

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

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**The economic importance and impacts of
intellectual property rights (IPRs) in Sudan**

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The Economic Importance and Impacts of Intellectual Property Rights (IPRs) in Sudan

**By Dr. Samia Satti Osman Mohamed Nour
(January 30, 2013)**

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Abstract

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, 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 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, government concern, private sector concern, public awareness, cooperation between universities and industry, institutions setting, coordination and culture for IPRs protection.

Keywords: IPRs, economic importance, economic impacts, Sudan, Africa.

JEL classification: O3, O30, O34

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The Economic Importance and Impacts of Intellectual Property Rights (IPRs) in Sudan

1. 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. So that all the technological development that took place since the First Industrial Revolution were indeed shaped by the various IPRs regimes in place in various countries throughout the history.^{2,3}

This paper discusses from economic perspective the importance of promoting IPRs in Sudan and differs in several ways from the several studies in the literature, which provides an interesting analysis of 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 world countries. Thirdly, different from the few studies in the Sudanese literature (cf. Makki, 2006; Atta-Al-Mannan, 1999; Ali, 1995; Yusuf, Babiker, Mater) that examine the importance of IPRs in Sudan from legal perspective, we examine the importance of IPRs in Sudan from 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 the 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 that 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.

Based on the above, the rest of this paper will be organized as follows: Section 2 explains the conceptual framework and review the literature on the economic importance and economic impacts of IPRs. Section 3 discusses the importance, implications and constraints of IPRs in Sudan. Section 4 provides the conclusions.

² See for instance, Verspagen (1999) pp. 2, 14, 16. See also Freeman and Soete (1997).

³ See for example, The OECD (1997) "The Second European Report on Science & Technology Indicators," (1997).

2. 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.^{4, 5}

The concept 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.⁶ In addition, IPRs include the category of Plant Breeder’s Rights (PBRs) that also known as Plant Variety Rights (PVR) that allows plant breeders the right to protect new varieties of plants.

Based on the definition of the concept of IPRs presented above, the literature explain the economic importance and economic impact of the various items of IPRs from different perspectives, micro and macro perspectives, user (consumer) and producers and national economy perspectives, and developed and developing countries perspectives.⁷ From economic perspective, Intellectual Property 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 form a cornerstone of the knowledge economy. From the economic point of view the economic importance of intellectual property rights (IPRs), as 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

⁴ As indicated by WIPO “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 year 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, p.3). According to 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, p.11).

⁵ See for example, Idriss Kamil (2003) “Intellectual Property – a Powerful Tool for Economic Growth,” WIPO, 2003:24).pp. 150-151.

⁶ The formal definitions of the different domains of intellectual property (IP) in the Convention of WIPO (1967) defines the terms intellectual property (IP) as including the rights relating to: literary, artistic and scientific works; performances of performing artists, phonograms, and broadcasts; inventions in all fields of human endeavor; scientific discoveries; industrial designs; trademarks, service marks, and commercial names and designations; protection against unfair competition; and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields. See: <http://www.wipo.int/about-ip/en/>, accessed on May 10, 2012.

⁷ See for example, Idriss (2003), pp. 150-151.

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.⁸

From 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 tries to solve the problem of market failure –especially for technological knowledge as a good which is characterized 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.^{9, 10} 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: IPRs regime may affect the innovative activity and thus contribute to growth, affect the inflows of Foreign Direct Investment (FDI) and technology transfers and enhance the growth, the IPRs regimes, enhance the ability of countries to export certain goods, and affect redistribution of income between the countries and between communities within the country.^{11, 12} 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.¹³

⁸ See for instance, Idris (2003) p. 24.

⁹ See for example, Verspagen (1999) p.5.

¹⁰ See for instance, David (1993) p.33.

¹¹ See Kumar (2002).

¹² Several recent studies show the relationship between IP protection and economic growth (Siwek, 2005; Shapiro and Hassett, 2005; OECD, 2005). Moreover, report by WIPO (2007) indicate a positive correlation between the strengthening of the IP system and subsequent economic growth and examine the impact of the IP system on areas such as R&D, FDI and technology transfer in six Asian countries– China, India, Japan, Malaysia, the Republic of Korea and Vietnam.

¹³ See for example, Van Wijk and Junne, (1993), p.22. Verspagen (1999) pp. 18-20, 23, 26, Ginarte and Park (1997), Maskus and Penubarti (1995), Gould and Gruben (1996), Rapp and Rozek (1990), Park and Ginarte (1997), Thompson and Rushing (1996, 1999), Kumar (2002), Park Walter G, Ginarte, Juan Carlos (1997), Kanwar (2006). In addition other studies discusses the effect of IPRs in FDI inflows, technology licensing and trade and indicate that there are controversies, however, surrounding the importance of IPRs to trade and FDI Kumar (2002), Asid, Rozilee - Yusoff, Yusnieza Syarmila - Saiman, mohd Safri (2004), Popovici (2006); OECD,

Concerning the developed countries, the policy debate has been expressed around two opposite views. On the one hand, supporter of the view claim that stronger IPR (such as patents) are necessary to give the proper incentives to inventors as, if inventions are not protected, imitation will flourish and reduce the rewards accruing to inventors. On the other hand, opponents to stronger IPR 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.¹⁴ As for the developing countries, there is increasing debate about the potential positive and negative effects of the international strengthening of IPRs.¹⁵ 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 the developing countries are that stronger IPRs protection could limit the access to patented products and ability to imitate expensive foreign product 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 patent). Some studies argue that the absence or weakness of patent protection encourages technology transfer and technological learning through copying and imitation. While 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 to be 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

(2002), Van Wijk and Junne (1993). In addition other countries discusses the failure of the role of IP and patent in developing countries, see for example, Verspagen, (1999), UNCTAD (1975), European Commission (1997), Mansfield (1993, 1994, 1995). The Weak IPRs may be an important barrier to technology transfer (Mansfield, 1995; Primo Braga 1990). The literature provides new evidence linking protection of IPRs to economic growth (Rod Falvey, Neil Foster, David Greenaway, 2004), innovation and technology diffusion (Rod Falvey, and Neil Foster and Olga Memedovic, 2006). See also Primo (1990), Duguet (2004), Giovanni, (1998), Freeman and Soete (1994, 1997)

¹⁴ See for instance, OECD (2003) "IPR, Innovation and Economic Performance" DSTI/STP Technology Policy Brief, Volume 3.

¹⁵ See for instance, Keith Maskus (2000) "Intellectual Property Rights in the Global Economy,"

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.^{16, 17}

3 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 in Section 2 above, in Section 3 below it is worthwhile to discuss the importance of IPRs in Sudan. We begin with brief background investigating IPRs in Sudan in Section 3.1, and then discussing the importance, implications and constraints of IPRs in Sudan in Section 3.2.

3.1 Background about IPRs in Sudan

The 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 the existing legal framework, legislations and laws issued to support IPRs in Sudan. For instance, Sudan 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 organizations and international conventions and agreements on IPRs. For instance, on a regional scale, Sudan joined the Organization of African Regional Intellectual Property Organization (ARIPO) in 1978.

