TRIPS Agreement and Economic Development:

Implications and Challenges for Least-Developed Countries like Bangladesh

by

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1. Introduction

Least-developed countries (LDCs) like Bangladesh could benefit from increasing demand and appropriate intellectual property rigths (IPRs) especially for patented agricultural and pharmaceutical goods. IPRs protection could be used as a vehicle for economic development through trade.[1] By appropriating rights, the country could use its comparative advantage of reverse-engineering, adding value through adaptation of existing technology goods (knowledge goods) accessed in formal and non-formal means. However, as a part of ensuring economic benefits to innovators, the World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property (TRIPS)[2] obliges its members, irrespective of their level of development, to offer strict IPRs protection in knowledge goods, including comprehensive control on technology diffusion. In theory, protection aims to foster beneficial technological development furthering innovation and increasing economic growth.[3]

However, quantitative research shows that IPRs do not often contribute to economic growth leading to economic development in countries below a development threshold of about US$3,400 in Gross Domestic Product (*GDP*), since countries at such a low level of development can neither 1) afford research and development (R&D), 2) or the technology, nor 3) do they have the ability to imitate, absorb, assimilate, replicate or do duplicative imitation of foreign inventions to meet consumption needs or fulfill economic goals.[4] In addition, quantitative research implies that in countries which have little ability to imitate to meet survival needs, standardizing IPRs protection not only restricts the previously free use of technology/knowledge goods, but also increases the cost of technological acquisition.[5] In fact,

[1] Economic development commonly refers to economic performance in terms of human development and the human development supplements economic development by incorporating social welfare considerations and of sustainable development. See details, Graham Dutfield and Uma Suthersanen, *Global Intellectual Property Law* (2008) 272.

[2] Agreement on Trade-Related Aspects of Intellectual Property Rights, 15 April 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 33 I.L.M. 1197 [hereinafter TRIPS Agreement].

[3] Gino Gancia and Fabrizio Zilibotti, 'Technological Change and the Wealth of Nations' (2009) 1 *Annual Review of Economics* 93.

[4] See Nagesh Kumar, 'Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries' (Study Paper 1b, Commission on Intellectual Property Rights, United Kingdom, 2002); Mark A Thompson and Francis W Rushing, 'An Empirical Analysis of the Impact of Patent Protection on Economic Growth: An Extension' (1999) *24 Journal of Economic Development* 1. They employ threshold regression techniques finding a threshold at an initial level of GDP of $3,400 (in 1980 dollars). For countries below this value there is no significant relationship between IPR protection and growth, but above, the relationship is positive and significant.

[5] Daniel Gervais, 'TRIPS 3.0: Policy Calibration and Innovation Displacement' in Chantal Thomas and Joel Trachtman (eds), *Developing Countries in the WTO Legal System* (2009) 391-392.

historical analysis suggests that such free use of technology/knowledge goods once helped today's developed countries to make economic progress.[6]

Furthermore, in return for the inconvenient obligations, the TRIPS does not provide for increased foreign direct investment (FDI) or trade in technology or knowledge goods that would aid LDCs and their economic welfare.[7] However, to alleviate the restriction on use of technology, the TRIPS allows for some flexibilities, including compulsory licenses or farmers' privileges of saving, re-sowing or exchanging seeds based on *ordre public*[8] and morality, as well as certain special and differential treatment in terms of an extended deadline for compliance and a promise of technology transfer.[9] Such exceptional treatment that legalizes informal technology and leads to follow-on innovations, holds some economic development prospects for LDCs, like Bangladesh. However, such development is placed in disencouraging circumstances, under a constant fear of economic sanctions, loss of market access and imposition of the TRIPS-plus obligations[10]. In addition, in apprehension of competition between developed and developing countries over low-cost manufacture and trade of pharma and agri goods, the TRIPS severly curtails development by requiring LDCs to fulfill prerequisites for availing themselves of the compulsory licensing-mechanism tailored for access to patented pharmaceuticals and supplying domestic and export markets, or of utilizing farmers' privileges in maintaining traditional farming practices.[11]

[6] Anil K Lal and Ronald W Clement, 'Economic Development In India: The Role Of Individual Enterprise (And Entrepreneurial Spirit)' (2005) 12(2) *Asia-Pacific Development Journal* 81.

[7] See Robert L Ostergard, 'Economic Growth and Intellectual Property Rights Protection: A Reassessment of the Conventional Wisdom' in Daniel J Gervais (ed), *Intellectual Property, Trade and Development* (2007) 115-55; William M Landes and Richard A Posner, *The Economic Structure of Intellectual Property Law* (2003) 413-15.

[8] The term '*ordre public*' is derived from French law. It is very difficult to translate it into English, and therefore the original French term is used in Article 27.2 of the TRIPS Agreement. It indicates concerns about matters threatening the social structures which bind a society together, i.e., matters that threaten the structure of civil society as such.

[9] Nagesh Kumar, 'Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries' (2003) 38(3) *Economic and Political Weekly* 209.

[10] TRIPS plus includes any new standards that restrict the ability of member countries to: 1) promote technological innovation and to facilitate the transfer and dissemination of technology; 2) take necessary measures to protect public health, nutrition and to promote the public interest in sectors of vital importance to their socio-economic and technological development; or, 3) take appropriate measures to prevent the abuse of intellectual property rights by right holders or the resort by right holders to practices which unreasonably restrain trade or adversely affect the international transfer of technology. As a result, the TRIPS plus concept covers both those activities aimed at increasing the level of protection for right holders beyond that which is given in the TRIPS. In addition, such measures reduce the scope or effectiveness of limitations on rights and exceptions under the TRIPS. See for details, Sisule F Musungu and Graham Dutfield, *Multilateral Agreements and a TRIPS-plus World: The World Intellectual Property Organization (WIPO)* (TRIPS Issues Paper 3, Quaker United Nations Office (QUNO), Geneva and Quaker International Affairs Programme (QIAP), Ottawa, 2003) <http://www.geneva.quno.info/pdf/WIPO(A4)final0304.pdf> 8 July 2010.

