INNOVATION & INTELLECTUAL PROPERTY
COLLABORATIVE DYNAMICS IN AFRICA

Editors: Jeremy de Beer, Chris Armstrong, Chidi Oguamanam & Tobias Schonwetter
Innovation & Intellectual Property
Collaborative Dynamics in Africa

EDITORS:
JEREMY DE BEER, CHRIS ARMSTRONG,
CHIDI OGUAMANAM AND TOBIAS SCHONWETTER

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Contents

Preface ............................................................................................................................. v
Acknowledgements ...................................................................................................... ix
About the Editors ....................................................................................................... xiii
About the Contributors ............................................................................................. xiv
Acronyms and Abbreviations ................................................................................... xvii

Chapter 1
Innovation, Intellectual Property and Development
Narratives in Africa ....................................................................................................... 1
Jeremy de Beer, Chidi Oguamanam and Tobias Schonwetter

Chapter 2
Frameworks for Analysing African Innovation: Entrepreneurship,
the Informal Economy and Intellectual Property ................................................... 32
Jeremy de Beer, Izabella Sowa and Kristen Holman

Chapter 3
Informal–Formal Sector Interactions in Automotive
Engineering, Kampala ................................................................................................. 59
Dick Kawooya

Chapter 4
Geographical Indication (GI) Options for Ethiopian Coffee and
Ghanaian Cocoa .......................................................................................................... 77
Chidi Oguamanam and Teshager Dagne

Chapter 5
A Consideration of Communal Trademarks for
Nigerian Leather and Textile Products ................................................................... 109
Adebambo Adewopo, Helen Chuma-Okoro and Adejoke Oyewunmi

Chapter 6
The Policy Context for a Commons-Based Approach to
Traditional Knowledge in Kenya ............................................................................. 132
Marisella Ouma

Chapter 7
Consideration of a Legal “Trust” Model for the
Kukula Healers’ TK Commons in South Africa .................................................... 151
Gino Cocchiaro, Johan Lorenzen, Bernard Maister and Britta Rutert
Chapter 8
From De Facto Commons to Digital Commons?
The Case of Egypt’s Independent Music Industry................................................. 171
Nagla Rizk

Chapter 9
Reflections on Open Scholarship Modalities and the
Copyright Environment in Kenya................................................................. 203
Ben Sihanya

Chapter 10
African Patent Offices Not Fit for Purpose .................................................. 234
Ikechi Mgbeoji

Chapter 11
The State of Biofuel Innovation in Mozambique........................................... 248
Fernando dos Santos and Simão Pelembe

Chapter 12
Reflections on the Lack of Biofuel Innovation in Egypt .................................. 267
Bassem Awad and Perihan Abou Zeid

Chapter 13
Effects of the South African IP Regime on Generating Value from Publicly Funded Research: An Exploratory Study of Two Universities......................................................... 282
Caroline Ncube, Lucienne Abrahams and Titilayo Akinsanmi

Chapter 14
Towards University–Industry Innovation Linkages in Ethiopia ....................... 316
Wondwossen Belete

Chapter 15
Perspectives on Intellectual Property from Botswana’s Publicly Funded Researchers................................................................. 335
Njoku Ola Ama

Chapter 16
Current Realities of Collaborative Intellectual Property in Africa.......................... 373
Jeremy de Beer, Chris Armstrong, Chidi Oguamanam and Tobias Schonwetter

Index................................................................................................................... 395
Preface

This book is among the key outputs of the Open African Innovation Research and Training (Open A.I.R.) Project. Based on case study research in nine African countries, the book examines the recent history and current on-the-ground realities of innovation and intellectual property (IP) in African settings. In doing so, the book reveals complex collaborative dynamics across a range of different countries, sectors and socio-economic contexts, and generates recommendations for how innovation and IP can be married with social and economic development objectives in African settings. This book’s sister report, *Knowledge and Innovation in Africa: Scenarios for the Future*, situates the current realities covered in this book within a much longer historical trajectory and multiple potential futures.

Conceived in 2009, established in 2010 and launched in 2011, Open A.I.R. is a pan-African and globally interconnected research and training network, which was established to:

- raise IP awareness in African settings and facilitate critical policy engagement;
- empower a networked, epistemic IP community in Africa;
- identify IP-related innovation bottlenecks and modes of open collaboration; and
- interrogate IP-related innovation metrics, capital and power structures.

Open A.I.R. is financially supported by Canada’s International Development Research Centre (IDRC) and Germany’s Federal Ministry for Economic Cooperation and Development (BMZ), and collaborates with numerous other organisations and individuals – all of whom are recognised in the Acknowledgements’ pages of this book. In addition to the aforementioned case study and foresight research, the Open A.I.R. network engages in a wide range of training, capacity building, outreach and policy engagement activities – both on the African continent and in settings outside the continent where matters of African innovation and IP are engaged. These engagements target external stakeholders capable of changing policies and practices, including:

- innovators, creators and entrepreneurs – individuals and companies;
- business groups such as chambers of commerce and industry associations;
- national, regional and international law-makers and policy-makers;
- issue leaders, such as politicians, judges, professors and practitioners;
- scientific and cultural research and development funding bodies;
university researchers, administrators and technology transfer officials;
rights-holders and collective rights management organisations; and
representatives of indigenous and local communities.

Open A.I.R. is motivated by a vision in which innovation and creativity in Africa are sustainable, properly valued, collaborative, widely accessible and result in benefits that are distributed throughout society. Based on this vision, the network’s mission is to better understand how innovation and IP processes work in African settings, how knowledge and technology currently protected by IP can be mobilised, and how IP systems can be harnessed or adapted in a manner that fosters openness-oriented collaborative innovation resulting in just distribution of new knowledge and technology.

This book and the Scenarios volume are two parts of a much broader attempt, by Open A.I.R. and other initiatives, to facilitate, in the medium to long term, the emergence of new, pragmatic means of valuing and facilitating innovation and creativity in Africa. Contextually appropriate metrics sensitive to the monitoring of meaningful changes in behaviour around innovation and creativity could be instrumental for promoting African grassroots entrepreneurship, broad-based business development, and a vibrant private sector built on small and medium-sized enterprises (SMEs) with a sustained ability to innovate. And the opportunities for innovation-driven SMEs could also benefit from policy-maker adoption of appropriate metrics when designing the policy and regulatory frameworks necessary to ensure predictable innovation environments for stakeholders.

Open A.I.R.’s core funders, IDRC and BMZ, have provided a framework for Open A.I.R.’s objectives. Open A.I.R. fits within the IDRC’s Science and Innovation programme, which supports research and policy engagement in relation to how science, technology and innovation (STI) can be engines of socio-economic development. Within this programme, the Information and Networks (I&N) initiative, which funds the Open A.I.R. Project, aims to better understand the linkages among innovation, creativity, networked collaborations (often enabled via information and communication technologies [ICTs]), and determinants of openness – including IP rights. The IDRC also supported the precursor network to Open A.I.R., the African Copyright and Access to Knowledge (ACA2K) Project, which ran from 2007 to 2011 and generated the nucleus of the expert network now driving Open A.I.R.

BMZ supports Open A.I.R. via Germany’s Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), under the GIZ commons@ip – Harnessing the Knowledge Commons for Open Innovation initiative. The commons@ip initiative focuses on how IP rights interact with open innovation, the knowledge commons, open licences and collaborative innovation. It is part of the BMZ-
mandated Train for Trade programme, which aims at strengthening the private sector and its constituent bodies in the Southern African Development Community (SADC) region through training and capacity building in export promotion, quality control and promotion of open innovation – as well as through promotion of local and regional economic development and trade.

Open A.I.R.'s training and capacity building components include:

- building the network's capacity – through online platforms, network-wide workshops, research methodology support, scenario-building meetings and thematic seminars;
- awarding Open A.I.R. Fellowships to emerging IP scholars and potential leaders – from Tanzania, Kenya, Uganda, Ethiopia, Cameroon, Nigeria and Egypt;
- exchanging knowledge through Africa-wide and South–South knowledge networking at seminars, workshops and conferences;
- growing awareness among African creators, innovators, entrepreneurs and policy-makers of openness-oriented approaches to innovation and IP matters in Africa; and
- teaching at African tertiary educational institutions, including development of a replicable, open course curriculum on IP law and development.

Because of the immense geographic size of the African continent, and unique logistical challenges of African intra-continental travel, ICTs have been instrumental in empowering the research network's "community of practice". Open A.I.R. has an offline presence in 14 African countries and in multiple countries outside the continent. Online, the network includes hundreds of individuals and institutions throughout Africa and from all corners of the globe, linked via a suite of online networking and social-media tools. The Open A.I.R. community of practice advances a culture of multidirectional exchange among African innovative and creative communities and external actors – with a view to sustainably empowering local communities and SMEs. Network members promote cross-fertilisation of ideas via original thinking and partnerships with national and international institutions, scholars, funding agencies, civil society organisations and other willing partners. Those wishing to join the community can visit http://www.openair.org.za/join.
Acknowledgements

True to its emphasis on “collaborative dynamics”, this book is the product of the collective energy of dozens of people and institutions in many countries, all of whom work within the Open African Innovation Research and Training (Open A.I.R.) network. Open A.I.R. currently has core network members and institutions in 14 African countries, spanning North Africa (Egypt, Tunisia), West Africa (Senegal, Ghana, Nigeria, Cameroon), East Africa (Ethiopia, Uganda, Kenya, Tanzania) and southern Africa (Malawi, Mozambique, Botswana and South Africa). Other network members and institutions are in Canada, the United States, the United Kingdom, Germany and France. These members are, in turn, linked – via online and offline interactions – to a broader Open A.I.R. network of hundreds of individuals and institutions, including people and entities in Brazil, India, Malaysia, Australia, Switzerland and the Netherlands. The network receives generous financial support from Canada’s International Development Research Centre (IDRC) and Germany’s Federal Ministry for Economic Cooperation and Development (BMZ).

Each of the editors and authors of this volume is part of, and collaboratively exchanges knowledge and expertise with, this large network, and we the editors, and each of the contributors, are profiled in “About the Editors” and “About the Contributors” sections of this book and on the Open A.I.R. website’s Team page, http://www.openair.org.za/content/open-air-team. On this Team page, one can also find the names and contact details of Open A.I.R. Fellows and other network members and institutions. The network is also accessible via its social media platforms, featured at http://www.openair.org.za/join

Open A.I.R.’s administrative hub is the IP Unit in the University of Cape Town Faculty of Law, where Project Manager Nan Warner and Administrator Phyllis Webb are the key operational drivers. Warner and Webb receive management support from two of the editors of this book (and the co-Principal Investigators of the Open A.I.R. Project), UCT IP Unit Director Tobias Schonwetter and Jeremy de Beer of the University of Ottawa Faculty of Law. Also supporting project management are Julie Nadler-Visser of UCT’s Research Contracts and IP Services (RCIPS) unit, members of the UCT Finance Department and Faculty of Law Finance Department, and another editor of this book: Chris Armstrong of the LINK Centre at the University of the Witwatersrand (Wits) in Johannesburg.

Network strategic guidance is provided by a Steering Committee composed of De Beer, Schonwetter, Warner, Chidi Oguamanam (another of this book's
editors) of the University of Ottawa Faculty of Law, Nagla Rizk of The American University in Cairo (AUC), Sisule Musungu of IQsensato in Nairobi, Khaled Fourati of the IDRC office in Cairo, and Balthas Seibold of Germany’s Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in Bonn. Further strategic support from the IDRC is, or has been, provided by Naser Faruqui, Simon Carter, Laurent Elder, Fernando Perini, Matthew Smith, Heloise Emdon and Phet Sayo; Karim Badran and Rose-Marie Ndiaye Pereira on financial matters; and Michelle Hibler and Nola Haddadian on publications. GIZ’s involvement is focused on the capacity-building components of the network, which are carried out in collaboration with the GIZ’s commons@ip – Harnessing the Knowledge Commons for Open Innovation initiative. At GIZ, in addition to support from the aforementioned Steering Committee member Balthas Seibold, who advises on matters of international knowledge cooperation and networking, support has also come from Petra Hagemann, Christine de Barros Said, Ursula van Look, Marina Neuendorff, Margrit Brockhaus and the Working Group of German Development Organisations on Promoting Innovation Systems. At UCT, as well as those already mentioned, key supporters and collaborators have been the Dean of Law, PJ Schwikkard, Lee-Ann Tong in the Faculty of Law, and, in the IP Unit, the Unit’s founder Julian Kinderlerer, its Deputy Director Caroline Ncube and its Senior Research Fellow Bernard Maister. At the University of Ottawa, in addition to those already mentioned, support has been provided by the Dean of the Faculty of Law, Common Law Section, Nathalie Des Rosiers, and Former Dean Bruce Feldthu sen.