¹⁶ See for example, Keith E. Maskus, *Intellectual Property Rights in the Global Economy* (2000), see also Mansfield (1994).

¹⁷ Patent system stimulates economic development, facilitates technology transfer and FDI and stimulates R&D at universities and research centers, see for example, Idriss (2003), p. 84). Patents are important for dynamic performance of the economy and have special importance, because it generates open externalities or spillovers effects that are especially valuable from an economic point of view, because, they are an important impetus to economic growth. See for instance, Verspagen (1999) pp. 9, 11-12). However, a monopoly provided by patents enables firms to charge too high prices from a societal point of view and this causes welfare loss for consumers (see for instance, Verspagen (1999), pp. 2-3, 6, 11, 16-17, 33). Several studies show the positive effects and benefits of patent system (Van Dijk, 1994) and argue in support of patents. Other studies present mixed results concerning the impacts of patents in technological development (Mazzoleni and Nelson, 1998, p.281). On the other hand, there is an argument that firms have alternative options for appropriating the return to R&D investment, and that these alternative options are often used more than patents. Levin, Klevorick et al. (1987), in a survey among large firms in U.S. and Arundel and Van de Paal (1995) for European large firms found that secrecy establishing a lead- time, an effective marketing campaign, and learning effects were measures of protecting knowledge that were considered to be more effective than patent by many (although not all) firms. Similar conclusion had been reached by in earlier studies such as Taylor and Silberston (1973). See for example, Verspagen (1999), pp. 7-8 and Mazzoleni and Nelson (1998) p. 281.

Moreover, at the international scale, Sudan joined the agreement of establishing the World Intellectual Property Organization (WIPO) (1967) in 1974, Paris Convention for the Protection of Industrial Property (1883) in 1974, the Berne Convention for 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.¹⁸

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 1-3). Concerning the intensity of industrial property in Sudan we find that the high intensity, most common and widely used type of industrial property as measured by the total number of application and granting is for trademarks, followed by industrial design and patents respectively. The low intensity of patents appears from the fewer number of patent applications made between 1988 and 2010 by residents and non-residents of Sudan (see Figures 9-10). Regarding the trend we find that the application and grant 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 both filling and granting of patents over the period (1990-2010) at the home level, but this should not hide the fact that the grant of international patents is very limited, particularly, international patents application for PCT by residents of Sudan is limited during the period (2003-2007) (see Figures 9-16, Table 3). 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 grant of industrial design, whereas by contrast, the share of foreign is higher than the share of national in the application and grant of patent, while for the application and grant 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 imply that trademarks are overwhelmingly foreign residents owned, as the total number of trademarks applications filed and granted of residents (6014) (4783) are less than those of non-residents (6643) (3529) in Sudan over the period (1999-2010) (see Table 1 and Figures 1-4). By contrast, the structure of ownership of industrial design imply that industrial designs are overwhelmingly national residents owned, as the total number of industrial design applications filed and granted of

¹⁸ 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.

residents (916) (98) are more than those of non-residents (90) (36) in Sudan over the period (1988-2010) (see Table 2 and Figures 5-8). Whereas, the structure of ownership of patent imply that patents are overwhelmingly foreign residents owned, as patent application from residents is lowest than those of the non-residents during the period (1988-2010) (see Table 3 and Figures 9-16 above).

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 9- 16). Nour (2004, 2005a; b; c, 2010, 2011) find that the poor application 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.¹⁹ The low patenting applications imply insufficient science and technology (S&T) infrastructure, low S&T output indicators and low innovative activities in Sudan and all Arab countries compared to advanced and leading developing countries like Singapore, Korea and China. Moreover, Figure 11 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; it is followed by Zimbabwe; Mali; Tunisia; Tanzania; Sudan and Libya. According to 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 11).

Moreover, our findings concerning the low 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, however, patent applications made and patents held by residents of developing countries (domestic applications or patents) are few. 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 by a number of grounds, including non-use of the system by universities and local research institutions.²⁰

¹⁹ See for example, US Patent and Trademark office web site: www.uspto.gov.

²⁰ 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.

Table 1-Trademarks applications, grants and certificates for national and foreign in Sudan (1999-2010)

Total	Filing (new Applications)			Granting			
	National	Foreign	Total	National	Foreign	Total	Certificates
1999	70	402	472	60	306	366	307
2000	513	760	1273	228	676	904	822
2001	187	507	694	200	312	512	418
2002	485	525	1010	200	278	478	398
2003	217	708	925	141	316	457	402
2004	60	1007	1067	20	478	498	366
2005	780	479	1259	215	406	621	540
2006	1010	800	1810	810	717	1527	1507
2007	1022	728	1750	340	640	980	725
2008	970	578	1548	773	566	1339	1306
2009	700	149	849	542	88	630	612
1999-2009	6014	6643	12657	3529	4783	8312	7403
1999-2009	5204	6643	11847	4007	6625	10632	1688-10927
2010			886			606	399
March-June-2010	242	239	481				

Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

Table 2- Industrial design applications and grants for national and foreign 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	1048	367								
1998-1997			831	480								

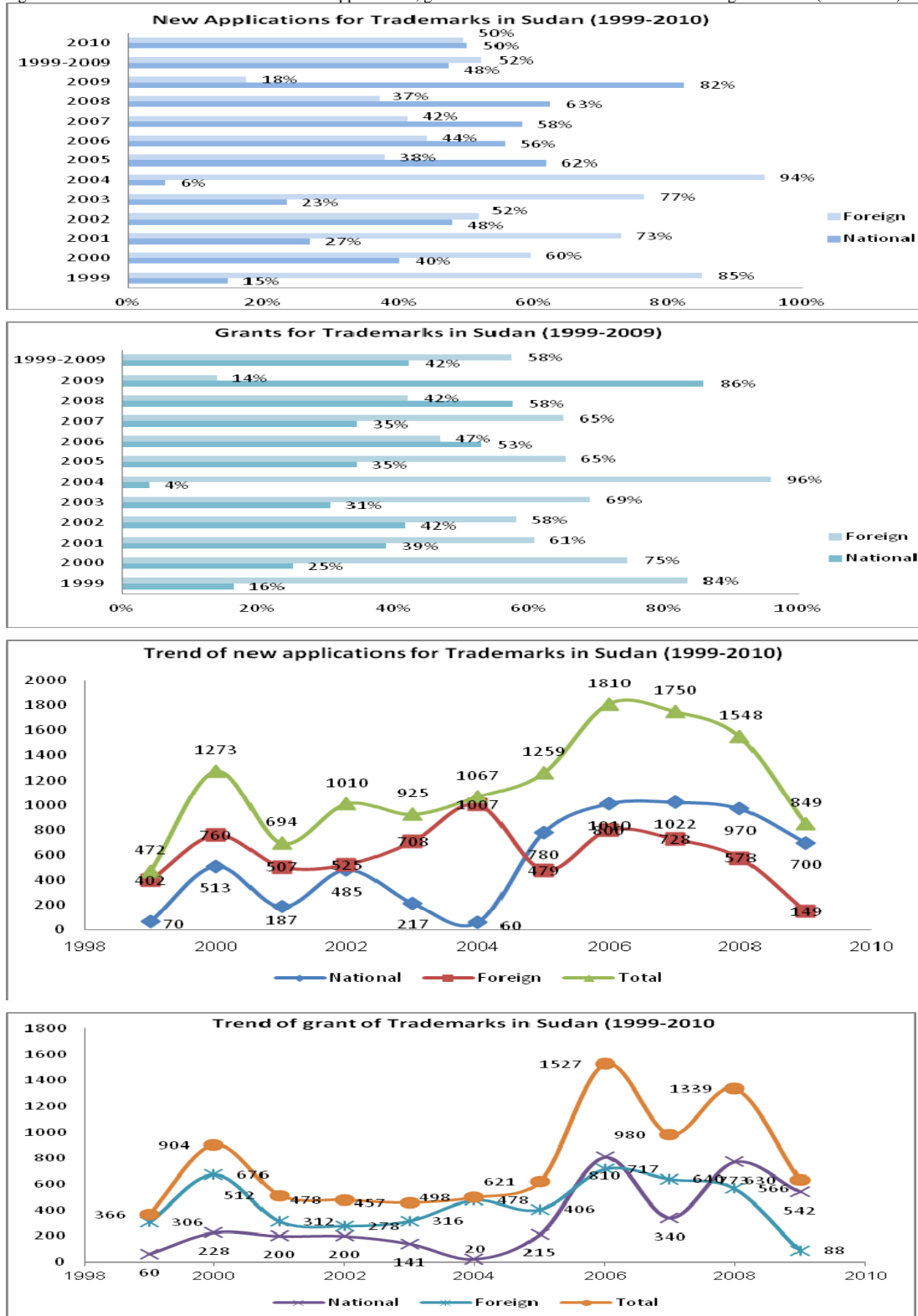
Source: (a) Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010), and (b) IPS Sudan web site: http://www.ipsudan.gov.sd/design_stat.htm. Accessed on 12 May 2012. Note: (1) refers to 2003-2008.