[11] M Rafiqul Islam, *International Trade Law of the WTO* (2006) 380.

Much has been written on the potential costs and benefits of the TRIPS protection for IPRs, particularly in developing countries, in terms of economic development determinants such as innovation and technology transfer. They express either critical or cautious views about the impact of the TRIPS on economic development, especially for LDCs.[12] Among them, a number of reports have either claimed that the TRIPS and the current trends in international intellectual property rule-making, are harmful for development or suggests that some aspects of them may be. Such reports are for example, the Human Development Reports of 1999, 2000, 2001 published by the United Nations Development Programme (UNDP)[13], another UNDP publication 'Making Global Trade Work for People,'[14] as well as the World Bank report 'Global Economic Prospects and the Developing Countries 2002'.[15]

Useful and high quality documentation has also been produced in support of developing countries in forums of Quaker United Nations Office, the South Centre, the International Centre for Trade and Sustainable Development (ICTSD) and United Nations Conference on Trade and Development (UNCTAD). Almost all of them invariably hold that the TRIPS 'one-size-fits-all' approach to harmonizing international IPRs makes little economic sense for developing and least developed countries.[16] These studies concur that countries, which have capacity for innovation or reverse-engineering, utilize the TRIPS rules and exception clauses as economy invigorating tools in order to manufacture and supply products at home and abroad. However, even these countries, as the documents suggest, need technology-transfer or other technology adaptation packages for their development. The suggested packages include forming

[12] Dutfield and Suthersanen, above n 1, 275.

[13] United Nations Development Programme, 'Human Development Report 1999' [hereinafter UNDP]. <http://hdr.undp.org/en/media/HDR_1999_EN.pdf> 10 July 2010; UNDP, 'Human Development Report 2000' <http://hdr.undp.org/en/media/hdr_2000_ch0.pdf> 10 July 2010; UNDP, 'Human Development Report 2001' <http://hdr.undp.org/en/media/completenew1.pdf> 10 July 2010.

[14] UNDP, 'Making Global Trade Work for People'

<http://content.undp.org/go/cms-service/stream/asset/;jsessionid=aJpGrJsxO-nd?asset_id=1948257> 10 July 2010.

[15] World Bank, 'Global Economic Prospects and the Developing Countries'

<http://siteresources.worldbank.org/INTGEP2002/Resources/gep2002complete.pdf> 10 July 2010.

[16] Sisule F Musungu, *Rethinking Innovation, Development and Intellectual Property in the UN, WIPO and Beyond* (2005) (TRIPS Issues Paper No. 5, Quaker International Affairs Programme) <http://www.qiap.ca/pages/documents/TRIPS53.pdf> 8 July 2010; Graham Dutfield and Uma Suthersanen, *Harmonisation or Differentiation in Intellectual Property Protection? The Lessons of History* (Occasional Paper 15, Quaker United Nations Office, Geneva, August 2004) <http://www.quno.org/geneva/pdf/economic/Occassional/Harmonisation-or-Differentiation.pdf> 8 July 2010; UNCTAD-ICTSD, *Resource Book on TRIPS and Development* (2005) 61-91; Sisule F Musungu et al., *Utilizing TRIPS Flexibilities for Public Health Protection Through South-South Regional Frameworks* (South Centre, Geneva 2004) <http://www.southcentre.org/publications/flexibilities/flexibilities.pdf> 8 July 2010.

common fund to initiate R&D and supply inputs to countries or supporting open sources of knowledge used in a product.[17]

There is also specific analysis on the TRIPS costs and benefits in pharmaceuticals and agriculture, for some newly industrialized countries (NICs) and developing countries, which endorse striking a balanced compromise between IPRs protection and development needs.[18] The study conducted by the United Kingdom government-sponsored Commission on Intellectual Property Rights is one of them. This study is perhaps the most thorough and widely-publicized study on the intellectual property-development nexus.[19] Its main argument is that due to different scientific and technological capacities and social and economic structures prevailing in developing countries, an optimal intellectual property system is bound to vary widely from country to country.[20] Consequently, while it appears that developing countries that have relatively advanced scientific and technological capacities, like India and China, may well benefit from high levels of IPRs protection in some areas, many other countries, like Bangladesh, Senegal or Niger, are likely not to do so.

For Bangladesh, it is not the TRIPS itself with the high protection for IPRs that would assist in achieving developmental objectives with innovation. Such protection measure would rather relegate the gradually rising pharmaceutical firms and seeds industry to low value added segments and hinder its economic development.[21] However, the protection measure conjoined with other factors such as market conditions, technology development policies, education etc. is likely to help such least developed economy gaining technology transfer by means of attracting FDI, licensing, joint ventures, material transfer agreements (MTA) and others, and the exception clauses would hold some economy stimulations especially in agriculture and pharmaceuticals with reverse engineering.[22]

In order to overcome concerns and give effect to the economic prospects of the TRIPS, this article offers policy recommendations to design a legal and infrastructural basis for this process in Bangladesh. With this goal in view, the study advances a model that attempts to extend IPRs protection, while meeting consumer needs and accommodating economic goals. Based on the

[17] Dutfield and Suthersanen, above n 1, 275-81; Gervais, above n 5, 363-393.

[18] For example, Anitha Ramanna, 'Intellectual Property Rights in South Asia: Opportunities and Constraints for Technology Transfer' in Suresh Chandra Babu and Asok Gulati (eds), *Economic Reforms and Food Security: The Impact of Trade and Technology in South Asia* (2005) 188-9.

