
INNOVATION & INTELLECTUAL PROPERTY
COLLABORATIVE DYNAMICS IN AFRICA
Editors: Jeremy de Beer, Chris Armstrong, Chidi Oguamanam & Tobias Schonwetter

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Collaborative Dynamics in Africa

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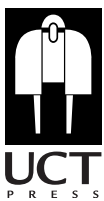

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Preface

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 Feldthusen.

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,

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

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Acronyms and Abbreviations

A2K	access to knowledge
A2K4D	Access to Knowledge for Development Center (The American University in Cairo, Egypt)
AAU	Addis Ababa University
ABS	access and benefit-sharing
ACA2K	African Copyright and Access to Knowledge Project
ACP	African, Caribbean and Pacific Group of States
ACTS	African Centre for Technology Studies (Kenya)
ADPP	Ajuda de Desenvolvimento de Povo para Povo (Mozambique)
AERC	African Economic Research Consortium
AFTE	Association for the Freedom of Thought and Expression (Egypt)
AGOA	African Growth and Opportunity Act
AIM	Agência de Informação de Moçambique
AmCham	American Chamber of Commerce (Egypt)
ARC	Aquaculture Research Centre (Egypt)
ARIPO	African Regional Intellectual Property Organisation
ASSAf	Academy of Sciences of South Africa
ASTII	African Science, Technology and Innovation Indicators
ATO	alternative trading organisation
ATPC	African Trade Policy Centre
ATPS	African Technology Policy Studies Network
AU	African Union
AUC	The American University in Cairo
B-BBEE Act	Broad-Based Black Economic Empowerment Act 53 of 2003 (South Africa)
BCP	bio-cultural community protocol
BIH	Botswana Innovation Hub
BMZ	Federal Ministry for Economic Cooperation and Development (Germany)
BoI	Bank of Industry (Nigeria)
BOTEC	Botswana Technology Centre
BPR	business process re-engineering
CAA	Cocoa Abrabopa Association (Ghana)
CARICOM	Caribbean Community
CBD	Convention on Biological Diversity
CBN	Central Bank of Nigeria

CC	Creative Commons
CCIA	Computer and Communications Industry Association
CEDAT	College of Engineering, Design, Art and Technology (Makerere University, Uganda)
CEHURD	Centre for Health, Human Rights and Development (Uganda)
CEPIL	Centre for Public Interest Law (Ghana)
CIGI	Centre for International Governance Innovation
CIPC	Companies and Intellectual Property Commission (South Africa)
CIPIT	Centre for IP and IT Law (Strathmore University, Kenya)
CIPO	Canadian Intellectual Property Office
CIPR	Commission on Intellectual Property Rights (UK)
CMO	collective management organisation
COCOBOD	Ghana Cocoa Board
CPD	Centre for Policy Dialogue (Nigeria)
CRTT	Centre for Research in Transportation Technologies (Makerere University, Uganda)
CSIR	Council of Scientific and Industrial Research (India)
CTEA	Copyright Term Extension Act (US)
CVCP	Committee of Vice-Chancellors and Principals (UK)
DACST	Department of Arts, Culture, Science and Technology (South Africa)
DEST	Department of Education, Science and Training (Australia)
DFID	Department for International Development (UK)
DHET	Department of Higher Education and Training (South Africa)
DNS	domain name system
DRC	Democratic Republic of Congo
DRM	digital rights management
DRST	Department of Research, Science and Technology (Botswana)
DST	Department of Science and Technology (South Africa)
DTI	Department of Trade and Industry (South Africa)
EAEP	East African Educational Publishers (Kenya)
EC	European Commission
ECBP	Engineering Capacity Building Program (Ethiopia)
ECOWAS	Economic Community of West African States
ECX	Ethiopia Commodity Exchange
EEAA	Egyptian Environmental Affairs Agency
EIPO	Ethiopian Intellectual Property Office
EIPRL	Egyptian Intellectual Property Rights Law
EPA	Environmental Protection Authority (Ethiopia)
EPO	European Patent Office
EST	environmentally sound technology

EU	European Union
EUEI	EU Energy Initiative
Eurostat	Statistical Office of the European Communities
FAO	UN Food and Agriculture Organisation
FCN	Friendship, Commerce and Navigation (Kenya)
FDI	foreign direct investment
FDRE	Federal Democratic Republic of Ethiopia
FDSE	Free Day Secondary Education (Kenya)
FES	Friedrich Ebert Stiftung (Germany)
FLO	Fairtrade Labelling Organisations International
FOSS	free and open source software
FPE	Free Primary Education (Kenya)
FTA	free trade agreement
GDP	gross domestic product
GEM	Global Entrepreneurship Monitor
GERD	gross expenditure on research and development
GI	geographical indication
GIPC	Global Intellectual Property Center
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (Germany)
GM	genetically modified
GOAN	Ghana Organic Agriculture Network
GOK	Government of Kenya
GR	genetic resources
GTZ	German Technical Cooperation
HSRC	Human Sciences Research Council (South Africa)
ICANN	Internet Corporation for Assigned Names and Numbers
ICIDSS	International Creativity and Innovation Development Support Services (Ethiopia)
ICJ	International Commission of Jurists
ICLS	International Conference of Labour Statisticians
ICPSK	Institute of Chartered Public Secretaries of Kenya
ICT	information and communication technology
ICT4D	ICT for development
ICTSD	International Centre for Trade and Sustainable Development
IDC	Industrial Development Corporation (South Africa)
IDLO	International Development Law Organisation
IDRC	International Development Research Centre (Canada)
IDS	Institute of Development Studies (Kenya)
IE	informal economy

IFC	International Finance Corporation
IICA	Inter-American Institute for Cooperation on Agriculture
IIDMM	Institute of Infectious Disease and Molecular Medicine (South Africa)
IIED	International Institute for Environment and Development
IIPA	International Intellectual Property Alliance
IISD	International Institute for Sustainable Development
ILC	indigenous and local community
ILO	International Labour Organisation
INAO	Institut national des appellations d'origine (France)
IP	intellectual property
IPA	Industrial Property Act (Botswana)
IPC	International Patent Classification
IPI	Industrial Property Institute (Mozambique)
IPR-PFRD Act	Intellectual Property Rights from Publicly Financed Research and Development Act (South Africa)
IRB	Institutional Review Board (Botswana)
IRENA	International Renewable Energy Agency
ISAS	integrated seawater agriculture system
ISCTEM	Instituto Superior de Ciências e Tecnologia de Moçambique
ISI	Institute for Scientific Information
ISO	International Organisation for Standardisation
ISP	Information Society Project (Yale University, US)
ITC	International Trade Centre
JBEDC	Japan Bio-Energy Development Corporation
JITAP	Joint Integrated Technical Assistance Programme
JLSRI	Justice and Legal System Research Institute (Ethiopia)
K2C Biosphere	Kruger to Canyons Biosphere (South Africa)
KE	knowledge economy
KECOBO	Kenya Copyright Board
KENFAA	Kenya Nonfiction and Academic Authors' Association
KES	Kenyan Shilling
KHA	Kenya Historical Association
KICD	Kenya Institute of Curriculum Development
KIPI	Kenya Industrial Property Institute
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KNAS	Kenya National Academy of Sciences
KOLA	Kenya Oral Literature Association
KTO	knowledge transfer office
LBC	Licensed Buying Company (Ghana)
LDC	least developed country

