, 69
 2010s, 71
- Techno-nationalism
 Japanese and, 46
 open innovation and, 57
- Tech Sinica
 beyond technology, 89–90
 conclusions, 108–109
 digital global ambition
 and, 91–97
 digital iron curtain and,
 107–108
 empowering future, 103–104
 Europe and, 102–103
 Huawei as way to,
 90–91, 109
 Huawei political economy
 and, 97–101
- Telecommunication sector policies
 conclusions, 72–74
 ICT and, 73, 93
Made in China 2025 initiative
 and, 67, 71, 74
 PRC, 74
 security and political
 factors, 69, 78
- Telenor, 230
- Telfort, 228, 278
- Tencent, vii, 99, 150
- Tentative Provisions on Encouraging
 Technology and Science
 Personnel to Establish
 Non-state-owned
 Technological Enterprises*
 (Shenzhen Municipal
 Government), 150

- Three-world framework
 Allison framework and, 173
 assessment criteria, 172
 conclusions, 185–187
 domestic policy instrument
 in, 171–187
 foreign policy target, US, in,
 172–174, 182–185
 independent global economic
 agent in, 172–174,
 178–182, 185
 interpretive framework,
 174–176
 overview, 6, 171–174
 research rationale, 172
 two-step approach, 172
- Time Unit Plan (TUP), 212, 213
- Torch Program, 68
- Trade war, US–China
 BIS and, 236
 opaqueness and, 299
 other countries view of, 51
 outset of, 149
 Silk Road initiative and, 301
 three-world framework and, 6
- Trading market for technology
 strategy, 151
- The Tragedy of Great Power Politics*
 (Mearsheimer), 41
- Transmission Innovation Center
 (TIC), 233
- Transnational corporation (TNC)
 domestic roots and, 149–153
 outward expansion and, 154
- Trump, Donald, 28, 30, 32–34,
 49, 58, 76, 97, 98, 118,
 131, 235
 on Huawei, 119, 131, 133
 NATO speech of, 97, 174
 US–China trade war and,
 117, 235
- Trump Administration
 halting globalization, 28
 May 2019 actions of, 26
- TUP, *see* Time Unit Plan
- U
- Uber, ix
- United States (US)
 Allison framework and, 173
 charges against Huawei, 26
 competition and, 6, 30, 41–43,
 57, 183, 187
 destructive or constructive
 competition and, 56–58
 digitalization approach of, 297
 18th century mercantilism of, 32
 5G national security and, 51, 54,
 98, 103, 329
 5G spending of, 29
 global strategic environment and,
 14, 31–35
 Huawei as foreign policy target of,
 172–174, 182–185
 Huawei hammering by, 75–78
 Huawei in crosshairs of, 50–56
Innovation and National Security
Report on, 49
 interdependence
 undermined by, 14
 liability of foreignness
 and, 5, 132
 May 2019 actions of, 26
 new world order crosscurrents
 and, 129–131

- R&D funding in, 68
 - Ren on tech companies in, 75
 - scale advantages impacting, 24
 - Silk Road initiative and, 301
 - silicon thinking in, 31
 - SOEs and, ix
 - strategic complacency of, 57
 - tech rivalry strategy of, 46–50
 - technology sharing and, 174
 - See also* Trade war, US–China
- V**
- Verizon, 76, 130, 295
 - Vision 2030 (China), 103, 331–332
 - Vodafone
 - IP and, 233
 - JIC and, 233
 - joint innovation strategy and, 230
 - radio access technology and, 232
- W**
- WIPO, *see* World Intellectual Property Organization
 - Working hard, *see* Fendou
- World-class companies
 - Huawei as top among, viii, ix
(*see also* *Specific companies*)
 - Uber and, ix
 - World Intellectual Property Organization (WIPO), 280
- X**
- Xi Jinping, 21, 46, 71, 91, 131, 177, 183
 - digital global ambition of, 91–97
 - innovation policy of, 43–46
 - policies redirected by, 21
 - Xiaomi, vii, 125, 130, 229
- Z**
- Zhao, Houlin, 177
 - ZTE
 - background, 23, 88, 153
 - 5G national security and, 301
 - 5G patents, 88, 108
 - foreign policy targeting and, 184
 - Huawei compared with, 51, 54, 159
 - PRC review boards and, 98