[19] Ibid.

[20] Commission on Intellectual Property Rights, *Integrating Intellectual Property Rights and Development Policy* (2002), <http://www.iprcommission.org/papers/pdfs/final_report/CIPRfullfinal.pdf> 20 March 2010 [hereinafter CIPR].

[21] Ibid.

[22] Keith Maskus, 'The Role of Intellectual Property Rights in Encouraging Foreign Direct Investment and Technology Transfer' in C Fink and K Maskus (eds), *Intellectual Property and Development: Lessons from Recent Economic Research* (2005) 70-1.

reality of the TRIPS, a standard economic theory of IPRs, the benefit of hind-sight and previous empirical studies of IPRs regime-changes in some NICs and developing countries, this article recommends some legal and technological strategies for Bangladesh that best utilize the TRIPS rules, the TRIPS transitional period and its clauses regarding agriculture and pharmaceuticals. The recommendations are drafted with the broader goals of fulfilling subsistence needs, increasing exports and thus, ultimately creating and enhancing economic development. At the same time, this study urges Bangladesh and other LDCs to join the international coalition pressing for a rethink of the TRIPS due to its implications and seeking alternatives, like the inclusion of specific and binding technology-transfer arrangements in the TRIPS that takes into account the actual level of development of LDCs.

2. The Relationship between Intellectual Property Rights and Economic Development: Historical Analysis

The relationship between IPRs and economic development has been complicated since the beginning of international system for IPRs protection in the 19th century. Developed countries particularly Britain and America viewed intellectual property rights as an instrument for promoting economic development through innovation of technology and its formal transfer.[23] At the heart of the Anglo-American IPRs system is the belief that limited monopoly rights in the name of IPRs are necessary to promote creativity and innovation, to transfer innovated technology and thus to make economic development.[24] That belief is said to have based on the reward/justificatory theory and stamped with personality/privatisation of the property on achieving command over property/technology. The establishing of IPRs command over technology came in prevention of the then rampant informal technology diffusion through industrial espionage by countries such as France, Sweden, Norway, Denmark, the Netherlands, and Belgium.[25]

However, it is a fact that industrial espionage and inadequate protection of IPRs of foreign citizens helped previously most of the now-developed countries in freely accessing foreign technologies and causing improvements to them.[26] In addition, at that point of time, patent laws in most countries including Britain, the US, the Netherlands, Austria, and France were

[23] Ha-Joon Chang, *Globalisation, Economic Development and the Role of State* (2003) 278.

[24] Ramanna, above n 18, 188-9.

[25] For instance, in the 1950s, a former Manchester textile finisher and Jacobite office, John Holker, was appointed as Inspector General of Foreign Manufacturers in the French government. While also advising French producers on technological problems, his main activity under this euphemistic job title consisted of industrial espionage and suborning of British skilled workers. See J Harris, *Industrial espionage and Technology Transfer: Britain and France in the Eighteen Century* (1998) 21.

[26] Kumar, above n 4.

very lax on checking the originality of the invention and often explicitly allowed patenting of imported inventions by their nationals.[27] For example, in the US, before the 1836 restoration of the patent law, patents were granted without any proof of originality. This not only led to the patenting of imported technologies but also encouraged racketeers to engage in rent-seeking by patenting devices already in use and by demanding money from their users under threat of suits for IPRs infringement.[28]

With the introduction of such rent-seeking IPRs laws in an increasing number of national jurisdictions and their trade presence in international arena, the pressures for an international IPRs regime naturally started growing from the late-19th century. After several attempts, IPRs get codified in an international regime comprising of the Paris Convention for the Protection of Industrial Property (Paris Convention) and the Berne Convention for the Protection of Literary and Artistic Works (Berne Convention) paving the way for achieving economic development through innovation and guided technology transfer. However, with the ineffectiveness and flexibility of the IPRs protection regime due to shorter period of protection and limited scope, a private good turns public once a good has been supplied and it allows an individual to get access to it free of charge without reducing the availability of the good to other individuals. Such trend of public goods encouraging informal technology transfer assists individuals to easily copy the information. With taking on such option, even the most developed countries were routinely violating the IPRs of other countries' citizens well into the 20th century. For example, as late as in the late-19th century, Britain was in a great concern with its IPRs violation by Germany who was at that time about to technologically overtake Britain.[29]

The continuation of such trend of public goods encouraging informal technology transfer also helps some NICs to develop.[30] In fact, countries that possess reverse engineering capacity adopt the policy of freely using technology. For example, this free use-cum informal technology transfer brings in economic development to South Korea, Taiwan, Singapore, and Brazil in the pre-TRIPS era.[31] Countries like China, India, Argentina, Malaysia and others also make good use of such policy and become competitors to industrialized countries. In addition to appropriation of technologies, the favourable market conditions also enable these NICs or developing countries to attract FDI, and lead the economy to a progress. They believe a certain level of technology and capital requires before higher levels of IPRs will assist in development since they find that piracy of IPRs benefited many of the developed world earlier in promoting

[27] W A Dolfsma, 'IPRs, Technological Development, and Economic Development' (Research Paper ERS-2006-004-ORG, Erasmus Research Institute of Management (ERIM), Erasmus University, 2006).

[28] Ha-Joon, above n 23, 279.

[29] D Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* (1969) 328.

[30] Ha-Joon, above n 23, 281-2.