LE	Egyptian Pound
LINK Centre	Learning Information Networking Knowledge Centre (Wits University, South Africa)
LSK	Law Society of Kenya
MAN	Manufacturers Association of Nigeria
MANCAP	Mandatory Conformity Assessment Programme (Nigeria)
MCH	Maasai Cultural Heritage Organisation (Kenya)
MCST	Ministry of Communications, Science and Technology (Botswana)
MCT	Ministério da Ciência e Tecnologia (Mozambique)
MDCA	Malindi District Cultural Association (Kenya)
MDG	Millennium Development Goal
MEA	Multilateral Environmental Agreement
MIST	Ministry of Infrastructure, Science and Technology (Botswana)
MIT	Massachusetts Institute of Technology
MOA	Ministry of Agriculture (Ethiopia)
MOE	Ministry of Education (Ethiopia)
MOFA	Ministry of Food and Agriculture (Ghana)
MoFED	Ministry of Finance and Economic Development (Ethiopia)
MOST	Ministry of Science and Technology (Ethiopia)
MoU	memorandum of understanding
MRC	Medical Research Council (South Africa)
Natoil	Natural Oil Company (Egypt)
NACI	National Advisory Council on Innovation (South Africa)
NCC	Nigerian Copyright Commission
NDA	non-disclosure agreement
NEP	National Enquiry Point (Botswana)
NEPAD	New Partnership for Africa's Development
NESC	National Economic and Social Council (Kenya)
NESTI	National Experts on Science and Technology Indicators
NIALS	Nigerian Institute of Advanced Legal Studies
NRF	National Research Foundation (South Africa)
NGO	non-governmental organisation
NIALS	Nigerian Institute of Advanced Legal Studies
NIPMO	National Intellectual Property Management Office (South Africa)
NIS	national innovation system
NMIMS	Narsee Monjee Institute of Management Studies (India)
NPR	National Public Radio (US)
NPSB	National Policy and Strategy on Biofuels (Mozambique)
NRC	National Research Centre (Egypt)

NREA	New and Renewable Energy Authority (Egypt)
NWLR	Nigerian Weekly Law Report
OA	open access
OAPI	Organisation africaine de la propriété intellectuelle
OCEES	Oxford Centre for the Environment, Ethics and Society
OCFCU	Oromia Coffee Farmers Cooperative Union (Ethiopia)
ODEL	open, distance and electronic learning
ODI	Overseas Development Institute (UK)
OECD	Organisation for Economic Co-operation and Development
OER	open educational resource
Open A.I.R.	Open African Innovation Research and Training Project
ORD	Office of Research and Development (Botswana)
PBIP	place-based intellectual property
PCT	Patent Cooperation Treaty
Petromoc	Petróleos de Mozambique
PIIPA	Public Interest Intellectual Property Advisors (US)
PIJIP	Program on Information Justice and Intellectual Property (American University, US)
PPS	probability proportional to size
PRO	public research organisation
ProBEC	Programme for Basic Energy and Conservation in Southern Africa
R&D	research and development
RCIPS	Research Contracts and IP Services unit (UCT, South Africa)
RIPCO (B)	Rural Industrial Promotion Company (Botswana)
RMI	rights management information
SADC	Southern African Development Community
SARUA	Southern African Regional Universities Association
SCE	Society for Critical Exchange (Kenya)
SID	Society for International Development (Kenya)
SINER-GI	Strengthening International Research on Geographical Indications
SME	small and medium enterprise
SMIEIS	Small and Medium Industries Equity Investments Scheme (Nigeria)
SMME	small, micro and medium enterprise
SNA	social network analysis
SON	Standards Organisation of Nigeria
SPS	sanitary and phytosanitary measures
STCI	Science and Technology Capacity Index
STEP	Science Technology and Economic Policy (US)
STI	science, technology and innovation
STS	Society for Technology Studies (Ethiopia)

SVKM	Shri Vile Parle Kalamani Mandal (India)
TBT	technical barriers to trade
TCE	traditional cultural expression
TGE	Transitional Government of Ethiopia
THE	Times Higher Education (UK)
THRIP	Technology and Human Resources Programme (South Africa)
TIA	Technology Innovation Agency (South Africa)
TIP-Net	Tanzania Intellectual Property Rights Network
TISC	Technology and Innovation Support Center
TK	traditional knowledge
TKDL	Traditional Knowledge Digital Library (India)
TPMs	technological protection measures
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
TTO	technology transfer office
TVET	Technical and Vocational Education and Training (Ethiopia)
UB	University of Botswana
UCC	Universal Copyright Convention
UCITA	Uniform Computer Information Transactions Act (US)
UCT	University of Cape Town (South Africa)
UEM	Eduardo Mondlane University (Mozambique)
UGT	Uganda Gatsby Trust
UK	United Kingdom
UM	utility model
UNCST	Uganda National Council for Science and Technology
UNCTAD	UN Commission on Trade and Development
UNDESA	UN Department of Economic and Social Affairs
UNDP	UN Development Programme
UNECA	UN Economic Commission for Africa
UNEP	UN Environment Programme
UNESCAP	UN Economic and Social Commission for Asia and the Pacific
UNESCO	UN Educational, Scientific and Cultural Organisation
UNFCCC	UN Framework Convention on Climate Change
UNICAMP	University of Campinas (Brazil)
UNIDO	UN Industrial Development Organisation
Unilag	University of Lagos
US	United States
USAID	US Agency for International Development
USPTO	US Patent and Trademark Office
WAK	Writers Association of Kenya
WATH	West Africa Trade Hub

WBCSD	World Business Council for Sustainable Development
WCT	WIPO Copyright Treaty
WEF	World Economic Forum
WEP	World Employment Programme
WHO	World Health Organisation
WIPO	World Intellectual Property Organisation
Wits	University of the Witwatersrand (South Africa)
WPIS	WIPO Patent Information Service
WPPT	WIPO Performances and Phonograms Treaty
WTO	World Trade Organisation
ZAR	South African Rand

Chapter 16

Current Realities of Collaborative Intellectual Property in Africa

Jeremy de Beer, Chris Armstrong, Chidi Oguamanam and Tobias Schonwetter

1. Introduction

Drawing conclusions across numerous studies featuring qualitative and quantitative data collected from myriad settings on the African continent is no simple task. It is also a task that needs to be approached with caution lest it fall into the trap of totalising "African" experience (when, in fact, this book is to a great extent about the diversity of realities present across a continent of 55 nation-states and innumerable sub-national realities).

Apart from Chapter 2's overview of conceptual frameworks potentially applicable in any or all of Africa's national and local settings, Mgbeoji's study (Chapter 10) of patent offices in 44 countries, and Oguamanam and Dagne's Chapter 4 looking at settings in both Ethiopia and Ghana, each of the studies in this book looks at realities in a single country. And, in the chapters on Kampala's informal-sector auto mechanics (Chapter 3) and on the Kukula traditional healers of Bushbuckridge in South Africa (Chapter 7), the study settings are sub-nationally localised. Further diversification arises from the fact that the research findings in this book emerge from several different modes of innovation and creativity; from a variety of approaches to intellectual property (IP); and from several different orientations towards socio-economic development. The purpose of this concluding chapter is to identify compelling results, commonalities and contrasts across the studies, and to arrive at some overarching conclusions and recommendations.

The researchers who responded to our open call for case study proposals – which generated the evidence for the contributions to this book – were asked to address this question: *How can existing or potential IP systems be harnessed to*

appropriately value and facilitate innovation and creativity for open development in Africa? What emerged were multiple, often overlapping interpretations of the question, and a range of relevant considerations in answering it. The research shed new light on the diverse nature of innovation and creativity in African settings, and on the different IP policies and practices related to innovation and creativity on the continent.

