



**INNOVATION &  
INTELLECTUAL  
PROPERTY**

**COLLABORATIVE DYNAMICS IN AFRICA**

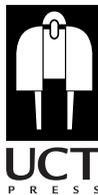
**Editors: Jeremy de Beer, Chris Armstrong,  
Chidi Oguamanam & Tobias Schonwetter**

# **Innovation & Intellectual Property Collaborative Dynamics in Africa**

EDITORS:

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

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## 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*

## About the Editors

**Prof. Jeremy de Beer** is an Associate Professor in the Faculty of Law, University of Ottawa, and co-Principal Investigator of the Open African Innovation Research and Training (Open A.I.R.) Project. His edited books include *Access to Knowledge in Africa: The Role of Copyright* (UCT Press, 2010), and *Implementing the World Intellectual Property Organization's Development Agenda* (Wilfred Laurier University Press, 2009). jeremy.debeer@uottawa.ca

**Dr Chris Armstrong** is a Visiting Researcher at the LINK Centre, University of the Witwatersrand (Wits), Johannesburg, publishing and communications consultant for the Open African Innovation Research and Training (Open A.I.R.) Project, and former Research Manager of the African Copyright and Access to Knowledge (ACA2K) Project. He is an editor of *Access to Knowledge in Africa: The Role of Copyright* (UCT Press, 2010). c.g.armstrong@gmail.com

**Dr Chidi Oguamanam** is an Associate Professor in the Faculty of Law, University of Ottawa, a lawyer with Blackfriars LLP in Lagos, a co-investigator for the Open African Innovation Research and Training (Open A.I.R.) Project, and former Director of the Law and Technology Institute at Dalhousie University, Halifax, N.S., Canada. He is author of the books *Intellectual Property in Global Governance* (Routledge, 2012) and *International Law and Indigenous Knowledge* (University of Toronto Press, 2010). coguaman@uottawa.ca

**Dr Tobias Schonwetter** is Director of the IP Unit in the Faculty of Law, University of Cape Town (UCT), African Regional Coordinator for Creative Commons (CC), co-Principal Investigator for the Open African Innovation Research and Training (Open A.I.R.) Project, and former co-Principal Investigator for the African Copyright and Access to Knowledge (ACA2K) Project. He is an editor of *Access to Knowledge in Africa: The Role of Copyright* (UCT Press, 2010). tobiasschonwetter@gmail.com

## About the Contributors

**Dr Perihan Abou Zeid** is a Senior Lecturer in the Faculty of Legal Studies and International Relations, Pharos University in Alexandria (PUA), a Post-doctoral Fellow in the Centre of Economic Law and Governance at Vrije University, Brussels, and a volunteer attorney for Public Interest Intellectual Property Advisors (PIIPA). [perihan.abouzeid@pua.edu.eg](mailto:perihan.abouzeid@pua.edu.eg)

**Lucienne Abrahams** is Director of the LINK Centre, University of the Witwatersrand (Wits), Johannesburg, and a former board member of South Africa's National Advisory Council on Innovation (NACI) and National Research Foundation (NRF). [luciennesa@gmail.com](mailto:luciennesa@gmail.com)

**Prof. Adebambo Adewopo** is a Professor of Law at the Nigerian Institute of Advanced Legal Studies (NIALS), Abuja, a Principal Partner at L&A Legal Consultants, Lagos, and former Director-General of the Nigerian Copyright Commission (NCC). [tonade@yahoo.com](mailto:tonade@yahoo.com)

**Titi Akinsanmi** is Policy and Government Relations Manager at Google, Johannesburg, an African Regional Representative on the At-Large Advisory Committee of the Internet Corporation for Assigned Names and Numbers (ICANN), and a former Research Associate at the LINK Centre, University of the Witwatersrand (Wits), Johannesburg. [titi.akinsanmi@gmail.com](mailto:titi.akinsanmi@gmail.com)

**Prof. Njoku Ola Ama** is an Associate Professor in the Department of Statistics, University of Botswana, Gaborone. [amano@mopipi.ub.bw](mailto:amano@mopipi.ub.bw)

**Dr Bassem Awad** is a Judge at the Appeal Court of Egypt, an Adjunct Professor in the Faculty of Law at the University of Western Ontario, London, Ont., Canada, and a Tutor at the Academy of the World Intellectual Property Organisation (WIPO). [awad\\_bassem@hotmail.com](mailto:awad_bassem@hotmail.com)

**Wondwossen Belete** is President of the Society for Technology Studies (STS), Addis Ababa, former Manager of International Creativity and Innovation Development Support Services (ICIDSS), and former Director of IP Protection and Technology Transfer at the Ethiopian Intellectual Property Office (EIPO). [wondwossenbel@yahoo.com](mailto:wondwossenbel@yahoo.com)

**Helen Chuma-Okoro** is a Research Fellow at the Nigerian Institute of Advanced Legal Studies (NIALS), Lagos, a Research Fellow of the Open African Innovation Research and Training (Open A.I.R.) Project, and Coordinator of Open A.I.R.'s West Africa hub in Lagos. [helenchuma@gmail.com](mailto:helenchuma@gmail.com)

**Gino Cocchiario** is a lawyer with Natural Justice: Lawyers for Communities and the Environment, Cape Town, and a former Legal Researcher at the International Development Law Organisation (IDLO), Rome. gino@naturaljustice.org

**Dr Tesh Dagne** is an Assistant Professor in the Faculty of Law, Thompson Rivers University, Kamloops, B.C., Canada. tdagne@tru.ca

**Fernando dos Santos** is Director-General of the African Regional Intellectual Property Organisation (ARIPO), Harare, a Tutor at the World Intellectual Property Organisation (WIPO) Worldwide Academy, Geneva, a former Lecturer in Law at Eduardo Mondlane University (UEM) and the Technical University of Mozambique, Maputo, and former Director-General of the Mozambican Industrial Property Institute (IPI). fsantos@aripo.org

**Kristen Holman** is a JD candidate in the Faculty of Law, University of Ottawa. kristen.holman@gmail.com

**Dr Dick Kawooya** is an Assistant Professor in the School of Library and Information Science, University of South Carolina, Columbia, SC, and former Lead Researcher of the African Copyright and Access to Knowledge (ACA2K) Project. He is an editor of *Access to Knowledge in Africa: The Role of Copyright*, (UCT Press, 2010). kawooya@sc.edu

**Johan Lorenzen** is an LLB candidate at the University of Cape Town (UCT) and a former consultant with Natural Justice: Lawyers for Communities and the Environment. yolorenz@gmail.com

**Dr Bernard Maister** is a Senior Research Fellow in the IP Unit, Faculty of Law, University of Cape Town (UCT), practised as an IP (patent) lawyer in the US, and is one of the authors of *Harnessing Intellectual Property Rights for Development Objectives* (Wolf Legal, 2011). maisterb@gmail.com

**Dr Ikechi Mgbeoji** is an Associate Professor at Osgoode Hall Law School, York University, Toronto, and a lawyer with Blackfriers LLP, Lagos. His authored books include *Global Biopiracy* (UBC Press, 2006). ikechimgbeoji@osgoode.yorku.ca

**Dr Caroline Ncube** is an Associate Professor, and Deputy Director of the IP Unit, in the Faculty of Law, University of Cape Town (UCT), and lectures in the Master of IP programme of the World Intellectual Property Organisation (WIPO) and African Regional Intellectual Property Organisation (ARIPO) at Africa University, Mutare, Zimbabwe. caroline.ncube@uct.ac.za

**Dr Marisella Ouma** is Executive Director of the Kenya Copyright Board (KECOBO), Nairobi, an Advocate of the High Court of Kenya, has taught IP Law at the University of Nairobi, and lectures in the Master of IP programme of the World Intellectual Property Organisation (WIPO) and African Regional

Intellectual Property Organisation (ARIPO) at Africa University, Mutare, Zimbabwe. mwarsie@justice.com

**Dr Adejoke Oyewunmi** is a Senior Lecturer in the Faculty of Law, University of Lagos (Unilag), Akoka, and a former Adjunct Lecturer in the Master of IP programme of the World Intellectual Property Organisation (WIPO) and African Regional Intellectual Property Organisation (ARIPO) at Africa University, Mutare, Zimbabwe. aoyewunmi@unilag.edu.ng, adejoke21@yahoo.com

**Simão Pelembe** is a legal advisor at Petróleos de Moçambique (Petromoc), Maputo, a Master's candidate in Business Law at Instituto Superior de Ciências e Tecnologia de Moçambique (ISCTEM), and serves on the boards of Petromoc group companies Petrogás, Somotor, Petroauto, Ecomoz and Somyoung Motors. simao.pelembe@petromoc.co.mz

**Dr Nagla Rizk** is Professor of Economics at the School of Business, The American University in Cairo (AUC), founding Director of the Access to Knowledge for Development Center (A2K4D) at AUC, a Faculty Associate at Harvard University's Berkman Center for Internet and Society, an affiliated Fellow of Yale University's Information Society Project (ISP), and a founding member of the Access to Knowledge Global Academy. She is co-editor of, and contributor to, *Access to Knowledge in Egypt: New Research on Intellectual Property, Innovation and Development* (Bloomsbury Academic, 2010), and a co-author of *Arab Knowledge Report 2009*. naglarzk@aucegypt.edu

