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IPR systems and technology transfer at research institutions in southern Africa

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The RIMI4AC project ran from 2009 to 2013, and aimed to strengthen the two research and innovation management associations in southern and West Africa, SARIMA and WARIMA, while supporting the establishment of similar associations in Central Africa, East Africa, and the Caribbean, namely, CARIMA, EARIMA and CabRIMA.

In the process, the RIMI4AC project provided training to members of the regional associations, and established an information and communications network, including customised websites that provide resources and support for research managers and administrators.

This document is one of a series of five papers published on themes related to research management practice, provision and development in Africa and the Caribbean. For a list of the other papers in the series, see the back cover of this document.

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1. Introduction

Intellectual property rights confer on an individual (either a natural person or a legal one) exclusive rights to exploit particular creations of human ingenuity (Cullet and Kameri-Mbote, 2005). Intellectual property rights (IPR) systems are also an important component of national innovation systems. The concept of national innovation systems, which provides a reasonable indication of a nation's technological performance and creative capacities, has been variously defined (OECD, 1997; Mugabe, 2006). In the context of the present review of IPR systems and technology transfer from research and higher education institutions in the Southern African Development Community (SADC) region, the following definition places the objective of the review into proper perspective:

...the system of interacting private and public firms (either large or small), universities, and government agencies aiming at the production of science and technology within national borders. Interaction among these units may be technical, commercial, legal, social and financial in as much as the goal of the interaction is the development, protection, financing or regulation of new science and technology. (Niosi et al., 1993: 212)

That is, national innovation systems denote an arrangement of public and private institutions that are organised through linkages and their interactive activities, for the purposes of generating and using products, processes and organisational practices. They also have universities, public R&D institutions, policymaking bodies, the government, private enterprises, financial institutions and technology support agencies as their main players (Mugabe, 2006).

As a critical component of national innovation systems, IPR systems are expected to play a catalytic role in encouraging innovation and successful technology transfer from research and higher education institutions. Blakeney and Mengistie (2011: 239) describe IPR as 'rights conferred by law in relation to some aspects of industrial, scientific and cultural creativity' that can therefore be viewed as 'ingredients of development infrastructure'. It has been observed that there is a significant causal relationship between intellectual property (IP), technology transfer and development.

The aims of this paper are twofold:

- First, to provide a synopsis of the status of IPR systems and technology transfer from research and higher education institutions (the core components of national innovation systems within the SADC region).
- Second, to identify weaknesses and challenges that key stakeholders could address through policy and other interventions, in order to maximise the benefits of implementing and/or improving national IPR systems and technology transfer efforts.

Although the SADC is made up of 14 countries, aspects of this review focus on five countries: Botswana, Malawi, Swaziland, Zambia and Zimbabwe. South Africa was deliberately excluded from the review because there is a significant gap between South Africa (which leads in research, innovation and technology transfer in the SADC region, and in Africa) and the other countries in the region. South Africa has a much more numerous and diverse cohort of research and higher education institutions. In addition, there is already more available information on its national IPR systems, technology transfer and research and higher education institutions, than exists for the other countries in the region.

2. Rationale for intellectual property rights systems and technology transfer in the SADC region

The SADC region consists of a block of 14 countries in sub-Saharan Africa, the majority of which are classified as least-developed countries (LDCs) or developing countries. According to Mugabe (2006) the declaration and treaty establishing the SADC declares, among other objectives, that of promoting the development, transfer and mastery of technology, pointing out Article 21 of the SADC treaty which particularly obliges SADC member countries to co-operate in the field of science and technology.

The development priorities of sub-Saharan African countries differ from country to country and also from one region to another. However, the need to secure access to foreign investment, acquire technologies, promote research and development, establish a solid industrial base secure access to medicines and establish food security, are common aspirations shared by all of these countries (Blakeney and Mengistie, 2011).

In their study of science and technology and higher education in the SADC region, SARUA (2007) provides some useful data on R&D indicators which are relevant to the present study. In general, the study reveals that with the exception of South Africa, which spends almost 1%, most countries in the region spend between 0.2 to 0.44% of their GDP on research and development. There are huge differences in education, infrastructure, and resources amongst the various SADC countries (Palmer, 2006).

The Commission on Intellectual Property Rights states that IPR systems create a legal mechanism to appropriate knowledge (CIPR, 2002). While IPR systems have been recognised as a tool to foster innovation, they have also been cautiously described as a 'compromise and an imperfect solution representing the search for balance between availing all knowledge freely, publicly, and granting ownership of valuable inventions to inventors' (Krattiger et al., 2007). This is especially relevant given an intrinsic characteristic of knowledge, which Falvey, Neil and Greenway, (2006) aptly describe as 'non-excludable', and which renders it impracticable to prevent others from applying new knowledge, even without the consent of its creators or holders. Furthermore, as observed by the CIPR (2002), one person's use of knowledge does not diminish another's and the extra cost of extending use to another person is often very minimal or nil.

IPR systems currently achieve little in stimulating innovation in developing countries, due to the lack of necessary human and technical capacity, including a certain threshold of scientific base (CIPR, 2002; Falvey, Neil and Greenway, 2006). However, it is generally accepted that the ultimate goal of implementing IPR systems is to foster innovation and technology transfer.

A perfunctory examination of the rationale for IPR systems, be they national, institutional or regional in nature, presupposes the emergence and/or creation of avenues and opportunities for enhanced economic growth, economic diversification and national prosperity – arising broadly from research, innovation, the commercialisation of research and technology transfer programmes, projects and processes.

The establishment of IPR systems may therefore be construed as one response to the more generic and fundamental problem of 'how to improve the knowledge ecology' of least developed countries in

the sense of creating and improving national institutions that enable the production, access and use of knowledge (Foray, 2007).

However, despite the robustness of any IPR systems, certain fundamental aspects of IPR systems, when applied contextually to the industrialised countries of the North and the less developed countries of the South, yield contradictory outcomes. This raises the question whether conventional IPR systems are properly and adequately designed to suit all situations and should be applied equally, or be applied with some level of caution, to the different contexts.

Feinson (2003) further argues that whereas developed countries are characterised by innovation systems which are for the most part well-developed and provide a foundation for maintaining or improving an already established level of competitiveness and growth, developing countries are constantly challenged with the task of 'catching-up'. Nonetheless, the CIPR (2002) has observed that a prerequisite for sustainable development in any country is the development of an indigenous, scientific and technological capacity and that, in principle, IPR can contribute to promoting effective national systems of innovation.

3. IP policy development capacity in southern Africa

One of the findings of a seminal study entitled 'Knowledge and Innovation for Africa's Development: Priorities, Policies and Programmes' conducted on behalf of the World Bank Institute was that:

[n]ational capacities for science, technology and innovation policy-making are weak. Most countries do not have budgets for policy research and analysis and/or trained persons to conduct research for policy. Many countries tend to organise science, technology and innovation policy-making as isolated events not processes. Such events are often not part of national economic development policy processes and practices. (Mugabe, 2009: 5)

However, building capacity for IP policy formulation (in general) includes building institutional (university/research institute) capacity, as well building capacity for IP policy formulation among government officials (Blakeney and Mengistie, 2011).

