

## Innovation under the Radar

Investigating the nature, drivers and sources of innovation in Africa, this book examines the channels for effective diffusion of innovation in and to Africa under institutional, resource and affordability constraints. Xiaolan Fu draws on almost a decade of research on innovation in Africa to explore these issues and unpack the process, combining a rigorous statistical analysis of a purposely designed multi-wave, multi-country survey with in-depth studies of representative cases. Building on this research, Fu argues that African firms are innovative but unsupported. Those ‘under-the-radar’ innovations that widely exist in Africa as a result of the constraints are not sufficient to enable Africa to leapfrog the innovation gap in the era of the Fourth Industrial Revolution. This is the first comprehensive analysis of the creation and diffusion of innovation in low-income countries. It also provides the first survey-based analysis of innovation in the informal economy.

Xiaolan Fu is the Founding Director of the Technology and Management Centre for Development and Professor of Technology and International Development at the University of Oxford. She led the UK Foreign, Commonwealth and Development Office (FCDO) and Economic and Social Research Council (ESRC) funded research on ‘Diffusion of Innovation in Low-income Countries’ and is appointed by the Secretary-General of the United Nations to the Council of the Technology Bank for the Least Developed Countries and the 10-Member High-Level Advisory Group of the Technology Facilitation Mechanism for sustainable development.

# Innovation under the Radar

*The Nature and Sources of Innovation in Africa*

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Xiaolan Fu

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To my beloved dad Baisong, mum Hualin, for the love that  
enlightened my life; husband Shaohui and son Yujie, for your  
love and support over the years.

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## Foreword

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This book, bringing together Xiaolan Fu's research on the nature and sources of innovation in Africa over the last seven years, represents a rather unique piece of academic research. Based on careful, empirical, in-depth research on two countries – Ghana in West Africa and Tanzania in East Africa (as well as a case study in Kenya) – the author brings to the forefront the various and diverse ways in which innovation in Africa takes place. This is not based on R&D as is the case in industrialized countries, nor purely 'frugal' or 'inclusive' in nature as assumed in many Asian low-income countries, but innovative in a creative African way – low-cost innovations, based on individual creativity, practice, organizational learning and adaptation. What the author calls 'innovation under the radar'. Most of these activities are incremental in nature, strongly demand-led and implemented across the board: in significantly improved, sometimes even new, products or processes, in non-technological areas such as management and marketing, in design. Innovation within a context of constraints to firms on all sides. In short: innovation to survive. No traditional innovation indicator will capture such activities.

The mirror picture of such invisible innovation is reflected in the lack of input from science and engineering in this African innovation process and the lack of the diffusion of foreign technology, including managerial knowledge. As the book highlights (containing also some contributions written with a couple of African colleagues of Xiaolan Fu), within the context of the global digital Fourth Industrial Revolution, this will be one of Africa's major challenges in the years to come. Xiaolan Fu's emphasis on the policy need to build up digital competencies in the African continent, both with respect to infrastructure and human skills, for Africa to 'leapfrog innovation' as illustrated in cases such as M-PESA, is well made. Coming from a world-class Chinese scholar who acknowledges in the conclusions that her interpretation of some of the results obtained might have been constrained by her lack of 'knowledge of the rich history,

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culture and economic and social diversity' of the African continent, one rather welcomes this detailed analysis of the nature and sources of innovation in Africa, often undetected by scholars more knowledgeable about the history and industrial development of the continent. I strongly recommend this book.

LUC SOETE

## Acknowledgements

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The book arises from my research on innovation in low-income countries since 2012. It is a serious academic book based on seven years of research and reflection. It aims to present a systematic, comprehensive and coherent study of the nature, origin and diffusion of innovation in Africa and the challenges and opportunities faced in the era of the Fourth Industrial Revolution. Although most of the chapters are fairly self-contained, the hope is that the whole will add up to more than the sum of its parts and enable us to develop a comprehensive understanding of this under-researched area of innovation, which is itself an outcome of system engineering.

Many acknowledgements and thanks are due. Among the numerous colleagues and friends I wish to thank for helpful and constructive comments and discussions are Pierre Mohnen, George Essegbey, Anne Miroux, Yong Li, Luc Soete, Bengt-Åke Lundvall, Christopher Adam, Marc Ventresca, Bitrina Diyamett, Anne Kingiri, Martin Bell, Raphie Kaplinsky, Adrian Wood, Valpy FitzGerald, Mammo Muchie, David Kaplan, Maria Sanova, Tomasso Ciarli, Shamika Sirimanne, Dong Wu, Dirk Willem te Velde, Augusto Luis Alcorta, Wunsch-Vincent, Sacha, Razzaque, Mohammad, Heide Hackmann, William Colglazier, David O'Connor, Oliver Schwank, Richard Roehrl, Wei Liu, Pervez Ghauri, Juha Vaatanen, Godfred Frempong, Shyama Ramani, Suraksha Gupta, Sonia Kabir, Douglas Gollin, Diego Sanchez-Ancochea, Calestous Juma, Jorge Katz and Jizhen Li; editors of Cambridge University Press, Valerie Appleby and Laura Parish; as well as five anonymous reviewers of the book proposal.

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Prototypes of various chapters have been presented, in past years, at various conferences and seminars in many universities, which cannot all be acknowledged here in detail. A few examples of these conferences include the ‘UNU-WIDER Development Conference 2013’ in Helsinki, ‘Expert Meeting on Innovation of the General Assembly of the United Nations 2014’, ‘Development Cooperation Forum 2015’, ‘Academy of Innovation and Entrepreneurship 2013 Annual Conference’ in Oxford, ‘Development Studies Association Annual Conference’, ‘1st African Innovation Summit’, ‘DILIC Innovation Conference’ in Ghana, ‘DILIC End of Project Conference’ in London, ‘2017 ILO Future of Work Forum’, ‘United Nations STI Forum in New York 2016 and 2017’, ‘UNCTAD Multi-Year Expert Group Meeting’, ‘UNIDO 50 Years Anniversary Conference’, ‘UK-China Innovation Round Table Meeting’, ‘UK-China Innovation and Development Forum’, and other conferences or workshops organized by UNCTAD Committee of Sciences and Technology for Development, UN DESA, UNCTAD, UNIDO and the International Council for Sciences. I am grateful to the organizers and participants for providing me with these opportunities to obtain helpful feedback on the research from experts and practitioners, and to share findings from the research with the wider community on technology, innovation and development.

The research has attracted attention and gained strong support from international organizations: UNCTAD, UNIDO, UN DESA, WIPO and ITU. It has been a great privilege to realize that the findings from this body of research will be able to contribute to the international debate and policymaking concerning the role of innovation in the global effort to achieve the sustainable development goals (SDGs), and in international efforts to strengthen the innovation and technological capabilities and technology facilitation in developing countries.

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