**Britta Rutert** is a PhD candidate in Anthropology at the Free University of Berlin and a Researcher for Natural Justice: Lawyers for Communities and the Environment in Bushbuckridge, South Africa. britta.rutert@gmail.com

**Prof. Ben Sihanya** teaches at the University of Nairobi Law School, is CEO of Innovative Lawyering and Sihanya Mentoring, Nairobi, and is former Dean of Law and Chair of the Department of Commercial Law at the University of Nairobi. His edited books include *Intellectual Property Rights in Kenya* (Konrad Adenauer Stiftung, 2009), and he is the author of *Intellectual Property and Innovation in Kenya and Africa* (Innovative Lawyering and Sihanya Mentoring, 2013) and *Presidency and Administrative Bureaucracy in Kenya* (forthcoming, 2013). sihanyamentoring@gmail.com, sihanya@innovativelawyering.com

**Izabella Sowa** is a JD candidate in the Faculty of Law, University of Ottawa. sowa.izabella@gmail.com

## 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
KIPRA	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 2

## Frameworks for Analysing African Innovation: Entrepreneurship, the Informal Economy and Intellectual Property

*Jeremy de Beer, Izabella Sowa and Kristen Holman*

### Abstract

*This chapter reviews conceptual frameworks to understand and measure innovation, and then outlines links between innovation and the concepts of entrepreneurship, the informal economy (IE) and intellectual property (IP). The review suggests that the time is ripe for African policy-makers to seek more holistic approaches to facilitating innovation and, in turn, to fostering socio-economic development in African nations.*

### 1. Introduction

Innovation is a key driver of economic development, but the gap between socio-economic climates that foster innovation in developed and developing countries, particularly the developing nations of Africa, is large (Aubert, 2006; GTZ, 2010). This is a problem that must be addressed. Innovation is affected by many variables, one of which is intellectual property (IP). While IP plays an especially important role in formal-sector innovation, its role in the informal economy (IE) is just beginning to be explored (De Beer *et al.*, 2013). The existing literature on the role of intellectual property in innovation, entrepreneurship, the IE and economic development is largely disconnected, providing inadequate bases for understanding how IP does, or could, function in a manner beneficial to social and economic progress.

For example, those who study or make policy on innovation usually rely on a definition in a document called the *Oslo Manual*, published by the Organisation for Economic Co-operation and Development (OECD) and the Statistical Office of the European Communities (Eurostat). The *Oslo Manual* defines innovation as

[...] the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (OECD and Eurostat, 2005, p. 46).

Citing this *Manual*, and the theoretical concepts and study methods contained in it, is trite for innovation scholars and policy-makers. But too few IP experts, especially intellectual property lawyers, are familiar with this well-established framework. For many people working on IP, innovation is less an established field of study than a rhetorical buzz word. Similarly, entrepreneurship is a concept intuitively connected to IP, but too often IP law, policy and practice are insufficiently tied to various theoretical models of how and why entrepreneurship happens. The problems with such gaps in the discourses and understanding among different fields of research are exacerbated in the context of Africa's predominantly informal economic activities.

To avoid, or at least mitigate, the pitfalls inherent in multidisciplinary analyses of intellectual property and innovation, this chapter begins to establish conceptual common ground. Inevitably, for some readers, the chapter will be too simple; for others, it may be the opposite. To strike a balance, the modest goal of this chapter is to examine linkages among disparate strands of thinking in the literature on these topics, and to weave the strands together in an interdisciplinary way, relevant to emerging realities on the African continent.

## 2. Innovation

Our understanding of the links between technological innovation, economic growth and human development has evolved significantly over the past century. Despite more sophisticated understandings of development, based on human freedom (Sen, 1999) or capabilities (Nussbaum, 2011), economic growth is still a key metric to measure success. Thus, this section begins by discussing the role of technological innovation in classical, neoclassical and Keynesian economic theory. Next, it explores the interdisciplinary conceptions of innovation as presented by proponents of development economics and modernisation theory. Third, this section discusses the systems approach to innovation, which in the 1970s aimed to address the fragmented research on the topic that had emerged up to that point. The section concludes by examining current views on the innovation–development nexus.

### ***Classical and neoclassical economics***

Since the 18th century, when classical economic theory emerged as the first modern school of economic thought, various conceptions of innovation have shaped

the economic discourse. Adam Smith (1776), a leading proponent of classical economics, argued that savings and capital accumulation are the key determinants of economic growth, and that competitive markets facilitate invention and innovation. This reasoning endured until the late 19th century, when neoclassical economics displaced classical economic theory.

Neoclassical economists assumed: that individuals have rational preferences among various outcomes to which values can be attributed; that individuals maximise utility; that firms maximise profits; and that people base their economic decisions on full information. Alfred Marshall, a key figure in the neoclassical school, acknowledged the link between innovation and local economic development (Marshall, 1920). He argued that firms involved in similar activities and clustered in the same place can be more efficient than isolated producers, because locational proximity allows third-party firms to benefit from new, non-excludable ideas generated by other firms. This early insight laid the groundwork for contemporary discourse around open, inclusive, networked or community-driven innovation, discussed later in this chapter.

### ***Dynamic development of economic systems***

In the 1930s and 1940s, Joseph Schumpeter countered the neoclassical view of orderly economic change and market equilibrium, arguing that adjustments in the economy are abrupt and uneven. He sought to explain how productive innovations arise sporadically within capitalist systems, displacing old equilibriums and creating radically new and more efficient socio-economic conditions. Schumpeter (1934, 1942) argued that such productive innovations can occur through the introduction of a new good or a new quality of a good; the introduction of a new method of production; the opening up of a new market; the conquest of a new source of supply; and/or the carrying out of a new mode of organisation of an industry.

Notwithstanding Schumpeter's novel ideas about the dynamic development of economic systems, neoclassical economic theories dominated the subsequent decades. Our understanding of innovation was thus impoverished, because the prevalent assumptions of rational optimisation – full information availability and an obsession with determinate solutions to fully specified models – left little room for analysis of technological change (AU-NEPAD, 2010).

### ***Keynesian economics and growth theory***

During the post-war period, economists viewed growth as the key requirement for development, and a number of growth theories emerged based on Keynesian

economic principles. Notably, the Harrod-Domar Growth Model posited that increased investment is a prerequisite for economic growth, and that the state should encourage savings in order to accumulate investment and should support technological advances to increase productive capacity and efficiency (Domar, 1947; Harrod, 1939; Peet and Hartwick, 2009).

In the late 1950s, Robert Solow (1957) presented a revolutionary growth model that focused on the role of technological development to explain economic growth that could not be accounted for by capital accumulation or labour productivity. Solow argued that technological progress is not a product of economic forces, but rather an exogenous collection of knowledge that is continuously expanding. In subsequent decades, economists relied heavily on Solow's growth model when formulating their development policy recommendations (Peet and Hartwick, 2009).

### ***Development economics***

The post-war period also saw the establishment of the development economics school, which was premised on the idea that economic processes in developing countries are distinct from those in developed ones. While institutions, technology and entrepreneurship were assumed to be exogenous in the neoclassical economics school, development economists considered these factors to be endogenous. Albert Hirschman (1958) argued that developing countries lack entrepreneurship, or the perception of opportunities for investment. Accordingly, Hirschman envisioned a role for the state that involved developing confidence among entrepreneurs, enabling them to make investments in key sectors such as manufacturing.

Other development economists focused on the link between geography, technological innovation and economic growth. François Perroux (1955) viewed the innovative capacities of propulsive industries as growth stimuli for geographically proximate firms involved in technologically complementary industries. Geographer Allan Pred (1965) shared this idea; he posited that the clustering of firms in specific locations would lead to the development of innovative centres, which would in turn attract economic activity. He also argued that there is a positive correlation between the importance of an innovative centre and the speed of its economic growth (Peet and Hartwick, 2009; Pred, 1965).

### ***Modernisation theory***

In 1959, Seymour Martin Lipset set the stage for the emergence of modernisation theory, which presented a sociological alternative to purely economic theories

of development. According to Lipset, industrialisation leads directly to positive social change, because it facilitates the emergence of democratic political institutions (Lipset, 1959). Bert Hoselitz also espoused a sociological approach to development, focusing on cultural change as a prerequisite for economic growth. Hoselitz argued that capitalist entrepreneurs, who of necessity set themselves apart from the mainstream, are the ones who generate new ideas. Hoselitz also believed that cities, to a greater extent than rural areas, are birthplaces of innovation, and he thus favoured political power being held by entrepreneurs in urban areas (Hoselitz, 1960; Peet and Harwick, 2009). Sociologist Talcott Parsons (1966) considered the most successful societies to be those that are able to adapt and differentiate for the purpose of using resources effectively and gaining a competitive advantage over other societies.