[31] Keith E Maskus and Jerome H Reichman, 'The Globalization of Private Knowledge Goods and the Privatization of Global Public Goods' (2004) 7(2) *Journal of International Economic Law* 279.

economic development. For this, many developing nations did not recognize patents on medicines and agriculture. However, most of the LDCs fail to grossly avail of the IPRs flexibility since they lack either the infrastructure necessary (e.g. presence of patents on medicines and agriculture) to engage in piracy or conditions that attract FDI, or capabilities/finance to afford technology and negotiation to press developed countries to transfer technology to them in consideration of development needs.[32]

As a way out to fulfil development needs in the existing context, developing countries that do not have R&D capacity to introduce innovation based economic development have long sought to use both national policies and international agreements to stimulate international technology transfer for making economic prosperity. They adopted national policies moving from the general, such as education and IPRs protection, to the specific, such as tax incentives for purchase of certain types of capital equipment. To this effect, various agreements are also furnished between countries but agreements regarding actions that governments should pursue to encourage international technology transfer are largely of a best-endeavour nature. So, there arises the necessity to have a binding international agreement.[33]

With the view to effectuate technology transfer in a binding international agreement, the first official attempt to challenge the Paris Convention-led IPRs regime for failing to meet the development needs of poor countries was made in 1961, when Brazil submitted a draft resolution co-sponsored by Bolivia to a committee of the United Nations (UN) General Assembly. The draft put forward various concerns including the access to knowledge and experience in science and technology that is often limited by patents and similar arrangements designed to protect the right of ownership and exploitation of investors of new processes, techniques and products. Brazil also requested the Secretary General to prepare a report especially containing an indication of possibility of revising IPRs legislation in accordance with principles of international law, with a view to permitting the rapid absorption of new products and techniques to accelerate the rate of economic development.[34]

The International Bureaus for Protection of Intellectual Property (BIRPI) and the International Chamber of Commerce (ICC) were alarmed by the tone of such initiatives which actually seek to shift deliberations on patent standard-setting to the UN General Assembly. In response, they lobbied for a radical change of the tone. This move came to a success with the General Assembly Resolution 1713(XVI) entitled 'The Role of Patents in the transfer of technology to

[32] Sanjaya Lall, 'Indicators of the Relative Importance of IPRs in Developing Countries' (Issue Paper No. 3, UNCTAD-ICTSD Project on Intellectual Property Rights and Sustainable Development, June 2003).

[33] Bernard M Hoekman, Keith E Maskus, and Kamal Saggi, 'Transfer of Technology to Developing Countries: Unilateral and Multilateral Policy Options' (2005) 33(10) *World Development* 1587.

[34] Ibid.

under-developed countries'.[35] The Resolution was much liked by both the ICC and BIRPI since it shifted the terms of reference of the requested Secretary General's report in a less patent-hostile direction.[36]

However, the patent hostility towards developing countries remained. This led the UN system to provide spaces for such dislike to be publicized. In 1964 when the first meeting of the UNCTAD was held, it adopted a Resolution recommending inter alia that:

> Developed countries should encourage the holders of patented and unpatented technology to facilitate the transfer of licenses, know-how, technical documentation, and in general to developing countries, including the financing of the procurement of licenses and related technology on favourable terms.[37]

The Resolution also calls for organizing additional facilities for information on and for the transfer of technical documentation and know–how within the UN framework in consultation with appropriate international organizations.[38]

In the same year, the UN Economic and Social Council adopted a Resolution. It concurred that access to knowledge and experience in the field of applied science and technology would facilitate the continued development of industrialization and international economic relations.[39]

In 1974, the UN General Assembly adopted two documents namely, the Declaration on the Establishment of a New International Economic Order and the Programme of Action on the Establishment of a New International economic Order.[40] However, neither dealt explicitly with intellectual property. They both covered technology transfer in ways that implied dissatisfaction with the international intellectual property regime for failing to contribute in this regard. Such ways appeared as a code of conduct for technology transfer and led to negotiations under the UNCTAD on a draft International Code of Conduct on Transfer of Technology. However, no final agreement could be reached.[41]

[35] United Nations General Assembly Resolution A/RES/1713(XVI) <http://daccess-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/167/66/IMG/NR016766.pdf?OpenElement> 8 July 2010.

[36] S P Ladas, *Patents, Trademarks, and Related Rights: National and International Protection* (1975) 171-4.

[37] United Nations Secretary General, 'The Role of Patents in the Transfer of Technology for Developing Countries' 1964 [Document E/3681].

[38] Dutfield and Suthersanen, above n 1, 272-80.

[39] Economic and Social Council Resolution 1027 (XXXVII), 13 July – 15 August 1964 <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/NR0/760/56/IMG/NR076056.pdf?OpenElement> 10 July 2010.

[40] General Assembly Resolution A/RES/S-6/3201 <http://www.un-documents.net/s6r3201.htm> 8 July 2010 and A/RES/S-6/3202 <http://www.un-documents.net/s6r3202.htm> 8 July 2010.

[41] Dutfield and Suthersanen, above n 1, 272-80.

A similar lack of consensus arose in the early 1980s from efforts by a group of developing countries (Group 77) at the World Intellectual Property Organization (WIPO) to revise the Paris Convention but it failed with opposition to such measures from many of the developed countries and also due to differences among the developing countries themselves.[42]

In order to break the deadlock, the TRIPS Agreement was adopted in 1995. It calls on countries to enforce comprehensive minimum standards of IPRs protection on a non-discriminatory basis. It also contains provisions relating to technology transfer, as discussed later in this article. In 2001, WTO members established a Working Group on Trade and Technology Transfer to examine the relationship between trade and technology transfer and explore ways to increase technology flows to developing countries in consideration of their development needs.[43]