Because IP is cross-cutting in nature, it must involve several international and transnational organisations and agencies, and several national ministries. However, a consequence of involving so many different bodies is that securing nationally and internationally consistent approaches in relation to common subjects becomes complicated (Blakeney and Mengistie, 2011). The authors provide an interesting illustration of this point:

For example, at the same time (November 2001) that the WTO was engaged in the Doha Trade Ministers' meeting, the FAO, together with CGIAR, was formulating a Treaty on Access to Genetic Resources for Food and Agriculture, the COP and UNEP were examining modalities governing access to genetic resources and benefits sharing and WIPO was examining the same subject in the context of the negotiation of its SPLT. The same topic was also being examined by UNCTAD and the ICTSD. As the country representatives at these meetings are selected from different ministries, with different cultures, it is not surprising that different policy approaches have emerged. Providing country representatives for all of these fora concerned with IP is a challenge for all countries. For LDCs that are invariably distant from the places where the negotiations are occurring, their national representation is usually undertaken by the local diplomatic representative, who is usually responsible for liaison with a variety of different international organisations. (Blakeney and Mengistie, 2011: 249)

IPR systems and governance structures in the SADC

A characteristic of IPR systems in the SADC region is that patent laws are administered across several ministries, including the Ministries of Trade, Commerce and Industry or their equivalents, and the Ministries of Law and Constitutional Affairs or their equivalents. A few countries have set up dedicated industrial property offices or organisations (see appendix 1).

In addition, the IPR systems that currently exist in the SADC region are, for the most part, overambitious. They tend to stem from the conviction that IPR systems can contribute to promoting effective national systems of innovation and consequently, to some level of economic growth and economic diversification. However, this of course assumes that the minimum scientific competence and technical capacity already exists in the region.

A few reasons for the current urgency to harmonise (and revise) IPR systems across the SADC region are as follows:

- Historically, IPR systems in most developing countries are either derived or inherited from colonial laws and legal systems. IPR systems were introduced to provide protection for innovations originating from the colonising power and not to protect domestic innovations (Adewopo, 2002; Cullet and Kameri-Mbote, 2005). Such systems haven't been examined thoroughly since independence from colonial powers – and are in need of revision.
- Each national policy and strategy appears to have been developed in isolation, without due regard for the commonalities that exist in the region – resulting in poor co-ordination of policy within and across national boundaries (Nicholson, 2003).
- Over time, most countries in the region have become members of the World Trade Organization (WTO) or are in the process of acceding to membership of the organisation. An important obligation for membership of the WTO is the implementation of the Agreement on Trade-Related Intellectual Property Rights (TRIPS), notably Article 7 of TRIPS, which calls for the protection and enforcement of IPR in the belief that such protection and enforcement 'should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare' (WTO, 2011: 323). As such, countries within the region wishing to benefit from trading opportunities arising from WTO membership, must comply with the minimum standards of IPR stipulated by TRIPs (Blakeney and Mengistie, 2011).
- Individual countries within sub-Saharan Africa and the SADC have entered into, and are parties to several free-trade agreements or bilateral trade agreements negotiated with a number of developed countries. Such agreements invariably contain TRIPS-related standards which these sub-Saharan African and SADC countries must comply with.
- Investment or donor assistance is usually conditioned by the policy priorities of the investing and donor countries, hence it is not inconceivable that IP policy formulation in sub-Saharan African and SADC countries is influenced by the policy priorities and objectives of investment or donor stakeholders. This point is aptly demonstrated by Tabaro (2009) in an example outside the SADC, but still within sub-Saharan Africa, where it is noted that the introduction of amendments to Uganda's patent laws and the introduction of a technology transfer regime arose more from the country's obligations to comply with international agreements such as TRIPS, than from an effort to implement a considered national innovation policy. It is further noted that Uganda's implementation of the patent co-operation treaty makes no provision for incentives for innovators, but merely 'follows the presumptions in international patent practice that the mere adoption of the evolving standards of patent protection is needed to trigger patenting activity, hence the transfer of technology' (Tabaro, 2009: 583).

In addition to the above points, there are underlying structural issues that also need to be addressed:

- The offices responsible for industrial property governance in these countries are generally known to be understaffed and under-equipped, with information at their disposal rarely used by researchers (Mugabe, 2006). Generally, there is also a shortage of availability of technical (scientific and engineering) and legal expertise, and where legal expertise does exist, it is generally not very well versed in matters relating to the acquisition and maintenance of IPR.
- Furthermore, IP authorities find it very difficult to attract and retain scientists and engineers, largely

because government salaries are uncompetitive with those of the private sector. Traditionally, IP institutions have been poorly understood within government bureaucracies and their operations have been accorded low priority. It is also a matter of rule, rather than exception, that IP offices operate on annual budgets allocated by the ministries to which they report, or by government treasuries.

Performance of IPR systems in the southern African region

The performance of IPR systems in the SADC (except for South Africa) is generally mediocre. One measure for determining the status or performance of the IPR systems in any given country is the International Property Rights Index (IPRI), developed by the Property Rights Alliance (Dedigama, 2009).

The International Property Rights Index (see appendix 2) assumes a significant correlation between the protection of private property rights and a nation's economic growth, and examines the legal and political environment (LP), physical property rights (PPR) and intellectual property rights (IPR) as essential components in strengthening and protecting a country's private property system (Dedigama, 2009). Table 1 shows the IPR ranking of some SADC countries relative to the best IPR performing countries globally (Germany and Finland). With the exception of South Africa, SADC countries generally performed poorly, with Zimbabwe and Zambia ranked 100 and 105 respectively on the list of 115 countries surveyed. In addition, Pouris and Pouris (2009) state that between 2000 and 2004, only South Africa recorded some level of IP.

Table 1: IPR ranking of SADC countries relative to top performing countries, 2009 IPRI Report

Rank	Country	IPRI	LP	PPR	IPR
1	Germany	8.3	8.3	7.9	8.7
2	Finland	8.7	8.9	8.5	8.6
20	South Africa	6.8	5.9	7.1	7.4
73	Malawi	5.3	4.2	7.3	4.3
77	Madagascar	4.2	4.3	4.2	4.1
79	Botswana	5.8	6.7	6.4	4.1
86	Mozambique	4.2	4.0	4.8	3.9
100	Zimbabwe	3.2	2.0	4.5	3.1
105	Zambia	4.0	4.1	5.1	2.8

Note: The International Property Rights Index (IPRI) Report is produced annually by the Americans for Tax Reform's Property Rights Alliance. The index investigates and ranks the individual's rights and ability to own private property in countries worldwide.

Source: Modified from Dedigama (2009)

Mugabe (2006) observed that the national intellectual property protection laws of countries in the

SADC region vary in terms of coverage and age. In addition, he notes that some of the laws pertaining to patents are old and outdated (for example, the case of Swaziland’s Patent, Design and Trade Marks Act No. 72 of 1936 which was last amended in 1969, and Mozambique’s patent legislation, Portaria No 17:043, enacted in April 1959).

South Africa received more than 60% of the total patents issued by the US Patent and Trademark Office (USPTO) to African inventors between 2000 and 2004. Mauritius filed 21 patents, of which 8 were granted, and Seychelles filed 31, of which 18 patents were granted, while Angola and the Democratic Republic of Congo both filed one patent each (Pouris and Pouris, 2009).

Zambia and Malawi also recorded some activity in trademark applications in 2001 and 2002 respectively, with Zambia recording 213 trademark applications by residents and 582 applications by non-residents, and Malawi recording 440 trademark applications by non-residents and 138 applications by residents (Pouris and Pouris, 2009).

