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Samia Satti Osman Mohamed Nour[ab]

[a] UNU-MERIT, School of Business and Economics, University of Maastricht, Maastricht, The Netherlands

[b] Economics Department, Faculty of Economic and Social Studies, Khartoum University, Khartoum, Sudan

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The economic importance and impacts of intellectual property rights (IPRs) in Sudan[1]

Samia Satti Osman Mohamed Nour[a,b]

[a]*UNU-MERIT, School of Business and Economics, University of Maastricht, Maastricht, The Netherlands*
[b]*Economics Department, Faculty of Economic and Social Studies, Khartoum University, Khartoum, Sudan*
Email: samiasatti@yahoo.com

This paper explains the importance of IPRs and examines the factors hindering and those contributing toward enhancing IPRs in Sudan. We find that the inadequacy of IPRs protection in Sudan is attributed to low integration in the international institutions, lack of legal issues, lack of government concern, lack of private sector concern, weak institutions setting, lack of public awareness, lack of resources, a weak culture for IPRs, lack of cooperation between universities and industry and lack of coordination. The inadequate IPRs protection in Sudan leads to poor national system of innovation, hindering Foreign Direct Investment (FDI) and hindering transfer of technology. The factors contributing toward enhancing IPRs in Sudan include promotion of adequate IPRs legislations and enforcement; planning, commitment to international IPRs agreements; finance, investment and resources; social partnership to encourage IPRs protection, increasing government concern, increasing private sector concern, improvement of public awareness, encouragement of cooperation between universities and industry, and improvement of institutions setting, coordination and culture for IPRs protection.

Keywords: Patents, industrial designs, trademarks, IPRs protection, IPRs promotion, Africa, economic development

Introduction

There is increasing concern amongst economists about the importance of IPRs and their related impacts on economic, social and innovation development in both developed and developing countries. The history of IPRs dates back to the pre-industrial era, which means that all the technological development that took place since the first industrial revolution was indeed shaped by the various IPRs regimes in place in various countries throughout history (cf. Verspagen 1999, Freeman and Soete 1997, OECD 1997).

IPRs are a very important topic in the discussion of economic development, and therefore understanding the strength or weakness of IPRs in a developing country like Sudan is of great significance. The paper combines data on patents, industrial designs and trademarks for Sudan with survey data on the importance of IPRs in Sudan. Moreover, it also focuses on the importance of strengthening IPRs, and therefore develops a case for this. It also discusses the arguments in favour of and against the role of strong IPRs in development. It also leads to the general conclusion that, provided that Sudan government gives a firm commitment to institutional reform and sound plans to strengthen IPRs, there are more advantages and arguments in favour of than disadvantages and arguments against strengthening IPRs to boost economic development in Sudan.

The paper discusses the economic importance of promoting IPRs in Sudan; it differs from existing studies in the literature on IPRs in the developing countries. First, different from the studies in the literature we focus on IPRs in Sudan as a new case of the African countries. Secondly, we compare the case of Sudan with other Arab, African and other countries. Thirdly, unlike the few studies in the Sudanese literature (cf. Makki 2006, Atta-Al-Mannan 1999, Ali 1995, Babiker 2000, Yusuf, Mater) that examine the importance of IPRs in Sudan from a legal perspective, we examine the importance of IPRs in Sudan from an economic perspective using more recent data wherever possible. Particularly, we provide a more in-depth analysis of the intensity, structure and trend of industrial property. Finally, different from the studies in the Sudanese literature, a novel element in our analysis is that we use new survey data based on primary data and interviews with official and academics experts in IPRs in Sudan to examine the main factors hindering and those contributing towards the promotion of IPRs in Sudan. The main purpose of this survey is to collect primary data to examine the causes of poor IPRs and to provide some recommendations to improve IPRs in Sudan. We are aware of the limited scope of our analysis, which focuses on industrial property, but due to lack of relevant data, it would not be possible to cover other types of IPRs in Sudan; we leave that for future studies, when adequate data are available.

We are aware of the importance of focusing on the pros and cons of strong IPRs in different sectors of the economy. We are aware that on the one hand some studies argue that strong IPRs (such as patents) are necessary to give the proper incentives to inventors and innovation, while on the other hand, there are studies that argue that weak IPRs are necessary in some areas to encourage technology transfer and technological learning to local firms.

This seems like a meaningful strategy, and comparisons with practices followed by successful countries in the past would be most appropriate. But because of the limited implementation of IPRs in different sectors of the economy and due to the lack of awareness across the different sectors of the economy on the importance of IPRs in Sudan, we could not cover these issues in this paper, but hope to do so in our future research when adequate data are available.

The factors constraining IPRs in Sudan and the implications of weak IPRs are discussed towards the end of the paper and the survey data does not necessarily reflect the opinion of the industry – it is based on the feedback academic experts. The limited implementation and awareness about IPRs in industry in Sudan appears mainly from the results of the firms survey conducted by Nour (2010) and discussed in Nour (2013). Nour (2013) indicates a weak technology output indicator as measured by patent applications – for instance, in 2008, only 6% of all respondent firms applied for a patent; this low degree of patenting may be attributable to low R&D efforts (cf. Nour 2013).[2]

Based on the above, the rest of this paper will be organised as follows: first we explain the conceptual framework and review the literature on the economic importance and economic impacts of IPRs. then we discuss the importance, implications and constraints of IPRs in Sudan and finally we provide some conclusions.

The conceptual framework and literature review

Before explaining the economic importance and impacts of IPRs in Sudan in Section 3 below, it is worthwhile in this section to begin with the conceptual framework and brief definition of the concept IPRs and then discuss the literature on the economic importance and impacts of IPRs.

As indicated by WIPO (1999):

> The need for international protection of intellectual property became evident when foreign exhibitors refused to attend the Intellectual Exhibition of inventions in Vienna in 1873, because they were afraid their ideas would be 'stolen' and exploited commercially in other countries. That ear marked the birth of Paris Convention for the protection of industrial property, the first major international treaty designed to help the people of one country obtain protection in other countries for their intellectual creations in the form of industrial property rights, known as inventions (patents), trademarks and industrial design. These efforts lead to the birth of the World Intellectual Property Organization (WIPO) in 1883 (WIPO 1999, 3).

According to the WIPO Report,

> Every country needs a well-developed and healthy intellectual property system for economic and social well-being. Intellectual property protection encourages the use and further development of local inventive and artistic talents and assets; nurtures and safeguards local intellectual property assets, such as traditional knowledge and folklore; and attracts investment, providing a stable environment in which investors, both local and foreign can be confident that their intellectual property rights will be respected. In addition, an intellectual property infrastructure allows participation in the exchange of commercially valuable information at the international level as promoted by WIPO, including the quick and easy access to information in new technology such as international patent applications and abstracts available under PCI. Beyond national boundaries, a well- functioning intellectual property system contributes to great stability and security for protected rights in an increasingly competitive global market place, allowing efficient enforcement of those rights. In addition, the system can aid in combating illegal activities such as counterfeiting and piracy (WIPO 1999, 11).

The concept of intellectual property (IP) refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. IP is divided into two main categories: industrial property, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; and copyright and rights related to copyright. The innovations and creative expressions of indigenous and local communities are also IP, yet because they are 'traditional' they may not be fully protected by existing IP systems. Access to and equitable benefit-sharing in genetic resources also raise IP questions. In addition, IPRs include the category of Plant Breeder's Rights (PBRs), also known as Plant Variety Rights (PVR), that allow plant breeders the right to protect new varieties of plants.

Based on the definition of the concept of IPRs presented above, the literature explains the economic importance and economic impact of the various items of IPRs from different perspectives: micro and macro perspectives, user (consumer) and producer and national economy perspectives, and developed and developing countries perspectives (cf. Idris 2003). From an economic perspective, IP can be perceived as a powerful tool for economic growth; IPR – in the form of patents, copyrights and trademarks – has come to perform a vital function in the global economy and forms a cornerstone of the knowledge economy. From the economic point of view, the importance of intellectual property rights (IPRs) as a source of innovation, creativity, growth and progress stems from the fact that almost everybody in society is a user and potential creator of intellectual property; so protection, through a system of national and international rules called intellectual property rights is necessary to provide incentives and financing for innovation and creation, which in turn lead to economic, cultural and social progress. Protection for intellectual property also encourages the production and dissemination of knowledge and a wide range of quality goods and services. Intellectual property rights add value for consumers and can provide a guarantee of source and quality. Intellectual property protection contributes to economic growth in both developed and developing countries by stimulating innovation, cultural diversity and technical development as part of a larger policy framework. Properly used, intellectual property rights can also be key

tools for the alleviation of poverty through trade. The immense adverse economic and social impact of intellectual property theft requires that a priority for combating counterfeiting and piracy is necessary for the intellectual property system and society to reap the benefits from IPRs (cf. Idris 2003).

From an economic perspective, a rationale for 'intellectual property' rests on incentive effects to overcome the 'free rider problem'. From the economic point of view, the system of IPRs can be considered as an institution that tries to solve the problem of market failure –especially for technological knowledge as a good which is characterised by non-rivalry and non-excludability – by providing private producers with incentives to supply public goods. So IPRs is one of the possibilities to solve the problem of market failure (cf. Verspagen 1999, David 1993). There is considerable controversy over the economic importance and economic implication of stronger IPRs in both developed and developing countries. In the literature there are three ways that the strength of the IPRs regime could affect economic growth and development indirectly. The IPRs regime may affect innovative activity and thus contribute to growth; it may affect the inflows of FDI and technology transfers and enhance growth; or it may enhance the ability of countries to export certain goods, and affect redistribution of income between the countries and between communities within the country (cf. Kumar 2002, Siwek 2005, OECD 2005, WIPO 2007). The literature indicates that the observed effects could be subject to the causality problem as developed countries are likely to have stronger IPRs regime than the poorer ones, in other words, the level of development is likely to be a determinant for strength of IPRs regime rather than the other way round (cf. Van Wijk and Junne 1993, Verspagen 1999, Kumar 2002, OECD 2002, UNCTAD 1975, OECD 1997, Mansfield 1994, 1995, Freeman and Soete, 1997).

