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Conceptualising Knowledge Governance for Development

Chris Armstrong
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Director, Intellectual Property Unit, Faculty of Law, University of Cape Town; and AJIC Guest Editor

Abstract
Through examining conceptions of the interface between development and knowledge, and conceptions of the notion of knowledge governance, this article provides a conceptual framing for the items published in this *AJIC* "knowledge governance for development" thematic issue.

Keywords
knowledge governance, development, sustainable development, intellectual property (IP), access to knowledge (A2K), human security, human rights

Recommended citation
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1. Introduction

The decision by *The African Journal of Information and Communication (AJIC*) to publish a series of thematic issues (this being the first) on the theme "knowledge governance for development" has its roots in the evolution of both the conceptual terrain and the journal itself.

As we have stated previously (Armstrong & Schonwetter, 2015), one of the most significant dimensions of the African information and communication ecosystem is the conceptual and practical paradigm known as "access to knowledge" or "A2K". Emergent at global level in the late 1990s and early 2000s, the A2K construct is focused on identifying pro-development approaches to intellectual property (IP) that enhance access dimensions. *AJIC* has to date produced three thematic issues with an A2K orientation: in 2006, 2009/2010 and 2015.

For the 2006 and 2009/2010 A2K-oriented *AJIC* thematic issues, the IP focus was on copyrights. The 2006 "Special Issue on Intellectual Property Rights and Creating an African Digital Information Commons" – published when *AJIC* was still called *The Southern African Journal of Information and Communication (SAJIC)* – carried articles on copyright term extension; fair use versus fair dealing; technological protection measures (TPMs); the first sale doctrine; Creative Commons licensing; the piracy narrative; and model language for exceptions and limitations (*SAJIC*, 2006). The 2009/2010 thematic issue, on "Scholarly Communication and Opening Access to Knowledge", included items on open access publishing; research "productivity-visibility-accessibility"; access to learning materials; the digital divide between universities; and publishing of IP from publicly funded research (*AJIC*, 2010).

AJIC's third A2K-oriented thematic issue, in 2015, had a broader focus in respect of IP. Entitled "African Intersections between Intellectual Property Rights and Knowledge Access", the issue included articles on farmer access to patented plant materials; strategic patenting in relation to life-saving drugs; the human rights dimension in IP policymaking; knowledge appropriation by micro and small enterprises (MSEs); technological absorption by MSEs; licensing of government open data portals; filmmaker rights to use of excerpts from copyrighted works; graffiti and copyright; and open licensing of scholarly and educational materials (*AJIC*, 2015). Not only were both patents and copyrights dealt with; there was also engagement in this thematic issue with informal modes of knowledge appropriation and distribution.

The diverse range of submissions received for the 2015 thematic issue prompted *AJIC* to consider whether a wider frame could be found for future thematic issues, i.e., a frame that would still have A2K and IP matters at or near its core, but that would, simultaneously, provide space for contributions shedding light on knowledge dynamics not necessarily intimately linked to formalised IP or to the concerns of the A2K movement. The theme *AJIC* decided upon was "knowledge governance for

development", and this current issue is the first output based on that theme.

But, one might ask, what are *AJIC*'s conceptions of "knowledge governance" and "development", and the fusion "knowledge governance for development"? This is a fair question. Our response, as the editors responsible for this and future *AJIC* issues on the knowledge governance for development theme, is that while our conceptions of "development" are relatively well-formed, our understanding of "knowledge governance" is less settled. The notion of knowledge governance does not have a long conceptual history, and thus its conceptualisations are still formative. Indeed, we regard the fluidity of this conceptual terrain as one of its strengths, as it offers many opportunities for conceptual innovation and expansion.

In Section 2, we provide an indication of how we conceptualise knowledge from a developmental orientation, and we also give a sense of what we regard as the current conceptual terrain in respect of knowledge governance. In Section 3, we introduce the 10 items that follow in this thematic issue.

2. The fluid knowledge governance for development terrain

Developmental conceptions of knowledge

In our previous contribution to *AJIC* (Armstrong & Schonwetter, 2015), we expressed our view that matters of socio-economic development in Africa and elsewhere in the developing world are central to A2K conceptualisations of IP. But at the same time we also acknowledged the malleability of the concept of development in IP debates:

> [t]he *development* conceptual frame is central to the push for better-balanced, more equitable international IP norms and policies. It is also a highly contentious frame, because proponents of TRIPS-style strong IP rights also typically see their approach as pro-development, […] (Armstrong & Schonwetter, 2015, p. 9, italics in original)

We cited the work of Correa (2000), Drahos and Braithwaite (2002), and Sell (2003) as providing persuasive critiques of the damaging elements of the WTO Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement regime for the progress of developing nations. In the words of Sell (2003), "[t]he industrialized countries built much of their economic prowess by appropriating others' intellectual property; with TRIPS, this option is foreclosed for later industrializers" (Sell, 2003, p. 9). Also informing our developmental conception of knowledge is the report of the UK Commission on Intellectual Property Rights (CIPR), which persuasively argued in 2002 that development had yet "to be integrated into the making of IP rules and practice" (CIPR, 2002, p. 8).

An early sign that the developmental conception of how knowledge should be

governed was gaining official momentum came in late 2001, when the Fourth WTO Ministerial Conference adopted the Doha Declaration on the TRIPS Agreement and Public Health (WTO, 2001) aimed at ensuring that the TRIPS dispensation did not threaten poor countries' access to essential drugs. Then in 2004, the governments of Brazil and Argentina tabled a proposal in the World Intellectual Property Organisation (WIPO) General Assembly for a WIPO "development agenda" (WIPO General Assembly, 2004), and A2K activists from civil society activists and academia issued the Geneva Declaration on the Future of WIPO (Geneva Declaration, 2004). In 2007, the WIPO General Assembly adopted an official Development Agenda (WIPO General Assembly, 2007), with implementation of the Agenda's 45 recommendations to be overseen by a permanent WIPO Committee on Development and Intellectual Property (CDIP). CDIP first sat in 2008. In attendance were representatives from roughly 100 WIPO Member States, as well as numerous NGOs and inter-governmental bodies (Armstrong & Schonwetter, 2015; De Beer, 2009).

In the academic sphere, as we pointed out in our 2015 article (Armstrong & Schonwetter, 2015), a key set of recent conceptualisations of the developmental dimensions of knowledge are contained in the Cimoli, Dosi, Maskus, Okediji, Reichman and Stiglitz edited 2014 volume, *Intellectual Property Rights: Legal and Economic Challenges for Development*. In their concluding chapter, Cimoli et al. (2014) forcefully review the ways in which "the historically unprecedented international harmonization of IPRs, 'upward' […] is harmful for the development process in general and for developing countries in particular" (Cimoli et al., 2014, p. 508). Cimoli et al. write that for developing countries, the international IPR regime

> not only fails to enhance the process of accumulating technological capabilities by domestic firms – which is at the core of the development process […] – it also hinders learning by putting serious limits on access to knowledge (and thus presents impediments to closing the knowledge gap) so essential if firms in developing countries are to catch up with the more technically advanced countries. (Cimoli et al., 2014, p. 508)

Accordingly, Cimoli et al. (2014) put forward a wide range of policy proposals for consideration by both rich and poor countries, and by international norm-setting bodies, to make IPR regimes help, rather than hinder, developing countries. Cimoli et al. (2014) make clear the interdependence of the developed and developing worlds in respect of knowledge and innovation flows, because "all innovations build on previous innovations, and by making the fruits of existing innovations less accessible, the progress of science and technology may be inhibited" (Cimoli et al., 2014, p. 503). Cimoli et al. (2014) also make clear the centrality of knowledge, and of developed/developing-world interdependence,

to "global public goods", using the example of the fight against climate change. They write that

> concerns about having to pay large rents to developed countries that control access to emission-reducing technologies is one important impediment to reaching a global climate accord. At the same time, without some incentives to undertake risky innovation, there may be fewer emission-reducing technologies available. (Cimoli et al., 2014, p. 504)

In the same vein, Cimoli et al. (2014) persuasively argue for recognition that rich and poor countries have an interdependent "humanitarian interest in avoiding unnecessary suffering" by ensuring access to, inter alia, essential medicines and seeds for agricultural production, and, accordingly there is an interdependent developed/developing-country interest in ensuring an international IP regime that facilitates "both innovation and access, without imposing unnecessary impediments, as the current system does" (2014, p. 504).

We agree with Cimoli et al.'s (2014) conceptions of the developmental dimensions of knowledge, including the manner in which their conceptions provide for consideration of matters of human rights and human security. In respect of human rights, we concur with Rens and Pfumorodze (2015), who succinctly lay out IP's human rights dimension, grounded in the 1966 International Covenant on Economic, Social and Cultural Rights. We are further persuaded by the 2003 report of the UN Commission on Human Security and the work of Ramcharan (2013). The UN Commission report foregrounds the urgency of matters of "ownership and application of knowledge for human health and security", referencing concerns over TRIPS patent provisions and applauding the developmental, access-to-medicines orientation of the 2001 Doha Declaration (UN Commission on Human Security, 2003, p. 103). And Ramcharan (2013) convincingly posits that

> [t]he human security framework can help the international community arrive at equitable balances between the regime of international intellectual property law and the needs of developing countries and indigenous peoples on the ground. (Ramcharan, 2013, p. x)

In our view, among the clearest (and starkest) manifestations of the developmental aspects of knowledge access and control are the issues of: (1) access to essential medicines; (2) access to climate change mitigation and adaptation technologies; and (3) access to learning materials. The access-to-medicines issue was, as outlined above, central to the origins of the A2K movement in Africa and globally, and to the 2001 Doha Declaration and the UK CIPR report (CIPR, 2002). When lives are potentially put at risk by application of patent procedures, then the socio-economic dimensions of knowledge are clear.

In respect of the second issue just listed, access to climate change mitigation and adaptation technologies, the socio-economic dimensions seem also clear. There can be little doubt that the rate and modes of transfer of patented green technologies between rich and poor countries will be central to the ability of the world's poorest nations to play a role in mitigating climate change and, even more crucially, in adapting to changing environmental conditions. Abdel-Latif, Maskus, Okediji, Reichman and Roffe (2011) correctly draw the parallel between the need for access to green technologies to combat climate change and the need for access to essential medicines, because "in both public health and climate change, there is a sense of moral urgency to address public policy objectives that requires going beyond the 'status quo' and 'business as usual' practices, including in the IP system" (2011, p. 3).

The third issue cited above, access to learning materials, indisputably goes to the heart of the quest for socio-economic progress by poor-country enterprises, households and individuals, as we made clear in the opening chapter of the 2010 edited volume *Access to Knowledge in Africa: The Role of Copyright* (Armstrong et al., 2010).

Benkler (2006) summarises the link between knowledge access and development as follows:

> Agricultural knowledge and biological innovation are central to food security. Medical innovation and access to its fruits are central to living a long and healthy life. Literacy and education are central to individual growth, to democratic self-governance, and to economic capabilities. Economic growth itself is critically dependent on innovation and information. For all these reasons, information policy has become a critical element of development policy and the question of how societies attain and distribute human welfare and well-being. Access to knowledge has become central to human development. (Benkler, 2006, p. 302)

Thus, our conception of the development paradigm in relation to knowledge is oriented towards the socio-economic imperatives of the world's low-income and middle-income countries, and of the governments, enterprises, households and individuals in those countries, while at the same recognising, in line with the statements cited above from Cimoli et al. (2014), the interdependence of the developing-world and developed-world quests to develop and harness knowledge to pursue socio-economic progress.

Conceptions of knowledge governance

One way to conceive of knowledge governance is as a set of knowledge phenomena generated by instruments and processes produced by public institutions that govern, i.e., produced by national governments/agencies, and regional and international bodies/agencies such as the WTO, WIPO, and the European Patent Office (EPO).

And such a conception also needs to take into account the influence exerted by the private sector and civil society players who interact with the national governments/agencies and international intergovernmental bodies/agencies, and who are often direct participants in governance modalities. Several of the works cited in the previous sub-section on "development" – i.e., Abdel-Latif et al. (2011), Cimoli et al. (2014) Correa (2000), Drahos and Braithwaite (2002), Ramcharan (2013), Sell (2003), the UK CIPR report (2002) – operate via this sort of knowledge governance conception, with an emphasis on the implications for developing nations.

Other notable works approaching knowledge governance as a global norm-setting phenomenon include, but are not limited to, those by Okediji (2003), Yu (2004), Chon (2011), May (2010) and Oguamanam (2011). For example, Oguamanam (2011) conceives of knowledge governance in relation to plant genetic resources as being a product of, inter alia, the "regime complexity" and "hegemonic agenda" produced by the International Union for the Protection of New Varieties of Plants (UPOV) and TRIPS international IP norm-setting instruments (2011, pp. 116-117). There are also significant works on knowledge governance at the international level that put emphasis on certain agencies and/or private-sector players, such as Drahos's (2010) work on international knowledge governance as wielded by certain patent offices, and the work of Lemmens (2013) on how international pharmaceutical companies behave in relation to certain laws and regulations. Meanwhile, the works of Lessig (2004) and Boyle (2008), while largely focused on the US context and not speaking explicitly of "governance" of knowledge, provide crucial, internationally-applicable insights into how corporate interests and actions dictate the extent to which knowledge becomes available for follow-on use in the public domain. Also concerned with the public domain is Beldiman (2013), who explicitly speaks of "knowledge governance" and calls for policy in support of "convergence" of all knowledge resources (i.e., towards making all knowledge freely accessible).

If one moves away from consideration of international-global spheres of knowledge governance, one finds that some of the earliest and most explicit deployments of the concept of knowledge governance are to be found in private-sector management literature, with a focus on activity within firms. Van Kerkhoff's (2014) review of knowledge governance literature identifies the work of Grandori (2001) as a pioneering example of this private-sector, firm-centric approach, with Grandori positioning knowledge governance as a rule-setting function within firms that guides the way knowledge flows and is used (Grandori, 2001; Van Kerkhoff, 2014). This firm-focused conception of knowledge governance has also been extended into the field of organisational economics, notably in the work of Foss (Foss & Michailova, 2009; Van Kerkhoff, 2014). The focus of the business management and organisational economic approaches is on linkages between intra-firm knowledge processes and, as Van Kerkhoff writes, "creativity, innovation and ultimately, profitability" (Van Kerkhoff, 2014, p. 86).

Moving away from firm-centric, private-sector conceptions, one finds a relatively rich array of explicit "knowledge governance" conceptions in the literature, concerned with matters such as industrial public policy; regulation of science; dynamics at universities and other knowledge-producing institutions; collective action and social learning; and the knowledge modalities of sustainable development initiatives. Among the examples cited by Van Kerkhoff (2014, pp. 87-88) are:

- Burlamaqui's (2012) work, from an evolutionary economics perspective, positioning knowledge governance as an industrial policy approach that balances private knowledge control and knowledge as a public good;
- Stehr's (2004) view of knowledge governance as the phenomenon produced by national regulation of scientific knowledge and the politics linked to such regulation;
- Fuller's (2004) conception focused on the internal knowledge dynamics of universities and similar institutions, Wilbanks and Rossini's (2009) characterisation of knowledge governance as a phenomenon nested in the institutions and practices of academia;
- the more sociological Gerritsen et al. (2013) conception, whereby knowledge governance is a mode of collective action characterised by elements such as self-organisation, transdisciplinarity and social learning; and
- Manuel-Navarette and Gallopin's (2011) sustainable-development-focused work on knowledge governance as the set of knowledge engagement practices at play among both public and private actors in the course of an effort to, in the case of their research, promote a shift in people's agricultural practices in a particular developing-world rural region.

Van Kerkhoff's own conception of knowledge governance sits in a sustainable development frame, focused on "institutional knowledge-based dimensions of sustainable development" – with "institutions" understood as being both formal and informal (2014, p. 90).

Another key non-firm-centric conception of knowledge governance that we feel deserves mention here is the "commons" conception of communal resource governance, including knowledge governance, as developed by Ostrom (1990, 2005) and Hess and Ostrom (2007), and extended into a knowledge commons research framework by Madison, Frischmann and Strandburg (2010). (The aforementioned work of Boyle (2008) on corporate encroachment on the public domain also provides a rich extension of the notion of the commons in relation to management of knowledge resources, as does the development of the Creative Commons suite of flexible copyright licences (Creative Commons, n.d.).)

In respect of the African context, a key account of high-level international knowledge governance processes affecting IP norm-setting in Francophone Africa is contained in Deere (2009). Deere gives an account of the pressures that led members of the

regional IP organisation OAPI (Organisation Africaine de la Propriété Intellectuelle) adopting standards, in the late 1990s and early 2000s, that went beyond minimum TRIPS requirements. Meanwhile, the Open African Innovation Research (Open AIR) network, of which we are part, has placed conceptualising and investigating African knowledge governance among its core pursuits. Broadly, Open AIR seeks to take account of "the complex, dynamic and multilevel nature not just of IP rules, but also of the broader governance of knowledge" (De Beer et al., 2014, p. 3). The network's conceptions of knowledge governance include consideration of a broad set of realities, ranging from on-the-ground practices of innovators all the way to the realities of high-level policymaking and law-making at national, regional, continental and international/global levels). Open AIR's current research programme is focused on innovation and knowledge governance modalities present in the continent's high technology hubs, informal sector innovation settings, and indigenous entrepreneurial settings, as well as a fourth, cross-cutting research track interrogating metrics, laws, and policies "for measuring, valuing, facilitating and scaling up knowledge production" (Open AIR, n.d.). Open AIR has thus sought to adopt multifaceted conceptualisations of knowledge governance – as something that is engaged in at myriad levels, from informal-sector innovators and indigenous entrepreneurs to high-tech hub administrators and international norm-setters. These multifaceted conceptualisations combine some of the aforementioned conceptions of knowledge governance in an attempt to fully (or at least better) capture the broad and diverse set of realities on the continent.

Open AIR's knowledge governance approach emerged from on-the-ground case studies of African innovation settings between 2011 and 2013 (De Beer et al., 2014) and a parallel scenario-building project focused on realities on the continent in the year 2035. The three scenarios – called "Wireless Engagement", "Informal – the New Normal" and "Sincerely Africa" – each have particular modes of knowledge governance associated with them:

- in the "Wireless Engagement" scenario, African innovation enterprises are widely interconnected with the global service economy, and African IP is "governed by copyrights, patents, utility models, scholarly publications, trademarks and industrial designs";
- in the "Informal – the New Normal" scenario, informal small-scale enterprises are at the forefront of innovative activity, and "[i]nterpersonal, dynamic and pragmatic systems are governed by improvisation, complexity, secrecy, first-mover advantage, customer loyalty and moral rights"; and
- in the "Sincerely Africa" scenario, successful African innovators are those who tap into traditional cultural practices and inter-generational knowledge, and "[t]raditional, sacred and hierarchical systems are governed by customary norms over traditional knowledge, benefit sharing, geographical indications and certifications schemes" (Elahi & De Beer, 2013, pp. 134-135).

Also providing valuable insights into African on-the-ground knowledge governance modalities was the recent work of the World Intellectual Property Organisation (WIPO) Development Agenda project on IP and the Informal Economy (see De Beer et al., 2013; Kraemer-Mbula & Wunsch-Vincent, 2016). That project, which Open AIR members participated in, investigated the knowledge management practices in three informal, micro and small enterprise (MSE) contexts: Ghanaian traditional medicine; Kenyan metalworking; and South African manufacturing of personal care and home care products. De Beer and Armstrong (2015) conducted an overview of the innovation and knowledge appropriation modalities uncovered by these three WIPO project studies and by two Open AIR project studies: a study of innovation exchange between informal-sector and formal-sector auto parts makers in Uganda (Kawooya, 2014); and a study of knowledge-sharing among a group of traditional healers in South Africa (Cocchiaro et al., 2014).

Looking across the five studies – the three by the WIPO project in Ghana, Kenya and South Africa, and the two by Open AIR in Uganda and South Africa – De Beer and Armstrong identified the following commonalities that are relevant to understanding African knowledge governance:

- African MSEs can and do orient themselves towards openness and inclusion, rather than exclusion, in their innovation practices;
- MSEs' knowledge networking for innovation can and does rely to great extent on offline, socially constructed linkages; and
- MSEs can and do favour informal appropriation approaches, and to a lesser extent semi-formal appropriation practices, for their innovative knowledge. (De Beer & Armstrong, 2015, p. 68)

In summary, we see elements of value in all of the conceptualisations of knowledge governance touched upon in this section – including the private-sector, firm-centric conceptions cited above. However, as African-based researchers, our bias is towards conceptions of knowledge governance – whether at the grassroots, or at an institution such as tech hub, or in an international intergovernmental context – that treat it as a process inextricable from matters of human and socio-economic development.

3. The contributions in this thematic issue

The preceding discussion has shown that notions of the knowledge dimensions of sustainable socio-economic development, and notions of knowledge governance, are already relatively abundant in the available literature. But at the same time, the concept of knowledge governance is typically deployed in the available literature in an implicit, rather than explicit, fashion. There are only a handful of researchers and writers who to date have foregrounded the precise expression "knowledge governance", and fewer still who have fused it directly with notions of sustainable human development.

Thus, it seems fair to say that the knowledge governance for development conceptual terrain is still quite new, and fluid. We see the terrain's newness and fluidity as characteristics to be embraced. It is our view that *AJIC*'s thematic issues touching on this terrain need not seek to constrain the fluidity but rather to examine it and document it. And each of the 10 pieces in the thematic issue contributes to the process of examination and documentation.

The contribution from Rutenberg and Makanga reports on research that the authors argue demonstrates the need for Kenya to reinstate substantive examination of utility model certificate (UMC) applications. At the same time, Rutenberg and Makanga are careful to point out that UMCs are but one component of the Kenyan innovation ecosystem, and should not be seen as a proxy for the country's levels of innovation.

The article by Adams and Adeleke presents research findings that reveal a contrast between the South African government's strong official support for the principle of open data and the actual realities of insufficient proactive information disclosure on environmental matters in the country.

The contribution by Ntawanga and Coleman outlines findings from an information and communication technology for development (ICT4D) intervention, in a rural South African community, that followed the "living lab" approach in order to give primacy to open, on-the-ground interaction between the application's developers and its eventual users.

In the Belete article, the author reports on a research exercise whereby he took data collected in the course of an Ethiopian "copyright industries" study funded by WIPO in order to craft a set of recommendations for policy support of Ethiopia's creative industries. Belete calls for the government to take steps to, among other things, improve ICT access, support formation of creative clusters, improved access to finance, and ensure significant copyright limitations and exceptions.

Rother's piece brings the aforementioned Madison et al. (2010) knowledge commons research framework to bear on the modalities of massive open online courses (MOOCs).

In the four thematic reports:

- Adusei tackles the matter of benefit-sharing, in the Ghanaian context, from IP that individuals create in the course of their employment.
- Dagne looks at the potential of geographical indications (GIs) as knowledge governance tools for producers of distinctive agricultural products in East and Southern Africa.
- Van Wiele analyses what he sees as deficiencies in South African copyright law in respect of its treatment of inclusion of public artworks in amateur

photographs and videos.
- Mwaura examines a feature of Kenyan patent law that gives significant power to the Kenya Industrial Property Institute (KIPI) in matters of technology transfer (TT) from foreign to domestic entities, arguing that how KIPI exercises this power is likely to be an increasingly important matter in the years to come in the context of technologies for climate change mitigation and adaptation.

The final item is Isiko Strba's review of Ncube's book on African IP administration and the continental harmonisation agenda (Ncube, 2015).

The compelling and diverse nature of the submissions published in this issue vindicates *AJIC*'s decision to adopt knowledge governance for development as a thematic frame. The items in this issue confirm Van Kerkhoff's (2014) assertion that "[b]y bringing the governance of knowledge to the fore (rather than regarding knowledge as an input to other governance goals)", one is able to identify "a range of opportunities and constraints" and to bring "the many rules shaping the dynamics of knowledge creation, sharing, access and use into consideration as a fundamental issue in sustainable development" (2014, pp. 90-91).

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Utility Model Protection in Kenya: The Case for Substantive Examination

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Abstract
The patent-granting authority of the Kenyan government ceased examining applications for utility model certificates (UMCs) in 2014, after 20 years of examination. This event resulted in an immediate and dramatic increase in the number of granted UMCs. The authors reviewed a selection of UMCs, some of which were granted after substantive examination and some of which were granted without substantive examination. Errors were found in both groups, and the overall quality of granted UMCs declined after cessation of substantive examination. The authors conclude that a return to substantive examination of UMC applications would, on balance, be beneficial to Kenya's innovative ecosystem, and recommend that such examination be reinstated.

Keywords
intellectual property, utility model certificates (UMCs), patents, examination, registration, developing countries, patent offices, Africa, Kenya

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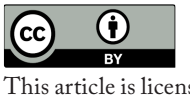

1. Introduction

Patents versus utility models

Patents protect advancements in technology that meet a relatively high threshold of requirements, that is: novelty, inventive step (non-obviousness), and industrial applicability (Brack, 2009).[1] Modern patent laws originated and developed from the Venice patent law of 1474. Utility model protection is more recent and less widely available, and was developed in response to the perceived need for patent-like protection of less inventive advancements (Suthersanen, 2006). Although utility models were first available in modern-day patent powerhouses such as Germany and Japan (Suthersanen, 2006), the majority of African countries have now adopted this form of intellectual property (IP) (Adams & Adams, 2012). In general, compared with patents, the requirements for utility models are less restrictive, both substantively and formally (Brack, 2009). Utility model certificates (UMCs) are typically granted for applications describing novel innovations that are industrially useful, but there is no requirement that the innovation satisfy an inventive step. This lower threshold has meant that UMCs are often known by alternative names such as "petty patents", or "minor patents". In the United States and the European Patent Office, a lesser form of patent protection such as the Utility Model Certificate is not available to applicants.[2]

Historical development of utility model protection

A thorough history of utility model protection has been written elsewhere (Richards, 2010); here it will suffice to provide a brief history for perspective. The German Patent Law of 1891 is among the earliest-known national laws recognising the utility model as a form of IP protection (Kardam, 2007; Richards, 2010). In 1905, Japan introduced a utility model law that was modelled after the German Patent Law, but with a broader scope of application (Kardam, 2007; Richards, 2010). Today, national-level utility model protection is available in several dozen countries worldwide (Brack, 2009). At least 30 countries in Africa provide utility model protection,[3] and many of the remaining 25 jurisdictions also provide alternative forms of patent protection (e.g., certificates of addition) (Adams & Adams, 2012).

In international treaties, the utility model was first mentioned in the 1911 Washington revision of the Paris Convention of 1883, and was included among patents and design rights (Kardam, 2007). Utility models remain in the current (1979) version of the Paris Convention. The Patent Cooperation Treaty (2001 version) includes utility

1 Despite the territorial nature of patents, patentability requirements are largely harmonised in law if not in interpretation. Terms that are substantially similar to "novelty", "inventive step", and "industrial applicability" are used in patent laws throughout the world.

2 Somewhat confusingly, the United States uses the term "utility patent" to refer to a full patent – i.e., one that requires inventive step as well as novelty.

3 Sixteen of the 30 African countries providing utility model protection do so as per their membership in the Organisation Africaine de la Propriété Intellectuelle (OAPI).

models in the definition of an "application" and in the definition of a "patent", thus allowing such terms to refer to national-level patents and/or UMCs. In contrast, there are no mentions of utility models in the World Trade Organisation (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In fact, it may be that utility model protection is inadequate to satisfy the TRIPS requirements pertaining to patents, not least for failing to provide sufficient duration of protection. Article 33 of TRIPS states that the term of patent protection must be 20 years from the filing date of an application for protection, while most national-level UMC legal provisions provide for a term significantly shorter than 20 years from the filing date of a UMC application. Kenya's UMC provisions,[4] for example, provide for a term of 10 years from the grant of the UMC. Ugandan[5] and Tanzanian[6] law provides for a term of seven years from the date of filing. Accordingly, these and similar national UMC laws, by themselves, are not TRIPS-compliant, necessitating that countries operate a dual system of patent protection and utility model protection.

Utility model certif icates (UMCs) as protection for incremental innovations

Essentially, all advancements in technology build on preceding developments. The extent to which a specific advancement departs from prior technologies is often used to characterise that advancement as an invention or an innovation (WIPO, 2006). Substantial advancements that depart significantly from prior technologies are typically labelled as inventions, and are considered suitable for patent protection. In the statutory language of patents, such advancements are said to be "novel" and "inventive" in respect of prior technologies (WIPO, n.d.).

In contrast, an incremental advancement that only marginally advances a known technology is often insufficiently different to qualify for patent protection. In the statutory language of patents, such incremental advancements are often not "inventive", but are nonetheless "new", and may often therefore be referred to as "innovations" rather than "inventions". The UMC is specifically designed to provide patent-like protection to such innovations. Inventive step is not a requirement for grant of a UMC, but the other requirements found in the patent law remain (Boztosun, 2010). In some cases, an incremental advancement may be exceptionally beneficial but only marginally different from prior technologies. This is often and particularly the case when existing technologies are adapted to the local context of developing countries (Suthersanen, 2006). Although the adapted technology is inspired by, and very similar to, the prior technology, small but important differences in the local situation necessitate the modifications that allow the adapted technology to be successful. Such small differences are not "inventive" but are sufficiently "new", and hence may qualify for UMC protection (Boztosun, 2010).

4 The Industrial Property Act (2001) s. 82 (3)
5 The Patents Act (Cap 216) s. 43
6 The Patents (Registration) Act (Cap 217) s. 74 (5)

It should be noted that both patent and UMC applications must include a proper disclosure of the advancement for which protection is sought (Boztosun, 2010). A proper disclosure is one that teaches an ordinary artisan in the same technical field how to make and/or use the disclosed advancement (WIPO, 2006). Such disclosure fulfils the applicant's duty and is foundational in justifying the time-limited, government-backed protection that accompanies a granted patent or UMC (Brack, 2009).

Boztosun (2010) highlights the following benefits of the utility model system:

- contribution to the creation and fostering of domestic technology and industrial base;
- enabling small and medium-sized enterprises (SMEs) to make use of the IP system;
- promoting research into small but practical and useful solutions;
- facilitating expansion and diffusion of knowledge to inventors through disclosures of protected inventions; and
- channelling follow-on innovations to certain sectors by restricting or widening the scope of the subject matter of protection (e.g., encouraging new products by limiting protection of processes).

Whether UMCs actually provide any or all of these benefits in practice can be debated (Leith, 2000). In particular, the exceptionally low level of utilisation of the UMC framework in developing countries (Mwiya, 2012) appears to contradict the idea that their availability promotes research, facilitates diffusion of knowledge, and contributes to the creation of technology.

Despite the doubtfulness of the efficacy of UMCs in fostering the above goals, one thing is certain: from a legal perspective, valid UMCs are preferable to invalid UMCs. A "valid" UMC is one that satisfies the statutory requirements of novelty, industrial usefulness, and proper disclosure, whereas an "invalid" UMC is one that is granted but fails to satisfy one or more such requirements. Primarily, a UMC is invalidly granted in one of two circumstances: the competent authority falls short in a substantive examination of the UMC application; or the competent authority does not carry out a substantive examination of the UMC application. The latter situation may be as mandated by law (i.e., where the national UMC law does not authorise, or expressly prohibits, substantive examination) (Boztosun, 2010), or by situation (e.g., where the competent authority lacks resources or elects not to substantively examine applications). Regardless of the reason, an invalidly-granted UMC has many potential drawbacks that will be discussed in more detail below. Put another way, substantive examination, although relatively less common for utility model regimes, potentially serves the important function of gatekeeping against granting applications that fail to meet statutory requirements. Previously, however, it has been very challenging to draw reliable conclusions when comparing examination regimes with registration

regimes in the context of UMCs. The main source of this challenge stems from such comparisons necessarily involving at least two national patent offices in two countries, thereby introducing many other variables into the comparison.

This article outlines our attempt to generate some preliminary insights into the workings of the UMC system in Kenya. The Kenyan UMC context is potentially instructive, because while substantive examination of utility models was carried out for 20 years from 1993 to 2014, in May 2014 the competent authority discontinued examination and switched to a pure registration system. Fortunately, this decision to discontinue examination allows us to compare an examination regime against a registration regime while holding constant many other variables. The next section of this article explores the Kenyan legal framework in respect of UMCs, UMC examination, and the role of the competent authority. Section 3 outlines the potential benefits, and drawbacks, of substantive examination of UMCs in general and in the Kenyan context, including a statement of our view that examination is preferable to registration. Section 4 provides data from our evaluation of Kenya's UMC records, and Section 5 offers our conclusions and recommendations, based on the findings from both the legal doctrinal data and the UMC applications data, in respect of the current and future roles of UMCs in the Kenyan innovation ecosystem.

2. Kenyan law and the discontinuation of UMC examination

Patents and UMCs in Kenya are regulated by the Industrial Property Act (IPA), 2001 (Republic of Kenya, 2001), and the associated Regulations of 2002 (Republic of Kenya, 2002). The competent authority for accepting, examining, and granting patent and UMC applications is the Kenya Industrial Property Institute (KIPI). An examiner corps is maintained by KIPI for the purpose of conducting substantive examination of patents and, at least until May 2014, for the purpose of conducting substantive examinations of UMC applications. From 1994 until 2001 (i.e., the period prior to the IPA of 2001), KIPI and its predecessor carried out similar operations under the previous Industrial Property Act, 1989 (Kameri-Mbote, 2005; Odek, 1994).

Sections 81-83 of the IPA of 2001 pertain to utility models. Section 82 specifically pertains to examination, stating: "Section 22, 24, 43, 44 and 60 shall not apply in the case of applications for utility model certificates."[7] Section 22 of the IPA states that an invention is patentable if it is new, involves an inventive step, is industrially applicable or is a new use, while section 24 provides a definition of inventive step. These sections "shall not apply" to applications for UMCs because the requirement of inventive step conflicts with section 82(1), which provides that "[a]n invention qualifies for a utility model certificate if it is new and industrially applicable." Thus, exclusion of sections 22 and 24 for UMC applications is clear.