Table 2: Patents awarded to southern African inventors by USPTO, 2000–2004

Country	Utility Patents	Design Patents	Plant Patents
Angola	N/A	1	N/A
Botswana	N/A	N/A	N/A
Lesotho	N/A	N/A	N/A
Madagascar	N/A	N/A	N/A
Malawi	N/A	N/A	N/A
Mauritius	N/A	N/A	N/A
Mozambique	N/A	N/A	N/A
Namibia	1	N/A	N/A
South Africa	557	61	10
Zambia	N/A	N/A	N/A
Zimbabwe	4	N/A	N/A

Source: Modified from Pouris and Pouris (2009)

Between 2000 and 2004, of the world’s total of 817,197 patents issued, Africa as a whole accounted for a meagre 6,333 patents. In 2006, sub-Saharan Africa, as a region, accounted for only 1% of the total granted world patents.

Status of IPR in selected SADC countries

It has been suggested that the existence of patent offices in the least developed countries may represent a diversion of national funds for the benefit of the rights-holders only, bearing in mind that the rights-holders account for only a tiny fraction of all patents that are registered in their own countries (Blakeney and Mengistie, 2011). It also provides avenues where rare, skilled and experienced technical staff, such as engineers, are underutilised. Furthermore, national patent offices in the least

developed countries, taken as a whole, may play an insignificant role in the development of international patenting standards or practices (Blakeney and Mengistie, 2011).

Zambia

In Zambia, the legal framework for IPR is contained in the following statutes: the Patents Act, (Chapter 400), the Trade Marks Act, (Chapter 40), the Registered Designs Act, (Chapter 402), the Copyright and Performance Act, (Chapter 406), and the Competition and Fair Trading Act, (Chapter 417) of the Laws of Zambia.

Zambia's patent laws conform to the requirements of the Paris Convention for the Protection of Industrial Property, to which Zambia is a signatory. Zambia is also a signatory to a number of international agreements on patents and intellectual property, including the World Intellectual Property Organization (WIPO), the Berne Convention, the African Regional Industrial Property Organization (ARIPO), and the Universal Copyright Convention of UNESCO.

The management of IPR is vested in two separate government ministries, namely the Ministry of Commerce, Trade and Industry (MCTI) and the Ministry of Information and Broadcasting. The Patents and Companies Registration Office (PACRO), which is an executive agency of the MCTI, administers the industrial property aspect of IPR, while the Ministry of Information and Broadcasting Services deals with copyrights and neighbouring rights. The mandate of IP protection under PACRO extends to trademarks, patents, and industrial designs.

Other aspects of protection for IPR, such as the protection of genetic resources, are administered by the Ministry of Agriculture and Cooperatives through various acts. The protection of genetic resources and traditional knowledge is not covered under current legislation, although the TRIPs Agreement requires that protection for these resources be provided.

IPR are enforced in the High Court of the Republic of Zambia. However, enforcement of intellectual property rights is weak in Zambia, and courts have little experience with commercial litigation. The Zambia Patent Office runs a monthly publication called the *Patent and Trade Marks Journal* that contains particulars of any application for registration of a trademark including a representation of the mark. The government recently launched the implementation plan for the National Intellectual Property Policy which spells out the national ambitions for use of intellectual property in Zambia. The Zambian government is also in the process of reviewing the entire intellectual property legislation in order to modernise and align it with international agreements that Zambia is part of (*Lusaka Times*, 5 October 2010). The government of Zambia has also established a Competition and Consumer Welfare Protection Bill and Policy to address possible conflicts of interest that may arise from encouraging the protection of intellectual property on the one hand, and inhibiting competition on the other.

Malawi

In Malawi, the Patents Act 1958 (Chapter 49:02) makes provisions relating to patents for inventions and for other related, incidental purposes. The Act is administered by the Registrar of Patents, nominated by the Minister of Justice and Constitutional Affairs to head the patents office, as provided for in Part I of the Act. Apart from defining an invention, the Act does not offer guidelines of what is patentable

subject matter in Malawi and does not include exceptions to patentability. Patent and design protection are obtained via a national filing in Malawi and by way of an ARIPO filing. A patent specification in the English language is required. The government has signed and adheres to bilateral and multilateral investment guarantee treaties and key agreements on intellectual property rights. Malawi is a member of the convention establishing the multilateral investment guarantee agency, the World Intellectual Property Organization (WIPO), the Berne Convention, and the Universal Copyright Convention.

The Copyright Society of Malawi (COSOMA), established in 1992, administers the 1989 Copyright Act which protects copyrights and 'neighbouring' rights in Malawi.

The Registrar General administers the Patents Act and the Trade Marks Act, which protect industrial intellectual property rights in Malawi. A public registry of patents and patent licences is maintained. Patents must be registered through an agent. Trademarks are registered publicly, following advertisement and a period of no objection.

The Ministry of Industry and Trade is working with the Copyright Society of Malawi, the Registrar General, and the ARIPO to align relevant domestic legislation with the WTO TRIPs agreement.

Malawi is, at the time of writing, developing its first-ever IP policy. The thrust of the policy is to provide a vision for using the IP system to enhance the country's development agenda. The policy therefore aims to stimulate, generate, protect and commercialise IPR as an economic tool for wealth creation in all the sectors of the economy; to encourage public and private institutions in Malawi to adapt their own IP policies and to integrate the IP system into government's development strategies (Maluwa, 2008). Prior to this development, the country did not have a policy on the use, management and administration of IPR to accelerate its socio-economic and technological development endeavours (Gausi and Kalanda, 2005; Maluwa, 2008). The policy provides the necessary framework for ensuring that the generation, protection and commercialisation of IPR are used as a tool for wealth creation so that the IP system effectively contributes to the sustainable socio-economic and technological growth of the country (Maluwa, 2008).

Zimbabwe

In Zimbabwe, the national IP Office (Zimbabwe Intellectual Property Office) and the recently established Inter-Ministerial Committee on Intellectual Property are key institutions of government that play a crucial role in IP development in the country. Patent and registered design protections are obtainable via national filings in Zimbabwe. A patent specification in the English language is required.

Zimbabwe is a member of the Berne Convention, ARIPO and the Patent Co-operation Treaty. The level of IP awareness amongst government policymakers and senior government officials in various ministries is minimal in Zimbabwe, leading one observer to state that 'even those who work in the national IP Office are not fully conversant with the subject matter beyond the mechanical processes of registration of applications'.

Swaziland

In Swaziland, IPR statutes include the following: Seed and Plant Variety Act No. 7 of 2000, Patents,

Utility Models and Industrial Designs Act No. 6 of 1997, Trade Marks Regulations of 1989, Trade Marks Act No. 6 of 1981, Merchandise Marks Act No. 24 of 1937, Copyright (Rome Convention) Act No. 1 of 1933, Copyright (Prohibited Importation) Act No. 35 of 1918 and Copyright Act No. 36 of 1912.

The IPR system in Swaziland automatically extends patent protection and registered trademarks to products that have been patented and for trademarks that have been registered in either South Africa or Great Britain, upon proper application. A bill for a new Intellectual Property Act has been published but not yet promulgated, and the African Regional Industrial Property Organization in Harare has reportedly assisted in drafting the new patent law. The draft law includes protection for pharmaceutical and agricultural chemical products.