Another group of modernisation theorists presented a more psychological orientation. David McClelland (1961) argued that economic development can only take place in a society that accords importance to the achievement of innovation and entrepreneurship. Everett Hagen (1962) argued that society's values would shift towards favouring innovation and economic growth once traditional peoples searching for new identities engaged in processes characterised by creativity and the need to achieve.

Alongside the development of these diverse perspectives on modernisation, the 1960s saw a resurgence of interest in the notion of innovation, with one area of particular interest being the inexplicably rapid rise of Japanese productivity (Freeman, 1987). Economists became interested in identifying factors instrumental in pushing countries along the path of modernisation. Walt Whitman Rostow (1960) argued that all societies pass through five sequential categories of economic development: (1) traditional society; (2) preconditions for take-off; (3) take-off; (4) the drive to maturity; and (5) an age of high mass consumption. In Rostow's thinking, technological development is the stimulus that moves a society from one stage to the next. As such, the emergence of new production functions, which facilitate rapid growth in primary sectors, is a prerequisite for development even in mature, industrialised economies.

Everett Rogers (1962) also devised a five-step theory, about the diffusion of innovation, whereby an individual (1) becomes aware of an innovation; (2) becomes interested in the innovation and seeks information about it; (3) chooses to either adopt or reject the innovation; (4) (if the innovation is accepted) puts the innovation to use on a small scale; and (5) adopts the innovation for continued use in the future. According to Rogers, the successful spread of an innovation follows an S-shaped curve: after the first 15% of people in a society adopt an innovation there is relatively rapid adoption by the remaining members.

During the years that followed the publication of Rogers' work, others put forward geographic versions of diffusion theory, highlighting the spatial aspects of modernisation. Peter Gould (1964) argued that new ideas are diffused from one area to another through communication. An innovation will be adopted earliest in areas of close proximity to the innovation's place of origin, and adopted much later in areas farther away. Gould, of course, was writing in the 1960s, an era when communications were limited by less sophisticated technologies than are available today.

### ***Evolutionary economic theory***

By the end of the 1970s, researchers were taking a view that prevailing theories were providing an inadequate picture of innovation, because the theories were fragmented across multiple intellectual disciplines. Moreover, neoclassical economists' preoccupation with profit maximisation and market equilibrium was causing them to overlook the uncertainty of innovation and the wide variety of institutions that support innovation across different sectors (Nelson and Winter, 1977). Richard Nelson and Sydney Winter developed an evolutionary theory of business capabilities and behaviour that was modelled on biology. Drawing on Schumpeter's ideas about discontinuous economic change, Nelson and Winter (1982) concluded that firms facing key business decisions rely not only on past experience, but also on innovative alternatives to their past behaviour.

Later in the 1980s, Christopher Freeman broadened the emerging field of evolutionary economics by stressing the importance of national systems of innovation, which he defined as "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" (Freeman, 1987, p. 1). Bengt-Åke Lundvall (1992) supported this view, concluding that the two key factors acting on a system of innovation are its structure of production and its institutional set-up. Charles Edquist (1997) presented a more general definition of systems of innovation, which included consideration of the economic, social, political, organisational and institutional factors that affect development and diffusion of innovation.

As economists began to experiment with models and surveys to measure innovation, the OECD's Working Party of National Experts on Science and Technology Indicators (NESTI) identified the need for a coherent set of analytical tools. Hence, in 1992, the OECD published the first edition of the aforementioned *Oslo Manual*, subtitled *Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*. This first edition focused on technological product and process innovation in manufacturing: an innovation is considered implemented if it has

been introduced to the market (product innovation) or used within a production process (process innovation). This first *Oslo Manual* identified scientific, technological, organisational, financial and commercial activities as innovations (OECD and Eurostat, 1992).

In parallel, Paul Romer (1992) proposed a new growth theory, which characterised technological advancements as an endogenous product of economic activity, and knowledge as the driver of progress. Other scholars corroborated the importance of the knowledge–development nexus. Richard Nelson and Nathan Rosenberg (1993) concluded that the main sources of innovation are organisations that promote the creation and dissemination of knowledge, and Joseph Cortright (2001) viewed government policies focusing on innovation and the diffusion of knowledge as instrumental to economic growth. Notably, Cortright argued that economic strategies should value not only the knowledge generated through scientific research, but also the innovation of frontline workers (Cortright, 2001; Peet and Hartwick, 2009). When the OECD published the second edition of its *Oslo Manual* in 1997, it recognised the importance of both the knowledge transfer and systems approaches to innovation. The 1997 edition of the *Oslo Manual* also expanded the definition of innovation to cover a wider range of industries, including construction, utilities, manufacturing and marketed services (OECD and Eurostat, 1997).

### ***The current state of innovation literature***

Research on innovation and development split in several directions around the start of the 21st century, partly due to shifts in global economic and geopolitical power triggered by the emergence of the BRICS nations of Brazil, Russia, India, China and now, South Africa (Lawson and Purushothaman, 2003). Recent literature on innovation and progress has begun to reflect global heterogeneity. For example, scholars examining African development using the systems of innovation approach have focused on indigenous knowledge and capabilities, because these factors emphasise learning and capacity building (Muchie *et al.*, 2003). Interestingly, such approaches mirror one proposed 30 years earlier in a UN-commissioned study entitled *Sussex Manifesto: Science and Technology for Developing Countries during the Second Development Decade*, which stressed the need for developing countries to nurture indigenous scientific capabilities rather than relying on technologies transferred from developed countries (Ely and Bell, 2009).

The current, third edition of the *Oslo Manual*, published in 2005, includes an annex on innovation surveys in developing countries. According to the OECD, these surveys are intended to serve as guiding tools for public policy development

and business strategy designs that seek to incorporate new ideas and knowledge. The current OECD view is that measurement exercises should focus on the innovation *process* rather than its outputs, and should emphasise how countries deal with *capabilities* and *efforts* as well as results. The OECD now sees efforts made by firms and organisations (innovation activities) and capabilities (stocks and flows) as equal to, or even more important than, the results (innovations), as elements requiring determination and analysis by researchers. Factors that hamper or facilitate innovation are key indicators for gauging a country's innovative profile in this context (OECD and Eurostat, 2005).

The recently established African Science, Technology and Innovation Indicators (ASTII) initiative is working to improve the measurement of science and technology indicators by Member States of the African Union (AU-NEPAD, 2010). ASTII published the *African Innovation Outlook* report (2010), which provides an overview of science, technology and innovation (STI) activities in 19 African countries.<sup>1</sup> Notably, the report asserts that

[g]iven the appropriate institutional context, entrepreneurship at all scales (in micro, small, medium and large enterprises) has the potential to meet the huge demands of the continent and its population of over one billion. Legitimate, participative governance, strengthened through an innovation systems policy perspective, will also improve social cohesion by reducing uncertainties and enabling evolutionary change. In combination, these discrete components of policymaking and coordination offer the continent the opportunity to escape the vicious cycles of underdevelopment. (AU-NEPAD, 2010, p. 30)

Innovation scholars also postulate that risk-taking entrepreneurs are the driving force behind innovative activities (Gault and Zhang, 2010). The AU's work connects the institutional context for entrepreneurship, including governance, with social cohesion and other, broader development objectives.

While this vision of a well-governed, cohesive entrepreneurial society is one prospect for parts of Africa, it is not the only plausible scenario for the future. To help imagine alternative evolutions of African entrepreneurship, the next section of this chapter examines the literature on entrepreneurship and highlights its linkages to economic development theory.

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1 The 19 countries are: Algeria, Angola, Burkina Faso, Cameroon, Egypt, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Malawi, Mali, Mozambique, Nigeria, Senegal, South Africa, Tanzania, Uganda and Zambia.

### 3. Entrepreneurship

#### ***Entrepreneurship defined***

Development scholars have tended to define entrepreneurship extremely broadly. In particular, recent literature has deemed any form of innovation that creates or improves a product, service or process as entrepreneurship. One of the most commonly referenced definitions in development literature defines entrepreneurship as

[t]he manifest ability and willingness of individuals, on their own, in teams within and outside existing organizations, to perceive and create new economic opportunities (new products, new production methods, new organizational schemes and new product-market combinations) and to introduce their ideas in the market, in the face of uncertainty and other obstacles, by making decisions on location, form and the use of resources and institutions. (Wennekers and Thurik, 1999, pp. 46–7; Caree and Thurik, 2003, p. 441)

This definition of entrepreneurship hinges on two aspects that jointly create capacity for entrepreneurship: an environmental component and a behavioural component. Thus, this definition links to the argument, seen in the work of McClelland (1961), that in order to foster entrepreneurship it is necessary to examine factors that exist at both the system level and the individual level of any given economy. This definition is also compatible with descriptions of entrepreneurship as a “process” rather than a somewhat static phenomenon that an economy seeks to achieve (UNCTAD, 2005).

But the relationship between entrepreneurship (so defined) and development requires a more precise indication of what type of entrepreneurship is being measured. In the contemporary literature, a distinction has been made between “necessity entrepreneurship” and “opportunity entrepreneurship”, coupled with an assertion that levels of opportunity entrepreneurship are a more significant indicator of a nation’s entrepreneurial capacity than necessity entrepreneurship (Acs, 2006, p. 97).