When linked with broader development objectives and models, the findings offer insights into the nature of IP-related dynamics in relation to innovation and creativity in Africa, and guidance towards IP policy and management possibilities. The next section of this chapter (Section 2) looks at the modalities of innovation and creativity uncovered through the case studies. Section 3 examines collaborative IP approaches across the studies. Section 4 looks at the visions of socio-economic development explicitly or implicitly present in the contexts studied. Section 5 summarises findings in relation to the book's three central themes: collaborative innovation and creativity, openness and IP. Section 6 concludes the book with recommendations to African policy-makers.

2. African innovation and creativity

The research outlined in this book reveals the need for restraint in drawing generalised impressions of the modes of innovation and creativity on the African continent. The diversity of settings studied refutes the temptation to use, as Muchie (2004) puts it, "the African nation as a unit of analysis" (2004, p. 318). The studies also challenge us to reflect on the appropriateness of (developed-world-centric) conceptualisations of "the idea of innovation in the African context" (Muchie, 2004, p. 318), i.e. to reflect upon the appropriateness of orthodox constructs of innovation, and innovative societies, in the context of African realities.

There are inherent and profound divergences among African countries' socio-cultural compositions and among their environments. At the same time, however, it cannot be denied that there is evidence of similarities at play across the African innovation landscapes. Such similarities point to systemic, albeit inchoate or open-ended, insights on innovation and creativity as the continent responds to the transformational pressures of market liberalisation and global IP norms. The results of the case studies make it apparent that, in Africa, innovation and creativity are not endeavours that inevitably take place in the context of market economic surveillance. Deliberate reification of commercial or organisational strategies for business and entrepreneurial advancement may be aspirational constructs, but they are not necessarily the mainstream of African orientation

towards innovation. Indeed, at present the African context seems predisposed towards innovations and creations of *necessity* (as pointed out in the conceptual survey in Chapter 2).

Because of their pragmatic tenor, innovations and creativity in African settings tend not to be consciously oriented towards so-called frontier or high technologies. As Belete's Chapter 14 reveals in relation to the Ethiopian context, where there is a paucity of institutional infrastructure for research and development (R&D) and of industrial absorptive capacity for knowledge conversion, high-level science and technology innovation (STI) will not flourish. Coupled with evidence of poor funding for Ethiopian universities and their sub-optimal level of R&D personnel, the findings in Ethiopia almost certainly resonate with many other national settings on the continent (including Botswana, as examined in Ama's Chapter 15). However, within the variegated and less formalised platforms examined, particularly in Kawooya's Ugandan study in Chapter 3, the capacity for informal innovation and inversion of frontier technologies to meet local needs in unpredictable circumstances is clearly a prominent feature of the innovation-creation experience.

Outside conventional straight-jacketing, innovations and creations in African settings often consist of endeavours that create value, and add value to societies, through *pragmatic* means. Innovations occur in multiple contexts, including through historic and extant transformations, re-orientations, and renegotiations of indigenous knowledge systems. The sites of innovation and creativity are diverse, from, *inter alia*, traditional medicines (Cocchiaro *et al.*'s Chapter 7) to agricultural products (Oguamanam and Dagne's Chapter 4) to clothing (Adewopo *et al.*'s Chapter 5) to automobile parts (Kawooya's Chapter 3) to biofuels (Dos Santos and Pelembe's Chapter 11, Awad and Abou Zeid's Chapter 12).

Innovations also happen in the shadow of the continent's transition and response in relation to global IP trends and pressures. The pressures are being negotiated at national levels – e.g. Chapters 13, 14 and 15 on emergent regimes around publicly funded research in South Africa, Ethiopia and Botswana, respectively – but under weak and fledgling national and regional institutional constraints, especially those dealing with IP. The constraints are stark in Mgbeoji's Chapter 10, which provides an unflattering portrayal of African national patent offices and which is resonant with the context-specific constraints apparent in several other case studies in this volume.

The innovation-creation dynamics reflected in most of the case studies unavoidably generate doubt over the veracity, in African contexts, of the "firm" or the "organisation", as positioned by orthodox innovation inquiry (Shane *et al.*, 1995), as the default unit for knowledge transfer. In the African settings examined, the configurations of cultural strands, nodes and clusters interact at formal

and informal scales to generate knowledge outside orthodox organisational paradigms. The singularities are present in every form of production, from Egyptian independent musicians, Nigerian textile makers, Ethiopian coffee growers and Ghanaian cocoa producers, to Ugandan auto mechanics, Kenyan scholarly authors, Botswana's publicly funded researchers, South African traditional healers and Mozambican jatropha growers.

Under the rubrics unveiled in the case studies, there are no clear individual-to-firm or firm-to-individual binary demarcations of the direction of knowledge of the kind recognised within orthodox innovation frameworks. Rather, knowledge transmission is mediated by myriad factors, including necessities generated by present dynamics, inter-generational obligations, and cultural sensitivities to experiences and knowledge from the (deep and/or recent) past. For instance, the studies found evidence of knowledge transmission being animated by individual pride within given trades, particularly those with sector-specific apprenticeship traditions (e.g., automobile repair, leather-crafting, textile design, feedstock agriculture, coffee production, traditional healing).

Tabulations of the quantity of science and engineering publications, yearly patent totals and other forms of R&D statistics reified by orthodox audits of innovation (see Bogliacino, *et al.*, 2012; Shane *et al.,* 1995) are but extremely blunt instruments for anyone seeking to distil the essence(s) of the innovations and creations present in the African settings analysed in this book. Given the predilection of the aforementioned R&D benchmarks for detection of (so-called) frontier technologies, it should not come as a great surprise that the oftentimes incremental, informal, traditional and/or accidental innovations and creations featured in this book (and discussed conceptually in De Beer *et al.*'s Chapter 2) do not readily submit to such benchmarks. For instance, Ouma's Chapter 6 and Cocchiaro *et al.*'s Chapter 7 draw attention to the contemporary salience of innovative knowledge systems arising from resourcefulness transmitted across the millennia via, *inter alia*, stewardship of plant genetic resources and other forms of traditional knowledge.

Current interest shown by some governments in Africa in calibrating university–industry liaisons through patenting and commercialisation of publicly funded research outputs (examined in Chapters 13–15) symbolises a response to the globalising world's innovation measurement imperative. Such attempted calibrations reflect exploration of the expansion of formal institutional channels for knowledge transformation in which the firm and other forms of local organisational structures would be conduits for knowledge transfer. The expansion of such formal institutional collaborations for innovation would likely result in increased relevance of orthodox benchmarking of innovation. But such changes might come at the expense of more context-appropriate approaches that better reflect realities

in African settings. Quite unlike the orthodox, firm-centric organisational structure featured in conventional innovation discourse, actors in the African settings probed in this book are situated within heterogeneous socio-cultural ecosystems characterised by ongoing hybridisations among the "modern" and the "traditional"; the "developed" and the "developing"; the "Western" and the "African".