For this book, key network participants were the team of JD candidates in the University of Ottawa Faculty of Law – Lukas Frey, Will Sapp, Phil Holdsworth, Maya Boorah, Kristen Holman and Saara Punjani – who provided long hours of diligent editorial assistance. In addition, because the research case studies presented in this book all required collection of data from human subjects – via interviews and/or focus group discussions and/or written surveys – this book would not have been possible without the cooperation of dozens of respondents across the countries of study. For reasons of confidentiality, most survey and interview respondents are not named in this book, but we are sincerely grateful for their contributions. Also contributing to the research outlined in this book was Donna Podems of OtherWISE in Cape Town, who advised on research methodologies and supported a methodology workshop for several of the authors featured in this volume, in addition to her support of Open A.I.R.’s monitoring and evaluation (M&E) framework. At this book’s publisher, UCT Press, the key drivers have been Publisher Sandy Shepherd and Project Manager Glenda Younge. The cover design for this volume is by Elsabe Gelderblom of Farm Design in Cape Town, who does all of Open A.I.R.’s design work for its website, social media tools, PR materials,
Acknowledgements

Briefing Notes and the network's other substantial publication output, the Open A.I.R. Scenarios compendium – which is available in hard-copy, and on the Open A.I.R. website, as a separate published output and companion to this book.

Network headquarters at the UCT IP Unit serves as Open A.I.R.'s Southern Africa Hub, coordinated by Project Manager Warner. There are also four other Hubs: the North Africa Hub at the Access to Knowledge for Development Center (A2K4D) of the School of Business at The American University in Cairo (AUC), coordinated by Nagham El Houssamy under the direction of Nagla Rizk; the West Africa Hub at the Nigerian Institute of Advanced Legal Studies (NIALS) in Lagos, coordinated by Helen Chuma-Okoro under the direction of Adebambo Adewopo; the East Africa Hub at the Centre for IP and IT Law (CIPIT) of Strathmore University, Nairobi, coordinated by CIPIT Director Isaac Rutenberg; and the Canada Hub at the University of Ottawa Faculty of Law, coordinated by De Beer and Oguamanam. Contact can be made with these Hubs and Hub Coordinators via the aforementioned Open A.I.R. website Team page.

Also integral to the success of the network are its nine Fellows, each of whom has spent time at the UCT IP Unit in Cape Town. The Fellows have contributed to Open A.I.R.'s case study and foresight research, to outreach and training work, and to building the network. The nine Fellows are: Esther Ngom of the Ngo Nyemeck law firm in Yaoundé; Seble Baraki of the Justice and Legal System Research Institute (JLSRI) in Addis Ababa; Moses Mulumba of the Centre for Health, Human Rights and Development (CEHURD) in Kampala; Douglas Gichuki of CIPIT in Nairobi; Milton Lore of Bridgeworks Africa in Nairobi; Eliamani Laltaika of the Tanzania Intellectual Property Rights Network (TIP-Net) in Dar es Salaam; Alexandra Mogyoros, a student in the Faculty of Law at the University of Ottawa; West Africa Hub Coordinator Helen Chuma-Okoro of NIALS in Lagos; and North Africa Hub Coordinator Nagham El Houssamy of A2K4D in Cairo.

Other collaborating institutions are the Program on Information Justice and Intellectual Property (PIJIP) at the Washington College of Law at American University in Washington, DC; the Centre for Technology and Society (CTS) in Brazil; the Centre for Internet and Society (CIS) in India; and the Open Society Foundations, where Open A.I.R.'s key partner is Vera Franz. The Open A.I.R. network has also benefited from interaction with staff at the World Intellectual Property Organisation (WIPO) headquarters in Geneva. In London, Shirin Elahi of Scenarios Architecture is the driver of Open A.I.R. foresight research work, as featured in the aforementioned Scenarios compendium that provides an important forward-looking complement to the current picture offered by this volume. Jo Higgs of Go Trolley Films in Cape Town did post-production on the videos available on the Open A.I.R. YouTube channel – videos which show how the network came into being and how the research was conceptualised.
All the people and institutions mentioned here have in one way or another played a role, by collaborating within the Open A.I.R. network, in the conceptualisation, planning, data collection, data analysis, writing, editing, design and production processes that resulted in successful research and the completion of this book. It is hoped that this volume’s free availability online, under a Creative Commons (CC) licence, will ensure that the book’s collaborative dynamics do not end here at the moment of publication, and continue long into the future in the work of the still-growing Open A.I.R. community.

Jeremy de Beer, Chris Armstrong, Chidi Oguamanam, Tobias Schonwetter
September 2013

xii
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<tr>
<th>Acronym</th>
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<tr>
<td>A2K</td>
<td>access to knowledge</td>
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<tr>
<td>A2K4D</td>
<td>Access to Knowledge for Development Center (The American University in Cairo, Egypt)</td>
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<td>AAU</td>
<td>Addis Ababa University</td>
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<td>ABS</td>
<td>access and benefit-sharing</td>
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<td>ACA2K</td>
<td>African Copyright and Access to Knowledge Project</td>
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<td>ACP</td>
<td>African, Caribbean and Pacific Group of States</td>
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<td>ACTS</td>
<td>African Centre for Technology Studies (Kenya)</td>
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<td>ADPP</td>
<td>Ajuda de Desenvolvimento de Povo para Povo (Mozambique)</td>
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<td>AERC</td>
<td>African Economic Research Consortium</td>
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<td>AFTE</td>
<td>Association for the Freedom of Thought and Expression (Egypt)</td>
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<td>AGOA</td>
<td>African Growth and Opportunity Act</td>
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<td>AIM</td>
<td>Agência de Informação de Moçambique</td>
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<td>AmCham</td>
<td>American Chamber of Commerce (Egypt)</td>
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<td>ARC</td>
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<td>ARIPO</td>
<td>African Regional Intellectual Property Organisation</td>
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<td>ASSAf</td>
<td>Academy of Sciences of South Africa</td>
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<td>ASTII</td>
<td>African Science, Technology and Innovation Indicators</td>
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<td>ATO</td>
<td>alternative trading organisation</td>
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<td>B-BBEE Act</td>
<td>Broad-Based Black Economic Empowerment Act 53 of 2003 (South Africa)</td>
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<td>BCP</td>
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<td>CARICOM</td>
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<td>Convention on Biological Diversity</td>
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<td>CBN</td>
<td>Central Bank of Nigeria</td>
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<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>CC</td>
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<td>CCIA</td>
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<td>Companies and Intellectual Property Commission (South Africa)</td>
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<td>collective management organisation</td>
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<td>CPD</td>
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<td>CTEA</td>
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<td>DNS</td>
<td>domain name system</td>
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<td>digital rights management</td>
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<td>EST</td>
<td>environmentally sound technology</td>
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<td>Acronyms and Abbreviations</td>
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<td>EU</td>
<td>European Union</td>
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<td>FDSE</td>
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<td>gross domestic product</td>
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<td>Global Entrepreneurship Monitor</td>
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<td>GERD</td>
<td>gross expenditure on research and development</td>
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<td>ICLS</td>
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<td>ICT4D</td>
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<td>ICTSD</td>
<td>International Centre for Trade and Sustainable Development</td>
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<td>IE</td>
<td>informal economy</td>
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<td>Acronym</td>
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<td>IFC</td>
<td>International Finance Corporation</td>
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<td>Institute of Infectious Disease and Molecular Medicine (South Africa)</td>
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<td>IIED</td>
<td>International Institute for Environment and Development</td>
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<td>IIPA</td>
<td>International Intellectual Property Alliance</td>
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<td>ILC</td>
<td>indigenous and local community</td>
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<td>Institut national des appellations d’origine (France)</td>
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<td>intellectual property</td>
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<td>integrated seawater agriculture system</td>
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<td>ISCTEM</td>
<td>Instituto Superior de Ciências e Tecnologia de Moçambique</td>
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<td>Institute for Scientific Information</td>
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<td>ISO</td>
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<td>ISP</td>
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<td>JBEDC</td>
<td>Japan Bio-Energy Development Corporation</td>
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<td>JITAP</td>
<td>Joint Integrated Technical Assistance Programme</td>
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<td>Kruger to Canyons Biosphere (South Africa)</td>
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<td>knowledge economy</td>
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<td>Kenya Copyright Board</td>
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<tr>
<td>KENFAA</td>
<td>Kenya Nonfiction and Academic Authors’ Association</td>
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<td>KES</td>
<td>Kenyan Shilling</td>
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<td>KIPI</td>
<td>Kenya Industrial Property Institute</td>
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<td>KIPPRA</td>
<td>Kenya Institute for Public Policy Research and Analysis</td>
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<td>KNAS</td>
<td>Kenya National Academy of Sciences</td>
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<td>KOLA</td>
<td>Kenya Oral Literature Association</td>
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<td>KTO</td>
<td>knowledge transfer office</td>
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<td>LBC</td>
<td>Licensed Buying Company (Ghana)</td>
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<td>LDC</td>
<td>least developed country</td>
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### Acronyms and Abbreviations

<table>
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<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
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<td>Learning Information Networking Knowledge Centre (Wits University, South Africa)</td>
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<td>Law Society of Kenya</td>
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<td>MAN</td>
<td>Manufacturers Association of Nigeria</td>
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<td>MANCAP</td>
<td>Mandatory Conformity Assessment Programme (Nigeria)</td>
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<td>Maasai Cultural Heritage Organisation (Kenya)</td>
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<td>MCST</td>
<td>Ministry of Communications, Science and Technology (Botswana)</td>
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<td>MCT</td>
<td>Ministério da Ciência e Tecnologia (Mozambique)</td>
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<td>MDCA</td>
<td>Malindi District Cultural Association (Kenya)</td>
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<td>MDG</td>
<td>Millennium Development Goal</td>
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<td>MEA</td>
<td>Multilateral Environmental Agreement</td>
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<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
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<td>MOE</td>
<td>Ministry of Education (Ethiopia)</td>
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<td>MOFA</td>
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<td>Ministry of Science and Technology (Ethiopia)</td>
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<td>MoU</td>
<td>memorandum of understanding</td>
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<td>Medical Research Council (South Africa)</td>
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<td>Natoil</td>
<td>Natural Oil Company (Egypt)</td>
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<td>NACI</td>
<td>National Advisory Council on Innovation (South Africa)</td>
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<td>NCC</td>
<td>Nigerian Copyright Commission</td>
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<td>NDA</td>
<td>non-disclosure agreement</td>
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<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
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<td>NESC</td>
<td>National Economic and Social Council ( Kenya)</td>
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<td>NESTI</td>
<td>National Experts on Science and Technology Indicators</td>
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<td>NIALS</td>
<td>Nigerian Institute of Advanced Legal Studies</td>
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<td>NRF</td>
<td>National Research Foundation (South Africa)</td>
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<td>NGO</td>
<td>non-governmental organisation</td>
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<td>NIALS</td>
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<td>NIPMO</td>
<td>National Intellectual Property Management Office (South Africa)</td>
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<td>NIS</td>
<td>national innovation system</td>
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<td>Narsee Monjee Institute of Management Studies (India)</td>
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<td>NPR</td>
<td>National Public Radio (US)</td>
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<td>NRC</td>
<td>National Research Centre (Egypt)</td>
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<td>Acronym</td>
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<td>OA</td>
<td>open access</td>
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<td>OAPI</td>
<td>Organisation africaine de la propriété intellectuelle</td>
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<td>OCEES</td>
<td>Oxford Centre for the Environment, Ethics and Society</td>
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<td>OCFCU</td>
<td>Oromia Coffee Farmers Cooperative Union (Ethiopia)</td>
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<td>ODEL</td>
<td>open, distance and electronic learning</td>
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<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>OER</td>
<td>open educational resource</td>
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<td>Open A.I.R.</td>
<td>Open African Innovation Research and Training Project</td>
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<td>ORD</td>
<td>Office of Research and Development (Botswana)</td>
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<td>PBIP</td>
<td>place-based intellectual property</td>
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<td>PCT</td>
<td>Patent Cooperation Treaty</td>
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<td>Petromoc</td>
<td>Petróleos de Mozambique</td>
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<td>PIIPA</td>
<td>Public Interest Intellectual Property Advisors (US)</td>
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<td>PIJIP</td>
<td>Program on Information Justice and Intellectual Property (American University, US)</td>
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<td>PPS</td>
<td>probability proportional to size</td>
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<td>PRO</td>
<td>public research organisation</td>
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<td>ProBEC</td>
<td>Programme for Basic Energy and Conservation in Southern Africa</td>
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<td>R&amp;D</td>
<td>research and development</td>
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<td>Research Contracts and IP Services unit (UCT, South Africa)</td>
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<td>RIPCO (B)</td>
<td>Rural Industrial Promotion Company (Botswana)</td>
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<td>RMI</td>
<td>rights management information</td>
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<td>SADC</td>
<td>Southern African Development Community</td>
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<td>Southern African Regional Universities Association</td>
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<td>Society for International Development (Kenya)</td>
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<td>SINER-GI</td>
<td>Strengthening International Research on Geographical Indications</td>
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<td>small and medium enterprise</td>
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<td>Small and Medium Industries Equity Investments Scheme (Nigeria)</td>
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<td>small, micro and medium enterprise</td>
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<td>Standards Organisation of Nigeria</td>
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<td>sanitary and phytosanitary measures</td>
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<td>STCI</td>
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<td>science, technology and innovation</td>
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<td>Acronyms and Abbreviations</td>
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<td>technical barriers to trade</td>
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<td>traditional cultural expression</td>
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<td>TGE</td>
<td>Transitional Government of Ethiopia</td>
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<td>Times Higher Education (UK)</td>
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<td>THRIP</td>
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<td>Technology Innovation Agency (South Africa)</td>
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<td>TISC</td>
<td>Technology and Innovation Support Center</td>
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<td>traditional knowledge</td>
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<td>Traditional Knowledge Digital Library (India)</td>
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<td>technological protection measures</td>
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<td>Agreement on Trade-Related Aspects of Intellectual Property Rights</td>
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<td>technology transfer office</td>
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<td>University of Botswana</td>
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<td>United Kingdom</td>
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<td>UM</td>
<td>utility model</td>
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<td>WATH</td>
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### Innovation & Intellectual Property

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<td>WBCSD</td>
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<td>World Intellectual Property Organisation</td>
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Chapter 14
Towards University–Industry Innovation Linkages in Ethiopia
Wondwossen Belete

Abstract
This chapter analyses findings from research into the apparent disconnect in Ethiopia between the state’s innovation policy and the practical realities of scientific research in the country. The research found that the Ethiopian government’s emphasis – in its Science, Technology and Innovation (STI) Policy of 2012 – is on IP protection, and patenting of outputs from publicly funded research. Meanwhile, it was found, there is a dearth of innovative research at Ethiopia’s universities, and scant linkage between universities and the private sector. The chapter argues that the Ethiopian government should look beyond the current focus on IP protection and patenting and seek the optimum balance among a variety of models of university–industry knowledge transfer.