#### ***Entrepreneurship in the developing world***

The national economies of countries with low levels of per capita income tend to be characterised by large numbers of micro and small enterprises (Ayyagari *et al.*, 2005). Higher per capita income levels tend to correspond with industrialisation, economies of scale and larger, established organisations satisfying increasing demand while increasing their relative roles in the economy. Thus, both the existence of small entrepreneurial ventures and their eventual growth into large ventures have important places in the transformation sequence of an economy from developing status to developed status. Early-stage entrepreneurial development and the growth of existing entrepreneurial ventures are two different, but equally important, matters.

Once an economy has moved to the industrialised phase of capitalist development, it can be argued that a “qualitative change in the drivers of economic growth occurs” (UNCTAD, 2005, p. 4). This theory of development is premised on the idea of “long cycles” of economic development, a concept attributable to Joseph Schumpeter. Schumpeter deemed the first long cycle of innovation as being the diffusion of the steam engine and textile innovations in the 18th century, followed by railway and steel innovations, electrical power and then the chemical industry (Schumpeter, 1934). He asserted that once an economy graduates from a threshold level of industrial development, technology and the accumulation of human knowledge become the primary drivers of economic growth.

Entrepreneurship is arguably the common denominator behind both technological advances and knowledge accumulation. In Schumpeter’s theory, it is the ability and initiative of entrepreneurs – drawing upon the discoveries of scientists and inventors – that create new opportunities for investment, growth and employment (Schumpeter, 1934, pp. 83–4). For this reason, Schumpeter believed that “new combinations” of factors of production would be a form of entrepreneurial discovery that would drive economic development. Schumpeter’s theory posits that the process of “creative destruction” would allow the innovative entrepreneur to take market share from existing suppliers and increase overall demand for the products offered in that market (Schumpeter, 1942; UNCTAD, 2005, p. 4).

Scholars asserting the importance of the entrepreneurship context have emphasised the critical importance of the “imitating” entrepreneur as opposed to the “innovating” entrepreneur (Schmitz, 1989). Imitating entrepreneurs are individuals who manipulate existing activities and put new products or methods into practice, thereby creating knowledge through a process that development scholars such as James Schmitz have characterised as learning by implementing (Schmitz, 1989). Critics of Schumpeter’s theory have pointed out that in order for learning/growth by imitation to ensue, there must be a trigger innovation of sufficient scale, and the social climate in which it is born must be “favourable” (Freeman, 1982). As major innovations become part of an economy’s backdrop, further growth in that economy can and should be spurred by the activities of individuals seeking to imitate and subtly vary existing innovations.

Mowery and Rosenberg (1979) have argued that the diffusion process of innovation cannot be viewed as one of simple carbon-copy replication. Rather, the economic growth that is spurred involves a sequence of *further* innovations: sometimes large, but mostly small, subtle innovations based on the larger technical innovation. This process is typically cast as an outcome of firms striving to gain an edge over competitors in an industry. As new industries emerge they each set in motion process innovations linked particularly to exploitation of economies of scale (Rosenberg, 1976; Mowery and Rosenberg, 1979). This characterisation of

economic growth appears relevant to markets in which there is an abundance of small firms (rather than a few key heavyweight actors), because small firms hold the capacity to imitate existing innovations. The “imitating entrepreneur” is an especially important figure throughout the developing world.

### ***Fostering an entrepreneurial environment in a developing economy***

There are two foundational models outlined in development literature that attempt to link entrepreneurship to development.

#### *The Wennekers and Thurik Model*

The Wennekers and Thurik Model divides analysis of innovative capacity growth through entrepreneurship into three categories: (1) individual level, (2) firm level and (3) macro level (Thurik and Wennekers, 2001). Each level operates according to its own set of “conditions” for entrepreneurship, which researchers believe are the factors driving innovative potential in the form of distinctive “cultures”: certain conditions are thought to be required in order for a certain type of culture to be achieved at each level. Each level has an impact on the capacity for entrepreneurship in a given economy, with the impact emanating from the individual level and moving towards the macro level. According to the Wennekers and Thurik Model, entrepreneurial activity originates with a single person, the entrepreneur, and entrepreneurship is, for the most part, dependent on factors affecting the individual. Capacity thus originates at the individual level and is later realised at the firm/institutional level. Innovation is stimulated by an individual’s attitudes, motives, skills and assessment of market risk.

Though this model posits that the individual entrepreneur does not undertake innovation in a timeless/space-less vacuum, the context in which the entrepreneur is acting is given less emphasis than the psychological factors that play on the entrepreneur’s decision to innovate. At the same time, psychological factors are understood to be influenced to some extent by cultural and institutional factors, the business environment and macroeconomic conditions: personal entrepreneurial qualities that cause one to innovate are necessary but not sufficient to foster entrepreneurship.

The Wennekers and Thurik Model asserts that entrepreneurial activity expands the productive potential of a national economy by inducing both “higher productivity” and “an expansion of new niches and industries” (UNCTAD, 2005, p. 7). These results are produced by the individual layer transforming the processes used for providing certain products and services. When factors at the individual

level foster entrepreneurial qualities in individuals, there is greater potential for increasing the productive potential at the firm level and, in turn, at the macro level. Individual entrepreneurs learn from the successes and failures of innovation attempts undertaken by themselves and others. These successes and failures form the basis of what is often referred to as “knowledge capital” – the “know how”. Knowledge capital drives research and development (R&D) in its purest and cheapest form: knowledge makes its way from the individual level to the firm and macro levels, increasing the potential for economic growth.

### *The GEM Model*

The Global Entrepreneurship Monitor (GEM) Model depicts entrepreneurship as something that is fuelled at the macro level, with movement to the micro level (Reynolds *et al.*, 2000). According to this model, capacity for entrepreneurship is fuelled by an economy’s social/political context: the context generates the economic conditions that allow for entrepreneurship to occur, resulting in opportunities/capacity at the individual level. This model views entrepreneurship predominantly as firm creation, defining entrepreneurship more strictly than does the Wennekers and Thurik Model. More particularly, the GEM Model measures entrepreneurship on the basis of new firm creation, as opposed to the Wennekers and Thurik Model’s broader focus on entrepreneurship as innovation in its purest form (i.e. innovation demonstrated by any form of improvement or imitation of existing products and processes).

The GEM Model also embodies a heavy focus on the role of existing firms. Existing firms are thought to generate new market opportunities for small and medium-sized firms, whether by technology spillover or by increasing domestic demand. The number of firms operating in the economy is thus regarded as an indicator of growth. In essence, the GEM Model conceptualises economic growth as firm growth and firm creation. Entrepreneurship in this context depends on the “emergence and presence of new market opportunities” – often the product of existing firms themselves – and the “capacity, motivation and skills of individuals to establish firms” (UNCTAD, 2005, p. 8). This is a narrower conceptualisation of entrepreneurship as it places less focus on opportunities for existing firms to increase returns through innovations in their production process.

### **Entrepreneurship and IP**

Where, then, might IP dynamics affect a national economy’s capacity to foster entrepreneurship? A prudent approach to answering this question would seem to require consideration of both the Wennekers and Thurik and GEM models

of building entrepreneurship. In fact, the models provide two distinct avenues through which to examine the potential for bolstering economic development through IP.

### *IP and the Wennekers and Thurik Model*

Given the focus on the individual entrepreneur that is proposed by the Wennekers and Thurik Model, it is essential to consider how changes to IP law and policy affect attitudes, motives and assessment of market risk in the economy. It is necessary to flesh out the ways in which IP can create attitudes of openness to innovation, increase incentives for the individual to pursue innovation, and shape conceptions of innovation in products and services as carrying minimal risk if pursued appropriately. According to this model, changing perceptions at the individual level will be the primary way to increase innovation at the firm level and, in turn, to foster high productivity in the broader economy. Crafters of IP laws and policies must thus take into account bottom-up approaches to increasing innovative capacity in target countries.

The most prominent scholar in this area is Harvard psychologist David McClelland, who has highlighted the importance of the “motivational aspect” of the entrepreneur. McClelland’s studies have demonstrated that entrepreneurial behaviour is “driven by a need for personal achievement leading to a clear proclivity for becoming an entrepreneur” (McClelland, 1961, pp. 358–99; UNCTAD, 2005, p. 10). Critically, McClelland’s work emphasises the fact that entrepreneurs with high motivation will almost always find ways to maximise economic achievement. This view implies that the levels of motivation of entrepreneurs are more critical than the economic conditions supporting their potential innovations. McClelland has identified 10 entrepreneurial competencies that must be strengthened in order to increase entrepreneurial potential at the individual level: (1) opportunity-seeking and initiative; (2) risk-taking; (3) demand for efficiency and quality; (4) persistence; (5) commitment to the work contract; (6) information-seeking; (7) goal-setting; (8) systematic planning and monitoring; (9) persuasion and networking; and (10) independence and self-confidence (McClelland, 1961).