Concerning the developed countries, the policy debate has been expressed around two opposite views. On the one hand, supporters of the view claim that stronger IPRs (such as patents) are necessary to give the proper incentives to inventors. If inventions are not protected, imitation will flourish and reduce the rewards accruing to inventors. On the other hand, opponents to stronger IPRs point to the obstacles they would be creating for the access and diffusion of knowledge and information, which is a basic condition for sustained innovation (cf. OECD 2003). As for the developing countries, there is increasing debate about the potential positive and negative effects of the international strengthening of IPRs (cf. Maskus 2000). On the one hand, the potential positive effects and benefits are that stronger IPRs provides competitive advantages for innovative firms, allowing them to appropriate larger returns from creative activity and generating incentives for additional invention, reducing contracting costs, allowing for international technology transfer, expansion of investment and technology flows to developing countries, raising closer integration of the developing countries with global sources of technology, enabling imitation, absorption and assimilation of foreign inventions and enhancing technological learning and economic growth – e.g. East Asian countries, Japan, Korea and Taiwan. On the other hand, the negative implications for developing countries are that stronger IPRs protection could limit access to patented products and the ability to imitate expensive foreign products and technology, raise the costs of acquiring new technology and products, worsening their terms of trade by shifting the global terms of trade in favour of technology producers and against technology consumers, and has negative impacts on foreign direct investment, technology transfer, and affecting market price.

Studies in the literature present mixed results concerning the economic impacts of IPRs (notably patents). Some studies argue that the absence or weakness of patent protection encourages technology transfer and technological learning through copying and imitation. Others argue that the patent system provides a mechanism which encourages technology transfer from abroad through direct investment or licensing, and the indirect effects are an effective means of technological learning, so the strength or weakness of the IP (e.g., patent) system has a strong effect on foreign direct investment, and that a low level of IP protection will preclude certain types of investment in various industries from being made. Other experts argue that the role of the patent system in economic development is likely to be case-specific, in the context of both variations from industry to industry and variations among countries. Patent statistics are not sufficient evidence to explain the causal effect of the patent system with regard to economic growth. However, there is at least a strong correlation between the level of research and development (R&D) expenditure and the level of patenting activity according to the pattern of business R&D investment in the Organization for Economic Cooperation and Development (OECD) countries (cf. Maskus 2000, Mansfield 1994).

Arguments for intellectual property rights have generally taken one of three forms (Hughes 1988, Moore 2008). *Personality theorists* maintain that intellectual property is an extension of individual personality. *Utilitarians* ground intellectual property rights in social progress and incentives to innovate. *Lockeans* argue that rights are justified in relation to labour and merit. While each of these strands of justification has its weaknesses, there are also strengths unique to each. Concerning the general critiques of intellectual property, there are several general critiques of the rights to control intellectual property. The first criticism is related to the argument that *information wants to be free*: many have argued that the non-rivalrous nature of intellectual works grounds a prima-facie case against rights to restrict access. Since intellectual works are not typically consumed by their use and can be used by many individuals concurrently (making a copy does not deprive anyone of their possessions), we have a strong case against

moral and legal intellectual property rights (Kuflik 1989, Hettinger 1989). One reason for the widespread pirating of intellectual works is that many people think restricting access to these works is unjustified. Moore argues that it false to claim that just because this information can be used and consumed by many individuals concurrently, a prima facie moral claim to maximal access is established.

The second claim is related to the *free speech argument against intellectual property*: according to some, permitting intellectual property rights is inconsistent with our commitment to freedom of thought and speech. Hettinger argues that intellectual property 'restricts methods of acquiring ideas (as do trade secrets), it restricts the use of ideas (as do patents), and it restricts the expression of ideas (as do copyrights) – restrictions undesirable for a number of reasons' (Hettinger 1989, cited in Moore 2011, paper published online). Two sorts of replies have been offered to this kind of worry (Himma 2006, Moore 2010). The first notes that it is the incentives found in providing limited protection that foster the creation and dissemination of information – a system of intellectual property protection may cause restricted access in the short run, but overall, the commons of thought and expression is enhanced. Second, it is not at all clear that free speech is so presumptively weighty that it nearly always trumps other values. The third claim is related to the *social nature of information argument*: according to this view, information is a social product and enforcing access restrictions unduly benefits authors and inventors. Individuals are raised in societies that endow them with knowledge which these individuals then use to create intellectual works of all kinds. On this view the building blocks of intellectual works – knowledge – is a social product. Individuals should not have exclusive and perpetual ownership of the works that they create because these works are built upon the shared knowledge of society. Allowing rights to intellectual works would be similar to granting ownership to the individual who placed the last brick in a public works dam. The dam is a social product, built up by the efforts of hundreds, and knowledge, upon which all intellectual works are built, is built up in a similar fashion. Finally, even if a defender of this view can justify societal ownership of general pools of knowledge and information, it could be argued that we have already paid for the use of this collective wisdom when we pay for education and the like (Moore 1998, 2001, 2011).

Moore (2011) discusses intellectual property, innovation, and social progress and the case against incentive-based arguments. He offers an internal and external critique of Anglo-American systems of intellectual property protection. Internally, it will be argued that incentive-based social progress justifications for intellectual property fail – alas, if we are to conduct a cost benefit analysis it appears that a different model or a different set of rights would be better than our current system. Social progress incentive-based arguments do not justify current copyright, patent, and trade secret models of intellectual property protection. Moreover, even if these arguments could be modified, they would seem to require allowances for multiple patents for the 'same' intangible work, not patent monopolies. Externally, it will be argued that consequentialism – more specifically, rule-utilitarianism – is beset with numerous seemingly insurmountable difficulties and cannot provide an adequate foundation for intellectual property. If the internal or external arguments succeed, then we will have to either find a different justification or abandon systems of intellectual property protection altogether. One alternative to granting patent rights to inventors as incentives is government support of intellectual labour. This would result in government-funded research projects, with the results immediately becoming public property. It is obvious that this sort of funding can and does stimulate the production of intellectual property without allowing initial restricted control to authors and inventors. The question becomes: Can government support of intellectual labour provide enough incentive to authors and inventors so that an equal or greater amount of intellectual products are created compared to what is produced by conferring limited property rights? Better results may also be had if fewer intellectual works of better quality were distributed to more people. If so, then intellectual property rights should not be granted on grounds of utility. In response to this kind of charge, defenders of the argument based on incentives have claimed that government support of intellectual labour does not and will not create the requisite incentives. It is only by holding out the promise of huge profits that society obtains maximal progress for all. Governments may be able to provide some incentives by paying authors and inventors in advance, but this kind of activity will never approach the incentive created by adopting a system that affords limited monopoly rights to intellectual property. As Shavell and van Ypersele (2001) note, reward models may be able to avoid the worries mentioned above while providing incentives. 'Under a reward system innovators are paid for innovation directly by the government (possibly on the basis of sales), and innovations pass immediately into the public domain' (cited in Moore 2003, 615). This system avoids the monopoly power provided by patents while maintaining strong incentives. If rewards, paid annually, are based on sales, then both of the worries mentioned above would fall away. Innovators would still burn the midnight oil chasing that pot of gold, and governments would not have to decide which projects to fund or determine the amount of the reward before its 'social value' was known. Taxes or collecting percentages of the profits of these innovations may provide the funds necessary to pay the rewards. Two other benefits are also obvious. One criticism of the patent system is that monopoly power allows monopoly prices. Under a reward system, consumers would avoid these prices and likely purchase other goods and services. A second criticism is that patents hinder

subsequent innovations and improvements of intellectual works. As with monopoly pricing, a reward system avoids this social cost because the intellectual works pass immediately into the public domain.(Moore 2003, 2011, Kremer 1998)

Ghosh (2006) discusses the intellectual property incentive and argues that there are big problems with the justification of intellectual property through a story about incentives. The most obvious, that invention and creation occurs without the grant of intellectual property, is perhaps the least interesting. The problem with the incentives story is that it predicts very little about the structure of intellectual property rights, except for the implication that intellectual property rights need to be strong as possible in order to maximise the incentives. While there may be some limits on rights in order to protect cumulative innovation and improvements, consistent with the incentives story, these limits are, in practice, introduced as an afterthought and as *ad hoc* exceptions to the assumption that intellectual property rights need to be as strong as possible. Empiricism, however, belies the justification of strong rights. The development of Western economies, for example, is marked with instances of appropriation of know-how and books that facilitated the transfer of knowledge and the growth of Western industries. Even if strong intellectual property rights do promote more creation, there is a question of whether strong rights effectively promote the distribution and consumption of the fruits of intellectual property. Because of these limitations, the incentives story is either completely false or at least misguided in shaping our understanding of intellectual property systems. Ghosh (2006) focuses on one of the errors in the incentive story. The error is that intellectual property protection is needed in order to correct the market failures arising from the combination of the high fixed costs of creating and the low marginal costs of distributing the new products that are the subject of intellectual property. Ghosh's (2006) argument is that this error appears in many critical intellectual property cases and academic commentary. When strong intellectual property rights are justified in terms of the prevention of free riding, a version of this error is made. The error is also made when intellectual property is limited in order to give the owner enough of an incentive to create the work initially. In both instances, intellectual property rights are being determined by the costs of creating and distributing the work. Ghosh (2006) is not denying that industries in which intellectual property rights are common (e.g. pharmaceuticals, entertainment, software) have unusual cost structures that make competition difficult to implement and hence intellectual property necessary. Ghosh's (2006) point is that cost structure by itself tells us very little about the details of how to structure intellectual property systems and implement policies. An emphasis on cost structure alone ignores the broader market and institutional arrangements which intellectual property helps to shape. Basing intellectual property law on a consideration of cost overemphasises the importance of cost and trivialises the role of distribution and consumption.