The case studies in this volume display pluralities of social units, associational frameworks and contexts for innovative and creative endeavour (King, 2001). Africa's diversity of social constructs cannot readily be compacted into a simplistic binary between so-called individualistic and collectivist societies. However, it is true that many of Africa's innovation contexts (including several of the contexts examined in this book) do not affirm the privileging of individualist cultures over so-called collectivist ones in innovation narratives (Shane, 1992; Taylor and Wilson, 2012). It is difficult to separate the presumptions in innovation studies about collectivist societies from the systematic under-reporting of the innovative credentials of contemporary African settings – with African contexts often uncritically pigeonholed into a collectivist framework posited as antithetical to aggressive innovation. The research findings presented in this volume suggest that the individual, the family, the community and various other social units and contingent entrepreneurial clusters, are all implicated in knowledge generation, innovation and creativity in the settings studied. This characteristic of African ingenuity should not be undermined or underestimated.

Based on the evidence presented in this book, it seems clear that, in contemporary African settings, innovative-creative modalities gravitate towards optimised hybrids: non-absolutist, adaptable mixes of openness and protection, of sharing and preserving, of informal and formal, of new and old, of open source and IP-protected. Such hybrids, arrived at via selective pragmatism, have the potential to accentuate the diversity of African innovation-creation practices and allow individuals, communities, regions and nations on the continent, and diasporic Africans, to more optimally participate in global IP structures – provided deployment of IP modalities is but one in the range of tools utilised in quests for acceleration of socio-economic development. IP law-making and policy-making in service to optimised hybrids are and will be complex, particularly given the fluidity of these hybrids. We now turn to examination of the various IP modes uncovered by the contributors to this book.

3. Collaborative intellectual property

The studies in this volume scrutinise several African IP frameworks and systems that govern knowledge. They do this by investigating six thematic areas covering

a range of IP-related issues: informal protections; trademarks and geographical indications (GIs); traditional knowledge (TK); copyrights; patents and public policy; and ownership of publicly funded research outputs. Some of the case studies probe the relationship between IP and innovation in a selected setting without emphasising distinctions among specific kinds of IP (e.g. the Ugandan study in Chapter 3), but most focus on a specific area of IP and its impacts on certain sectors, communities and/or policy processes in a selected national or sub-national setting.

Across the studies, we can see examples of what seem to be potential middle-ground models of IP policies and practices, based on underlying principles of *inclusion* and *collaboration*. This middle ground emerges when one is willing to accept that absolute openness is not required to facilitate knowledge-sharing; and, at the same time, nor does IP protection inevitably preclude access to everyone but the individual proprietor. Situated in this middle ground are various forms of IP that can be used as tools to facilitate collaboration within or across communities of many kinds. As the Kawooya study shows, automotive mechanics and university researchers can and do share trade secrets among themselves, often pursuant to informal agreements enforced by social rather than legal norms. The studies by Oguamanam and Dagne and by Adewopo *et al.* found that groups of agricultural or industrial producers and retailers invoke place-based protections. Meanwhile, as evidenced by the Ouma study and the Cocchiaro *et al.* research, indigenous peoples manage cultural heritage or medicinal knowledge through a mix of customary laws and cultural norms, and/or through more formal mechanisms such a bio-cultural community protocol (BCP). Rizk found that musicians choose to confront the realities of copyright unenforceability through alternative business models, and Sihanya looked at how scholars and publishers can use copyright creatively to openly license learning materials. The studies by Dos Santos and Pelembe and Awad and Abou Zeid found evidence to suggest that the patent system could play a role in the sharing of technological knowledge between rights-holders and communities of potential users or collaborators, thus furthering particular industrial policy objectives, in respect of clean energy technologies. The Ncube *et al.*, Belete and Ama research findings suggest that appropriate IP management policies and practices can contribute to the ability of publicly funded researchers to put "open science" models into practice, i.e. to engage in wide online sharing of research data in order to spur collaborations and dissemination.

In none of these cases observed would IP owners be likely to see advantage in exercising the power to fully exclude others from the protected knowledge. Doing so would be counter-productive to underlying social, cultural and economic objectives present in the settings in which the knowledge is being deployed. Even in the context of indigenous and local communities (ILCs), sharing among select

groups of stewards or practitioners is necessary to preserve and utilise TK. What we observe, then, are *degrees* of openness, where boundaries between communities and outsiders can become more or less porous, depending on the context. We have decided to call this phenomenon of selective inclusion "collaborative intellectual property".

The De Beer *et al.* Chapter 2 and the Kawooya Chapter 3 look at previously understudied modes of appropriation in the informal economy (IE). What the authors of these chapters describe in relation to the IE, theoretically in Chapter 2 and empirically in Chapter 3, would in high-income countries be commonly understood as trade secrecy. Trade secrets, confidential information and sharing or non-disclosure agreements are all well-accepted forms of IP management and play important roles in innovation systems. Yet, because secrecy does not produce a quantifiable output (e.g. a patent), its use and value in Africa's informal sectors are too often ignored. Experts such as Juma (see Juma and Ojwang, 1989) have argued that design patents or utility models (UMs) are appropriate modes of protection for the IE, because they are generally easier to obtain (and, consequently, offer weaker protection) than ordinary patents. Similarly, Dos Santos and Pelembe's Chapter 11 suggests that UMs may need prioritisation in Mozambique as a means to spur biofuel innovation. But, at the same time, as seen in Kawooya's Chapter 3, the Kampala informal-sector actors surveyed through interviews and other in-depth qualitative research techniques made no mention of any desire for such protection. Perhaps they are unaware of the benefits, or perhaps UMs are only of limited value in highly informal settings, because UMs, though less administratively cumbersome than patents, still depend on formal administrative and legal mechanisms to obtain and enforce. There is undoubtedly a need for further research on the issue of UMs in African settings.

The Oguamanam and Dagne and Adewopo *et al.* studies, outlined in Chapters 4 and 5, respectively, look at trademark certification schemes and origin-designated or place-based branding of GIs as underdeveloped forms of IP protection in the African context. Chapter 4 examines how GIs could benefit the Ethiopian coffee and Ghanaian cocoa industries. Chapter 5 considers how different kinds of communal trademarks or communal branding strategies (collective marks, certification marks and GIs) could improve the market position of leather and textile producer clusters in Nigeria. In both cases, however, prudent legal or policy reforms would be required. In Ethiopia and Ghana, as Oguamanam and Dagne emphasise, policy-makers need to seek a balance between protection, preservation, openness and collaboration. Based on the Nigerian case studied, the authors Adewopo, Chuma-Okoro and Oyewunmi note that the current national legal framework for the protection of at least two of the three forms of communal trademarks is inadequate.

Ouma's Chapter 6 and Cocchiaro *et al.*'s Chapter 7 both look at *commons*-based approaches to TK, in Kenya and in the Bushbuckridge area of South Africa, respectively. Kenya currently has no specific law on the protection of TK, but a draft TK law was published in mid-2013 (as this book was being finalised) and there are several Kenyan laws that touch on TK as it relates to copyright, biodiversity, genetic resources, agriculture, forestry and wildlife. In addition, Kenya's National TK Policy, which underpins the 2013 draft TK law, seeks to recognise, preserve, protect and promote the sustainable use of TK for national development purposes. Ouma concludes that reliance on existing Kenyan copyright law and industrial property law (which at present represent a conventional IP regime) would not be sufficient to ensure realisation of an effective commons modality in Kenya; rather, it is the National TK Policy (and draft law), coupled with emerging state interest in creating a Kenyan TK digital library, that show the most promise for the establishment of a TK commons that combines the objectives of protection, access and controlled exploitation.