7 Section 60 of the IPA of 2001 pertains to patent term, and is not relevant for this discussion.

It is less clear, however, how to interpret the exclusion of sections 43 and 44. Section 44(1) provides that "[t]he Managing Director may […] (a) direct that applications for patents relating to a specified field or specified technical fields shall be the subject of an examination as to substance [...]", and section 43(1) provides that "[t] he Managing Director may instruct that any application found in order as to form be the subject of an international type search." The remaining portions of sections 43 and 44 provide details regarding substantive searches.

It is important to note that both sections 43 and 44 indicate that the Managing Director of KIPI "may" subject patent applications to substantive searches and examination, i.e., such processes are optional. As is discussed below, section 82 of the IPA, as read with sections 43 and 44, allows several possible interpretations with respect to substantive examinations of UMC applications – and the decision whether or not to substantively examine has substantial consequences for stakeholders. We turn first to the official KIPI policy with regard to substantive examinations, and then discuss the legality of such policy, and consider alternative policies.

KIPI discontinuation of substantive examination of UMCs

From 1994 until 2014, patent and UMC applications in Kenya were subjected to formalities and substantive examinations. However, in 2014, KIPI ceased substantive examinations of UMC applications. According to the official KIPI journal, in its issue dated 30 April 2014:

> Following a review of the practice in the Institute with regard to the processing of utility model applications, the Institute has decided to discontinue the carrying out of substantive examinations in relation to utility model applications with effect from 1 May 2014 in order to align the practice with the Industrial Property Act, 2001. However, such applications shall continue to be subject to examination for compliance with all the other requirements of the Act and Regulations.
>
> In particular, the applications shall be examined for compliance with filing date and formality requirements as well as for inventions that are excluded from protection and for non-patentable inventions under sections 21(3) and 26 respectively. Upon compliance with formality requirements, the applications shall be published as provided under section 42 of the Act. A Utility Model certificate shall then be granted and a certificate issued to the applicant as provided under sections 45 and 46 of the Act. (KIPI, 2014)

Since May 2014, official KIPI notices for allowed UMC applications have included the following statement:

> The applicant is invited to note that, following the decision of the Institute as published in the Industrial Property Journal no. 2014/04 of 30th April

> 2014 to discontinue substantive examination of Utility Model applications, this application has not been examined to determine whether or not the invention disclosed therein is novel or industrially applicable. (KIPI, n.d.)

As is discussed below, the cessation of substantive examination has, inter alia, resulted in a dramatic increase in the number of granted UMCs.

Interpreting the Act in respect of KIPI's treatment of UMCs

As indicated above, KIPI's decision to cease examination is based on an interpretation of the IPA. It is instructive to analyse that interpretation and to determine whether there are other valid and contrary interpretations of the IPA. On the face of it, there appear to be three reasonable interpretations of sections 82 and 44 of the IPA read together – i.e., interpretations of the meaning of the section 82 provision that section 44 (on examination) "shall not apply" in the case of UM applications. The choice of interpretation has potentially significant implications for UMC validity, UMC applicants, legal procedures, and, in turn, the country-wide innovation ecosystem.

First interpretation

The first interpretation is that the *content* of section 44 is *forbidden* from being applied to UMCs. In this interpretation, the substantive examination that is described in section 44 must not be applied to UMCs. The result of this interpretation is that UMCs are necessarily not substantively examined.

Second interpretation

In a second interpretation, recalling that section 44 provides for *optional* substantive examination (i.e., the KIPI Managing Director "may" subject the application to substantive examination), the optional substantive examination of section 44 does not apply. In this interpretation, the competent authority (KIPI) is tasked with issuing valid UMCs and is thereby required to carry out a substantive examination to determine such validity. The result of this interpretation is that UMCs are necessarily substantively examined.

Third interpretation

In the third interpretation, the contents of section 44 do not apply and, furthermore, that section has no bearing on UMC applications, i.e., it is as if the section does not exist with respect to utility models. In this interpretation, whether substantive examination is required is unspecified, and therefore left to the discretion of the competent authority, or is to be specified in Regulations. This interpretation is the opposite of the first interpretation. Here, section 44 per se does not apply but the content of section 44 may apply. The result of this interpretation is that the competent authority may validly choose whether or not to substantively examine UMC applications.

Meanings of "shall"

Determining the most valid interpretation may hinge to some extent on interpretation of the intent of the term "shall" (in "shall not apply" in section 82(2)). In a legal context, "shall" has two possible meanings (The Law Dictionary, n.d.): (1) imperative or mandatory; *or* (2) permissive or directory (as equivalent to "may"). The first meaning is consistent with the plain common meaning and the canons of legislative interpretation: i.e., "shall" signifies an imperative for the competent authority to not apply section 44 to section 82(2). The second meaning provides the authority with an alternative: to ignore the plain common meaning if such meaning clearly contravenes the intention of Parliament.

The available legislative history for the IPA of 2001 is not helpful in interpreting the sections relevant to UMCs, as Parliamentary discussions of the Bill that led to the Act were essentially limited to the question of whether or not to include compulsory licensing provisions. Accordingly, Parliament's intent can only be surmised. Given that both UMCs and patents have a substantive requirement of novelty, and that Parliament required substantive examination for patents, it is reasonable to conclude that Parliament also intended for UMCs to be substantively examined. The second meaning of the word "shall", i.e., as not necessarily an imperative, is further supported by Kenyan judicial precedent. In the words of Ringera J in *Standard Chartered Bank Ltd v Lucton (Kenya) Ltd* (1997):

> There appears to be a common belief by many in these courts that the use of the word "shall" in a statute makes the provision under construction a mandatory one in all circumstances. That belief in my discernment of the law is a fallacious one. As I understand the canons of statutory interpretation, the use of the word "shall" in a statute only signifies that the matter is prima facie mandatory. The use of the word is not conclusive or decisive. It may be shown by a consideration of the object of the enactment and other factors that the word is used in a directory sense only.

Under this interpretation of the meaning of "shall", the IPA of 2001 provides some discretion: KIPI is not obligated to omit substantive examination, but may do so if desired. The function of KIPI, as provided in section 5 of the IPA, is "[to] consider applications for and grant industrial property rights". By use of the word "consider", the IPA implies that KIPI is not required to grant all applications and is therefore more than merely a registration body. In fact, inclusion of the function of "considering" applications for industrial property rights supports an interpretation whereby KIPI is invited (or, perhaps, is *required*) to apply the patentability requirements prior to granting such rights. Substantive examination is the only way for KIPI to assess whether an application satisfies the relevant requirements prior to grant.

Judicial decisions, international norms

To date, we are not aware of any Kenyan High Court or Intellectual Property

Tribunal decisions that mention or interpret the UMC provisions of the IPA. In respect of international norms, in the latest (1979) revision of the Paris Convention, Article 4 provides guidance in the administration and function of utility models, and is potentially relevant to interpretation of the national law in Kenya. Specifically, Article 4A of the Paris Convention states that "[a]ny person who has duly filed an application for a patent, or for the *registration* of a utility model [...] shall enjoy […] a right of priority during the periods hereinafter fixed" (emphasis added). The use of the word "registration" with respect to utility models, and not for patents, indicates that the drafters of the Paris Convention considered these filing processes to be distinct. The Paris Convention's Article 4A is not explicit or prescriptive, but could be interpreted to favour a UMC system without substantive examinations.

In summary, several interpretations of the IPA appear to be valid in respect of whether or not UMC applications are to be substantively examined in Kenya. With the existence of multiple interpretations, we turn to an investigation of the implications of an examination system versus a mere registration system. As will be seen below, such investigation provides support for selecting an interpretation of the IPA that provides for an examination system of utility model certificates.

3. UMC examination versus registration

As with all patent and patent-type rights, UMCs distort the natural economy by encouraging government-backed monopolistic behaviour by the owner of the right (Boztosun, 2010). Such distortions are generally recognised as undesirable but for the potential of the protection to encourage innovation and product development (see Boztosun's list of potential benefits, discussed above).

Patent rights are, in part, economically undesirable for imposing artificial (i.e., merely legal rather than technical) restrictions on trade (Condon & Sinha, 2008; Maina, 2007). As such, they are intended to be granted for a limited period of time and only when justified. Patent rights become more easily justified when, among other things, the patent applicant through a patent application satisfies the legal requirements pertaining to novelty, usefulness, and disclosure. Where a UMC application complies with its necessary requirements, and the UMC is granted and published, the general public reaps the benefit of the disclosure, particularly once the term of the UMC expires and the subject matter of the UMC enters the public domain.[8] Failure of a UMC application to adequately define and enable an advancement in technology leaves the general public without such benefits, and the case for granting the government-backed exclusionary rights that a UMC provides is correspondingly less justifiable. This partly explains and adequately justifies the fact that, in all patent and UMC systems that include substantive examination, the number of applications

8 This discussion is necessarily simplified and ignores potential complicating factors such as multiple patents (including the practice of "evergreening"), non-patent rights, and know-how.

exceeds the number of granted patents/UMCs granted (Correa, 2011). Substantive examination is used to "weed out" the applications that fail to comply with the legal requirements and therefore fail to provide the benefits expected from the general public.

The potential benefits of an examination system for UMCs therefore lie chiefly in the increased legal certainty provided (Brack, 2009). Assuming that substantive examination is effective in increasing the quality of granted applications, the overall number of granted UMCs is fewer, meaning that the extent of exclusionary rights and the limitations on commerce are reduced (Correa, 2011). And in respect of those UMCs that are granted, the UMC-holders and the general public have a higher degree of certainty (higher than where there is no substantive examination) as to the scope of valid, enforceable, exclusionary rights that are conferred by the certificates (Brack, 2009).

Enhanced certainty in the validity of a granted UMC is important for several reasons. According to Kenyan judicial precedent in respect of patents, when there is substantive examination of applications, granted patents are afforded a very high degree of credibility in an infringement or validity proceeding. In the decision on *Sanitam Services (EA) Ltd v Rentokil (K) Ltd & another* [2000] eKLR, Judge Waweru HPG states:

> I will start with the question of the validity of the patent. The applicant has produced a copy of the same patent and on its face value it was duly registered by a recognized body. The first respondent says the patent was registered by mistake because first defendant had obtained a patent for the foot operated litter sanitary disposal bin on 20th February 1995 under certificate of registration No 2042739. The second respondent says it was not properly registered because the objection to its registration had been lodged with Kenya Industrial Properties Office (KIPO) who were
>
> expected to inform ARIPO before it could be registered. In my humble opinion, and with respect, these are not for me to consider as these are matters between the registering bodies and the respondents. I cannot sit on judgment upon the actions of KIPO and ARIPO as that aspect is not before me. Neither can I legally stop the applicant in its application on grounds that there are objections lodged against the registration of its patent as these objections are not before me for decision. I find that as far as I am concerned, what is before me as a duly registered patent is valid and will remain so valid till the same validity is revoked by the right bodies.

A potential infringer who is sued for infringement of a UMC could elect to challenge the validity of the UMC. With an examination system in operation at the competent authority, the ruling cited above suggests such a challenger would face an uphill

task in convincing the presiding judge to overrule KIPI's informed determination of validity. Put simply, a holder of a UMC granted prior to May 2014 has a relatively high degree of certainty that the UMC would not be overturned by a Kenyan court in an infringement proceeding. In contrast, in a court proceeding involving a recently granted (i.e., not substantively examined) UMC, a judge could not assume validity of the UMC and would therefore be forced to evaluate the merits of the original application. Thus, a holder of a Kenyan UMC granted on or after 1 May 2014 has no degree of certainty that their UMC would withstand a challenge of validity in an infringement proceeding.

The potential drawbacks of examining UMC applications are few (and, in our opinion, outweighed by the benefits), but still noteworthy. Certainly, fewer UMCs are likely to exist under an examination system than under a registration system, as the examination process eliminates unsuitable applications (Correa, 2011). Although examination is positive for providing enhanced clarity regarding the exclusionary rights in the market, it can be argued that it has a dampening effect on the *quantity* of innovation. (This argument relies on the position that UMCs are inherently an incentive to innovation, a position that, as stated in the opening section of this article and further discussed below, we do not support.) Another potential drawback of an examination system is that it is presumably more costly and time-consuming for the competent authority compared to a registration system (Pouris & Pouris, 2011). The system is also presumably more costly to applicants, as the existence of an examination barrier typically necessitates that applicants hire legal counsel for preparing a UMC application.

Indeed the examination system in the Kenyan context highlights the recurrent problem, for innovators and inventors, of identifying qualified legal assistance. KIPI maintains a registry of patent agents: individuals authorised to practice before KIPI on behalf of patent and UMC applicants. The requirements for becoming an agent are provided in Part XV of the Industrial Property Regulations, 2002. In essence, an agent is either an advocate practising in Kenya or "has a university degree in science or a technical field and is conversant with industrial property matters" (Republic of Kenya, 2002). KIPI does not administer an exam when admitting agents. Furthermore, in Kenya, law is an undergraduate degree and advocates are not typically trained in a field of science or technology. The majority of Kenyan patent agents are thus familiar with the administrative aspects of filing patent and UMC, but not with the substantive process of drafting applications.

A registration system for UMC applications (i.e., one without substantive examination) results in a nearly one-to-one ratio of applications to granted UMCs (Correa, 2011). In such a system, the primary barrier to grant is a non-substantive examination by the competent authority for compliance with legal formalities, i.e., formatting of the application and the presence or absence of required sections

(regardless of the technical adequacy of such sections). This is a very low threshold that can be surmounted by nearly all applicants. In such a system, UMC protection becomes, essentially, a guaranteed right. Applicants need not hire costly legal services to produce an application that is substantively compliant with the IPA, and applicants are virtually guaranteed that the payment of official filing fees will result in a granted UMC. If formal IP rights were indeed an incentive to innovation in Kenya (an assumption that we rebut herein), the registration system would likely be more effective than an examination system, by providing a lower barrier to obtaining such rights.

It is instructive to look to South Africa as an example and a warning against registration-only systems in granting of patent-type rights (Correa, 2011; Pouris & Pouris, 2011). The registration system for patents in South Africa has come under heavy criticism from several sources, most notably access to medicines advocates (Correa, 2011; Pouris & Pouris, 2011; Wen & Matsaneng, 2014). Unexamined patents, it is argued, are prone to abuse and overuse (Boztosun, 2010), resulting in the existence of many patents that would not have been granted in an examination system. "Evergreening", the practice of extending patent term for pharmaceuticals by filing follow-on applications near the end of the original term of coverage, is a simple, obvious, and likely effective strategy when the follow-on applications are granted without examination (Correa, 2011). The registration patent system shifts the burden of validation of patent applications to courts and to defendants challenging such validity, resulting in the necessity of costly litigation over potentially invalid patents.[9] For these reasons, substantial efforts have recently been made in South Africa to convert the registration system to an examination system (Wen & Matsaneng, 2014).

From a theoretical perspective, a UMC examination system arguably has both benefits and drawbacks. While our view is that the potential benefits clearly outweigh the potential drawbacks, we sought, with this study, to move beyond the theoretical realm and get a sense of how Kenya's UMC system is currently operating in practical terms.

4. Evaluation of UMCs granted in Kenya

Rate of UMC grants

The cessation of substantive examination of UMCs in Kenya in May 2014 has had at least one clear result: a substantial increase in the rate of granting UMCs. KIPI began accepting UMC applications in 1993. Between 1993 and 30 April 2014 (when substantive examination ceased), KIPI received 412 applications for UMCs (i.e.,

9 The situation is similar to the problem of non-practising entities (NPEs, also sometimes referred to as "patent trolls") in the US, where granted software patents of questionable validity are frequently asserted against a large number of defendants. The vast majority of such lawsuits end in out-of-court settlements in order for the defendant to avoid the cost and time of litigation.

roughly 20.5 applications per year). From those applications, using the substantive examination procedure, KIPI granted 51 certificates, resulting in an overall grant rate of 12% of all applications for this 20-year period. The pace of grant for this period was approximately 2.5 UMCs per year. Such applications were determined by KIPI examiners to satisfy all legal requirements for a UMC, including novelty, industrial use, and proper disclosure.

In contrast, between 1 May 2014 and 21 April 2016, KIPI granted 57 UMC applications (without substantive examination), bringing the total number of granted UMCs to 108.[10] This granting of 57 UMCs in two years represented a rate of grant of approximately 28.5 UMCs per year, a rate increase of over 1,100% from the average rate of grant for the previous years.

We determined that KIPI received 217 applications between 1 May 2014 and 21 April 2016 (i.e., roughly 108.5 applications per year, an increase of 525% in the annual rate over the rate for the preceding 20-year period). It is expected that most of these applications will eventually become granted UMCs. (Possible reasons that a UMC application would not be granted include: failure to comply with the formality requirements; and failure to pay grant fees. But due to the lag between application and publication, the grant rate of recent UMC applications will not be knowable for some time. Section 42 of the IPA requires a waiting period of 18 months between the priority filing date and the publication of an application. There is no provision in the IPA for requesting early publication.

Quality of UMC applications

For the 57 UMCs granted since 1 May 2014, the lack of substantive examination means that these granted UMCs may lack novelty, industrial use, and/or proper supporting disclosure – or, in fact, they may fully satisfy all of these requirements. In order to determine the quality of granted UMCs, and whether such quality has been affected by the cessation of substantive examination, we evaluated the granted claims of 39 out of the 108 total granted UMCs: 17 claims that were granted before 1 May 2014 (i.e., based on substantive examination) and 22 claims that were granted from 1 May 2014 onwards (i.e., not based on substantive examination). For this analysis, we selected, at random, an average of 3.5 granted UMCs from each numerical decade (i.e., one UMC was selected from the UMCs numbered 1-10, three were selected from those numbered 11-20, four were selected from those numbered 21-30, four were selected from those numbered 31-40, and so on for the 11 total decades).

The criteria we used for evaluating the set of claims in each successful UMC were

10 Fifty of the 57 UMCs granted since May 2014 (representing 88%) were filed as final applications prior to May 2014, and were therefore filed by applicants expecting substantive examination of such applications. This may have bearing on the quality of such applications although it is beyond the scope of this paper to determine the intent of the UMC applicants.

mostly selected from Regulation 14 of the Industrial Property Regulations of 2002, and they were selected due to their objectivity. We used the following inquiries for each claim in the set of claims contained in a UMC application: (1) whether the features of the claim were preceded by the words "characterised in that" or "characterised by", or any words to the same effect as required by Regulation 14(3); (2) whether the claim relied on a reference to a drawing as prohibited by Regulation 14(4); (3) whether the claim was consecutively numbered in relation to the other claims in the application using Arabic numerals as required by Regulation 14(7); (4) whether the claim was a single sentence with only one full stop; (5) whether dependent claims were properly formatted as dependent claims; and (6) whether all limitations had proper antecedent basis.

We found that only six out of the 39 reviewed UMCs were based on a set of claims containing no errors.[11] Most of the errors we found were substantial enough that they would (or should) result in a claim rejection or objection during a substantive examination. The data are summarised in Table 1.

Table 1: Claim errors identified among 39 Kenyan UMCs, 1993 to April 2016

UMC number range	A claim lacks transition word	A claim contains critical reference to a drawing	Claims not consecutively numbered	Claims not a single sentence	Improper dependency format	Antecedent basis problem	Total errors found
1-51[a]	8	0	0	3	9	11	31
52-108 [b]	4	2	1	6	10	13	36
Overall	12	2	1	9	19	24	

Source: authors' data collection

[a] In this range, UMCs were subjected to substantive examination. Seventeen of these UMCs were reviewed.

[b] In this range, UMCs were not subjected to substantive examination. Twenty-two of these UMCs were reviewed.

The data show that most granted UMCs in Kenya contain claims with errors, regardless of whether or not the claims were subjected to substantive examination. In some cases, the errors are minor ones, such as omissions of full stops and minor antecedent basis errors. Minor errors are easily correctable during examination, and correction rarely raises issues such as violation of the prohibition against addition of new matter during prosecution. In other cases, the errors are major ones, such as a complete lack of structure – e.g., claims written in a multiple-sentence narrative format. Such errors are often quite difficult to remedy during prosecution without

11 Of the six error-free UMCs, two were subjected to examination (i.e., are pre-2014) and four were not subjected to examination (i.e., are from 2014 onward). A substantial number (seven) of the claims we examined were missing a full stop at the end of the claim, but we did not record this error as we regarded it as too minor.

adding new matter to the application. Narrative-style claims were observed in post-1-May-2014 UMCs but not in pre-May-2014 UMCs.

The average number of errors did not increase in the claims for UMCs issued after substantive examination was discontinued. Out of the 17 UMCs reviewed with grant dates prior to 1 May 2014 (i.e., UMCs subjected to substantive examination), we observed 31 errors, resulting in an average rate of 1.8 errors per UMC. For the 22 UMCs reviewed with grant dates after 1 May 2014 (i.e., UMCs not subjected to substantive examination), we observed 36 errors, resulting in an average rate of 1.6 errors per UMC. However, in addition to the six factors mentioned above, a variety of other issues were noted in our review. In one UMC (filed and granted after 1 May 2014), the claims were clearly directed to a perpetual motion machine (i.e., a device that generates more energy than it consumes). Patent claims to such devices are typically prima facie invalid for claiming a device that is physically impossible. In at least three UMCs granted after 1 May 2014, we found that the applications were initially filed as patent or utility model applications but then, upon receiving a rejection from KIPI during the substantive examination of the patent claim, the applicant converted the application to a UMC application and the claims were granted without amendment.[12]

We conclude from our review of granted UMCs that:

- substantive examination improves the quality of granted claims;
- presence of substantive examination does not guarantee that the granted claims are compliant with even the formalities requirements of the IPA of 2001; and
- lack of substantive examination allows prima facie invalid claims to be granted.

UMC applicants: Local versus foreign entities

In addition to reviewing the claims as described above, and in order to ascertain the local versus foreign distribution of UMC applicants, we reviewed the biographical data for 100 of the 108 granted UMCs.[13] For all but one granted UMC that we reviewed (i.e., 99%), the owner was listed as having a Kenyan address. This was substantially different from the situation for patents, in which 573 out of the first 655 granted patents (i.e., 87.5%) had owners with a foreign address.[14] This indicates that, unlike patents, UMCs are almost exclusively filed and held by local Kenyan applicants.

12 A substantive examination of the claims (i.e., for novelty, clarity, sufficient support by the specification, etc.) was beyond the scope of this investigation. Anecdotally, however, from our review we expect that many of the non-examined claims would fail such an examination.

13 Data were unavailable for eight of the first 25 granted UMCs.

14 At the time of writing in April 2016, roughly 800 patents have been granted by KIPI. We examined the biographical data from patents numbered 1-655.

The identities of the owners of the 99 locally owned UMCs were also investigated. Local universities were named as owners of seven granted UMCs. For 43 of the UMCs reviewed, the owner and the inventor were the same, indicating that an individual (as opposed to a corporation) filed the application. The remaining 50 UMCs were owned by local corporations, and of those, 24 were owned by a single applicant.

From our analysis of UMC ownership data, several conclusions can be drawn. The data show that utilisation of the UMC system is strongly biased towards local applicants and slightly biased towards non-corporate applicants.[15] In addition, it appears that UMCs have so far not presented a motivating factor for research at universities and businesses. Approximately 70 universities currently exist in Kenya, yet such universities collectively owned only seven of the granted UMCs that we looked at. Furthermore, notwithstanding the existence of one entity that is relatively active in obtaining UMCs (holding 24 in total), the thousands of companies registered in Kenya do not appear to be engaging to any significant extent with the UMC system, as there were only 26 granted UMCs held by companies other than the single entity holding 24. It is very likely that some of the remaining 43 UMCs – i.e., those filed and owned by an individual inventor – were also associated with an SME through assignment or otherwise, but these numbers clearly show that the vast majority of Kenyan businesses are not filing UMC applications[16] and are not obtaining granted UMCs.

Processing times

In order to gauge the efficiency of KIPI in respect of application throughput, we further compared the application and grant dates of 90 of the 108 granted UMCs.[17] We found that 64 (71%) of the 90 granted UMCs we looked at required approximately two or fewer years to proceed to grant from the original filing date of the final (i.e., non-provisional) application. Approximately nine of the 90 UMCs required three years, seven required between four and five years, and 11 required six or more years to proceed to grant from the filing date of the final application. Significantly, roughly half of the applications requiring greater than four years were granted after KIPI ceased substantive examination, indicating that such applications had stalled during the examination process but were pushed to grant after examination ceased.

15 Our analysis of ownership is based on filing documents in the official KIPI files, and does not account for the possibility of later assignment of the applications or granted UMCs.

16 As of the date of this writing, a total of 630 UMC applications (including applications that have been granted, abandoned, and are still awaiting grant) had been filed at KIPI.

17 Data were unavailable for the remaining granted UMCs.

Table 2: Number of years between application and grant for 90 of 108 granted UMCs

Years from application to grant	Fewer than 2 years	2-3 years	4-5 years	6+ years
Number of granted UMCs	64	9	7	11

Source: authors' data collection

We conclude from our review of ownership and processing times for granted UMCs that:

- UMCs are almost exclusively filed by local entities;
- UMCs do not appear to be operating to incentivise substantial amounts of innovation by businesses in Kenya; and
- cessation of substantive examination of UMC applications has resulted in the grant of many applications that had stalled during such examination.

5. Conclusions and recommendations

In this article, we have presented two sets of findings drawing on our primary data collection. First, based on our doctrinal analysis of Kenya's legal context for UMCs, we found that Kenya's patent law, the IPA of 2001, allows, and arguably encourages, substantive examination of UMC applications.

Second, our analysis of UMC applications received by the competent authority, KIPI, found dramatic recent increases in the number of UMC applications received and UMCs granted since KIPI's discontinuation of substantive examination of UMC applications and introduction of a registration-only system. The analysis of the UMC application data also found, in the registration-only era since 1 May 2014, an increase in the incidence of major errors in the laying out of claims in the UMC applications, and an apparent granting of UMCs to applications that had stalled in the examination era prior to May 2014.

The findings from the UMC data thus suggest that the increase in volume of UMCs in the registration-only era is accompanied by a decrease in quality. These findings from the UMC records support our initial view, held before conducting the research, that examination of applications results (at least to some extent) in higher quality, and thus more enforceable, granted UMCs (Correa, 2011; Kaplan et al., 2009; Pouris & Pouris, 2011). The findings also suggest that further improvement in the quality of granted UMCs would be easier to achieve under an examination system (i.e., by training KIPI examiners to be more thorough in examination), as opposed to under a registration-only system (i.e., by training the patent applicants to write better applications).

Accordingly, it is our recommendation that the competent authority, KIPI, reinstate substantive examination for UMCs. The result of this reinstatement would, in our

estimation, likely be a reduction in the rate of UMC grants. Such a reduction would not, in our view, result in a reduction in levels of innovation in the vibrant Kenyan ecosystem, because, as we stated above, we do not hold the view that UMCs (or, indeed, patents) are essential to motivating innovation. Our belief is that a reduction in the rate of granting UMCs by KIPI would represent, if the UMCs were substantially examined, an enhancement of the quality of the UMC system – and, in turn, would allow granted UMCs to play a more legitimate role in (as but one part of) Kenya's complex innovation ecosystem.

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Using the Living Lab Approach to Develop and Adapt a Context-Aware ICT4D Solution

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Abstract
The rising use of mobile smartphones by people in rural areas of the developing world has resulted in increased deployment of information and communication technology for development (ICT4D) solutions targeted at empowering rural communities to overcome various socio-economic challenges. However, shortfalls in infrastructure, community buy-in, training, and management of ICT interventions are widely cited as impeding user acceptance and sustainability of potentially useful rural ICT4D interventions. This article outlines a deployment of the living lab approach to develop and adapt a mobile, web-based, e-procurement solution for small-scale retailers in Kgautswane, a remote rural area in South Africa's Limpopo Province. The living lab approach is an open-innovation methodology for development of context-based sustainable ICT4D solutions.

Keywords
ICT4D, rural areas, sustainability, living lab, open innovation, context-aware computing, usability, Kgautswane, South Africa

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1. Introduction

Deployment of information and communication technology for development (ICT4D) is increasingly being regarded as a key driver of socio-economic upliftment (Brown & Grant, 2010). Indications of how ICT4D interventions have significantly improved the living conditions of people in remote, developing-world communities have been reported by many authors (Brown & Grant, 2010; Roztocki & Weistroffer, 2011). Sectors in which ICT4D has been extensively explored and seen to produce positive impacts in the developing world include health, small business, agriculture, education, and governance (Thompson & Walsham, 2010). The observed improvements are identified as being mostly due to high penetration, adoption, and use of various forms of enabling ICT tools and online services, particularly via mobile devices.

The proliferation of mobile phones and Internet connectivity in rural areas in the developing world has provided an increasingly conducive environment for the implementation of rural ICT initiatives (Aker & Mbiti, 2010; Asongu, 2013; Gumede et al., 2008). Most rural areas in developing countries are now covered by mobile data communication networks capable of providing connected individuals and communities with a wide range of new opportunities (Aker & Mbiti, 2010; Gumede et al., 2008). Several ICT initiatives that build upon the existing network connectivity and mobile phone use in rural areas have been deployed. Yet many rural ICT4D interventions fail to achieve their intended objectives because of factors such as lack of technology feasibility, lack of adequate infrastructure, lack of community buy-in, and, more generally, the absence of a sustainability strategy (Etta & Parvyn-Wamahiu, 2003; Thompson & Walsham, 2010). Various methodologies have been put in place that seek to overcome the challenges of development and deployment of ICT4D solutions in rural areas. One such method, which was deployed in the study that is the focus of this article, is the living lab methodology (ENoLL, 2015; Gumbo et al., 2012). The living lab methodology seeks to harness a user-centric, open-innovation environment, based on a multi-stakeholder partnership, in order to enable real-life end-users to assume an active role in the research, innovation and deployment process of ICT solutions (Smit et al., 2011).

In parallel to growth in interest in the living lab methodology, there has been increased recognition of the value of context-aware computing. This type of computing incorporates contextual information such as device characteristics and various environmental factors within the user environment (weather data, for example) during applications development and run-time, in order to enhance usability (Bohmer & Bauer, 2010; Lowe et al., 2012).

In this article, we outline and analyse an instance of use of the living lab methodology in the period 2010-14, at the Sekhukhune Living Lab in Kgautswane, South Africa. The living lab approach was used to develop and deploy a context-based ICT4D

solution, as part of a larger ICT4D initiative spearheaded by the South African arm of SAP Research, a research entity established by German-based international software and systems developer SAP. Our particular contribution to the study, which we contributed on behalf of the University of South Africa (UNISA) School of Computing, was alignment of the living lab approach to context-awareness, usability and sustainability of the ICT4D intervention.

This article provides the conceptual and practical context for the living lab deployment in Kgautswane, explaining the components of the living lab approach and context-aware computing. We then explain how the living lab approach and context-aware computing were deployed in the Kgautswane's Sekhukhune Living Lab, with particular focus on the evaluation of the initiative, conducted between June 2012 and December 2013. As explained in the concluding section, it was our finding that the living lab approach was effective, with the ICT4D solution proving to be usable, acceptable and sustainable for the users who were engaged by the living lab intervention. Through the use of the living lab methodology, environmental factors and challenges within the deployment environment of the solution were effectively utilised as opportunities, and were contextualised to ensure deployment of as sustainable a solution as possible.

2. The living lab methodology

Rural areas in developing-world countries such as South Africa are often characterised by a lack of adequate infrastructure and adequate public services, for example, poor roads, limited health facilities, and unreliable electricity (Thompson & Walsham, 2010). These issues impact negatively on the socio-economic development of communities and aggravate additional challenges such as the spread of preventable diseases, low levels of educational attainment, and long, cumbersome travel to access facilities.

Several ICT4D interventions that leverage the high penetration of mobile phones in rural areas have been implemented and proven to help remote communities overcome some of these challenges (Aker & Mbiti, 2010; Asongu, 2013; Thompson & Walsham, 2010). ICTs, and specifically mobile ICTs, can provide seamless access to information, even to isolated rural communities, which in turn can empower rural communities and people in their development, drive innovation, and provide solutions for many socio-economic problems (Asongu, 2013).

Mobile-phone-based ICT4D interventions that have had positive impacts on the lives of rural people in the developing world include (Asongu, 2013; Thompson & Walsham, 2010):

- financial services, such as M-Pesa developed in Kenya;
- health services, such as the BBC Ebola WhatsApp service that provided up-to-date information on Ebola in English and French (BBC, 2014); and

- agricultural services, such as those in India using SMS to send useful information, e.g., on weather patterns, to farmers.

Irrespective of the reported benefits of some ICT4D tools, many face challenges in terms of acceptance, critical sustainability, scalability and impact. Among other things, ICT4D interventions in rural areas are susceptible to top-down approaches (Etta & Parvyn-Wamahiu, 2003) that undermine success. Friedmann (1992) argues that a bottom-up participatory approach to solving a problem, in close collaboration with communities, is likely to provide better results than the top-down approach. Participatory approaches provide solutions from a community's viewpoint (Smit et al., 2011). The living lab approach is a method that formalises bottom-up principles.

Definition

The term living lab emerged from the "ambient intelligence" (AmI) research context, and more specifically from discussion of experience and application research (EAR) (De Ruyter et al., 2007). The thinking and practice behind the living lab methodology was developed by William Mitchell of the MIT Media Lab and School of Architecture and Planning (ENoLL, 2015). In recent years, the term has been promoted and implemented by the EU, resulting in creation of the European Network of Living Labs (ENoLL). From 2008 to 2010, ENoLL expanded beyond European borders, its mission to support innovation environments for ICT-based products, services, and social innovations, and to facilitate innovation and collaboration between users, industry and research stakeholders (ENoLL, 2015). There are a number of definitions for the term living lab in the literature (Schaffers et al., 2010). We propose that a living lab be understood as follows (EC, 2009):

> A user-centred, open innovation real environment based on a multi-stakeholder partnership (public-private) which enables real-life end users to take an active role in the research, development and innovation process (EC, 2009, p. 50).