Table 3- Patent applications by non resident and patent granting for non resident and residents in Sudan (1989-2010)

	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		

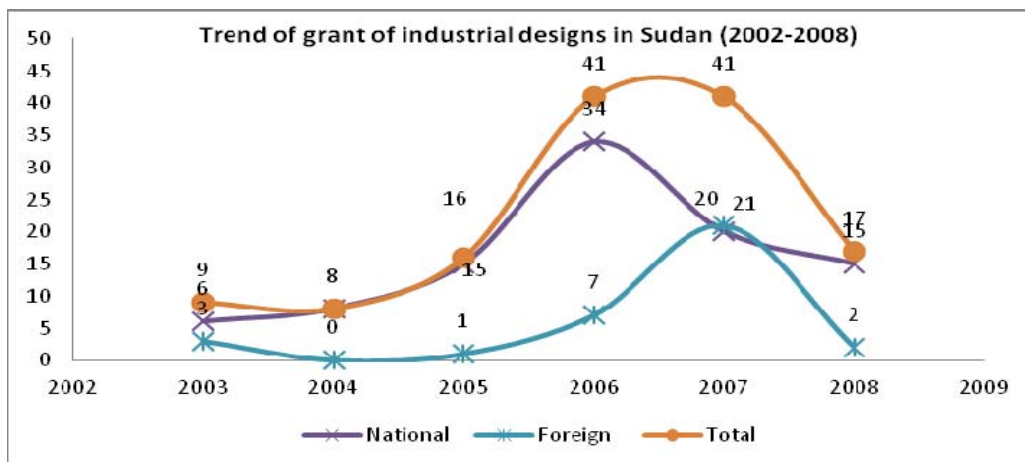
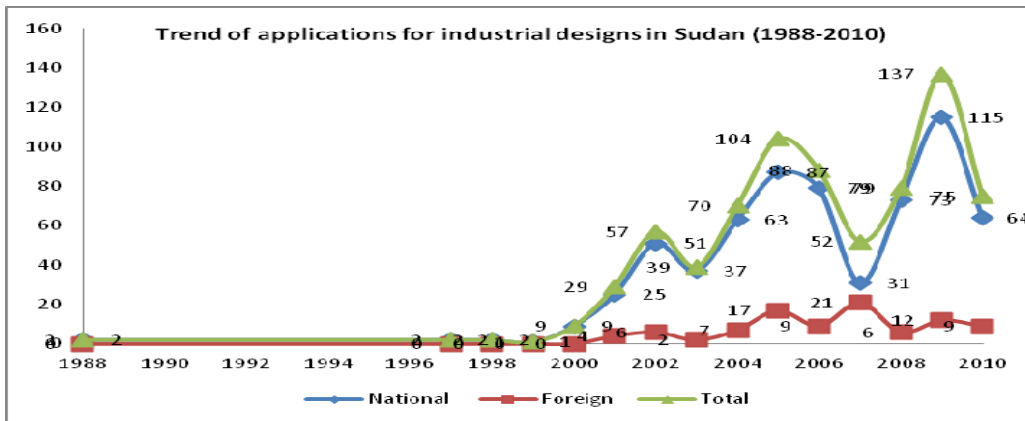
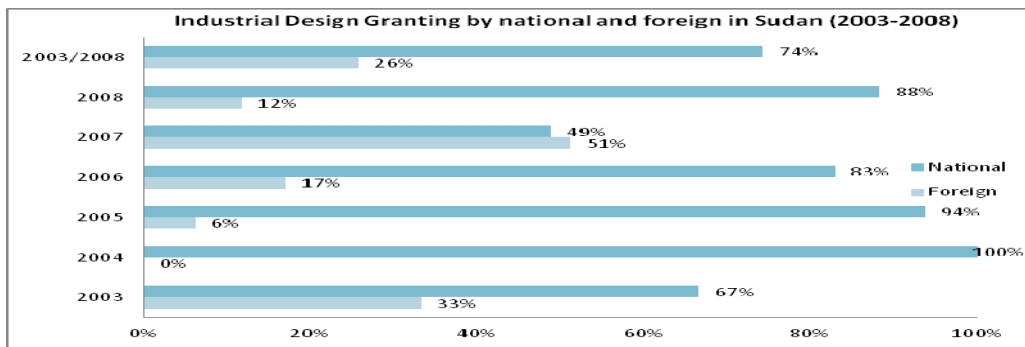
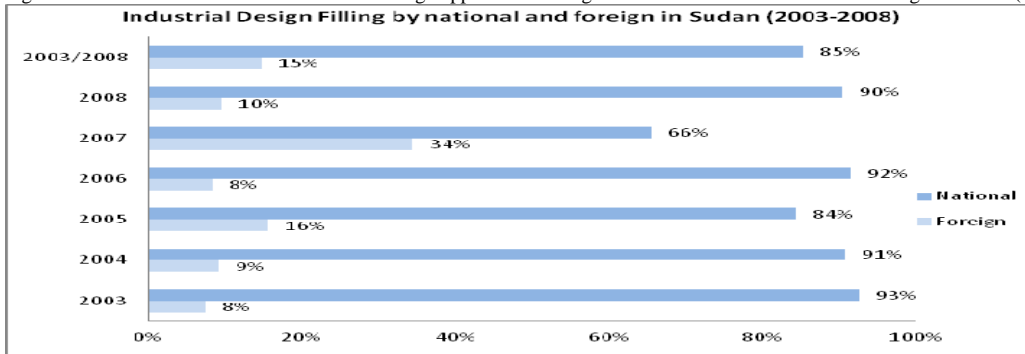
Source: (a) Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010), (b) IPS-Sudan web site: http://www.ipsudan.gov.sd/patent_stat.htm. Accessed 12 May 2012. Note (1) refers to 2002/2007, and (2) refers to PCT.