Chapter 7's authors, Cocchiaro, Lorenzen, Maister and Rutert, share Ouma's scepticism expressed in Chapter 6 regarding the suitability of conventional IP laws for dealing appropriately with TK (in this case, the TK of the Kukula traditional medicinal practitioners). Problematic issues identified in Chapter 7 include the requirement of novelty in patent law (which contradicts the fact that knowledge constituting TK often dates back many generations) and the protection requirements, in copyright law, of originality and manifestation in material form (when, for instance, traditional songs and melodies of indigenous peoples often exist only in oral form). Both copyright laws and patent laws also require a single inventor-creator or a clearly distinguishable group of co-inventors or co-creators. In the case of multi-generational TK, identifying a sole inventor-creator or even a discrete group of inventors-creators is often impossible. Recognising these difficulties, the authors of Chapter 7 suggest that the group which was the focus of the authors' research, the Kukula Healers' collective, could benefit from the creation of a legal trust as a platform to, at the very least, more effectively manage its TK. Such an approach, according to the authors, could facilitate sharing of TK at the local level while ensuring that any non-traditional uses of such knowledge comply with the norms and values of, and provide benefits to, the community. Setting up a legal trust could also encourage the healer community to better document its TK, in order to determine the actual trust "property", which in turn could provide potential external partners with information regarding the precise scope of the TK.

The first of the two copyright-focused chapters, Chapter 8, provides an investigation of Egypt's vibrant independent music industry and the complex dynamics of distribution and consumption in that sector. The author, Rizk, observes a

significant disconnect between the law on the books (which affords copyright protection to musical works) and consumption and distribution practices on the ground (which routinely violate copyright). Physical CDs and cassettes are copied and sold irrespective of the legal restrictions imposed by copyright law. As far as online material is concerned, the majority of consumers and independent musicians surveyed said that they regard such material as inherently free-of-charge. The surveyed musicians said they generally find the notion of copyright protection for their material irrelevant to their practices, in addition to being inadequately enforced. Rizk concludes that Egypt's independent musicians produce music primarily for self-expression and voicing opinion, and only expect remuneration for live performance. However, musicians could, in Rizk's analysis, reap an enhanced monetary benefit (and restore a measure of legitimacy to the Egyptian copyright regime) if they bundled free access to content in their "digital commons" with paid access to live performances (perhaps combined with optional contributions to the band and purchase of a physical CD), thus adopting a "freemium" approach to organisation and exploitation of their commons.

The other copyright-oriented chapter, Sihanya's Chapter 9, identifies a stumbling block for open scholarship and alternative publishing in Kenya in the existence of uncertainty among stakeholders regarding reward mechanisms, particularly economic rewards (even though, at the same time, the scholarly authors interviewed generally said they consider *moral* rights to their works to be of greater importance than *economic* rights). In order to overcome the uncertainties in terms of authors' control over economic rights, Sihanya recommends a revision of the Kenyan Copyright Act of 2001 with the aim of more clearly providing a balance between authors' economic rights and users' access rights – by, for instance, (a) clarifying owner's rights and more clearly recognising limitations and exceptions (e.g. exceptions for access through Braille), and (b) strengthening copyright administration.

Mgbeoji's Chapter 10, Dos Santos and Pelembe's Chapter 11, and Awad and Abou Zeid's Chapter 12 all address issues related to patent protection. Based on survey and interview responses from stakeholders in 44 African countries and at African regional IP bodies ARIPO and OAPI, Mgbeoji finds that African states are serving as "dumping grounds" for patents, with little or no examination or public access. Mgbeoji argues that national patent offices in Africa are thus insufficiently facilitating the legal bargain between inventors and society that is at the heart of patent law: i.e. the exchange whereby disclosure of inventions results in time-limited monopolies. According to Mgbeoji, this bargain requires a system in which experts evaluate the patentability of an invention, and patent offices collate and systematically disseminate patent documents in a publicly accessible manner. Mgbeoji argues that the wider significance of his findings is that dysfunctional

national patent regimes not only contradict the spirit of national laws but may also disincentivise R&D and hamper the dissemination of technological knowledge, in turn undermining social welfare and development.

Dos Santos and Pelembe investigate the extent to which IP plays, or could play, a role in access to, use of, and development of biofuel technologies in Mozambique. The authors' focus is on patenting under the country's Industrial Property Code of 2006, combined with an analysis of two relevant policies: the National Policy and Strategy on Biofuels (NPSB) of 2009 and the Intellectual Property Strategy 2008–2018. The NPSB directs the Mozambican government to enact specific legislation on biofuels, and to establish both a National Agenda for Research and Innovation in Biofuels and a National Programme on Biofuels Development. The IP Strategy aims to stimulate creativity and innovation to promote economic, scientific, technological and cultural development. Both policies emphasise the need to support technological solutions developed by local innovators, and the NPSB emphasises the need for small-scale rural farming enterprises to be empowered via the country's biofuel exploitation. However, a patent landscaping exercise conducted by Dos Santos and Pelembe revealed that all 18 biofuel-related patents thus far registered in Mozambique have been filed by foreign companies, with only one patent originating from Africa (South Africa). The authors also found that *first generation* biofuel production technology in use in Mozambique appears to be mostly in the public domain, with a surge in biofuel patenting since 2008 resulting in the more efficient *second generation* technologies typically being patented. The authors conclude that, while patents do not hinder access to the first generation biofuel technologies, future use of second generation technology will likely require negotiation with the owners of the technology and payment of licensing fees, thus undermining participation by small enterprises. As mentioned earlier in this chapter, Dos Santos and Pelembe also call for greater Mozambican government attention to UMs as a potential form of IP protection for innovations that may not meet the criteria for full patenting. At the same time, the authors of this Mozambique study present an interesting example they discovered of informal, open access technology transfer (of a biofuel cold-pressing method) between Tanzanian rural small-scale farmer groupings and a similar Mozambican grouping. This informal mode of technology transfer (which resonates with the kind of knowledge-sharing found by the Kawooya research outlined in Chapter 3) could, in the view of the authors, be one of the paths towards innovative, localised, small-scale biofuels production in Mozambique and, more generally, environmentally sustainable socio-economic development.

The Awad and Abou Zeid study of Egyptian biofuel technology development was, to some extent, prompted by the growing view at international level (in evidence, for example, in talks related to the UN Framework Convention on Climate

Change [UNFCCC]) that laws and regulations governing patents can be barriers to sustainable development of clean energy technologies. Awad and Abou Zeid examine whether Egypt's patent system is conducive to biofuel innovation, and their legal observations include the finding that there is a *sui generis* protection regime in Egypt for plant varieties, and that a so-called "breeder exemption" exists, in the context of plant variety rights, in order to allow permission-free access to plant material so as to facilitate breeding of new varieties. Furthermore, Egyptian patent law requires, according to the authors, "the highest possible level" of disclosure in exchange for granting a patent. At the same time, the authors found that there is very little in the way of *actual* biofuel innovation in Egypt – with only one identified domestically generated biofuel patent to date (which has not been commercialised). Awad and Abou Zeid propose several mechanisms that, if adopted in Egypt, could increase clean energy innovation, including a clean energy patent fast-tracking system; an advanced patent database for wider dissemination of clean energy technology information; and a clean energy "patent commons" model that would facilitate the collaborative elements of innovation and allow easier access to patented clean energy technologies.