This definition has four key dimensions: (1) user-centred, (2) open innovation, (3) multi-stakeholder, and (4) real environment. These can be described as follows (EC, 2009; Smit et al., 2011):

- *User-centred:* Users are not only involved in the experimental living lab phase, but also in the maturity and full deployment of the innovation.
- *Open innovation:* This dimension refers to involvement of stakeholders and expertise from outside the customary limits of an organisation. This paradigm is increasingly important in the current innovation environment, where external sources possess ever-increasing knowledge and resources key to the development of sustainable innovations.
- *Multi-stakeholder:* An element of the open innovation paradigm, a multi-stakeholder approach opens up to external stakeholders and includes them

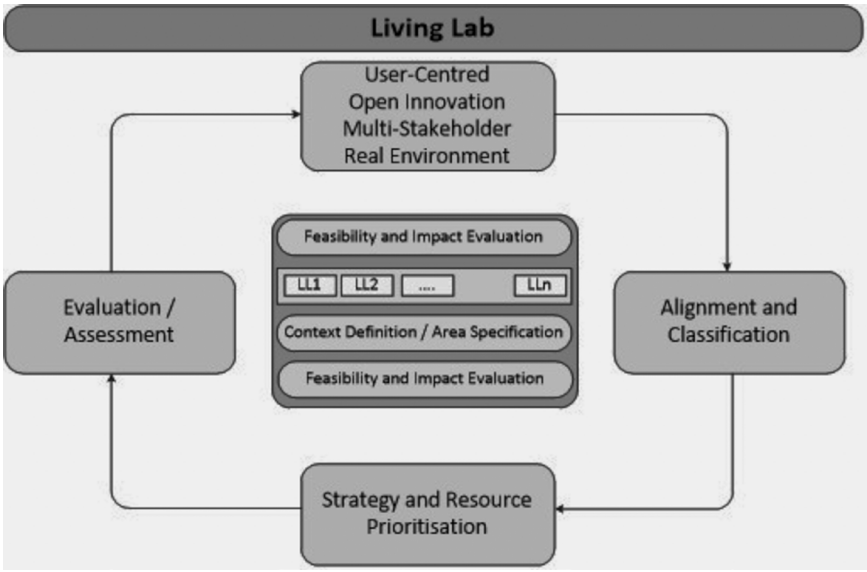
in the innovation process. Stakeholders in the living lab methodology may include users, innovators, policymakers, academic, service providers, donors and sponsors, and researchers.

- *Real environment:* This dimension refers to the conceptualisation, development and deployment of solutions in a real environment, as opposed to a test or laboratory environment.

Implementation

The living lab methodology follows a specific implementation process in order to achieve desired outcomes, as shown in Figure 1 below.

Figure 1: Living lab methodology



Source: adapted from Smit et al. (2011)

The top box in Figure 1 shows the four dimensions described above (user-centred, open innovation, multi-stakeholder, real environment). And the three other boxes in the outside ring show the other key components of the living lab approach:

- *Alignment and classification:* Details of how the living lab aims to achieve its goals are outlined; stakeholders are identified and approached to be incorporated into the process;
- *Strategy and resource prioritisation:* Resources and stakeholders are assigned roles; activities aimed at achieving the living lab's goals are prioritised; and

- *Evaluation / assessment:* The living lab's ability to deliver on objectives and provide a reliable environment for interventions is evaluated.

The central box in Figure 1 provides more clarity on the core activities that are carried out in a living lab context. All the steps outlined in Figure 1 were carried out for the entire intervention at the Sekhukhune Living Lab, and the development and deployment of the e-procurement application, which is the focus of this article, followed the four dimensions in the top box.

Living labs in South Africa

ENoLL (2015) currently lists two existing and active living labs in South Africa:

- *Sekhukhune Living Lab:* This Living Lab, where the intervention described in this article took place, is located in the Kgautswane community, Sekhukhune District Municipality, Limpopo Province.[1] A number of partners were involved and played critical roles during its establishment as well as in the intervention, including SAP and the Meraka Institute at the Centre for Scientific and Industrial Research (CSIR).
- *Siyakhula Living Lab:* Established in 2006, this Living Lab is located in the Mbashe Municipality, near the Dwesa-Cwebe Nature Reserve, Eastern Cape Province.[2] It is coordinated by Rhodes and Fort Hare Universities through their Departments of Computer Science, with involvement from the universities' Departments of Anthropology, Communication, Education, African Languages, Information Systems, Journalism and Media Studies, and Sociology, thus providing a strong multi-disciplinary flavour. The Lab acts as a field test site for ICT4D interventions from Rhodes, Fort Hare and partners from France, Australia, Brazil, Germany, Italy, Spain, the UK, Greece and Hungary (ENoLL, 2015; Gumbo et al., 2012).

3. Context-aware computing

Incorporating relevant context information during an application's run-time, for the purposes of improving usability of both desktop and mobile applications, is what has been termed "context-aware computing" (Dey, 2001; Lowe et al., 2012; Pettey, 2011; Wagner et al., 2011). Context-aware computing continues to gain attraction, and indications are that context will form a significant part of consumer services in the near future (Pettey, 2011). Context-aware computing that aims to incorporate environmental, technological and other factors during application run-time has a significant influence on the way applications are being developed. For example, context information in the form of user profiles and locations is currently being used to improve usability in applications such as Facebook and Google.

1 See www.c-rural.eu/Southafrica-LivingLab

2 See http://siyakhulall.org

Like the living lab approach, context-aware computing is a relatively new area, with

a number of aspects remaining to be clarified. We adopt the definition of "context" provided by Dey (2001), which has been widely cited by other authors (Asif & Krogstie, 2012; Bohmer et al., 2010; Dey, 2001; Lowe et al., 2012; Poulcheria & Costas, 2012):

> Context is any piece of information that can be used to characterise a situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves.

This definition relies on context being "relevant", which means that any context information that can be derived for use in an application has to be relevant to a specific circumstance or purpose (Asif & Krogstie, 2012; Bohmer et al., 2010; Lowe et al., 2012). "Context information" refers to the set of data elements that constitute or define context (Poulcheria & Costas, 2012). Examples of common context information that developers use to improve usability include location and user preferences (Asif & Krogstie, 2012; Orjuela-Parra et al., 2009).

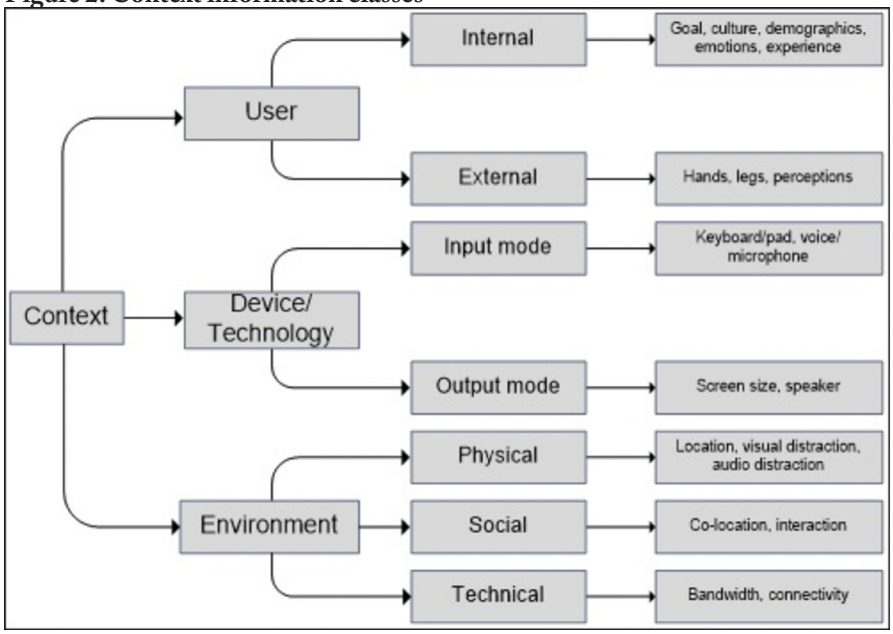
Context information classes

Context information is classified according to the information source, with different authors classifying context information in different ways. We have adopted the three-tier context classification widely utilised by other researchers (Barnard et al., 2007; Coursaris & Kim, 2007; Poulcheria & Costas, 2012):

- *User-specific:* This is context information that is directly related to the actions of the user when in the application, and provides characteristics of the user, for example, whether the user is in motion or stationed in one place. User models (or customer profiles) are usually used as a source of such information in mobile and desktop applications.
- *Device (technology)-specific:* This is context information that is related to the device and technologies being utilised by the user during interaction with an application. For example, is the device touch-screen or otherwise?
- *Environment-specific:* This is context information that is available within the environment in which the user can be found during interaction with an application, for example the bandwidth strength. Environmental context information does not relate to either the user or the device in use.

Figure 2 illustrates the general components of context information in a mobile web application. The figure shows the tree structure for context classes, sub-classes and selected specific examples of context information for each branch.

Figure 2: Context information classes



Acquisition of context information

Literature indicates that context information is acquired through sensors that fall into two broad categories: *physical* and *logical* (Poulcheria & Costas, 2011; Santos et al., 2010). The specific sensors collect pieces of context information and supply the information for interpretation and utilisation in an application (Chin-Chih & Shih-Tsung, 2012; Lowe et al., 2012). *Physical* sensors detect and garner context information through the use of some form of a physical electronic device (Poulcheria & Costas, 2011). A common example of physical context sensors is a GPS sensor. *Logical* sensors use some form of developed software in order to gather context information (Poulcheria & Costas, 2011). An example is the wireless universal resource file (WURFL), which is a widely utilised extensible mark-up language (XML) file that contains specific features and associated real values for nearly all known mobile phones and tablets (Scientiamobile, 2013).

In this study, the living lab approach provided an additional opportunity to acquire information that was contextualised and utilised during the development of the context-aware solution. Section 4 elaborates more on how information collected from the community through the living lab was utilised to adapt the solution.

Using context information in applications development

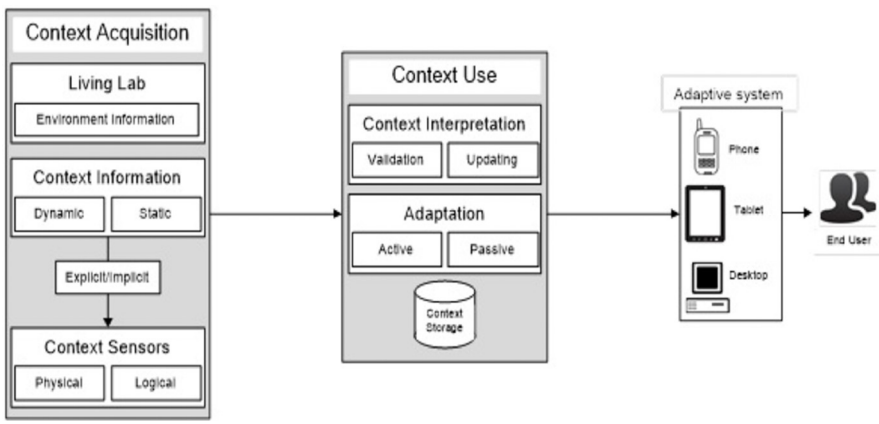
The primary use of context information is to improve usability and user experience in software applications. The following four main types of adaptations can be implemented using determined context in order to improve usability of software

applications (Lowe et al., 2012; Orjuela-Parra et al., 2009; Poulcheria & Costas, 2012; Sathish & Pettay, 2006):

- *User interface adaptation*: User interface adaptation refers to the ability of a system to alter the user interface or interaction approach based on the determined user's current context information at any specific point in time.
- *Content adaptation*: Content adaptation refers to the ability of a system to select only relevant content for processing and/or presentation by the application. Based on the determined and available context information, context-aware systems adapt to context in order to meet the user's specific goals for interacting with the system. For example, in most recommender systems, content that the user indicated in his or her preferences is brought first on the interface with an option given to ask for more information or content (see Amazon, n.d.; Takealot, n.d.).
- *Functionality adaptation*: Functionality adaptation refers to the ability of the system to select only relevant functions to be performed by an application based on the available context information.
- *Device adaptation*: Device adaptation is adaptation that performs the above-outlined three adaptations (user interface, content, functionality) to suit the capabilities of the specific device being utilised by the user during interaction.

Figure 3 shows the architecture for a context-aware system with a living lab component, with the living lab providing environmental information that can be interpreted and utilised for adaptation in the solution.

Figure 3: Architecture for a context-aware system



Source: adapted from Lowe et al. (2012) and Poulcheria and Costas (2012)

4. The living lab ICT4D intervention in Kgautswane

During development of the ICT4D intervention at Sekhukhune Living Lab in Kgautswane, a number of critical initial activities were carried out in order to identify a possible suitable and useful ICT4D solution that could be implemented, and to determine the context for deployment.

Baseline study to determine context and needs

A comprehensive baseline study was conducted as a preliminary step, in order to ascertain the general context of the environment and to determine the critical needs of the community – so that any introduced innovation would have the potential to add value to the users and improve the socio-economic status of the entire community. The baseline study involved in-depth interviews, general observations, and workshops with a sample of 30 community members. The results of the baseline study informed the process of identifying functional requirements for the proposed ICT4D solution.

The baseline results indicated that small-scale retailing was the main economic activity for generating household income in the community, with a small retail shop present about every 500 metres in the community. Considering the challenges that the small-scale shop owners said they faced when conducting business, for example, theft of stock, damage to stock while in transit, and price fluctuations, all of which affect budgeting and planning, it was ascertained that streamlining the retailers' business activities could provide a practical and useful solution for the community. Leveraging the community's high penetration of (lower-end) smartphones, and the availability of mobile network Internet connectivity, a mobile-phone-based, web-based e-procurement solution was proposed, developed and deployed in the community.

The living lab approach provided additional avenues for collecting context information from the community and users. Physical and direct communication that took place during the baseline study enabled the researchers to gather context information, which could have otherwise been cumbersome to determine, for inclusion in the app design process in order to increase the chances that a solution could be suitable and sustainable. Examples of context information that was gathered included the actual levels of socio-economic development in the area, literacy levels, demographics of the intended users, and the actual experiences in the community of using mobile devices and applications. This information was contextualised, interpreted and utilised during the development of the solution in order to improve the applications' suitability to the Kgautswane community environment.

Development of the mobile e-procurement solution

Based on the findings of the baseline research, an e-procurement solution was designed, which could then be implemented and evaluated. The strategic objectives

for developing the application were to:

- provide small-scale retailers (users) with a simple, easy-to-use, context-aware mobile e-procurement application that could be used to remotely place stock orders;
- ease challenges small-scale retailers face during the stock ordering; and
- enhance efficiency of supply of necessities to the entire community, and consequently improve the socio-economic status of the community.

The functional requirements and operating context for the proposed application were derived during the aforementioned baseline study. Open source software development tools were utilised to implement the application. The choice of open source was made to ensure the application's compatibility with the variety of other technologies running on the lower-end smartphones widely used in the community. Furthermore, use of open source tools was cost-effective for the development phase and would lower the application's cost of ownership for its intended users. Among the tools utilised for development of the application were: the Ruby on Rails framework, MySQL database management system (DBMS), PhP, Java, and Apache Geronimo.

Functionality of the application

Users of the application were able to access the mobile, web-based e-procurement application on any mobile browser such as Opera Mini or a proprietary mobile phone browser. The application enabled registered users to login and navigate through an online and up-to-date supplier product catalogue. The application interfaced with the suppliers' stock management system in the backend (providing up-to-date details on stock, prices, and availability), and an administration web interface was implemented for conducting system administration tasks. Stock suppliers were involved in the study as partners to the living lab.

During ordering, real-time pricing, stock availability and total cost to be paid for the quantities of selected items were displayed, which enabled retailers to budget stock purchases beforehand, without needing to travel long distances to suppliers' premises. The application also enabled collaborative ordering in which a number of the small-scale retailers could place orders weekly and the supplier could make a bulk delivery of all orders for a particular week to the community, saving the retailers' time and transport expenses and at the same time benefitting the suppliers, who could gain competitive advantage and bigger sales volumes.

Figure 4 shows the main user interface of the mobile e-procurement application implemented in Kgautswane, featuring the (i) main menu, (ii) product catalogue display, and (iii) order confirmation form pages.

Figure 4: Mobile e-procurement application interface

(i) (ii) (iii)

Factoring in usability considerations and context of use

The following features of the application were implemented and adapted to improve usability based on the determined specific classes of context (as per the context information classes outlined above in Figure 2). The basis of the adaptations was context obtained from the results of the baseline study within the living lab.

- *Look and feel:* The application's interface was developed to match the look and feel of the lower-end-smartphone menu items that were found to be popular among the users during the baseline study. A minimal grid design for the main menu was used for the interface, with all of the system's functionalities presented on the main screen upon successful log in (Figure 4). (During evaluation, it was found that this feature eased navigation of the application, allowing use even for users with little experience.)
- *Terminology and icons:* Because of the low literacy levels of the participants (as identified by the baseline study), simple terminology and meaningful icons were utilised for the system's functions. Furthermore, because the majority of the users were unbanked and had no credit cards, the application did not include an online payment module. Payment for purchases took place via cash on delivery method. (Evaluation results showed that these considerations improved the system's learnability and effectiveness, and user trust in the system.)
- *Catalogue display:* An easy-to-navigate, graphical product catalogue was implemented to assist users in recognising the products rather than having to spend time reading product information. The screen display also aimed to avoid cluttering the small device screen: an accordion view and tabbed designs were incorporated during development and run-time in order to achieve this goal.
- *Steps to complete the order process, and user input during ordering:* The application

supplanted the six steps involved in the traditional stock replenishment process, by requiring only two main steps after successful login. The first step involved perusing the product catalogue and selecting items for order; the second step involved confirmation and submission of the order. Received and aggregated orders were organised by the supplier, and collection of the orders took place weekly at a central delivery point. (This proved to require little effort from the user to effectively utilise the system for ordering, and users showed great satisfaction with use of this system to perform online remote ordering.)

- *Network connectivity:* Due to the absence of high-speed fourth generation (4G) mobile Internet connectivity in the community, the application was designed to respond (accordingly and favourably) to the network connectivity fluctuation challenges synonymous with the area. For example, in some instances during run-time images were replaced with text in order to improve the speed of the application in times of limited connectivity speed.

The living lab enabled determination and defining of community context, and usability considerations were tightly coupled to the identified context of the community and incorporated into the application in order to improve the potential sustainability of the application. Learning and validating mechanisms were implemented within the application to ensure that during run-time the context could be validated and necessary changes to context information could be captured and utilised. This mechanism worked as a feedback loop through which up-to-date context information was continuously collected from the run-time environment, including users' profiles, bandwidth variations, purchasing history, and updated in the system.

5. Evaluation of the intervention

The core element of our research was a usability evaluation of the intervention, aimed at determining the usefulness of the context-based solution that had been implemented via the living lab methodology. We also conducted an impact assessment that looked at the effects the intervention had on the whole community, i.e., the degree to which the application addressed social-economic challenges in the community.

Usability evaluation

According to standard ISO9241-11, usability is a process-oriented standard that states that a piece of software or system is usable when it allows the user to perform tasks effectively, efficiently and with satisfaction, in a specified context of use (Min, Li, & Zhong, 2009; Tullis & Albert, 2008). Thus, the standard consists of three elements:

- *Effectiveness:* The accuracy and completeness with which specified users achieve specified goals in a particular environment;
- *Efficiency:* The extent to which a software product enables tasks to be

performed in a quick, effective and economical manner; and
- *Satisfaction:* The degree to which a software product gives contentment or satisfies the user.

Our usability evaluation consisted of both a heuristic evaluation and usability testing (Min & Li, 2009; Min et al., 2009; Sharp et al., 2007). The heuristic evaluation was carried out by eight experts in mobile software development and usability, who identified the application's usability challenges prior to the usability testing. The feedback from the heuristic evaluation was utilised to improve and address any shortfalls in the system. The data collection tools for the usability testing consisted of a written questionnaire, observations, task performance measures involving 30 evaluation participants (users of the application, i.e., small-scale retailers). The 30 usability evaluation participants interacted with the application and completed the questionnaire over a period of five months, from June to October 2013. (Use of the system began before the evaluation.)

Impact assessment

The impact assessment was conducted over a period of 18 months, from June 2012 to December 2013, at times running in parallel, between June and October 2013, to the usability evaluation. It was aimed at assessing influences of the intervention in the community that went beyond the intervention's direct objectives. The following dimensions were assessed:
- *Economic and financial management:* This dimension aimed at evaluating the application's impact on growth in the sustainability of businesses in the community, e.g., growth in the retailers' ability to identify opportunities and grow existing businesses.
- *Information dissemination and access:* This dimension aimed at determining whether the application improved access to product information.
- *Organisational management:* This dimension aimed at evaluating the impact on the retailers' ability to organise themselves, learn from each other, and grow.

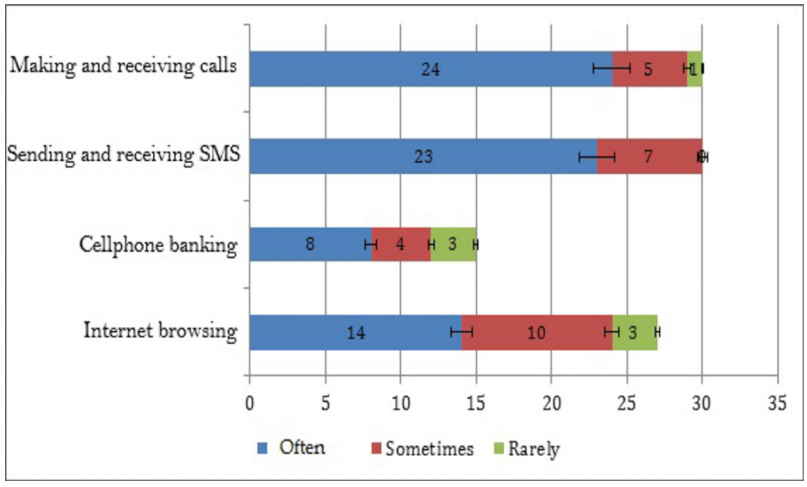
The impact assessment was conducted via interviews administered to a random sample of 10 households and to the same 30 small-scale retailers who participated in the usability evaluation. The retailers also completed an evaluation questionnaire. Two questionnaires were developed for the impact assessment: one to guide the interviews with the households and the second one to be completed by the 30 small-scale traders during assessment of each criterion. The second questionnaire, which was completed by the 30 participants, was included as part of the usability evaluation questionnaire. In addition, general observations of how things were working in the community, and self-reported metrics such as general comments obtained from the usability evaluation, were utilised to augment the impact assessment data (Tullis & Albert, 2013).

Usability evaluation results

The usability evaluation participants, recruited purposively on the basis of their having used the application, all indicated that they owned a smartphone. The majority of the participants owned low-cost, lower-end smartphones, with Internet browsing capability, from manufacturers such as Nokia, HTC, Huawei, Samsung, LG and Blackberry. A few indicated that they owned more complex mobile phones such as HTC Wildfire and Blackberry 9800.

Participants' existing experience in use of smartphones was assessed by analysing reported main uses. Figure 5 summarises the main uses reported by the 30 evaluation participants. The findings suggested that the sample owned suitable devices and could be presumed to have enough knowledge in using mobile phones to effectively use the e-procurement application and provide useful feedback during the evaluation.

Figure 5: Main uses of mobile phones by the usability evaluation participants (n = 30)



The users were asked to evaluate six usability dimensions of the application – navigation, learnability, efficiency, help provided, layout, and design – as well as "overall reaction". Figure 6 shows the results. The numerical scores were collected by participants selecting an option on a five-point Likert scale for each set of questions addressing each single dimension.

Figure 6: Usability ratings (n = 30)

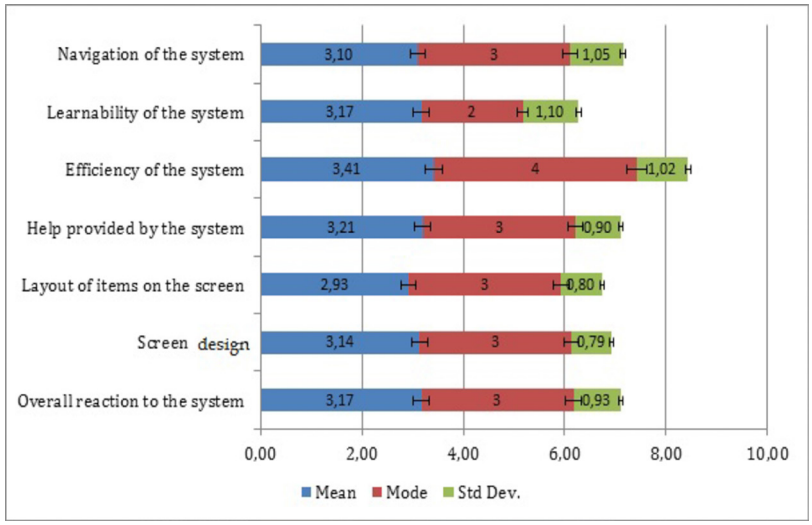


Figure 6 shows the mean (i.e., average) mode and standard deviation of the ratings for each aspect of usability that was evaluated. According to Tullis and Albert (2013), a usability score of less than 60% is considered poor, and a score between 60% to 80% is considered good, while a score above 80% is considered very good. The usability factors of the mobile e-procurement application scored "good" because the average ratings were between 58% and 68% (2.9 to 3.4). Most of the participants' rating values were very close to the mean, as indicated by the modes (frequency value) and a relatively small standard deviation. This means that participants had similar feelings about the usability aspects that were evaluated.

Impact assessment results

The following findings emerged from the impact assessment section of the questionnaire that the small-scale retailers completed:

Economic and financial management

Results from the impact assessment section of the questionnaire administered to the small-scale retailers indicated that 73% [n=22] of the 30 small-scale retailers reported that they had experienced an increase in customers visiting their shops since the beginning of the intervention. (The households interviewed indicated that there was improved confidence in finding various items at the small shops, a suggestion that was corroborated by the shop owners). Furthermore, there were clear indications of an increase in the volume of stock that the small-scale retailers ordered.

All 30 retailers stated that they were able to save on travelling costs because they

could order stock remotely, and that some of these savings were used to increase the volume of orders. A smaller number of retailers, however, did say that for certain specific items, they still needed to travel to supplier premises in order to procure. Examples of stock for which retailers needed to travel were goods that sold quickly and thus needed to be replaced frequently, and items not supplied by the suppliers used in the project. (Suppliers who engaged in the e-procurement intervention made deliveries once a week.)

Information dissemination and access
Almost all retailers stated that the application helped them obtain items more easily and efficiently than through the traditional catalogues that used to be distributed in the community. A few retailers, however, mentioned that they still needed the traditional catalogues to complement their understanding and decision making, because traditional catalogues were more detailed than the mobile phone application catalogue. In addition, the small-scale retailers indicated that the paper catalogue was shared with customers, allowing the retailers to get input on other products customers may want stocked in the small shops. Thus, in general, it was concluded that the application was useful in disseminating timely product information to the retailers, though paper catalogues were still useful to both the retailers and the community.

Organisational management
While only 43% [n=13] of the retailers indicated that they were currently collaborating with other shops and exchanged business information, 23% [n=7] of the respondents indicated that they sometimes bought stock, via the application, in collaboration with other shop owners.

6. Conclusions

Our usability evaluation and impact assessment found that the living lab approach was effective in improving acceptance, usability and sustainability of an ICT4D application. The living lab allowed for broad learning of the context of use for the application, via direct interaction between intervention implementation teams (partners, stakeholders), users, and the users' environment. The living lab also allowed for context-based adaptation of the usability elements of the application, thus enhancing the application's effectiveness, efficiency and user satisfaction.

At a broader socio-economic level it was found that the savings the participating retailers made from cost reductions associated with the streamlined stock replenishment process enabled them to order more stock from the suppliers, helping them serve the Kgautswane community better. And the finding that 23% of the participating retailers had begun to cooperate with other retailers for cooperative use of the e-procurement application represented a potentially significant impact, because no evidence had been found, prior to deployment of the intervention, of efforts to form cooperatives or engage in group bulk-purchasing. Our findings thus

suggest that adoption of a living lab approach can contribute to ensuring that an ICT4D intervention effectively addresses critical, tangible challenges that people face in rural areas of the developing world.

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Policy Modalities for Support of Ethiopia's Creative Industries

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Abstract
Creative industries are a rapidly growing sector in the global economy in terms of income generation, job creation, and export earnings. The creative economy, based to a significant extent on ideas rather than physical capital, offers new, high-growth opportunities for developing countries. The author of this article led a WIPO-commissioned study (Belete & Tadesse, 2014) of the economic contribution of the creative industries in Ethiopia. That study quantified the contribution of "copyright industries" to the country's economy, and showed the sector's great potential to contribute to sustainable development in the country. Alongside the vast opportunities offered by the creative industries, that earlier study also found a number of corresponding challenges that needed to be addressed by Ethiopian policymakers. In this article, the author provides a framework for understanding the policy issues at play in the Ethiopian creative industries sector and then brings that framework to bear on the findings of his earlier study (Belete & Tadesse, 2014). The result is a set of proposed policy measures that the author determines are necessary for optimal support of Ethiopia's creative economy.

Keywords
creative industries, culture, copyright, public policy, knowledge, Ethiopia

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1. Introduction

The economic significance of the creative industries has gained increased attention over the past few decades. It has become evident that the creative industries, in addition to helping countries maintain their cultural identity, can also offer the countries comparative advantages in support of improved global competitiveness. The activities of these industries, which include the creation, production, marketing, and distribution of products and services resulting from human creativity, deal with the interplay of various knowledge-based economic activities. They are much less dependent on natural resources than traditional economic sectors. Growth strategies in the creative economy, therefore, focus on harnessing the development potential of an unlimited resource rather than on optimisation of limited resources via traditional manufacturing industries (Van der Pol, 2007).

As globalisation makes primary industries, i.e., manufacturing and services, more unpredictable, it is perceived that "creativity and innovation" , "the knowledge economy" and "the creative industries" are vital to future prosperity (Holden, 2007). The creative industries serve as a platform for promoting innovation, enhancing services, and reducing unemployment. A new development paradigm is emerging that links economy and culture, embracing economic, cultural, technological and social aspects of development at both the macro and micro levels. Culture is increasingly finding a route to the market, which is leading to radical transformations in the way people create, consume and enjoy cultural products (UNDP & UNCTAD, 2008; Van der Pol, 2007). An increasing proportion of the world's intellectual and creative resources is being channeled into culture-based industries, whose sometimes intangible outputs are now acknowledged as being just as "real" and considerable as those of more traditional industries (UNDP & UNESCO, 2013).

The creative industries sector holds great potential for developing countries, which often have rich traditions of art, music, dance, literature, film, and other forms of creative talent, as well as vast reserves of cultural heritage and traditional knowledge (UNCTAD, 2011) not yet widely exposed beyond national borders. Creative industries have already shown impressive growth and economic performance in some developing countries, in contrast to other more traditional sectors. However, most developing countries have yet to tap the full potential of their creative industries sector. Creative products from many developing countries are very much under-represented in world markets, despite the great potential of their creative economies. This is a reflection of weaknesses in domestic policy and business environments, and biases at the global systemic level (UNDP & UNCTAD, 2010). With the correct institutional and policy frameworks, the creative economy can offer developing countries a feasible development option and opportunities to leapfrog into emerging high-growth areas of the world economy (UNDP & UNCTAD, 2008).

There is a growing tendency for countries, both developed and developing, to

include various aspects of creative industries in measuring national developmental performance. It has become obvious that these industries have an impact on gross domestic product (GDP) and employment, and that they can improve a country's foreign trade position and competitiveness. In many countries, the promotion of these industries is now included in industrial and economic policies. Such policies, directed towards the development of rural areas or rejuvenating depressed inner cities, have contributed to poverty alleviation and job creation, assisted the local economies of individual villages and inner city districts, and promoted self-reliance (UNIDO, 2007).

The creative industries are by nature inter-disciplinary. They combine culture on one hand, economy on the other, and many other connected areas such as education and innovation. Grounded in ideas rather than physical capital, the creative economy extends to economic, political, social, cultural and technological issues and sits at the crossroads of arts, business and technology (Van der Pol, 2007). Creative activities often generate positive externalities in the areas where they are located. Their openness and interaction with other activities give rise to agglomeration and cluster effects, and they tend to generate a high proportion of their total value-added locally. This makes it crucial for a range of stakeholders, from government, the business community and the non-governmental sector, to collaborate and create integrated strategies for the creative industries (EU, 2012).

The creative industries sector has a flexible and modular market structure that ranges from independent artists and small-business enterprises at one extreme to some of the world's largest conglomerates at the other (UNDP & UNCTAD, 2008; 2010). This makes the creative industries appealing in that they can draw upon individual human capacities and small-scale initiatives, rather than being reliant upon only large-scale capital investment. By drawing more on local cultural practices than expertise from outside, creative industries' strategies can maintain cultural diversity and promote cultural sustainability. Moreover, the rapidly falling costs of production and distribution associated with the global dissemination of networked digital media technologies further enhances such possibilities by opening up new markets for such cultural products and practices (Flew, 2014).

A study undertaken in Ethiopia for the World Intellectual Property Organisation (WIPO) revealed the significance of the products and services provided by the Ethiopian creative industries in generation of value-added, employment creation and export earnings (Belete & Tadesse, 2014). The findings of this study indicated the potential of the sector to contribute to sustainable development in the country and that with appropriate policy support, the economic contribution of these industries could be further enhanced. This article builds on the findings of that study by identifying modes of government intervention necessary for the realisation of the developmental potential of the creative industries in Ethiopia.

The research for this article consisted of, first, a review of conceptual approaches, measurement frameworks, and policy issues in relation to the creative industries. The findings of this review were then fused with the findings of the earlier WIPO-commissioned study (Belete & Tadesse, 2014), in order to generate policy recommendations for pursuit by the Ethiopian government. It was found that the government could improve the performance of the creative industries through strengthening the infrastructure that supports the creative economy; improving access to finance; facilitating the formation and growth of creative clusters; strengthening the interface between the creative industries and other economic activities; and determining an appropriate level of copyright protection.