Figures 1-4- Structure and trend of trademarks applications, grants and certificates for national and foreign in Sudan (1999-2010)



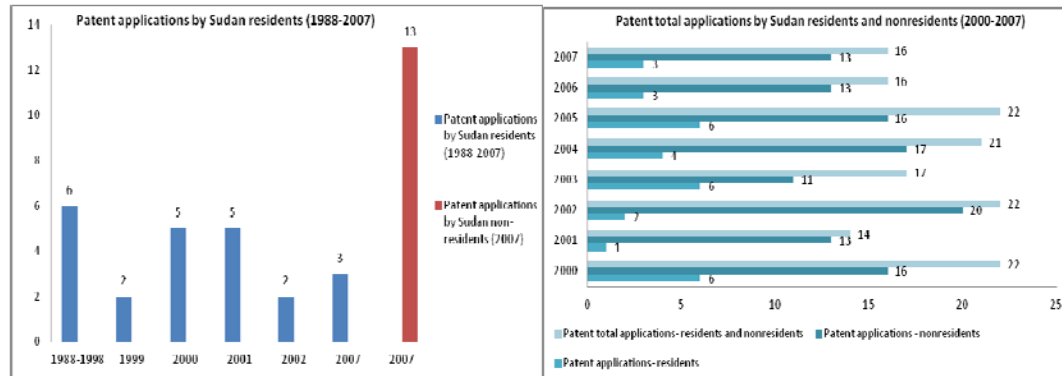
Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

Figures 5-8- Structure and trend of industrial design applications and grants certificates for national and foreign in Sudan (1988-2010)



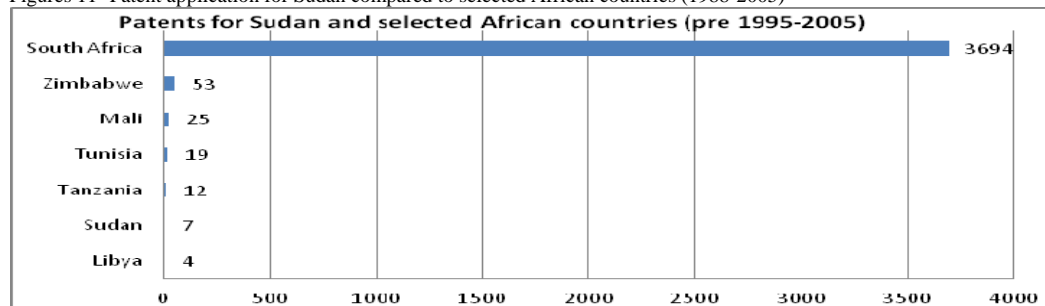
Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

Figures 9-10- Patent applications by residents and non-resident for Sudan (1998-2007)^a (2000-2007)^b



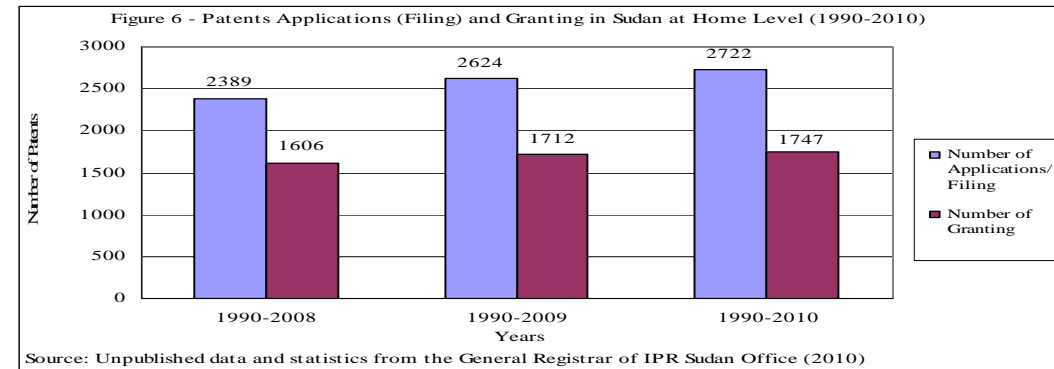
Sources: (a) World Development Indicators database (2005); (b) World Development Indicators database (2012).

Figures 11- Patent application for Sudan compared to selected African countries (1988-2005)



Source: UNESCO (2006)

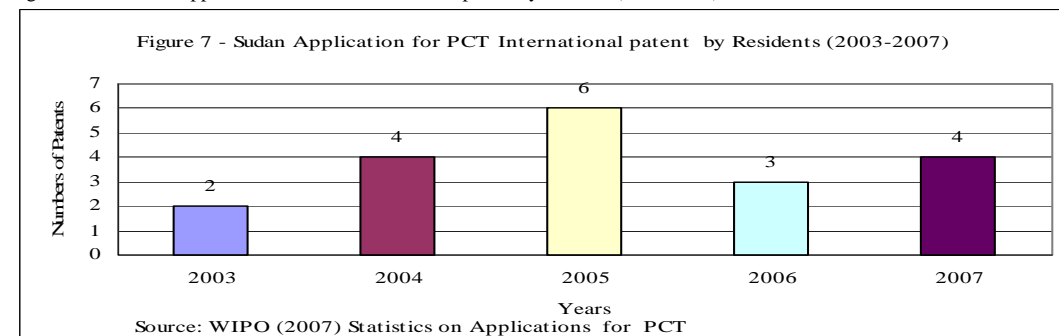
Figure 12 - Patents Applications (Filing) and Granting in Sudan at Home Level (1990-2010)



Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

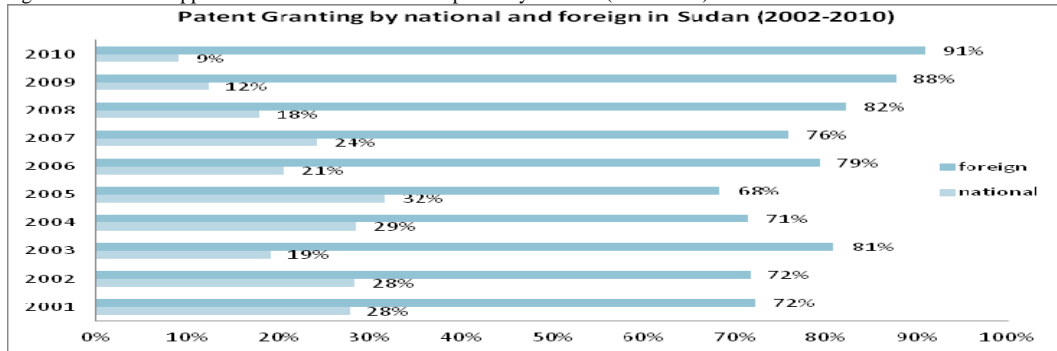
Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

Figure 13 - Sudan's Application for PCT International patent by resident (2003-2007).