Martin (1998) presents the case against intellectual property, approaching the issue from a different background to most of us in the free software movement. He mentioned some of the problems arising from ownership of information, and shows the weaknesses in its standard justifications, mainly, by an overview of problems with the so-called 'marketplace of ideas', which has important links with intellectual property. He indicates that there is a strong case for opposing intellectual property. Among other things, it often retards innovation and exploits Third World peoples. Most of the usual arguments for intellectual property do not hold up under scrutiny. In particular, the metaphor of the marketplace of ideas provides no justification for ownership of ideas. He outlines some alternatives to intellectual property and some possible strategies for moving towards them. He indicates that the alternative to intellectual property is that intellectual products not be owned, as in the case of everyday language. Strategies against intellectual property include civil disobedience, promotion of non-owned information, and fostering of a more cooperative society (cf. Martin 1998).

The importance of IPRs in Sudan

Based on the conceptual framework and the review of the international literature on the economic importance and impacts of IPRs as discussed above, it is worthwhile to discuss the importance of IPRs in Sudan. We begin with brief outline about the development of IPRs in Sudan compared to Arab and world emerging countries. Next, we provide a brief background investigating IPRs in Sudan, and then discuss the importance, implications and constraints of IPRs in Sudan.

Development of IPRs in Sudan compared to Arab and world emerging countries

Before analysing data on patents, trademarks and industrial designs that provide useful indicators about the process of innovation in Sudan (see Tables 4–6), we begin our analysis by international comparison. We use comparison across countries, and we compare IPR in Sudan with that in an emerging country like China or South Korea when they were at a similar level of development as Sudan was. This may involve relating IPR to the stage of development. Tables 1–2 show the number of patent and trademark applications in Sudan compared to Arab and world countries.

Table 1 shows the number and trend of patent applications by residents and non-residents in Sudan over the period 1983–2007. Table 1 indicates a substantial decline and decreasing trend in total patent applications from 74 in 1983 to 22 in 2000–2005 and to 16 in 2006–2007. That is attributed to the decline and decreasing trend in patent applications by residents in Sudan from 7 in 1983 to 6 in 2000–2005 and to 3 in 2006–2007. But it can also

Table 1: Patent applications by residents and non-residents in Sudan compared to selected Arab and world countries (1983–2007)

	Residents					Nonresidents					Total				
Country	1983	2000	2005	2006	2007	1983	2000	2005	2006	2007	1983	2000	2005	2006	2007
Arab World															
Algeria	30	32	59	58	84	278	127	465	611	765	308	159	524	669	849
Bahrain						28					28				
Egypt	88	534	428		516	727	1 081	1 008		1 589	815	1 615	1 436		2 105
Iraq	33					128					161				
Jordan		71	49	75	59		127	169	428	507		198	218	503	566
Morocco	16	104	140	178	150	300		520	732	782	316	104	660	910	932
Saudi Arabia		76	119	119	128		797	374	419	642		873	493	538	770
Sudan	7	6	6	3	3	67	16	16	13	13	74	22	22	16	16
Syria		247	105	124			48	34	133			295	139	257	
Tunisia	19	47	56			197	210	282			216	257	338		
Yemen		7	20	14	11		22	23	34	24		29	43	48	35
Arab World	193	1 124	982		951	1 725	2428	2 891		4 322	1 918	3 552	3 873		5 273
China		25 346	93 485	122 318	153 060		26560	79 842	88 183	92 101		51 906	173 327	210 501	245 161
Korea	1 599	72 831	122 188	125 476	128 701	4 795	29179	38 733	40 713	43 768	6 394	102 010	160 921	166 189	172 469
Malaysia		206	522	531	670		6021	5 764	4 269	1 702		6 227	6 286	4 800	2 372
Singapore	5	516	569	626	696	852	7720	8 036	8 537	9 255	857	8 236	8 605	9 163	9 951
India		2 206	4 721	5 686	6 296		6332	19 661	23 242	28 922		8 538	24 382	28 928	35 218
South Africa	4 240	895	1 003	866	915	5 479	2400	6 001	6 739	7 402	9 719	3 295	7 004	7 605	8 317

Note: Source: The World Bank – World Development Indicators Database (2013)

be mainly attributed to a decline and decreasing trend in patent applications by non-residents in Sudan from 67 in 1983 to 16 in 2000–2005 and to 13 in 2006–2007. The substantial decline and decreasing trend in total patent applications in Sudan is opposite to the observed substantial increasing trend in world countries such as, China, Korea, India, Singapore and Arab countries (see Table 1 and Figure 1).

Table 2 shows the number and trend of trademark applications by residents and non-residents in Sudan over the period 1963–2007. Table 2 indicates an increase and increasing then constant trend in total trademark applications from 700 in 1963 to 781 in 1977 and to 3 355 in 2002–2007. That is attributed to an increasing then constant trend in trademark applications by residents in Sudan that showed declining then increasing and then constant trend from 206 in 1963 to 161 in 1977 and to 1 852 in 2002–2007. That is also mainly attributed to an increasing then constant trend in trademark applications by non-residents in Sudan, from 494 in 1963 to 620 in 1977 and to 1 503 in 2002–2007. The increasing and then constant trend in Sudan is similar to the observed increasing trend in world countries such as China, Korea, India, Singapore Malaysia and South Africa (see Table 2 and Figure 2).

Background about IPRs in Sudan

The growing recognition of the importance of IPRs in Sudan can be perceived at the national, regional and international levels. At the national level the recognition of the importance of IPRs can be perceived from

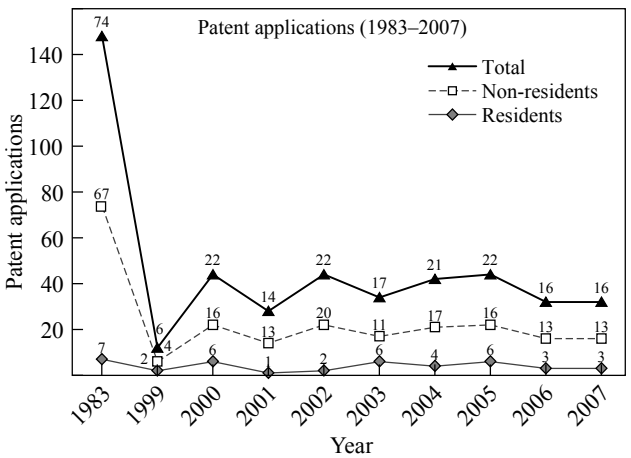


Figure 1: Trend in Patent applications by resident and non-residents in Sudan (1983–2007). Source: The World Bank – World Development Indicators Database (2013)

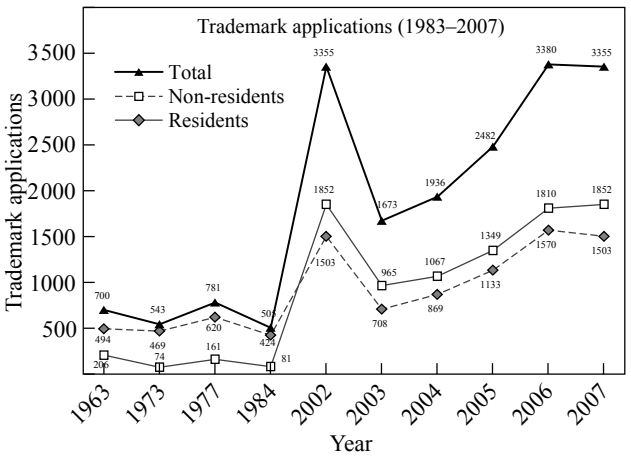


Figure 2: Trend in trademark applications by residents and non-residents in Sudan (1963–2007). Source: The World Bank – World Development Indicators Database (2013)

Table 2: Trademark applications by residents and non-residents in Sudan compared to selected Arab and world countries (1963–2007)

	Nonresident					Resident					Total				
Country	1963	1977	2002	2006	2007	1963	1977	2002	2006	2007	1963	1977	2002	2006	2007
Arab World															
Algeria		1 166	1 258	1 415			144	1 333	2 235			1 310	2 591	3 650	
Bahrain			2 089	3 169	3 627			289	411	340			2 378	3 580	3 967
Egypt		936					383					1 319			
Iraq	556	458				501	166				1 057	624			
Jordan	430	734	2 279	3 850	4 633	100	77	2 353	4 163	4 512	530	811	4 632	8 013	9 145
Kuwait	505					66					571				
Lebanon	997					299					1 296				
Libya	336					28					364				
Morocco	276	470		1 421	1 502	273	381		4 297	5 020	549	851		5 718	6 522
Qatar															
Sudan	494	620	1 503	1 570	1 503	206	161	1 852	1 810	1 852	700	781	3 355	3 380	3 355
Syria	869					184					1 053				
Tunisia	284	604				52	350				336	954			
Yemen		145	1 092	1 737	1 934			842	1 867	2 441		145	1 934	3 604	4 375
Arab World		5 133					1 662					6 795			
China			37 221	56 840	59 714			321 034	669 276	604 952			358 255	726 116	664 666
Korea	303	2 733	17 862	16 840	20 131	992	6 682	90 014	105 544	112 157	1 295	9 415	107 876	122 384	132 288
Malaysia	926	1 866	8 785	12 840	13 605	1 142	1 687	7 661	11 209	12 289	2 068	3 553	16 446	24 049	25 894
Singapore		2 221	8 321	10 279	11 170		1 775	3 343	4 852	5 383		3 996	11 664	15 131	16 553
India	1 308	721	5 930	15 209	6 500	5 399	9 680	88 190	88 210	117 014	6 707	10 401	94 120	103 419	123 514
South Africa	887	2 773	7 832	11 778	17 921	3 550	2 983	12 535	20 017	17 080	4 437	5 756	20 367	31 795	35 001