2. Concepts and approaches

The creative industries emerged as a distinct area of interest for researchers and policymakers in the early 1990s.In Australia, the issue has been in play since 1994, the year of the launch of the report *Creative Nation* (Government of Australia, 1994). This report emphasised culture's importance, defining it more broadly than had been the case in earlier conceptions. The report also stressed the economic potential of cultural activity and the arts by positing that culture adds value, generates employment, is a valuable export in and of itself and is an essential accompaniment to the export of other commodities. Subsequently, the notion of creative industries started to be even more widely used after preparation in the UK of the *Creative Industries Mapping Document,* produced by the Creative Industries Task Force (CITF) under the UK government's Department of Culture, Media and Sport (DCMS, 1998).

Different models have been developed as a means of providing a systematic understanding of the structural characteristics of the creative industries. One of these models is the one developed by WIPO, which has adopted a functional classification of the "copyright-based industries".

WIPO Guide

In order to assist its members to conduct surveys in the field, WIPO developed the *Guide on Surveying the Economic Contribution of the Copyright-Based Industries* (WIPO, 2003). This *Guide* has been implemented in over 40 countries (WIPO, 2014), including the Ethiopian study I participated in (Belete & Tadesse, 2014). In order to make the *Guide* compatible with recent developments in the copyright industries and with changes that have taken place in the international industrial classification system, a revised *Guide* was issued in 2015 (WIPO, 2015), with the revised volume's title referring simply to "copyright industries" instead of "copyright-based industries".

The WIPO *Guide* covers content creation (expression of original ideas, formatting and processing of work); production of original creative work; distribution, marketing and promotion of creative work; and consumption and use of such work. The *Guide*

divides the copyright industries into four categories:

- core copyright industries;
- interdependent copyright industries;
- partial copyright industries; and
- non-dedicated support industries (WIPO, 2015).

Core copyright industries
The main sectors that fall under this category are advertising, film and video, music, performing arts, publishing, photography, software, television and radio, visual and graphic art, and copyright royalty collection and disbursement.

Interdependent copyright industries
These are industries engaged in production, manufacture and sale, and renting or leasing, of equipment such as TV sets, computers, musical instruments, and photographic and cinematographic instruments. Their function is wholly or primarily to facilitate the creation, production, or use of works and other protected subject matter.

Partial copyright industries
These are industries in which a portion of the activities is related to copyrighted work and other protected subject matter, e.g., architecture, clothing, footwear, design, fashion, toys and games and household goods.

Non-dedicated support industries
This category generally refers to business services and delivery modes, including general wholesale and retailing, general transportation, and telephony and the Internet (WIPO, 2015).

UK DCMS Mapping Document
Another methodology for classifying the creative industries is the model adopted by the aforementioned UK DCMS Creative Industries Task Force. The DCMS regards the creative industries as: "those activities which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property".

In its first *Mapping Document* in 1998, the DCMS defined the following industries as creative: advertising, architecture, crafts, design, designer fashion, film and video, interactive leisure software, music, arts and antiques market, performing arts, publishing, and software and computer services (DCMS, 1998). Although some minor adjustments have been made to the list, the 1998 definition is essentially the one still used by the DCMS today, and it is often used by other countries as the basis for developing their own definition (BOP Consulting, 2010). The DCMS *Mapping Document* definition of the creative industries is narrower than that of the WIPO

Guide. Furthermore, while the WIPO methodology designates the industries under different groups depending on their level of involvement in the creation, manufacture, production, broadcast and distribution of copyrighted works, the DCMS model makes no such distinctions between the industries included.

UNESCO Framework

The UN Educational, Scientific and Cultural Organisation (UNESCO) Framework for Cultural Statistics (FCS) approach is grounded in a broad definition of culture based on the "cultural cycle" model (UNESCO, 2009, p. 19). In accordance with this model, the culture sector covers the following domains: cultural and natural heritage; performance and celebration; visual arts and crafts; book and press; audio-visual and interactive media; design and creative services; and "transversal domains" such as intangible cultural heritage, education and training, archiving, and preservation (2009, p. 28). The list of cultural domains also includes related domains (tourism, sports and recreation), as well as equipment and supporting materials for cultural domains (UNESCO, 2009). According to this approach, all components of modern and technologically oriented activities of culture are defined as cultural or partially cultural domains, together with the traditional fields of art. Although it does not go into detailed breakdowns of the different groups of activities, the UNESCO approach contains most of the activities included in the core, interdependent and partial copyright industries of the WIPO *Guide*.

UNCTAD approach

The UNCTAD classification divides the creative industries into four broad groups: heritage, arts, media, and functional creations. Heritage includes traditional cultural expressions and cultural sites while art is divided into visual and performing arts, which are creative industries based purely on art and culture. Media covers publishing and printed media and audiovisuals. The functional group comprises demand-driven and service-oriented industries creating goods and services with functional purposes such as design, architecture and advertising. According to this approach, there is a mutually-reinforcing relationship between the "upstream" (heritage and arts) and "downstream" (media and functional group) activities. The downstream activities, which are much closer to the market, derive their commercial value from low reproduction costs and easy transfer to other economic domains (UNCTAD, 2004, p. 4; UNDP & UNCTAD, 2010, p. 8).

3. Policy priorities for the promotion of the creative industries

As with any industrial sector, the creative industries sector requires a strategic policy framework to support its development potential and to address the constraints and barriers to its growth. Creative industries sector policies need to establish an effective link between creativity and economic development. This requires proper understanding, among policymakers, of the interface between activities in the creative industries and a number of other sectors of a nation's economy. Flew (2014)

has identified the following policies that can promote the creative economy in developing countries:

- provision of improved digital infrastructure and access to high-speed broadband networks and information and communications technologies (ICTs);
- investment in education and human capital;
- strategies for cultural asset management and community cultural development;
- innovation in financing of small and medium-sized enterprises (SMEs) in creative industries, including better access to microfinance;
- establishment of creative clusters;
- a whole-of-government approach to cultural industries policy that recognises links to policies in the education, trade and industry sectors; and
- advanced data-gathering, in order to better understand the size, significance and linkages arising in national creative industries.

The UN *Creative Economy Report* of 2010 (UNDP & UNCTAD, 2010) identifies the following kinds of policy initiatives for boosting creative economies in the developing world:

- provision of infrastructure;
- provision of finance and investment;
- creation of institutional mechanisms;
- appropriate regulatory framework;
- development of export markets;
- establishment of creative clusters; and
- a mechanism for effective data collection and analysis.

It can be seen that there is much in common between the areas of government intervention identified by Flew and by the UN .Let us now turn to a discussion of some of the key policy areas.

ICTs

ICTs, identified as an important policy area by Flew (2014), help artisans and artists increase the benefits they derive from their labour. ICT platforms and networks allow creators to include their creations in domestic and international value chains, enhance their services to clients, and encourage integration of creative industries into national trade development strategies. ICTs open up new opportunities for creators to produce and distribute their works to a wider public at a lower cost, independent of physical and geographical constraints. Key creative industry sub-sectors such as media, entertainment and publishing are becoming more and more reliant on digital, ICT-based production, delivery and consumption. In addition, the convergence of multimedia and telecommunications technologies, together with globalisation, has transformed consumers from passive recipients of cultural messages into active co-

creators of creative content (Van der Pol, 2007).

In discussing the enormous power of ICTs in the creative industries, the UN *Creative Economy Report* of 2010 puts emphasis on three types of "digital convergence": technological convergence (a shift in patterns of ownership of media, such as film, television, music and games); media convergence (allowing users to consume different media at the same time using a single personal computer); and access convergence (all production and distribution of media and services are being reengineered to work on a distributed network platform, i.e., everything is becoming available or doable on the Internet) (UNDP & UNCTAD, 2010).

Financing

Although ICTs potentially provide numerous opportunities to creative enterprises, SMEs in creative industries are susceptible to the same constraints that afflict small enterprises in other areas of the economy. Chief among these constraints is access to finance. Hence policy recommendations for SMEs in other sectors are applicable in the main to SMEs in the creative industries sector. Improving access to credit facilities, or to loans and investments that would make the businesses in the creative industries more viable, is thus an important area for policy intervention.

Entrepreneurs in the creative industries often find it difficult to present a convincing business model. Many skills and professions related to the creative economy are not recognised as business categories in legal terms. The low levels of physical assets that can be used as collateral restrict access to commercial banking services (most creative-industry assets are intellectual property-based and hard to value and secure against). Financial institutions are often ill-at-ease with the sector's innovation-driven character, notably when an enterprise relies on the generation of copyright content (Hackett et al., 2000; UNDP & UNCTAD, 2008).

Education and training

Education and training are considered by many governments as key issues for long-term growth of creative industries (Madsen, 2007; UNCTAD, 2011). Creative skills need to be developed at primary, secondary and tertiary educational levels. Mueller and Thomas (2001) and Florida (2004) have examined how the approach to education can foster creativity in the economy. Also, business skills are increasingly necessary for the sector's professionals (Zaboura, 2009). Educational activities can also be considered important instruments for stimulating demand for creative products and services (Dervojeda et al., 2013).

Education is often considered a vital contributor to the social and human capital of a country, enhancing the skills base of the workforce and, in turn, attracting "high-end" industry and increasing per capita income. Dervojeda, Nagtegaal, Lengton and Datta (2013) assert that good education is important for laying the foundation for the

emergence of creative industries. According to Australia's *Creative Industries Strategy* (Commonwealth of Australia, 2011), creative talent can have a positive impact not only on creative industries, but also on the capacity for all sectors to adapt to future challenges. The strategy recognises the importance of investing in education, skills and training in the creative industries to support supply of skilled labour now and in the future; demand for production and consumption of creative content and services, generating markets for creative businesses; and development of creative and digital skills leading to a more innovative workforce over time.

Copyright

Until recently, there was a general consensus among industrialised nations that relatively strong copyright protection spurred the development of content and was both pro-innovation and pro-consumer (see Atkinson, 2012). Recently, however, divergent perspectives have emerged on how copyright and intellectual property laws impact creativity, innovation, and the creative industries.

The challenge for copyright instruments is to achieve balance, whereby neither the creator of a new work nor the wider public is able to appropriate all of the benefits that flow from the work's creation (Flew, 2015). The degree to which the copyright owner can appropriate the value produced by the consumption or appreciation of the work by others and the degree to which this appropriation hinders consumption are the crucial issues. This trade-off between efficient production and efficient consumption – between incentivising creators and protecting public interest – is a prominent discussion in the copyright literature (see Watt, 2004).

The development of new knowledge is enhanced if all sections of society have broad access to the widest possible pool of information, knowledge and forms of creative expression at the lowest feasible cost – so that knowledge can be promoted, equitably shared and built upon. Copyright policy, hence, needs to balance the incentive for the development of new content with the need to provide potential users with access to the material (Png & Wang, 2006; PwC, 2011).

Watt (2004) identifies the need for copyright law to achieve a balance between copyright's static effects and the dynamic effects that can emerge via the cumulative aspect of creation made possible by access to creative works, i.e., there must not be so much protection that second-generation creation is thwarted. Overzealous copyright regimes can stifle second-generation creativity. The benefits from creating additional creative works can be maximised, and the diffusion of knowledge and knowledge-based products encouraged by designing a copyright law with an appropriate scope and optimal duration of protection.

4. Economic contribution of the creative industries in Ethiopia

Ethiopia is an ancient country with rich linguistic and cultural diversity. This diversity includes many languages, and tangible and intangible heritage composed of both traditional and modern cultural expressions. The country's centuries-old know-how in handicraft production, and its songs, dances, poetry, stories, images and symbols, form the foundation of its creative industries. The majority of the cultural products of the country's various ethnic groups are authentic, indigenous products with little to no influence from foreign cultures, giving Ethiopian artifacts strong potential comparative advantage in international markets.

The strong economic potential of the creative industries in Ethiopia was made evident by the findings of the aforementioned WIPO-commissioned study (Belete & Tadesse, 2014). Using the *WIPO Guide on Surveying the Economic Contribution of the Copyright-Based Industries* (WIPO, 2003), our study revealed Ethiopian creative industries' value-added to the country's GDP, and their contribution to employment and to revenue generated from foreign trade. The study was also aimed at generating research-based evidence and analysis to inform policymakers about the economic significance of the sector. Since most economic activities involve a degree of creativity, there was a challenge to identify the portion attributable to creativity. However, using the tools provided in the *Guide* it was possible to identify the activities considered to be part of the creative industries. Following the *Guide*'s suggested methods and procedures for quantifying the contribution of the copyright industries in statistical terms, the study quantified the economic significance of Ethiopia's (1) core copyright industries, (2) interdependent copyright industries, (3) partial copyright industries, and (4) non-dedicated support industries.

The study found that, in 2012, the value-added of the copyright industries in Ethiopia was ETB 23,989,211,925 (approximately USD1.3 billion at the 2012 exchange rate). As a percentage of GDP, at constant prices, this amounted to 4.73% of GDP. The largest contribution came from the core copyright industries, which represented 1.96% of GDP. The three largest sub-sectors – (1) press and literature; (2) radio and television; and (3) music, theatrical production and opera – accounted for 78.72% of the total GDP contribution of the core copyright industries in terms of gross value added.

Motion pictures and video contributed only ETB550,500,000 (USD30 million) to the country's GDP in 2012, constituting 5.54% of the total share of the core copyright industries. This is a very low figure compared with the performances of other African countries, such as Nigeria and South Africa, which have booming film industries. Some recent attempts are showing positive signs of the sub-sector's future in Ethiopia. However, the Ethiopian film industry is suffering from a shortage of qualified personnel, and investors are not yet ready to contribute huge expenditure in the area. The poor marketing system of Ethiopian movies, controlled by a few

groups, has also negatively impacted the growth of the sector. Much needs to be done to promote the country's film industry abroad, which has currently not received recognition outside of the Ethiopian diaspora.

Official data also revealed the current low level of development of Ethiopia's software industry. With ETB584,653,226 (USD32 million) value-added in 2012, software and databases accounted for only 5.88% of the share of the core copyright industries. Out of this total, software programming and consultancy accounted for ETB88,163,949 (USD4.8 million), while the remaining balance, ETB496,489,277 (USD27 million) was the contribution from database activities. Ethiopia has great advantages and considerable room to improve its capability in the software industry and make better use of this potential. The growing number of private-sector enterprises that could use automation and digitisation to improve their competitive position, and the various initiatives aimed at improving public sector efficiency, create demand for software products and services. Furthermore, the expansion of tertiary-level education in the country has created the opportunity to significantly increase the number of adequately-trained ICT professionals. However, the current level of development of software companies in the country is low, and the potential benefits of the technology are underexploited in the economy. In the group of interdependent industries, which contributed 1.39% of GDP, TV sets, radios, VCRs, CD players, DVD players and other electronic equipment took the leading place with 57.48% of that category.

It was found that the copyright industries provided jobs to 240,287 persons, which constituted 4.2% of urban employment in the country. The core copyright industries, which employed 78,407 persons, had the highest share (32.63%) of copyright industries employment, followed by the interdependent copyright industries, which employed 72,725 people (30.27% of employment in the copyright industries).

The partial copyright industries and non-dedicated support industries provided jobs for 18,861 and 70,294 people respectively, representing 7.85% and 29.25% of employment in the copyright industries, respectively. With a 0.65% share of exports and a 10.87% share of imports, the copyright industries also played an important role in Ethiopia's external trade. Total exports by the copyright industries amounted to ETB 465,501,740 (USD25 million) worth of goods and services, while total imports amounted to ETB24,358,767,344 (USD1.3 billion) (Belete & Tadesse, 2014).

The study also compared the copyright industries sector with other sectors of the Ethiopian economy. It was found that the contribution of the copyright industries to GDP was higher than that of many other important sectors, i.e., higher than mining and quarrying; hotels and restaurants; financial intermediation; education and health; and social work. And in terms of employment generation, the copyright industries outperformed mining and quarrying; transport and communication; and financial intermediation (Belete & Tadesse, 2014). The general picture that emerged

from that research was that the creative industries are of great economic importance to Ethiopia.

5. Policy initiatives to promote the creative industries in Ethiopia

A clear implication of the results just outlined from the WIPO-commissioned copyright industries study (Belete & Tadesse, 2014) is that the Ethiopian government should strive to put in place policy measures that can optimise the potential of these industries for wealth creation, employment generation, and export promotion. As discussed above with reference to the work of Flew (2014) and UNDP and UNCTAD (2010), governments can use a wide range of measures to stimulate the creative industries and promote their contributions to development.

Let us now discuss the policy measures that Ethiopian policymakers should consider, with my recommendations grounded in the realities uncovered by the 2012 data gathered for the WIPO-commissioned study.

ICT access

A policy area clearly relevant to the creative industries in Ethiopia is that aimed at improving ICT access. ICTs provide a link between education and commerce and assist in turning knowledge into marketable products. In Ethiopia, ICTs are seen within the broader context of the country's socioeconomic development objectives. The sector is seen as a key strategic pillar in different policies and strategies. Ethiopia's National Information and Communication Technology Policy and Strategy of 2009 provides guidance on leveraging ICT in all sectors of the economy (FDRE, 2009). The country's first Growth and Transformation Plan (GTP) also positioned embracing ICT as essential for education; creation of new jobs and business opportunities; and improvement of the effectiveness of government administration and service delivery (FDRE, 2010).

ICTs are also taken as one of the priority areas in the economic infrastructure sector in the country's second GTP (FDRE, 2015). This second Plan identifies strategies for expanding ICT infrastructure, for modernising and standardising ICTs, improving the contribution of the private sector in ICT development, and mainstreaming laws and legal frameworks related to the development of data services into policies, strategies and programs (FDRE, 2015).

The ICT sector in Ethiopia is nascent and small-scale compared to the sector in many other countries in Africa, which have been strategically building their local ICT industry and even emerging as viable players in global ICT-based industries (Adam, 2012; Lixi & Dahan, 2014). In Ethiopia, the ICT sector suffers from significant gaps in availability of the necessary infrastructure, and shortage of the talent pool necessary to realise potential opportunities in ICT-based services. These shortcomings create a barrier to development of the creative industries, because many applications to

stimulate creative production and e-business depend on the use of ICTs.

Appropriate policies, investment incentives, and institutional forms are important foundations for ICT-based services industry development, and have been critical to success for many countries (Lixi & Dahan, 2014). Policy efforts in Ethiopia should focus on better infrastructure for ICT, and better human resource development in order to address the knowledge gap faced by the sector. The government has initiated some projects for exploitation of opportunities provided by ICT. Examples of these projects are the establishment of Ethiopia's first information technology park, a large-scale telecommunication infrastructure expansion project and WoredaNet, which is an e-government network connecting more than 800 woredas (districts) (Reba, 2015). In order to enhance the positive impact of ICT in the economy it is also necessary to address issues of affordability, accessibility and education.

Access to finance

Another area of government intervention necessary to promote development of creative industries in Ethiopia is improvement of access to finance. According to a recent World Bank report, young and small firms in Ethiopia are the most likely to report that access to finance is a major constraint to their business operations, with the constraint reported at higher rates than in many other African countries (World Bank, 2015). Banking in the country is inclined towards conventional lending practices, where collateral is mandatory. As in other developing economies, banks in Ethiopia prefer immovable collateral, such as land, rather than movable assets such as machinery. Typically, only large firms are able to use equipment as collateral. The aforementioned 2015 World Bank report also showed that the average value of collateral needed for loans in Ethiopia is very high compared with other regions of the world, including some other economies in Africa. On average, Ethiopian firms require 234% of the loan amount for collateral, compared with 134.3% in Eastern Europe and Central Asia. In relatively better positioned African countries, collateral requirements are much lower than in Ethiopia, e.g., 120.8% in Kenya (2007) and 103.6% in South Africa (2007) (World Bank, 2015).

The resources of creative enterprises and individuals are mainly intangible intellectual assets, which are not considered assets by many organisations, including banks. Hence most Ethiopian creative enterprises are at present marginalised from the system of bank loans, lacking the basic requirements that a loan request demands. Creative enterprises could do better in the economy if the financial sector were better-adapted to financing them, i.e., if they were more officially recognised. Government intervention in support of small-enterprise finance development should focus on improving the financial sector infrastructure; addressing limitations in the current collateral regime and contractual environment; and developing an institutional framework for alternative sources of funding. Creation of a small-enterprise finance culture among financial institutions, and provision of incentives to commercial banks

for engaging in market downscaling initiatives are important policy considerations.

Creative clusters

Although many creative industries operate individually, others cooperate in groups or clusters to source raw materials and market their products. UNIDO (2007) defines creative clusters as combining production and distribution activities within a common structure, being capable of promoting creativity, research applications and distribution systems, and being supported by both private and public financing. According to the UN *Creative Economy Report* of 2013, creative clusters are vertically-disintegrated networks of production units that can function flexibly when faced with the high levels of instability and risk that prevail in the production and consumption of cultural goods and services (UNDP & UNESCO, 2013). Creative clusters have been identified as an important mode of operation, helping micro and small enterprises (MSEs) to obtain higher levels of growth through mutual stimulation, making use of others' knowledge and establishment of integrated services and markets (UNIDO, 2007). Creative clusters thrive when support systems that respond to their needs are available.

Naturally-emerged clusters of MSEs are widespread in Ethiopia. Clothing and footwear, which are grouped under partial copyright industries in the WIPO copyright industries model, are good examples of Ethiopian creative industry production sectors that currently exhibit MSE clustering. Clusters have attracted the interest of policymakers and various development organisations, including the UN Industrial Development Organisation (UNIDO), which seeks to promote them because of the direct impact they can have on poverty alleviation. Cluster-based development is also given strong priority in Ethiopia's first GTP as a key tool for spurring income and employment growth among MSEs (FDRE, 2010; Ali et al., 2016).

The Ethiopian government can play an active facilitative role in the formation, growth and scale-up of emerging and existing natural creative clusters by providing infrastructure such as roads and electricity, by developing training programmes with local educational institutions, by facilitating the development of linkages and networks between local firms, and by facilitating the securing of finance to support cluster activities.

Government can also contribute by identifying weaknesses in existing natural cluster value chains, and by helping to attract investors and businesses to fill these identified gaps, thus strengthening clusters' forward and backward linkages within creative-industry value chains.

Coordination with other sectors

Our report (Belete & Tadesse, 2014) commissioned by WIPO argues that the lack of appropriate policies for development of the copyright industries will not only

constrain the performance of creative industries in Ethiopia, but will also affect activities in many other production- and service-based sectors of the economy. Similarly, Ethiopian government policies in a variety of social and economic sectors impact both directly and indirectly on performance of the creative industries.

Lack of integration among government sectoral policies, and weak linkages and networking among the different sectors, whose activities are related to the creative sector, are currently factors hampering the performance of the creative economy in Ethiopia. The interface between the creative industries and other economic activities needs to become a central issue in Ethiopian policymaking. Sectors that have strong relationships with creative businesses, such as providers of intermediate inputs and tools to the creative industries sector, have a key role to play in both the design and implementation of policies for creative industries.

Copyright and non-core activities

The prevailing view among copyright rights-holders in Ethiopia is that stronger copyright protection and enforcement are necessary for the growth of the country's creative industries (Belete & Tadesse, 2014). However, sound copyright policies are not dictated solely by the interests of rights-holders alone. Due consideration must be given to *both* the interests of the rights-holders (in obtaining returns on their investment) *and* needs of the majority of people(for improved access to knowledge) (Belete & Tadesse,2014). Data generated by the 2014 WIPO-commissioned study established the existence of a link between *core* copyright industries and industries that disseminate copyrighted products (Belete & Tadesse, 2014). Therefore, in deciding the level of copyright protection in Ethiopia, it is necessary to take into consideration the potential impact of strong copyright protection on not just the *core* copyright industries, but also the other three types of copyright industries delineated in the WIPO Guide that have links with the core copyright activities – *interdependent*, *partial*, and *non-dedicated* industries (WIPO, 2003).

The scale of economic activities in Ethiopia affected by copyright is much broader than previously understood. The broad impact of copyright on various sectors of the economy makes it imperative that there be close interaction among the various stakeholders affected by the copyright policymaking process. Copyright policymakers must adopt a broad conceptualisation of the creative industries and recent technological changes and, accordingly, revisit previously-held views that formed the basis for a belief in strong copyright protection. Copyright policymaking should be seen in terms of a delicate balancing of the following imperatives: improving competitiveness and access to important knowledge-based products; facilitating research; protecting cultural expression; and reducing poverty. In order to address these myriad needs, it will be necessary for Ethiopian copyright policy and law to provide significant flexibilities, i.e., significant limitations and exceptions to exclusive copyright protection.

6. Conclusion

The existing data show that Ethiopia's creative industries are already generating significant economic gains for the country. Increased production and distribution of creative goods and services can thus be sources of enhanced income, employment and trade. The multifaceted nature of the creative economy necessitates a range of public policies and strategic choices in order to optimally harness the economic potential of the creative industries to generate socioeconomic development. These policies and strategies must be based on a clear understanding of the range of stakeholders in the creative economy, the nature of their interactions, and how the creative sector relates to other sectors of the economy.

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Assessing the Potential Role of Open Data in South African Environmental Management

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Abstract
This study explores the possibilities for open data as a knowledge governance mechanism that could benefit environmental management in South Africa. The authors consider the potential benefits of open data in support of public participatory governance modalities, and the legislative frameworks and Constitutional Court stance in South Africa in support of the right of access to information and proactive disclosure of environmental information. The article also looks at potential barriers to effective use of open data in South Africa. The authors find that effective deployment of open data as a means to support participatory environmental governance will require a dedicated South African open data legal instrument, as well as political will to compile the necessary data, and steps to ensure meaningful citizen data access and use.

Keywords
open data, environmental management, participatory governance, access to information, knowledge governance, South Africa

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1. Introduction

In 1981 in southern California, the Internet Working Group for DARPA (Defense Advanced Research Projects Agency) published a report calling for development of a worldwide inter-network system for sharing critical information between computers (Information Sciences Institute, 1981). This initiative eventually became known as the World Wide Web, a key element of the Internet. In the same year, in Nairobi, the African Charter on Human and Peoples' Rights was adopted by African heads of state. Thirty-five years later, digital technology is playing an increasingly significant role in governance, through its ability to effectively distribute knowledge products, and the African human rights discourse has evolved such that public participatory governance is now a human rights norm. Accordingly, the need to address the synergies between these phenomena – online networks as a tool for knowledge distribution, and participatory governance – becomes ever more critical.[1]

The study outlined in this article sought to explore the potential for open data in South Africa to serve as both a public online platform to share vast quantities of data and information and as a mechanism of public participatory governance, looking specifically at environmental management. We maintain that open data is an important knowledge governance development that has the potential to facilitate public participatory governance of the environment.

Through doctrinal research, we investigated the legal context currently in place in South Africa in relation to disclosure of environmental management information. We also consulted relevant secondary literature in order to understand both the potential benefits and drawbacks of open data in the South African environmental management context. The inquiry was focused on South Africa's environmental sector because of the government's recent commitment, through the Open Government Partnership (OGP),[2] to adopt open data provisions as a mechanism to disclose environmental management information (RSA, 2012).

2. Participatory governance and environmental management

The concept of public participatory governance has gained increased global appreciation in recent decades (Speer, 2012). One of the most salient applications of this concept is as a means, through localised environmental management, to mitigate environmental degradation (Du Plessis, 2008). In broad terms, public participatory governance is a concept that describes a continuous relationship between citizens and governance structures, whether public or private, such that

1 For a brief overview of the history of the developments in knowledge governance generated by the Internet and World Wide Web see, also, Wilbanks and Rossini (2014).

2 The Open Government Partnership (OGP) is an international platform launched in 2011 by eight countries, including South Africa. The OGP seeks to provide a space for states committed to making their governments more open, accountable, and responsive to citizens to develop actionable commitments every two years.

citizens are able to meaningfully engage in governance decisions that affect their lives. Public participatory governance therefore requires open channels of communication between citizen stakeholders and relevant public and private entities. These lines of communication are predicated on the availability and accessibility of timely, relevant, and comprehensible information (Braun & Schultz, 2010; Gaventa, 2004).

Across the world, environmental degradation constitutes one of the most significant challenges of modern times. South Africa is no exception. Further, the degradation often disproportionately affects rural communities where most livelihoods are dependent on natural resources and environmental sustainability. Local communities and groups typically hold unique knowledge and insight about their local environments that are not readily available to outside actors, thus making public participation particularly important in respect of environmental management (Ellis, 2005; Raymond et al., 2010). Local communities are often best-equipped to identify areas of concern or problems, as well as to provide potential solutions. They are, further, typically best placed to monitor the implementation, from a grassroots perspective, of environmental policies or commercial activities
that may have an impact on the environment, and to contribute to the "diversity of knowledge and values" that Reed (2008) cites as being essential to environmental management (2008, p. 2418). According to Reed,

> [e]nvironmental problems are typically complex, uncertain, multi-scale and affect multiple actors and agencies. This demands transparent decision-making that is flexible to changing circumstances, and embraces a diversity of knowledges and values. (Reed, 2008, p. 2418)

In South Africa, public participatory governance is a constitutional imperative. The Constitution's section 152, in Chapter 7, reads as follows:

> **Section 152 Objects of Local Government**
> (1) The objects of open government are –
> (a) To provide democratic and accountable government for local communities;
> (b) To ensure the provision of services to communities in a sustainable manner;
> (c) To promote social and economic development;
> (d) To promote a safe and healthy environment; and
> (e) To encourage the involvement of communities and community organisations in the matters of local government. (RSA, 1996)

These section 152 objectives are in line with the human rights set out in Chapter 2 of the Constitution, particularly socio-economic rights (section 27), environmental rights (section 24), freedom of expression (section 16), and the right of access to information (section 32). There is also increasing recognition of the need for private

companies to facilitate public participatory governance models in the course of business activities that may have an impact on local communities (Ruggie, 2011). Central to public participatory governance is information availability.

Ready availability of relevant information is central to an effective public participatory governance model because of, inter alia, (1) its potential to empower communities and non-government stakeholders to participate effectively; and (2) its potential to build trust between stakeholders involved in public participatory governance. As noted by Barten et al. (2007), "information and access to information can change the balance of power" (2007, p. 169), and "genuine empowerment depends on the control that community-based organizations ultimately acquire, and meaningful participation requires certain preconditions such as access to information" (2007, p. 166). Further, ensuring access to relevant and timely information shows a commitment to enhanced communication and transparency, which can build trust (Bartenberger & Grubmüller-Règent, 2014).

Noting the centrality of access to information as a precondition to public participatory governance, it can be argued that open data, as a new and evolving form of transparency and knowledge governance, can enhance and support public participatory governance structures by providing access to data that can be translated into information and knowledge. According to Bartenberger and Grubmüller-Règent (2014), "open government data might enable new and more participative and collaborative forms of governance" (2014, p. 38). They go on to state that:

> The general way of thought is that open (government) data could enable forms of collaborative and participative governance since in order for citizens to participate in public projects or to voice their opinions, they first need to learn about the addressed issue and also need to have a platform where they can share their contributions. From this perspective open data can serve both to lower the barriers for participation and collaboration and to make citizen involvement more attractive. (Bartenberger & Grubmüller-Règent, 2014, p. 38)

We are in agreement with Bartenberger and Grubmüller-Règent regarding the potential benefits of open data for public participatory governance, yet we also note – as discussed below – that there are various limitations to this proposition in the South African context.

3. Open data and disclosure of environmental management information

Contemporary global society is frequently described as an information society, and it is said that we are living in an "information age" (Castells, 2011) driven by advancements in information and communications technologies (ICTs) and ICT-enabled content resources. It follows, then, that ICTs and ICT-enabled content have the potential to serve as important tools for promoting access to information in

support of public participatory governance (Palen & Lui, 2007).

Open data

The concept of "open data" refers to the provision of an online portal whereby data can be shared freely without discrimination and easily accessed (Janssen et al., 2012). (It typically refers to government-held data, but not exclusively so. The data released can be made available by any entity, public or private, in possession of the datasets.) Although the data can contain either textual or non-textual information, the data released are often statistical and non-textual in form. The openness element of the concept of open data refers to the notion of any individual or group being able to freely use, reuse, and share the data (Shadbolt, 2012).

Increasing relevance has been assigned to the concept of open data as an element of open government, particularly in relation to sustainable development (see World Bank, 2015). Certainly, among the most critical potential benefits of open data provision are its potential to promote government transparency, to allow for citizens to hold government accountable, and to advance meaningful engagement by citizens in policymaking. It is for these reasons that open data has been hailed as having the potential to bring about radical social change, by bridging the power-knowledge gap between government and society, and creating a paradigm shift in the way individuals, communities and civil society engage with public institutions (International Open Data Charter, 2015). In South Africa, the National Planning Commission's (NPC's) *National Development Plan: Vision for 2030* recognises the need to transform the government via open data (NPC, 2011).[3]

The open data movement has been influenced in part by the advancement of standards of openness in spheres such as open source software licensing, open educational resources, open access scholarly publishing, and the international open science movement. In the African context, civil society groups such as Code for Africa, the World Wide Web Foundation, Code for South Africa, Open Institute, and Ushahidi,[4] have all done considerable work in promoting open data. And open data's implications in the global Southern and African contexts are receiving increased critical, analytical attention (see Davies, 2014; Mutuku & Mahihu, 2014; Ohemeng & Ofusu-Adarkwa, 2015; Van Schalkwyk et al., 2015; Willmers et al., 2015).