1. Introduction
Ethiopia is the second most populous country in sub-Saharan Africa, with a population of 84 million. Agriculture accounts for 41% of gross domestic product (GDP) and 85% of employment, and is also the main source of foreign exchange and raw materials for domestic industry. Although the country is one of the poorest in the world, its economy has demonstrated signs of improvement in recent years. At the time of writing, Ethiopia had experienced double-digit GDP growth for nine consecutive years, making it one of the fastest-growing economies in Africa.

Despite promising signs of economic improvement, poverty eradication still remains a priority for the Ethiopian government. The country’s low level of technological development is a major constraint on this national development objective. Promoting technological progress is therefore seen as essential to achieving
Towards University–Industry Innovation Linkages in Ethiopia

broad-based, accelerated and sustained economic growth. The government in 2012 approved a Science, Technology and Innovation (STI) Policy based on a national innovation system (NIS) approach. The NIS approach is premised on the assumption that the flow of technology and information among people, enterprises and institutions is key to the innovative process. The Policy emphasises the need for strengthening the interaction among universities and industrial enterprises to enhance the innovative capacity of industry. Other government policies and programmes also view the wealth of knowledge generated through academic research as a source of industrial innovation and national competitiveness (FDRE, 2010a, 2010b, 2012; MOST, 2010).

In turn, intellectual property (IP) rights have been identified as important tools to facilitate the transfer of university-generated knowledge to industry. Various studies have recommended policies that permit universities and government research institutes to retain IP rights (EIPO, 2007; Mengistie, 2006; MOST, 2009). The studies do not mention specific foreign policies to be used as models, but a critical examination of the studies reveals that priority is being placed on the adoption of IP policies from developed countries in relation to the promotion of university–industry interaction (EIPO, 2007; MOST, 2009). These studies have had a significant influence on the IP strategy of the STI Policy – an important point, given that the recommended strategy provides for the development and implementation of institutional IP systems that could, if implemented, lead to increased privatisation of the knowledge outputs from publicly funded research (FDRE, 2012).

There are a number of challenges associated with cross-national emulation of STI policies between developed-world and developing-world contexts. STI policies need to cater to a country’s socio-economic context, the research environment in its universities and research institutes, the capacity of a country’s domestic firms to absorb external knowledge, and the availability in the country of resources for research and innovation. Hence the appropriate policies needed to enhance the benefits of STI are highly context-specific. In order to build an innovation system that works in the Ethiopian context, it is necessary to base STI policy development on research evidence reflecting the current situation of science and technology.

This study aimed to produce evidence on the potential impact of IP dynamics on university–industry interaction – a matter of heated debate in Ethiopian STI policy-making. The study sought to answer the question: How does IP protection of academic research output potentially influence the performance of innovation in Ethiopian industry?

The study reviewed the policies and laws in place in Ethiopia to promote a university–industry alliance, and examined the views of stakeholder groups regarding the different channels of knowledge transfer between universities
and industry and the policy environment affecting that knowledge transfer. Establishing a system that stimulates effective university–industry interaction requires a clear understanding by academic researchers, industry managers and policy-makers of the relative merits of the different models of knowledge transfer, and this study sought to generate findings that can contribute to this process of understanding.

The next section of this chapter (Section 2) outlines the study’s methodology. The third section reviews the relevant literature in order to establish the context of the study. Section 4 analyses the relationships between IP rights, publicly funded research and industrial innovation in Ethiopia on the basis of information gathered during the research. The fifth and final section provides conclusions and policy recommendations. (See Chapters 13 and 15 of this volume for more research, in South Africa and Botswana, respectively, into matters at the intersection of IP and publicly funded research.)

2. Research methods

This study used two main data collection methods: document analysis and questionnaires. The documents analysed included government policies, laws, plans, programmes and study reports. Also analysed were research strategies of universities and study papers produced during recent university reforms in Ethiopia – in order to gather information on research performance and management at the institutional level. In addition, previous research in this area was reviewed to identify questions that needed to be answered and to explore different viewpoints on the application of IP protection in relation to publicly funded research.

Questionnaires were used to collect information from groups categorised into (1) universities, (2) industrial enterprises and (3) government agencies. The universities included in the study were selected according to the following factors: number of academic staff, size of public research funding, research performance and previous experience in collaborations with industry. Researchers in universities who directly participate in publicly funded research, or who are involved in the process of design and implementation of research projects, were selected for the study. Industrial enterprises were chosen based on their levels of innovative activities and prior collaboration with universities. The respondents from enterprises were selected on the basis of their roles in research management and protection of enterprise IP. The government agencies included in the study were those with active roles in the development of STI policy. In these agencies, government officials with technical knowledge of IP rights administration were targeted as respondents.
Because the nature of the information gathered from each group had some level of variation, three separate questionnaires were developed. The questionnaires were delivered as attachments to e-mail messages. The questionnaires included background information about the study and posed questions intended to collect information on the impact of academic patenting on industrial innovation. Each question gave respondents a range of options to select from. In cases where answers did not fit into the given options, respondents were allowed to provide their own comments. The questionnaires also contained a section that allowed respondents to add their individual thoughts on IP and the dissemination of university research results.

Some of the university researchers targeted as respondents did not respond to the questionnaire. This limited the study’s ability to incorporate the views of people with in-depth information on the subject. In addition, since the study focused on a recent policy issue that has not yet been extensively or systematically researched in the context of least developed countries (LDCs), it was difficult to find materials written from the perspective of such countries. Although innovation policies are context-specific, LDCs share commonalities associated with their low level of technological development.

3. IP rights and university research

IP and dissemination

Over the past three decades, IP protection of publicly funded university research has been the subject of intense policy debate in both developed and developing countries. Some people consider the dissemination of university research via patent licensing as a model that facilitates economic and social returns from university research. Others have highlighted the potential for this model to generate unintended and deleterious consequences for innovation systems (Boettiger and Bennet, 2006; Montobbio, 2009; Sampat, 2006).

The UK Commission on Intellectual Property Rights (CIPR) found that the underlying argument for patenting university inventions and exclusive licensing of technologies is to increase the rate of commercial application of knowledge by encouraging private sector investment (CIPR, 2002, p. 123). University inventions are often in the very early stages of development, and therefore require substantial development before commercial application. It is thus argued that unless companies are able to negotiate exclusive access to the IP from university research, the companies will not have the incentive to invest the resources necessary for developing marketable products. The argument for university ownership of IP rights, therefore, “pertains not to ex ante
incentives for invention, but to incentives *ex post* for downstream users to invest in commercialization of federally funded inventions” (Thursby and Thursby, 2007, p. 4).

The opposing argument is that the interests of technology transfer and commercial application will be best served by the widest possible dissemination of knowledge in the public domain. According to this perspective, increased focus on IP protection of academic inventions is a threat to the objectives of universities (Davis *et al.*, 2011). Academic researchers have traditionally been committed to “open science”, which involves peer evaluation, a shared culture of scientists that emphasises the importance of motivational factors other than economic ones, and the widespread dissemination of research findings (David, 2003; Dosi *et al.*, 2006; Liebeskind, 2001; Lundvall, 2008; Sampat, 2006). It is argued that the open science approach helps to avoid excessive duplication of research efforts, to promote information-sharing and to allow the development of a strong public knowledge base from which subsequent researchers can draw (Fabrizio, 2006).

**Bayh-Dole and its international emulation**

The 1980 Bayh-Dole Act in the United States permitted university patenting. Proponents of the Act argued that there was a significant informational divide between the world of academia and the world of industry, making it difficult to implement university inventions in practice (Colyvas *et al.*, 2002). Bayh-Dole aimed to promote the commercialisation of university research results that were seen as going to waste (Fabrizio, 2006). The Act responded to a belief by policy-makers that stronger protection for the results of publicly funded research and development would accelerate the commercialisation of these results and the realisation of economic benefits for US taxpayers (Mowery *et al.*, 2001). Furthermore, allowing universities to share in the proceeds from faculty inventions would create incentives for the universities to advertise these inventions to industry. Bayh-Dole “provided blanket permission for performers of federally funded research to file for patents on the results of such research and to grant licences for these patents, including exclusive licenses, to other parties” (Mowery and Sampat, 2005, p. 228).

Recent policy initiatives in a number of industrial economies have revealed that there is considerable interest in emulating the Bayh-Dole Act. Many European countries changed their innovation policies to accord with the American example, entrusting universities with IP management and providing support to intermediary units that help to facilitate the university–industry technology transfer process (Poglajen, 2012). Similarly, Bayh-Dole provided a model of reform for Japanese policy-makers (Walsh *et al.*, 2008). Several developing countries have
also adopted legislation modelled on Bayh-Dole, while others are considering the introduction of such policies (Foley and Lardner, 2011; Graff, 2007; Koyama, 2010; Vartak and Saurastri, 2009).

Despite this apparent popularity of cross-national policy emulation in the case of the Bayh-Dole Act, there is a strong argument that policy copying without due consideration of country-specific situations is not desirable. Verspagen (2006) argues that the justifications given for the adoption of Bayh-Dole in the US may not be applicable in the European context. Crespi et al. (2006) used their data from a large-scale survey of European countries to argue against Bayh-Dole-like legislation in Europe. According to their argument, there is no indication of market failure, in the dissemination of university research in Europe, to justify legislative intervention. Mowery and Sampat (2005) argue that the emulation of Bayh-Dole in other industrial economies is based on a misreading of the empirical evidence of the effects of the Act, and a misreading of the importance of the facilitating role of IP rights in the transfer and commercialisation of university inventions. There is also a lack of firm evidence on the effect that Bayh-Dole has had on the quantity and quality of university research output and its level of commercialisation (CIPR, 2002).

Various authors have criticised the emulation of Bayh-Dole in developing countries. Anthony et al. (2008) are doubtful that the benefits of legislation modelled on Bayh-Dole can outweigh the costs in developing countries. Sampat (2009) examined the theory and evidence supporting the main goals of the draft Indian Bill for the Protection and Utilisation of Publicly Funded Intellectual Property. Like Bayh-Dole, India’s proposed Bill was to apply to all research resulting from government grants. Sampat noted the difficulties inherent in cross-national policy emulation, and advised that India and other developing countries considering Bayh-Dole-like legislation should not precisely follow the American model. These insights are also applicable in Ethiopia.

4. IP, university research and industrial innovation in Ethiopia

Government policies

Seeking to foster the development of domestic technological capabilities, various government policies in Ethiopia emphasise the need for stronger interaction between universities and industry. These policies are intended to strengthen graduate training and university research, to establish mechanisms to facilitate collaboration and information flow, and to create industry demand for knowledge generated by universities.
Ethiopia issued its first national Science and Technology Policy in 1993 (TGE, 1993). This Policy contained directives intended to establish and/or strengthen science and technology institutes and research and development (R&D) centres. The Policy also addressed the need for dissemination and application of research results, and encouraged the private sector to invest capital, participate in the promotion and development of scientific and technological activities, and promote mutual support between research and production (TGE, 1993). However, the Policy followed a linear approach to innovation that limited its ability to create a strong alliance between universities and industry. The linear approach postulates that innovation starts with basic research, then adds applied research and development and ends with production and diffusion.

Hence in 2012 the government adopted a new STI Policy. This new Policy envisages the establishment of a national innovation system that strengthens the links between different innovation actors. The Policy contains strategies for creating strong connections between universities, research institutes and industry in the learning and adaptation of foreign technologies (FDRE, 2012).

The government’s Education and Training Policy of 1994 emphasises the creation of an appropriate nexus between university research and industrial innovation. The Policy sets out the research-oriented role that higher education should play, in order to enable students to become problem-solving professional leaders who address broader societal needs in their fields of study. The approach gives priority to research with practical societal impact that fosters cooperation among stakeholders (TGE, 1994). The Higher Education Proclamation of 2009 serves to consolidate the Education and Training Policy. One of the objectives of the Proclamation is to promote and enhance university research by focusing on knowledge and technology transfers consistent with the country’s priority needs (FDRE, 2009).