Source: The World Bank – World Development Indicators Database (2013)

the existing legal framework, legislation and laws issued to support IPRs in Sudan. For instance, Sudan has issued the Trademarks Law (1931, 1969), Patent Law (1971), Copyright Law (1974), Industrial Designs Law (1974), Civil Procedures Law (1983), Civil Transactions Law (1984), Copyright and Related Rights Law (1996), Criminal Law (1991), Criminal Procedure Law (1991) and Literary and Artistic Works Law (2000). Moreover, at the regional and international levels the recognition of the importance of IPRs in Sudan is also perceived from Sudan's membership of several IPRs international and regional organisations and international conventions and agreements on IPRs. For instance, on a regional scale, Sudan joined the African Regional Intellectual Property Organization (ARIPO) in 1978. Moreover, at the international scale, Sudan joined the agreement of establishing the World Intellectual Property Organization (WIPO) (1967) in 1974, the Paris Convention for the Protection of Industrial Property (1883) in 1974, the Berne Convention for the protection of Literary and Artistic works (1886) in 2002, the Madrid Agreement on International Registration of Marks (1891) in 1984 and the Patent Cooperation Treaty (PCT) (1970) in 1984 and showed interest to join the TRIPS agreement.[3]

Based on the above background it is useful to explain the intensity, trend and structure of industrial property rights including trademarks, industrial design and patents in Sudan (see Tables 3–5). Measured by the total number of applications and the total number of IPRs granted in Sudan, we find that the most common and widely used type of IPRs are trademarks, followed by industrial design and patents respectively. The low intensity of patents appears from the lower number of patent applications made between 1988 and 2010 by residents and non-residents of Sudan (see Figures 11–12). Regarding the trend, we find that the application for and granting of both trademarks and industrial designs show considerable fluctuation over the periods 1999–2010 and 2003–2008, respectively, and general decline over the periods 2008–2010 and 2007–2008, respectively, while by contrast the application and grant of patents show constant increasing trends over the period 2005–2007. Despite the growth in the number of patents either filed for or granted at the home level over the period 1990–2010, this should not hide the fact that the granting of international patents is very limited. Applications for international patents for PCT by residents of Sudan was particularly limited during the period 2003–2007 (see Figures 11–18, Table 5).

Concerning the structure as measured by the structure of ownership, we find that the share of national is higher than the share of foreign in the application and granting of industrial designs, whereas by contrast, the share of foreign is higher than the share of national in the application and granting of patents, while for the application and granting of trademarks, the share of foreign is higher than the share of national over the period 1999–2004 and the opposite is true for the period 2005–2009. Particularly, the structure of ownership of trademarks implies that trademarks are overwhelmingly foreign residents owned, as the total number of trademarks applications filed by (6 014) and granted to (4 783) residents is less than those of non-residents (6 643) (3 529) in Sudan over the period 1999–2010 (see Table 3 and Figures 3–6). By contrast, the structure of ownership of industrial designs imply that

Table 3: Trademarks applications, grants and certificates for nationals and foreigners in Sudan (1999–2010)

Year	Filing (new Applications)			Granting			Certificates
	National	Foreign	Total	National	Foreign	Total	
1999	70	402	472	60	306	366	307
2000	513	760	1 273	228	676	904	822
2001	187	507	694	200	312	512	418
2002	485	525	1 010	200	278	478	398
2003	217	708	925	141	316	457	402
2004	60	1 007	1 067	20	478	498	366
2005	780	479	1 259	215	406	621	540
2006	1 010	800	1 810	810	717	1 527	1 507
2007	1 022	728	1 750	340	640	980	725
2008	970	578	1 548	773	566	1 339	1 306
2009	700	149	849	542	88	630	612
1999–2009	6 014	6 643	12 657	3 529	4 783	8 312	7 403
1999–2009	5 204	6 643	11 847	4 007	6 625	10 632	1 688-10 927
2010			886			606	399
March-June–2010	242	239	481				

Source: Sudan IPR General Registrar Office (2010)

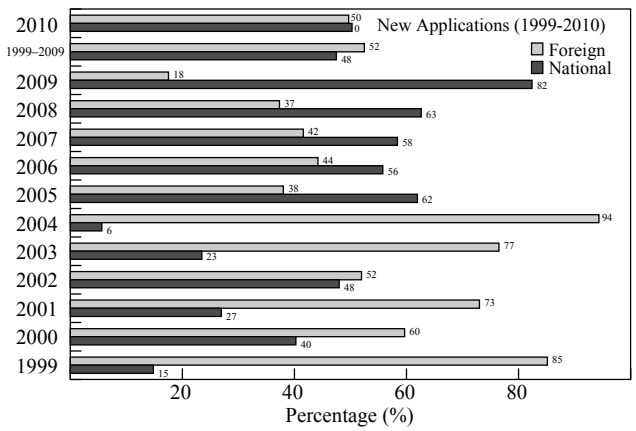


Figure 3: Structure and trend of new applications for trademarks by nationals and foreigners in Sudan (1999–2010). Source: Sudan IPR General Registrar Office (2010)

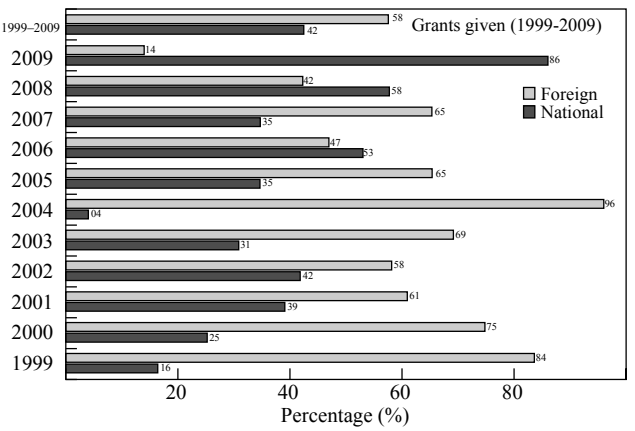


Figure 4: Structure and trend of granting of trademarks for nationals and foreigners in Sudan (1999–2009). Source: Sudan IPR General Registrar Office (2010)

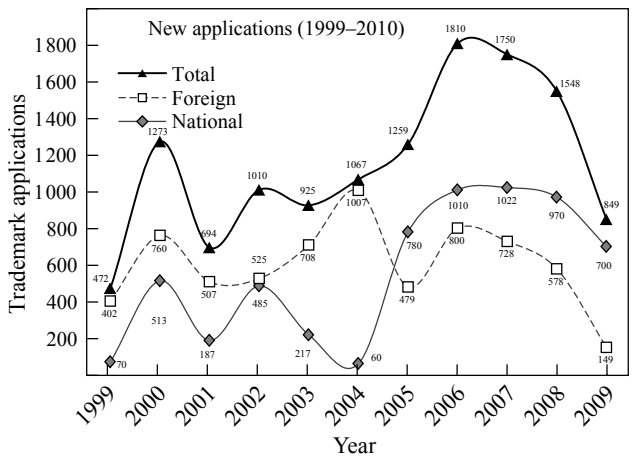


Figure 5: Trend of new applications for trademarks by nationals and foreigners in Sudan (1999–2010). Source: Sudan IPR General Registrar Office (2010)

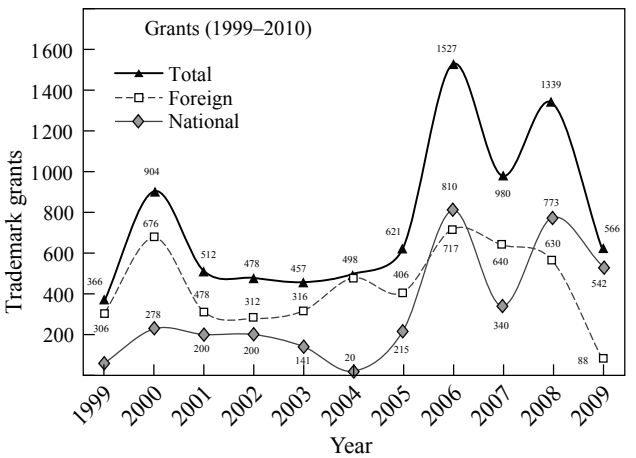


Figure 6: Trend of granting of trademarks for nationals and foreigners in Sudan (1999–2010). Source: Sudan IPR General Registrar Office (2010)

industrial designs are overwhelmingly national residents owned, as the total number of industrial design applications filed by (916) and granted to (98) residents are more than those of non-residents (90) (36) in Sudan over the period 1988–2010 (see Table 4 and Figures 7–10). However, the structure of ownership of patents implies that patents are overwhelmingly foreign residents owned, as patent applications from residents are lower than those of non-residents during the period 1988–2010 (see Table 5 and Figures 11–18). In addition Figure 19 shows that the share of patent applications in the top fields of technology in Sudan over the period (1997–2011) implies heavy concentration on pharmaceuticals (35.48), followed by other special machines (12.9); basic materials chemistry (9.68); furniture, games (9.68); audio-visual technology (3.23); telecommunications (3.23); IT methods for management (3.23); control (3.23); medical technology (3.23); macromolecular chemistry, polymers (3.23) and others (12.88) respectively (see Figure 19).