Open data is part of a growing propensity to favour "more open and cooperative knowledge governance" systems (Wilbanks & Rossini, 2014, p. 201). Open data can represent a decentralised knowledge governance system insofar as various state and non-state actors can contribute to it and, as Wilbanks and Rossini (2014) note,

3 See Chapter 14 of NPC (2011) on "Promoting Accountability and Fighting Corruption".

4 See https://codeforafrica.org, http://webfoundation.org, http://code4sa.org, www.openinstitute.com, www.ushahidi.com

it can serve as a form of "downstream governance of knowledge" (2014, p. 200) that challenges traditional top-down knowledge governance. Among open data's benefits is its provision of a pre-established technological infrastructure and standard for individuals, and other non-state actors, to participate in. But at the same time, there is evidence to suggest that it can be difficult to categorise and measure the impact of open data initiatives. In Kenya, for example, a national open data portal was established in 2011, but a study in 2014 found that "there is little or no recorded evidence to support consequential social impact of these initiatives and technologies or the way grassroots citizens engage with government data" (Mutuku & Mahihu, 2014, p. 4).[5] Further, Wilbanks and Rossini (2014) have noted some of the difficulties of ICT-enabled knowledge governance systems, including

> the difficulty of rewarding participation in peer production of knowledge, the difficulty of defining knowledge into forms that work on wikis and other new models of knowledge creation and distribution, […] the complexity of curating data and databases and […] the limitations of library capability in the long-term storage and preservation of data […] (Wilbanks & Rossini, p. 204)

According to Wilbanks and Rossini (2014), "optimism for open data must be tempered with the reality of data sharing, which is difficult, expensive and often unsatisfying" (p. 218), and "data is of little value if there is no infrastructure to make it comprehensible" (p. 219). Bartenberger and Grubmüller-Règent (2014) stress that "data needs to be organised and made accessible in ways that transform pure data into knowledge" (2014, p. 42). For Reichman, Jones and Schildhauer (2011), access to raw data can be increased through the development of robust metadata, and the World Wide Web Consortium maintains that open data must be both machine-readable and human-readable (W3C, 2016). Concerns around reward, affordability and access are particularly important when considering the implementation of open data in developing-world regions.

Open data in support of the right of access to information

The right of access to information has become globally accepted as a human right (Mendel, 2003). The South Africa Constitution's section 32 enshrines the right of access to information from both public and private bodies. However, there is evidence that this right has not been effectively realised in South Africa, especially when it comes to the delivery of information to disadvantaged communities (see Arko-Cobbah, 2008; Calland, 2009; Diallo & Calland, 2013; McKinley, 2003).

The importance of the Internet and open data to access to information is captured in the recent African Declaration on Internet Rights and Freedoms (2015). The relationship between the Internet and access to information is complex and interwoven. An essential component of the right of access to information is the

5 See also Jetzek et al. (2012) and Van Schalkwyk et al. (2015).

character, in both form and substance, of information as a resource. Form relates to both access and the means of access, where the Internet plays a crucial role; substance relates to the value of information as an enabler of other rights. Information, and knowledge, can be garnered from data sources, with data sources acting as a kind of "raw material" for information.

In South Africa, the Promotion of Access to Information Act (PAIA) 2 of 2000 was passed to give effect to the aforementioned Constitutional right of access to information. The Constitution also recognises the right to "just administrative action" (section 33), which embodies the norms and standards of public engagement with the state. The Promotion of Administrative Justice Act (PAJA) 3 of 2000, passed in the same year as PAIA, gives effect to this administrative justice right, and provides for a notice and comment procedure for anyone to make representation on a decision that could adversely affect her or his rights, including environmental rights. In terms of PAIA, the primary framework for accessing information is through the submission of individual information requests – a system that various empirical studies have demonstrated is not a sufficiently effective enabler of access to information. For example, a Cape Town-based body, the Centre for Environmental Rights (CER), submitted 240 access to information requests to both public and private bodies over a period of four years, and in that period, less than 30% of the information requests were granted (CER, 2014, pp. 2-3). While PAIA provides, in sections 34-42, several grounds for refusal to disclose, it also provides in section 46 for mandatory disclosure of information in the public interest where

> [t]he disclosure of the record would reveal evidence of a substantial contravention of, or failure to comply with, the law or reveal imminent and serious public safety or *environmental risk* and the public interest in the disclosure of the record clearly outweighs the harm contemplated. (emphasis added)

Thus, PAIA provides an imperative to publicly disclose requested information relating to environmental risks that are deemed sufficiently important to override any exemptions to information disclosure. PAIA also provides for proactive disclosure of information by both public and private entities. Sections 15 and 52 of PAIA provide that public and private bodies may, on a voluntary and periodic basis, describe "the categories of records […] that are automatically available without a person having to request access" (RSA, 2000a). But the extent to which PAIA's proactive disclosure provisions have been complied with to date is negligible (see PAIA Civil Society Network (2014) and SAHRC (2013)). According to McKinley (2003), PAIA's potential to facilitate public participatory governance has been constrained by a combination of factors: the lack of an obligation on public and private entities to create records for public access; delays and refusals by both public and private bodies to grant requests for information; extensive exemptions in PAIA that allow public

and private bodies to refuse requests for information; the fees payable; and the lack of an efficient oversight body to oversee compliance with the law.

A strong call has emerged in South Africa for proactive disclosure of information via open data as a means of increasing public participatory governance. The call has been concretised through establishment of the City of Cape Town Open Data Policy and portal (City of Cape Town, 2014; City of Cape Town, n.d; Willmers et al., 2015), and by the work of civil society organisations such as Code for South Africa. In relation to environmental management information, a call for open data appears to be implicit in the government's OGP commitment to "[e]xplore the possibility of establishing a single agency mandated by Government to develop a comprehensive and publicly accessible portal of environmental management information" on the grounds that "[t]ransparency will be enhanced if citizens have access to reliable environmental data on water quality and other environmental issues" (RSA, 2012). The government states that such a portal would allow members of the public to have the same levels of access to information that government officials enjoy, and would assist the public in determining whether developments will affect their environment or compromise environmental sustainability and livelihoods (RSA, 2015, p. 23). The government has also stated that the proposed portal will be integrated with the Coordinated and Integrated Permitting System, so as to allow users to monitor approval of development applications (RSA, 2015, p. 24).

In respect of open data for environmental management, Reichman et al. (2011) have stated that "access to data is not only important for basic ecological research but also crucial for addressing the profound environmental concerns we face today and, inevitably, in the future" (2011, p. 703). Further, because of the diverse fields and disciplines that need to be engaged in the pursuit of environmental governance (see Reichman et al., 2011), open data portals can be useful platforms for bringing these together.

South African online environmental information datasets

In its 3rd OGP National Action Plan, launched in May 2016 and covering the period 2016-18, government committed to developing a pilot national open data portal that will "consolidate various datasets from across the three spheres of government, enabling citizens and businesses to easily access government data" (RSA, 2016b). (At the time of completion of this article in July 2016, the pilot portal was not publicly available at the www.data.gov.za URL cited in the 3rd OGP National Action Plan. Government did, however, provide us, during the course of our research, with a URL for spatial data: http://egis.environment.gov.za. The expected date for the pilot portal to be fully operational is said to be March 2017).

As it stands, there are four notable South African environmental databases online: the

South African Mineral Resources Administration System (SAMRAD);[6] the South African Waste Information System (SAWIS) available on the South African Waste Information Centre (SAWIC) site;[7] the South African Protected Areas Database (SAPAD);[8] and the Blue Drop System.[9]

The data in SAMRAD, hosted by the Department of Mineral Resources, are produced in terms of the Mineral and Petroleum Resources Development Act (MPRDA) 28 of 2002 . The data allow the public to view information on the locality of applications, rights and permits made in terms of mining and prospecting of mineral resources. SAMRAD also allows for electronic applications for permits. SAMRAD is thus an existing mechanism for the proactive disclosure of information.

SAWIS and SAPAD are initiatives of the Department of Environmental Affairs. SAWIS is enabled by the National Environmental Management: Waste Act 59 of 2008. The Act provides in section 16 for a general duty, on the part of manufacturers of products that may result in the generation of hazardous waste, to inform the public of the impact of that waste on health and the environment. SAWIS is designed to contain information on the quantities, types, and sources of waste in the country's landfill sites. This system further seeks to support the improvement of integrated waste management in South Africa through the dissemination and use of reliable waste information, so as to contribute to protection of the environment and human health. Information about pollution at industrial facilities is often the most difficult for the public to access. (South Africa does not have a pollutant release and transfer register (PRTR), which is an emission inventory that is present in other countries such as Germany, Spain, and Switzerland. A PRTR provides information about the extent to which facilities are complying with standards that limit releases into air and water.)

SAPAD, established by section 10 of the Protected Areas Act 57 of 2003, holds information on "land cover, conservation, protected areas, special data for environmental impact assessments for renewable energy project proposals, solar data, and distribution maps of mammals in South Africa" (OGP, 2015, p. 35). However, while the portal is open to the general public, it is primarily aimed at technical users such as "environmental practitioners, policy-makers, and the private sector to produce studies that enhance the richness of policy dialogue" (OGP, 2015, p. 36).

The Blue Drop System is a national Department of Water Affairs online portal where users can access information about the water quality in their area. Although it was developed prior to South Africa's involvement in the OGP, South Africa included

6 See http://portal.samradonline.co.za
7 See http://sawic.environment.gov.za
8 See www.padcollaboration.org
9 See https://www.dwa.gov.za/dir_ws/DWQR

reference to the Blue Drop System in its commitment, under its initial OGP action plan, for establishment of an online portal to host environmental information (RSA, 2012, p. 10).

These four online databases do not, however, conform to the standards for open data set out by the World Wide Web Consortium (W3C, 2016). SAPAD, SAMRAD and SAWIS require users to register online before accessing data, potentially limiting access. Further, Chien and Davies (2015) note that:

> Despite […] SAMRAD being advertised as a portal "where the general public can view the locality of applications, rights and permits made or held in terms of the [Mineral and Petroleum Resources Development Act]", […] SAMRAD has never functioned in a way that allows the public to access copies of mining licences or any other regulatory information relating to mining operations. (Chien & Davies, 2015, p. 28)

With regard to the Blue Drop System, the national government itself has commented on the failure of rural municipalities to provide accurate and up-to-date information (Rivett et al., 2013, p. 410).

Legislation mandating possible open data datasets

There are a number of other South African laws that support public disclosure of the kinds of data that a South African open data portal for environmental management could host.

National Environmental Management Act (NEMA) 107 of 1998

NEMA recognises, in section 31, the importance of both transparency in environmental decision-making and promotion of public participation in environmental governance. The Act provides for public access to information on the state of the environment, environmental threats, environmental management, environmental implementation plans, and emergency hazardous incidents. Moreover, NEMA excludes the confidentiality of information where the information relates to environmental quality or the state of the environment; any risks posed to the environment, public safety, health and well-being of people; or compliance with or contraventions of any environmental legislation (section 31Q).

Water Services Act 108 of 1997

This Act requires, in section 69, that water service providers must provide the public with information on water services, and further that the public is entitled to reasonable access to information contained in the national information system on water services. The Act further provides (section 67) that the Minister must take reasonable steps to ensure that information is made available in an accessible format.

National Forest Act 84 of 1998
This Act provides, in section 6, that information in support of sustainable forest management should be disclosed to the public.

National Environmental Management: Biodiversity Act 10 of 2004
In accordance with sections 38, 40, 52, 56, 67 and 70 of this Act, information on the following is published in the *Government Gazette*: bio-regions; lists of threatened ecosystems; lists of critically endangered species; lists of endangered species; lists of vulnerable species and protected species; list of alien species; and lists of invasive species.

National Environmental Management: Air Quality Act 39 of 2004
This Act requires public access to air quality information and public participation in setting of national norms and standards on air quality (section 57).

National Environmental Management: Integrated Coastal Management Act 24 of 2008
This Act requires, under section 93, disclosure of information, in order to enable public participation, concerning protection and management of coastal zones.

Judicial support for proactive disclosure
The principal of proactive disclosure has also found support in a decision of the South African Constitutional Court. In its decision in *Bengwenyama Minerals (Pty) Ltd v Genorah Resources (Pty)*, the Constitutional Court noted the importance of proactive disclosure of substantive information. This case involved a community's challenge to what it saw as a mining company's defective compliance with a community consultation requirement in applying for a mining licence (2011 (4) SA 113 (CC)). The court noted the necessity of providing the community with the "necessary information on everything that is to be done so that they can make an informed decision in relation to the representations to be made […]" (2011 (4) SA 113 (CC), paragraph 66).

4. Analysis, conclusions and recommendations

There are a number of potential tensions within the open data concept in the South African context, and these tensions will need to be taken into account and worked through in development of the concept as a mechanism of public participatory governance.

Legal support for proactive disclosure
As outlined above, PAIA is the overarching law for access to government and privately-held information in South Africa. It provides that anyone can make a request for access to information from a *public* institution without giving a reason for the request. Meanwhile, requests for access to information from *private* institutions require demonstration that the information is required for the exercise or protection

of a right in terms of the Constitution's Bill of Rights. In terms of PAIA, when an access to information request is refused, remedies must be obtained through an application to the courts. (A recent amendment of PAIA, through the Protection of Personal Information Act 4 of 2013, creates the possibility of seeking remedies through an independent administrative tribunal called the Information Regulator, but this body is yet to be established.) Also outlined above were PAIA's provisions for public and private institutions to voluntarily and proactively disclose information. Thus PAIA seeks, to some extent, to foster a culture of proactive transparency. And we saw above that there are several South African Acts specific to environmental matters that require a measure of proactive disclosure. We also saw support for the proactive disclosure principle in a decision of the Constitutional Court. However, as stated above with reference to research by the PAIA Civil Society Network (2014) and SAHRC (2013), proactive disclosure by public and private entities, has to date been limited in South Africa.

Accordingly, a robust legislative mechanism that specifically deals with proactive disclosure through open data is required. The African Union (AU) Model Law on Access to Information for Africa proposes an expansive approach to proactive disclosure of information, thus potentially serving as a valuable starting point for drafters of South African open data legislation (AU, 2013). Article 7 of the AU Model Law provides for automatic disclosure of various policies, contracts, licences, permits, authorisations, public-private partnerships and reports, in addition to budget, revenue and expenditure information.

Adopting a prescriptive approach to disclosure, which specifies how and when disclosures should be made as well as their format, would be useful for ensuring the automatic availability of information already embedded in the principles of PAIA and of many of the environmental sector Acts reviewed above. This approach would be consistent with open government policy shifts that other countries are adopting. The Obama government's Open Government Directive in the United States requires that government agencies "should proactively […] disseminate useful information, rather than waiting for specific requests under FOIA" (Fung, 2013. p. 188). Furthermore, "open government policies in the United States and the United Kingdom often stress the release of 'data-sets' and the importance of providing information in machine-readable formats that can be searched and analyzed using computational tools and methods" (Fung, 2013, p. 188).

There is a need for a law to back an open data policy approach, because it is central to promotion of what the PAIA Preamble refers to as "a society in which the people of South Africa have effective access to information to enable them to more fully exercise and protect all of their rights" (RSA, 2000a). This is part of the idea of what Fung (2013) calls "democratic transparency", where the principle of public information is based on availability, proportionality, accessibility, and actionability

(2013, p. 190). According to Fung, the public should be able to access information without restrictions imposed through excessive government confidentiality or "proprietary intellectual property restrictions that govern much of the information produced and collected by private corporations" (2013, p. 191).

There is no existing law in South Africa that provides for comprehensive open data disclosures. The South African OGP commitment to a comprehensive open data portal is being pursued in a legal vacuum. The various laws outlined above prescribe only limited disclosures in the South African environmental sector. A comprehensive, proactive open data disclosure law is necessary.

Political will

Open data, as with any effective government transparency system, requires the maintenance of effective record-keeping by government bodies (Darch, 2013). Darch and Underwood (2005) explain that an access to information culture in South Africa has failed to blossom because

> [O]rganizations do not, by and large, operate efficient record keeping systems, either for paper or for digital records. At the provincial level, record keeping (including selection for destruction) is either 'out of control or in complete chaos'. Digital documentation is equally disorganized, and 'a Wild West scenario prevails'. […] there is little capacity for the provision of workable public access. Many departments and other bodies 'seem to assume that they can rely on existing staff already heavily overburdened by other responsibilities' – with predictable negative results. (Darch & Underwood, 2005, pp. 79-80, with quotes from Pickover & Harris, 2001)

Without political will that translates into policy requirements and budgets for record-keeping and disclosure, much of the promise of open data will remain unfulfilled. Over and above effective record-keeping in the public sector, and noting the concerns raised by Darch and Underwood, as cited above, in relation to the lack of personnel, an open data portal would likely require dedicated teams of experts and ICT technicians within relevant government departments to ensure data is captured and uploaded in line with necessary standards (e.g., standards of the kind set out by the World Wide Web Consortium (W3C, 2016)). In addition to building political will, it is also necessary to avoid a situation, as described by Janssen (2012), where there is an element of capture of government open data initiatives by certain stakeholders:

> [T]he danger arises that the focus of the public bodies, who have to make choices in assigning their limited time and resources, will move from making information available for a large audience to disseminating data to a small group of developers and activists, just because their cry for data is louder and the immediate rewards for government in terms of reputation

and goodwill from the public will be better. (Janssen, 2012)

Citizen access and use

To ensure open data accessibility, Fung (2013) argues, government regulation is required to determine disclosure priorities, in terms of the creation, collection, organisation, analysis, publication and utilisation of information that prioritise the ability of citizens to exercise and protect essential rights. The principle of proportionality, Fung (2013) states, requires that "information about organizations should be publicly available in proportion to the extent that the actions of those organizations threaten and create risks to citizens' vital interests" (2013, p. 192). Where information is proportionally made available, the public must also have the capacity to process the information in specific and meaningful ways. Communities and community organisations need to be empowered to utilise information presented from open data disclosures. This requires the provision of "economic, political, and social structures that appropriately facilitate action based on that information" (Fung, 2013, p. 202).

Of concern with respect to citizen open data access and use in South African are the still-low levels of broadband ICT access and, in turn, digital literacy, in impoverished South African communities. As is made powerfully clear in the 2014 African Declaration on Internet Rights and Freedoms, public participatory governance processes need to take into account myriad elements of ICT availability and usage (African Declaration on Internet Rights and Freedoms, 2014). Such elements include affordability of data, technological and data literacy, geographical locations where digital access might be difficult, and age and gender inequalities.

In order to be interpreted and mediated into useful information and knowledge, open data need to be engaged with by people with knowledge and understanding of data value (Bartenberger & Grubmüller-Règent, 2014; Janssen, 2012; Wilbank & Rossini, 2014). In this regard, intermediaries, including journalists, research institutions and researchers, will have an important role to play in South Africa in ensuring that data provided on online portals are translated into meaningful information and knowledge. At the same time, Janssen (2012) provides the important warning that if this power of intermediaries is misused, "open data risks the creation of an illusion of transparency and accountability, while in reality causing information inequality and a disempowerment of the citizens" (Janssen, 2012).

In addition, in order for public participatory governance to be effective, information must be shared on a two-way basis between local communities and authorities. As noted above, this is particularly key for environmental management, where communities are often in possession of critical information about the state of their local environment. While open data can provide a means for communities to access information held by public and private bodies, it will not serve as a tool of true two-

way communication of information if it does not allow citizens to themselves upload information or datasets. For example, the Ghana open data initiative was found to be "too narrowly focused on the supply side of the project", and it was suggested that the portal should "generate an even platform to improve interaction between government and citizens to ensure a balance in knowledge sharing with and among all constituencies" (Ohemeng & Ofusu-Adarkwa, 2015, p. 419).

Full citizen access and use also require datasets that are free from restrictions such as copyright, patents, and fees, and that are designed to be reused, disaggregated and re-compiled with other datasets. As Willmers, Van Schalkwyk and Schonwetter (2015) point out, for open data to be effective, the datasets must be accompanied by clearly-articulated open licensing rules:

> The absence of an open licence implies that all rights are reserved to the author or copyright holder, and serves as a potential barrier for re-use. It is therefore not only important that data are made open, but also that the potential users of such data are clear about being able to re-use data without fear of legal sanction (Janssen et al., 2012). In order for users to operate autonomously in this manner, licensing provisions should be expressed clearly and in alignment with other organisational terms of use or policies governing content distribution. (Willmers et al., 2015, p. 27)

Willmers et al. (2015) present valuable insight into open data provision in developing countries, looking specifically at the Kenyan Open Data Initiative and the City of Cape Town Open Data initiative. The authors note challenges with regard to understandings of what open licensing is, and also find that the "current state of licensing is nascent and practice is manifesting in a non-uniform fashion" (2015, p. 34).

Another dimension of citizen access and use is that open data practices must remain sensitive to the value of indigenous information and knowledge. In this respect, the arguments of Darch and Underwood (2002) still have relevance:

> The technology of the information age has proved for the most part robust and attractive, with the potential to be a driver of social change rather than merely a consequence of developing social need. Such powerful forces have a destructive as well as a shaping consequence. The baleful effects can already be seen in communities where the value of indigenous knowledge is being ignored in favour of documentary knowledge from the outside. (Darch & Underwood, 2002, p. 34)

This concern is particularly relevant to environmental management, where indigenous knowledge is critical. Open data efforts designed to promote public participatory governance in the environmental management sector will need to include measures

to ensure that the necessary value is placed on information and knowledge produced by indigenous and local communities, in line with the objectives of the recently-tabled Protection, Promotion, Development and Management of Indigenous Knowledge Systems Bill (RSA, 2016a).

Finally, in recognition of the realities of South Africa where, for the reasons discussed in this article, many of the people most impacted by environmental matters will not be able to fully benefit from environmental management open data, it is necessary for there to be other forms of information disclosure and feedback – via, for instance, offline consultations and proactive collaborations with communities. Such face-to-face engagements will continue to be essential to enabling inclusive public engagement. And these engagements must necessarily be geared towards free, prior and informed consent of communities in environmental management matters.

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MOOCs as "Semicommons" in the Knowledge Commons Framework

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Abstract
The commons approach to knowledge governance is an increasingly popular and successful model for mediating and explaining the ways in which knowledge producers and users, institutions, and shared information resources, interact in social and cultural domains. There is a growing body of literature on the knowledge commons, to which this article seeks to contribute by offering an analysis of massive open online courses (MOOCs). The study outlined in this article deployed the knowledge commons research framework developed by Madison, Frischmann and Strandburg (2010). This framework attempts to align studies of knowledge commons by providing a structured yet flexible set of research questions that emphasise the dynamic relation between default governance regimes (such as proprietary intellectual property rights), tools and infrastructure, and social and cultural norms. The study determined that the MOOC environment exhibits some characteristics of a knowledge commons, and thus the Madison et al. (2010) framework can be productively applied in this context. In addition, the study found that, due to the generally conventional copyright paradigms and varying degrees of openness within the proprietary MOOC platforms, MOOCs can be considered a type of what Madison et al. (2010) term a "semicommons". Furthermore, because access to learning resources, a key element of access to knowledge (A2K), is an important driver of development, and because openness is an important facilitator of that access, the semicommons status of MOOCs (as learning resources) to some extent mitigates their contribution to increased A2K.

Keywords
knowledge commons, semicommons, massive open online course (MOOC), copyright, access to knowledge (A2K), development

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1. Introduction

In the context of increasing levels of openness in society and access to information precipitated by the rise of the World Wide Web (Weller, 2014), models are needed to explain the ways in which knowledge producers and users, shared information resources, and institutions, interact in social and cultural domains (Madison, et al., 2010). The knowledge commons research framework (Madison et al., 2010) provides one such model, and has been productively applied both by the framework's authors (to such varied contexts as Wikipedia, patent pools and open source software) and by other researchers (Frischmann et al., 2014). The framework has not, however (to the best of my knowledge), been applied in the context of education.

This study is informed by the fact that education and access to knowledge (in the form of educational materials) are major drivers of economic and social development. Given the apparent democratising potential of Internet-enabled open education (OE) and OE-adjacent models such as the so-called massive open online course (MOOC), there is a need to question how effective these models may be in promoting access to knowledge, or in serving as knowledge governance regimes in and of themselves.

The study outlined in this article examined the MOOC phenomenon through the lens of the knowledge commons research framework offered by Madison, Frischmann and Strandburg (2010). The Madison et al. (2010) framework was adapted from the Institutional Analysis and Development (IAD) framework developed by Ostrom (2005). The research took the form of a desktop case study, using MOOCs as a site for the application of the knowledge commons research framework.

In order to provide a complete account of the study, the next section of this article (Section 2) provides a general introduction to the concept of commons, followed by presentation of the Madison et al. (2010) knowledge commons research framework. Section 3 briefly establishes the link between education and development. Section 4 explains the rationale for using the Madison et al. (2010) research framework in the context of MOOCs, and describes how the study applied the framework to the MOOC environment, generating the article's analysis and, as outlined in Section 5, its conclusions.

In order to populate the knowledge commons research framework and address representative research questions provided by the framework authors, the study used existing research and literature on the history and development of MOOCs. In the analysis, the study gave particular consideration to the functions of intellectual property (IP) – specifically copyright, as the default knowledge governance regime governing many educational resources – in what Benkler has termed the "increasingly permeable boundaries between the university and the world" in "the networked information economy" (2008, p. 55). Among the conclusions that emerged from the study, as outlined in Section 5, were that there are copyright tensions inherent in

MOOCs, chiefly in respect of:

- how conventional notions of copyright "ownership" are disrupted with regard to course content and user-generated content, specifically in relation to MOOC platform-providers' terms of use and institutional (IP) policy frameworks; and
- use of third-party content within MOOCs, including fair use/fair dealing.

Accordingly, the study was able to reach the conclusion that the generally proprietary copyright environment around MOOCs means that, when scrutinised via the knowledge commons research framework, MOOCs appear to represent a type of what Madison et al. (2010) call "semicommons".

2. Understanding the commons

The commons approach

The commons approach to resource management has its origins in the biophysical realm, as a means of ensuring long-term availability, sustainability and (usually) equity of access to natural or physical resources (or infrastructure). The resources are not owned but rather held "in common" by a community, and all members of the community have an equal claim in supporting the resources' survival. Examples from the physical environment include communal grazing lands; agricultural fields and forests; rivers, seas and oceans; the atmosphere and electromagnetic spectrum; and roads, highways and bridges. Access to these resources is generally free, but the resources themselves are rivalrous, meaning they are subject to depletion and exclusion if not managed correctly. In addition, because – in a "commons" sense – the resources interface with a community, they are subject to the behaviours and intentions of human actors (Hess & Ostrom, 2007, p. 4).

The concept of commons, therefore, transcends consideration at a purely physical level, as Frischmann, Madison and Strandburg (2014) point out in their general definition:

> Commons refers to a form of community management or governance. It applies to resources, and involves a group or community of people, but commons does not denote the resources, the community, a place or a thing. Commons is the institutional arrangement of these elements. (Frischmann et al., 2014, p. 2)

Much of the foundational work on commons as sites of scholarly research is provided in the work of Ostrom, whose IAD framework offers a useful tool for empirical study of commons of various kinds and in various contexts (Ostrom, 2005). The IAD framework disaggregates the constituent elements of a commons: the resources, the community, the rules that govern the interaction between these, the "action arenas" where these interactions play out, the outcomes and results of the interactions, and

how those outcomes feed back into the initial conditions of the system (Ostrom, 2005). In addition, the work of Hess and Ostrom (2007) provides an initial attempt at implementing the study of commons in the realm of intellectual resources – although as Hess and Ostrom point out, the study of so-called "knowledge commons" has a distinct origin in the historical narrative of enclosure and openness.

Delineating the knowledge commons

In contrast to a biophysical commons, a knowledge commons consists of "resources" that are non-rivalrous by nature, placing a different set of imperatives on the management or governance of these resources and making a different set of assumptions about the reasons for participating in such commons (Hess & Ostrom, 2007). In this context, any piece of information, body of knowledge, or result of creative activity, at whatever level of construction – essentially any product of the mind or intellectual effort – can be considered a resource in a knowledge commons. Madison et al. (2010) consider knowledge commons as

> environments for developing and distributing cultural and scientific knowledge through institutions that support pooling and sharing that knowledge in a managed way […] with limitations tailored to the character of those resources and the communities involved rather than left to evolve via market transactions grounded solely in traditional proprietary rights. (Madison et al., 2010, p. 659)

Thus, for Madison et al (2010), the defining characteristics of a knowledge commons, i.e., those characteristics that distinguish it from a biophysical commons, are the nature of its resources (i.e., non-rivalrous cultural or scientific knowledge), and the specific way the management of those resources departs from the default rules (i.e., in this case, IP rules) that typically govern such resources when they are in non-commons-oriented conditions.

The terms "knowledge commons", "information commons", and "cultural commons" can be, and are, used fairly fluidly and interchangeably in the literature (Hess & Ostrom, 2007). In their foundational work for the systematic study of knowledge commons, Madison et al. (2010) provide the clearest formulation of the concept, referring to "constructed commons in the cultural environment" (2010, p. 659). This formulation conveys both the wide range of resources that can be considered as part of a commons, as well as the inclusive nature and rationale for the systematic study of such environments. The terminology also hints at an underlying characteristic of a knowledge commons: since "knowledge" is constructed, knowledge is both the input and the output: it is both the "raw material", if you will, and the "end product" of the activities within a knowledge commons. For the purposes of this study, the term "knowledge commons" is preferred.

Central to operation of a knowledge commons is the fact that not only is a common "store" of knowledge not depleted by one person's appropriation of any particular "piece" of it; the cumulative nature of information and knowledge means that whatever a person may produce as a result of her or his interaction with that knowledge can be considered a public good, so long as it is contributed back into the common store (Hess & Ostrom, 2007). This is what Frischmann (2008, p. 305) refers to as "spillover", i.e., "benefits realised by one person as a result of another person's activity without payment". (This spillover effect assumes, of course, that the commons in question has an open nature, which is not necessarily a given.)

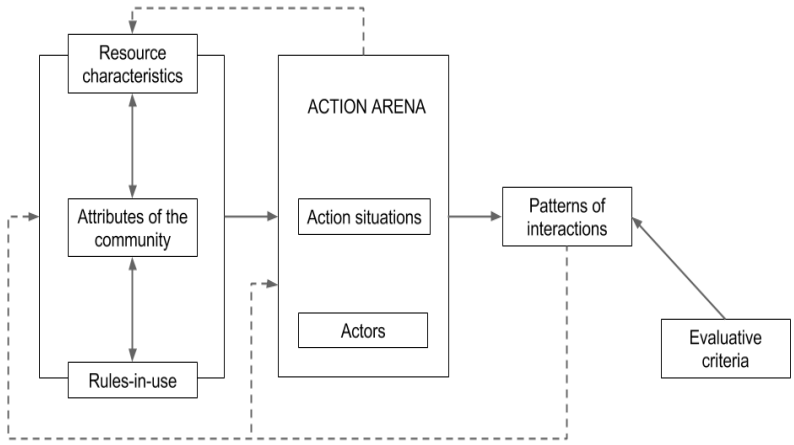
The term "commons" "can be constructive […] [b]ut a commons is not value laden – its outcome can be good or bad, sustainable or not […]", depending on the particular social dilemmas that act on or arise from it (Hess & Ostrom, 2007, p. 14). This foregrounds the need for an understanding not only of the background history and narrative of a particular commons, but also of its objectives and motivations, specifically the objectives and motivations of its members. That is where the Madison et al. (2010) knowledge commons research framework departs most significantly from the IAD.

In addition to the "classical" knowledge commons (in as much as one could imagine such a thing), Madison et al. (2010) argue that there also exist many " 'semicommons' – complex combinations of private rights and commons, some of which are constructed at the 'macro, system level' of law, and some of which are constructed at the 'micro, contextual level' of cultural commons" (Madison et al., 2010, p. 668, internal citations omitted). A "semicommons" combines features of a knowledge commons with social norms and formal knowledge governance regimes such as IP regimes (Madison et al., 2010).

The knowledge commons research framework

As stated above, the Madison et al. (2010) knowledge commons research framework (hereinafter referred to simply as "the framework") is adapted from the IAD framework developed by Ostrom. The application of the IAD framework to the domain of knowledge commons was in many respects fairly obvious, but Madison et al. (2010) found that some refinement was necessary in order to capture all of the nuances and complexities inherent in the information environment. The basic layout of the framework remains similar to the IAD framework in its disaggregation of the constituent elements of a commons environment, but with less focus on outcomes and more opportunities for dynamic interaction and feedback between elements. This results in a less linear progression than that of the IAD framework, and more opportunities for "nesting" of a particular commons within a larger cultural environment (Madison et al., 2009) – or, indeed, for nesting of a smaller "semicommons" within a larger commons (Madison et al., 2010). The framework is represented graphically in Figure 1 below.

Figure 1: The knowledge commons research framework



Source: Madison et al. (2010, p. 682)

As well as a graphical model, the authors provide a suite of representative research questions to consider when applying the framework in conducting a case study (Frischmann et al., 2014, p. 20). The questions are clustered into the broad categories of:

- background environment: e.g., what is the context and "default" status of the particular commons environment?
- attributes (both of resources and of community members): e.g., what is pooled, who may contribute, and how do contributors interact with the commons?
- goals and objectives: e.g., what is the motivation for participation, and what are the history and narrative of the commons?
- governance: e.g., what rules govern interactions, and what institutional structures bear on the commons?
- patterns and outcomes: e.g., what benefits, costs and risks arise from the commons?[1]

The questions align with the areas of the graphical model in Figure 1, and can be applied selectively according to each particular case, as some questions may be more or less relevant depending on the specific characteristics of the commons under examination.

In order to consider the "action arena" component of the framework, it would be necessary to analyse a particular MOOC in detail, which is beyond the scope of

1 A comprehensive list of the research questions is available at http://knowledge-commons.net/publications/gkc/research-framework

this study. Thus, in deployment of the framework, the study considered MOOCs generally, paying particular attention to the first, second and third areas of the model as outlined in Figure 1, namely "resource characteristics", "attributes of the community", and "rules-in-use". The study also focused on the "patterns of interactions" and "evaluative criteria" components of the framework, as illustrated in Figure 1, when considering how effective MOOCs might be at addressing issues of access.

Frischmann et al. (2014) state that the "empirical approach must balance structured enquiry with interpretive flexibility" and foreground the "complexity of the interplay among the characteristics of particular resources, various communities and groups, and the social, political, economic, and institutional attributes of governance" (2014, p. 470). At the same time, Frischmann et al. (2014) state that the value of a harmonised set of questions and structured framework lies in their potential to generate a body of literature that is comparable across time and context, thus facilitating the selection of theories to explain the existence of commons and the rules and norms that govern them. To this end, although my inquiry was structured according to the schematic elements in Figure 1, it was the representative research questions – with their emphasis on narrative – that most strongly shaped the rationale for, and course of, the investigation.