Industrial development and capacity-building policies also stress the importance of universities as sources of new ideas with industrial application. These policies consider the interface between universities and their socio-economic environment as one of the key factors for development. While giving recognition to the role of universities as breeding grounds for professional leaders and researchers, these policies emphasise that tertiary institutions should be engaged in activities aimed at generating knowledge that can be applied in industry. Universities are required to have a role in problem-solving activities that address the specific needs of industry and contribute to innovation through technology transfer (FDRE, 2002a, 2002b).

However, it is this author’s view that there is no evidence to suggest that the focus of these policies – on universities as instruments for knowledge-based
economic development and change – has yet brought the envisaged change in industrial innovation and economic growth in Ethiopia. Examination of the factors constraining the contribution of universities to technological capacity building and national competitiveness is a broad research subject that goes beyond the scope of this study. However, the following subsection outlines capacity-related constraints that seem to explain the scant collaborative links between universities and industry in Ethiopia.

**University research and innovation performance of firms**

Over the past 15 years there has been a significant expansion of higher education in Ethiopia, facilitating improved access to tertiary education for many young people. The number of universities increased from just two in 2000 to 32 in 2011. Undergraduate enrolment increased from 149,694 students in 2005 to 319,217 students in 2009. Postgraduate enrolment increased from 3,884 students to 10,125 students over the same period (MOE, 2005, 2010, 2011). University research has not, however, shown parallel growth. Only a handful of universities, chiefly Addis Ababa University (AAU), Haramaya University and Mekelle University, are engaged in notable research activities. Furthermore, it was found that there is a disconnect between the research focus of the universities and the needs of the economy. A situation analysis of research activity at AAU found that none of the units at the university had set research priorities based on national development objectives (Lemma et al., 2008). A shortage of qualified researchers, lack of adequate research funding and weak research infrastructure have also been identified as factors limiting the involvement of universities in development-oriented research programmes (Belete, 2010; Lemma et al., 2008).

The strength of university–industry links depends not only on the amount and orientation of university research activities, but also on the ability of industrial firms to identify, assimilate and apply knowledge generated in universities. The absorptive capacity of recipient firms is a major factor in potential transfer of university knowledge and effective university–industry interaction. Viewed from this perspective, most Ethiopian industrial enterprises have weak absorptive capacity for externally generated knowledge. They face problems related to their lack of information on available technological options, financial constraints and skill gaps (i.e. differences between the skill requirements of the enterprise and those possessed by graduates) (Belete, 2010). The resulting lack of required technical skills negatively influences the technological capabilities of enterprises. Most of the technical staff working in firms are trained by the Technical and Vocational Education and Training (TVET) institutes of Ethiopia. However, in my experience, many TVET graduates do not meet the
expectations of industrial enterprises. TVET has traditionally concentrated on institution-based training, which favours theoretical instruction. Until recently, TVET training was input-oriented and followed curricular requirements instead of workplace and labour market requirements. Moreover, training and continuous upgrading for the existing workforce was only partially in place. A meaningful structure for steady adaptation to workforce demands and life-long learning was missing (MOE, 2005).

The structure of the industrial sector is another factor contributing to the innovative performance of industrial enterprises and their connections with universities. Ethiopia’s manufacturing sector is dominated by small and medium enterprises (SMEs), which are often owned by individuals or families. These SMEs tend to be risk averse. Enterprises willing to invest in new management systems or new production processes are relatively scarce. It is rare to find separate units within these enterprises focusing on innovation; rather, innovative activities are carried out informally along with day-to-day manufacturing operations (Belete, 2010; UNCTAD, 2002).

The government has launched several initiatives aimed at improving the linkage between universities and industry in Ethiopia. Starting as early as 1986, these initiatives focused on encouraging industrially relevant university research and improving the capacity of industry to absorb and utilise university-generated knowledge (Gebreyesus, 1998; Kitaw, 2008; Wasmuth and Nebelung, 2006). The most recent of these initiatives is the Engineering Capacity Building Program (ECBP). In 2011–12, the ECBP established Institutes of Technology at different universities. The Institutes are engaged, *inter alia*, in an interdisciplinary approach to applied technology research and technology transfer, in an effort to impact the development of Ethiopia’s regional and national economies. Also among the core tasks of the Institutes are the establishment of sustainable partnerships for development and mutual support between industry, the business community and national and international institutions (Edhardt and Scholz, 2009).

**The national IP system and institutional IP management**

IP protection is a relatively new concept in Ethiopia. The country’s first patent law was adopted in 1995, and regulations implementing it were introduced in 1997. The national IP system began to take shape only after the establishment of the Ethiopian Intellectual Property Office (EIPO) in 2003. The EIPO operates as an autonomous government agency with responsibility for the administration of IP rights. It is also mandated to conduct studies in various IP fields and to recommend policies and legislation (FDRE, 2003).
Despite the demanding tasks entrusted to the EIPO, it suffers from a shortage of professionals with sufficient knowledge and skills to carry out its mandate.\(^1\) The examination of patent applications is performed by personnel who lack the requisite training and experience. Moreover, there is a general lack of appreciation of how specific IP policies affect creativity.

Under Ethiopia’s 1995 patent law, employers are the default owners of any patents on inventions created by employees in the course of employment. This provision may be interpreted as entitling universities to retain the IP rights on research conducted by academic staff using institutional resources. However, inventions that are not related to an employee’s employment or service contract and were created without the use of the employer’s resources, data, materials or equipment, belong to the employee (TGE, 1995). The Higher Education Proclamation of 2009 recognises individual IP rights and confidentiality agreements when university-generated knowledge is used for public benefit (FDRE, 2009). However, the Proclamation does not contain any explicit provisions for institutional ownership of patents on inventions generated by university research. Such a provision was included in the Research Policy at AAU, which was submitted for discussion to the academic community in 2011. The University’s Research Policy requires all potentially patentable inventions conceived by academic staff in the course of their employment, and in sponsored projects, to be disclosed on a regular basis to the Office of the Vice President (AAU, 2011). This gives the University the right to patent inventions developed as a result of public funds or other public financing being channelled through the University. At the same time this AAU Research Policy creates the potential for delays in the publication of research results until a patent application is filed. The Research Policy of Adama University, like that of AAU, requires academic researchers to disclose all inventions resulting from their research activities in the course of their employment, so that the University may claim patent ownership. The University consequently gains the right to grant exclusive licences to industry (Adama University, 2010).

As a consequence of policy emphasis on strengthening university–industry interaction, technology transfer units were established within the organisational framework of some of the country’s institutes of higher education, including the aforementioned universities in 2011–12. The technology transfer units are tasked with encouraging links between the institutes and the economy. Within this scope, the technology transfer units are responsible for the management of IP (Edhardt and Scholz, 2009). However, it is my view that the units are not

\(^1\) The author served as the EIPO’s Director of Intellectual Property Policy and Planning in 2004–06, Director of Trademarks in 2007–10, and Director of Intellectual Property Protection and Technology Transfer in 2010–11.
sufficiently resourced to staff offices with adequately trained IP-knowledgeable professionals who can determine how and when to use IP as a tool for technology transfer.

**Perspectives of policy-makers, industry managers and academic researchers**

Effective interaction between knowledge-generating universities and industry is dependent on the capacity of IP policy-makers to appreciate the various factors affecting the relationships between research, innovation and economic development. However, this study found, via the questionnaires completed by government officials, that Ethiopia lacks sufficient IP expertise in the government agencies responsible for science, technology, industry and trade. Most policy-makers, understandably, have a limited understanding of the complex and multifaceted role of IP in national innovation systems. Those government officials with IP knowledge tend to have technical knowledge of IP rights administration and only a limited understanding of the role of IP as a tool of regulatory and economic policy.

The government respondents surveyed for this study cited an absence of noticeable transfer of knowledge between university research and industry. They indicated that universities are not engaged in large-scale research activities and argued that the small amount of university research lacks relevance to industrial innovation. Further, respondents pointed to the inadequacy of public funds allocated for university research. The absence of research infrastructure and a shortage of qualified researchers were also identified as factors limiting the amount of research conducted in universities.

The government officials responsible for STI policy cited a lack of clarity on IP ownership of university research as a factor limiting university–industry collaboration. They argued that IP policies allowing university ownership of publicly funded research outputs are essential for strengthening collaborative ties between universities and industry. A critical look at the questionnaire data found that government respondents viewed the alignment of national IP laws (as well as national and institutional IP policies) with international standards as necessary to build national competitiveness. Their views seem clearly to be influenced by the proclaimed positive impact, in developed countries, of IP on national innovation systems. Furthermore, the government respondents implicitly favoured the replication of IP policies of developed countries as important in strengthening university–industry linkages in Ethiopia.

At the same time, information obtained from government respondents demonstrated that universities in Ethiopia are not significant players in terms
of ownership of IP rights. Most of the local applications received by the EIPO are from SMEs. These SMEs are mainly requesting utility model certificates for their incremental inventions (which may not fulfil the criteria of patentability). Government respondents considered the low utilisation of IP by universities as an outcome of the low level of awareness about IP among the academic community.

Respondents from industry shared the views of government officials regarding the scale and orientation of university research. All industry respondents considered universities to be relatively unimportant information sources for Ethiopian industry’s innovative activities. New products and processes introduced over the last few years by their enterprises have, the respondents said, been mainly developed internally, while others have been acquired from local technology centres or foreign research institutes. The inadequate supply of industrially applicable university knowledge and the weak alliance between university and industry actors were both noted as factors limiting the transfer of innovation to industrial enterprises.

Most industry respondents’ knowledge of IP systems was limited to the technical requirements for IP protection. While the views expressed by industry respondents varied according to their level of understanding of the subject matter, some opinions were found to be shared among respondents. First, they agree on the need to view the issue of IP, in the context of current STI policy efforts in Ethiopia, as a tool for potentially facilitating the development of domestic technological capability – with industrial enterprises used as loci of innovation. Second, they agree on the need to eliminate barriers constraining industrial enterprises in their efforts to access university knowledge. Third, respondents said they believe that there is a need to devise mechanisms that will stimulate university researchers to engage in industrially applicable research. Finally, industry respondents cited the need for balance between measures stimulating industry-oriented university research and measures ensuring improved access to university knowledge by industry.

Similar to the other two stakeholder groups surveyed, the academic researcher respondents demonstrated a low level of awareness and understanding of IP. The limited IP expertise that can be found at universities is apparently concentrated in the schools of law, which offer semester-long courses in IP. I found the lack of IP awareness surprising, given that the respondents who participated in this study are directly involved in research or research management at their respective universities. (It was therefore presumed that they would have an interest in IP in the university context and a greater level of understanding of the topic.) The researchers’ primary concern is apparently funding. The respondents stated that inadequate funds hinder their ability to carry out meaningful research that
Innovation & Intellectual Property

will be considered worthy of industrial application. Also cited as problems were: inadequate research facilities; a shortage of qualified research staff; a lack of information resources; a lack of institutional incentive mechanisms; and a lack of clear research strategy. Researcher respondents were also critical of the heavy teaching loads and administrative burdens faced by most university professors, limiting their involvement in research.

The university researcher respondents indicated that the direct commercialisation of research outputs is not an incentive that drives research. Furthermore, they indicated that IP considerations play a negligible role in the transfer of university research output to industry. However, respondents were of the view that as long as mandatory requirements on patenting research are not imposed on researchers, IP can be used as but one in an array of mechanisms for the transfer of university-generated knowledge to industry. Conferences, workshops, journal articles and personnel mobility – more than IP rights – were all identified as the prevailing mechanisms for the dissemination of university research results.

The researcher respondents indicated that the potential mutual benefits that can accrue from universities working closely with industry include networking and researcher access to industry partners, access to industry laboratories and equipment, and financial benefits from consulting activities. Respondents did not place importance on the generation of income through IP protection for university research. According to the responses, the focus should be on improving knowledge transfer between universities and industry, and the patenting and licensing of university knowledge should be viewed as an option for income generation only so long as it does not constrain the academic objectives of open science. They consider IP as but one mechanism for commercialisation of university research, not as a default option.

5. Conclusions and recommendations

Ethiopia's national STI Policy of 2012 envisions building of capabilities to enable rapid learning, adaptation and utilisation of effective foreign technologies. The realisation of this vision depends on the existence of institutional structures that support the process of technological learning and innovation. Publicly funded university research, which forms an important element of such structures, can play a central role in the process of technological catch-up called for by the Policy of 2012, especially catch-up through adaptation of foreign technologies to suit local conditions. Promoting innovation in industrial enterprises requires wide dissemination of technology research outputs generated by universities.
Universities in Ethiopia were found by this study to be playing only a limited role as research centres for the adaptation of foreign technologies and as sources of knowledge for problems affecting industry. They have weak research capacities, both in terms of infrastructure and qualified manpower. Furthermore, the research activity in these institutions (what little there is of it) was found to be not aligned with the needs of industry, and thus it has little relevance to the economy. University institutional IP policies that prioritise patenting of academic inventions have the potential to further limit the degree and rate of academic knowledge transfer, thus slowing the rate of innovation.