However, the adoption of the TRIPS Agreement makes the relationship between IPRs and economoc development evermore complicated. This is because the TRIPS puts the policy cart before the empirical horse by equating the introduction of a TRIPS-compatible level of IPRs protection with an increase in trade and consequently economic development for all countries alike.[44] This equation seems flawed especially when measured in terms of welfare increases.[45] With the TRIPS in place, the scope, depth, and enforcement of IPRs is likely to differ between countries according to their economic and political institutions, and ability to engage in and disseminate the fruits of inventions.[46] In addition, the TRIPS underestimates the development needs of developing countries. This is because the development needs are based on IPRs-appropriation with the use of flexibilities. However, the TRIPS framework merely serves profiteering interests of developed countries and restricts less developed countries from their existing economy invigorating measures of flexibilities. One is reminded by Thomas Jefferson, who describes the treaty's sufficient flexibility in responding to the needs of a developing society as one of the most crucial elements for achieving growth.[47]

From the above discussion, it appears that in the pre-TRIPS era there has generally been an association between weak rather than strong forms of patent protection allowing informal

[42] Ibid.

[43] Ibid.

[44] WG Park and D Lippoldt, 'International Licensing and the Strengthening of Intellectual Property Rights in Developing Countries', (OECD document TD/TC/WP(2004)31/FINAL, 21 December 2004).

[45] C Fink and CA Primo Braga, 'How Stronger Protection of Intellectual Property Rights Affects International Trade Flows' in C Fink and Keith Maskus (eds), *Intellectual Property and Development: Lessons from Recent Economic Research* (2005) 19-37.

[46] La Croix and Konan, 'Have developing countries gained from the marriage between Trade Agreements and Intellectual Property Rights?' (Economics Working Paper No. 06-5, University of Hawaii – Manoa, 2006).

[47] Zorina Khan and Kenneth L Sokoloff, 'Historiacl Perspectives on Patent Systems in Economic Development' in Neil Weinstock Netanel (ed), *The Development Agendas: Global Intellectual Property and Developing Countries* (2009) 215-243.

technology transfer and economic development enabling countries to become significant producers of innovations and new technology as seen in Korea and India.[48] As the IPRs regimes strengthened, NICs and some developing countries coped up with and became champion in creation and trade of cheaper technology but developing and least developed countries felt for fine-tuning technology transfer provisions in the IPRs regimes. In line with the formative economic development history, Bangladesh follows largely the pursuit of informal technology transfer in absence of local R&D and technology access through FDI. However, until the 1970s and 1980s most of the economy relied on the traditional agricultural sector due to lack of human resources and scientific and technological infrastructure, and resulted in low levels of industrial development. With liberal economic policies introduced worldwide in 1990s, such state of petite development prompts an LDC like Bangladesh to have some dependence on foreign technology either through FDI or informal technology transfer i.e. copying and imitation of foreign technology as a good alternative tool for its economic development.[49] Policy reform was also initiated through Structural Adjustment Programs and Enhanced Structural Adjustment Programs that were initiated in 1982, 1985-1986 and then again in 1991-1992, which resulted in a unilateral trade liberalization of Bangladesh's economy.[50]

3. The Relationship between Intellectual Property Rights and Economic Development: Theoretical and Empirical Analysis

3.1 Theoretical Background

There are many theoretical and empirical studies determining the impact of IPRs on economic growth that leads to economic development.[51] However, only a few studies have been done for non-OECD (Organization for Economic Co-operation and Development) countries, particularly LDCs, mainly because of problems relating to the collection of data. Some studies are based on economic theory, while others are based on empirical research with country-

[48] Kumar, above n 4.

[49] Carlos M Correa, 'Pro-competitive Measures under TRIPs to Promote Technology Diffusion in Developing Countries' in Peter Drahos and Ruth Mayne (eds), *Global Intellectual Property Rights: Knowledge, Access and Development* (2002) 41.

[50] Padmashree Gehl Sampath, 'Intellectual Property and Innovation in Least Developed Countries: Pharmaceuticals, Agro-Processing and Textiles and RMG in Bangladesh' (Background Paper No. 9, The Least Developed Countries Report 2007, UNCTAD, Geneva, 2007); M A Hossain and MD Karunarathne, 'Export Response to the Reduction of Anti–export Bias: Empirics from Bangladesh' (Discussion Paper No. 303, School of Economics, The University of Queensland, Brisbane, 2002); C A F Dowlah, 'Bangladesh' in M D Ingco (ed), *Agriculture, Trade and the WTO in South Asia* (2003).

[51] Rod Falvey, Neil Foster, and David Greenaway, 'Intellectual Property Rights and Economic Growth' (2006) 10(4) *Review of Development Economics* 700; Walter G Park and Juan Carlos Ginarte, 'Intellectual Property Rights and Economic Growth' (1997) 15(3) *Contemporary Economic Policy* 51; D M Gould and W C Gruben, 'The Role of Intellectual Property Rights in Economic Growth' (1996) 48(2) *Journal of Development Economics* 323.

specific analysis. The economic studies proceed on the assumption that every country in trade with strong IPRs protection will benefit, and therefore, a positive relationship exists between strong IPRs and economic growth leading to development.[52] This assumption is based on the fact that IPRs in general contribute to economic development by ensuring rewards to innovators for bringing new technologies and products to market.[53] Based on the same hypothesis it is claimed that the hope of economic rewards coming out of strong IPRs persuades innovating countries to transfer technologies to developing and least developed countries.[54]