Ncube *et al.*'s Chapter 13, Belete's Chapter 14 and Ama's Chapter 15 address the issue of ownership of publicly funded research outputs. Ncube, Abrahams and Akinsanmi investigate the potential impact of South Africa's Intellectual Property Rights from Publicly Financed Research and Development (IPR-PFRD) Act on collaborative research, innovation and scholarly publishing at two of the country's top universities, the University of Cape Town (UCT) and Johannesburg's University of the Witwatersrand (Wits). The authors submit that the Act seems to have resulted in some change in behaviour, as the two universities studied are adapting to the realities of patenting and commercialisation under the new legislation. The authors caution against South African public research institutions approaching the Act's requirements from merely a compliance perspective. They recommend, instead, an ongoing process of considering the Act's full range of objectives and requirements, so as to avoid indiscriminate patenting without due consideration of social and broad economic benefits. The authors also highlight the need for state support of the open access (OA) publishing movement already apparent at both UCT and Wits and among other public research stakeholders, in order to ensure a counter-balancing of the Act's knowledge commercialisation emphasis by vibrant knowledge "socialisation" and open science activities.

Belete's Chapter 14 notes the Ethiopian government's emphasis on strengthening university–industry interactions, and the assumed important role of IP rights protection and commercialisation in facilitating knowledge transfer from universities to industry. Acknowledging global debates about IP protection for publicly funded research, Belete cautions against uncritical cross-national law and

policy emulation, especially from high-income to low-income countries, because country-specific situations must be considered. In Ethiopia's case, for instance, universities currently have weak research capacities, which are often not aligned with industry needs. Meanwhile, private sector firms often have limited capacity to seek and utilise externally generated knowledge, due to financial constraints. In Belete's analysis, instead of emphasis on privatising knowledge by way of IP rights, the push should be towards the methods of knowledge transfer associated with the aforementioned concept of open science. IP-related models can still play a role in encouraging innovative research, Belete suggests, but other measures are even more important, such as increasing research budgets and creating salary systems that incentivise research activity and better recognise research contributions. Belete concludes that such strategies have the potential– more readily than IP commercialisation – to increase knowledge transfer from universities to the private sector.

Ama's Chapter 15 looks at IP matters in relation to publicly funded research in Botswana, examining the country's relevant policies and laws and presenting original survey data on public researchers' perceptions of IP matters. Key findings from the author's investigation include a general lack of awareness among researchers of the specifics of national and institutional IP law and policy frameworks. At the same time, Ama also found that Botswana's researchers do see value in the notion of commercialisation efforts facilitated by IP protection. However, resonant with Belete's analysis of the Ethiopian setting, Ama found that most of the Botswana researchers surveyed believe that value from publicly funded research is best served by approaches whereby research outputs are widely shared and openness and collaboration are prioritised, i.e. approaches founded on the notion of open science.

Thus the IP approaches identified as suitable by the research outlined in this book – i.e. approaches identified as being compatible with innovation and creativity in the African settings studied – tended to be characterised by a strong degree of openness and a balance between protection and collaboration objectives.

4. Visions of socio-economic development

As well as improving understanding (as outlined in the previous section) of the real and potential links between collaborative modes of IP management and innovation and creativity, the research outlined in this book has shed light on the roles that collaborative IP, innovation and creativity are being expected, or could be expected, to play in service to broader socio-economic development visions. For it is clear that, as demonstrated to some extent by De Beer *et al.* in Chapter 2,

issues of innovation and creativity, and the potential of IP modalities as spurs to innovation and creativity, derive their importance primarily from being seen as having the capacity to stimulate socio-economic development. And it is thus necessary to take stock of the developmental visions present in the various African settings examined by the research in this book. A range of developmental visions was uncovered: high-level state policy visions (e.g. in Egypt, Ethiopia, Botswana, Mozambique and South Africa); mid-level visions (e.g. among small-scale, community-based associations and collectivities in Nigeria, Ghana, Ethiopia, Mozambique and South Africa); and grassroots, *ad hoc* visions of loose collectivities (e.g. among Egyptian independent musicians and Ugandan informal-sector auto mechanics.)

High-level, state visions

In the examinations of policies on IP from publicly funded research in South Africa, Ethiopia and Botswana (Chapters 13 to 15), we see the national governments in these three countries to some extent borrowing approaches from afar, in particular from the IP commercialisation orientation of the US Bayh-Dole Act. It remains to be seen whether such an orientation, fashioned more than three decades ago in the world's strongest economy, will be helpful in contemporary or future African contexts. The evidence provided in this book suggests that the IP commercialisation orientation for public research outputs will have a relatively benign impact in South Africa; potentially damaging consequences in the context of Ethiopia (with its moribund university–industry linkages); and highly uncertain results in Botswana (where the policy-making is very recent and awareness among public researchers very low).

The biofuel innovation context (covered in Chapters 11 and 12) is another area in which contributors to this book uncovered evidence of apparently strong, high-level, state developmental visions (in Mozambique and Egypt, respectively). Policy-makers in both these nations seem clearly to see domestic clean energy innovation as central to the national drive for sustainable socio-economic development (notwithstanding the extreme flux at national government level in Egypt as this book was being finalised in mid-2013). However, at the same time, in both the Mozambique and Egypt studies the research found evidence of highly uncertain feasibility in the visions of clean energy technology innovation as national development drivers, with potentially thorny IP matters, specifically patenting matters, seemingly receiving inadequate attention in both countries. In Mozambique, the Inter-Ministerial Committee on Biofuels, guided by the National Policy and Strategy on Biofuels (NPSB) of 2009, became operational only in 2012, and thus it is ultimately too soon to tell whether the state's developmental vision will align

with the actual innovation and IP realities in the biofuels sector. The presence on this Inter-Ministerial Committee of three government Ministers (of Agriculture; of Science and Technology; and of Environment) suggests a high degree of state commitment to developmental goals via biofuels, but at the same time it is notable that there is no mention of IP in the NPSB of 2009. Meanwhile, in Egypt the feasibility of a developmental vision in relation to bioenergy innovation is called into question by the finding, by case study researchers Awad and Abou Zeid, that there appeared to be only one locally generated Egyptian bioenergy patent, and that the patent was not yet commercialised.

It must be borne in mind, however, that it is future possibilities, not current realities, that matter most when examining development pathways. The poor patent position of a country such as Mozambique may or may not place it at a competitive disadvantage. Important players with natural affinities to Mozambique through shared colonial history (and thus cultural, social, linguistic and economic linkage) – e.g. companies like Brazil's Petrobras – may see fit to make substantial local investments in Mozambican biofuel capacity. Also uncertain, because of the advent of new technologies to generate energy, in particular fracking to extract natural gas, is whether biofuels will remain a policy priority.

Mid-level, associational visions

In contrast to the bureaucrat-led state developmental visions described in several case studies were the seemingly more grounded developmental visions, found in other studies, of sector- and/or community-based associations. Whether it is the Ethiopian coffee and Ghanaian cocoa grower-producer collectives (Chapter 4), the leather and textile unions and associations in Nigeria (Chapter 5), the small-scale jatropha oil-pressing collective in Mozambique (Chapter 11) or the traditional medicinal practitioners in South Africa (Chapter 7), there is evidence in the behaviour of these groups of adoption of developmental visions which prioritise sustainable and realistic engagement with prevailing innovation (and to some extent IP) realities. And there is evidence to suggest that these associational collectivities have the dynamism to translate their development visions into workable innovations and IP engagements based on gradations of openness, collaboration and protection that they determine to be appropriate to local conditions. Put another way, these groupings appear to have the potential to harness the potential vitality – to the extent that it exists in their respective settings – of collaborative, openness-oriented (i.e. "open development"-oriented – see Section 5 below) approaches to the intersection of IP management, innovation and creativity, in service to livelihood development and socio-economic upliftment for association members.