### *IP and the GEM Model*

The GEM Model, in contrast to the Wennekers and Thurik Model, lends support to the notion that innovative capacity is impacted predominantly at the macro level and must trickle downwards. Viewed via the GEM Model, IP laws and policies could themselves be cast as the driving forces behind increases in entrepreneurship and innovation. The GEM Model would thus seem to favour a domestic

IP structure that specifically encourages: (1) the growth of existing large firms, thus generating profit opportunities for small and medium-sized firms; and (2) the establishment of new firms. Based on the GEM Model's focus on more formalised concepts of R&D, increasing innovative capacity would require some form of incentive system to encourage the formal sector to spend more on R&D.

## ***Entrepreneurship and Africa***

The scholarly literature on African entrepreneurship provides several explanations of why entrepreneurship has not succeeded in lifting the continent's people from poverty. There is less analysis of how entrepreneurship needs to be – and has the potential to be – a key force for economic growth in African countries. The limited literature that does exist in relation to the importance of entrepreneurship in Africa tends to single out large youth populations, high levels of youth unemployment and rural–urban shifts as primary reasons why entrepreneurship needs to, and can, spur development in the context of Africa.

There are concerns that a large portion of Africa's youth population<sup>2</sup> has become marginalised and excluded from access to education, health care and salaried jobs. There is extensive literature on the increased marginalisation of African youth, including their inability to create sustainable livelihoods for themselves, and there is also evidence that this marginalisation phenomenon has affected not only impoverished youth but also youth across a broad spectrum of socioeconomic classes, including the well-educated (Chigunta, 2002, p. 11; Chigunta *et al.*, 2005, p. 5).

Africa has a larger youth-to-adult ratio than any other continent, and this ratio is growing. The ILO determined that 62% of Africa's total population was below the age of 25 (ILO, 2006). This “youth bulge”<sup>3</sup> is most evident in the sub-Saharan region of Africa, a region noted as having the highest population growth rate in the world (Guarcello *et al.*, 2008). The population of the sub-Saharan region has quadrupled since 1950 and continues to grow. Its youth-to-adult ratio was, in 2002, increasing at a projected rate of 18% (Chigunta, 2002, p. 4; Sommers, 2010, p. 321). To provide some perspective on this figure, a study by Population Action International reveals that there are 46 countries where at least 70% of the population is under 30, and all but seven of those countries are in sub-Saharan Africa (Leahy *et al.*, 2007, p. 23). Meanwhile, Africa also has the highest youth rural–urban mobility rate of any continent. It is estimated that more than 50% of

2 The category of “youth” in Africa is generally deemed to be those individuals in the range of 15 to 30 years of age. The UN definition is individuals aged 15 to 24.

3 The term “youth bulge” was originally coined by demographer Gary Fuller (Hendrixson, 2005, p. 2).

African youth reside in urban centres (Chigunta, 2002, p. 12). At the same time, formal job opportunities in the urban centres are limited. A recent study by the UN Office for West Africa revealed that by 2020, one half of the African population would be living in cities, with more than 50% of urban inhabitants being under the age of 19 (UNOWA, 2005, p.1).

Having a large youth population that is not in the workforce has been consistently pegged in development literature as a significant indicator of risk of general civil instability (Urdal, 2004, p. 16). This concern is reflected in the development community, including at the US Agency for International Development (USAID), which has noted that: “Urbanization concentrates precisely that demographic group most inclined to violence: unattached young males who have left their families behind and have come to the city seeking economic opportunities” (USAID, 2005, p. 7). Of particular concern is evidence that large numbers of unemployed youth in Africa have come to engage in unconventional means of sustaining their livelihoods (Chigunta *et al.*, 2005). Finding formal sector work can be particularly difficult for urban youth, as there are few jobs and many youth lack the qualifications that formal-sector work often requires. For instance, a Sierra Leone study found that only 9% of the working-age population in that country had formal-sector jobs, with opportunities falling significantly lower for youth than the average adult (Peeters *et al.*, 2009). Another study, in Angola’s capital city, Luanda, determined that the average age of individuals working in the city’s outdoor market areas was 21, and that both male and female youth averaged just over five years of education, with the women being exposed to fewer opportunities and lesser pay (De Barros, 2005, p. 212).

The size of the African workforce, estimated at 492 million in 2012, continues to grow at an annual rate of 2.8% per year (the highest in the world), representing roughly 13.8 million new entrants a year, a rate that is declining only marginally year over year (ILO, 2013).<sup>4</sup> That said, accurate unemployment statistics for the African continent are notoriously difficult to come by. Unemployment information for Africa has proven both difficult to gather and difficult to calculate, due to varying definitions of employment. As a result of these difficulties, the range of reported youth unemployment statistics is described as “phenomenal” (Sommers, 2010, p. 322).

Extensive research has been conducted on the supply-side factors affecting youth unemployment in Africa. This research has pointed to two dominant barriers: (1) a deficiency in skills, and (2) an underlying perception that the only worthwhile employment is “formal employment” rather than less formal employment (the category in which entrepreneurship generally lies) (Chigunta *et al.*, 2005). When it comes to engaging youth, Mike Grant and Jamie Schnurr have argued

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4 Between 2000 and 2012, the rate dropped from 2.9% to 2.7% (ILO, 2013).

that demand-side factors are just as critical as supply-side factors. These scholars posit that economic development cannot be bolstered simply by directing youth through “stationary” paths to formal employment roles but rather by creating more “flexible systems” to propel youth into the workforce (Grant and Schnurr, 1999). Michael Todaro (1997) similarly asserts that too much emphasis should not be placed on the formal means of bolstering African economies through youth employment. Thus, it can be inferred that creating favourable conditions for youth entrepreneurship would be a component of any plan to bolster economic development.

In contexts where it is essential that youth create their own employment opportunities, a lack of financial and business resources will be detrimental. Individuals often lack the support that is required to turn innovative ideas into reality. Government budgets are too limited to directly support the large population of unemployed and increasingly marginalised youth in their countries. However, African governments can help alleviate this burden by engaging youth in entrepreneurship. In particular, educational institutions could introduce entrepreneurial education designed to expose youth to entrepreneurship at an early age, increasing the prospect of more successful entrepreneurial ventures in Africa (Chigunta *et al.*, 2005, p. 165). This concept suggests the time is ripe to better understand where government spending should be aimed if it is to target potentially entrepreneurial individuals and to support existing entrepreneurship in Africa.

As part of the OECD’s ongoing work on innovation, it partnered with the UN Educational, Scientific and Cultural Organisation (UNESCO) in 2009 to host an international workshop entitled “Innovation for Development: Converting Knowledge to Value”. Participants highlighted, *inter alia*, the important role of local entrepreneurs with respect to innovation and the need to focus on “the generation, transfer and application of local knowledge” (UNESCO, 2009, p. iii). In developing countries, the institutional framework for knowledge transfer at local levels consists primarily of informal institutions and organisations. For example, in sub-Saharan Africa, informal employment represents nearly three quarters of non-agricultural employment. It contributes, on average, 41% of national GDP in these countries, and over 50% in individual countries such as Ghana, Togo and Niger (ILO, 2002).

As early as 2000, it was estimated that in Africa, two in three urban residents obtain their livelihoods from the informal economic sector, a sector thought to be growing at an annual rate of 7%. At this time, it was estimated that more than 90% of jobs would be created through informal economies (Karl, 2007, pp. 53–4). A failure to recognise the vitality and necessity of informal markets constitutes a denial of fundamental economic realities. Confirming this projection was the

aforementioned Sierra Leone study finding that a mere 9% of the working-age population had formal sector jobs (Peeters, *et al.*, 2009). Such figures highlight the need to recognise and fully harness the informal sector's roles in innovation. Accordingly, Section 4 of this chapter now turns to an examination of the linkages between innovation, entrepreneurship and the informal sector in Africa.

## **4. The informal economy (IE)**

### ***The “informal sector” concept***

According to the International Labour Organisation (ILO), the “informal sector” comprises non-agricultural, private, unincorporated enterprises that produce their goods or services for sale or barter and are not registered under national legislation (ILO, 1993). While this definition provides some direction with respect to measuring the size of the informal sector in a given economy, it does not capture the various discipline-specific approaches that have been developed over the past 60 years to value informal sector activities.

In 1954, William Arthur Lewis first conceptualised the economy as constituting more than one sector. Lewis posited a dual economy model, whereby “[t]he capitalist sector is that part of the economy which uses reproducible capital, and pays capitalists for the use thereof [and the] subsistence sector is by difference all that part of the economy which is not using reproducible capital” (Lewis, 1954, p. 407). Lewis believed that the flow of labour is unidirectional, moving from the subsistence sector into the more formal, capitalist sector. Two decades later, economic anthropologist Keith Hart (1973) presented a different approach to the dual economy analysis. While studying the economy of urban Ghana in 1971, Hart noted that a thriving “informal sector” exists alongside the formal sector in urban economies. According to Hart, labour flows back and forth between these sectors in response to the availability of employment in each one at any given time.