However, the economic benefit-argument, which developed countries use in trying to convince developing countries to adopt strong protection measures, seems based on unstable ground. First, adopting stronger IPRs regimes in developing and least-developed countries promotes the economic growth of developed countries, possibly to the detriment of the economic development of developing and least-developed countries.[55] Second, the evidence suggests that unless LDCs enhance the skill-level or absorptive capacity of domestic firms in improving their productivity[56] and contain IPRs in competition policies or make them responsive to taxes, trade practices, tariffs, or contract laws, strengthening IPRs to a certain extent offsets its growth-enhancing benefits, since it requires domestic firms to shift from imitation to innovation and to facilitate other activities with growth-enhancing technology spillovers.[57] However, empirical research shows that countries like Senegal and Niger, who have IPRs laws similar to those of developed countries and tend to protect foreign IPRs, still struggle in making economic progress and are not fulfilling consumption needs and economic goals. Yet, they face the 'development dilemma' by receiving political and economic threats for not protecting foreign IPRs and promoting others' economic growth.[58] Consequently, as the empirical evidence shows that for developing and least developed countries, IPRs monopolise subsistence goods, impede technology transfer, and restrict the country's comparative advantage in reverse-engineering,

[52] *Keith E Maskus, Intellectual Property Rights in the Global* Economy (2000) 150.

[53] Alireza Naghavi, 'Strategic Intellectual Property Rights Policy and North-South Technology Transfer' (2007) 143(1) *Review of World Economics* 55; Robert Sherwood, 'Some Things Cannot be Legislated' (2002) 10 *Cardozo Journal of International and Comparative Law* 37, 39-40; Keith Maskus, 'Intellectual Property Rights and Economic Development' (2000) 32 *Case Western Reserve Journal of International Law* 471.

[54] Gervais, above n 5, 391-392.

[55] Dov Greenbaum, 'Determining Optimal Levels of Intellectual Property Protection in Developing Nations: Is Less Really More? Is More Really Less?' (2009) 97(11) *Current Science* 1604.

[56] Daniel Gervais, 'The TRIPS Agreement and the Doha Round: History and Impact on Economic Development' in P K Yu (ed), *Intellectual Property and Information Wealth: Issues and Practices in Digital Age* (2007) 23- 72.

[57] Maskus and Reichman, above n 31, 279; James Boyle, 'A Manifesto on WIPO and the Future of Intellectual Property' [2004] *Duke Law and Technology Review* 0009.

[58] CIPR, above n 20; Anselm Kamperman Sanders, 'Intellectual Property Treaties and Development' in Daniel Gervais (ed), *Intellectual Property, Trade and Development: Strategies to Optimize Economic Development in a TRIPS Plus Era* (2007)157-70; Srividhya Ragavan, 'The Jekyll and Hyde Story of International Trade: The Supreme Court in PhRMA v Walsh and the TRIPS Agreement' (2004) 38 *University of Richmond Law Review* 777, 789.

with the consequence of putting off meeting consumption needs and increasing economic welfare.[59] In contrast, countries like South Korea, Taiwan, and Brazil have enhanced the absorptive capacity of their domestic firms improving their productivity by using a soft IPRs regime in the pre-TRIPS era, strengthened IPRs post-TRIPS to progress by accessing technology (transferred from developed countries), making inventions with minor adaptations of existing technologies, protecting these inventions from infringement, and hence encouraging domestic firms to increase investments and productivity. This method allowed them to finally change their status to NICs.[60]

It thus appears that IPRs protection help innovating western countries to make gradual economic progress, since IPRs in the name of patents, trademarks and trade secrets afford firms greater certainty that they will face only limited threats of uncompensated appropriation. This certainty induces them to trade and license their technologies and products more readily, enhancing their diffusion into the economy. Nevertheless, such security for investment through IPRs protection brings in economic insecurity for developing and least developed countries in fulfilling their development needs based mostly on IPRs- appropriation. This is because for countries at a lower level of development that cannot afford R&D or technology, IPRs protection is of no use in initiating innovation-based economic development. However, for them strengthening IPRs would benefit technology transfer-based economic development when they attain certain level of technology-absorption capacity and make small investments in small and medium enterprises (SMEs). And for protecting such investments against unfair competition and misappropriation, IPRs protection especially patent or trademark would be of a great necessity for them. Lack of such IPRs protection is likely to strangle their own technical change-based innovations, and thus hamper their creativity with patent or trademark infringement.[61] In addition, inadequate IPRs protection makes countries dependent on dynamically inefficient firms that rely on counterfeiting and imitation.[62] Such circumstances make developing and least developed countries with technology absorption capability (for example, Bangladesh) feeling obligated to have IPRs systems that favour information-diffusion

[59] Carlos M Correa, *Intellectual Property Rights, the WTO and Developing Countries: The TRIPS Agreement and Policy Options* 18-19; Mark Ritchie, Kristin Dawkins, and Mark Vallianatos, 'Intellectual Property Rights and Biodiversity: The Industrialization of Natural Resources and Traditional Knowledge' (1996) 11 *St. John's Journal of Legal Commentary* 431; Daryl Lim, 'Innovation and Access: Legal Strategies at the Intellectual Property Rights and Competition Law Interface' in Antoine Masson and Mary J Shariff (eds), *Legal Strategies: How Corporations Use Law to Improve Performance* (2010) 403-37.

[60] Carlos M Correa, 'Can the TRIPs Foster Technology Transfer to Developing Countries?' in Keith Maskus and Jerome H Reichman (eds), *International Public Goods and Transfer of Technology under a Globalised Intellectual Property Regime* (2005) 227-8. See also Kumar, above n 4.

[61] R Evenson and L Westphal, 'Technological Change and Technology Strategy' in J Behrman and T N Srinivasan (eds), *Handbook of Development Economics* (1995) 2209-2300.