Although Swaziland is a member of the Patent Co-operation Treaty and ARIPO, adherence to key international agreements on intellectual property rights appears to be minimal. The government has acceded to the WTO TRIPS agreement.

Lesotho

In Lesotho, patent and design protection are obtainable via national filings or by way of ARIPO applications. A patent specification in the English language is required. Lesotho is a member of the Berne Convention, the Patent Co-operation Treaty and ARIPO.

Patents are rarely issued in Lesotho but trademark protection is often sought and granted. Intellectual property protection is regulated by the Industrial Property Order No. 5 of 1989 and the Copyright Order No. 13 of 1989, which conform to the standards set out in the Paris and Berne Conventions, respectively.

The law protects patents, industrial designs, trademarks, and grant of copyright. The Law Office is responsible for the enforcement of copyrights. No adequate steps have been taken to implement and enforce the WTO TRIPS agreement and the government has not signed and ratified the WIPO internet treaties (US State Department, 2010).

Botswana

The main pieces of legislation governing IP in Botswana are the Industrial Property Act enacted in 1996, and the Copyright and Neighbouring Rights Act of 2002, amended in 2005, for protection of copyright and related rights. Other laws and regulations pertaining to anti-piracy measures and copyright enforcement are the Copyright Arbitration Panel 6 of 2006 and the Customs and Excise Duty Act. Copyright in Botswana is also protected through international treaties, conventions and protocols as provided in section 36 of the Copyright and Neighbouring Rights Act.

The Office of the Registrar of Companies and Intellectual Property, a statutory body under the Ministry of Trade and Industry, is responsible for the management of IP, including copyrights. The establishment of the Technical Committee on Intellectual Property Rights, following the establishment of the National Committee on Trade Policy and Negotiations (NCTPN), was designed to consolidate the country's position on IP matters.

Stakeholders in Botswana, with collaboration from regional and international organisations, have held and continue to hold several anti-piracy training and sensitisation programmes for law enforcement agencies and the general public. The Copyright and Neighbouring Rights Act provides for civil remedies, criminal sanctions and other remedies for protecting copyright holders in the case of copyright infringement. There are no specific provisions concerning internet copyright infringement under the copyright law of Botswana.

Botswana is a member of the Berne Convention, the WTO TRIPS Agreement, the WIPO Copyright Treaty (WCT), in force since January 27 2005, the WIPO Performances and Phonograms Treaty (WPPT) and ARIPO.

Current regional frameworks for IP

SADC countries are party to a number of international treaties, conventions, bilateral and multilateral agreements that address IP issues within the broader context of trade. These include the Paris Convention (industrial property); The World Intellectual Property Organization (WIPO) Convention; the Berne Convention (literary and artistic works); the Rome Convention; and the UPOV Convention (plant variety protection).

Regional IPR systems for SADC countries are embodied in the Africa Regional Industrial Property Organization (ARIPO) and also parallel national systems for obtaining patent rights. Current membership of ARIPO consists of Botswana, Gambia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. A parallel regional IPR system, Organisation Africaine de la Propriété Intellectuelle (OAPI), exists for a number of French-speaking African states.

The Africa Regional Industrial Property Organization (ARIPO)

ARIPO administers two protocols, namely the Harare Protocol and the Banjul Protocol. The Harare Protocol empowers ARIPO to receive and process patent and industrial design applications on behalf of states party to the Protocol. As such, an applicant for the grant of a patent or the registration of an industrial design can, by filing a single application, designate any of the contracting states in which he wishes his invention or industrial design to be accorded protection. The Harare Protocol also sets down conditions for acquiring patents.

It must, however, be noted that member states of ARIPO may choose not to recognise in their territory, patents granted by ARIPO, on the grounds that the patents are contrary to national legislation. In contrast, member states of the Organisation Africaine de la Propriété Intellectuelle do not maintain national IPR offices and depend solely on the authority of OAPI with regard to industrial property matters.

The Banjul Protocol on Marks is a similar system model alongside the Harare Protocol, but dealing with trademarks. In force since March 1997, the following are contracting states: Malawi, Swaziland, Zimbabwe, Lesotho and Tanzania. Article VI of the ARIPO provisions mandates that the organisation

co-operate with non-member states. In line with this provision, ARIPO co-operates with the following SADC states that have observer status in the ARIPO meetings: Angola, Mauritius, Namibia, the Seychelles and South Africa (Palmer, 2006).

The Cotonou Agreement (EU-ACP countries agreement)

The Cotonou Agreement is the most comprehensive partnership agreement between developing countries and the EU. Since 2000, it has been the framework for the EU's relations with 79 countries from Africa, the Caribbean and the Pacific. A significant number of members of the SADC are also members of the Africa, Caribbean and Pacific (ACP) group of states. Article 46 of the Cotonou Agreement obliges the parties to recognise and acknowledge the need to ensure sufficient and effective levels of protection of intellectual property, industrial and commercial property rights and other rights covered by the TRIPS agreement, including the protection of geographical indications. The main objective of this obligation on the ACP member states is to achieve the necessary international standards to reduce distortions and any other forms of barrier to bilateral trade. As such, draft proposals with the Economic Community of West African States (ECOWAS) and the SADC demand substantial obligations in the area of copyright and related rights, trademarks, geographical indications, industrial designs, patents, plant variety protection and enforcement (Blakeney and Mengistie, 2011). The EU also demands that ACP countries accede to the substantive portions of the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT) that address issues of production, use and distribution of digital content. It is noted that this is an area in which few least developed countries have been able to participate, purely as a consequence of the digital divide between the North and the South (Blakeney and Mengistie, 2011). The protection of non-original databases, the imposition of obligations to protect digital rights management and technological protection mechanisms are additional areas that have been contemplated in these draft agreements by the EU (Blakeney and Mengistie, 2011).

The African Model Legislation

The African Model Legislation for the protection of the rights of local communities, farmers and breeders, and for the regulation of access to biological resources (OAU Model Law) was proposed by the Organization of African Unity for its member states. The model law, which was ratified by the heads of state/governments of the OAU in 1998, seeks, among other things, to regulate access to genetic resources. The Ministerial Council of the OAU has recommended that African states pass legislation based on the draft law; that they negotiate a convention in order to create a regional instrument to coordinate action; and that they develop a common African negotiating position in the revision of Article 27.3(b) of the TRIPS Agreement.

The model legislation includes a number of provisions impacting on intellectual property rights. For example, access agreements prohibit the collector of biological resources from applying for any form of IP right over the resource, or over any community innovation, practice, knowledge or technology, without the prior informed consent of the original provider. Protection for community rights, in line with the customary laws of those communities, is also provided. Such communities are granted an inalienable right to carry on using, exchanging or sharing their biological resources in line with customary laws and practices. The law also provides that the publication of a written or oral description of a biological resource or its associated knowledge, or the presence of these resources in a collection,

will not prevent the local community from exercising their rights in relation to those resources. The farmers' right to protect their traditional knowledge and to save, use, exchange and sell (other than on a commercial scale) farm-saved seed is also recognised. Farmers are also allowed to use a protected variety to develop new farmers' varieties.