The capacity of firms to absorb externally generated knowledge is an equally important issue for facilitating university knowledge transfer. Ethiopian firms are significantly limited in their capacity to seek out and make effective use of externally generated knowledge, due to a lack of investment in building internal research and innovation capacity. Companies depend heavily on minor in-house innovative activities aimed at adapting technologies to specific local circumstances. Moreover, most firms in Ethiopia operate on a small scale and face resource constraints, limiting their capacity to acquire university knowledge through mechanisms that may require some financial investment.

In this context, university–industry interactions that require less financial commitment by enterprises will contribute more effectively to the enhancement of technological capacities at the company level. For this reason, making university research available in the public domain could be a more effective way – more effective than the use of IP rights – of improving access to research knowledge by industry. Moreover, the Ethiopian government’s current emphasis, on IP protection for the transfer and commercialisation of publicly funded university research outputs, may have undesired consequences for the innovation process. Patenting of publicly funded university research should be considered the best option only when there is empirical evidence to suggest that other models of knowledge transfer would fail to ensure effective utilisation of the research outputs.

This study’s review of Ethiopian government policies clearly found that the underlying IP focus is on building the technological capability of local enterprises, by facilitating their access to improved technologies emerging from university research. The views expressed by the different stakeholders surveyed also emphasised the importance of strengthening the interaction between universities and industry through the flow of university knowledge. But there was a clear view among many of the researcher and industry respondents that the desired strong university–industry nexus is more likely to be achieved through encouraging knowledge transfer via open science methods – such as publications, conference presentations and informal contacts – than via formal technology transfer methods based on IP rights. Therefore, Ethiopia’s government actors and policy
community need to look beyond the current IP focus and seek the optimum balance between different models of university–industry knowledge transfer (with IP-related models as but one part of the mix).

For a developing country like Ethiopia, technological catch-up requires emphasis on the use of information in the public domain, not emphasis on privatisation of knowledge. The primary focus, therefore, should be on enhancing the research capacities of universities to improve the supply of research outputs with potential applications in industry. Rather than, or at least in addition to, relying on the privatisation of university research through IP, the research environment in universities can be improved by upgrading the skill levels of the researchers, increasing the research budgets, implementing a salary structure that incentivises research, and giving better recognition to the intellectual contributions of academic researchers. Such measures would, in this author's opinion, enhance universities' research performance and ensure wider dissemination of university knowledge for the improvement of social and economic returns from academic research.

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Policies, strategies


Towards University–Industry Innovation Linkages in Ethiopia


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Towards University–Industry Innovation Linkages in Ethiopia


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Index

Please note: Page numbers in *italics* refer to figures, tables and appendices.

A

Academy of Sciences of South Africa (ASSAf) 289, 308
access and benefit-sharing (ABS) 15–16, 18, 151
Nagoya Protocol 153, 161–162
Regulations, South Africa 162
access to knowledge (A2K) 3, 17, 204, 285–286
Access to Knowledge for Development Center (A2K4D) 178
Adama University Research Policy, Ethiopia 325
Addis Ababa University (AAU) 323
Research Policy 325
Africa 4–5, 61
agricultural production 89
diversity of social constructs 377
net exporters of knowledge 18
recommendations to policy-makers 391–393
unemployment statistics 46
African Economic Research Consortium (AERC) 210
African Growth and Opportunity Act (AGOA) 114
African innovation and creativity
undermining 5, 7–8
undervaluing 5–7
African innovation policy priorities 20
African national patent regimes 242
African Regional Intellectual Property Organisation (ARIPO) 139–140, 237, 238, 239, 250–251, 256, 262, 381
African Science, Technology and Innovation Indicators (ASTII) 39
African Innovation Outlook report 39
African Technology Policy Studies Network (ATPS) 210
African Union (AU) 344
African workforce 46
agricultural biotechnology 88
agricultural industries 133
agricultural producers 79
agricultural products 375
agricultural waste 272, 273
rice straw 273
Agro Eco-Louis Bolk Institute 88
Ajuda de Desenvolvimento de Povo para Pova (ADPP), People to People Development Aid, Mozambique 257
community biofuel project 256, 257, 258–259
NGO project 260
algae 272, 273
alternative art scene, Cairene 178–179
alternative markets for higher-value products 78
alternative music and art industries 179
alternative music-consuming populations 179
alternative publishing models
online subscription 204–205, 212
online OA self-archiving 205, 212
alternative trading organisations (ATOs) 86
alternative value chain 90–91
American University in Cairo, The (AUC) 178
Anne Nang’unda Kakuli v Mary A Ogola & Another, Kenya, 215–216
anti-commons effect 337
Anti-Counterfeit Act, Kenya 140
Antique coffee, Guatemala 97
apprenticeship
as means of learning 66–67
sector-specific 376
Aquaculture Research Centre (ARC), Egypt 273
Arab Academy for Science, Technology and Maritime Transport 373
Arabic Creative Commons licences 175
architecture for Kenyan scholarship
copyright communities 210
libraries and archives 209
professional research and publishing 210
publishers 209
scholarly consortia 210
universities 209
Argentina 306
artisans 67
and technology students 69
Association for Promoting Fairtrade in Finland 86
Australian patent office (IP Australia) 275–276
authorship 206–208
motivation for 219–221
and open scholarship 220–221
automobile parts 375
B
Balì meeting, UNFCCC 268
Banjul Protocol on Marks within the Framework of ARIPO 340
Bank of Industry (BoI), Nigeria, 116, 125
international emulation 320–321
B-BBEE Act, South Africa 293
Berne Declaration on Open Access 298, 303, 308, 310
Berne Convention for the Protection of Literary and Artistic Works (BCPs) 153, 378, 388
Biodiversity Act, South Africa 159, 162
biofuels 15, 375
agricultural products 248
ethanol and biodiesel 248–249
exploitation 250
innovations 270, 383, 385
legislation 254
policy landscape, Mozambique 255–256
technology in production 258, 382
technology patenting 20
biopiracy 152–153
bio-prospecting 162
biotechnology 11
Botswana 385
benefits of public research to economy and society 359, 362
framework for IP at institutions 348–353
importance of IP factors to commercialisation 360
industrial property rights 341
institutional funding for research 365, 365
institutional IP environments 364
institutional IP policies 364
institutional IP policy on commercialisation 352, 352–353
institutional IP policy on dissemination 350
institutional IP policy on knowledge utilisation 351
institutional roles 362–363, 363
IPA and PRO ownership of results 350
IP and research practices necessary for value 361
IP and STI environment 340–342
IP and University of Botswana (UB) 342–343
IP expertise and activity 344–345
IP law and policy 338, 353, 354–355
IP management infrastructure 363
IP methods used 359
IP for protection of research output 345–346, 347
knowledge of how to use IP 347
knowledge of institutional IP policies 349, 353
levels of research activity 356–357
ministerial powers and parastatal institutions 343–344
Ministry of Trade and Industry 339, 343
publicly funded researchers 22, 335, 359, 384, 387
public policy 22
Registrar of Companies 344–345
research factors and commercialisation 358
“triple helix” of research and development 344
types of research 353, 356
university and PRO roles 366
use of IP procedures 348, 358
Botswana domestic laws and regulations
Copyright and Neighbouring Rights Act 341
Industrial Property Act (IPA) 341
Industrial Property Regulations, Statutory Instrument 341
Botswana Export Development and Investment Authority 343
Botswana Football Association and Another v. Kgamane 345
Botswana Innovation Hub (BIH) 343, 344
Botswana Technology Centre (BOTEC) 343
Braille, audio or digital texts 225
branding 110
communal strategies 379
BRICS nations (Brazil, Russia, India, China, South Africa) 38
Budapest Open Access Initiative 211
Bushbuckridge, Kruger to Canyons (K2C) area, South Africa 151–168, 380
multi-ethnic nature of TK commons 160
municipality 157
registered as Biosphere Reserve 151
traditional medicinal practitioners 18, 386
C
Canadian Intellectual Property Office (CIPO) 276
capitalist entrepreneurs 36
Centre for Research in Transportation Technologies (CRTT), Makerere University, Uganda 64–65
certification assessing schemes 88–90
critics of schemes 89
overseen by governmental bodies 88
marks 16–17, 78, 111, 112–113, 120, 123, 124
registration of marks 117
trademarks schemes 379
China 97, 110, 111, 122
clean energy technology 378, 383
Egypt 242, 267
fast-track administrative procedure 275–276
innovations 270, 385
and IP mechanisms 268
Mozambique 242
Climate Change Conference, UN, Copenhagen 268
clothing 375
Codes of Practice for Organic Farming, Ghana 88
collaborative, openness-oriented dynamics 4
collaborative branding, trademarks and geographical indications (GIs) 16–17
<table>
<thead>
<tr>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>collaborative innovation and creativity 9–12, 22, 135, 388</td>
</tr>
<tr>
<td>collaborative intellectual property 377–384</td>
</tr>
<tr>
<td>collaborative partnerships 144–145</td>
</tr>
<tr>
<td>collective entities 81</td>
</tr>
<tr>
<td>collective management organisations (CMOs) 210</td>
</tr>
<tr>
<td>collective marks 111, 123, 124</td>
</tr>
<tr>
<td>“CA” mark 112</td>
</tr>
<tr>
<td>collective rights of a community 80</td>
</tr>
<tr>
<td>College of Engineering, Design, Art and Technology (CEDAT), Makerere University 16, 63, 387</td>
</tr>
<tr>
<td>IP dynamics 71–72</td>
</tr>
<tr>
<td>Kiira EV Project 64–65, 67, 72</td>
</tr>
<tr>
<td>Makerere Clusters Programme 73</td>
</tr>
<tr>
<td>MoUs (memoranda of understanding) 72</td>
</tr>
<tr>
<td>networks among study participants and entities 74</td>
</tr>
<tr>
<td>research centre and informal-sector artisans 59–60</td>
</tr>
<tr>
<td>see also Gatsby Garage automotive workshop</td>
</tr>
<tr>
<td>commercialisation 320, 335</td>
</tr>
<tr>
<td>in global R&amp;D markets 305</td>
</tr>
<tr>
<td>of IP 285, 286, 304</td>
</tr>
<tr>
<td>of research output 348</td>
</tr>
<tr>
<td>Commission on Intellectual Property Rights (CIPR), UK 319–320</td>
</tr>
<tr>
<td>common law</td>
</tr>
<tr>
<td>of copyright 214</td>
</tr>
<tr>
<td>jurisdictions of UK and former British colonies 78</td>
</tr>
<tr>
<td>commons 137</td>
</tr>
<tr>
<td>concept 154–155</td>
</tr>
<tr>
<td>knowledge 137</td>
</tr>
<tr>
<td>material 137</td>
</tr>
<tr>
<td>social 137</td>
</tr>
<tr>
<td>traditional agricultural 388–389</td>
</tr>
<tr>
<td>communalism 112</td>
</tr>
<tr>
<td>communal trademarks 109, 111–113, 120, 123, 379</td>
</tr>
<tr>
<td>Ethiopian initiative 111</td>
</tr>
<tr>
<td>feasibility 114</td>
</tr>
<tr>
<td>models 124</td>
</tr>
<tr>
<td>Nigeria 116–119</td>
</tr>
<tr>
<td>communication 37</td>
</tr>
<tr>
<td>communities</td>
</tr>
<tr>
<td>closed group of 81</td>
</tr>
<tr>
<td>traditional agricultural 82</td>
</tr>
<tr>
<td>Companies and Intellectual Property Commission (CIPC) (formerly CIPRO), South Africa 307</td>
</tr>
<tr>
<td>confidential information 379</td>
</tr>
<tr>
<td>construction, innovation in 38</td>
</tr>
<tr>
<td>consultancies for industry 353</td>
</tr>
<tr>
<td>consumer preferences 96</td>
</tr>
<tr>
<td>Convention on Biological Diversity (CBD) 138–139, 153, 271</td>
</tr>
<tr>
<td>cooking oil 272, 273–274</td>
</tr>
<tr>
<td>copyright 1, 3, 10, 132, 138, 346, 378</td>
</tr>
<tr>
<td>American law 214–215</td>
</tr>
<tr>
<td>development in Kenya and Africa 213–214</td>
</tr>
<tr>
<td>economic rights 208</td>
</tr>
<tr>
<td>and empowered creativity 19</td>
</tr>
<tr>
<td>infringement 221</td>
</tr>
<tr>
<td>laws, policies, practices 224</td>
</tr>
<tr>
<td>moral rights 207, 208</td>
</tr>
<tr>
<td>paternity right 207</td>
</tr>
<tr>
<td>policy-makers 205</td>
</tr>
<tr>
<td>protection 175, 205, 389</td>
</tr>
<tr>
<td>in research 14</td>
</tr>
<tr>
<td>right of integrity 207</td>
</tr>
<tr>
<td>term in Kenyan law 207</td>
</tr>
<tr>
<td>violations 175</td>
</tr>
<tr>
<td>see also open scholarship and copyright, Kenya</td>
</tr>
<tr>
<td>Copyright Act, Kenya 140, 141</td>
</tr>
<tr>
<td>Copyright Tribunal, Kenya 210</td>
</tr>
<tr>
<td>cosmetic industries, and traditional knowledge (TK) 133</td>
</tr>
<tr>
<td>counterfeiting and falsification 97, 124</td>
</tr>
<tr>
<td>Creative Commons 11, 175</td>
</tr>
<tr>
<td>Creative Research Systems, Sample Size Calculator 339</td>
</tr>
<tr>
<td>creativity 1–2, 10, 133, 374, 375</td>
</tr>
<tr>
<td>cultural heritage 378</td>
</tr>
<tr>
<td>customary laws 157–158, 159</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>De Beers Element Six programme 303</td>
</tr>
<tr>
<td>demand-side factors 47</td>
</tr>
<tr>
<td>Department for International Development (DFID), UK 94</td>
</tr>
<tr>
<td>Department of Chemical Engineering, UCT 296</td>
</tr>
<tr>
<td>Department of Education, Science and Training (DEST), Australia 287</td>
</tr>
<tr>
<td>Department of Higher Education and Training (DHET), South Africa 289, 308</td>
</tr>
<tr>
<td>Green Paper for Post-School Education and Training 289</td>
</tr>
<tr>
<td>Department of Molecular and Cell Biology, UCT 286</td>
</tr>
<tr>
<td>Department of Science and Technology (DST), South Africa 288, 308</td>
</tr>
<tr>
<td>Department of Trade and Industry (DTI), South Africa 303</td>
</tr>
<tr>
<td>design theft 121</td>
</tr>
<tr>
<td>diffusion</td>
</tr>
<tr>
<td>geographic versions of theory 37</td>
</tr>
<tr>
<td>process of innovation 41–42</td>
</tr>
<tr>
<td>digital commons business model 171, 387</td>
</tr>
<tr>
<td>advertising and/or sponsorships 181</td>
</tr>
<tr>
<td>knowledge of 181</td>
</tr>
<tr>
<td>Meetphool digital platform 181–182</td>
</tr>
<tr>
<td>online digital music and streaming 184</td>
</tr>
<tr>
<td>digital copyright exchange 286</td>
</tr>
<tr>
<td>digital communications 203</td>
</tr>
<tr>
<td>digital rights management (DRM) 219, 223</td>
</tr>
<tr>
<td>digitisation and copyright, Kenya 210–211</td>
</tr>
<tr>
<td>discontinuous economic change 37</td>
</tr>
</tbody>
</table>
Innovation & Intellectual Property