Our findings from the data from the national and international sources regarding the low number of patent applications made by Sudan are consistent with the findings in the literature (see Figures 11–18). Nour (2005a, 2005b, 2013) found that the low number of applications to patent in Sudan and Arab countries (168) compared to advanced and leading developing countries like Singapore (27), Korea (931) and China (793) over the period 1990–1999 can be attributed to the low percentage share of spending on R&D to GDP and the small number of scientists and engineers in R&D in the Arab countries compared to advanced and developing countries like Singapore, Korea and China.[4] The low number of patenting applications implies insufficient science and technology (S&T) infrastructure, low S&T output indicators and low innovative activities in Sudan and all Arab countries compared to

Table 4: Industrial design applications and grants for nationals and foreigners in Sudan (1988–2010)

Year	Filling[a]			Granting[a]	Filling[b]			Granting[b]		
	National	Foreign	Total	Total	National	Foreign	Total	National	Foreign	Total
1988	2	0	2	45						
1997	2	0	2							
1998	2	0	2							
1999	1	0	1							
2000	9	0	9							
2001	25	4	29							
2002	51	6	57	43						
2003	37	2	39	11	37	3	40	6	3	9
2004	63	7	70	7	59	6	65	8	-	8
2005	87	17	104	38	86	16	102	15	1	16
2006	79	9	88	33	76	7	83	34	7	41
2007	31	21	52	45	40	21	61	20	21	41
2008	73	6	79	44	19	2	21	15	2	17
2009	115	12	137	104						
2010	64	9	75	42						
1988–2008			836	481	317[1]	55[1]	372[1]	98[1]	34[1]	132[1]
1997–2010	916	90	1 048	367						
1998-1997			831	480						

Source: [a]Sudan IPR General Registrar Office (2010), [b]IPS Sudan web site (2012); Note: [1]2003–2008

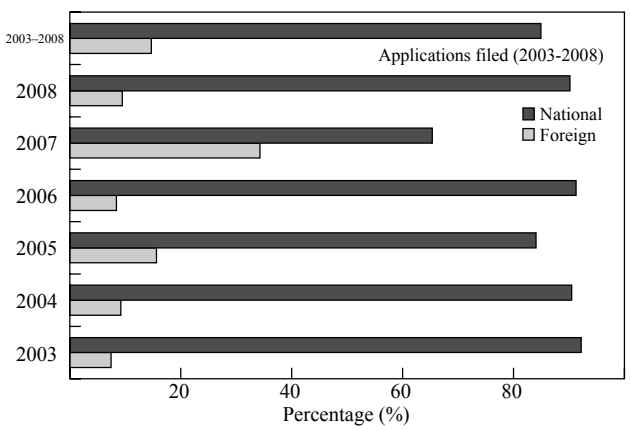


Figure 7: Structure and trend of industrial design applications filing by nationals and foreigners in Sudan (2003–2008). Source: Sudan IPR General Registrar Office (2010)

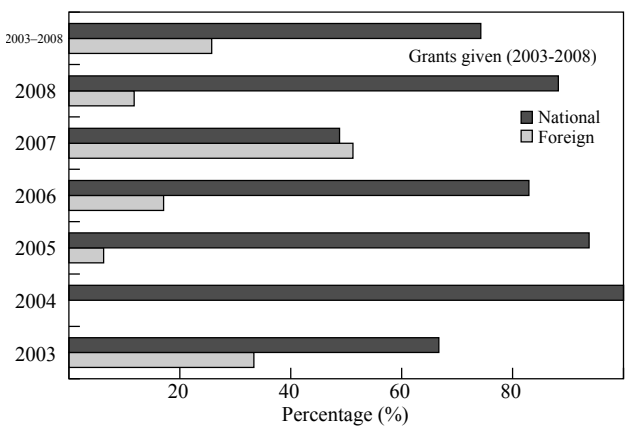


Figure 8: Structure and trend of industrial design grants for nationals and foreigners in Sudan (2003–2008). Source: Sudan IPR General Registrar Office (2010)

advanced and leading developing countries like Singapore, Korea and China. Moreover, Figure 13 shows that Sudan and African countries together have filed far fewer patents than South Africa. The highest numbers of patent applications were made by South Africa, followed by Zimbabwe, Mali, Tunisia, Tanzania, Sudan and Libya. According to the USPTO report, Sudan produced only seven patents in about 40 years with no patents at all in the period 1992–1995 and this puts it much lower than most African countries in terms of patents (see Figure 13).

Moreover, our findings concerning the lower number of patent application from residents than those of the non-residents of Sudan is consistent with the findings in the literature, which indicate that in all developing countries, few patent applications are made or held by residents of developing countries (domestic applications or patents). Patents are overwhelmingly foreign residents owned. In most developing countries, domestic applications accounted only for 1% to 8% of total applications. Thus, the role of the patent system is less visible to domestic users of the patent system in developing countries. The reason for the low level of patenting in developing countries by their nationals and residents can be explained on a number of grounds, including non-use of the system by universities and local research institutions.[5]

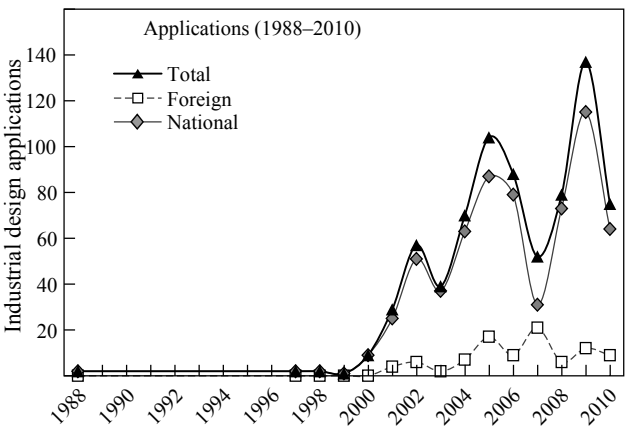


Figure 9: Trend of applications for industrial designs by nationals and foreigners in Sudan (1988–2010). Source: Sudan IPR General Registrar Office (2010)

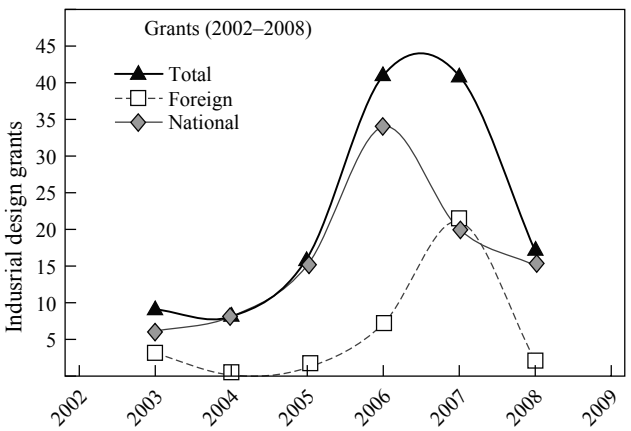
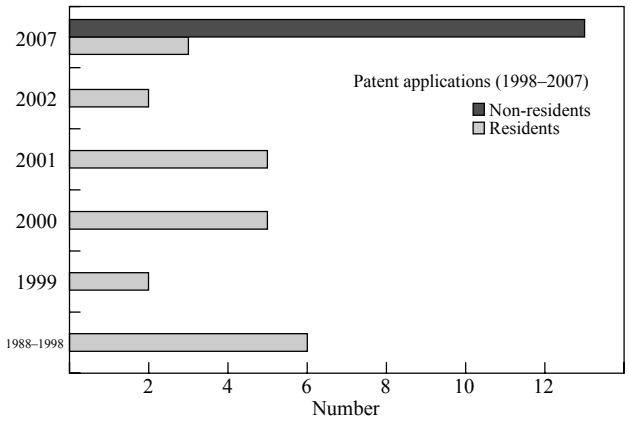


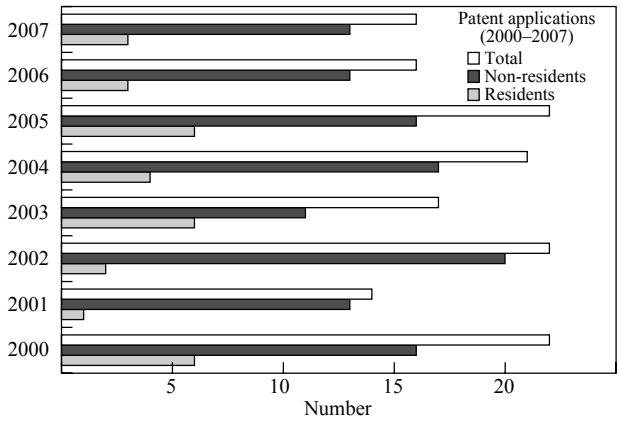
Figure 10: Trend of granting of industrial designs for nationals and foreigners in Sudan (2002–2008). Source: Sudan IPR General Registrar Office (2010)

Table 5: Patent applications by non-residents and patent granting for non-residents and residents in Sudan (1989–2010)

Year	Filling[a]	Granting[a]	Countries[a]	Local granting[a]	Filling[b]	Granting[b]
1989		36	Sweden , USA, Netherlands, Italy, France, USSR, Norway, England, Australia			
1990		47	Germany, Sweden , USA, British, England, Australia, European Patent			
1991		70	Sweden , USA, UK, Belgium, Greek, Australia			
1992		99	Sweden , USA, Japan, France, Norway, England, Mauritania, Hungarian, Spain, Denmark			
1993		124	Spain, Sweden , USA, Italy, England, British			
1994		156	Sweden , USA, Swiss, Italy, Canada, Norway, New Zealand, France			
1995		183	USA, Canada, Australia			
1996		204				
1997		213				
1998		224				
1999		237	South Africa, Sweden, Australia			
2000		262	South Africa, Sweden , Swiss, Belgium, Germany, Great Britain, USA			
2001		279	Swiss, USA, Netherlands, Italy,	107		
2002	345	296	Swiss, USA, Netherlands, Italy, India, China, Denmark	117	112	102
2003	356	306	India, Canada, Swiss, Australia	72	110	76
2004	373	321	India, Swiss, Germany, UK, USA, Emirates	128	157	108
2005	386	331	Sweden , USA, France, Hungarian, Korea	153	168	78
2006	392	346	Egypt, India, Swiss, Italy, China, Japan, Korea, Russia	90	170	91
2007	415	352	Germany, Great Britain, England	112	220	123
2008	430	361	China, Japan, Russia	78	937[1]	578[1]
2009	441	371	Sweden , USA, Netherlands, England, Japan	52	419[2]	355[2]
2010	452	374	China, Germany, Australia	37		

Source: [a]Sudan IPR General Registrar Office (2010), [b]IPS-Sudan web site (2012); Note: [1]2002/2007, [2]PCT





Figures 11–12; Patent applications by residents and non-residents for Sudan (1998–2007)[a] (2000–2007)[b]. Sources: (a) The World Bank -World Development Indicators database (2005); (b) The World Bank -World Development Indicators database (2012)