IP dimensions

Madison et al. (2010) assert that theoretical understanding of knowledge commons

> is critical for obtaining a more complete perspective on intellectual property doctrine and its interactions with other legal and social mechanisms for governing creativity and innovation, in particular, and information and knowledge production, conservation, and consumption, generally. (2010, p. 657)

The same authors submit that the study of IP should accommodate nuanced perspectives on openness, so as to acknowledge the broad array of commons arrangements that exist between total enclosure and open access, where "[d]efault rules of intellectual property […] may be combined with licenses and contracts, with social norms, and with cultural and other institutional forms […]" (Madison et al., 2010, p. 669).

Furthermore, there is a growing understanding that the highly social and cultural nature of creativity and knowledge production – especially in a digital paradigm – means that they cannot and should not be governed or considered within "a simple set of property rules to incentivize individual innovative and creative efforts" (Madison et al., 2010, p. 669). Therefore, "[t]he question for both public policy and legal theory becomes how best to use legal and other tools to encourage the growth and

persistence of creative, sustainable, and equitable cultural environments" (Madison et al., 2010, p. 669).

As opposed to the biophysical paradigm, where the focus of resource management is generally on sustainability, a knowledge commons usually seeks, additionally, to foster growth and development. Thus, analysis of a knowledge commons should go beyond consideration only of the management and sharing of resources within the community, and extend to looking at resources that are potentially created by the community and transferred outside of the commons for the benefit of the general public (Madison et al., 2010). Madison et al. (2009) summarise the matter thus:

> Questions of knowledge production, distribution, and growth exist side by side with questions of the sustainability and stewardship of cultural institutions, disciplines, and forms of knowledge. In the cultural environment, commons play a key role, and perhaps a central role (along with proprietary rights and government subsidies, among other things), in mediating competing and complementary individual and social interests in each of these processes. (Madison et al., 2009, p. 373)

As indicated earlier, a knowledge commons is not necessarily "value laden", i.e., its value will depend on its outcomes and sustainability. But Madison et al. (2010, p. 708) assert that knowledge commons, in promoting "openness" – by deviating from the "default rules of exclusion" associated with IP regimes such as copyright – "are often welfare-enhancing in regard to promoting valuable spillovers of information and knowledge distribution". Such spillovers can be of particular benefit in the context of access to learning materials, thus making a knowledge commons a potentially valuable access to knowledge (A2K) vehicle.

3. Education and development

The relationship between education and development is well established, and increasingly well-understood. Okediji (2006) notes the importance of "education and basic scientific knowledge" to "creating an environment in which domestic initiatives and development policies can take root" (Okediji, 2006, p. 2). As Okediji puts it, "[a] well-informed, educated and skilled citizenry is indispensable to the development process" (Okediji, 2006, p. 2). There can be no doubt that education is essential not only to poverty reduction and economic development at national and global levels, but also to human development, by enabling people to make choices that fulfill their human potential. And when development is considered not only on an economic basis, but also in social and cultural terms, then education becomes even more essential. According to Drache and Froese (2005):

> Developing skills for the information economy requires raising literacy rates with a greater investment in education – an area of primary

> importance for developing nations. As literacy levels rise, culture becomes more than entertainment; it becomes part of a strategy for social cohesion and inclusion. (Drache & Froese, 2005, p. 28)

Indeed, Article 26 of the United Nations Universal Declaration of Human Rights (1948) frames education unequivocally as a basic human right, stating that "[e]veryone has the right to education […]" and "[e]ducation shall be directed to the full development of the human personality […]".

Effective and meaningful education is heavily dependent on the availability of, and access to, suitable learning materials (see Armstrong et al., 2010). The Cape Town Open Education Declaration (2007) envisions "a world where each and every person on earth can access and contribute to the sum of all human knowledge", and where "everyone should have the freedom to use, customize, improve and redistribute educational resources without constraint". The emergence of a global open education movement, linked to the rise of information and communications technologies (ICTs), has gone some way to increasing and democratising access to educational materials (Armstrong et al., 2010). However, significant cost and other barriers to access remain, especially in developing countries, where huge numbers of people still lack Internet access (Internet.org, 2014). Inequities in access to education are often exacerbated by geography, socio-economic status, and gender (Armstrong et al., 2010). It has been shown that

> [a]s […] societies redefine gender roles, corresponding values, rules, institutions, and family practices are transformed in new ways. Identity becomes a strategic resource to facilitate the active participation of both genders in the public life of southern societies. Rising literacy rates are a close ally in this process. (Drache & Froese, 2005, p. 28)

Thus, from the foregoing, it can be seen that access to learning materials is a key driver not only of socio-economic development, but also of increasing equality. Notwithstanding the challenges mentioned above and those that will be presented in the following analysis, MOOCs – as a form of knowledge commons – present an opportunity to expand access to learning materials, and thus to knowledge.

4. Application of the knowledge commons research framework to MOOCs

Although MOOCs do not necessarily fit squarely into the knowledge commons paradigm, the inquiry proceeded from the premise that the MOOC environment exhibited sufficient commons characteristics to justify an application of the knowledge commons framework. It was anticipated that framing MOOCs in this manner could contribute to future development of fruitful comparisons, e.g., placement of the MOOC phenomenon into context alongside other (more or less) effective commons models, in order to compare governance structures and the respective models'

potential for long-term sustainability, optimisation of benefits, and impact. The aim was for the application of the framework to the MOOC environment to yield a structured and contextualised view of the resources because, as Madison et al. (2010, p. 677) point out, "[t]he framework approach recognizes the crucial importance of the interplay between the characteristics of a commons resource and the social, political, economic, and institutional arrangements for its governance in which it is embedded".

Let us now turn to the outcomes of my initial attempt at applying the framework to MOOCs. It is important to mention at this point that there are two more-or-less distinct streams of MOOC: (1) the so-called "connectivist" MOOCs, or "cMOOCs", which were the earliest prototypes, emphasising connections between participants in order to fulfill some of the learning requirements; and (2) the more common "constructivist" or content-based "xMOOCs".[2] The emphasis in cMOOCs is less on content and more on the learning experience and elements of human interaction, which are much more difficult to provide at scale. It could be argued that cMOOCs, by relying more on interaction between community members, place more emphasis on the "action arena" aspect of the model presented in Figure 1 above, and thus exhibit different commons characteristics from the more "content-heavy" xMOOCs. In any case, it is the arguably less-pedagogically-open and less advanced xMOOC model that has achieved greater prominence (Weller, 2014), having been adopted as the model of choice by the three major MOOC providers introduced below in the "community attributes" section. This model therefore informed the course and focus of this study.

MOOCs' resource characteristics

As indicated earlier, the MOOC acronym refers to "massive open online courses". Although there is some contention, it is generally accepted that in relation to MOOCs:

- "massive" typically means large numbers of enrolment;
- "open" means that the courses have no formal requirements for participation;
- "online" means that the content is offered in a digitally mediated, generally Internet-based, environment; and
- "course" means that it is a structured learning experience, conceived and delivered as a coherent and cohesive whole.

Since their inception, various types and definitions of MOOCs have emerged, and various sub-models have been identified, as a result of providers and institutions combining MOOC elements in novel ways to produce MOOC variants, e.g., open boundary courses, and wrapped MOOCs, both of which function in a relatively formal curricular space (Czerniewicz et al., 2015). Although the approaches vary,

2 For a thorough analysis of this point, see www.elearnspace.org/blog/2012/07/25/moocs-are-really-a-platform

the four elements suggested by the acronym and enumerated above – massive, open, online, course – are generally common to all MOOCs. This inquiry focused on MOOCs produced by universities, and, accordingly, adopted the following definition, from Jones and Regner (2016), of a university MOOC:

> (1) a free educational course – (2) delivered entirely online – which is (3) designed and taught by professors at accredited universities yet (4) not necessarily part of a degree program or resulting in credits that can be counted towards a degree. (Jones & Regner, 2016, p. 5)

The term "free" requires some clarification, as there is a distinction to be made between "free to access" and "free to use". The term "open access" is a common trope in the discourse around openness – and, by extension, the commons – and is specifically used in relation to access to scholarly research articles. But in the context of this study it is used more generally, i.e., to discuss the degree of openness of access to MOOCs and their constituent elements. The distinction between free to access and free to use is often characterised as *gratis* versus *libre*, the former indicating free to access without cost, and the second indicating not only free to access without cost but also free to use and re-use with limited restrictions only. The ability to freely use, re-use and adapt resources is seen by many as a central tenet in the open paradigm (Weller, 2014). As shall be seen in the analysis below of rules-in-use, although the university MOOC model necessarily operates on a *gratis* basis with regard to resources, many MOOCs adopt a fairly conventional "all rights reserved" copyright paradigm, i.e., not a *libre*-oriented paradigm. However, at the same time, many MOOC providers do make use of open licensing (e.g., Creative Commons licences) to facilitate *libre* use of the resources within their courses. This analysis proceeded on the assumption that *gratis* access is sufficient for a MOOC to be analysed via the knowledge commons research framework, i.e., a *libre* approach is not an essential feature of, or prerequisite for, existence of a commons. There is, however, a tension here with the ideal that a commons should transfer benefits outside of the community, and this distinction informed my eventual finding that MOOCs may be more accurately defined as a kind of "semicommons".

The first MOOCs to be named as such appeared on the higher education landscape in 2008 – although people had been running open courses and releasing open courseware before then.[3] The format only really came to wider public attention in

2012, which Pappano (2012) has called the "year of the MOOC". Courses typically consist of a combination of video/audio lectures, text documents, and assessments graded either by a computer or by others enrolled in the same course. Delivery and

3 MIT's OpenCourseWare project (http://ocw.mit.edu/index.htm), an early precursor to MOOCs and the first open educational resource (OER) initiative to really achieve global recognition, was first announced in 2001.

facilitation are typically online, either through a purpose-built learning environment or an ad hoc assemblage of digital tools and platforms such as blogs, forums, and video hosting sites like YouTube. Importantly for the copyright discussion below, each of the course elements may have a separate and different creator or owner.

The generalised nature of the content and structure means there are no institutional or pedagogical limits to the number of students who can enrol in any given course, and although MOOCs are typically developed by university faculty along traditional syllabi and curricula, they are generally taught with minimal intervention or involvement from the developers (Jones & Regner, 2016).

MOOCs' community attributes

The infrastructure provision for MOOCs is usually outsourced to independent platform providers. These providers host the course content, control access, and offer support and administrative assistance, usually through proprietary software solutions. Most of the providers also offer course participants some sort of formal certification, usually for a fee, for courses they have completed. Many of these providers are commercial, for-profit enterprises, attempting to develop a workable business model out of the MOOC phenomenon.

At the global level, the three largest MOOC platform providers are:

- US-based Coursera, which has roughly 50% market share in terms of participants (some 17 million registered users globally);
- US-based EdX, with EdX and Coursera together controlling roughly 50% of the MOOC market in terms of courses offered (to date around 4,200 courses have been developed by over 500 universities); and
- UK-based FutureLearn, which grew by 275% in 2015, and is now ranked, in terms of enrolments, as the third-largest platform provider behind Coursera and EdX (Shah, 2015).

Of these three, only EdX is non-profit and has a commitment to open source ideals, i.e., the software for the EdX platform – Open EdX – is available for use under an open source software licence. According to the Open EdX website:[4]

> Open edX is the open source platform that powers edX courses. Through our commitment to the open source vision, edX code is freely available to the community. Institutions can host their own instances of Open edX and offer their own classes. Educators can extend the platform to build learning tools that precisely meet their needs. And developers can contribute new features to the Open edX platform.

The arrangements between content providers and platform providers are contractually managed, and are usually mutually beneficial: the platform providers cultivate huge

4 See https://open.edx.org/about-open-edx

audiences, and – seeking to develop brand cachet – use the promise of massive publicity and exposure to recruit content from the top institutions (Weller, 2014).

Although MOOCs are still, by and large, free to access, they are not, of course, cost-free in terms of development. Most of the investment – such as capital, time, and resources – comes from the institutions, which have their own motivations for participating in commons of this sort, including, potentially, the ability to reach significantly higher numbers of learners; to showcase high profile teaching and increase formal enrolment; and, in certain cases, to meet an institutional "social responsiveness" mandate through community engagement with outward facing courses. MOOCs offer universities and other institutions the opportunity to provide informal learning to virtually limitless numbers of people around the world, at no cost to the participants and more or less on the learners' own terms (Czerniewicz et al., 2015). While the early rationale for MOOCs included a very strong open education component (Reich, 2012), the MOOC provision space has subsequently come to be dominated by commercial interests – with a concomitant impingement of *gratis* open access – which some feel severely mitigates MOOC potential for providing access to education (Boga & McGreal, 2014; Weller, 2014).

Much of the focus in developing nascent MOOC business models has been on charging for certification and value-added services, and some platform providers are now beginning to push back the openness of MOOCs by charging for certain core services such as assessment. In this regard, MOOCs exhibit common characteristics with so-called "online creation communities", where open access to resources within the community is contingent on their being made openly available online, but "the open-access condition of the resources does not imply openness when understood as the degree of control and intervention in decision making of those conditions", and "[t]he level of openness to decision making about the conditions of use of the resources (as stated in the license and embedded in the platform of participation), here again, depends on the level of openness of the infrastructure provider" (Fuster Morell, 2014, p. 290).

MOOCs' rules-in-use

The territorial nature of IP means that this part of the analysis was necessarily situated in a specific national context, so for the sake of expedience South Africa's Copyright Act (No. 98 of 1978) (hereinafter referred to as "the Act") serves as an example of national legislation (RSA, 1978). Such territoriality notwithstanding, given the harmonising effect of international instruments such as the Berne Convention and the TRIPS Agreement on copyright legislation internationally, it is assumed that this national context could be easily generalised to other national contexts. The policies and practices at the University of Cape Town (UCT) provided a convenient case for this study, although, since all universities set their own policies, it is not assumed that these policies and practices are representative.

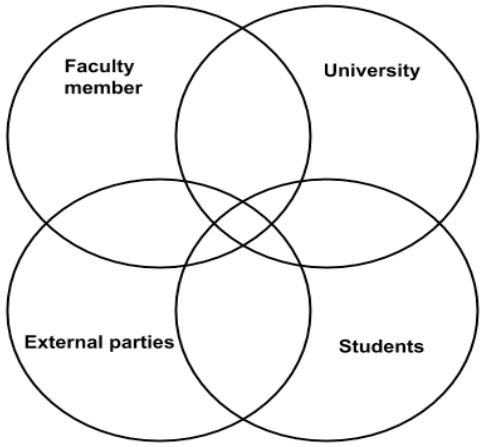
Ownership of copyright

Ownership of copyright in South Africa is conferred by section 21(1) of the Act, which states that:

> (a) Subject to the provisions of this section, the ownership of any copyright conferred by section 3 or 4 on any work shall vest in the author or, in the case of a work of joint authorship, in the co-authors of the work.

The ownership of copyright in university-level courses – be they formal or informal – is complicated by the nexus of interests for various stakeholders. First and foremost is the relationship between the course creators – i.e., the faculty members responsible for the development of the content – and the university that employs them. This is generally a straightforward employer-employee relationship, but may be clouded by special contractual or policy arrangements. Secondly, there is the relationship between the institution/course developers and the holders of copyright in resources that may be incorporated into the course. This relationship is typically managed by a licence agreement, be it a transactional licence for a specific individual use or a so-called "blanket" licence. Then there is the relationship between these parties and the students, or other users of the course, who may also be contributing their own IP in the form of written assignments or – in the online context – forum comments and discussion (see Figure 2).

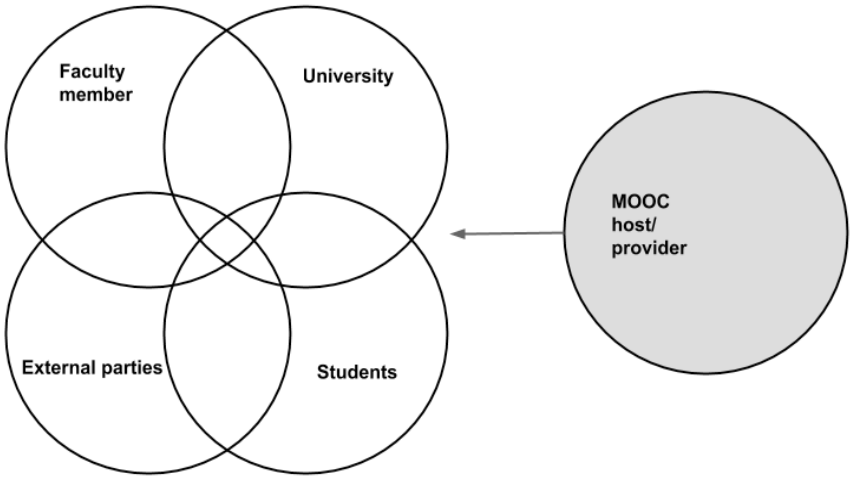
Figure 2: Copyright interests for typical college courses (online or face-to-face)



Source: Porter (2013, p. 11)

These relationships are complicated enough in and of themselves, but they are further complicated in the MOOC context by the introduction into this nexus of the platform provider (see Figure 3).

Figure 3: Copyright interests for MOOCs



Source: Porter (2013, p. 12)

The employer-employee relationship is governed by section 21(1)(b) and (d) of the Act, in this case specifically paragraph (d), which says that:

> Where […] a work is made in the course of the author's employment by another person under a contract of service or apprenticeship, that other person shall be the owner of any copyright subsisting in the work by virtue of section 3 or 4.

This strong assumption of employer ownership is supported by UCT's own IP Policy (hereinafter referred to as "the Policy"), of which section 8 considers "Copyright Protected Works and Course Materials", and says:

> 8.1 UCT holds copyright in:
> […]
> Syllabuses and curricula
> […]
> Specifically commissioned works and course materials that fall outside the scope of normal academic work (UCT, n.d.).

The Policy's section 8.1 is, however, potentially limited by section 8.2, which states that:

> UCT automatically assigns to the author(s) the copyright, unless UCT has assigned ownership to a third party in terms of a research contract, in:
> […]
> Course materials, with the provision that UCT retains a perpetual, royalty-free, non-exclusive licence to use, copy and adapt such materials within

> UCT for the purposes of teaching and or research (UCT, n.d.).

Thus, copyright in university courses would seem to be shared between the "author", i.e., the lecturer or instructor who creates the course materials, and the university which holds copyright in the syllabus or curriculum which determines how the course is taught. In the MOOC context, however, the creation of courses is governed by a contract between the platform provider, the institution, and the instructor. Section 3.2 of the Policy provides:

> […] should any Intellectual Property be created as part of a private contract, or private and professional work that falls within the technical scope of the Creator's employment at UCT, the Creator is bound to disclose this IP to RCIPS. In the absence of an agreement signed by UCT to the contrary, the Intellectual Property will be deemed to be owned by UCT (UCT, n.d.).

Furthermore, Porter (2013) writes:

> [c]reating an online course might well involve "significant use of university resources" – particularly if (a) the faculty member has been specifically given extra support to develop the course (e.g., in the form of course release or grant), or if (b) development of the course has involved significant personnel time of instructional designers, videographers, or multimedia specialists. (Porter, 2013, p. 7)

Thus, while the actual content of a course may be the IP of individual faculty members, since resources like video lectures and assessments are created together with a team of specialists, the copyright in these will be held by the institution, unless the contract between the three parties, i.e., the platform provider, the university, and the instructor, stipulates otherwise. Even within only the institutional context then, the matter of ownership is far from simple. Matters become further complicated when one considers that, as Porter (2013) writes:

> (1) a course is typically an assemblage of copyrighted (and uncopyrighted) materials from a variety of sources; (2) "the original work of authorship" in intellectual property law is itself a highly ambiguous foundational concept, particularly in the age of digital information and digital remix […]. (Porter, 2013, p. 11)

Use of third-party copyright material

The use of third-party copyright material of a literary or artistic nature at UCT relies on a blanket licensing agreement that the university has with the literary collecting society in South Africa, the Dramatic, Artistic and Literary Rights Organisation (DALRO). This agreement authorises the reproduction and distribution of limited numbers and quantities of learning materials on campus. According to the Guidelines

to UCT's Blanket Licence Agreement, the licence fee paid against this agreement is calculated on the university's number of Full-time Equivalent (FTE) students (UCT, 2013, p. 1). The agreement states that:

> [c]opying for people who do not contribute to the institution's FTE, is not covered. Extra-curricular courses e.g. short courses are not FTE contributory and clearance for reproduction for courses of this nature must obviously be obtained transactionally in the way that has been done before. (UCT, 2013, p. 1)

Since MOOCs are usually entirely extra-curricular, and most participants are in no way affiliated to the institution, third-party copyright material used in the development of a MOOC will not usually be covered by the licence, and use of such material must be secured through a transactional licence with the copyright-holder unless a so-called copyright exception and limitation applies. Use of certain copyright material in an educational context may be covered by section 12(1), (3) and/or (4) of the Act. This section provides the general "fair dealing" exceptions from copyright protection of literary and musical works, specifically:

> (1) Copyright shall not be infringed by any fair dealing with a literary or musical work –
>
> (a) for the purposes of research or private study by, or the personal or private use of, the person using the work;
>
> […]
>
> (3) The copyright in a literary or musical work which is lawfully available to the public shall not be infringed by any quotation therefrom, including any quotation from articles in newspapers or periodicals that are in the form of summaries of any such work: Provided that the quotation shall be compatible with fair practice, that the extent thereof shall not exceed the extent justified by the purpose and that the source shall be mentioned, as well as the name of the author if it appears on the work.
>
> (4) The copyright in a literary or musical work shall not be infringed by using such work, to the extent justified by the purpose, by way of illustration in any publication, broadcast or sound or visual record for teaching: Provided that such use shall be compatible with fair practice and that the source shall be mentioned, as well as the name of the author if it appears on the work.

The problem here – as is well known – is the ambiguity and uncertainty around the meanings of "fair dealing", "fair practice", "personal or private use", and "the extent justified by the purpose" (Schonwetter et al., 2010, p. 241). There is almost no case law in South Africa to provide clarity or guidance on these issues. However, it could be argued that these provisions would *not* apply in the – however tangential – for-profit context of a MOOC, and that the courts would, accordingly *not* consider use

in a MOOC to constitute a fair dealing (Educause, 2013).

In any case, the fair dealing exceptions apply only to literary and musical works. Use of all other third-party materials, e.g., artworks or video, would have to be provided by a transactional licence with the copyright holder, unless those materials are openly licensed, for instance with an appropriate Creative Commons licence.

Platform provider's terms of use

In spite of the "open" rationale behind MOOCs, most of the major MOOC platform providers (EdX being the exception) impose fairly restrictive IP policies through their terms of use. An examination of the three platform providers considered in this analysis is indicative. The largest MOOC platform provider Coursera's terms of use page states:[5]

> Subject to these Terms […] we grant you a *limited, personal, non-exclusive, non-transferable, and revocable license* to use our Services.
>
> You may download content from our Services only for your *personal, non-commercial use*, unless you obtain Coursera's *written permission* to otherwise use the content. […] Using our Services *does not give you ownership of any intellectual property rights* in our Services or the content you access. [emphasis added]

The wording of FutureLearn's terms and conditions page is fairly similar (section 6):[6]

> 6.1 Subject to your compliance with these Terms, we grant you a fully revocable, worldwide, non-exclusive, non-transferable, non sub-licensable limited right and licence:
>
> (a) to *access, internally use and display* the Website and Online Content and Courses *as an individual only* at your location solely as necessary to browse and/or participate in the Online Content and Courses as permitted by these Terms; and
> (b) to download permitted content from the Online Content and Courses so that you may exercise the rights granted to you by these Terms.
>
> 6.2 You must *abide by all copyright notices or restrictions* contained on the Website or the Online Content and Courses. You may not delete any attributions, legal or proprietary notices on the Website or the Online Content and Courses. [emphasis added]

5 See https://www.coursera.org/about/terms
6 See https://about.futurelearn.com/terms

But FutureLearn's terms do at least also make the offer that:

> 6.3 Certain Partner Institutions may, *at their own discretion, make available certain Online Content and Courses under a Creative Commons licence (non-Commercial)*. Should Partner Institutions choose to do this, it will be clearly identified on the appropriate Online Content and Courses page of the Website and *we acknowledge that the Creative Commons licence will override certain of these terms and conditions as appropriate*. A full copy of the relevant Creative Commons licence will be available from a link at that point. [emphasis added]

EdX has similar provisions on their terms of service page, but also notably with an express intent to make content openly available through open licensing:[7]

> Unless indicated as being in the public domain, the content on the Site is protected by United States and foreign copyright laws. Unless otherwise expressly stated on the Site, the texts, exams, video, images and other instructional materials provided with the courses offered on this Site are for your personal use in connection with those courses only. *We aim to*
>
> *make much of the edX course content available under more open license terms that will help create a vibrant ecosystem of contributors and further edX's goal of making education accessible and affordable to the world*. [emphasis added]

User-generated content

All three of these platform providers also make extensive claims to the content that users create and share on their platforms. Coursera states:

> To the extent that you provide User Content, you grant Coursera a *fully-transferable, royalty-free, perpetual, sublicensable, non-exclusive, worldwide license to copy, distribute, modify, create derivative works based on, publicly perform, publicly display, and otherwise use the User Content*. This license includes granting Coursera the right to authorize participating institutions to use User Content with their registered students and on-campus learners independent of the Services. Nothing in these Terms shall restrict other legal rights Coursera may have to User Content, for example under other licenses. We reserve the right to remove or modify User Content for any reason, including User Content that we believe violates these Terms. [emphasis added]

EdX has similar wording:

> By submitting or distributing your User Postings, you hereby grant to edX a *worldwide, non-exclusive, transferable, assignable, sub licensable, fully paid-*

7 See https://www.edx.org/edx-terms-service

> *up, royalty-free, perpetual, irrevocable right and license* to *host, transfer, display, perform, reproduce, modify, distribute, re-distribute, relicense and otherwise use, make available and exploit* your User Postings, *in whole or in part, in any form and in any media formats and through any media channels (now known or hereafter developed).* [emphasis added]

FutureLearn provides an acknowledgement of individual ownership of the content, but still with extensive licensing provisions (section 7):

> 7.2 *We do not claim ownership of any Learner Content you may submit or make available* for inclusion on the Website or Online Content and Courses. Accordingly, subject to the licence granted to us and any applicable Partner Institution, *the Learner will be the sole and exclusive owner of any and all rights, title and interest in and to the Learner Content*. [emphasis added]
>
> 7.3 With respect to any Learner Content you submit to us (including for inclusion on the Website or Online Content and Courses) or that is otherwise made available to us, *you grant us an irrevocable, worldwide, perpetual, royalty-free and non-exclusive licence to use, distribute, reproduce, modify, adapt, publicly perform and publicly display such Learner Content* on the Website and/or in the Online Content and Courses *or otherwise exploit the Learner Content, with the right to sublicense such rights (to multiple Learners), for any purpose associated with the provision of the Website and the Online Content and Courses*. We reserve the right to remove any Learner Content without prior notice at any time and for any reason. [emphasis added]

Given the above approaches to copyright and licensing, the MOOC model of provision at a macro level, and even individual MOOCs at a micro level, should most accurately be viewed as a type of what Madison et al. (2010) describe as a "semicommons" or "limited commons", i.e., a commons with resources and characteristics "that are partly open and partly closed, usable by members and sometimes by the public at large, though not always on a purely 'free' basis" (Madison et al., 2010, p. 669).

MOOCs' patterns of interactions

The MOOC phenomenon could be said to have arisen out of a crisis in higher education, although, as is discussed below, this narrative of crisis is somewhat problematic and limiting. Nonetheless, it can be persuasively argued that MOOCs increase education access not only in developing countries but also some of the most developed economies, such as Canada, the US, the UK and other OECD nations, where the supply of higher education cannot meet demand, and the cost of a university education outstrips the cost of inflation by a factor of 3 to 1 (Hill, 2015). In both developing and developed economies, government subsidy for higher education has steadily declined, leaving many students saddled with massive debt (Anderson, 2013). In this context, the availability of low-cost or free (at least to access), quality-

assured, university-level education would seem like a promising solution to a broken system.

Most of the major MOOC platform providers will credit at least part of their rationale to the democratisation of learning as a social good. Among the three leading platform providers mentioned above, Coursera states its mission as simply to "provide universal access to the world's best education",[8] while EdX offers to "[i]ncrease access to high-quality education for everyone, everywhere; [e]nhance teaching and learning on campus and online; [a]dvance teaching and learning through research",[9] and FutureLearn places a strong emphasis on "social learning", aligning themselves more with the connectivist paradigm.[10] Some commentators offer a more cynical perspective, however, citing the involvement of venture capitalism and the so-called "Silicon Valley" narrative of MOOCs as a disruptive technology panacea to the "broken system" for their phenomenal proliferation (Weller, 2014).

While some MOOC platforms have started to generate revenue – Coursera, for instance, was reported to be generating from certificate sales around USD1 million per month in 2014 (Shah, 2014) – the lack of a clear business model, and significant institutional investment with relatively little (at least financial) return for the universities and other institutions developing the content, seems to point to a different set of motivations for these institutions. Such motivations could include, most obviously of course, the democratisation of access to education, and the publicity and exposure mentioned above. The latter could be seen as a form of marketing, leading eventually to higher profile and a greater market share in formal enrolments. This is the so-called "shop window" effect, which could have the added benefit of demonstrating public good, thus justifying ongoing funding and support (Anderson, 2013). MOOCs also provide an innovative space for experimentation with curriculum and pedagogy, and an effective vehicle for embedding discussions about openness generally within an institutional culture. As Weller (2014) points out:

> Openness in education offers many real opportunities to improve education in terms of the opportunities for learners, developing pedagogies based on open practice, distributing free resources and democratising education. Many of these radical changes are being driven by those who work in education, but the Silicon Valley narrative wishes to exclude this part of the story. MOOCs have highlighted how the battle for narrative shapes the direction that an innovation can take. (Weller, 2014, p. 133)

As for the learners taking MOOCs, there is once again a wide range of possible motivations. MOOC-takers are a less homogenous group than is conventional in higher education (Hadi & Gagen, 2016), and can be divided into four broad

8 See https://www.coursera.org/about

9 See https://www.edx.org/about-us

10 See https://www.futurelearn.com/about/our-principles

categories of usage type: completing, auditing, disengaging and sampling. One of the most common arguments against the value of MOOCs is that they suffer from high dropout rates, with massive numbers enrolling in courses, but very few actually starting them, and even fewer completing (Weller, 2014). Although the courses are conceived and designed as complete units, the less formal nature of learning within MOOCs suggests that they should be viewed more as "learning resources (much as a library) that learners can use in very many different ways, with equally diverse learning outcomes" (Anderson, 2013, p. 6). As many MOOC-takers are using the courses in unconventional ways, research has shown that completion rates are perhaps the wrong metric to use in measuring the success of a MOOC, and that the wide range of motivations and demographic variation in the MOOC audience should be taken into account (Hadi & Gagen, 2016).

From the foregoing then, arguably the most obvious (indeed perhaps even the foundational) reason for MOOCs to be considered as knowledge commons is their generation of the spillover effects that Madison et al. (2010) characterise as a defining feature of a knowledge commons.

MOOCs' evaluative criteria

Measuring the outcomes of a knowledge commons is complicated by the fact that benefits are often derived by persons outside of the commons itself – the so-called "spillover" effects (Madison et al., 2010). This is particularly true in the case of MOOCs, where by far the largest constituency in the community is the general MOOC-taking public. Further complicating an assessment of the effectiveness of MOOCs is the fact that the majority of research on MOOCs has been conducted in the global North and developed nations. Very soon after their ascendance, MOOCs were being touted as a possible solution to inequity of access to education in the developing world (Liyanagunawardena et al., 2013). The massive nature and quality-assured origins of the courses provide an opportunity to fill knowledge gaps in the workforces of developing countries for key skills areas. And there has already been some successful experimentation in this regard (Boga & McGreal, 2014). Although, as indicated earlier, MOOCs have been criticised for their low completion rates (some studies finding as low as 4%) (Weller, 2014), current research from the developing world (Garrido et al., 2016) has shown that completion rates in these regions are much higher – upwards of 49% – and that MOOC participants are indeed using the courses as a means of gaining specific professional skills and certification, preparing for further education, and finding a new job. Furthermore, this research has found that MOOC participants in the developing world tend to be younger, from more diverse educational backgrounds, and from lower income populations than their counterparts in the developed world, and that women are more likely to complete courses than men (Garrido et al., 2016).

An oft-cited reason for poor completion rates is the "top-down" pedagogy employed in xMOOCs, and that when these courses are not actually running on the platforms, the contents are closed, greatly compromising their viability as commons resources. This problem does not afflict the fundamentally more open cMOOCs (Kop & Fournier, 2015), where emphasis is on the "action arena" element of knowledge commons analysis. Not everyone shares these misgivings, arguing that constructivist pedagogy has been a part of university education for generations (Anderson, 2013), and acknowledging that some students derive great benefit from "disembodied learning content that is well contextualized in a learning framework and supported by indicators of progress and self-administered assessments", and "do not need mediation of course materials by experts, guides, and peers." (Katz, 2012, p. 20) The affordances of the MOOC model are mitigated, however, by challenges of, for example, access and connectivity in the developing world, and continuing research has provided a more nuanced perspective after the initial hype and enthusiasm (Garrido et al., 2016). Furthermore, although they are developed and presented by accredited institutions, and most platform providers offer some form of certification for completion, MOOCs are not yet necessarily recognised as a legitimate form of higher learning (Anderson, 2013).

Many now see MOOCs as an interesting and innovative, if somewhat limited, solution, with shortcomings including: lack of representation of diverse global contexts, and even cultural imperialism (Boga & McGreal, 2014), with the "current hegemony of western knowledge systems being further entrenched across the world" (Czerniewicz et al., 2014, p. 124); language barriers, as most MOOCs have been developed, and are offered, in English (Boga & McGreal, 2014; Liyanagunawardena et al., 2013); and limitations on re-use of courses and course content due to established, and often restrictive, conventions of IP protection of resources by providers (Boga & McGreal, 2014). Of course, "[a]s is typical for educational technology development, the uses of the technology are running ahead of law and policy" (Porter, 2013, p. 15).