[62] Maskus, above n 53, 479-81.

through low-cost acquisition of foreign products and technologies.[63] So, it appears that there exists relationship between IPRs and economic development and it is most likely dependent on the determinants of innovation and technology transfer.[64]

3.2. Innovation as a Determinant to Economic Development

In intellectual property-economic development nexus, innovation is but one ingredient of a complex recipe.[65] IPRs rules allow local consumers and industry gain lawful access to innovations i.e. knowledge products and services for making further innovations.[66] For example, through publication patent claims in innovations allow rival firms to use the information in them to imitate/develop further inventions.[67]

Insofar as developing countries are concerned, innovation for them often proceeds through imitation of foreign technology and products, which requires some technical skills, then modification or improvements of the technology.[68] Intellectual property rights play a significant role in encouraging such innovation, product development, and technical change by stimulating acquisition and dissemination of new information.[69] A recent paper by Chen and Puttitanun which made empirical research on a sample of 64 developing countries using panel data over the period 1975-2000 shows that domestic innovation in a country increases in its protection of IPRs and its level of development.[70] Two similar studies by Kanwar and World Bank also find that innovations proceeding through imitation of foreign technology and

[63] Ulrike Pokorski da Cunha, *Study on the Viability of High Quality Drugs Manufacturing in Bangladesh* (2007) 26-8 (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH commissioned by Federal Ministry for Economic Cooperation and Development, Eschborn , Germany 2007).

[64] Keith E Maskus, 'Intellectual Property Challenges for Developing Countries: An Economic Perspective' [2001] *University of Illinois Law Review* 457.

[65] The other drivers are trade, finance, migration and aid. See I Goldin and K Reinert, *Globalization for Development: Trade, Finance, Aid, Migration and Policy* (2007) 21-46; Samuel Adams, 'Globalization and Income Inequality: Implications for Intellectual Property Rights' (2008) 30 *Journal of Policy Modeling* 725.

[66] K Maskus, 'The Economics of Global Intellectual Property and Economic Development: A Survey' in Peter K Yu (ed), *Intellectual Property and Information Wealth: Issues and Practices in Digital Age* (2007) 158-86; Daniel Gervais, 'The TRIPS Agreement and the Doha Round: History and Impact on Economic Development' in Peter K Yu (ed), *Intellectual Property and Information Wealth: Issues and Practices in Digital Age* (2007) 23- 72.

[67] Yi Qian, 'Are National Patent Laws the Blossoming Rains? Evidence from Domestic Innovation, Technology Transfers, and Implementations in the Period 1978-2002' in Neil Weinstock Netanel (ed), *The Development Agendas: Global Intellectual Property and Developing Countries* (2009) 191-213.

[68] Adams, above n 65, 725.

[69] World Intellectual Property Organization, *Transfer of Technology* (2010) 4-9 (SCP/14/4, Standing Committee on the Law of Patents, Fourteenth Session, Geneva, 25-29 January 2010) <http://www.wipo.int/edocs/mdocs/scp/en/scp_14/scp_14_inf_2.pdf> 10 December 2010.

[70] Y Chen and T Puttitanun, 'Intellectual Property Rights and Innovation in Developing Countries' (2005) 78 *Journal of Developing Countries* 474.

products lead to an increase in agricultural or industrial production in less developed countries that could have positive effect on economic development.[71] However, for most of the least developed countries as far as economic development through innovation is concerned, there is no clear domestic economic benefit in maintaining strong IPRs protection for innovation since they lack R&D to promote innovation.[72]

Nevertheless, in an LDC like Bangladesh who can afford a little technology and possess some absorption capacity, IPRs especially trademark protection is likely to encourage innovation through product development and opening of small and medium enterprises (SMEs) including ready-made garments (RMG), or benefits pharmaceutical generic manufacturers. In Bangladesh, the RMG industry claims to have a strong interest in designing apparel of high quality and style targeting European and North-American markets. With the strong enforcement of trademark laws, this sector is likely to create further competition among entrepreneurs with quality product, creation of broader markets, earning foreign currency, and furthering the country's economic development. Trademark protection also carries prospects in the food products sector, where legitimate firms would flourish with the assurance that rivals will not be passing off consumer goods, such as soft drinks (coconut drink), processed foods (shrimps, chutneys, sauces) and spices under their trademarks. Related prospects are also therein with innovative producers in the cosmetics, pharmaceuticals, leather, ceramics, and metal products sectors. Thus, IPRs especially trademark protection is likely to hold bright prospects for SMEs with local product development and establishment of new enterprises if they are not muffled by infringement with lower quality and loss of reputation.

In addition, Bangladesh possesses lively copyright industries including publishing, entertainment comprising of film, television, and music, and software. However, weak protection and enforcement, lower-quality copies are widely available and hampering the economy's domestic cultural and technological development.[73] With strong protection of copyright, there could be more innovative writers, film producers, musicians, and software industries whose creations could successfully be exported to neighbouring economies or in developed economies where expatriate people are living.

[71] Sunil Kanwar, 'Intellectual Property Protection and Technology Transfer: Evidence From US Multinationals' (Economics Working Paper Series 2007-05, Department of Economics, University of California at San Diego, 2007); World Bank, *World Development Indicators* (2005)

<http://devdata.worldbank.org/wdi2005/Cover.htm> 10 July 2010.

[72] Maskus, above n 53, 479-81.

[73] International Intellectual Property Alliance, '2007 Special 301: Bangladesh' (12 February 2007) 202; <ww.iipa.com/rbc/2007/2007SPEC301BANGLADESH.pdf> at 19 November 2007.