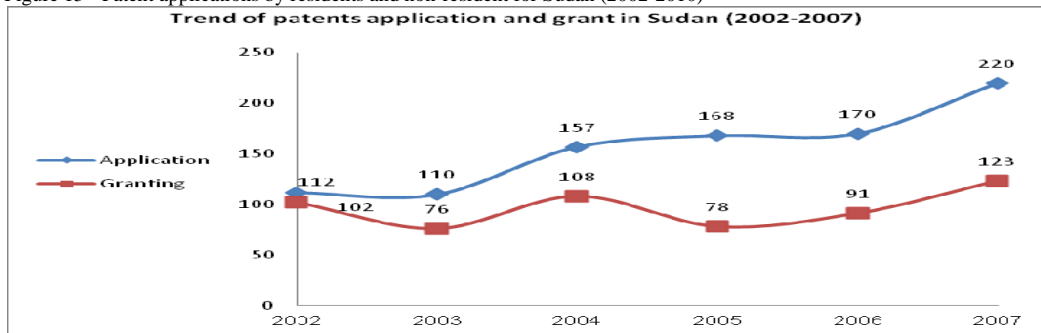
Source: WIPO (2007) Statistics on Applications for PCT

Figure 14- Sudan's Application for PCT International patent by resident (2002-2010).



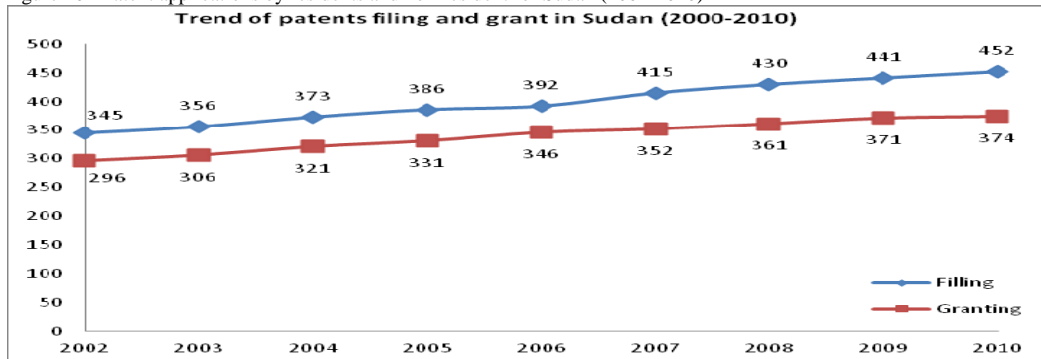
Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

Figure 15 - Patent applications by residents and non-resident for Sudan (2002-2010)



Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

Figure 16 - Patent applications by residents and non-resident for Sudan (2002-2010)



Source: Unpublished data and statistics from the General Registrar of IPR Sudan Office (2010)

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, so, further efforts are still important to encourage adhesion to international IP laws and conventions.

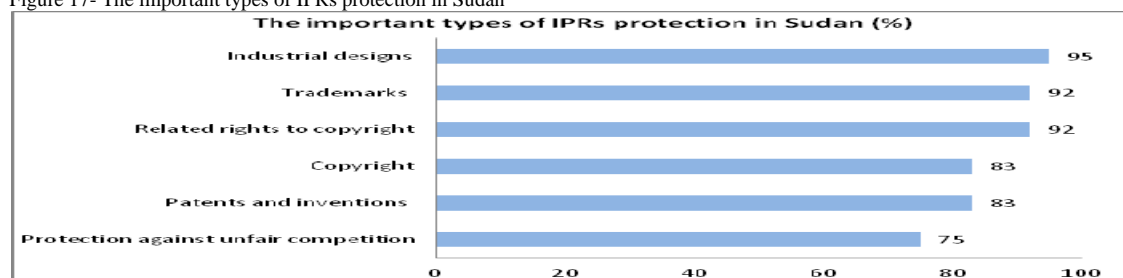
3. 2. Importance, implications and constraint to IPRs in Sudan

The questionnaire and interview with IPRs experts in Sudan and the survey data based on primary data and 12 face-to-face interviews with the official and the academics experts 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.²¹

The results of the IPRs survey indicate that the important types of IPRs implemented in Sudan are industrial designs, trademarks, related rights to copyright, copyright, patents and invention and protection against unfair competition respectively (see Figure 17).²² The results of IPRs survey recognize the importance of strengthening IPRs for achieving economic development objectives in Sudan. For instance, IPRs has the potential to assist industrial prosperity through the creation of industrial design and agricultural development through plant varieties and hence contribute to Gross Domestic Products. Moreover, IPRs provides incentives for innovative producers, provides good quality products for consumers, generates revenues for innovative producers and promotes economic growth, prosperity and development. Furthermore, IPRs protection has the potential to 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 in the international institutions respectively (see Table 4).²³

Figure 17- The important types of IPRs protection in Sudan



Source: IPRs Survey (2010)

²¹ 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.

²² As indicated by 95%, 92%, 92%, 83%, 83%, and 75% of the respondent official policy makers and academic experts respectively.

²³ As indicated by 95%, 95%, 92%, 92%, 92%, 92%, 92%, 92%, 92%, 92%, 92%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, 83%, and 75% of the respondent official policy makers and academic experts respectively.

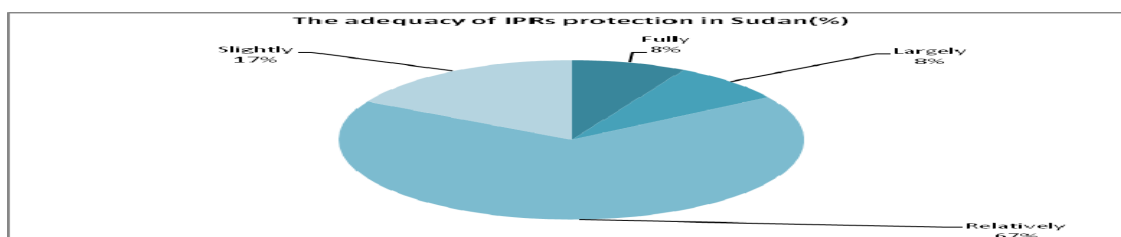
Table 4- The important factor encouraging and strengthening IPRs for achieving development objectives in Sudan

Importance of strengthen IPRs in Sudan	%
1. Industrial prosperity and the creation of industrial design	95
2. Agricultural development through plant varieties	95
3. Contributes to Gross Domestic Products	92
4. Incentives for innovative producers	92
5. Good quality products for consumers	92
6. Generates revenues for innovative producers	92
7. Economic growth, prosperity and development	92
8. R&D	92
9. S&T development	92
10. Networks	92
11. Private industrial investment	83
12. Flow of FDI	83
13. Promotes technology transfer	83
14. Generates revenues for government	83
15. Contributes to export	83
16. Increasing employment opportunities	83
17. Cooperation between universities and industry.	83
18. Fair competition	83
19. Development of expressions of local culture, folklore, and traditional knowledge	83
20. Cultural heritage	83
21. Encourages the integration in the international and regional institutions	75