Other areas of co-operation in IPR among SADC countries have been in the area of biopiracy especially as regards traditional knowledge. At a diplomatic conference convened by ARIPO in 2010 in Swakopmund, Namibia, nine of the 14 member states of the SADC signed a Protocol on the Protection of Traditional Knowledge and Expressions of Folklore. The purpose of this protocol is to protect innovations and inventions, derived from the exploitation of traditional knowledge in ARIPO member countries, against misappropriation and illicit use through biopiracy. Among other objectives, the protocol seeks to prevent the recognition, registration and granting of patents to inventions arising from pirated traditional knowledge; to promote wider commercial use and recognition of traditional knowledge by its holders, and to ensure that collective custodianship and ownership of such knowledge is not compromised by the institution of novel regimes of private IPR (Blakeney and Mengistie, 2011).

Interestingly, Nicholson (2003) has observed that whereas there is co-operation amongst SADC countries in the area of industrial property (i.e. intellectual property excluding copyright), as well as with the various countries who are members of ARIPO, there are no co-operative copyright treaties amongst SADC member countries. Nicholson (2003) further observes that there is no harmonisation of copyright laws in the SADC region, where 13 of the 14 countries have some form of copyright protection and legislation, although in many cases, as already noted, such laws and legislation are outdated. As a result, the importance, application and interpretation of copyright legislation differ from one country to another.

Universities, research and IP in the SADC

The role of African higher education institutions in research and innovation has recently become a central point of attention. The activities of researchers in these institutions, especially in faculties such as engineering, science, medicine and agriculture, are potential sources of innovation that may need IP protection (CIPR, 2002). However, most African higher education and R&D institutions, already pressured by inadequate funding from their respective governments, are also unable to generate much income from internal resources to augment such limited government funding. R&D intensity, as measured by GERD (gross expenditure on R&D, expressed as a percentage of GDP), is very low in many countries (AU, 2010). The 2010 *African Innovation Outlook* reports that except for Malawi, South Africa and Uganda, which met the AU's set GERD of 1%, the GERD for all other countries ranged from 0.2% to 0.48%. The report further reveals that with the exception of Malawi, Ghana and South Africa, the business sector in Africa contributes less than 10% of domestic R&D expenditure and that many firms that innovate on the continent do not engage in R&D activities, thereby raising the question of the source or origin of such innovations.

Strenuous financial circumstances make it difficult for most universities to fulfil their missions adequately, affecting in particular their ability to conduct not only research, but also research of a good

quality. Mugabe (2009) has observed that one of the consequences of poorly funded universities in Africa has been the conduct of research that is of little or no interest to industrial firms. Thus only very weak links exist between R&D institutions and industry and consequently, the level of transfer of knowledge from universities and R&D institutions and its subsequent utilisation in economic development and the creation of wealth is generally low. It is therefore not surprising that productive and quality university–industry collaborations are few and of low calibre, or completely absent on the innovation landscape of most African countries.

In general, some of these institutions in the SADC have begun to form R&D offices, technology transfer offices, IP offices, IP management units, IP enterprises, foundations, or advancement offices, and so on, with the development of IP policies, IP guidelines, IP strategies, research commercialisation strategies all forming important components of their core activities. Some institutions have indeed approved innovation funds to support the activities of these offices. Unpalatable experiences in South Africa and Kenya, exemplified by the Hoodia case and a collaborative study on HIV/AIDS involving British and Kenyan researchers, as well as numerous other cases of biopiracy have brought the issue of IP protection into sharp focus and consequently the need to have clear IP policies (CIPR, 2002).

Excluding South Africa, there is a dearth of evidence on patenting by universities in the SADC. However, it is generally perceived that patenting activity is very low within most universities in the region. Furthermore, some universities have already established processes to support their research commercialisation, such as developing IP policies, IP strategies, research commercialisation strategies, and also setting up technology transfer offices to address issues of technology transfer and research commercialisation in general. A palpable and considerable potential for tension exists between the need to secure IP protection for the products of research institutions and the need to publish among African researchers, who are still deeply immersed in the maxim of ‘publish or perish’ and as such appear to view the additional demands of participating in patenting activities as an unnecessary burden.

Ample evidence shows that the level of publishable research outputs from the region is very low. SARUA (2007) estimates that between 2001 and 2006, the SADC region produced approximately 47,694 ISI-rated journal articles, an annual average of 6,800 articles. Of this total, South Africa alone accounted for a whopping 80% (38,232), while the rest of the SADC region shared the remaining 20% among them, with Botswana, Malawi, Tanzania, and Zimbabwe each producing more than 1,000 articles during the same period in ISI-rated journals. The study further observed that in most SADC countries, the total annual output for the country was less than that of an active laboratory or university department in many other science systems. Thus it is not difficult to imagine why, at this stage, in most universities in the SADC, patenting and technology transfer is not yet mainstream and does not appear to be considered as a critical area of engagement.

Nonetheless, a few progressive institutions are making cautious strides in this area, as engagement with IPR and technology transfer becomes the norm in contemporary universities elsewhere, especially in the North. This is evident in institutional strategic positioning, and the creation of different models of research management structure within these institutions. The establishment of offices of research, the development of IP policies and the establishment of various statutory committees to drive the research

agenda has become the norm at most research and higher education institutions in the SADC.

It is worth noting that the mission statements of a significant number of universities in the SADC imply the role of innovation, technology transfer and related activities as a means of contributing to wider social needs. However, mission statements in themselves do not usually provide any strong basis on which institutions' progress toward technology research, development, innovation and transfer achievements could be gauged. Rather, research strategies, institutional IP policies and other related policies may lay down the rules of engagement between the various stakeholders involved in the generation and commercialisation of a patent.

The University of Zambia

The University of Zambia has developed a research policy that integrates a comprehensive intellectual property rights policy (University of Zambia, 2008). In this policy, the university proposes to establish an IP Management Unit to manage the University of Zambia's IP in conjunction with the university's Legal Counsel, its Intellectual Property Advisory Board and its Intellectual Property Enterprises. Through its research and IP policy, the institution further intends to promote the application of research findings to commercial ventures and thus support science and technology value-adding activities (University of Zambia, 2008). The University of Zambia anticipates the generation of significant and substantial income through royalties and fees from licensed IPRs from innovations, inventions and created works, university-owned companies and joint ventures, the commercialisation of research and development findings and the utilisation of existing protected and unprotected intellectual property creations. In general, ownership of IPR to whatever is made, conceptualised, discovered or created by a member of staff, students and visiting researchers in the course of carrying out their responsibilities during their employment at the institution is vested in the University of Zambia. The IP policy further states that the institution will own IPR arising from the research of any person who makes significant use of the institution's resources in connection with the development of IP.

At the national policy level, Zambia envisages in its Science and Technology Policy, a nation in which a strong, well-co-ordinated and monitored science and technology system is the basis for achieving sustainable socio-economic development. The policy identifies 'investment in pilot plants, processes demonstration and prototype development to enable rapid commercial exploitation of technologies which are developed in the country' as some key objectives (Republic of Zambia, 2006: 17). The Zambian Government established the Zambia Strategic Research Fund to pursue its strategic research objectives. Ownership of IP resulting from funded projects through the Zambia Strategic Research Fund rests with the government. However, details pertaining to technology transfer and commercialisation are spelt out in research agreements.

The University of Zimbabwe

Research is recognised as one of the three mandates of the University of Zimbabwe, the other two mandates being teaching and community service (University of Zimbabwe, 2010). Hitherto, research at the University of Zimbabwe has been mostly fundamental, not geared towards the generation of funds. The issue of intellectual property rights was thus not regarded as urgent. However, the University of Zimbabwe has now established a Research Board and an Office of Development as instruments for driving research at the institution.