Divine Chocolate Inc, UK 86
domain name system (DNS) 210
Draft Bill on Protection of Traditional Knowledge and Traditional Cultural Expressions (Draft TK Bill), Kenya 141–142
dual economy model 48

E
Econergy International Corporation 249, 252–253
ecological and sustainability conditions, of production 87
Economic Community of West African States (ECOWAS) 125
economic development 36
drive to maturity 36
Economic Development Imports 86
economic growth 33
economic strategies 38
economic systems
classic and neoclassical 33–34
development 33, 35
dynamic development 34
formal and informal 9
Eco-Patent Commons 276–277
ecosystem, building the new 309–310
"egocentric networks" approach 63
selection of central node 63–64
Education and Training Policy, Ethiopia 322
Egypt 306, 385
Al Sawy Cultural Wheel 179
willingness to pay musicians 183
biofuel patenting 20, 271–272, 275–278
biofuel technology development 382
copyright law 174–175, 381
Economic Court 194
"Hollywood of the East" 171
illegally copied CDs and cassettes 183–184
independent music industry 19, 171–172, 376, 380–381, 387
IP law in practice 175–177
alternative art outlets, Cairo 197
Patent Gazette 272
patent law 270
Patent Office 270–271, 272, 275, 276
patent system 267–272
private sector 274–275
public sector 274
research incentives 277
stakeholders 272–275, 277–278
see also music industry
Egyptian alternative music scene 390
judicial process and court system 180, 181
knowledge of copyright law 179–180
relevance of copyright 180
Egyptian copyright provisions 268–271
administrative bodies 194
conditions of protection 192
duration of protection 193
economic rights 192–193
Executive Regulation 270–271
moral rights 192–193
Egyptian Environmental Affairs Agency (EEAA) 274
Egyptian Intellectual Property Rights Law (EIPRL) 174–175, 182–183, 268–269
Executive Regulation 271
moral rights 190
electronic patent databases 14
electronic publishing 204
engineering, software and genetic 203
Engineering Capacity Building Program (ECBP), Ethiopia 324
enterprises, parastatal and industrial 336
entrepreneurial education 47
entrepreneurial environment in a developing economy 42–45
entrepreneurs
"imitating" 41, 42
"innovating" 41
risk-taking 39
entrepreneurial 9, 32
and Africa 45–48
defined 40
in developing world 40–42
imitation 52
and IP 43–44
environmental certifications 78, 87
and labelling 84
Environmental Protection Authority (EPA), Ethiopia 91
environmental standards 110
environmentally sound technologies (ESTs) 276
ethanol 249
Ethiopia 21–22, 99, 316, 373, 375, 384, 385
agriculture and GDP 316
coffee industry 17, 77, 78, 84–85, 90–91, 376, 379, 386
Coffee Quality Control and Inspection Centre 83
Coffee Quality Control and Marketing Proclamation 92
coffee trademark and licensing initiative 98–99
Draft Gls Proclamation 91
empirical value chain 82
Farmers Cooperative Unions 84, 388
foreign exchange earnings 83
Forest Stewardship Council 87
government policies 321–323
institutional IP management 324–326
IP rights and university research 319–321
Ministry of Trade 91
national IP system 324–326
Office of the Vice-President 325
Organic Agriculture System Proclamation 88
Index

policy-makers, industry managers, academic researchers 326–328
poverty eradication 316–317
public researchers 387
Rainforest Alliance 87
university research and innovation by firms 323–324, 329
UTZ KAPEH 87
Ethiopia Commodity Exchange (ECX) 84
quality inspection centres 92
Ethiopian Intellectual Property Office (EIPO) 83, 91, 324–325, 327
trademark-based protection 98–99
Europe 99
European Patent Office 275
Eurostat (Statistical Office of the European Communities) 9, 32
evolutionary economic theory 37–38
Expert Group on Informal Sector Statistics (Delhi Group) 49

F
fair trade 84
certification 86–87, 89–90
labelling 78
Fairtrade Federation 86, 90
Fairtrade Foundation, UK 87
Fairtrade Labelling Organizations International (FLO) 86
FAIRTRADE™ mark 86
Fair World Designs 86
financial support facilities and schemes 125
FLO-Cert 86
Kafa Forest Coffee Farmers Cooperative Union 86
Oromia Coffee Farmers Cooperative Union 86
Sidama Coffee Farmers Cooperative Union 86, 89, 93
Yirgacheffe Coffee Farmers Cooperative Union 86, 93
folklore 133, 136, 214
foreign certifiers 88
foreign direct investment (FDI) 344
foreign markets 113
formal and informal sectors
dualistic conceptions 60–61
innovative work 66
networks, linkages between 67–69
sharing of innovations 70–71
formal–informal continuum 61–62, 387
choosing a point on 62
knowledge transfer 61
formal–informal exchanges and linkages 69–70
formal–informal innovation intersections 11
France 99
free and open source software (FOSS) movement 11
Free Day Secondary Education (FDSE), Kenya 209
Free Primary Education (FPE), Kenya 209
Friendship, Commerce and Navigation (FCN) Agreements 214

G
Galp Energia 252
Gatsby Garage automotive workshop, Uganda 16, 387, 388
IP protection issues 65–66
research 62–69
General Administration for the Prevention of Infringement of Intellectual Property Rights, Egypt 194
genetically modified (GM) foods 88
genetic resources (GRs) 79
geographical indications (GIs) 13, 16, 17, 77–78, 80–82, 89, 111, 113, 118, 123, 124, 138, 341, 346, 378
compliance and additional production costs 94
feasibility 90–91
legislation 92–93
operational challenges 95
origin-designated (or place-based) branding 379
potential economic benefits and costs 94
protection for wines and spirits 98
structural challenges 91–95
Ghana 48, 373
adinkra and kente cloths 97
certification schemes 85
Cocoa Abrabopa Association 87, 93
cocoa industry 17, 77, 78, 90–91, 376, 379, 386
empirical value chain analysis 82
Geographical Indications Act 91
good agricultural practice guidelines 92
government role in production and marketing 85
Kuapa Kokoo Farmers Union 86–87
Licensed Buying Companies (LBCs) 85, 388
Ministry of Agriculture 92
Ministry of Trade 83
Rainforest Alliance 87
Registrar General’s Department 83
Standards Authority 83
Standards Board Codes of Practice for Organic Farming 88
UTZ KAPEH 87
Ghana Cocoa Board (COCOBOD) 85, 94
Quality Control Division 93
global diseases 306
Global Entrepreneurship Monitor (GEM) Model 43
and IP 44–45
globalisation 109, 111
global patenting market 306
greenhouse gas emissions 267
green inventions 275
green technologies 268, 276
Innovation & Intellectual Property

gross domestic product (GDP)
- Botswana 344
- Ethiopia 316
- Nigeria 110

gross expenditure on research and development (GERD) 344

Group of 77 developing nations (G77) 268

H
- Hagen, Everett 36
- Hague Agreement Concerning the International Deposit of Industrial Designs 340
- Hague Convention on the Law applicable to Trusts and their Recognition 163
- Haramaya University, Ethiopia 323
- Hargreaves Report, UK 285–286
- Harrod-Domar Growth Model 35
- healing schools (imphande) 157
- Higher Education Proclamation, Ethiopia 322, 325
- Hirschman, Albert 35
- HIV infection 152
- Hoechst, Germany 252–253
- Holden, Andrew 26

I
- IBM 276–277
- implementation, meaning of 10
- inclusive development 8–9
- India 118
- Council of Scientific and Industrial Research (CSIR) 134
- Darjeeling tea 111
- Protection and Utilisation of Publicly Funded Intellectual Property 321
- leather products, toys, wall decorations 111
- pashmina textiles 111
- indigenous and local communities (ILCs) 18, 80, 81, 144, 145, 146, 378–379
- control over commercialisation and exploitation 134
- control over natural resources and TK 153
- Kenya 132, 133, 136–137
- Kukula Healers, South Africa 161–162
- and TK 17, 80
- indigenous art 123
- indigenous knowledge and capabilities 38
- Indigenous Knowledge Systems Policy, South Africa 159
- indigenous people’s innovation 3
- indigenous scientific capabilities 38
- indigenous textile products, Nigeria 113
- industrial absorptive capacity for knowledge conversion 375
- industrial designs 138, 346
- Industrial Development Corporation (IDC), South Africa 305
- industrialisation 36
- Industrial Property Act (IPA), Botswana 341
- Industrial Property Act, Kenya 140, 141
- Industrial Property Code, Mozambique 255, 382
- Industrial Property Institute (IPI), Mozambique 250–251, 256
- industrial property rights 255
- informal appropriation, research on 13
- informal economy (IE) 16, 32, 47–48, 52, 61, 379
- “informal sector” concept 48–50
- informal protections 378
- international statistical definition 49
- Kampala auto mechanics 373
- networks, linkages in 69–70
- information and communication technology (ICT) 204
- efforts to digitally document TK 134, 136
- systems 14, 51, 80
- use of in Kenya 144–45
- “informationalism” 203
- innovation 1–2, 10, 33, 67, 133, 283, 288, 304, 339, 374, 375
- conceptual frameworks 32
- current state of literature 38–39
- development and diffusion 37
- and entrepreneurship 36, 52
- five-step theory (Rogers) 36
- in industrial enterprises 328
- knowledge transfer approach 38
- measurement in the informal sector 50–51
- systems approach 33, 38
- innovation–development nexus 33
- innovation for development 47
- innovative knowledge systems 376
- Institute of Chartered Public Secretaries of Kenya (ICPSK) 210
- Institute of Infectious Disease and Molecular Medicine (IIDMM), UCT 296
- Institut national des appellations d’origine (INAO), France 98
- instructional broadcasts 216
- intangible resources 14
- integrated seawater agriculture system (ISAS), Egypt 274
- intellectual property (IP) 32, 77, 111, 248, 249, 268, 335, 373
- Code, Mozambique 255
- commercialisation 384
- conventional rights 79
- and dissemination 319–320
- education and training of lawyers in Africa 238
- fear of exploitation and infringement 52
- framework for development 51–52
- law and traditional healing 158–159