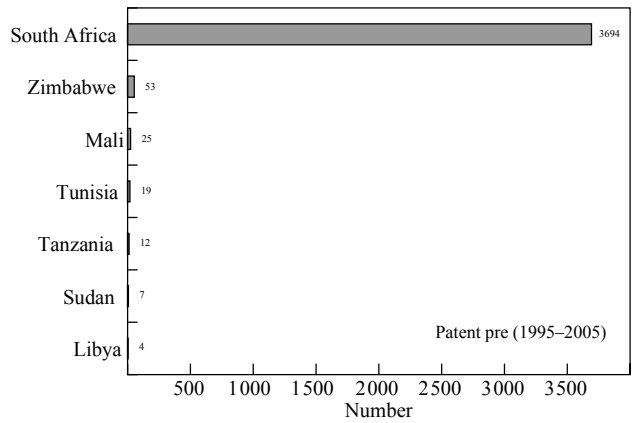


Figure 13: Patent applications for Sudan compared to selected African countries (1988–2005). Source: UNESCO (2006)

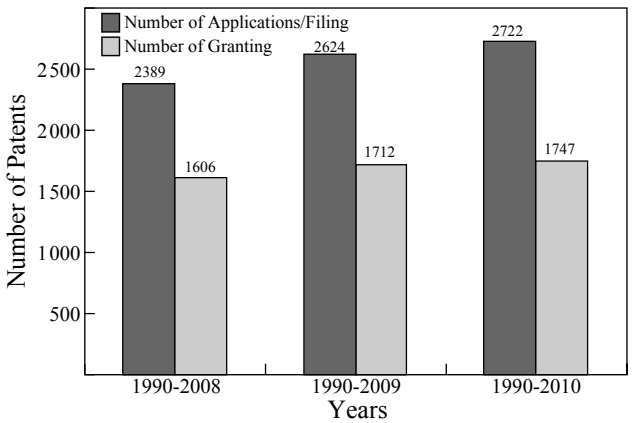


Figure 14: Patents applications (filing) and granting in Sudan at home level (1990–2010). Source: Sudan IPR General Registrar Office (2010)

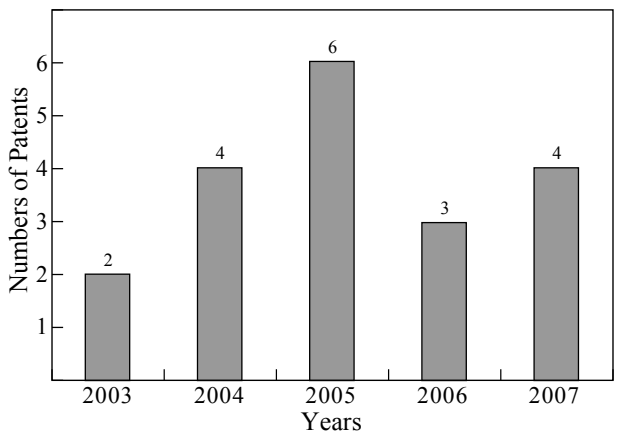


Figure 15: Sudan's applications for PCT international patents by residents (2003–2007). Source: WIPO (2007) Statistics on Applications for PCT

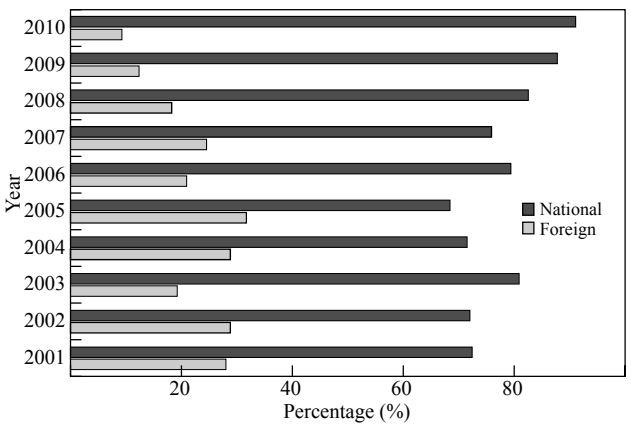


Figure 16: Sudan's application for PCT international patents by residents (2002–2010). Source: Sudan IPR General Registrar Office (2010)

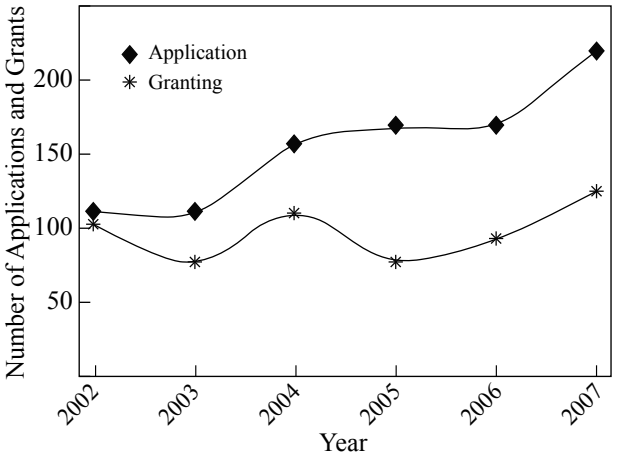


Figure 17: Patent applications by residents and non-residents for Sudan (2002–2010). Source: Sudan IPR General Registrar Office (2010)

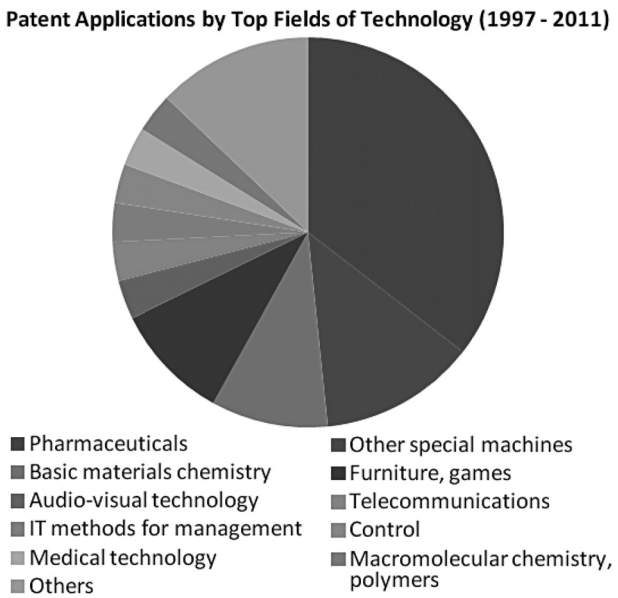


Figure 19: Patent applications by top fields of technology in Sudan over the period (1997–2011). Source: WIPO statistics database (2012)

Hence, in Sudan as in most Arab and African countries, the protection of IPRs, IP laws and adhesion to international bodies and conventions are still limited and inadequate (see Tables 1–5). Further efforts are still important to encourage adhesion to international IP laws and conventions.

Importance, implications and constraint to IPRs in Sudan

The questionnaire and interview with IPRs experts in Sudan and the survey data based on primary data and 12 face-to-face interviews with official and academic experts

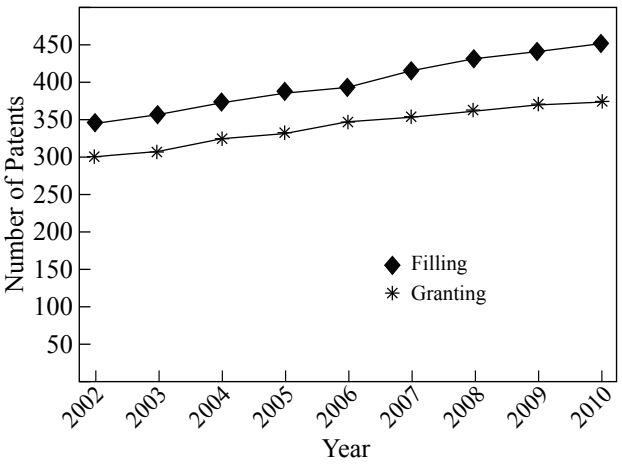


Figure 18: Patent applications by residents and non-residents for Sudan (2002–2010). Source: Sudan IPR General Registrar Office (2010)

in the IPRs in Sudan aims to improve the understanding about the economic importance of IPRs and to examine the factors hindering and those contributing toward enhancing the IPRs in Sudan. The main purpose of this survey is to collect primary data to examine the causes of poor IPRs protection and then to provide some recommendations to improve IPRs in Sudan.[6]

The results of the IPRs survey indicate that the important types of IPRs implemented in Sudan are industrial designs, trademarks, rights related to copyright, copyright, patents and invention and protection against unfair competition respectively (see Figure 20).[7] The results of the IPRs survey recognise the importance of strengthening IPRs for achieving economic development objectives in Sudan. For instance, IPRs have the potential to assist industrial prosperity through the creation of industrial design and agricultural development through plant varieties and hence contribute to GDP. Moreover, IPRs provide incentives for innovative producers, provide good quality products for consumers, generate revenues for innovative producers and promote economic growth, prosperity and development. Furthermore, IPRs protection has the potential to

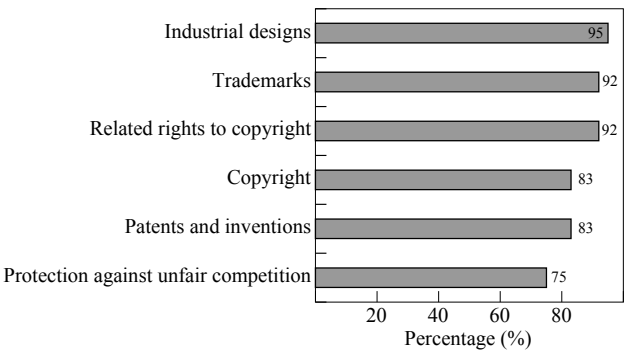


Figure 20: The important types of IPRs protection in Sudan. Source: IPRs Survey (2010)

Table 6: The important factor encouraging and strengthening IPRs for achieving development objectives in Sudan

	%
Industrial prosperity and the creation of industrial design	95
Agricultural development through plant varieties	95
Contributes to Gross Domestic Products	92
Incentives for innovative producers	92
Good quality products for consumers	92
Generates revenues for innovative producers	92
Economic growth, prosperity and development	92
R&D	92
S&T development	92
Networks	92
Private industrial investment	83
Flow of FDI	83
Promotes technology transfer	83
Generates revenues for government	83
Contributes to export	83
Increasing employment opportunities	83
Cooperation between universities and industry.	83
Fair competition	83
Development of expressions of local culture, folklore, and traditional knowledge	83
Cultural heritage	83
Encourages the integration in the international and regional institutions	75