Source: IPRs Survey (2010)

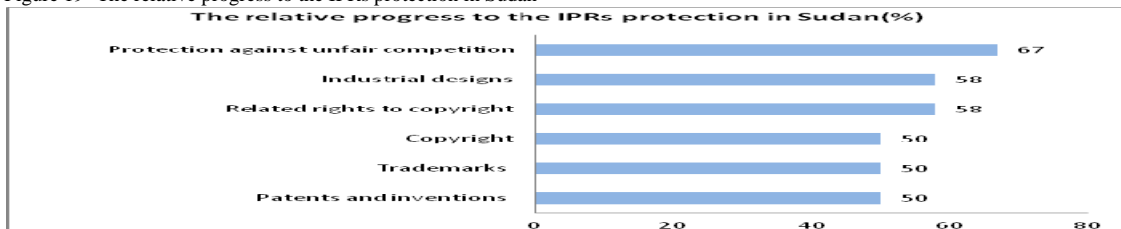
The prevalence of important types of IPRs and recognition of the importance of IPRs protection for economic development should not hide the fact that IPRs is still limited in Sudan. For instance, the results of IPRs survey indicate that the official efforts to promote IPRs have been only relatively successful in some sectors in Sudan (see Figure 18).²⁴ Particularly, relative progress has been made toward protection against unfair competition, industrial designs and related rights to copyright, copyright, patents and invention, and trademarks respectively (see Figure 19).²⁵

Figure 18- The adequacy of IPRs protection in Sudan



Source: IPRs Survey (2010)

Figure 19- The relative progress to the IPRs protection in Sudan



Source: IPRs Survey (2010)

²⁴ As reported by 67% of the respondent official policy makers and academic experts respectively.

²⁵ As indicated by 67%, 58%, 58%, 50%, 50%, and 50% of the respondent official policy makers and academic experts respectively.

The follow up interview for the IPRs survey indicates the inadequacy of IPRs legislations 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, that would be particularly useful for Sudan, because since long the structure of Sudan economy has been heavily dependent on the agricultural resources. The results of IPRs survey indicate the serious shortcoming and inadequacy in IPRs protection in Sudan, which is mainly attributed to several hindering factors. These include for instance, the low integration in the 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 wide spread of unfair competition. In addition to lack of resources, investment and finance, low incentives for innovative producers, lack of universities concern, 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 encourages the use of the illegal products. In addition to the low industrial prosperity, lack of cooperation between universities and industry, lack of coordination and harmonization for IPRs related policies, easy infringement of IPRs and low returns for innovative producers respectively (see Table 5).²⁶ 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 harmonization policies related to IPRs, brain drain: migration of researchers, skills, experts and creators, hindering transfer of technology, wide spread of unfair competition, difficult control of illegal protected products, easy infringement of IPRs, weak enforcement of

²⁶ As indicated by 83%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 75%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 67%, 58%, 58%, 58%, 50% and 42% of the respondent official policy makers and academic experts respectively.

IPRs, low integration in the regional institutions and low integration in the international institutions respectively (see Table 6).²⁷

Table 5- The important factors and constraints hindering IPRs in Sudan

The important Constraints hindering IPRs in Sudan	%
1. Low integration in the international institutions	83
2. Lack of legal issues	75
3. Lack of legal issues in plant varieties	75
4. High costs for innovative producers (e.g. application for patents)	75
5. Lack of government concern	75
6. Lack of private sector concern	75
7. Weak institutions setting	75
8. Lack of public awareness and concern	75
9. Difficult control of illegal products	75
10. Low integration in the regional institutions	75
11. Wide spread of unfair competition	75
12. Lack of resources, investment and finance	67
13. Low incentives for innovative producers	67
14. Lack of universities concern	67
15. Weak R&D	67
16. Lack of networks	67
17. Weak enforcement of IPRs.	67
18. Weak culture for IPRs protection	67
19. Lack of national system of innovation	67
20. Poverty and low purchasing power encourages the use of the illegal products	67
21. Low industrial prosperity	58
22. Lack of cooperation between universities and industry.	58
23. Lack of coordination and harmonization for IPRs related policies	58
24. Easy infringement of IPRs	50
25. Low returns for innovative producers	42

Source: IPRs Survey (2010)

Table 6- The important implications of weak IPRs in Sudan

Implications of weak IPRs in Sudan	%
1. Low incentives for producers	92
2. Poor national system of innovation	83
3. Hindering FDI	83
4. Hindering access to protected medicines	83
5. Lack of cooperation between universities and industry.	83
6. Financial loss for innovative producers	83
7. Lack of networks	83
8. Low R&D	75
9. Low agricultural prosperity and low plant varieties	75
10. Low industrial prosperity	75
11. Poor S&T development indicators	75
12. Lack of coordination and harmonization policies related to IPRs	75
13. Brain drain: migration of researchers, skills, experts and creators.	75
14. Hindering transfer of technology	75
15. Wide spread of unfair competition	75
16. Difficult control of illegal protected products.	75
17. Easy infringement of IPRs	75
18. Weak enforcement of IPRs.	67
19. Low integration in the regional institutions	67
20. Low integration in the international institutions	58

Source: IPRs Survey (2010)

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, the factors related to legislations and enforcement; education and training systems; planning IPRs protection, learning from international experiences in IPRs

²⁷ As indicated by 92%, 83%, 83%, 83%, 83%, 83%, 83%, 75%, 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.

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 7).²⁸ 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 organizations, 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 Organization, civil society and community and non-Governmental Organizations respectively (see Table 8).²⁹ Moreover, strengthening IPRs in Sudan can be facilitated by several important mechanisms, instruments or policies. These include for instance, promote 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. In addition to increasing the returns for innovative producers/creators, increasing the information about IPRs, coordination and harmonization policies related to IPRs, culture for IPRs protection, new instruments to encourage access to protected medicines, prevent piracy, universities concern, providing adequate incentives for innovative producers/creators and networks respectively (see Table 9).³⁰ Moreover, one important mechanism and instrument for IPRs protection is the use of internet that creates opportunities and challenges for IPRs protection and for the producers and the consumers of IPRs protected products. For instance, the major opportunities that the use of 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 respectively. Whereas, the major challenges that the use of internet creates for IPRs protection are easy infringement of IPRs protected products and financial rights

²⁸ As indicated by 92%, 83%, 83%, 83%, 83%, 75%, 75%, 75%, 75% and 75% of the respondent official policy makers and academic experts respectively.

²⁹ 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.