Once regarded as one of Africa's leading research institutions, the University of Zimbabwe was hit hard by the country's economic crisis and suffered consequences such as brain drain and a dearth of scientific research (Bafana, 2011). However, recent developments at the institution indicate that the institution's research and innovation capacity is set to get a facelift with the establishment of a new business unit that will be dedicated to attracting more private funding and helping researchers in the commercialisation of their inventions (Bafana, 2011). The new unit is expected to foster an entrepreneurial system within the university through attracting private-sector funds to research programmes and academic development. It further aims to add value to research output through the commercialisation of innovations and will aim to eventually make the university's funding self-sustaining (Bafana, 2011). The university intends to provide seed funding for the new unit and has identified key research focal areas, including the development of animal vaccines, cassava-based foods and renewable energy such as solar power and non-carbon fuels (Bafana, 2011). The business unit will also prioritise setting up new partnerships, patents and trademarks. The strategy framework for the unit was expected to be launched in late 2010 (Bafana, 2010).

It should be noted that Zimbabwe has more than seven state universities and more than three private university institutions in addition to several polytechnics, colleges and a significant number of R&D institutions. Not a single institution of higher learning in Zimbabwe has an IP policy (Mawire, undated). However, the law faculties in a few institutions, including the University of Zimbabwe and the Midlands State University, do offer training courses in IP. The Africa University also offers an IP master's degree programme, in collaboration with WIPO and ARIPO. ARIPO also offers courses in drafting patents.

The University of Botswana

The University of Botswana seeks to transform from a learning and teaching institution into a research-intensive institution by the year 2021. The University's Research Strategy of 2008 spells out its strategic objectives in this regard; notably, to increase the volume and quality of research outputs and to enhance the impact of its research. The research strategy identifies culture, the arts and society, economic diversification and entrepreneurship, environmental systems and natural resource management, health, indigenous knowledge systems, minerals, water and energy, and social and political developments as areas of strategic focus. The university has been aggressively implementing its research strategy and has put in place a number of structures and policy documents to this effect. The Office of Research and Development is at the forefront of this initiative. Significantly, the university has created an innovation fund to assist in its research commercialisation objectives and has established formal links with the newly created Botswana Innovation Hub, an entity created by the government of Botswana as a means of diversifying the national economy through the commercialisation of research.

The University of Botswana has also created a Research Commercialization Office within the Office of Research and Development, headed by an assistant director. Other units within the Office of Research and Development include Research Funding, Research Quality and Research Ethics. The university's Intellectual Property Policy, which was first developed in 2004, is currently under review, in order to respond to new developments. Additional policy documents to support technology transfer at the institution that are currently under development include draft guidelines for the implementation of the Revised Intellectual Property Policy, a Research Commercialization Strategy, a Research Incentive

Policy and a Research Funding Policy. The Office of Research and Development also hosts regular workshops on a range of IP topics, technology transfer and research commercialisation, research funding, research ethics and research quality for both staff and graduate students in its drive to achieve the intensification of research at the institution by the year 2021.

A second public university, the Botswana International University of Science and Technology (BIUST) became operational in 2013. Two former public research and development institutions, the Botswana Technology Centre (BOTECH) and the Rural Industries Promotion Company- Botswana (RIPCO-B) have also been merged to create the Botswana Institute for Technology, Research and Innovation (BITRI). Other research and development institutions worth noting include the National Food Technology Research Centre (NFTRC) and a number of private tertiary institutions, which include Botho University, Balsago University and Limkokwing University of Creative Technology. IP and technology transfer issues are emerging issues in these various institutions and efforts are currently underway to develop IP policies in most of them.

The University of Malawi

The University of Malawi is the country's principal state university and comprises four colleges and a polytechnic, with campuses spread around the country. It operates a federated system, with a central administration led by a vice chancellor and the satellite colleges each administered by a principal (University of Malawi, 2006). In 2006, the University of Malawi's Senate approved a comprehensive University Research and Consultancy Policy, which broadly addresses research management issues at the institution including, but not limited to, funding, ethics, incentives, and ownership of IPR. The University Research and Publications Committee is a Senate Committee which is the central organ for strategic planning of research at the University of Malawi. The Research and Publications Committee is tasked with the development and implementation of policies on research and consultancies, and works with various college-based research and publications committees to support and monitor all university-approved research and related activities (University of Malawi, 2006). In 1998, the University of Malawi appointed a full-time university research coordinator to serve on the University Research and Publications Committee and liaise with other institutions and the government on matters concerning research. This office has since been transformed into the University Directorate of Research and Consultancy Services (University of Malawi, 2006).

The University of Swaziland

The important role of research management and the exploitation of IP and technology transfer arising from research conducted at the institution as a means of extending the University of Swaziland's third mission does not appear to have been seriously considered and implemented by the institution. At this stage, it appears that no structures have been put in place to formally manage the university's research objectives and IP expected to arise from such research endeavours. Nonetheless, according to the University of Swaziland Strategic Plan 2010–2015, the institution intends 'to be one of the regional universities with a strong research output and publication record coupled with a capacity to host national and international conferences to disseminate research findings' (University of Swaziland, 2012). The university also makes clear its intention 'to participate in the formulation of an IPR policy to protect the rights of scholars who have made esteemed academic and development contributions' (University of Swaziland, 2012).

It must, however, be noted that there are significant challenges in research funding in Swaziland, with no established funding mechanisms for research and experimental development at the national level, with research capacity thus weakened in terms of both financial and human resources (Makoni, 2011). Perhaps with the development of Swaziland's first science policy (Makoni, 2011) and the role the University of Swaziland is expected to play in not only contributing toward the development of the policy, but also to its implementation, the institution may rise to the occasion. The policy intends to target key areas such as science, education and training, R&D, innovation, industrial development, investment, management, indigenous knowledge systems and the public understanding of science (Makoni, 2011). A further national development, with additional implications for the University of Swaziland, is the construction of the Royal Science and Technology Park which began in 2010 (Makoni, 2011). The imperative for linkages between science parks and research institutions, the establishment of the Royal Science Technology Park and the development of the science policy therefore provide an opportunity for the University of Swaziland to rethink its research objectives and develop appropriate institutional strategies to respond to these developments effectively.

Support networks for IPR and technology transfer in the SADC

Building partnerships, networks and collaborations is very important in the development of effective IPR, technology transfer initiatives and broad innovation systems. For these partnerships, collaborations and networks to be effective, they must include stakeholders drawn from the various pillars of the triple or multi-helix platforms that make up the innovation ecosystem, namely research and academic institutions, the public sector represented by national governments and sometimes by foreign governments, and the private sector represented by industries and industry associations. More importantly, it is essential that each stakeholder group clearly understands the role they are expected to play in support of the innovation agenda and that they are empowered to fulfil that role effectively. A number of support networks and professional associations do exist within the SADC and also outside the SADC to support IPR systems, innovation and technology transfer in the region. In the SADC, well-established networks in South Africa have some outreach activities that include participation by interested parties within the broader SADC. Still other networks are outside the region, but have activities that support initiatives with the region. These networks include the Southern African Research and Innovation Management Association (SARIMA), the International Network of Research Managers Societies (INORMS), the Association of Universities Technology Managers (AUTM), the Licensing Executives Society (LES) and the recently launched Southern Africa Innovation Support Programme (SAIS).