Source: IPRs Survey (2010)

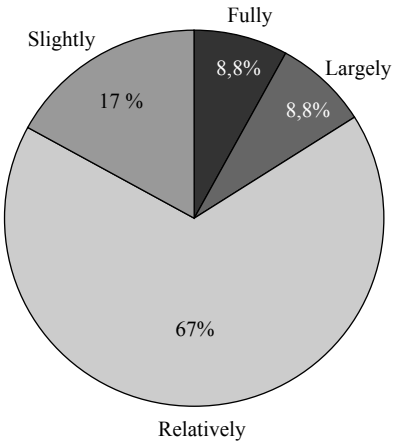


Figure 21; The adequacy of IPRs protection in Sudan. Source: IPRs Survey (2010)

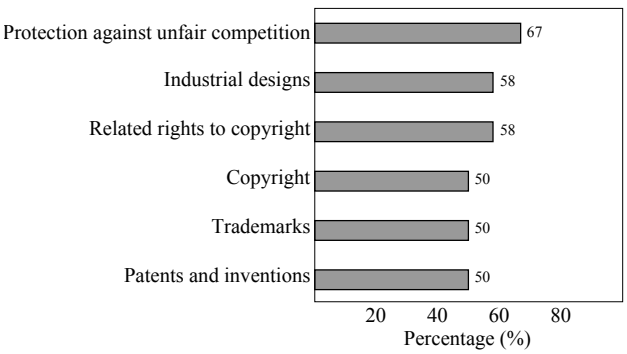


Figure 22; The relative progress to the IPRs protection in Sudan. Source: IPRs Survey (2010)

promote R&D, S&T development, networks, private industrial investment, flow of FDI, promote technology transfer, generate revenues for government, contribute to export, increasing employment opportunities and cooperation between universities and industry. Moreover, IPRs protection has the potential to promote fair competition, development of expressions of local culture, folklore, and traditional knowledge, cultural heritage, integration in regional institutions, and integration with international institutions respectively (see Table 6).[8]

The prevalence of important types of IPRs and recognition of the importance of IPRs protection for economic development should not hide the fact that IPRs are still limited in Sudan. For instance, the results of the IPRs survey indicate that official efforts to promote IPRs have been only relatively successful in some sectors in Sudan (see Figure 21).[9] Particularly, relative progress has been made toward protection against unfair competition, industrial designs and rights related to copyright, copyright, patents and invention, and trademarks respectively (see Figure 22).[10]

The follow-up interview for the IPRs survey indicates the inadequacy of IPRs legislation in Sudan that appears from the lack of laws concerning the protection of plant breeders' rights: plant varieties, geographical indications and traditional cultural expressions, expressions of folklore, traditional knowledge and genetic resources. The lack of laws for protection of plant breeders' rights and plant varieties is somewhat surprising in view of the international recognition that the protection of new plant varieties creates incentives for investment in breeding and producing more and better varieties for farmers and incentives for development of new plant varieties and quantitative and qualitative development of agricultural production, which would be particularly useful for Sudan, because the structure of Sudan economy has long been heavily dependent on agricultural resources. The results of the IPRs survey indicate the serious shortcomings and inadequacy of IPRs protection in Sudan, which is mainly attributed to several hindering factors. These include, for instance, low integration in international institutions, lack of legal issues, lack of legal issues in plant varieties, high costs for innovative producers (e.g. application for patents), lack of government concern, lack of private sector concern, weak institutions setting, lack of public awareness and concern, difficult control of illegal products, low integration in the regional institutions and widespread unfair competition. In addition to lack of resources, investment and finance, low incentives for innovative producers, lack of concern from universities, weak R&D, lack of networks, weak enforcement of IPRs, weak culture for IPRs protection, lack of national system of innovation and poverty and law purchasing power encourage the use of illegal products. In addition to low industrial prosperity, lack of

cooperation between universities and industry, lack of coordination and harmonisation for IPRs related policies, easy infringement of IPRs and low returns for innovative producers respectively (see Table 7).[11] The inadequate IPRs in Sudan lead to several implications. These include, for instance, the low incentives for producers, poor national system of innovation, hindering FDI, hindering access to protected medicines, lack of cooperation between universities and industry, financial loss for innovative producers, lack of networks, low R&D, low agricultural prosperity, low plant varieties and low industrial prosperity. In addition to poor S&T development indicators, lack of coordination and harmonisation policies related to IPRs, the brain drain or migration of researchers, skills, experts and creators, hindering transfer of technology, widespread unfair competition, difficult control of illegal protected products, easy infringement of IPRs, weak enforcement of IPRs, low integration in regional institutions and low integration in international institutions respectively (see Table 8).[12]

Apart from the hindering factors and implications of inadequate IPRs in Sudan, the results of the IPRs survey imply the important role of several factors contributing toward enhancing the IPRs in Sudan. These include, for example, factors related to legislation and enforcement; education and training systems; planning IPRs protection; learning from international experiences in IPRs protection; commitment to international IPRs treaties; monitoring current efforts toward IPRs protection; finance, investment and resources allocation; research institutions and social partnership and collaboration between educational and training institutions, judiciary authorities, IPRs related institutions and the State to encourage IPRs protection and the most effective ways of meeting and financing them respectively (see Table 9).[13] In addition, the enhancement of IPRs in Sudan can be facilitated with the important role of several supporting institutions. These include, for example, the Ministry of Justice, WIPO, international organisations, government, Ministry of Industry, universities, educational, training and other related institutions, Ministry of Culture, independent research centres, Ministry of Finance and National Economy, Ministry of Higher Education, Ministry of Science and Technology, private sector, Sudanese Standards and Metrology

Table 7: The important factors and constraints hindering IPRs in Sudan

	%
Low integration in the international institutions	83
Lack of legal issues	75
Lack of legal issues in plant varieties	75
High costs for innovative producers (e.g. application for patents)	75
Lack of government concern	75
Lack of private sector concern	75
Weak institutions setting	75
Lack of public awareness and concern	75
Difficult control of illegal products	75
Low integration in the regional institutions	75
Wide spread of unfair competition	75
Lack of resources, investment and finance	67
Low incentives for innovative producers	67
Lack of universities concern	67
Weak R&D	67
Lack of networks	67
Weak enforcement of IPRs.	67
Weak culture for IPRs protection	67
Lack of national system of innovation	67
Poverty and law purchasing power encourages the use of illegal products	67
Low industrial prosperity	58
Lack of cooperation between universities and industry.	58
Lack of coordination and harmonization for IPRs related policies	58
Easy infringement of IPRs	50
Low returns for innovative producers	42

Source: IPRs Survey (2010)

Table 8: The important implications of weak IPRs in Sudan

	%
Low incentives for producers	92
Poor national system of innovation	83
Hindering FDI	83
Hindering access to protected medicines	83
Lack of cooperation between universities and industry	83
Financial loss for innovative producers	83
Lack of networks	83
Low R&D	75
Low agricultural prosperity and low plant varieties	75
Low industrial prosperity	75
Poor S&T development indicators	75
Lack of coordination and harmonization policies related to IPRs	75
Brain drain: migration of researchers, skills, experts and creators	75
Hindering transfer of technology	75
Wide spread of unfair competition	75
Difficult control of illegal protected products	75
Easy infringement of IPRs	75
Weak enforcement of IPRs.	67
Low integration in regional institutions	67
Low integration in the international institutions	58

Source: IPRs Survey (2010)

Table 9: The important factors for promoting IPRs in Sudan

	%
Legislations and enforcement.	92
Education and training systems.	83
Planning IPRs protection.	83
Learning from international experiences in IPRs protection.	83
Commitment to international IPRs treaties.	75
Monitoring current efforts toward IPRs protection.	75
Finance, investment and resources allocation.	75
Research institutions.	75
Social partnership and collaboration between educational and training institutions, judiciary authorities, IPRs related institutions and the state to encourage IPRs protection and the most effective ways of meeting and financing them.	75

Source: IPRs Survey (2010)

Organization, civil society and community and non-Governmental Organisations respectively (see Table 10).[14] Moreover, strengthening IPRs in Sudan can be facilitated by several important mechanisms, instruments or policies. These include, for instance, promoting government concern, adequate legislation for enforcement of IPRs to reduce infringement of IPRs, fair competition, legal issues in plant varieties, new instruments to encourage the transfer of technology. In addition to promote industry and creation of industrial design, private sector concern, public awareness and concern, R&D, cooperation between universities and industry, institutions setting, control for IPRs protected products: control for illegal products and encourage the use of technology to reduce the costs for innovative producers. Besides promoting IPRs, additional instruments include for instance, increasing the returns for innovative producers/creators, increasing information about IPRs, coordination and harmonisation policies related to IPRs, creating a culture of IPRs protection and new instruments to encourage access to protected medicines, preventing piracy, improving universities concern, and providing adequate incentives for innovative producers/creators and networks respectively (see Table 11).[15] Moreover, one important mechanism and instrument for IPRs protection is the use of the internet, which creates opportunities and challenges for IPRs protection and for the producers and consumers of IPRs protected products. For instance, major opportunities that the use of the internet creates for IPRs protection are the easy collection of revenues for producers, easy communications, cheap products, high quality products, easy exchange of IPRs protected products and easy access to IPRs protected products. The major challenges that the use of internet creates for IPRs protection, however, are easy infringement of IPRs protected products and financial rights and financial loss for producers, difficult control of illegal products imitating IPRs protected products, easy piracy, the need for more legislation and a better legal framework, weak enforcement of IPRs, easy infringement of moral rights, easy imitation, easy modifications of IPRs protected products and widespread of unfair competition (see Table 12).[16]

The observed inadequacy and the presence of several factors hindering adequate IPRs imply the importance