Grassroots, ad hoc *visions*

Also uncovered by the research were instances of grassroots, *ad hoc* (and more implicit than explicit) developmental visions held by relatively unorganised actors with minimal associational support. The Ugandan auto mechanics (Chapter 3) and Egyptian independent musicians (Chapter 8) seem not to be engaged in the formation of overtly collective structures, but at the same time they seem to display strong, entrenched visions of how to achieve livelihood success. Chapter 2's conceptual survey helps us to see that the IE and informal economic and subsistence structures are emergent topics of interest in innovation research. The evidence in Chapters 3 and 8 of powerful-yet-informal developmental visions provides support for the view that the dynamics of informality in African settings require closer scrutiny and have many insights to offer to researchers.

Kawooya in Chapter 3 proposes the conceptual tool of the "continuum" between formality and informality, and it will be valuable to examine, in the years to come, where the Ugandan informal-sector mechanics and Egyptian independent musicians – and myriad other collectives of relatively informal actors in African settings – find themselves (or place themselves) on the continuum in their efforts to realise personal, familial or community developmental goals. In Chapter 8, Rizk provides thoughts on how a mix of digital commons and freemium approaches might allow Egypt's independent musicians to adopt greater adherence to formalised copyright realities while at the same time remaining true to the vision and practices organically developed in their loosely defined creative sector. Meanwhile, via the Ugandan study, Kawooya shows us that the Gatsby Garage is to some extent a formal–informal (or "semi-formal", in Kawooya's words) hybrid: a setting where both formalised actors (employed by Makerere University) and informal actors (contracted or paid on an occasional basis) collaborate and share ideas, innovations and trade secrets as IP. Such findings make it easy to imagine that formal–informal (semi-formal) hybrid encounters with innovation, creativity and IP will, in the years and decades to come, become increasingly prevalent engines of socio-economic development in African settings.

We have also seen stakeholders in the case studies, – e.g. the scholarly authors in Kenya, and (to a lesser extent) the public researchers in Ethiopia and Botswana – who, while they have formalised employment at institutions (e.g. universities) that are presumably governed in line with national developmental goals, seem to lack a strong connection to visions of socio-economic development. In the case of the researchers in Ethiopia and Botswana, there seems to be little linkage between high-level government socio-economic visions (in relation to innovation and IP) and the felt needs of researchers.

5. Current intersections: collaborative innovation and creativity, openness and IP

It is now necessary to draw out some of the key findings from across the chapters of this book in relation to the main themes proposed by the Open A.I.R. Project that supported the research: the themes of collaborative innovation and creativity, openness and IP.

Collaborative innovation and creativity

In almost every one of the cases outlined in this book, there are vibrant collaborative models at play in relation to innovation and livelihood development. The collaborations range from the extremely informal (e.g. the apprenticeship and referral networks among the Ugandan auto mechanics in Chapter 3); to the considerably more formal (the BCP instrument of the Kukula Healers in South Africa, Ghanaian cocoa's Licensed Buying Companies, and Ethiopian coffee's Farmers Cooperative Unions); to the somewhere in between (the Gatsby Garage in Uganda, the sometimes fractious union or association structures for Nigerian leather and textile producers, the oil-from-jatropha initiative in Mozambique). A crucial engine in these collaborative innovation-creation endeavours seems clearly to be openness.

Openness

In some of the studies featured in this book, we see what appears to be a strong emphasis on openness (with an almost complete absence of restrictions or closures) in relation to certain innovative, collaborative outputs. For instance, the Ugandan mechanics interviewed for Chapter 3 do not, as is the nature of the very open paradigm in which they innovate and develop their livelihoods, seek proprietary control over access to their innovative ideas and solutions. But in other chapters, we see that collaboration does not mean absolute openness. The Kukula Healers are committed to openness among the participants in their TK commons, but their BCP controls access to their commons (by both participants and non-members). Likewise, the leather and textile makers in Nigeria seek to share within their unions and associations, but at the same time they seek to prevent their designs from being used by non-union/association members. And while the Kenyan scholarly authors discussed in Chapter 9 are enthusiastic about the potential of OA publishing, they also want protection of their economic rights as creators. In these three cases, the *knowledge commons* present seems to be analogous to the traditional agricultural commons (in which there is sharing of the common

land but not everyone [i.e. not someone who does not reside in the vicinity of the commons] has access to the common land).

As discussed in some detail in Chapter 1 and mentioned in other chapters (see Oguamanam and Dagne's Chapter 4, Ouma's Chapter 6, Rizk's Chapter 8, Sihanya's Chapter 9), the concept of "open development" is relatively new and still at an early stage of conceptual evolution. To the extent that the studies outlined in this volume suggest that collaboration is a primary engine of innovation and development in many African settings, then the conceptual emphasis of open development's proponents – the emphasis on networked collaboration – seems to fit. But it must also be borne in mind that the framers of the open development framework acknowledge that absolute openness will often not be beneficial or possible in developmental settings; there will usually need to be some parameters and restrictions (see Smith *et al.,* 2011).The findings generated by the studies in this book support the contention that open development cannot be conceived as a binary proposition, either open or closed. Nor would a metaphor of a spectrum, from more open to more closed, necessarily be apt: socio-economic development, especially when conceived as open development, is a far more complex process than that.

IP

Long before it became fashionable to extol the virtues of collaborative, open approaches to IP, these were factor endowments inherent in the African innovation and creation experience. These endowments are now assets (or can become assets) that African policy-makers and practitioners can bring to national, regional, continental and global IP policy and practical discourses. To do so, however – as the crosscutting nature of this volume's collection of case studies shows – African innovation policy-makers and actors will need to move away from dominant preconceptions of IP as involving mainly patent, copyright and trademark protections. Informal and flexible protections such as trade secrets seem much better suited to the informal sector, as the Kawooya study in this volume demonstrates. And Ouma, in her study, notes how orthodox IP institutions are inappropriate to protect TK, while Cocchiaro and his co-authors show how legal mechanisms outside of IP, such as trusts, may prove useful. A further indication that the conventional forms of IP are increasingly unsuited for more organic forms of innovation and knowledge generation emerges from the fact that several of the case studies in this book (e.g. the studies by Oguamanam and Dagne, Cocchiaro *et al*. and Awad and Abou Zeid) discuss or report on existing systems of *sui generis* protection for certain forms of IP (e.g. GIs, TK, plant varieties). The lack of salience, in many African settings, of conventional IP, drives home the fact (discussed in Chapter 1) that using patent numbers (commonly used as

an indicator of innovation, thus positioning Africa as a continent that produces little or no innovation) is too crude an instrument to adequately measure innovation in Africa. Another factor mitigating against the salience of conventional IP in many African settings (in addition to the attractiveness of non-conventional approaches to IP), is the presence in many African countries of weak institutional infrastructure and a lack of context-sensitive policy orientation on IP (De Beer and Oguamanam, 2010).

Formal IP protection cannot exist in the absence of strong institutions, including not just IP offices that register, disclose and educate, but also a culture of respect and enforcement of IP rights. Several case studies in this book provide evidence that while IP laws are in place, their impact is minimal (or at least reduced) due to shortcomings in the administrative infrastructure needed to implement and enforce these laws. In many of the case study settings, the policy context is almost invisible, clearly divorced from the (often informal) economic and social structures central to innovation dynamics. Egypt's independent musicians and consumers of independent music are revealed, in Chapter 8, to behave (in their production and consumption, respectively) according to organically evolved motivations that take no account of mainstream music business models or copyright law. Chapter 10's findings reveal that many African national patent offices serve as a mere "clerical outpost" (to use author Mgbeoji's expression), with little regard for the statutory obligations at the basis of their existence. And there is a conundrum: attempts to boost IP infrastructure and enforcement can easily be viewed, particularly by marginalised communities who already perceive themselves to be on the wrong side of the prevailing IP exploitation equation, as introducing new tools of exclusion. Such perceptions would tend to decrease, rather than increase, respect for conventional IP modalities.