law, policy and practice 7, 10, 384
macro-level public policies 11
management, innovation, creativity 386
micro-level management practices 11
open or closed systems 283
policy instruments 133, 309
protection 319, 327, 346
rights 1–8, 22, 138, 317
rights in Africa's informal sector 59
South African public funding 283
training of legal counsel and judges 241
valorising (adding value to) GRs (genetic resources) 79
Western model of rights 79
benefit-sharing 295
conditions that apply only to exclusive licences 294
conditions that apply to all licences 294
conditions that apply to offshore transactions 294
evolution of South African approach 289
Framework, 288
institutional infrastructure 292
IP ownership and statutory protection 292–293
IP transactions 293–294
key provisions 291–292
primary intent of Act 290–291
Regulations 282–285
state “walk-in” rights 294–295
inter-ethnic traditions and customary laws 160
Inter-Ministerial Committee on Biofuels, Mozambique 254
regulations for biofuel additives to commercialised fuel 254
International Commission of Jurists (ICJ), Kenya Section 210
International Conference of Labour Statisticians (ICLS) 49
International Development Research Centre (IDRC), Canada 50
International Federation of Organic Agriculture Movements 88
International Institute for Environment and Development (IIED) 158
International Intellectual Property Alliance (IIPA) 176
International Labour Organisation (ILO) 45, 48–49, 51, 61
international markets competition and standards 114
promotional activities in 95
International Patent Classification (IPC) committee of experts 276
Green Inventory 276
International Organisation for Standardisation (ISO) 110
International Trade Centre (ITC) 343
International Treaty on Plant Genetic Resources for Food and Agriculture (International Seed Treaty) 139
inventions 304, 381
evaluation of merits 20
protection and processes 359
inventors 303
investment 35
Italian Embassy, Maputo 252
Italy 110
J Japan
policy-makers 320
productivity 36
Joint Integrated Technical Assistance Programme (JITAP) 343
jojoba 274–275
medicinal applications 275
plantations 272
K Kenya 380
alternative publishing 381
Anti-Corruption and Economic Crimes Act 218
civil society organisations 213
collaboration between government and indigenous and local communities (ILCs) 132
collective management organisations (CMOs) 213
conceptualising and contextualising copyright 206–208
Constitution 132, 140, 204, 214
Copyright Act 206, 211, 213, 214–217, 219, 224–226, 381
copyright law 380
Department of Culture 136
Department of Justice 136
Digitising Traditional Culture Initiative 145
Draft TK Bill 132, 146–147
fair dealing 214–215
funding 143
industrial property law 380
international and regional legal instruments 138–140
IP laws 132
IP rights 214
legal instruments for protection of IP 140–141
legal/policy framework and role of government 142–144
Innovation & Intellectual Property

local economy 49  
McMillan Memorial Library Act 209  
national and legal policy framework 140–142  
National Museums of Kenya 136, 143–144  
National TK Policy 18, 132, 142, 144, 146–147, 380  
Office of the Attorney-General 136  
Official Secrets Act 218  
Penal Code 218  
Public Officer Ethics Act 218  
scholarly authors 376, 387, 388  
Science and Technology Act 209  
State Law Office 213, 225  
TK commons 380  
TK digital library 380  
University of Nairobi 136  
Vision 2030, policy blueprint 204  
see also open scholarship and copyright, Kenya  
Kenya Copyright Board (KECOBO) 136, 143–144, 145, 146, 210, 213, 225  
National Competent Authority for traditional knowledge (TK) 142  
Kenya Historical Association (KHA) 210  
Kenya Industrial Property Institute (KIPI) 136, 142, 143–144, 145, 239  
Kenya Institute for Public Policy Research and Analysis (KIPPRA) 209  
Kenya Institute of Curriculum Development (KICD) broadcasts 216  
Kenya National Academy of Sciences (KNAS) 210  
Kenya National Library Service Board Act 209  
Kenya Nonfiction and Academic Authors' Association (KENFAA) 210  
Kenya Oral Literature Association (KOLA) 210  
Keynesian economics and growth theory 33, 34–35  
knowledge  
African 5  
capital 43  
commercial application 337  
commons 7, 388  
dissemination 320, 348  
economy 78–79  
hoarding 285–186  
informal management of 16  
“know how” 43  
poor people’s 3  
pre-existing (“prior art”) 235  
socialisation 21, 310–311, 338  
technological 242  
utilisation 348  
knowledge-based economic development and change 322–323  
knowledge–development nexus 38  
knowledge economy (KE) 203  
knowledge-governance frameworks 7  
knowledge-sharing 178  
knowledge transfer 375–376  
knowledge transfer offices (KTOs), Botswana 349, 353  
Kruger to Canyons (K2C) Biosphere Region, South Africa 151  
ethnic groupings 151–152  
K2C Management Committee 151, 153, 154, 165, 166  
Kukula Healers 151–154, 373, 380, 388  
Association 156–157, 167  
bio-cultural protocol (BCP) 153–154, 160, 161  
Code of Ethics 157  
collective 380  
commons 155–156  
cosmetics 164  
evolution of TK commons 156–161  
Goding and Godding laboratories 164  
holistic approach to knowledge-sharing 158  
IP-based property rights 156  
Nagoya Protocol 161–162  
non-disclosure agreement with Godding and Godding 161–162  
Trust as legal model 161–163, 166  
Kyoto Protocol 252, 267  

L  
labelling 93  
labour, flow of 48  
Latin America 61  
Law Society of Kenya (LSK) 210  
least developed countries (LDCs) 319  
legal profession and universities 304  
legal trust components 163–164  
licensing  
alternative, in Egypt 175  
and assignments of scholarly works 217  
compulsory 216  
learning materials 378  
of rights, voluntary 255  
and registration of businesses 50  
Lipset, Seymour Martin 35–36  
Luanda, Angola study 46  
Lusaka Agreement on the Creation of ARIPSO 340  

M  
Maasai, Kenya 142  
community 135–136, 143, 144  
knowledge 18, 132, 133  
project on digitisation of culture 145  
Maasai Cultural Heritage (MCH) Organisation, Kenya 136  
Madrid Agreement Concerning the International Registration of Marks 117, 255, 340
Index

Protocol 117, 118, 255, 341
Treaty 124–125
Malindi District Cultural Association (MDCA), Kenya 136, 144
Manufacturers Association of Nigeria (MAN) 116
manufacturing 35, 38
Margaret Ogola & 3 Others v David Aduda and Another, Kenya 215
marginalisation of African youth 45
marketed services, innovation in 38
Marshall, Alfred 34
mass consumption, age of high 36
Mauritius 306
McClelland, David 36
media coverage 6
medicinal knowledge 378
medicinal plants 152, 157
and animals 158
Mekelle University, Ethiopia 323
memoranda of understanding (MoUs) 72
microelectronics 203
micro-entrepreneurs 50
micro or cottage enterprises 113
Miji Kenda community, Kenya 135–136, 142, 143
Millennium Development Goals (MDGs) 51
Ministry of Agriculture (MOA), Ethiopia 83, 88, 91, 94
Agricultural Extension Directorate 91
Coffee Quality and Marketing Implementation Manual 92
Ministry of Infrastructure, Science and Technology (MIST), Botswana 343, 344, 345
modernisation theory 33, 35–37
Mozambique 379, 382, 385
applications to the Industrial Property Institute (IPI), Maputo 262
biofuels agreement with EU and Brazil 253
biofuel production 248–250
biofuel technology patenting 250, 256
Constitution 254
Inter-Ministerial Committee on Biofuels 259–260, 385–386
IP Code 255
IP Strategy 254–255
national biofuel policy-making and patenting 20
oil-from-jatropha initiative 388
patents granted 261
policy and legal framework 253–255
studies of biofuel sector 251–253
Multilateral Environmental Agreements (MEAs) 110
musicians
anti-commercialisation 187–188
business model 188
ethical consumption 189
non-monetary inclinations 188
remuneration model 188–189
sharing-based public licence 189
music industry 133
access versus incentive tension 172–174
commons-based approach 172, 190
consumers of alternative music, Cairo 178
consumption patterns 182–184
copyright and sharing 177–178
digital 172–173
“freemium” model 19, 171, 381, 387
illegal music copying, Egypt 176–177
independent music digital commons 191
jingles for advertisements 187
legal barriers and IP rules 173
live music scene, Cairo 173–174, 187, 190–191
monetary reward 186
money spent on concerts 185
money spent on music 185
physical versus virtual 189–190
piracy in Egypt 176
as quasi-public good 172–174
remuneration, incentives, business models 184–189
websites for illegal music downloads, Egypt 176
muti (traditional medicine) hunters, South Africa 152

N
National Agenda for Research and Innovation in Biofuels, Mozambique 254, 260
National Enquiry Point (NEP), Botswana 343
National Experts on Science and Technology Indicators (NESTI), OECD 37
national innovation system (NIS) approach 317
National Museums and Heritage Act, Kenya 140, 141
National Museums of Kenya 142, 143
National Policy and Strategy on Biofuels Development, Mozambique 248, 249, 250, 253, 258, 259, 382, 385–386
National Policy on Traditional Knowledge, Genetic Resources and Traditional Cultural Expressions (National TK Policy), Kenya 141
National Programme for the Promotion of Mozambican Innovators 258
National Programme on Biofuels Development, Mozambique 254, 260
National Research and Development (R&D) Strategy, South Africa 288
National Research Centre (NRC), Egypt 273
National Scholarly Editors’ Forum, South Africa 289
Natural Justice non-governmental organisation (NGO) 153
neoclassical school 34
market equilibrium 34
orderly economic change 34
Natural Oil Company (Natoil), Egypt 274–275
New and Renewable Energy Authority (NREA), Egypt 274
New Nile Company, Egypt 274
Nigeria 379
Aba leather shoemakers 115, 115–116, 120, 121–123
Central Bank 125
economy 109–111
existing cluster dynamics 119–120
existing knowledge of IP 121
export of leather 110
Itoku-Abeokuta textile producers 115, 120, 121–124
Kano leather tanneries 114, 115, 120, 121–122
leather and textile products 17, 78, 109–111, 113–114, 388
leather and textile unions and associations 386
legal and regulatory framework 116–119
market challenges 121–123
oil sector 109–110
Patent Office, Abuja 236–237
revenue generation 110
small-scale operators 123
textile makers 376
Trade Marks Act 112, 116–117, 121, 124–125
Yoruba people 113
Nigerian Customs Service 125
Nigerian Export Promotion Council 116, 125
Nokia 276–277
non-disclosure agreements (NDAs) 299–300
non-GI certification marks 124
non-trademarked certification schemes 78
North Africa 3
North–South protectionist dynamics 18
O
online Creative Commons-based “digital commons” 19
open, distance and electronic learning (ODEL) 216
open access (OA) 204, 211–212
to knowledge and culture 81
online publishing approach 19
publishing 289, 303, 383, 388
scholarly publishing 282, 287, 306
Open African Innovation Research and Training Project (Open A.I.R.) 12–15, 388
network’s interdisciplinary framework 13
research programme 14
open development 8–9, 80, 134, 191, 204, 211, 386
open educational resources (OERs) 289
open innovation 135
open knowledge 288
openness 22, 388–389
open research 288
open scholarship 222–223, 381
challenges to accessing scholarly information 217–218
and alternative publishing, Kenya 225–226
and copyright, Kenya 19, 203–205, 211–212
open science approach 21, 288, 320, 335, 337
open source approach 276
Oromia Coffee Farmers Cooperative Union (OCFCU), Ethiopia 93
organic certification 84, 88, 90
schemes 90
through foreign-based certifiers 89
organic labelling 78
Organisation africaine de la propriété intellectuelle (OAPI) 237, 238, 239, 381
Organisation for Economic Co-operation and Development (OECD) 6, 9, 32, 38, 51, 335, 366
Working Party of NESTI 37–38
work on innovation 47
ownership and control systems 7
of IP rights 327
of outputs from publicly funded research 20–22, 378
Oxfam 86
P
Paris Convention for the Protection of Industrial Property 117–118, 139, 255, 340
Parsons, Talcott 36
patentability 234
patent commons 276–277
International Bureau, Geneva 256, 261
Office, Geneva 238
patent data 276
patenting and commercialisation 383
dynamics 20
university 320
patent offices in Africa 234
roles of 235–236
survey data 243–244
patents 1, 10, 132, 158, 234, 248, 249, 346, 378
access to information 259
applications 236, 238
business method 210
database 276
design 379
“dumping grounds” 381
exclusive rights 270
incentivised payment for examiners 241
regimes in Africa 236–238