The prevalent economic thinking in the 1960s was that employment levels would increase if an economy achieved success in generating capital and promoting exports. However, in 1967 the ILO proposed that development efforts should focus on increasing employment as a distinct policy objective. Accordingly, the ILO established the World Employment Programme (WEP) and organised “comprehensive employment missions” to analyse employment in developing countries (Bangasser, 2000, p. 5).

During the WEP's 1972 mission to Kenya, the ILO acknowledged the informal sector concept that Hart had coined a year earlier. However, the ILO presented a more nuanced perspective, asserting that informal activities “are not confined to employment on the periphery of the main towns, to particular occupations

or even to economic activities. Rather, informal activities are the way of doing things” (ILO, 1972, pp. 5–6). Based on this view, the ILO (1972) identified seven elements that characterise the informal sector: (1) ease of entry; (2) reliance on indigenous resources; (3) family ownership of enterprises; (4) small scale of operation; (5) labour-intensive and adapted technology; (6) skills acquired outside the formal school system; and (7) unregulated and competitive markets.

The years that followed saw a gradual recognition of the need for an international statistical definition of the informal sector (Husmanns, 2004). Consequently, in 1993, the 15th International Conference of Labour Statisticians (ICLS) adopted the following definition:

The informal sector may be broadly characterised as consisting of units engaged in the production of goods or services with the primary objective of generating employment and incomes to the persons concerned. These units typically operate at a low level of organisation, with little or no division between labour and capital as factors of production and on a small scale. Labour relations – where they exist – are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees. (ILO, 1993, p. 2)

In 2001, the Expert Group on Informal Sector Statistics (Delhi Group) assessed existing methods for measuring informal sector employment, and highlighted the need for a definition of informal employment (Husmanns, 2004). In 2003, the 17th ICLS responded by officially defining informal employment as “the total number of informal jobs [...] whether carried out in formal sector enterprises, informal sector enterprises, or households, during a given reference period” (ILO, 2003, p. 2).

The ILO has described a continuum of economic relations that exists in the informal sector: “production, distribution, and employment relations tend to fall at some point on a continuum between ‘formal’ relations (i.e., regulated and protected) at one pole and ‘informal’ relations (i.e., unregulated and unprotected) at the other” (ILO, 2002, p. 12). (See Chapter 3 of this volume for Kawooya’s case study of linkages between the formal and informal sectors in automotive engineering in the Ugandan capital city, Kampala.) Steve Daniels recently built on this idea in his analysis of Kenya’s local economy by noting that informality exists along a spectrum (Daniels, 2010). According to Daniels, enterprises in the country’s formal and informal sectors differ, to varying degrees, with respect to several factors: business size, start-up capital, labour, labour protection, skills, selling price, raw materials, infrastructure, quality, resources, market linkages, flexibility, efficiency, self-sufficiency and culture. For example, in terms of business size, an enterprise at the informal end of the formal–informal spectrum has fewer than five employees, while an enterprise at the formal end has more than 50 (Daniels,

2010). Meanwhile, firms with 6 to 50 employees are situated somewhere along the spectrum. Given the varying levels of regulation and legal protection for those providing goods and services across the spectrum of informality, striking the optimal balance between tight and loose regulation is likely to be critical to harnessing the potential of Africa's IE to facilitate innovation and development.

Paul Godfrey (2011) has reviewed how various disciplines – ranging from economics to sociology to management – define the IE. Godfrey found that the term receives varying treatment across the literature. Some development economists see limited potential for efficiency in the informal sector due to the small size of local enterprises and these enterprises' lack of protection of property rights (Godfrey, 2011). Hernando de Soto (2000), for example, positions informal work arrangements as a rational response by micro-entrepreneurs to onerous regulations governing the licensing and registration of businesses. Not all business and economics literature characterises informality in that light. Sparks and Barnett (2010), for example, argue that the informal sector is a source of vibrant entrepreneurship and job creation.

Outside the field of economics, additional favourable narratives have emerged regarding the IE. Political scientists Gaughan and Ferman assert that “[i]nformal activity takes place largely in personal and intimate domains [...] reflect[ing] the nature of the personal ties between the participants, defined by norms and institutions that are in essence non-economic” (Gaughan and Ferman, 1987, p. 16). Sociologists Portes and Sensenbrenner believe that “[a] solidary ethnic community represents, simultaneously, a market for culturally defined goods, a pool of reliable low wage labor, and a potential source for start-up capital” (Portes and Sensenbrenner, 1993, p. 1329).

A joint IDRC/OECD-published volume has also acknowledged that innovation among micro and small firms in the informal sector “can result in benefits not only to informal entrepreneurs, but also to the society as whole; the informal sector in fact produces economically viable and beneficial innovations that affect a large proportion of the population” (Kraemer-Mbula and Wamae, 2010, p. 66). The most recent literature on IP and indigenous peoples' innovation further highlights the widespread recognition that “traditional knowledge systems are indeed innovative, dynamic and directly relevant to practical needs; that collective and cumulative forms of innovation and creativity have value and worth in themselves” (Drahos and Frankel, 2012, p. xv).

### ***Measuring innovation in the informal sector***

Emerging from the somewhat discipline-specific approaches to defining the IE are various means of measuring informal employment and activities. Historically, the

ILO measured informal employment using the residual method, which assessed existing statistical data from population censuses, labour force surveys and/or household surveys, and compared countries according to international benchmarks (ILO, 1993). In recent years, the OECD has begun to give greater emphasis to country-specific innovation surveys than to international comparisons, because the former are seen as more effective tools for policy-making and business planning to facilitate the building, sharing and application of new knowledge (OECD and Eurostat, 2005).

However, Fred Gault (2010) has highlighted the fact that, in many developing countries, measuring innovation in the IE is not amenable to standard innovation surveys. Gault has proposed the use of case studies, based on structured interviews, as an alternative research approach. According to Gault, “[t]he results may highlight the need, for example, to treat agriculture as a knowledge-based industry in a global world, rather than a subsistence activity, or the need to protect indigenous knowledge so that its use can continue to benefit the community that has developed it over time” (Gault, 2010, p. 133).

## 5. A framework for development through IP

Parallel to the emergence of a heterogeneous literature on innovation, entrepreneurship and the IE, researchers have constructed an increasingly sophisticated definition of “development” as encompassing not simply economic growth, but more fundamentally, the promotion of human freedom. For example, Amartya Sen (1999) focuses on political, economic and social rights and opportunities that advance the capabilities of the individual. Martha Nussbaum (2000; 2011) argues for an approach whereby all people are afforded a minimum threshold of capabilities, including bodily health and integrity, as well as control over their environments. Thus, while economics is still heavily influential in theories of development, it no longer dominates policy discourse. The dialogue has become infused with international affairs, political science and law (including IP law).

There is now concerted reflection on how innovation can best contribute towards achievement of the UN Millennium Development Goals (MDGs) by 2015. Calestous Juma and Lee Yee-Cheong (2005) have highlighted the important role that innovation and innovation policy can play in this regard. Juma and Yee-Cheong stress that innovation has the potential to increase the ability of existing science, technology and innovation programmes to reduce poverty and expand human capabilities, particularly in the areas of public health, agriculture, energy use and information and communication technologies (ICTs). Development scholars have also begun to explore how innovation can contribute solutions to

global challenges (Kraemer-Mbula and Wamae, 2010), and it is likely that theorists will continue along this trajectory as they broaden their understanding of the innovation–development nexus.

As suggested above, innovation and entrepreneurship encompass not only “pure” forms of innovation, but also imitation as innovation: small but significant improvements on processes and design. Given the limited resources available to most individuals working in the IE, imitation entrepreneurship is inevitably a prominent kind of entrepreneurial activity in the IE. In the context of scarce resources, the creativity to alter and adapt design processes and products is essential and abundant.

However, despite this wealth of creative innovation, those operating in the IE are, in most cases, not optimally incentivised. Among the stifling forces for innovation in the IE are, it would seem, IP dynamics. In the IE, IP dynamics potentially operate negatively in at least two fashions: (1) pure innovations receive little to no IP protection, allowing for duplication by large players in the formal economy; and (2) entrepreneurs do not attempt to expand the reach of their products, perhaps because they fear they are infringing on the rights of IP holders. Such limitations – fear of IP exploitation and fear of IP infringement – may be a disincentive for IE players to innovate and expand the reach of their innovations. Thus, mismatched IP policies and structures may be among the factors hindering the IE’s potential to trigger a new phase of economic development in Africa driven by entrepreneurship and innovation. This is among the overarching uncertainties probed throughout the chapters of this book.

It is necessary when interrogating the functioning of the IE in Africa to interrogate, *inter alia*, the IP system’s potential limitations at both macro and micro levels. Certain macro-level policy changes favouring improved knowledge dissemination in the IE are likely to be necessary to help address innovators’ fears of potential IP expropriation. At the micro level, grassroots programmes will likely be required to quash fears of IP infringement by IE entrepreneurs and to engage entrepreneurship at the individual level in order to bolster the “motivational aspect” of IE entrepreneurship as posited by McClelland (1961). Such micro-level work will likely need to involve programmes that allow for shifts in the mindsets of the individuals that comprise the IE.