5. Conclusion

Commons-oriented approaches to knowledge governance offer insights into normative cultural methods of knowledge production and dissemination, which function alongside the formal institutional paradigms of IP. The knowledge commons research framework presents a method for analysing knowledge commons so as to better understand the features that define them.

From the foregoing analysis it can be argued that MOOCs exhibit certain knowledge commons characteristics, and combine these with the default copyright regime in such a way as to qualify as examples of "semicommons". Membership in the MOOC community is open to all, although formal contributions are limited to certain types of institutions. And although the course contents themselves are open for anyone to use free-of-charge and dependent only on one's ability to access the Internet, the

courses are generally subject to formal copyright.

Having established the "semicommons" status of the MOOC environment, it becomes possible to assess the effectiveness of the model in relation to the positioning of the study, namely that the openness inherent in the commons promotes access to educational resources. To a certain extent MOOCs are – although they could and perhaps should be doing so to an even greater extent – leveraging dynamic IP environments, vis-à-vis open licensing and commons-type arrangements, to open up access to educational resources and generate valuable spillovers in the form of increased access to knowledge, which in turn stimulates development. To co-opt a sentiment from Madison et al. (2009), speaking in the context of universities, MOOCs and their contributing "institutions and practices" can be seen as constituting "constructed commons", and "treating them as constructed commons offers a more nuanced basis for diagnosing their strengths and weaknesses in the cultural environment than models based primarily on theories of proprietary rights, government subsidies, or the public domain" (2009, p. 402).

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THEMATIC REPORTS

Reflections on Intellectual Property Benefit-Sharing in Employment Situations in Ghana

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Abstract
Among the key justifications for protecting intellectual property rights (IPRs) is that they incentivise and reward human creativity and innovation. The incentive/reward rationale is expected to foster a culture of innovation across jurisdictions and to provide sufficient motivation for further research and innovation. In this thematic report, the author explores the practical relevance of the incentive/reward justification for intellectual property (IP) protection in situations of employment. The author argues that in employment situations under Ghanaian law, the employer enjoys the economic benefits of the fruits of mental exertion to the detriment of the employee; the party actually engaged in the enterprise of creating IP materials receives insufficient incentives. This reality, the author argues, undermines the practical relevance of the core justification for IPRs protection.

Keywords
intellectual property rights (IPRs), protection, justification, incentive, reward, employment, benefit-sharing, Ghana

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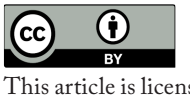

1. Introduction

One theoretical foundation for protecting intellectual property rights (IPRs) is that they provide incentive and reward for human ingenuity. In prosaic terms, the argument is that IPRs protection is a reward for creative and innovative work, and that without IP protection, fewer people would devote their efforts to intellectual activities, because they need the incentive and reward of the legal protection (Gervais & Judge, 2011, pp. 8-9). IPR theorists bolster this foundational justification with various linked proclamations, including: that the efforts that persons put into the creation of intellectual materials often demand enormous expertise, creativity and capital investment, which the law should endeavour to protect (Stiglitz, 2008, p. 1695);[1] that IPR protection promotes the transfer of technology and the creation of wealth; and/or that IPRs provide incentives for the advancement of local knowledge and innovation. The corollary is that the incentives to innovate and invest in high-risk research and development could suffer significant setbacks without a legal framework to secure creative endeavours. Accordingly, deliberate efforts have been made in both policy and academic discourse to craft or construe IP laws and regulations in a manner that advances this vision of a just and attractive creative culture (Fisher, 2001, p.10).

This thematic report explores the practical relevance of the incentive/reward justification for IPR protection in situations of employment in Ghana, and argues that there exists a wide chasm between the justification *de jure* (i.e., positive law justification) and the justification *de facto* (i.e., the real motivation to be creative and innovative) in situations of employment under Ghanaian law. The existing Ghanaian IP legal framework provides no real motivation for employees to create and innovate, and claims that sufficient incentive arises from the salaries paid to employees are untenable. The underlying juridical foundations for securing IPRs are undermined by inequities in the allocation of proprietary rights over knowledge goods created in the course of employment. The reality is that the prevailing modes for protecting IPRs in employment situations serve the needs of employers more than those of employees. The employer is fed the largest portion of the metaphorical carrot of incentive/reward, to the detriment of the employee who is actually engaged in the enterprise of creating intellectual assets, and thus deserves the largest share of the carrot. The result is an undermining of the foundational theoretical justification for protecting IPRs.

Section 2 briefly outlines the general and global theories advanced to rationalise the ideology of the IP system in Ghana. Theories such as the natural rights theory, the incentive/economic theory, the reward theory, and the disclosure/social contract theory have somewhat influenced the architecture of the intellectual property law order in Ghana. Section 3 provides the legal realities of IP ownership in situations

1 See also *Diamond v Chakrabarty* at 304.

of employment under Ghanaian law, and makes suggestions as to how to make the incentive/reward justifications more tangible to employees engaged in creating IP in the course of employment. Section 4 discusses potential means by which benefit-sharing can become more firmly established in Ghana in respect of IP generated by employees.

2. Basic rationales for IP rights protection

The rationale for protecting the fruits of mental exertion finds potent articulation in a number of theories propounded by scholars and policymakers (Fisher, 2001; Merges & Ginsburg, 2004). Theories proffered in defence of IP law systems include the natural rights theory, the reward theory, the incentive theory, and the contract/disclosure of secret theory (see Adusei, 2013, pp. 111-129). These theories have cumulatively influenced the trajectory of the regimes of IPRs and their related jurisprudence in Ghana.

For instance, the natural rights theory and reward theory played a crucial rhetorical role in the design of the copyright law of Ghana. The tenor of the protection of economic rights under the Copyright Act, 2005 (Act 690) reflects this reality: the law grants exclusive economic rights in respect of the exploitation of copyrightable works to the copyright-owner.[2] It requires that the protection for the economic rights of the copyright-owner should subsist for the life of the author and 70 years after the death of the author.[3] The Copyright Act of 2005 also grants authors perpetual protection of the moral rights of authorship and integrity in the work.[4] For proponents of such an approach, "the labours of the mind and productions of the brain are as justly entitled to the benefit and emoluments that may arise from them, as the labours of the body are" (Smith, 2003, p. 103).

The incentive theory, which attempts to establish a causal relationship among IP incentives, inventiveness, and economic progress, has also found ardent articulation in Ghanaian IP law through a number of judicial decisions. In *Copyright Society of Ghana v Afreh*, the Court of Appeal in Ghana set out the underlying motivation to be creative in the following words:

> […] public patronage of [intellectual property] work augurs well for the national economy and it is imperative that every effort be made to let this phenomenon serve as an incentive to authors […]. We must recognize that wherever there are adequate incentives there flourishes a healthy competition as a catalyst for economic growth of any country. (*Copyright Society of Ghana v Afreh* [1999-2000] 1 GLR 135 at 142-143)

2 See section 5 of Act 690.
3 Section 12 of Act 690.
4 Section 6 and 18 of Act 690.

The Supreme Court of Ghana, in *Pearson Education Ltd v Adzei*, stated that "[the] law endeavours to strike a balance between protecting the economic rights of owners […] and the need to encourage the free exchange and dissemination of ideas which is vital for the development and progress of any society" (*Pearson Education Ltd v Adzei* [2011] 2 SCGLR 864 at 867). The expectation, as captured in the 2003 Memorandum to the Copyright Bill that led to Ghana's 2005 Copyright Act, is that "the protection offered by the revision of [intellectual property] law will nurture and promote the creative talents of the citizenry and thus contribute to the development of this country" (Republic of Ghana, 2003b, at i). Following a similar logic, the 2013 Memorandum to Ghana's Plant Breeders' Bill stated that the object of the proposed law was to "acknowledge the achievements of breeders of new varieties by making available to them an exclusive right on the basis of a set of uniform and clearly defined principles" (Republic of Ghana, 2013, at i.). It is thus envisaged that such legal safeguards will promote the growth of the seed industry and safeguard the lawful right and interest of plant breeders.

The belief, as articulated by Locke in his just deserts principle for physical property and extended by others to immaterial goods, is that, "every *Man* has a *Property* in his own person. The *Labour* of his body, and the *Work* of his hands, we may say, are properly his" (Locke, 1690, in Locke & Macpherson, 1980, para. 27, emphasis in original).[5]

The architecture of the regime of patents in Ghana is influenced by the disclosure/social contract theory. The idea of this theory is that the grant of a patent right constitutes a bargain between the inventor/creator and the public, in which the creator obtains exclusive IPR protection for 20 years in exchange for giving the public information about the work. Under the Patents Act, 2003 (Act 657), this disclosure is expected to take place in the form of publication of the invention and the details of how it works in the course of the application process (sect. 5(5) of the Patents Act, 2003). This theory also assumes that the information disclosed in return for the grant of an exclusive legal right is enough for the public to work the invention. As Amani (2009, p. 46) explains, "the disclosure essentially functions as
a 'how-to' guide providing information so that others are able to make and use the invention".

5 The full text of Locke's famous paragraph 27 of the *Second Treatise* reads: "Though the earth, and all inferior creatures, be common to all men, yet every *Man* has a *Property* in his own *person*: this nobody has a right to but himself. The *Labour* of his body, and the *Work* of his hands, we may say, are properly his. Whatsoever then he removes then he takes out of the state that nature hath provided, and left it in, he hath mixed his *Labour* with, and joined to it something that is his own, and thereby makes it his *Property*. It being by him removed from the common state nature hath placed it in, it hath by this *Labour* something annexed to it, that excludes the common right of other men: for this *Labour* being the unquestionable property of the labourer, no man but he can have a right to what that is once joined to, at least where there is enough, and as good, left in common for others" (emphasis in original).

My focus in this exploration is on what I regard as the core justifications for IPRs in Ghanaian law: the incentive/reward theories. The point is that, of the many justifications available, the incentive/reward justifications are the predominant ones in policy and in judicial decisions in Ghana. The study then examines whether or not the workings of IP protection in employment situations in Ghana actually correspond to the theoretical incentive/reward rationale.

3. IP in situations of employment in Ghana: Justifications and legal realities

As outlined above, a central argument in policy, legal and academic discourse is that the incentive/reward offered to IP owners serves as a morale booster of sorts, encouraging persons to apply their creative and innovative talents. It follows that without the "prize" under the legal system, IP, creative and innovative materials would not be made in abundance.

This argument has, however, been undermined by studies that indicate that the IP system administered today is unable to ensure, in many instances, that the reward goes where it is most deserved (Penrose, 1973, p. 27). This is especially true in situations of employment, where the intellectual property rights are predominantly granted to employers-commissioners instead of the rights being granted to the persons actually employed to undertake the job. There is, thus, a wide chasm between the justification *de jure* (i.e., positive law justification) and the justification *de facto* (i.e., the real motivation to be creative) in situations of employment.

In the Ghanaian context, some of the relevant provisions in the country's IP legislation deserve cooptation and analysis *in extensor*. Section 7 of the Ghana's Copyright Act, 2005, broadly in line with the approach taken in copyright laws in many other countries, provides as follows:

> **Employed authors**
> In the absence of any contract to the contrary, the economic right of a work shall vest in an employer or a person who commissions the work where the employed or commissioned author has created the work in the course of employment or commission.

As Amegatcher (2013, p. 54) correctly points out, this standard provision unsettles the core principle in copyright law that the first owner of copyright is the person who created the work. In terms of this section 7 in Ghana's Copyright Act, the basic rule is that the employer enjoys the economic benefits of the IP works created by the employee in the course of employment. The *raison d'être* for this exception in copyright is the assumption that the employer has paid remuneration to the employee, and as a result, the employer ought to benefit from the outcome of such expenditure. The law vests the economic interests in the employer-commissioner, and only the moral interests vest in the employee-author. The employer enjoys the

pecuniary benefits of the intellectual property material, while the employee retains the non-economic/moral interests.

The only potential saving graces for the employee in section 7 are the specifications "in the absence of any contract to the contrary" and "in the course of employment or commission". In the event of a dispute, the employer would have to provide evidence to establish that the work was created in the course of employment. In respect of the matter of a potential "contract to the contrary", reliance has been made in judicial proceedings (see the English case *Beloff v Pressdram* [1973] 1 All E.R 241) on technicalities to distinguish between a contract *of* employment and a contract *for* employment. In Australia, in *University of Western Australia v Gray* [2009] FCAFC 116, the phrase "in the course of employment" was interpreted strictly in favour of the employee to mean that the employment contract ought to expect the employee to invent before the employer can lay claim to the ownership of the IP materials. Thus, where the employer is able to provide credible evidence to the effect that the IP-generating work was created in the course of employment, the labourer will have arguably laboured in vain, except for the salaries earned.

In interpreting the section 7 "employed authors" provision in Ghana's copyright law, Cecilia Koranteng-Addow J., in *Musicians Union of Ghana v Abraham & Another*, held that:

> Where the work was made in the course of the author's employment the copyright became vested in the author's employer. The Plaintiffs who were *mere employees* of either the first defendant or T. Ltd, had no right assigned to them under the agreement between the defendants and thus they could not be owners of the copyrights of the work so as to control its release. Being *mere employees*, they were also not entitled to five percent of the fee payable to owners of the copyright of a musical work [...] and neither could any benefit be discerned in their favour from the contract between the two defendants so as to bring them under the Contracts Act, 1960 (Act 25). (*Musicians Union of Ghana v Abraham & Another* [1982-83] GLR 337 at 338, emphasis added)

The facts on which the above decision was rendered were briefly as follows: the plaintiffs (musical band members) had been engaged to play for a band by the first defendant. During the existence of the employment relationship, the first defendant entered into an agreement with the second defendant, a recording company, granting that company the sole and exclusive right to make recordings of the performances of the band. The plaintiffs, claiming that the first defendant was their agent or manager, sought an order of interim injunction in the High Court to restrain the second defendant from (i) making any further releases of their recorded musical works, and (ii) making any further royalty payments to the first defendant.

The court, however, refused the application on the grounds that the plaintiffs were "mere employees" of the first defendant.

There are significant flaws inherent in granting the employer the economic benefits derived from IP materials created by employees in the course of employment. First, by presumptively vesting the economic rights in the employer, the law fails to fully appreciate the investments made by the employee in creating the intellectual work. This is especially so in the context of copyright, where no provision is made for returns that are much higher than anticipated – and when the employee is not sufficiently compensated by salary payments alone.

Second, the reality is that most employment contracts are either drafted by the employer or are standard-form contracts, and tend to contain provisions that priortise the interests of the employer, who is in the dominant position during contractual negotiations. A contract influenced by unequal bargaining positions will be generally unable to address the inequities inherent in vesting the pecuniary benefits of intellectual creations in the employer. Additionally, the low level of IP law consciousness in Ghana militates against the desire by persons to insist on express beneficial stipulations prior to their signing of an employment contract.

Third, the treatment of employed creator under section 7 of the Copyright Act has the potential to trigger labour/post-labour disputes if an employee insists on the protection of his/her moral interests. In essence, the enjoyment of the moral interest may draw in the economic interests, thereby creating disputes, and vice versa. The relatively dominant employer's interests stifle the somewhat docile moral interests of the employed author: the real labourer becomes a "mere employee" as adumbrated in the above-cited case. In *Ransome-Kuti v Phonogram Ltd* [1976] 1 GLR 220, the High Court found that the moral rights of the author are merely secondary.

A reported example of a dispute that turned on the tension between the economic and moral IP rights of creators working in employment situations occurred in 2006 between Elizabeth Ohene (a well-known Ghanaian journalist) and the Graphic Communications Group Ltd (GCGL). The Plaintiff, GCGL, sued Ohene, a former employee and a former editor of the *Daily Graphic*, for infringement of the company's copyright. GCGL asked the High Court for an injunction to restrain Ohene from incorporating – in her books – articles, editorials and news items published by Ohene in the *Daily Graphic*. The gravamen (i.e., essence) of GCGL's case was that even though Ohene wrote the articles and participated in the writing of the editorials, she did so as an employee, for which her services were paid. The parties eventually settled the matter amicably and the case did not go to trial, with the GCGL Board deciding that having regard to the unique role played by Ohene at a critical time in the history of the *Daily Graphic* and Ghana, she should be granted permission to use the said

materials for the publication of her two books, namely *Thinking Allowed* and *Stand Up and Be Counted* (Amegatcher, 2013, p. 56).

Turning to the patent sphere, the analogous provision in Ghana's Patents Act, section 4, is significantly more favourable to employees than what is contained in the Copyright Act. While section 4(5) provides that "[w]here an invention is made in execution of an employment contract, the right to the patent belongs in the absence of any contractual provisions to the contrary, to the employer," section 4(6) takes it a step further by providing that:

> Where the invention has an economic value much greater than the parties could have reasonably foreseen at the time of the conclusion of the contract, the inventor shall be entitled to a special remuneration, which shall be fixed by the court in the absence of an agreement between the parties.

The Patents Act thus provides avenues for the sharing of the benefits of IP works created in the course of employment. Such a provision is, to my knowledge, unique across the common law world. With this benefit-sharing provision, employees can be assured that where the IP benefits of their labours are substantial, not all of the benefits will go to the employer alone. In the context of copyright, no provision is made for situations where the returns are much higher than anticipated – and at least in situations when the employee is not sufficiently compensated by salary payments alone.

It is my view that this unique benefit-sharing approach contained in the Patents Act should be accorded to all manner of intellectual assets created in the course of employment in Ghana. Furthermore, the benefit-sharing should not be limited by the law to inventions of high economic value, i.e., it should not be limited to cases where the employee-created IP has, as the Patents Act puts it, "an economic value much greater than the parties could have reasonably foreseen at the time of the conclusion of the contract". It is submitted that the benefit-sharing should apply to all benefits, regardless of their economic value.

A regime of IP protection that takes due account of the labour of an employee in the distribution of the benefits derived from the IP would better serve as an incentive than the present regime that treats the employee as a "mere employee". At present, the law's inability – particularly in the case of the Copyright Act, and to a lesser degree in the Patents Act – to take due account of the IP interests of employees undermines the practical relevance of the incentive/reward justifications that are much-trumpeted in IP policy and in legal discourses.

I now turn to an examination of the ways in which benefit-sharing could become more firmly established in Ghana in respect of IP generated by persons in the course of employment.

4. Benefit-sharing modalities

Contracts

One option for attaining a fair allocation of benefits accruing from IP works created in the course of employment is through the adoption of enforceable contracts. Such express arrangements take away the discretion that the law accords to judges, in the course of judicial proceedings, in interpreting the phrase "in the course of employment" or "in the course of the commission", or, in the case of the Patents Act, "an economic value much greater than the parties could have reasonably foreseen at the time of the conclusion of the contract". There is a need to sensitise the public about the position of the law with regard to the ownership of IP works created in the course of employment. Such sensitisation would potentially generate insistence by prospective employees on express IP benefit-sharing terms as part of their employment contracts.

Institutional policies

To obviate the challenge of finding a solution after a conflict has arisen, the University of Ghana developed and adopted its Intellectual Property Policy of 2015.[6] This Policy serves as the guiding contract between the University and its employees/students, and it also applies to visiting academics and visiting students at the University (in the absence of any contract to the contrary). The Policy attempts to define benefit-sharing approaches that would satisfy the needs of both the University and its IP-creating researchers (employees and students).

Paragraph 4.1 of the Policy allows employees to own IP works created without a significant use of the University's resources. Conversely, the University holds the rights over IP works created in the course of employment and with significant use of the University's resources. A "significant use of University resources" is defined to include the use of University-administered funds, University facilities, equipment, resources, time, office space, personnel, and administrative support. In the particular instance of inventions – which are commercialised through the University's Office of Research, Innovation and Development (ORID) – the Policy provides the following formula for sharing royalties that may accrue from such inventions: 40% to the inventor, 25% to the University, 15% for the support of research grants or fellowships, 10% to the inventor's College and its constituents, and the remaining

6 See University of Ghana (2015). Unlike countries such as South Africa, Ghana has no special arrangements in regard to the sharing of benefits from publicly funded research. In the absence of any contract to the contrary, the laws of Ghana treat all institutions equally in regard to IP works created in the course of employment.

10% to an Intellectual Property Fund to be established in support of IP protection, marketing and commercialisation activities.[7]

Legislation

As explained above, potential employees in Ghana are typically not in a position favourable to negotiation of the IP terms of their employment contracts. And the University of Ghana IP Policy only applies to a single, albeit important, institution. Given these limitations with the first two benefit-sharing approaches discussed – contracts and institutional policies – the ideal situation would be to have national legislative amendments to codify benefit-sharing from IP created in the course of employment. Such legislative amendments, and amendments to accompanying regulations, would need to be based on due consideration of both economic and moral rights, would need to provide a formula for recognising both employer and employee contributions to IP, and for sharing of the benefits. Such legislation would also need to contain provisions for non-adversarial mechanisms of dispute resolution, so as to minimise labour disputes and to preserve healthy working relationships between employers and employees.

5. Conclusions

This thematic report has shown that the incentive/reward justifications commonly advanced for protecting intellectual assets in Ghana are not – outside of specific contexts such as the University of Ghana – given practical effect in terms of accrual of benefits from IP created by employees. To reverse this trend, there is a need to sensitise the public about the position of the law with regard to the ownership of IP works created in the course of employment. Such sensitisation would potentially generate insistence by prospective employees on express IP benefit-sharing terms as part of their employment contracts. And at a more fundamental level, because of the inequality of bargaining power between employers and employees, consideration needs to be given to legislative amendments requiring the establishment of regulatory formulas and procedures for fair sharing, between employers and employees, of benefits from all IP created in the course of employment. The use of legislation, and accompanying regulations, to correct the imbalances would ensure that the justification *de jure* translates into justification *de facto* in spurring on human creativity in situations of employment. For now, the incentive/reward justifications have theoretical importance only.

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Geographical Indications (GIs) as Tools for Agricultural Knowledge Governance in Selected East and Southern African Countries

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Abstract
This thematic report looks at geographical indications (GIs) as tools of knowledge governance in agricultural development in selected Eastern and Southern African countries. The author identifies features of GI law in these countries, and concludes that properly-crafted GIs can serve as tools for support of production and marketing of a wide variety of African agricultural resources.

Keywords
intellectual property (IP); geographical indications (GIs); traditional knowledge (TK), agricultural production

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1. Introduction

A geographical indication (GI) is a form of intellectual property (IP) right, European in origin, in which a product carries a sign or name linked to the particular geographical origin of the product. GI-protected products in Europe include cheeses, meats, wines and spirits. A product is given GI protection, i.e., the exclusive right to use the sign or name in question, on the basis of demonstration that the product has unique qualities or reputation linked to the geographical origin signified by the sign or name. (For example, only sparkling wine from the French region of Champagne can bear that geographical name, because Champagne is a registered "controlled designation of origin" regulated by France's Institut National de l'Origine et de la Qualité.)

In recent times, African countries have begun to pay increased attention to GIs as a potential mode of knowledge governance for African agricultural products drawing on localised traditional knowledge (TK). There have been a number of recent developments regarding GIs – at continental, regional and national levels in Africa – as one of the tools through which the value, identity and earning power of TK-based agricultural activity can be enhanced.

The legal means for the protection of GIs can either be *sui generis* or trademark-based. A *sui generis* system is one whereby a law is provided that is specifically designed to provide GI protection. A trademark-based system protects GIs through trademarking tools such as collective marks, certification marks and ordinary trademarks. In this report, my focus is on (existing or proposed) *sui generis* GI instruments.

In Section 2, I identify recent African continental-level initiatives for introducing and establishing GIs, including the activities of the African Union (AU) Commission, the European Commission for Agriculture and Rural Development, the African Regional Intellectual Property Organisation (ARIPO), and the Organisation Africaine de la Propriété Intellectuelle (OAPI). Section 3 identifies legislation concerning GIs at country level in Ethiopia, Kenya, Mozambique, Uganda, and Zimbabwe, all of which have either existing or proposed European-modelled *sui generis* legal regimes for GI protection. Section 3 also identifies GI-relevant products in each jurisdiction, i.e., products that have the potential to qualify for GI protection. Section 4 offers some observations and recommendations.

2. African continental and regional initiatives

The AU Commission's Department of Agriculture and Rural Economy (DREA) has positioned GIs as important tools for linking product origin to quality parameters, in line with AU efforts to promote and support intra-African and global trade (DREA, 2012). In its 2014-2017 Strategic and Operational Plan, the DREA identified awareness creation on GIs among its strategies and actions to pursue, with a view to the development of a continental GI policy framework (DREA, 2014).

In 2011, a joint AUC-EU College-to-College Declaration emphasised the need to support African farmers, fishermen and agri-food producers wishing to make use of the GI system, with the Declaration calling for dissemination of knowledge on GIs, sharing of experiences, and addressing the challenges farmers, fishermen and agri-food producers face if seeking to use the GI (AUC & EC, 2011). As a deliverable linked to the Declaration, the AU Commissioner for Rural Economy and Agriculture and the European Commissioner for Agriculture and Rural Development agreed to convene a joint AU-EU workshop at which developments in the area of African GIs would be reviewed and strategies for further progress discussed. Held in Kampala in November 2011, the workshop drew roughly 60 government officials and high-level GI and product development experts from across sub-Saharan Africa and the EU (AUC & EC, 2011).

In December 2012, an AU Member States' consultation on GIs was convened in Abuja, raising awareness on the importance of linking products, and product quality, reputation or other characteristics, to the geographical locations where they originate. In March 2013, the Pan-African Parliament collaborated with the Southern African Development Community (SADC) for a consultation on GIs with participants from Malawi, Namibia, South Africa, Tanzania, Zambia and Zimbabwe (Egbe, 2013). These consultations were conducted as part of formulating appropriate policies to ensure that farmers acquire rights to key products linked to what they produce, and that they obtain premium prices via such rights (DREA, 2014).

Harare-based ARIPO, as an organisation mandated to facilitate African regional harmonisation of IP laws and regulations, has taken a keen interest in assisting its members "to enact appropriate GI laws [and] work towards the adoption of a regional system on GIs" (Appiah, 2011). In December 2011, the 13th Session of the ARIPO Council of Ministers mandated the ARIPO Secretariat to include GIs in its overall mandate on intellectual property. In 2012, ARIPO signed a Memorandum of Understanding with the European Commission Directorate-General for Agriculture and Rural Development, with the MoU calling on ARIPO and the Commission to "cooperate in matters related to GIs" and "to build capacity among the administrators and stakeholders for a development of a harmonised protection system on GIs" (Appiah, 2011).

Since 2010, Yaoundé-based OAPI – ARIPO's counterpart for West and Central Africa – has cooperated with the French Development Agency (AFD) for development of a GI project for six products, with technical assistance from the French Agricultural Research Centre for International Development (CIRAD). Through this collaboration, three of the products covered under the project have been registered with OAPI as GIs: Oku white honey, Penja pepper, and Ziama-Macenta coffee. Registration with OAPI means that these products enjoy protection in all OAPI member states. Registration was postponed for the other three products

evaluated for GI protection under the project: Dogon shallots, Galmi purple onions, and Korhogo cloth (Chabrol et al., 2015).

3. African national initiatives

There are GI initiatives in a number of African nations, and we now turn to five of those countries: Ethiopia, Kenya, Mozambique, Uganda and Zimbabwe.

Ethiopia

Ethiopia has two pieces of draft legislation that cater to *sui generis* GI instruments: the draft Proclamation for the Registration and Protection of Designation of Origin (FDRE, n.d.1), and the draft Geographical Indications Proclamation (FDRE, n.d.2). Plans are under way to integrate these two pieces of legislation and drive utilisation of GIs for a wide variety of agricultural products. Some of the country's most notable locally specific products are its coffee varieties. Three such varieties – Sidamo, Yigacheffe and Harrar – already enjoy a non-*sui-generis* form of GI protection via their registration as trademarks at international level, including in the EU, the US and Japan (Oguamanam & Dagne, 2014). Other Ethiopian coffee varieties that could potentially qualify for *sui generis* GI protection in accordance with the contemplated Ethiopian legal instruments are Limu, Jimma, Lekempt, Ghimbi and Harenna Forest coffees. Meanwhile, in respect of possible GI products outside the coffee sector, Ethiopia's Ambo herbs, grown in the Western Highlands, have a reputation for their unique taste and character (Zuberi et al., 2014).

Kenya

Kenya already registers GI-relevant products as certification marks and collective marks (Bagal et al., 2013). Since 2001, Kenya has worked on a bill that would provide for *sui generis* GIs. A draft bill was published in 2007, but it has not become law. In the eyes of the supporting Kenyan legislators, *sui generis* protection of GIs would serve to protect consumers from deception, would enhance markets, and would ensure Kenya's compliance with the World Trade Organisation (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) (Njuguna, 2013). Among Kenya's GI-relevant products are specialty tea and coffee varieties, wild silk, Ukambani honey, Yatta and Papaya wines, Echuchuka aloe, and Mount Kenya roses (Ramba, 2013).

Mozambique

Mozambique provides for *sui generis* protection and administration of GIs through its Industrial Property Code (2006) and the Code's Regulations on Appellations of Origin and on Geographical Indications (2009). (An amended Industrial Property Code (2015) came into force in March 2016, but it does not make substantive changes regarding GIs (Abdala & Murrure, 2016).) Mozambique's Industrial Property Institute has been greatly involved in drafting technical specifications in terms of the Industrial Property Code for possible GI protection of Mozambican White Prawns.

Highly regarded due to their quality and unique taste (Jocitala, 2014) and coming predominantly from Mozambique's Sofala Bank, White Prawns are believed to have high export potential.

Uganda

Uganda's Geographical Indications Act of 2013 creates a *sui generis* legal protection system with the following objectives:

> (1) to provide for the protection and registration of geographical indications; (2) to provide for the duration of protection of geographical indications; (3) to provide for the appointment of a registrar; (4) and to provide for remedies for infringement or prohibited use of geographical indications.

The Uganda Registration Services Bureau has called for implementation of the Act to be fast-tracked in order to prevent other countries from trademarking unique goods from Uganda (URSB, 2013). Chief among Uganda's GI-relevant products is Central Uganda's Bark Cloth textile, made from fig tree bark (Katebalirwe, 2011). Bark Cloth production in Uganda is rooted in ancient culture and tradition, starting in the 13th century. The trees are wrapped in fresh banana leaves to protect the bark from insects and dryness. The UN Education, Scientific and Cultural Organisation (UNESCO) has recognised Bark Cloth as "a masterpiece of oral and intangible heritage of humanity" (UNESCO, 2008). Also having strong GI potential are Uganda's Mukono vanilla, known for having the highest vanillin content of any vanilla in the world (Mpeirwe, 2013); its cotton, with its unique smoothness and brightness (Selleyfan, 2012); and its sesame plants, which is said to have the highest oil content in the world. Other potential GI products are Kasese passion fruit, Kawanda passion fruit, Kavare potato, Bugisu coffee and Katuulo pineapple (URSB, ARIPO & EU, 2013).

Zimbabwe

Zimbabwe's Geographical Indications Act of 2001, which provides for *sui generis* protection and registration of GIs, was primarily a result of pressure on Zimbabwe to fulfill its international obligations under TRIPS (Nyakotyo, 2013). However, Zimbabwe does have a number of potential domestic GI products. One such product is Tanganda tea from the Chipinge district, a best-selling brand of tea in Zimbabwe and central Africa. Also notable are Cashel Valley beans from the Chimanimani district, Chipinge and Vumba coffees, Vumba cheese, Nyanga/Inyanga tea, Claremont trout, Mukuyu wine, and Mazoe oranges (Pasipanodya, 2012).

4. Observations and recommendations

Scope of coverage

In comparison with the scope of products covered by GI instruments in the EU, the scope under African existing and draft legislation is broad. For example, Uganda's

Geographical Indications Act defines a GI-relevant "good" as "a natural or agricultural product or animal product or a product of handcraft or industry" (Republic of Uganda, 2013). Under Zimbabwe's GI law, a GI-relevant "product" is defined as "any natural or agricultural product or any product of handicraft or industry" (Republic of Zimbabwe, 2001). Kenya's draft Bill covers "natural, agricultural, food, handicraft or industrial products" (Republic of Kenya, 2007). And under Ethiopia's draft Geographical Indications Proclamation applies to "agricultural products, natural products, handicrafts, [and] industrial products" (FDRE, n.d.2).

In the EU, however, GI protection is mostly applied to processed and manufactured cheese, meat and alcohol products.[1] The EU Regulation on GIs applies to "agricultural products and foodstuffs", and does not explicitly include natural resources and handicrafts (EU, 2012), thus taking a narrower approach than that found in the enacted or contemplated GI laws of the surveyed African countries. The broader scope of GI protection in African countries can be explained by the fact that African GI-relevant products often are not highly processed or manufactured, and are raw or near-raw materials.

The value chain

In Africa, it has been shown that "only a few percent of the final consumer-cost of an agricultural product normally goes to the farmers. The bulk of the value-added in an agricultural product is absorbed by the marketing chain" (AUC & EC, 2011). Many of the GI-relevant products in Africa are sold in their raw material form, processed (and sometimes combined with other varieties of the same product) somewhere else outside of Africa, and then sold at premium prices outside the continent (e.g., Kenyan tea in Pakistan, which is typically blended with other non-Kenyan tea varieties).

Accordingly, a focus of implementation of GI legislation in African countries needs to be on empowering actors at lower points in the value chain – i.e., at the farmer-producer level – to also become higher-level manufacturers and retailers so as to reduce the number of participants (particularly participants outside the product's country of origin) in the value chain.