The Southern Africa Innovation Support Programme is regional and multilateral in nature and supported by the Government of Finland through the Ministry of Foreign Affairs of Finland. It involves four participating countries, namely Botswana, Namibia, Mozambique and Zambia and has four strategic components: networking, capacity building, learning from best practices and institutional development. Its overall objectives are to support a regional innovation system in the SADC; to promote collaborations between the innovation systems of SADC countries in order to promote greater impact on both economic and social development; to consolidate the element of innovation systems in each country; to continue to grow the innovation systems in the SADC and to provide a strategic approach to

raising funds for innovation, combining both local and international sources.

The role of SARIMA

In its relatively short history, the Southern African Research and Innovation Management Association (SARIMA) has emerged as major role player in the broad management of research and innovation in the SADC region (although most of its activities and successes to date are mainly in South Africa). SARIMA already has a wealth of experience and technical competence in dealing with the broad issues involved in IPR systems, technology transfer and research commercialisation through its various activities and through its established links and networks in South Africa and elsewhere. More importantly, SARIMA has built relationships and partnerships with key stakeholders at a strategic level in South Africa, the SADC and outside the region, and can therefore use this position of strength and access to play a strong advocacy role in the field of IPR systems and technology transfer in the SADC. Perhaps what SARIMA needs to do is strive to become more visible outside of South Africa and take aggressive steps toward promoting its activities in the SADC outside South Africa. It is also critical that SARIMA focusses on an advocacy role through engaging the executive management of universities in the SADC, especially through groupings such as the Southern African Research Universities Association (SARUA) and any SADC vice chancellors' associations at a regional level, as well as with organisations such as the Licensing Executives Society, the Southern Africa Innovation Support Programme, the Association of University Technology Managers and WIPO at the international level. SARIMA could also leverage its strengths in partnership building to influence an attitudinal change within the private sector through pressure from its various stakeholders, such as industry associations and various chambers of commerce in the SADC countries, to play their expected roles in the innovation ecosystem. In sum, SARIMA's efforts toward capacity building in the area of IPR and technology transfer in the SADC need to be strengthened and striking alliances with organisations such as the Licensing Executives Society and WIPO may be very useful in this regard. While the challenges in this area are many, it is recognised that no effort is wasted effort as success depends largely on culture and attitude change, which for the most part is a painstakingly slow process.

4. Challenges

There is no doubt that IPR systems in the SADC, as in most other developing countries, are constrained by a number of serious challenges that cut across all major stakeholder groups involved. Ample evidence shows that most IPR systems in the SADC have performed dismally and appear to serve the needs and interests of foreign users as opposed to national stakeholders. This is evident in the significant proportion of patents applications and trademark filings in the region that are prosecuted by foreign applicants, and also in the number of patents granted and trademarks registered in the SADC. Perhaps the problem lies in the substandard quality of innovation inputs that SADC countries make in support of innovation as a whole (INSEAD, 2011).

The challenges that SADC countries face in the formulation, implementation and utilisation of IPR systems for economic development are many and daunting. These challenges are experienced at the level of government administration, at the level of academic and research institutions, at the level of the industries and the private sector, and even in the general public.

Typical challenges that SADC countries face in the formulation, implementation and utilisation of IPR systems include:

- Lack of national IP policies and strategies.
- Implementing such policies and strategies.
- Inadequate or incomplete understandings of IPR systems.
- Lack of public awareness of IPR systems and their potential role in economic development;
- Poor policy formulation and legislation on IP.
- Undertrained IP practitioners.
- Inadequate participation in international rule-making organisations (such as WIPO and WTO).
- Inadequate administration and enforcement of IPR systems at the national level, and in consonance with international obligations.

Within academic and research institutions in the region, IPR issues are still largely rudimentary; there is a limited number of academic institutions with IP in their curriculum, and an acute lack of resources hampers capacity building in IP. Blakeney and Mengistie (2011) observe that there is a dearth of IP expertise in academic and R&D institutions, in the legal and business fraternity and in civil society groups in most developing countries. A consequence of this is that very few, if any, local legal professionals specialise in intellectual property disciplines in the SADC. It is certainly the norm that patent attorneys are generally qualified in either science or engineering disciplines in addition to their law qualifications. In most African countries, including the SADC, it is rarely the situation that patent attorneys are trained in both either science or engineering and law disciplines. The norm appears to be that trained lawyers, with no science or engineering backgrounds, practise as patent attorneys.

While the situation may have been improving, the levels of awareness about IPR systems, especially with regard to their operation, costs and benefits, still remain low among key stakeholder groups such as the business sector, the scientific community and public officials (CIPR, 2002). The CIPR (2002) has observed that almost all developing countries face shortages of professional staff in their national IP administration. The availability of technical and legal staff tends to be in short supply and where legal expertise does exist, there is no IPR specialty. There is also a pervasive, low level of IP awareness among the general population in the SADC and other developing countries.

Where IPR policies exist, implementation is lacking, or poor, or inadequately monitored at national and institutional levels. The role of information technologies as a critical requirement for the efficient management of IP administration is still not being fully appreciated. As an important determinant of institutional capacity, information technologies offer easy access to a wide variety of information on IP policy subjects as well as online patent databases and library resources of organisations such as WIPO and other major patent offices (CIPR, 2002). Despite these advantages, a large number of countries in the SADC, as in many developing countries, still have manual, paper-based systems, which not only hinders efficient processing of applications, but greatly compounds the collection of important statistical and management information (CIPR, 2002). Other challenges confronting SADC countries include IPR reforms to suit the dictates of the WTO TRIPS agreement, the design of appropriate protection systems for plant varieties and plant genetic material, whether and how to protect traditional knowledge within the formal IP system, and how to regulate access and implement benefit-sharing legislation in these areas (CIPR, 2002).

5. Conclusions

The debate as to whether IPR systems indeed contribute to the economic growth and development of developing countries, and to what extent, continues. What is clear, however, is that IPR systems as presently conceptualised and implemented in developing countries are skewed to a great extent in favour of meeting the needs and demands of external stakeholders especially within bilateral and multilateral framework arrangements.

There is still a near-complete lack of understanding and activity amongst various stakeholders in the innovation ecosystem in the SADC, especially at the practical level. Theoretically, the academic sector stakeholders, the public sector stakeholders and industry sector stakeholders all have a basic understanding of what each should be doing to enable the development, protection and exploitation of IP for economic growth and development in the region. However, the performance of IPR systems in the region most definitely tells a different story and points to a wide gulf between expectations and reality.

It is contended here that even with the best IPR systems in place in the region, innovation and technology transfer achievements will still be low, probably because the overall investments in innovation inputs in the region are very low and not comprehensively co-ordinated.

Most industries in the region are SMMEs and do not have sufficient financial resources to explore opportunities to capitalise on IPR systems and technology transfer from research and higher education institutions in order to expand their business offerings. The quality of research emanating from universities in the region does not appear to fit profiles for research commercialisation. And when it does, the technical skills and know-how, and financial resources to enable its translation into actual products and services are wanting. However, the fact that a number of universities in the region have been progressive enough to establish technology transfer offices and also develop IP policies, is a step in the right direction.