Table 10: The important institutions for promoting IPRs in Sudan

	%
Ministry of Justice	92
WIPO	92
International organizations	92
Government.	83
Ministry of Industry	83
Universities, educational, training and other related institutions.	75
Ministry of Culture	75
Independent research centres	67
Ministry of Finance and National Economy.	67
Ministry of Higher Education	67
Ministry of Science and Technology	67
Private sector	67
Sudanese Standards and Metrology Organization	58
Civil society and community.	58
Non-Governmental Organizations	58

Source: IPRs Survey (2010)

Table 11: Important mechanisms, instruments or policies for strengthening IPRs in Sudan

	%
Government concern	83
Adequate legislation for enforcement of IPRs to reduce infringement of IPRs	75
Fair competition	75
Legal issues in plant varieties	75
New instruments to encourage the transfer of technology	75
Industry and creation of industrial design	67
Private sector concern	67
Public awareness and concern	67
R&D	67
Cooperation between universities and industry.	67
Institutions setting	67
Control for IPRs protected products: control for illegal products	67
The use of technology to reduce the costs for innovative producers	67
Increasing the returns for innovative producers/creators	67
Increasing the information about IPRs	67
Coordination and harmonization policies related to IPRs.	67
Culture for IPRs protection	67
New instruments to encourage access to protected medicines.	67
Prevent piracy	67
Universities concern	58
Adequate incentives for innovative producers/creators	58
Networks	58

Source: IPRs Survey (2010)

Table 12: Important implications of the use of the internet for IPRs in Sudan

	%
The use of the internet creates the following opportunities	
Easy collection of revenues for producers	67
Easy communications	58
Cheap products	50
High quality products	50
Easy exchange of IPRs protected products	42
Easy access to IPRs protected products	42
The use of the internet creates the following challenges	
Easy infringement of IPRs protected products and financial rights and financial loss for producers	83
Difficult control of illegal products imitating IPRs protected products	83
Easy piracy	83
Need for more legislations and legal framework	83
Weak enforcement of IPRs	75
Easy infringement to moral rights, easy imitation, and easy modifications of IPRs protected products	75
Wide spread of unfair competition	58

Source: IPRs Survey (2010)

of further efforts for the enforcement of IPRs in Sudan. These include for instance, provisional measures to prevent an infringement of an intellectual property right from occurring, expeditious remedies to deter further infringement, and expeditious remedies to offer adequate compensation to the right-holder. (see Table 13).[17, 18, 19, 20, 21]

Conclusions

This paper explains the importance of IPRs and examines the factors hindering and those contributing toward enhancing IPRs in Sudan. Our findings from the IPRs survey discussed indicate the recognition of the importance of strengthening IPRs for achieving economic development objectives in Sudan and show that the important types of IPRs protection implemented in Sudan are respectively industrial designs, trademarks, rights related to copyright, copyright, patents and invention and protection against unfair competition. We explain that the prevalence of important types of IPRs and recognition of the importance of IPRs for economic development should not hide the fact that IPRs are still limited and only relatively successful in some sectors in Sudan. We find that the inadequacy of IPRs in Sudan is attributed to several hindering factors, such as, low integration in international institutions, lack of legal issues, high costs for innovative producers, lack of government concern, lack of private sector concern, weak institutional setting, lack of public awareness, lack of resources, weak enforcement of IPRs, weak culture for IPRs, lack of cooperation between universities and industry and lack of coordination and harmonisation for IPRs related policies. The inadequate IPRs in Sudan lead to several implications such as a poor national system of innovation, hindering FDI and hindering transfer of technology. Our results show that the factors contributing toward enhancing the IPRs in Sudan include promotion of adequate IPRs legislation and enforcement; planning IPRs protection, commitment to international IPRs agreements; monitoring current efforts toward IPRs protection; finance, investment and resources allocation; and social partnership to encourage IPRs protection. Moreover, strengthening IPRs in Sudan can be facilitated by increasing government concern, increasing private sector concern, public awareness and concern, cooperation between universities and industry, institutional setting, coordination and harmonisation policies and culture for IPRs protection.

Notes

[1] An earlier version of this paper was published with the title 'The economic importance and impacts of intellectual property rights (IPRs) in Sudan,' UNU-MERIT Working Paper 2013-014, Maastricht, the Netherlands, January 2013: http://www.merit.unu.edu/publications/wppdf/2013/wp2013-014.pdf. The first draft of this paper was originally prepared for the 10th GLOBELICS International Conference 2012: 'Innovation and Development: Opportunities and Challenges in Globalisation' Zhejiang University (ZJU) and Tongji University (Tongji), 9–11 November 2012, Hangzhou, China. The author would like to thank the participants for their useful comments on this paper. The author would like to gratefully thank Dr. Angathevar Baskaran, Editor-in-Chief of this journal, and anonymous referee(s) for good comments on earlier draft of this paper. All the usual disclaimers apply.

[2] The firm survey conducted by Nour (2010) on 'Technological Change and Skill Development in Sudan's Manufacturing Sector' aimed to assess skill and technology indicators and the impacts of unskilled workers amongst the food, textile, chemical and metal small, medium and large establishments in Sudan. It includes information on the application of IPRs in industrial manufacturing sector in Sudan as measured by patent applications. The results of the survey conducted by Nour (2010) and discussed in Nour (2011, 2013) show the weak application to patents as reported by 6%, 8%, 3%, 8%, 6%, 7% and 5% of the all firms, chemical, food, metal, large, medium and small respondent firms respectively. This implies that only five firms: one small chemical, one medium chemical,

Table 13: Important enforcement procedures for IPRs in Sudan

	IPRs	Copyright	Patents	Industrial design	Trademarks
Provisional measures to prevent an infringement of IPRs from occurring	92	92	83	92	92
Expeditious remedies to deter further infringement	83	92	67	83	83
Expeditious remedies to offer adequate compensation to the right-holder	83	83	83	92	92
Civil and administrative procedures, actions, proceedings and remedies	83	92	83	83	95
Provisional measures	83	92	75	92	92
Provisional measures to preserve relevant evidence with regard to the alleged infringement	83	92	67	92	95
Border measures	83	83	75	92	92
Damages to offer the right-holder adequate financial compensation for the injury suffered by infringement	83	75	67	75	83
Interlocutory injunctions	83	83	75	75	83
Civil remedies	75	83	83	83	92
Final injunctions	75	83	67	83	92
Criminal procedures	67	83	83	83	95
Injunctions	67	75	67	83	92
Account of profit	67	58	58	67	67
Measures of self-help	58	75	75	75	95
Delivery	42	58	58	67	67

Source: IPRs Survey (2010)

one medium metal, two large chemical and one large food firm applied for patents in the period (2008–2010) (cf. Nour 2013).

[3] See Sudan intellectual property office web site: http://www.ipsudan.gov.sd/interna_agree.html, accessed on May 12 2012. See also Makki (2006) pp. 151, 153, 154, 230.

[4] See for example, US Patent and Trademark office web site: www.uspto.

[5] See, for instance, WIPO Patent Agenda Study by Mr. Getachew Mengistie, Acting Director General of the Ethiopian Intellectual Property Office, A/39/13 Add.1 available at http://www.wipo.int/documents/en/document/govbody/wo_gb_ab/doc/a_39_13add1.doc, accessed March 20 2008.

[6] The interviews were conducted with the officials and experts (83%) and academics staff in the universities (17%) and indicate a total response rate of 83%. The design of the questionnaire in the IPRs survey includes three two types of questions: nominal (Yes/No), and scalar or categories questions.

[7] As indicated by 95%, 92%, 92%, 83%, 83%, and 75% of the respondent official policy makers and academic experts respectively.

[8] As indicated by 95%, 95%, 92%, 92%, 92%, 92%, 92%, 92%, 92%, 92%, 92%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, and 75% of the respondent official policy makers and academic experts respectively.

[9] As reported by 67% of the respondent official policy makers and academic experts respectively

[10] As indicated by 67%, 58%, 58%, 50%, 50%, and 50% of the respondent official policy makers and academic experts respectively.

[11] As indicated by 83%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 58%, 58%, 58%, 50% and 42% of the respondent official policy makers and academic experts respectively.

[12] As indicated by 92%, 83%, 83%, 83%, 83%, 83%, 83%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 67%, 67% and 58% of the respondent official policy makers and academic experts respectively.

[13] As indicated by 92%, 83%, 83%, 83%, 83%, 75%, 75%, 75%, 75% and 75% of the respondent official policy makers and academic experts respectively.

[14] As indicated by 92%, 92%, 92%, 83%, 83%, 75%, 75%, 67%, 67%, 67%, 67%, 67%, 58%, 58% and 58% of the respondent official policy makers and academic experts respectively.

[15] As indicated by 83%, 75%, 75%, 75%, 75%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 58%, 58%, and 58% of the respondent official policy makers and academic experts respectively.

[16] As indicated by 67%, 58%, 50%, 50%, 42%, 42%, 83%, 83%, 83%, 83%, 75%, 75% and 58% of the respondent official policy makers and academic experts respectively.

[17] As indicated by 92%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, 75%, 75%, 67%, 67%, 67%, 58% and 42% of the respondent official policy makers and academic experts respectively.

[18] As indicated by 92%, 92%, 83%, 92%, 92%, 92%, 83%, 75%, 83%, 83%, 83%, 83%, 75%, 58%, 75%, and 58% of the respondent official policy makers and academic experts respectively.

[19] As indicated by 83%, 67%, 83%, 83%, 75%, 67%, 75%, 67%, 75%, 83%, 67%, 83%, 67%, 58%, 75% and 58% of the respondent official policy makers and academic experts respectively.

[20] As indicated by 92%, 83%, 92%, 83%, 92%, 92%, 92%, 75%, 75%, 83%, 83%, 83%, 83%, 67%, 75%, and 67% of the respondent official policy makers and academic experts respectively.

[21] As indicated by 92%, 83%, 92%, 95%, 92%, 95%, 92%, 83%, 83%, 92%, 92%, 95%, 92%, 67%, 95% and 67% of the respondent official policy makers and academic experts respectively.

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