Geography versus culture-tradition

Implementation of GIs in the EU involves strict geographical demarcations, and monitoring and enforcement of these geographical boundaries of production. The EU distinguishes its GI protection according to three categories, depending on the

1 Currently in the EU, there are 2,945 GIs registered for wines and 327 for spirits. The combined number of registered GIs and pending applications for other agricultural products and foodstuffs is 1,289, of which 240 are for cheese. For the list of wines and spirits, see the EC's DOOR and E-Spirit-Drinks databases at http://ec.europa.eu/agriculture/quality/door/list.html and http://ec.europa.eu/agriculture/spirits For agricultural products and foodstuffs, see the EC's E-Bacchus database at http://ec.europa.eu/agriculture/markets/wine/e-bacchus/indexcfm?&language=EN

degree of geographical connection of a product:

- *protected designation of origin* (if all stages of production of a product are restricted to a particular geographical area)
- *protected geographical indication* (if at least one stage of the production and processing of the product has a geographical connection); and
- *traditional specialty guaranteed (TSG)* (where the product's quality arises from the culture and tradition of production in a region, and not necessarily from the geographical connection) (EU, 2012).

Given that defining, monitoring and enforcing a geographical production zone can be costly, it is my view that implementation of GIs in African countries should, in the short to medium term, focus primarily on identifying, and enforcing, characteristics of the type denoted by the third EU GI type outlined above: the TSG variety of *sui generis* GI. This variety would appear to be less costly to regulate, and would at the same time often be highly suitable to the TK-based attributes of African products (i.e., the TK-based customary, unique agricultural practices from which the raw materials and products emerge).

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Copyright, and Photographs or Videos of Public Art, in South Africa: An Imperfect Picture

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Abstract
The rise of digital photography and videography has made the creation, sharing and commercialisation of high-quality photographs and videos more accessible, in terms of both cost and skills required. This thematic report examines the impact on copyright infringement of the increase in photographs and videos containing public art. It then analyses the applicability, for such photographs and videos, of the general exceptions for protection of artistic works in South Africa's Copyright Act 98 of 1978. The author argues that the Act's general exceptions are too ambiguous, and in at least one important case too narrow, and thus insufficient to cater to the current digital environment. Accordingly, the author proposes the introduction of broadened and clarified copyright exceptions that include fairness requirements.

Keywords
photography, videography, public art, copyright, South Africa, limitations and exceptions, user rights, freedom of panorama, incidental inclusion

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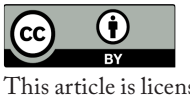

1. Introduction

Digitisation has drastically lowered the cost and skill requirements for production and distribution of high-quality photography and videography. Through the use of smartphones and digital cameras, the average person is capable of making high-quality photographs and videos, which can then easily be shared, and even commercialised, via online platforms. Inevitably, many of the photos and videos taken in the public space include public art. The concept "public art" can include many forms of art and is not necessarily restricted to works in physical public spaces (Sharp et al., 2005). For the purposes of this report, "public art" is defined as visual artwork that has been planned and executed with the intention of being staged in physical public spaces. This includes works of architecture.

When in a public space, the average person might have the expectation that she or he is allowed to photograph and film whatever she or he sees – including public art. This expectation potentially conflicts with the exclusive rights of the holders of the copyright in such artwork. Copyright law addresses this conflict by providing limitations and exceptions, aiming to serve the public interest and often referred to as "user rights", which allow for certain uses of copyright materials without the permission of the copyright-owner (see Flynn, 2015). The relevant user rights provided by the South African Copyright Act 98 of 1978 could generally be qualified as incidental inclusion, (non-fully-fledged) freedom of panorama, and fair dealing. Also important to note is that in July 2015, South Africa's Department of Trade and Industry published a draft Copyright Amendment Bill ("draft Bill"), which, as is discussed below, introduces a general "fair use" exception that could, if drafted differently, mitigate the problem of photographs of public art (DTI, 2015).

2. Copyright as potential barrier to photography and videography in public spaces

Copyright subsists in artistic works from the moment the works are created, with no formalities required, as long as the works fulfil the requirements for the subsistence of copyright. Section 1(1) of the South African Act defines "artistic works" as including "(a) paintings, sculptures, drawings, engravings, photographs; (b) works of architecture, being either buildings or models of building; or (c) works of craftsmanship […]". The Act grants an artistic work's copyright owner the exclusive right to do or authorise, among other things, the following: reproduction of the work, publishing of the work, and inclusion of the work in a cinematograph film (e.g., a video) or a television broadcast.

Accordingly, public spaces include many instances of copyright-protected artistic works, such as statues, buildings, graffiti walls and billboards, some of which qualify as public art. Photographs taken in public spaces will inevitably include such works, with the inclusion occurring on both incidental and non-incidental bases. The South African Act's section 1(1) provides for the conversion of a three-dimensional work into a two-dimensional work – by, for example, photographing a statue – to constitute

an act of reproduction. Accordingly, both the inclusion of two-dimensional and three-dimensional works in a photograph or film, either incidental or non-incidental, in principle constitutes copyright infringement. Although some public artworks will have entered the public domain – due to the expiry of the work's copyright term, which, for artistic works, is in principle 50 years from the end of the year in which the creator died – many other works will still be under copyright protection and thus form a potential risk for photographers and videographers in public spaces and for people who later distribute, and potentially sell, these photographs and videos. To avoid liability, professional photographers and videographers often seek a licence from the copyright owner that grants the right to use the work. In the case of South African filmmakers, it has in fact been found that most filmmakers seek to obtain licences for incidental capture, even when they could use the content without a licence (Flynn & Jaszi, 2009, p. 17; Flynn, 2015). Amateur photographers, however, typically do not have the resources or knowledge to engage in such contractual arrangements.

In the pre-digital environment, inclusion of public artwork in the photographs of amateur photographers or filmmakers went largely unnoticed and without legal consequence. Digitisation, however, has significantly lowered the barriers to entry for the world of high-quality amateur photography and videography, including of distribution of the resulting photographs and videos. Digital cameras have decreased in cost, and eliminate the cost involved in buying or developing film (thus virtually eliminating the marginal cost of production of a photograph or film). Moreover, most mobile phones are now equipped with high-quality cameras, making photography and videography possible anywhere, at any time. Inevitably, there has been a large increase in the number of high-quality photographs and videos being shot.

Digitisation has also transformed distribution of photographs and videos. Before the digital age, amateur photographs and videos were typically only shared with family and friends. Today, amateur photography and videography are disseminated to a worldwide audience via social networks, blogs, and websites, including online platforms that allow for easy commercialisation. In cases where photographs or videos go beyond the permission-free uses covered by the existing limitations and exceptions in the South African Act, the country's amateur photographers and videographers could potentially attract legal attention.

At present, the generally non-litigious nature of the South African copyright environment is such that only high-value copyright infringement is likely to end up in the courts. This, however, does not prevent copyright-owners from relying on other methods to enforce their rights. Cease-and-desist letters provide an inexpensive and low-risk method to compel infringers to stop their acts. In addition, many online platforms have an internal process in place to remove potentially infringing photographs and videos.

3. The inadequacy of South Africa's current copyright exceptions

Incidental inclusion

In terms of the South African Act's section 15(1), incidental inclusion of an artistic work in a cinematograph film, in a television broadcast, or in a transmission in a diffusion device, does not represent copyright infringement, provided "such inclusion is merely by way of background, or incidental, to the principal matters". Accordingly, a person who wanted to film inside a private art gallery would not require permission of the artworks' respective copyright-holders provided the inclusion of the artwork was by way of background or incidental to the principal matters in the film (and provided the private gallery itself does not place restrictions). It can be argued that South Africa's incidental inclusion exception is unclear and not as open as it could be, i.e., that it unreasonably restricts the incidental use of subject matter.

The pre-requisite "as background, or incidental, to the principal matters" creates ambiguity, as it is not always clear what constitutes the principal matter of a work. For example, in a wide shot of a public square, all (or none) of the elements of the square could constitute principal matters, i.e., it would seem to be unreasonable to require that there be a principle matter, or subject, in every shot. Even when the principal matter(s) can be determined, the use needs to be "by way of background, or incidental" thereto. While the use as background is relatively self-evident, incidental use is not. Neither the Copyright Act nor South African case law provides guidance on the interpretation of the concept of "incidental inclusion". In the UK, Chadwick L.J. identified the relevant test for establishing "incidentiality" as "why – having regard to the circumstances in which the [allegedly infringing work] was created – has [the original copyright work] been included in [the former]?" (*Football Association Premier League Ltd v Panini UK Ltd*, 2004, p. 1156). This test clarifies the UK Court of Appeal's approach on incidental inclusion, but does not resolve all related issues (Hennigan, 2003).

The South African Act's section 15(1) limits incidental inclusion to inclusion in a cinematograph film, television broadcast or transmission in a diffusion device. It does not provide for incidental inclusion in other works that capture background materials, such as photographs, paintings, and drawings. This exception thus does not provide a solution for the large number of people taking photographs that incidentally include public art. A similarly narrow approach can be found in section 67 of the Australian Copyright Act of 1968. But other common law jurisdictions provide a far more user-friendly approach, allowing for incidental inclusion of all subject matter in a wide range of works, e.g., section 30.7 of the Canadian Copyright Act of 1985; section 41(1)(a) of the New Zealand Copyright Act of 1994, and section 31(1) of the UK Copyright, Designs and Patents Act of 1988. In the EU, Article 5(3)(i) of the InfoSoc Directive allows Member States to introduce a copyright exception in their own national laws for the "incidental inclusion of a work or other subject-matter

in other materials" (italics added), hereby allowing Member States to adopt a broad incidental inclusion exception in their national laws that, for example, allows for the incidental inclusion in both photographs and videos.

Freedom of panorama

Freedom of panorama is an exception in copyright law that generally allows for the creation, and later use, of images (photographs, paintings, films, etc.) that predominantly include three-dimensional copyright-protected works (buildings, sculptures, etc.) that are permanently or ordinarily located in the public space, without permission of the copyright-holder. The South African Act's potential (but not fully-fledged, in my analysis) freedom of panorama exception, in section 15(3), states:

> The copyright in an artistic work shall not be infringed by its reproduction or inclusion in a cinematograph film or a television broadcast or transmission in a diffusion service, if such work is permanently situated in a street, square or a similar public place.

The wording of section 15(3) raises the question as to what constitutes a "similar public space" to that of a "street" or "square". Based on the definition of Searle J.P. in *R v Innes*, a space is public when everyone has general access to it (*R v Innes*, 1925, p. 164). But the South African legislator creates an unduly complicated definition by referring to *similarity* to a street or square, both of which have different physical characteristics. The implication is that similarity does not need to be found in the physical elements of a street or square, but rather in the level of *publicness*, which would seem to refer to openness. Essential elements of a level of openness similar to a street or square would potentially be public access and the absence of an entrance fee, e.g., a freely accessible recreational area or park. A public gallery could also qualify as a public space. However, such galleries often restrict photography and videography on their premises. This level of complication could have been avoided by section 15(3) simply referring to "public space".

There is also ambiguity in respect of what is meant by "permanently situated", and the Act does not provide guidance on interpretation of this concept. The ordinary meaning of "permanently" is "in a way that lasts or continues without interruption; continually" (OED, n.d.). According to this interpretation, artistic works created with the intention of being staged in the public space but that are only temporarily on public display, such as the inflatable artworks of Paul McCarthy, would not qualify.

At the same time, while pointing to section 15(3)'s problematic ambiguities, it must be acknowledged that, through use of the term "artistic work", the South African legislator implicitly allows for a great number of works – i.e., including architectural and two-dimensional works, such as graffiti, paintings and photographs – to qualify as works that need to be considered in terms of the panorama exception. This

approach is less narrow, in respect of the types of works concerned, to those followed in, for instance, Canada and Australia where the freedom of panorama exception is specified as relating only to certain types of three-dimensional works, such as sculptures, models and buildings (section 32.2(1)(b) of the Canadian Copyright Act, section 65(2) and 66 of the Australian Copyright Act.). But in my analysis, the potentially positive impact, from a user-rights perspective, of South Africa's broader approach to which works can be reproduced is undermined by the aforementioned ambiguities in the wording of the relevant section.

Even more undermining to South Africa's section 15(3) – and hence prompting my argument that the exception is not in fact a fully-fledged freedom of panorama exception – is the fact that the South African legislator fails in the section to accommodate photographers and other visual artists in the exception, by restricting the use to inclusion in cinematograph films, television broadcasts, or transmission in diffusion devices.

Other jurisdictions apply a far more permissive approach to the types of uses allowed under the right of panorama exception. In Australia, for example, section 65(2) of the Copyright Act provides as follows:

> The copyright in a [sculpture and work of artistic craftsmanship] that is situated, otherwise than temporarily, in a public place, or in premises open to the public, is not infringed by the *making of a painting, drawing, engraving or photograph of the work or by the inclusion of the work in a cinematograph film or in a television broadcast*. (italics added)

The Australian Act's section 66 contains a similar broad exception in relation to buildings or models thereof. Article 5(3)(h) of the European Infosoc Directive allows Member States to introduce a copyright exception in their own national laws to allow "*use* of works, such as works of architecture or sculpture, made to be located permanently in public places" (italics added), with "use" not defined further and thus left open to potentially broad interpretation (EU, 2001).

Fair dealing and enumerated exceptions

The South African Act's section 12 contains general exceptions relating to literary and musical works. According to section 15(4), subsections 12(1), (2), (4), (5), (9), (10), (12) and (13) shall *mutatis mutandis* be applied to artistic works. The first subsection contains the fair dealing exception:

> (1) Copyright shall not be infringed by any fair dealing with a literary or musical work-
>
> (a) for the purposes of research or private study by, or the personal or private use of, the person using the work;

> (b) for the purposes of criticism or review of that work or of another work; or
> (c) for the purpose of reporting current events -
> (i) in a newspaper, magazine or similar periodical; or
> (ii) by means of broadcasting or in a cinematograph film […].

Although this provision in principle applies to photography and videography of public art, its confinement to certain purposes – such as for personal or private use, or for the purpose of criticism – excludes the prevailing uses of photographs and videos of public art that might attract legal attention. For example, the sharing of photographs or videos of public art on social media or other online platforms cannot be regarded as solely for personal or private use.

Thus, in its present form, the South African Act's fair dealing provision in subsection 15(4)(12)(1) does not mitigate the problems faced by photographers and videographers when including public art in their photographs and videos. The subsequent subsections of the Act's 15(4)(12) provide enumerated exceptions, such as use in a judicial proceeding, and use for teaching purposes. Accordingly, these subsections have an even more limited application in regard to the use of photographs and videos of public art.

4. Opening up the public space

There are, in my analysis, two possible ways to improve the public interest copyright exceptions relevant to photographing and videoing public art in South Africa. The first solution would consist of broadening and clarifying the existing section 15 exceptions for protection of artistic works. The second solution, in line with the approach in the aforementioned draft Bill of 2015, would consist of introducing a flexible "fair use" exception.

Broader and clearer exceptions

The scope of section 15 could be broadened and clarified by amending subsections 15(1) and 15(3) to read as follows (with the proposed language redactions in bold and the proposed new language underlined):

> (1) The copyright in [**a work]** shall not be infringed by its inclusion in [**another work]**, if such inclusion is merely by way of background, or incidental, to the principal matters.
> […]
> (3) The copyright in an artistic work [**which is ordinarily situated in a public space or another premise open to the public]** shall not be infringed by its reproduction or inclusion in [**another work]**, <u>provided the use will have no substantial adverse effects on the exploitation of the existing work</u>.

The proposed amended incidental inclusion exception (sect. 15(1)) would align with the reality faced by photographers and videographers and provide for incidental inclusion of all types of works in any other work. This would decrease the potential for infringement suits and, in suits brought forward, would allow courts to focus on the core factor – determining whether the use is by way of background, or incidental, to the principal matter.

Meanwhile, the proposed amended freedom of panorama exception (sect. 15(3)) would allow for public art to be included in a wide range of works. This exception would respond to reality by not differentiating between traditional works of public art, such as sculptures and works of artistic craftsmanship, and other artistic works in public, such as graffiti walls. The proposed amendment would specify that the exception applies to artistic works "ordinarily situated in a public space or another premise open to the public" (instead of "permanently situated in a street, square or a similar public place"). The effect of this wording would be twofold. First, by the use of "ordinarily situated", the exception would cover both works of art permanently and temporarily on public display, while still excluding works of art in transit, which otherwise could be freely reproduced while in a public space. Second, the simplified terminology for public space would avoid unduly complicated language and eliminate uncertainty surrounding it. Moreover, the amendment would introduce a fairness requirement ("no substantial adverse effects on the exploitation") to balance copyright-owners' interests with the public interest, thereby assuring South Africa's compliance with its international obligations, commonly referred to as the three-step test, under Article 9(2) of the Berne Convention (Berne Convention, 1886) and Article 13 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS, 1995).

Fair use

Alternatively, a broad "fair use" provision, which would substitute the fair dealing provisions, could be introduced. Unlike fair dealing, fair use allows the use of a work for any purposes as long as it qualifies as fair in terms of an open-ended list of fairness factors. In the US, these fairness factors are: "(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work" (17 U.S.C. § 107). The interpretation of these factors in the US context is established by a substantial amount of case law.

Among the advantages of a fair use provision would be that it would apply to all works and its scope would not be limited to uses for certain purposes, i.e., it would potentially allow for permission-free drawings of statues, photographs of graffiti walls, and even videos of public performances (see, e.g., *Italian Book Corp. v American*

Broadcasting Co., 1978). Fair use would thus potentially permit a broader scope of uses than those provided for in the current incidental inclusion and freedom of panorama exceptions found in South African copyright law.

Incidental inclusion of public art in a photograph would likely qualify as fair use. While the second and fourth fairness factors outlined above would usually be neutral on an incidental use, the first and third factors would appear to favour a fair use finding. For non-incidental inclusion, however, it is likely that the finding would be different. If a public artwork was the subject matter of a photograph or film and the entire work was copied, the third fairness factor would seem to go against a fair use finding. (At the same time, it is important to note that the reproduction of an entire work does not block the finding of fair use. In *Sony Corp v Universal City Studios,* the US Supreme Court held that, considering the nature of motion pictures (in this case a film), "the fact that the entire work is reproduced […] does not have its ordinary effect of militating against finding fair use" (*Sony Corp v Universal City Studios*, 1984, p. 417).)

By taking into consideration the purpose and character of the use, fair use is less likely to succeed when the work is used for commercial purposes. This would, for example, allow a person to take a photograph or film of a public artwork for personal use, but would exclude the commercial exploitation of the work in, say, an advertisement.

The proposals in the 2015 draft Bill show that South Africa is leaning towards adopting a fair use approach. The draft Bill introduces a fair use concept, making use of the same fairness factors as those of the US fair use provision. However, at the same time, the proposed new "fair use" provision limits fair use to certain acts or purposes, thereby nullifying much of the flexibility and openness that comes with the concept. As a result, the fair use concept as proposed in the draft Bill would not mitigate the copyright problems that arise from photography and videography of public art.

Additionally, there is the question as to whether the fair use doctrine could be successfully transmitted into South African law. Fair use is extremely dependant on judicial interpretation, and democratic South Africa, as a young legal system with relatively low rates of litigation, lacks a large body of copyright case law. Though South African judges could potentially have regard to the extensive US jurisprudence in interpreting fairness factors, the socio-economic differences between the US and South Africa put the desirability of reliance on US cases into question. Thus, in the short-term, the option of introducing a fair use provision is unlikely to be as desirable as the first option discussed in this section: broadening and clarifying of existing exceptions.

5. Conclusion

This article has explained how digitisation has enabled vast numbers of people to affordably create and distribute high-quality photographs and videos that in some cases contain public artworks. The article has also shown that the South African Copyright Act exceptions relevant to photography and videography containing public artworks are in some instances unclear, and, in at least one crucial instance, too narrow to cater effectively to the new digital reality.

This article has also proposed two options for improving the South African copyright exceptions relevant to photographing and videoing of public art: (1) broadening and clarifying existing exceptions; or (2) introducing a general fair use exception. The former is favoured, at least in the short-term, because it would create legal certainty by being less reliant on case law. Thus it would cater better to the current South African copyright context, which does not have a substantial body of copyright court decisions.

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Technology Transfer for Climate Change Mitigation: A Perspective from Kenya

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Abstract
The impact of climate change continues to be experienced worldwide. Treaties such as the UN Framework Convention on Climate Change (UNFCCC) of 1992 and the UNFCCC Paris Agreement of 2015 demonstrate the value that UN Member States attach to reaching consensus on climate change mitigation steps. In this thematic report, the author looks at the issue of climate change mitigation technology transfer (TT) from a Kenyan perspective, specifically with reference to Kenya's National Climate Change Action Plan (NCCAP), and to provisions in Kenya's patent law that are relevant to TT licensing agreements between foreign and Kenyan entities.

Keywords
climate change mitigation, greenhouse gases (GHGs), technology transfer (TT), licensing, patents, Kenya

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1. Introduction

It was reported in March 2016 that the average global temperature was 1.28°C warmer than the average temperature for the period March 1951 to 1980 (Silberg, 2016). The 2015-2016 El Nino weather phenomenon, the most intense and widespread in 100 years, has caused drought, floods and extreme temperatures (FAO, 2016). These conditions have affected the food security of an estimated 60 million people worldwide (FAO, 2016).

Climate change is defined under Article 1 of the UN Framework Convention on Climate Change (UNFCCC) as a change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods (UNFCCC, n.d.). As a result of the impact of recent alterations in climatic conditions, global attention has been drawn to the possibilities of mitigating such outcomes through various initiatives. The Paris Agreement, adopted at the 21st session of the UNFCCC Conference of the Parties (COP) held in December 2015, is one of these initiatives (UNFCCC, 2015). Kenya ratified the 1992 UNFCCC in 1994 and the 2015 Paris Agreement in April 2016.

The accumulation of carbon dioxide and other greenhouse gases (GHGs) in the Earth's atmosphere has for a long time been known as a factor that can increase the temperature of the planet and consequently lead to natural disasters (UN, n.d.1). The supply and use of fossil fuels by mankind account for 80% of carbon dioxide emissions (UNFCCC, n.d.). Oil, natural gas and coal produce most of the energy required for activities such as electricity production and the running of automobiles (UNFCCC, n.d.). Clearing of forests for agriculture or development also results in the release of carbon into the atmosphere by way of burning or decomposition of trees (UNFCCC, n.d.). Considering the role played by carbon-emitting activities in day-to-day life, the challenge presented by attempts to reduce carbon emissions is clear. The development and use of technologies that achieve reduced emissions of carbon dioxide and other GHGs can be expected to result in the reduction of global warming.

The issue of technology transfer (TT) features in both the UNFCCC and the Paris Agreement. In the UNFCCC, various provisions refer to TT, and cooperation of Member States on TT, in respect of technologies to control, reduce or prevent the omission of greenhouse gases. The Paris Agreement also refers to the element of cooperation among members with regard to TT, in addition to acceleration of innovation, in order to achieve an effective, long-term global response to climate change.

Kenya's National Climate Change Action Plan (NCCAP) 2013-2017 identifies technology development as a key element of mitigation, stating that

> as technology developments have supported Kenya to cope with climate variability in the past, new technologies will continue to pave the way for low carbon climate resilient development in the future. (Government of Kenya, 2013, p. 115)

The NCCAP refers to inadequate access to technology as a barrier to the achievement of optimal environmental conditions. The technology availability gap is a problem in most of Africa, with limited research and development (R&D) capacity (via dedicated R&D centres) identified as a key factor undermining development and market entry of potentially viable locally produced technologies (UNECA, 2014).

Kenya's NCCAP also highlights the need for cooperative action at international, regional and national levels in respect of the intellectual property rights (IPRs) – typically patents – that often underpin protection of technology (and undermine TT). The UNFCCC of 1992 and Paris Agreement of 2015 do not, however, specifically mention IPRs.

2. TT and sustainable development

In the context of climate change, TT has been defined by the Intergovernmental Panel on Climate Change (IPCC) as a broad set of processes – covering the flows of know-how, experience and equipment for mitigating and adapting to climate change – among governments, private-sector entities, financial institutions, non-governmental organisations and research and education institutions (IPCC, 2000).

It has been noted that in Kenya, carbon-producing combustion of wood and charcoal accounts for almost 70% of primary, non-electricity, non-transport energy consumption (Government of Kenya, 2013). In addition to producing GHG emissions, this threatens the existence of the forests, which produce the oxygen that helps to counterbalance greenhouse gases. Meanwhile, agriculture, on which many Kenyans depend for their livelihoods, was responsible for one-third of Kenya's emissions in 2010 (Government of Kenya, 2013).

Various technologies have been identified as relevant to the achievement of a low-carbon development strategy (sometimes referred to as a low-emission development strategy) in Kenya. The concept of low-carbon development has its origins in the UNFCCC of 1992 (UN, 1992). Low-carbon development generally refers to forward-looking national economic development plans or strategies that encompass low-emission and/or climate-resilient economic growth (OECD & IEA, 2010). The technologies identified in Kenya's NCCAP include those for geothermal

generation, wind-power generation, improved charcoal production and restoration of forests (Government of Kenya, 2013, pp. 117-118). The NCCAP calls for such technologies either to be developed in Kenya or transferred to Kenya from other countries (Government of Kenya, 2013, p. 118).

TT can take place in various ways, including via foreign direct investment (FDI), licensing agreements, joint ventures, training, and mergers and acquisitions (Pugatch, 2011). Additionally, in the energy industry, production-sharing contracts have been cited as an effective method of sharing technology (IPCC, 2000). Under such agreements, private firms contract with local parties, usually state-owned companies or governments, to share technology with them in exchange for a share of products (IPCC, 2000).

3. TT and IPRs

The relationship between IPR protection and TT is contentious and unclear. It is argued by some that with the exception of very advanced technologies, firms do not rank IPRs highly among the factors influencing decisions as to whether or not to transfer technology (Hall & Helmers, 2010). Others argue that weak IPR systems lead to lower FDI as a result of the increased likelihood of infringement (see, for example, Javorcik (2004)). Some posit that other elements of a country's regulatory framework, for example taxation and production incentives, also have a strong role to play in determining whether a country is an attractive investment destination for firms (see, for example, Maskus (1998)).

Another argument at play in this issue is that in a significant proportion of green technologies, the underlying technology is not actually under patent (as it is a mature technology) and thus is in the public domain – and, accordingly, most technological progress in this field can be expected to come from incremental improvements to existing off-patent technologies (Hall & Helmers, 2010).

It can thus be argued that for many climate change technologies (i.e., the ones with underlying elements in the public domain), TT does not have to play a key role, as local innovators can forge incremental innovations from public-domain technologies. This argument, however, is dependent on the country in question having the resources necessary to build on the public-domain technologies. Observed from a developing-country perspective, where there is limited capacity for technological advancement, TT will likely still be necessary even in technology areas with a high proportion of existing public domain technological know-how. Indeed, a UN Economic Commission for Africa (UNECA) study – of medical research in Kenya – found that in cases where there was some limited TT flowing into Kenya via staff training by overseas entities (e.g., by the Japan International Cooperation Agency (JICA)), the impact of the TT was undermined by a shortage of multidisciplinary scientists to support product development and commercialisation; by a non-commercially-

oriented research environment; and by a lack of comprehensive policy for sharing revenues generated from research output (UNECA, 2014). The findings of the UNECA study, though focused on the medical research sector, are also likely to be indicative of the state of Kenya's climate change mitigation research sector.

At the same time, emerging economic powers such as China are reported to have significant numbers of patents in clean energy sectors, meaning that in some climate change technology areas patents could present a clear barrier to TT (Consilvio, 2011). This is because it would be necessary for non-patent holders of such technology to seek licences prior to using the technology for commercial purposes, to avoid infringing the patents.

4. KIPI screening of TT licences

Where TT to Kenya involves patented technology, it falls under the Industrial Property Act (IPA), 2001. As a Member State of the World Trade Organisation (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) of 1994, Kenya enacted the IPA as a step towards compliance with the TRIPS minimum standards for IPR protection.

The IPA provides in section 5(b) for TT of patented technology, and allocates screening of TT agreements and licences to the Kenya Industrial Property Institute (KIPI). Under section 68(6), only TT licences registered by KIPI have validity.

The IPA's section 69 outlines the terms that are prohibited under TT licences, i.e., the terms, if found to be present in a licence, may bar KIPI registration of the licence. One such prohibited term is one that would enable importation of technology already available in Kenya or substantially similar to technology already available in the country. Another prohibited term is one that would require payment of a fee, royalty or other consideration where the payment/consideration is disproportionate to the value of the technology to which the licence relates. Also prohibited are restrictions on a licensee's use of the technology. In sum, the IPA's section 69 aims to protect Kenyan technology licensees from being exploited by foreign patent holders in TT arrangements; and to protect Kenya's economic interests when existing local technologies make the TT unnecessary.

5. Conclusion

It seems clear that, due to gaps in capacity development and a lack of financial resources necessary to undertake R&D and other activities integral to technology advancement, Kenya's climate change mitigation technology development will, for the foreseeable future, be reliant on TT from other countries.

In this context, KIPI's application of section 69 of the IPA of 2001 will potentially be of great significance. In respect of local licensing of foreign climate change mitigation

technologies, will application of section 69 serve as an enabling mechanism (by ensuring that such licences are crafted in a way that serves local needs), or will it serve as a barrier (by deterring foreign technology providers from seeking licensing opportunities in Kenya)? Questions of this sort will become increasingly important in Kenya in the years to come as the need to make foreign technology available for climate change mitigation grows.

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BOOK REVIEW

Review: On Intellectual Property Cooperation and the Public Interest in Africa

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Caroline B. Ncube, Intellectual Property Policy, Law and Administration in Africa: Exploring Continental and Sub-Regional Co-Operation. *London: Routledge, Taylor and Francis Group, 2015, 188 pages, £97 (hardcover), ISBN: 978-1-138-82073-9.*

Some works succeed in providing a wealth of information and covering a broad range of issues in a concise manner, to the comfort of the reader. Professor Ncube's book, *Intellectual Property Policy, Law and Administration in Africa: Exploring Continental and Sub-Regional Co-Operation*, does just that. Ncube evaluates the extent to which African states' and institutions' approaches to intellectual property (IP) align with the public interest need to balance the needs of rights-holders with those of users. She also lays out the challenges posed by the harmonisation agenda of the newly-formed Pan-African Intellectual Property Organisation (PAIPO).

In respect of pursuit of the public interest via IP policymaking, law-making and administration, Ncube finds the continent's record is decidedly mixed. In considering the viability of the African Union's (AU's) drive for a harmonised African continental IP framework via PAIPO, the author examines and analyses the IP policy, legal, and administrative modalities of the continent's regional economic communities (RECs) and of its regional IP institutions, the African Regional Intellectual Property Organisation (ARIPO) and the Organisation Africaine de la Propriété Intellectuelle (OAPI). Ncube concludes that PAIPO's harmonisation mandate is going to be difficult to fully achieve, particularly because of the already-existing (and very

different in their approaches) ARIPO and OAPI regimes. ARIPO crafts IP legal instruments that its Member States can then domesticate in line with their particular development and public interest needs. In contrast, OAPI's legal instruments are binding on all its Member States. Due to these and other complexities, Ncube recommends that PAIPO should initially pursue a relatively loose IP *cooperation* model, and only later begin to pursue full, tighter *harmonisation.*

The book begins by tracing the history of existing IP laws in Africa and reminds the reader of the continent's diverse legal, socio-economic, cultural and political landscapes, and the resulting need "for flexible and nuanced IP systems" (p. 10). Ncube's international starting point is IP law as anchored in the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which, through various flexibilities, seeks to balance the interests of rights-holders and users. Ncube conducts an overview of public interest use of TRIPS flexibilities in Africa at both national and regional levels, and finds that "meaningful progress is being made" in this respect (p. 31). Examples of public interest TRIPS flexibilities being used on the continent that Ncube points to are: transition periods, tailored definitions of invention, other patent-related flexibilities (e.g., for parallel importation, compulsory licensing), and government use provisions.

The author also highlights the public-interest-oriented contributions of the African Group of official country representatives at the World Intellectual Property Organisation (WIPO) in Geneva. The African Group played a key role in articulating, formulating and adopting the WIPO Development Agenda of 2007, which is considered a symbol of inclusion of public interest concerns in IP governance.

Nevertheless, Ncube finds that lack of national governmental capacity negatively affects levels of state technical IP expertise, efficiency of government institutions dealing with IP matters, and autonomy of IP offices responsible for TRIPS implementation. And most of the technical assistance provided to national governments comes from WIPO which, as Ncube points out, is "IP-centric", i.e., puts emphasis on a rights-holder needs. This rights-holder-oriented agenda often gets translated into national solutions without the necessary domestic calibration. Ncube suggests building the capacity of national IP offices and government departments so that they are more appreciative of the developmental and public interest relevance of IP.

Ncube also evaluates the extent to which REC IP policies serve the public interest, finding that significant IP policymaking progress has been made by the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA) and the Economic Community of West African States (ECOWAS).

In respect of the regional institutions where IP is the sole focus, namely ARIPO and OAPI, Ncube concludes that, save for ARIPO's work with the Swakopmund

Protocol on the Protection of Traditional Knowledge and Expressions of Folklore, these institutions have not done as much as they could to advance their Member States' public interest needs. Ncube cites OAPI's early adoption of TRIPS standards, and the adoption by both OAPI and ARIPO of the International Union for the Protection of New Varieties of Plants (UPOV) model for strong plant variety protection (PVP) standards, as clear examples of failure to cater to the public interest.

On the matter of PAIPO, the author provides a historical outline of the events up to the time of writing in March 2015. After outlining possible arguments for and against the creation of PAIPO, Ncube concludes that "since the AU has committed to the establishment of PAIPO, the real challenge is the efficient operationalization of the organization" (p. 140). Ncube concludes that PAIPO should focus on building continental IP cooperation for the next 10 years, modelled on Asia's ASEAN bloc, and only later seek to adopt full harmonisation, potentially modelled on the European Union (EU) approach or the Latin American MERCOSUR approach. The author also stresses the importance, during the initial cooperation phase, of PAIPO interacting with ARIPO and OAPI in a way that respects their distinct mandates and maximises efficiency. This cooperation, though with the two IP institutions that the author has demonstrated have not done much to promote the public interest, is key to the successful functioning of PAIPO.

The author articulates, in a clear manner, the complex policy, legal and administrative considerations, and challenges, currently at play in the African IP landscape. The book is strongly recommended to students and scholars interested in an introduction to, or in learning more about, the subject, and to policymakers seeking public interest approaches to IP.

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