What is also clear is that for IPR systems to have some clout, a minimum level of scientific and technological capacity and competence needs to be in place. Significantly, this base-level capacity and competence is necessary in order to harness IPRs for economic growth and development. Therefore, key recommendations for IPR and technology transfer in the SADC region ought to include the following:

- National and institutional capacity for the commercialisation of research in SADC countries needs to be developed.
- Reward systems and incentives for the commercialisation of research and technology transfer activities needs to be implemented and aggressively pursued at universities and research institutions in the SADC region.
- The public and private sectors should also jointly and collaboratively explore the possibility of implementing such rewards and incentives systems within the private sector.
- The public and private sectors in SADC countries need to be educated and encouraged to invest, in a meaningful way, in technology transfer activities arising from research and higher education institutions in the region.
- Capacity building in IPR policymaking, administration, implementation and monitoring in the SADC region must be strengthened.

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Appendices

Appendix 1: Organisations dealing with different aspects of IP

Organisation	Location	Topics of interest	Corresponding national ministry
World Intellectual Property Organization (WIPO)	Geneva, New York and Singapore	All IP	Industry, Science, Culture, Communication
World Trade Organization (WTO)	Geneva	All IP	Trade, Foreign Relations
World Health Organization (WHO)	Geneva	Patents	Health
Commission on Intellectual Property Innovation & Public Health (CIPRIH)	Geneva	Patents	Health
United Nations Conference on Trade and Development (UNCTAD)	Geneva	All IP	Trade, International Development
International Union for the Protection of New Varieties of Plants (UPOV)	Geneva	Plant varieties	Agriculture
Food & Agricultural Organization (FAO)	Rome	Plant varieties & patents	Agriculture
Conference of Parties (COP) of the Convention on Biological Diversity (CBD)	Montreal	Plant varieties & patents	Agriculture, Environment
United Nations Environmental Program (UNEP)	Nairobi	Plant varieties and patents	Environment
United Nations Economic, Scientific and Cultural Organization (UNESCO)	Paris	Copyright	Culture
United Nations Industrial Development Organization (UNIDO)	Vienna	Industrial property	Industry
Consulting Group on International Agriculture Research (CGIAR)	16 locations	Plant varieties and patents	Agriculture
International Police Organization (Interpol)	Lyon	Enforcement of all IP	Justice, Police
World Customs Organization (WCO)	Brussels	Enforcement of all IP	Customs, Revenue, Justice

SADC Government ministries and departments dealing with IPR

Country	IPR	Competent authority
Swaziland	Copyright, Industrial property	<ul style="list-style-type: none"> Ministry of Commerce Industry and Trade – Intellectual Property Office
Lesotho	Copyright, Industrial property	<ul style="list-style-type: none"> Ministry of Law and Constitutional Affairs
Malawi	Copyright	<ul style="list-style-type: none"> Copyright Society of Malawi (COSOMA) Ministry of Youth, Sports and Culture
	Industrial property	<ul style="list-style-type: none"> Department of the Registrar General Ministry of Justice and Constitutional Affairs
Zambia	Copyright	<ul style="list-style-type: none"> Copyright Administration Ministry of Information and Broadcasting Services
	Industrial property	<ul style="list-style-type: none"> Patents and Companies Registration Office (PACRO) Ministry of Commerce, Trade and Industry
Zimbabwe	Copyright & Industrial property	<ul style="list-style-type: none"> Zimbabwe Intellectual Property Office (ZIPO) Ministry of Justice, Legal and Parliamentary Affairs
Botswana	Copyright & Industrial property	<ul style="list-style-type: none"> Registrar of Companies and Intellectual Property Ministry of Trade

Appendix 2: Glossary of terms and abbreviations

ACP	Africa, the Caribbean and Pacific countries.
ARIPO	Africa Regional Industrial Property Organization
CGIAR	Consulting Group on International Agriculture Research
COP	Conference of Parties of the Convention on Biological Diversity
CIPR	Commission on Intellectual Property Rights
FAO	Food and Agricultural Organization
GERD	Gross Expenditure on Research and Development
ICTSD	International Centre for Trade and Sustainable Development
IP	Intellectual Property
IPR	Intellectual Property Rights
IPRI	<p>International Property Rights Index (IPRI)</p> <p>The IPRI assumes a significant correlation between the protection of private property rights and a nation's economic growth and examines the legal and political environment (LP), physical property rights (PPR) and intellectual property rights (IPR) as components essential in strengthening and protecting a country's private property system.</p> <p>In determining the IPRI, the variable, <i>IPR</i>, evaluates the protection of intellectual property covering all areas of IPR and further reviews a country's policies and their effectiveness in enforcing patents and copyrights. While the variable, <i>protection of intellectual property rights</i>, contains expert opinion survey outcomes reflecting a nation's protection of IP, the variable, <i>patent protection strength</i>, replicates the information provided by the 2000 Ginarte-Parks Index of Patent Rights. (The Ginarte-Parks Index of Patent Rights reflects a country's rank in patent strength based on coverage; membership in international treaties; restrictions on patent rights; enforcement; and duration of protection.) The <i>copyright piracy</i> variable examines the level of piracy in the IP sector as an important indicator of the performance and execution of protecting IPR in a country.</p> <p>The IPR ranking within the IPRI may therefore provide a comparatively good indication of the performance or status of a nation's IPR system relative to other countries or regions.</p>
LDCs	Least Developed Countries
LP	Legal and Political Environment
OAU	Organization of African Unity
PPR	Physical property rights
SADC	Southern African Development Community
SARIMA	Southern African Research and Innovation Management Association
SARUA	Southern African Research Universities Association
SPLT	Substantive Patent Law Treaty
TRIPS	Trade-Related Intellectual Property Rights
UPOV	International Union for the Protection of New Varieties of Plants (UPOV)
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environmental Programme
WIPO	World Intellectual Property Organization
WPPT	World Intellectual Property Organization Performance and Phonogram Treaty
WTO	World Trade Organization

About the author and the University of Botswana

The author, Alphonsus Neba, is Assistant Director, Commercialisation, in the Office of Research and Development at the University of Botswana.

The Office of Research and Development is the hub for research and innovation management activity at the university, with the overall mandate to co-ordinate research and innovation activities and the specific mandate to facilitate the implementation of the University Research Strategy. The Office has six senior members of staff and several specialised programme staff who work on various EU- and US-funded projects, and support staff. The activities of the Office are organised into Research Quality, Research Ethics, Research Funding, Research Commercialisation and Strategic Programmes.

Our role in the RIMI4AC project

The University of Botswana is the project partner responsible for southern African activity. The university works closely with the Southern African Research and Innovation Management Association (SARIMA) to enhance and engage research management activity in the SADC region outside South Africa. As part of the project, the University of Botswana has conducted a series of workshops and staff exchanges to share best practice in research management in the wider sub-Saharan region. In recent years, staff from the Office of Research and Development have contributed to research management-related events in Cape Town, Dar es Salaam, Buea, Kingston and Ibadan, and the Office has also hosted research management staff from Zimbabwe, Nigeria, Cameroon, Tanzania and Mozambique.

The papers in this series

As part of the RIMI4AC project, five papers were commissioned to help ensure that the work undertaken at institutional and regional level both reflects and feeds into wider policy debates. The papers are all available on the project website at <http://www.rimi4ac.net/en/>, and are listed below.

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