³⁰ 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.

and financial loss for producers, difficult control of illegal products imitating IPRs protected products, easy piracy, the need for more legislations and legal framework, weak enforcement of IPRs, easy infringement to moral rights, easy imitation, and easy modifications of IPRs protected products and wide spread of unfair competition (see Table 10).³¹

Table 7- the role of important factors for promoting IPRs in Sudan

Factors related to the IPRs institutions	%
1. Legislations and enforcement.	92
2. Education and training systems.	83
3. Planning IPRs protection.	83
4. Learning from international experiences in IPRs protection.	83
5. Commitment to international IPRs treaties.	75
6. Monitoring current efforts toward IPRs protection.	75
7. Finance, investment and resources allocation.	75
8. Research institutions.	75
9. 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)

Table 8 - The role of important institutions for promoting IPRs in Sudan

Role of institutions in promoting IPRs in Sudan	%
1. Ministry of Justice	92
2. WIPO	92
3. International organizations	92
4. Government.	83
5. Ministry of Industry	83
6. Universities, educational, training and other related institutions.	75
7. Ministry of Culture	75
8. Independent research centres	67
9. Ministry of Finance and National Economy.	67
10. Ministry of Higher Education	67
11. Ministry of Science and Technology	67
12. Private sector	67
13. Sudanese Standards and Metrology Organization	58
14. Civil society and community.	58
15. Non-Governmental Organizations	58

Source: IPRs Survey (2010)

Table 9- The important mechanisms, instruments or policies for strengthening IPRs in Sudan

Mechanisms for strengthen IPRs in Sudan	%
1. Government concern	83
2. Adequate legislation for enforcement of IPRs to reduce infringement of IPRs	75
3. Fair competition	75
4. Legal issues in plant varieties	75
5. New instruments to encourage the transfer of technology	75
6. Industry and creation of industrial design	67
7. Private sector concern	67
8. Public awareness and concern	67
9. R&D	67
10. Cooperation between universities and industry.	67
11. Institutions setting	67
12. Control for IPRs protected products: control for illegal products	67
13. The use of technology to reduce the costs for innovative producers	67
14. Increasing the returns for innovative producers/creators	67
15. Increasing the information about IPRs	67
16. Coordination and harmonization policies related to IPRs.	67
17. Culture for IPRs protection	67
18. New instruments to encourage access to protected medicines.	67
19. Prevent piracy	67
20. Universities concern	58
21. Adequate incentives for innovative producers/creators	58
22. Networks	58

Source: IPRs Survey (2010)

³¹ 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.

Table 10- The important implications of the use of Internet on IPRs in Sudan

Implications of the use of Internet on IPRs in Sudan		%
The use of Internet creates the following opportunities		
1.	Easy collection of revenues for producers	67
2.	Easy communications	58
3.	Cheap products	50
4.	High quality products	50
5.	Easy exchange of IPRs protected products	42
6.	Easy access to IPRs protected products	42
The use of Internet creates the following challenges		
7.	Easy infringement of IPRs protected products and financial rights and financial loss for producers	83
8.	Difficult control of illegal products imitating IPRs protected products	83
9.	Easy piracy	83
10.	Need for more legislations and legal framework	83
11.	Weak enforcement of IPRs	75
12.	Easy infringement to moral rights, easy imitation, and easy modifications of IPRs protected products	75
13.	Wide spread of unfair competition	58

Source: IPRs Survey (2010)

Table 11- The important enforcement procedures for IPRs in Sudan

Importance of enforcement procedures for IPRs in Sudan		IPRs	copy right	Patents	industrial design	trademarks
1.	Provisional measures to prevent an infringement of IPRs from occurring	92	92	83	92	92
2.	Expeditious remedies to deter further infringement	83	92	67	83	83
3.	Expeditious remedies to offer adequate compensation to the right-holder.	83	83	83	92	92
4.	Civil and administrative procedures, actions, proceedings and remedies	83	92	83	83	95
5.	Provisional measures	83	92	75	92	92
6.	Provisional measures to preserve relevant evidence with regard to the alleged infringement	83	92	67	92	95
7.	Border measures	83	83	75	92	92
8.	Damages to offer the right-holder adequate financial compensation for the injury suffered by infringement.	83	75	67	75	83
9.	Interlocutory injunctions.	83	83	75	75	83
10.	Civil remedies may include:	75	83	83	83	92
11.	Final injunctions	75	83	67	83	92
12.	Criminal procedures.	67	83	83	83	95
13.	Injunctions	67	75	67	83	92
14.	Account of profit.	67	58	58	67	67
15.	Measures of self-help.	58	75	75	75	95
16.	Delivery up	42	58	58	67	67

Source: IPRs Survey (2010)

The observed inadequacy and the presence of several factors hindering adequate IPRs imply the importance of further efforts for the enforcement of IPRs in Sudan. These include for instance, the provisional measures to prevent an infringement of an intellectual property right from occurring, expeditious remedies to deter further infringement, expeditious remedies to offer adequate compensation to the right-holder. In addition to the civil and administrative procedures, actions, proceedings and remedies, provisional measures, provisional measures to preserve relevant evidence with regard to the alleged infringement, border measures, damages to offer the right-holder adequate financial compensation for the injury suffered by infringement, interlocutory injunctions and the civil remedies that may include: final injunctions, criminal

procedures, injunctions, account of profit, measures of self-help and delivery up respectively (see Table 11).^{32, 33, 34, 35, 36}

4. Conclusions

This paper explains the importance of IPRs and examines the factors hindering and those contributing toward enhancing IPRs in Sudan. Our findings from IPRs survey discussed in Section 3 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 industrial designs, trademarks, related rights to copyright, copyright, patents and invention and protection against unfair competition respectively. 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 is 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, the low integration in the international institutions, lack of legal issues, high costs for innovative producers, lack of government concern, lack of private sector concern, weak institutions 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 harmonization for IPRs related policies. The inadequate IPRs in Sudan lead to several implications such as 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 legislations 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, institutions setting, coordination and harmonization policies and culture for IPRs protection.

³² As indicated by 92%, 83%, 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.

³³ 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.

³⁴ 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.

³⁵ 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.

³⁶ 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.

References:

- Ali, M. S. "Explaining the Sudanese Civil Transactions Act" Part I, Omdurman Islamic University House Publishing, 1995.
- Arundel, A. and G. Van de Paal (1995) "Innovation Strategies of Europe's Largest Industrial Firms," Maastricht, MERIT, unpublished manuscript.
- Atta Al-Mannan, A. "Commercial Law" Khartoum 1999.
- Asid, Rozilee - Yusoff, Yusnieza Syarmila - Saiman, mohd Safri (2004) "Impact of Intellectual Property Protection, Domestic Market Condition and R&D Expenditure on Foreign Direct Investment Inflow: A Preliminary Evidence in Selected Cross-Countries Data," University Library of Munich, Germany, MPRA Paper series No. 1008, 2004.
- Babiker T. I. "Industrial property rights between theory and practice in Sudan,".
- David, P. A. (1993) "Intellectual Property Institutions and Panda's Thumb: Patents, Copyrights, and Trade Secrets in Economic Theory and History" in M. B. Wallerstein, M. E. Mogee and R. A. Schoen *Global Dimensions of Intellectual Property Rights in Science and Technology*, Washington, D.C., National Academy Press: 19-64.
- Duguet Emmanuel (2004) and Lelarge Claire (INSEE) "Does patenting increase the private incentives to innovate? A microeconomic analysis" EPEE - University of Evry EconWPA series of Development and Comp Systems number 0411019, 16 Nov 2004.
- Freeman, C. (1994) "Technological Revolutions and Catching-Up: ICT and NICs, the Dynamic of Trade, Technology and Growth," J. Fagerberg, B. Verspagen and N. Von Tunzelmann Aldershot, Edward Elgar: 198-221.
- Freeman, C. and L. Soete (1997) "The Economic of Industrial Innovation," third Edition, Cassell, London.
- Giovanni, D. (1998) "Sources, Procedures and Microeconomic Effect of Innovation" *Journal of Economic Literature*, Vol. XXVI, September 1998, p.1139.
- Idris, Kamil (2003) "Intellectual Property – a Powerful Tool for Economic Growth," WIPO, 2003, p. 24.
- Ioana Popovici (2006) "Impact of Intellectual Property Rights Reforms on the Diffusion of Knowledge through FDI" Florida International University, Department of Economics Working Papers series number 0602, May 2006.
- IPRs Survey (2010).
- Kumar, Nagesh (2002) "Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries," Study Paper 1b, UK Commission on Intellectual Property Rights.
- Levin, R. C., A. K. Klevorick, et al. (1987) "Appropriating the Returns from Industrial Research and Development," *Brookings Papers on Economic Activity* 3: 783-820.
- Mansfield, E. (1993) "Unauthorized Use of Intellectual Property: Effects on Investment, Technology Transfer and Innovation," in M. B. Wallerstein, M. E. Mogee and R. A. Schoen *Global Dimensions of Intellectual Property Rights in Science and Technology*, Washington, D.C., National Academy Press: 107-145.
- Mansfield, E. (1994) "Intellectual Property Protection, Foreign Direct Investment and Technology Transfer," *International Finance Corporation Discussion Paper No. 19*.
- Mansfield, E. (1995) "Intellectual Property Protection, Direct Investment and Technology Transfer: Germany, Japan and the United States," *International Finance Corporation Discussion Paper No. 27*.
- Mazzoleni, R. and R. R. Nelson (1998) "The benefits and costs of strong patent protection: a contribution to the current debate," *Research Policy* 27:273-284.
- Makki, H. A. H. (2006) "intellectual property, according to Sudanese law" Sudan Printing Press Company Limited of the. Khartoum, Sudan.
- Mater, A. "the copyright law in the Sudan".
- Nour, Samia (2004), "Science and Technology (S&T) Development Indicators within the Arab Mediterranean countries" Paper prepared for the Fifth Mediterranean Social and Political Research Meeting, organised by the Mediterranean Programme of the Robert Schuman Centre for Advanced Studies at the European University Institute, Italy- Florence March 24–28, 2004.
- Nour, Samia (2005a), "Science and Technology (S&T) Development Indicators in the Arab Region: A comparative Study of Arab Gulf and Mediterranean Countries," Published in *UNU-INTECH Discussion Paper Series UNU-INTECHDPS2005-3*, Maastricht, the Netherlands, August 2005). (English).
- Nour, Samia (2005b), "Science and Technology (S&T) Development Indicators in the Arab Region: A comparative Study of Arab Gulf and Mediterranean Countries," *The Journal of Science, Technology and Society* (SAGE Publications), Vol.10; No. 2; September 2005; pp. 249-274 (Published in *UNU -INTECH Discussion Paper Series UNU-INTECHDPS2005-3*, Maastricht, the Netherlands, August 2005)
- Nour, Samia, (2005c), "Technological Change and Skill Development in the Arab Gulf Countries," *Doctoral Dissertation, Maastricht University Press*, Maastricht, The Netherlands, November 2005.
- OECD, European Commission (1997) "The Second European Report on Science & Technology Indicators," OECD, Paris, 1997. p. 464 DG XII.
- OECD (2002) "The impact of trade-related intellectual property rights on trade and foreign direct investment in developing countries" OECD/ TRADE DIRECTORATE/TRADE COMMITTEE/WORKING PARTY OF THE TRADE COMMITTEE/(2002) NO. 42.
- OECD (2003) "IPR, Innovation and Economic Performance" DSTI/STP Technology Policy Brief, Volume 3.
- OECD (2005), Intellectual Property as an Economic Asset: Key Issues in Valuation and Exploitation (Background and Issues) (Report of the European Patent Office) (2005): http://academy.epo.org/schedule/2005/e02/background_report.pdf.
- Park, Walter G, Ginarte, Juan Carlos (1997) "Intellectual Property Rights and Economic Growth" - Oxford University Press, *Journal of Contemporary Economic Policy*, Volume (Year): 15 (1997), Issue (Month): 3 (July), pp: 51-61:
- Primo Barga, C. (1990) "Guidance from the economic theory Strengthening Protection of Intellectual Property in developing countries" A survey of the literature E. W. Siebeck Washington D.C. World Bank Discussion Paper No. 112.
- Robert J. Shapiro and Kevin Hassett, *The Economic Value of Intellectual Property* (USA for Innovation) (Oct. 2005) http://www.usaforinnovation.org/news/ip_master.pdf
- Rod Falvey, Neil Foster, David Greenaway (2004) "Intellectual Property Rights and Economic Growth" *Internationalisation of Economic Policy Research Paper No. 2004/12*, 2004

-
- Rod Falvey, and Neil Foster and Olga Memedovic (2006) "The Role of Intellectual Property Rights in Technology Transfer and Economic Growth: Theory and Evidence," UNITED NATIONS Industrial Development Organization (UNIDO), Vienna, 2006. Stephen Siwek of Economists Incorporated entitled.
- Stephen E. Siwek (Economists Inc.), (2002) "Copyright Industries in the U.S. Economy; the 2002 Report"
- Stephen E. Siwek (Economists Inc.), (2005) "Engines of Growth: Economic Contributions of the U.S. Intellectual Property Industries" (Nov. 2005): http://nbcumv.com/corporate/Engines_of_Growth.pdf.
- Sunil Kanwar (2006) "Innovation and Intellectual Property Rights" Centre for Development Economics, Delhi School of Economics in its series Working paper number 142, Aug 2006.
- Taylor, C. and A. Silberston (1973) "The Economic Impact of the Patent System," Cambridge, Cambridge University Press.
- The United States Patent and Trademark office web site: www.uspto.gov.
- UNCTAD (1975) "The Role of the Patent System in the Transfer of Technology to Developing Countries," New York, United Nations.
- Van Dijk, T. (1994) "The Limits of Patent Protection Essays on the Economics of Intellectual Property Rights," Ph.D. thesis, Faculty of Economics, Maastricht, University of Limburg.
- Van Wijk, J. and G. Junne (1993) "Intellectual Property Protection of Advanced Technology Changes in the Global Technology System: Implications and Options for Developing Countries," Maastricht, UNU/INTECH Working Paper No. 10.
- Verspagen, B. (1999), "Intellectual Property Rights in the World Economy," MERIT, Maastricht University, MERIT Research Memorandum No. RM 2/99- 017, 1999.
- World Intellectual Property Organization (WIPO) (1999) "General Information," WIPO Publication No. 400 (E). Geneva, Switzerland, April 1999 WIPO Geneva, Switzerland.
- WIPO's Japan Office (2007) "Measuring the Economic Impact of IP Systems" joint project between WIPO and UNU, September.
- Yusuf, D.A.. "Sudanese experience in enforcement of industrial property rights".

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