Entrepreneurs should be taught not only how to protect and exploit their own IP, formally or informally within the pragmatic parameters of the environments in which they operate. They should also be aware that imitation and improvement of existing products and processes are acceptable and, in fact, encouraged when done within certain parameters. Such a shift from the dominant rhetoric about the perils of IP piracy would seem to be an important component of an innovation policy. A shift in mindset at the individual level could potentially enhance existing incentives for those participating in the IE and, in turn, push the IE’s innovative potential beyond its current threshold.

## Bibliography

- Acs, Z.J. (2006), "How is entrepreneurship good for economic growth?" *Innovations: Technology, Governance, Globalization*, Vol. 1 No. 1, pp. 97–107.
- African Union–New Partnership for Africa’s Development (AU-NEPAD) (2010), *African Innovation Outlook 2010*, AU-NEPAD, Pretoria, available at: [www.nepad.org/system/files/June2011\\_NEPAD\\_AIO\\_2010\\_English.pdf](http://www.nepad.org/system/files/June2011_NEPAD_AIO_2010_English.pdf) (accessed 11 April 2013).
- Anand, S. and Sen, A. (1996), *The Income Component of the Human Development Index*, UN Development Programme (UNDP), New York.
- Aubert, J. (2006), "Innovation systems in emerging and developing economies", in Blankley, W., Scerri, M., Molotja, N. and Saloojee, I. (Eds), *Measuring Innovation in OECD and non-OECD Countries*, Human Sciences Research Council (HSRC), Cape Town.
- Ayyagari, M., Beck, T. and Demirgüç-Kunt, A. (2005), *Small and Medium Enterprises across the Globe*, World Bank Review on Small Business Activities, Washington, DC.
- Bangasser, P.E. (2000), *The ILO and the Informal Sector: An Institutional History*, International Labour Organisation (ILO), Geneva.
- Caree, M.A. and Thurik, A.R. (2003), "The impact of entrepreneurship on economic growth", in Acs, Z.J. and Audretsch, D.B. (Eds), *Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction*, Kluwer Academic, Boston/Dordrecht.
- Chigunta, F. (2002), "The socio-economic situation of youth in Africa: problems, prospects and options", paper presented at the Youth Employment Summit, 7–11 September, Alexandria, Egypt.
- Chigunta, F., Schnurr, J., James-Wilson, D. and Torres, V. (2005), *Being "Real" about Youth Entrepreneurship in Eastern and Southern Africa: Implications for Adults, Institutions and Sector Structures*, International Labour Organisation (ILO), Geneva, available at: [www.ilo.org/youthmakingithappen/PDF/WP72-2005.pdf](http://www.ilo.org/youthmakingithappen/PDF/WP72-2005.pdf) (accessed 11 April 2013).
- Cortright, J. (2001), *New Growth Theory, Technology and Learning: A Practitioner’s Guide*, Impresa, Portland, OR.
- Daniels, S. (2010), *Making Do: Innovation in Kenya’s Informal Economy*, Analogue Digital, available at: [www.analoguedigital.com/docs/makingdo-download-lores.pdf](http://www.analoguedigital.com/docs/makingdo-download-lores.pdf) (accessed 11 April 2013).
- De Barros, M.C. (2005), "Profiling youth involved in the informal markets of Luanda", in Muloongo, K., Kibasomba, R. and Kariri, J.N. (Eds), *The Many Faces of Human Security: Case Studies of Seven Countries in Southern Africa*, Institute for Security Studies (ISS), Pretoria.

- De Beer, J., Fu, K. and Wunsch-Vincent, S. (2013), "The informal economy, innovation and intellectual property – concepts, metrics and policy considerations", WIPO Economic Research Working Paper No. 10, July, available at: [www.wipo.int/export/sites/www/econ\\_stat/en/economics/pdf/wp10.pdf](http://www.wipo.int/export/sites/www/econ_stat/en/economics/pdf/wp10.pdf) (accessed 30 July 2013).
- De Soto, H. (2000), *The Mystery of Capital*, Basic Books, New York.
- Domar, E. (1947), "Expansion and employment", *American Economic Review*, Vol. 37 No. 1, pp. 34–55.
- Drahos, P. and Frankel, S. (Eds) (2012), *Indigenous Peoples' Innovation: Intellectual Property Pathways to Development*, Australian National University E Press, Canberra.
- Edquist, C. (1997), *Systems of Innovation: Technologies, Institutions, and Organizations*, Pinter, London.
- Ely, A. and Bell, M. (2009), *The Original "Sussex Manifesto": Its Past and Future Relevance*, STEPS Centre, Brighton, UK.
- Freeman, C. (1982), "Innovation and long cycles of economic development", paper presented at the International Seminar on Innovation and Development at the Industrial Sector, University of Campinas (UNICAMP), Campinas, Brazil.
- Freeman, C. (1987), *Technology Policy and Economics Performance: Lessons from Japan*, Pinter, London.
- Gaughan, J.P. and Ferman, L.A. (1987), "Toward an understanding of the informal economy", *Annals of the American Academy of Political and Social Science*, Vol. 493, pp. 15–25.
- Gault, F. (2010), *Innovation Strategies for a Global Economy: Development, Implementation, Measurement and Management*, International Development Research Centre (IDRC), Ottawa.
- Gault, F. and Zhang, G. (2010), "Challenges and directions", in Kraemer-Mbula, E. and Wamae, W. (Eds), *Innovation and the Development Agenda*, Organisation for Economic Co-operation and Development (OECD) and International Development Research Centre (IDRC), Paris-Ottawa, pp. 13–27.
- Godfrey, P.C. (2011), "Toward a theory of the informal economy", *Academy of Management Annals*, Vol. 5 No. 1, pp. 231–77.
- Gould, P. (1964), "A note on research into the diffusion of development", *Journal of Modern African Studies*, Vol. 2 No.1, pp. 123–25.
- Grant, M. and Schnurr, J. (1999), *A Conceptual and Analytical Research Framework for Youth Enterprise and Entrepreneurship Development: Social Innovation towards Sustainable Livelihoods for Youth*, International Development Research Council (IDRC): Sustainable Livelihoods for Youth Exploration, Ottawa.
- GTZ: Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (2010), "Strengthening innovation systems in the context of development cooperation", workshop documentation, 5–8 October, Dortmund, Germany.

- Guarcello, L., Manacorda, M., Rosati, F., Fares, J., Lyon, S. and Valdivia, C. (2008), "School-to-work transitions: regional overview", in Garcia, M. and Fares, J. (Eds), *Youth in Africa's Labor Market*, World Bank, Washington, DC.
- Hagen, E. (1962), *On the Theory of Social Change*, Dorsey Press, Homewood, IL.
- Harrod, R. (1939), "An essay in dynamic theory", *Economic Journal*, Vol. 49 No. 193, pp. 14–33.
- Hart, K. (1973), "Informal income opportunities and urban employment in Ghana", *Journal of Modern African Studies*, Vol. 11 No .1, pp. 61–89.
- Hendrixson, A. (2005), "Angry young men, veiled young women: constructing a new population threat", Corner House Briefing 34, December, available at: [www.thecornerhouse.org.uk/pdf/briefing/34veiled.pdf](http://www.thecornerhouse.org.uk/pdf/briefing/34veiled.pdf) (accessed 13 April 2013).
- Herrington, M., Kew, J. and Kew, P. (2009), *Tracking Entrepreneurship in Africa: A GEM Perspective*, Global Entrepreneurship Monitor (GEM), Cape Town.
- Hirschman, A. (1958), *The Strategy of Economic Development*, Yale University Press, New Haven, CT.
- Hoselitz, B. (1960), *Sociological Aspects of Economic Growth*, Free Press, Glencoe, IL.
- Hussmanns, R. (2004), *Measuring the Informal Economy: From Employment in the Informal Sector to Informal Employment*, International Labour Organisation (ILO), Geneva.
- International Labour Organisation (ILO) (1972), *Employment, Incomes and Equity: A Strategy for Increasing Productive Employment in Kenya*, Geneva.
- International Labour Organisation (ILO) (1993), "Resolution concerning statistics of employment in the informal sector", adopted by the 15th International Conference of Labour Statisticians (ICLS), ILO, Geneva, January, available at: [www.ilo.org/wcmsp5/groups/public/@dgreports/@stat/documents/normativeinstrument/wcms\\_087484.pdf](http://www.ilo.org/wcmsp5/groups/public/@dgreports/@stat/documents/normativeinstrument/wcms_087484.pdf) (accessed 11 April 2013).
- International Labour Organisation (ILO) (2002), *Women and Men in the Informal Economy: A Statistical Picture*, Geneva, available at: [www.ilo.org/dyn/infoecon/docs/441/F596332090/women%20and%20men%20stat%20picture.pdf](http://www.ilo.org/dyn/infoecon/docs/441/F596332090/women%20and%20men%20stat%20picture.pdf) (accessed 11 April 2013).
- International Labour Organisation (ILO) (2003), "Guidelines concerning a statistical definition of informal employment", adopted by the 17th International Conference of Labour Statisticians (ICLS), ILO, Geneva, November, available at: [www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms\\_087622.pdf](http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_087622.pdf) (accessed 22 April 2013).
- International Labour Organisation (ILO) (2006), *Regional Labour Market trends for Youth: Africa*, Geneva.
- International Labour Organisation (ILO) (2013), *Global Employment Trends 2013: Recovering from a Second Jobs Dip*, Geneva.