404
Index

protection 381, 389
and renewable energy 15
in research 14
software 210
statistics 11
systems in African states 240–241
performance industry 133
Perroux, François 35
Petrobras, Brazil 386
Petromoc, Mozambique 251, 253, 257
‘petty patent’ utility models (UMs) 248
pharmaceutical industries 133, 134, 306
pharmaceutical research 306
Pitney Bowes 276–277
place-based intellectual property (PBIP) 17, 378
strategies 77, 78
plagiarism 221
Plant and Health Inspectorate, Kenya 143–144
plants 273
African palm 249
breeder exemption 270, 383
breeders' rights 138
castor seed 249
cocnut 248, 249
genetic resources 376
jatropha 248, 249, 250, 251, 252, 256, 272,
274, 376, 386
sugar cane 248, 249
sui generis protection for varieties, Egypt 383
sunflower 249
variety rights systems 270
see also jojoba
Population Action International 45–46
preconditions for take-off 36
Pred, Allan 35
principles of inclusion and collaboration 378
prior informed consent 151
private-sector investment 319–320
probability proportional to size (PPS) measures 339
Proclamation for the Registration and Protection of Designation of Origin, Ethiopia 91
product
innovation 38
quality improvement 96
production cost 125
professionalism in patent offices 239
property ownership, attributes of 90
proprietary value 101
protection of IP 285–286
public good 172, 204
publicly funded research 14, 318, 320, 338, 351,
359, 375, 376, 384, 385
ownership of outputs 383
public–private partnerships 14–15
public research organisations (PROs), Botswana 335, 336–337, 339, 353, 363
publishers' copyright policies 221–222
publishing
digital 204
offline print 204
scholarly 204
Q
qualitative data 13, 373
quantitative data 13, 373
quasi-public good 173
R
reading or recitation of an extract 216
remuneration, direct financial 204
Renewable Energy Strategy, Egypt 268
research
analytical framework 12
applied 353
development-focused 287
emphasis on institutions 357
epidemiological 353
evaluation 353
investment of public funds 306
literature/desk review 353
methods 12–13
multi-disciplinary network of researchers 12
perception of institution's involvement 357
publicly funded entities 309
publishing 285
respondents’ average yearly output, Botswana 358
thematic areas 13–16
types 356
under-utilisation of findings 286
research and development (R&D) 15, 20, 43, 45,
209, 242, 253, 254, 283, 305, 322, 375, 382
university-based 308
Revised National Policy on Research, Science,
Technology and Innovation, Botswana 344
rights-holders 100
rights management information (RMI) 219
Rogers, Everett 36
Rostow, Walt Whitman 36
royalties 204
Rural Industrial Promotion Company (Botswana) (RIPCO (B)) 344
rural poverty 152
Scholarly communication 208
Scholarly publishing 203, 205, 287
literary works 207
scholarly works, use of 221
scholarship 208
see also architecture for Kenyan scholarship
school use and copyright 215–216
Scielo OA publishing platform, Brazil 289
Scielo South Africa 289
science and engineering publications 376
Science and Technology Capacity Index (STCI) 344
Science and Technology Policy, Ethiopia 322
“science first” position 337
science, technology and innovation (STI) 337
African Science, Technology and Innovation Indicators (ASTII) 39
Botswana 335, 344
national goals 22
Policy, Ethiopia 316–318, 322, 328, 338, 375
at Uganda National Council for Science and Technology (UNCST) 65
scientific information in African patent applications 242
scientific research, new economics of 337
scientists and academics 272–274
Schumpeter, Joseph 34, 41
Seeds and Plant Varieties Act, Kenya 140
sharing or non-disclosure agreements 379
Sierra Leone, study 48
small, micro- and medium enterprises (SMMEs) 341
small and medium enterprises (SMEs) 253, 255, 324, 327, 391
access to technology 258
utilisation and adaptation 256
small-scale enterprises 109
small-scale entrepreneurs 111
Smith, Adam 34
social and cultural value of textiles 110
social (de facto) commons 171–174
socialisation of knowledge 286–287, 299
socially conscious consumers 86
social network analysis (SNA) 63, 64
social networks 11
Society for International Development (SID), Kenya 210
socio-economic development 32, 134, 204, 283, 373, 382, 384–385, 387
grassroots, ad hoc visions 387
high-level, state visions 385–386
mid-level, associational visions 386
sociological approach to development 36
solar and wind energy 272
Solow, Robert 35
growth model 35
Sony 276–277
sorghum 249
South Africa 118, 385
traditional healers 376
traditional medical practitioners 386
South African Revenue Service 307
Southern African Development Community (SADC) 344
South Korean patent office (Korean Intellectual Property Office) 275–276
standardisation 109
Director of International Standards and SMEs 110
Duty Drawback Schemes 125
respondent adherence to standards 119
Statistical Office of the European Communities, see Eurostat
sub-Saharan Africa
informal employment 47
perspectives 3
“youth bulge” 45
youth-to-adult ratio 45
sui generis
ex parte form of GI protection 94
ex officio form of GI protection 94
go geographical indications (GIs) 77–78, 80
protection of GIs, TK, plant varieties 389–390
regimes 80
systems 18
Sumitomo Chemical Company 256
Sun Biofuels Mozambique 256–257
Quinvita 257
Lufthansa 257
supply-side factors 47
Sussex Manifesto: Science and Technology for Developing Countries during the Second Development Decade 38
Svakopmund Protocol on the Protection of Traditional Knowledge and Expressions of Folklore within the Framework of ARIPO 139–140, 340
T
take-off preconditions 36
Tanzanian small-scale farmers 382
Tea Board of India 97
Technical and Vocational Education and Training (TVET), Ethiopia 323–324
technological development 35, 36
technological innovation 33
technological knowledge 242
technological protection measures (TPMs) 14, 173, 219
Technology and Human Resources Programme (THRIP), South Africa 303
Technology and Innovation Support Centres (TISCs), WIPO 259
Technology Innovation Agency (TIA), South Africa, 288, 304, 308, 309
technology research outputs 328
technology transfer offices (TTOs) 292, 296, 302, 307, 366
funding functions at Wits Enterprise 305
informal mode 382
and legal offices 309
telecommunications 203
Ten-Year Innovation Plan, South Africa 288
Thomson Reuters Web of Science 289
trade
global 79
Index

<table>
<thead>
<tr>
<th>Term</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>liberalisation</td>
<td>109, 111</td>
</tr>
<tr>
<td>secrets</td>
<td>1, 10, 138, 346, 379, 389</td>
</tr>
<tr>
<td>trademark-based GI protection</td>
<td>101</td>
</tr>
<tr>
<td>trademark GIs versus <em>sui generis</em> GIs</td>
<td>100–102</td>
</tr>
<tr>
<td>ecological, cultural, biodiversity goals</td>
<td>100</td>
</tr>
<tr>
<td>trademarks</td>
<td>1, 10, 80, 132, 138, 346, 378</td>
</tr>
<tr>
<td>collective</td>
<td>78</td>
</tr>
<tr>
<td>conventional</td>
<td>78</td>
</tr>
<tr>
<td>ordinary</td>
<td>78</td>
</tr>
<tr>
<td>protection</td>
<td>389</td>
</tr>
<tr>
<td>registration and licensing</td>
<td>98</td>
</tr>
<tr>
<td>in research</td>
<td>13</td>
</tr>
<tr>
<td>speciality</td>
<td>78</td>
</tr>
<tr>
<td><em>see also</em> communal trademarks</td>
<td></td>
</tr>
<tr>
<td>Trade Marks Act, Kenya</td>
<td>140, 141</td>
</tr>
<tr>
<td>Trademarks Registry, Nigeria</td>
<td>116</td>
</tr>
<tr>
<td>traditional cultural expressions (TCEs)</td>
<td>133, 136, 145</td>
</tr>
<tr>
<td>traditional ecological knowledge</td>
<td>133</td>
</tr>
<tr>
<td>traditional healers, Bushbuckridge, South Africa</td>
<td>151–152</td>
</tr>
<tr>
<td>Traditional Health Practitioners Act, South Africa</td>
<td>159</td>
</tr>
<tr>
<td>traditional knowledge (TK)</td>
<td>80, 123, 136, 138, 214, 341, 376, 378</td>
</tr>
<tr>
<td>and biodiversity</td>
<td>155</td>
</tr>
<tr>
<td>biological resources and cultural goods</td>
<td>133</td>
</tr>
<tr>
<td>commercialisation</td>
<td>133</td>
</tr>
<tr>
<td>commons</td>
<td>16, 18, 134, 151</td>
</tr>
<tr>
<td>commons-based approach</td>
<td>380</td>
</tr>
<tr>
<td>commons pool</td>
<td>160</td>
</tr>
<tr>
<td>digital library initiative as defensive protection</td>
<td>145</td>
</tr>
<tr>
<td>exploitation of</td>
<td>18</td>
</tr>
<tr>
<td>legal trust mechanism</td>
<td>18</td>
</tr>
<tr>
<td>multi-generational</td>
<td>159, 380</td>
</tr>
<tr>
<td>patent applications</td>
<td>271</td>
</tr>
<tr>
<td>potential of commons arrangements</td>
<td>18–19</td>
</tr>
<tr>
<td>in production processes</td>
<td>114</td>
</tr>
<tr>
<td>in research</td>
<td>15</td>
</tr>
<tr>
<td><em>sui generis</em> protection</td>
<td>145</td>
</tr>
<tr>
<td>TK-based agricultural products</td>
<td>80</td>
</tr>
<tr>
<td>TK-related IP challenges</td>
<td>16</td>
</tr>
<tr>
<td>trans-generational territorial</td>
<td>81</td>
</tr>
<tr>
<td>Traditional Knowledge Digital Library (TKDL), India</td>
<td>134, 144</td>
</tr>
<tr>
<td>traditional medicinal knowledge</td>
<td>133, 375</td>
</tr>
<tr>
<td>ancestors Nkomo Le Lwandle and Dlamini</td>
<td>157</td>
</tr>
<tr>
<td>from healer (<em>sangoma</em>) to apprentice (<em>thwasa</em>)</td>
<td>157</td>
</tr>
<tr>
<td>transfer and collection systems</td>
<td>158</td>
</tr>
<tr>
<td>traditional society</td>
<td>36</td>
</tr>
<tr>
<td>trust</td>
<td></td>
</tr>
<tr>
<td>administration rules</td>
<td>166</td>
</tr>
<tr>
<td>beneficiary</td>
<td>166–167</td>
</tr>
<tr>
<td>property</td>
<td>164–165</td>
</tr>
<tr>
<td>settlor</td>
<td>165</td>
</tr>
<tr>
<td>terms</td>
<td>165–166</td>
</tr>
<tr>
<td>trustee</td>
<td>166</td>
</tr>
<tr>
<td>Trust Property Control Act, South Africa</td>
<td>162–164, 166</td>
</tr>
<tr>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>59, 375</td>
</tr>
<tr>
<td>auto mechanics</td>
<td>387</td>
</tr>
<tr>
<td>Central Engineering Workshop, Kampala</td>
<td>70</td>
</tr>
<tr>
<td>Kampala</td>
<td>59</td>
</tr>
<tr>
<td>policy-making</td>
<td>72–73</td>
</tr>
<tr>
<td><em>see also</em> Gatsby Garage automotive workshop</td>
<td></td>
</tr>
<tr>
<td>Uganda Gatsby Trust (UGT)</td>
<td>64</td>
</tr>
<tr>
<td>Uganda National Council for Science and Technology (UNCST)</td>
<td>65, 72–73</td>
</tr>
<tr>
<td>UK</td>
<td>78, 94, 118, 319–320</td>
</tr>
<tr>
<td>Copyright Acts, colonial era</td>
<td>213–214</td>
</tr>
<tr>
<td>Intellectual Property Office</td>
<td>275</td>
</tr>
<tr>
<td>IP framework</td>
<td>285</td>
</tr>
<tr>
<td>UN</td>
<td></td>
</tr>
<tr>
<td>Commission on Trade and Development (UNCTAD)</td>
<td>94, 343</td>
</tr>
<tr>
<td>Declaration of the Rights of Indigenous Peoples</td>
<td>139</td>
</tr>
<tr>
<td>Department of Economic and Social Affairs (UNDESA)</td>
<td>251–252, 256</td>
</tr>
<tr>
<td>Educational, Scientific and Cultural Organisation (UNESCO)</td>
<td>6, 47, 151</td>
</tr>
<tr>
<td>Framework Convention on Climate Change (UNFCCC)</td>
<td>252, 267, 276, 382–383</td>
</tr>
<tr>
<td>Industrial Development Organisation (UNIDO)</td>
<td>116</td>
</tr>
<tr>
<td>Office for West Africa</td>
<td>46</td>
</tr>
<tr>
<td>unemployment</td>
<td>152</td>
</tr>
<tr>
<td>unfair competition</td>
<td>101</td>
</tr>
<tr>
<td>Universal Copyright Convention (UCC)</td>
<td>214</td>
</tr>
<tr>
<td>universities</td>
<td>338</td>
</tr>
<tr>
<td>university-generated knowledge</td>
<td>317</td>
</tr>
<tr>
<td>university–industry knowledge transfer, Ethiopia</td>
<td>316, 329, 376, 383</td>
</tr>
<tr>
<td>university–industry linkages</td>
<td>385</td>
</tr>
<tr>
<td>University of Botswana (UB)</td>
<td>339, 342, 345</td>
</tr>
<tr>
<td>Institutional Review Board (IRB)</td>
<td>339</td>
</tr>
<tr>
<td>Office of Research and Development (ORD)</td>
<td>342</td>
</tr>
<tr>
<td>research community</td>
<td>342–343</td>
</tr>
<tr>
<td>University of Cape Town (UCT)</td>
<td>21, 282–285, 383</td>
</tr>
<tr>
<td>commercialisation and dispute resolution</td>
<td>295</td>
</tr>
<tr>
<td>Creative Commons (CC)-licensed learning materials</td>
<td>298</td>
</tr>
<tr>
<td>Intellectual Property Advisory Committee</td>
<td>295</td>
</tr>
<tr>
<td>ownership of IP</td>
<td>295</td>
</tr>
<tr>
<td>research and innovation indicators</td>
<td>295–296, 296</td>
</tr>
<tr>
<td>Research Contracts and IP Services office (RCIPS)</td>
<td>285, 296–297, 298, 299</td>
</tr>
<tr>
<td>researcher-inventor perspectives</td>
<td>299–300</td>
</tr>
<tr>
<td>UCT OpenContent website</td>
<td>298</td>
</tr>
</tbody>
</table>

407