However, there is evidence, in some of the chapters of this book, of settings where improved institutional performance in relation to IP and related matters can be of potential benefit. In these settings, generally weak institutions impede effective policy implementation and compound the uncertainty already inherent in innovation environments. Kenya's scholarly authors would apparently, according to the research findings in Chapter 9, be more willing to embrace alternative publishing models if they had more faith in state protection of their economic rights under copyright. And Mgbeoji calls, in Chapter 10, for improved performance by African national patent offices, in their roles as examiners and disseminators of patent filing data, as a spur to localised innovation. Meanwhile, in Chapter 5 it is apparent that improved performance by a body not formally mandated as an institution of IP administration, the Standards Organisation of Nigeria (SON), would be of benefit to leather and textile innovation. We saw that the innovators studied in Nigeria have an inherently unpredictable relationship

with SON, which has the power to regulate and standardise the quality of goods produced by small traders but does not at present adequately perform these functions. These findings connect to the crucial matter of how best to grow the small and medium enterprise (SME) sector on the continent – a sector made up of enterprises which, while suited to working within informal frameworks, can also benefit from a certain degree of regulatory predictability and formality in relation to the goods and services on which their business models are based.

Meanwhile, where there are state efforts to create more predictable and enabling IP policy environments for innovation, such as in South Africa, Ethiopia and Botswana, there is evidence of reliance on foreign models that are not necessarily well suited to local contexts. And hasty adaptations of such models – intended to superficially improve their suitability to African contexts – will likely make matters worse. While the American Bayh-Dole Act has been criticised for causing problems by giving publicly funded research institutions *the right to* patent outputs, we saw in Ncube *et al.*'s Chapter 13 that South Africa's IPR-PFRD Act of 2008 goes further by *requiring*, as a default, institutions to protect IP and to seek patent protection in any case where patentability seems possible. The Ncube *et al.* findings suggest that South African public research bodies will be able to construct workaround solutions to mitigate the potentially adverse impacts of the IPR-PFRD. But there are risks inherent in seeking to work around faulty policy – risks that are less likely to be present when policy-makers are truly attentive to emerging evidence and truly consultative with all relevant stakeholders.

6. Recommendations to African policy-makers

The final task of this chapter, and of this book, is to make some recommendations to African policy-makers: recommendations based on the evidence presented in the preceding chapters. IP policy-making in many African contexts is in a state of infancy. In many countries, IP is only now emerging onto the policy radar, and we hope that this book will enhance visibility of key issues. Growing interest in IP as a policy lever for innovation and creativity in Africa presents both profound opportunity and tremendous risk. Not only are emergent IP policies in Africa often driven by foreign interests and top-down assessments, but early African adopters of IP policy frameworks are in some cases leapfrogging developed-world models, and often not in a useful way.

Regardless of how little or how much the stakeholders who were surveyed, interviewed and observed in the studies done for this book are interacting with IP systems, policy frameworks (and the laws, regulations and institutions which seek to concretise the policy frameworks) have contextual importance in almost all

of the settings studied. And, in most of the studies, the IP policy frameworks, no matter how faintly acknowledged, intersect with issues crucial to African nations' socio-economic development, including, but not limited to, science, energy, education, food, culture and communications. Given the range of important areas that IP policies and practices impact upon, and the often poor alignment (revealed by several studies in this book) between existing IP systems and present innovation realities, three key recommendations to African policy-makers emerge from, and provide a suitable conclusion to, this book.

Avoid mistakes

The first recommendation to African policy-makers is to avoid policy mistakes. Having no IP policy may be better than entrenching the wrong IP policy. This does not mean that policy-makers can ignore IP, but that they should be cautious and seek to make evidence-based rather than political decisions wherever possible. We have witnessed, in most of the case studies presented in this book, that actors innovate and create shared value through collaboration between interconnected communities (broadly defined). Collectivities in African settings continue to do what they have done – and done well – for millennia. Certainly, IP policies properly tailored to local contexts can enhance the benefits of innovation and creativity. But poorly designed policies can exacerbate problems, requiring risky and inefficient workarounds for innovation practitioners. Because, in many countries, IP policies are not yet locked in for the long term, the opportunity remains to leapfrog past many developed countries that are struggling with the adverse consequences of ill-conceived IP measures. But policy leapfrogging need not be a rapid endeavour. Learning from others' experiences, and then crafting context-appropriate responses, requires the willingness to collect evidence and consult broadly. Patience will provide African policy-makers an advantage.

Broaden IP conceptions

The second recommendation to policy-makers is to broaden conceptions of relevant and valuable IP practices. The studies presented in this book suggest that patent systems (even were the institutional capacity to exist, and in most cases it does not) are irrelevant to many of the modes of innovation and creativity happening in Africa. Copyright seems also to be ineffective in many African settings, because of its lack of enforceability.

We do not suggest putting an end to the building of capacity to conduct patent examinations and disseminate patent disclosures, or an end to the raising of copyright awareness in order to enhance copyright enforcement and

compliance. These are potentially useful exercises. We believe it is better, however, to focus resources on mechanisms that are more relevant to localised, marginalised innovator communities. In many contexts, informal modes of IP protection, such as trade secrecy, coupled with limited knowledge-sharing within a defined group, seem better suited than formal IP mechanisms. Branding, whether through reputation alone or protected by geographic, communal or certification marks, may be another useful form of IP in many instances. Utility models and industrial designs deserve more careful analysis and consideration. And in the context of indigenous communities, it may be necessary to think more creatively about the kinds of mechanisms that have the potential to reinforce local customs and facilitate benefit-sharing, rather than building ways (as many emerging TK laws seem to be implicitly doing) to allow communities and/or governments to perpetually monopolise access to collectively generated knowledge. The crucial point is that IP can certainly be a practical tool for collaboration, but not if it is perceived narrowly or pursued dogmatically.

Look forward

The third, and perhaps most important, recommendation we can draw from the studies in this book is that African policy-makers need to look forward, not backwards. Through on-the-ground qualitative and quantitative data gathering, the researchers who have contributed to this volume have demonstrated the rapidly evolving dynamics of IP, innovation, creativity and development in African settings. This evidence provides a sense of the current realities in a wide variety of contexts. But simply observing the past and present cannot adequately prepare policy-makers and stakeholders for the future. Many African states appear to be at a crossroads in their paths towards negotiating their places in an increasingly globalised IP order. A narrative of Africa as "emerging Africa" (*The Economist*, 2013) has gained currency in recent years via African countries' relatively strong GDP growth in the wake of the 2008–09 global financial crisis (at a time when many "developed" states are experiencing stagnated GDP). This more positive view of the continent's prospects is potentially a welcome boost for African nations seeking to attract investment and partners. But this narrative whereby Africa is *emergent* also brings with it the danger of intensified pressure on African states to fine-tune national and regional laws and reorient knowledge production traditions into a globalised paradigm predicated on the market economy (in which orthodox approaches to IP rights have typically been positioned as sacrosanct). The findings in this book suggest that, going forward, African policy-makers, as with the innovators and creators whom the policy-makers are supposed to serve, must seek to harness IP rights on their own terms.

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