- Juma, C. and Yee-Cheong, L. (2005), *Innovation: Applying Knowledge in Development*, UN Millennium Project, Earthscan Publications, London.
- Karl, K. (2000), "The informal sector", *The Courier*, Vol. 178 (Dec. 1999–Jan. 2000), pp. 53–4.
- Kraemer-Mbula, E. and Wamae, W. (2010), "Adapting the innovation systems framework to Sub-Saharan Africa", in Kraemer-Mbula, E. and Wamae, W. (Eds), *Innovation and the Development Agenda*, Organisation for Economic Co-operation and Development (OECD), Paris.
- Lawson, S. and Purushothaman, R. (2003), "Dreaming with BRICs: the path to 2050", *CEO Confidential*, Issue 2003/12, Goldman Sachs Group, New York, available at: [www.goldmansachs.com/ceoconfidential/CEO-2003-12.pdf](http://www.goldmansachs.com/ceoconfidential/CEO-2003-12.pdf) (accessed 11 April 2013).
- Leahy, E., Engelman, R., Gibb Vogel, C., Haddock, S. and Preston, T. (2007), *The Shape of Things to Come – Why Age Structure Matters to a Safer, More Equitable World*, Population Action International, Washington, DC.
- Lewis, W.A. (1954), "Economic development with unlimited supplies of labour" in Agarwala, A.N. and Singh, S.P. (Eds), *The Economics of Underdevelopment*, Oxford University Press, London.
- Lipset, S.M. (1959), "Some social requisites of democracy: Economic development and political legitimacy", *American Political Science Review*, Vol. 53 No. 1, pp. 69–105.
- Lundvall, B. (Ed.) (1992), *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter, London.
- Marshall, A. (1920), *Principles of Economics*, Macmillan, London.
- McClelland, D. (1961), *The Achieving Society*, D. Van Nostrand, Princeton, NJ.
- Mowery, D. and Rosenberg, N.S. (1979), *Technology and the Pursuit of Economic Growth*, Cambridge University Press, Cambridge, UK.
- Muchie, M., Gammeltoft, P. and Lundvall, B. (Eds) (2003), *Putting Africa First: The Making of African Innovation Systems*, Aalborg University Press, Aalborg, Denmark.
- Nelson, R.R. (Ed.) (1993), *National Innovation Systems: A Comparative Analysis*, Oxford University Press, New York.
- Nelson, R.R. and Rosenberg, N. (1993), "Technical innovation and national systems", in Nelson, R.R. (Ed.), *National Innovation Systems: A Comparative Analysis*, Oxford University Press, New York.
- Nelson, R.R. and Winter, S.G. (1977), "In search of useful theory of innovation", *Research Policy*, Vol. 6, pp. 36–76.
- Nelson, R.R. and Winter, S.G. (1982), *An Evolutionary Theory of Economic Change*, Harvard University Press, Cambridge, MA.
- Nussbaum, M. (2000), *Women and Human Development: The Capabilities Approach*, Cambridge University Press, Cambridge, UK.
- Nussbaum, M. (2011), *Creating Capabilities: The Human Development Approach*, The Belknap Press of Harvard University Press, Cambridge, MA.

- Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat) (1992), *Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*, OECD, Paris.
- Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat) (1997), *Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*, 2nd ed., OECD, Paris, available at: [www.oecd.org/science/inno/2367580.pdf](http://www.oecd.org/science/inno/2367580.pdf) (accessed 11 April 2013).
- Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat) (2005), *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*, 3rd ed., available at: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_PUBLIC/OSLO/EN/OSLO-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/OSLO/EN/OSLO-EN.PDF) (accessed 22 April 2013).
- Parsons, T. (1966), *Societies: Evolutionary and Comparative Perspectives*, Prentice Hall, Englewood Cliffs, NJ.
- Peet, R. and Hartwick, E. (2009), *Theories of Development: Contentions, Arguments, Alternatives*, 2nd ed., Guildford Press, New York.
- Peeters, P., Cunningham, W., Acharya, G., and Van Adams, A. (2009), *Youth Employment in Sierra Leone: Sustainable Livelihood Opportunities in a Post-Conflict Setting*, World Bank, Washington, DC.
- Perroux, F. (1955), "Note sur la notion de pole de croissance", *Économie Appliquée*, Vol. 8, pp. 307–20.
- Portes, A. and Sensenbrenner, J. (1993), "Embeddedness and immigration: notes on the social determinants of economic action", *American Journal of Sociology*, Vol. 98 No. 6, pp. 1320–50.
- Pred, A. (1965), "Industrialization, initial advantage, and American metropolitan growth", *Geographical Review*, Vol. 55 No. 2, pp. 158–85.
- Reynolds, P.D., Hay, M., Bygrave, W.D., Camp, S.M. and Autio, E. (2000), *Global Entrepreneurship Monitor 2000 Executive Report*, available at: [www.gemconsortium.org/docs/download/2408](http://www.gemconsortium.org/docs/download/2408) (accessed 11 April 2013).
- Rogers, E.M. (1962), *Diffusion of Innovations*, Free Press, New York.
- Romer, P. (1992), "Two strategies for economic development: using ideas and producing ideas", in *Proceedings of the World Bank Annual Conference on Development Economics 1992*, World Bank, Washington, DC.
- Rosenberg, N. (1976), *Perspectives on Technology*, Cambridge University Press, Cambridge, UK.
- Rostow, W.W. (1960), *The Stages of Economic Growth: A Non-Communist Manifesto*, Cambridge University Press, Cambridge, UK.
- Schmitz, J.A. (1989), "Imitation, entrepreneurship and long-run growth", *Journal of Political Economy*, Vol. 97 No. 3, pp. 721–39.

- Schumpeter, J. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge, MA.
- Schumpeter, J. (1942), *Capitalism, Socialism, and Democracy*, George Allen and Unwin, London.
- Sen, A. (1999), *Development as Freedom*, Oxford University Press, Oxford.
- Smith, A. (1776), *The Wealth of Nations*, Random House, New York.
- Solow, R. (1957), "Technical change and the aggregate production function", *Review of Economics and Statistics*, Vol. 39 No. 3, pp. 312–20.
- Sommers, M. (2010), "Urban youth in Africa", *Environment and Urbanization*, Vol. 22 No. 2, pp. 317–32.
- Sparks, D.L. and Barnett, S.T. (2010), "The informal sector in Sub-Saharan Africa: out of the shadows to foster sustainable employment and equity?" *International Business and Economics Research Journal*, Vol. 9 No. 5, pp. 1–12.
- Todaro, M.P. (1997), *Economic Development*, 6th ed., Longman, New York.
- Thurik, R. and Wennekers, S. (2001), *A Note on Entrepreneurship, Small Business and Economic Growth*, Erasmus Research Institute of Management, Rotterdam, available at: <http://repub.eur.nl/res/pub/125/erimrs20011101173530.pdf> (accessed 11 April 2013).
- UN Conference on Trade and Development (UNCTAD) (2005), *Entrepreneurship and Economic Development: The Empretec Showcase*, Geneva, available at: [http://unctad.org/en/Docs/webiteteb20043\\_en.pdf](http://unctad.org/en/Docs/webiteteb20043_en.pdf) (accessed 11 April 2013).
- UN Educational, Scientific and Cultural Organisation (UNESCO) (2009), *Innovation for Development: Converting Knowledge to Value: Summary Report*, UNESCO Forum on Higher Education, Research and Knowledge, co-hosted by the Organisation for Economic Co-operation and Development (OECD) and UNESCO, 28–30 January, available at: <http://unesdoc.unesco.org/images/0018/001832/183288e.pdf> (accessed 11 April 2013).
- UN Office for West Africa (UNOWA) (2005), *Youth Unemployment and Regional Insecurity in West Africa*, Dakar, Senegal.
- Urdal, H. (2004), *The Devil in the Demographics: The Effect of Youth Bulges on Domestic Armed Conflict, 1950–2000*, World Bank Social Development Papers: Conflict Prevention and Reconstruction Paper No. 14, Washington, DC.
- US Agency for International Development (USAID) (2005), *Youth and Conflict: A Toolkit for Intervention*, Washington, DC.
- Wennekers, S. and Thurik, R. (1999), "Linking entrepreneurship and economic growth", *Small Business Economics*, Vol. 13 No. 1, pp. 27–56.
- World Intellectual Property Organisation (WIPO) (2013), *Conceptual Study on Innovation, Intellectual Property and the Informal Economy*, prepared by WIPO Secretariat in collaboration with De Beer J. and Fu, K., available at: [www.wipo.int/meetings/en/doc\\_details.jsp?doc\\_id=232525](http://www.wipo.int/meetings/en/doc_details.jsp?doc_id=232525) (accessed 11 April 2013).

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