3.3. Technology Transfer as a Determinant to Economic Development

3.3.1 Theoretical Background

The relationship between IPRs and economic development through the determinant of technology transfer is ambiguous in theory and depends on a country's circumstances. In theory, IPRs can play a positive role in knowledge diffusion, since the information available in patent claims is available to other potential inventors. In addition, strong IPRs protection may encourage technology transfer in the process by which a firm in one country gains access to and employs technology developed in another country. For this, the IPRs-consistent technology transfer from countries at the technological frontier is considered to be one of the main potential benefits of the IPRs system and an essential economic development determinant along with market liberalization and deregulation, technology development policies and competition regimes, and a low level of corruption, particularly for developing countries that tend not to innovate significantly.[74] This theoretical claim that strengthening IPRs increases the transfer of technology by MNCs to reforming countries is tested in a study by Branstetter et al. who use affiliate level data on the United States' (US) MNCs and aggregate patent data. The results suggest that technology transfer is higher following IPR reforms, with an increase in technology transfer, as measured by intra-firm royalty payments from parent firms to affiliates located in IPRs reforming countries.[75] However, such theoretical and country specific prospects appear to be a misfit for LDCs since stronger IPRs protection can also restrict the diffusion of technology, with patents preventing others from using proprietary knowledge and the increased market power of IPRs holders potentially reducing the dissemination of knowledge due to lower output and higher prices in LDCs.[76]

Now it stands that the IPRs-consistent technology transfer brings in economic benefits either to transferors or transferees or both. With such traits in place, international technology transfer occurs sometimes between willing partners in formal transactions, but much comes through non-market transactions or spillovers i.e. informal channels. Formal technology transfer takes place by trade in goods and services, with imports of goods having the potential to formally transfer knowledge through reverse engineering, but also through the cross-border learning of

[74] Rod Falvey and Neil foster, 'The Role of Intellectual Property Rights in Technology Transfer and Economic Growth: Theory and Evidence' (Working Paper, United Nations Industrial Development Organizations, Vienna, 2006, 23-4) [hereinafter UNIDO].

[75] Lee Branstetter, Raymond Fisman, and C Fritz Foley, 'Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from U.S. Firm-Level Panel Data' (2006) 121(1) *Quarterly Journal of Economics* 321.

[76] Daniel Chow, 'The Role of Intellectual Property in Promoting International Trade and Foreign Direct Investment' in Peter K. Yu (ed), *Intellectual Property and Information Wealth: Issues and Practices in the Digital Age* (2007) 187-200. IP promotes all four channels of trade – goods, services, technology transfer and FDI. China is a different case because of its, size, resources and influence.

production methods, product design, organizational structure and market conditions.[77] Another formal channel is FDI, inward FDI in particular, with MNCs expected to deploy advanced technology to their subsidiaries that may be diffused to host-country firms.[78] Licensing, which is a further means of technology diffusion involves the purchase of production and distribution rights for a product and the knowledge required to make effective use of these rights.[79] The movement of skilled workers across borders can also act as a formal channel for international technology diffusion.[80] The non-market channels include imitation, the movement of personnel from one firm to another taking with them specific knowledge of their original firm's technologies, data in patent applications and the temporary migration of people such as scientists and students to universities and research institutes in advanced countries.[81] With the aim to maximise economic benefits out of technology, IPRs-consistent standards come into play for technology diffusion and encourage technology transfer in the way of international trade, FDI, licensing, and joint venture in almost all fields of technology for a country.[82]

3.3.2. International Trade/Imports

With the security of investment in products, IPRs protection leads significantly to higher trade or import flows of IPRs-sensitive goods, services or inputs to a country.[83] However, it is often found that MNCs do not base their export decisions on IPRs in the poorest countries since such countries have the weakest local threats of imitation and reverse engineering.[84] Usually, on taking imports or trade, local consumers and industries in countries with technology absorption capacity gain lawful access to those products and services. The access to foreign inputs and technology goods enables local industries to reverse engineer the imported products and learn from them, or enable the imported equipment to impart advanced techniques with aim to increase the productivity and may result in welfare gains for importing countries.[85] However, the welfare gains vary by country, being greater in countries with stronger absorptive capacities

[77] Michael Blakeney, 'A Critical Analysis of the TRIPS Agreement' in Meir Perez Pugatch (ed), *The Intellectual Property Debate: Perspectives from Law, Economics and Political Economy* (2006) 17-32.

[78] UNIDO, above n 74, 23-4.

[79] Ibid.

[80] Ibid.

[81] Ibid.

[82] Joseph Straus, 'The Impact of the New World Order on Economic Development: The Role of Intellectual Property Rights System' (2007) 15(1) *European Review* 47-63; Chow, above n 76, 187-200; Maskus, above n 22, 70-71.

[83] UNIDO, above n 74, 29.

[84] C Fink and Keith E Maskus, 'Why We Study Intellectual Property Rights and What We Have Learned' in Carsten Fink and Keith E Maskus (eds), *Intellectual Property and Development: Lessons from Recent* Economic Research (2005) 1-15.

[85] Jonathan Eaton and Samuel Kortum, 'Innovation, Diffusion, and Trade' (NBER Working Papers Series no. 12385; Cambridge: National Bureau of Economic Research, 2006).

(as measured by the level of local education attainment and research and development investments).[86] In addition, increased trade flows may lead to new jobs in distributorships and their retail sector although these are likely to be low-skilled, low-paying positions. There also may be significant gains in terms of product quality and reliability, most notably in the area of high tech industries like pharmaceuticals although high tech firms may decide to serve foreign markets through FDI and licensing, so that exports in such industries may be little affected by variations in the degree of IPRs protection.[87] This may also however lead to price increases especially when goods whose status changes to pirate or counterfeit after the introduction of IPRs protection are displaced by genuine goods sold at a higher price.[88] Furthermore, while stronger IPRs protection may increase imports of high-tech goods, it also increases imports of low-tech consumer goods and may lead to the decline of indigenous industries relying on informal technology transfer especially imitation.[89]

3.3.3. Foreign Direct Investment

IPRs protection is now-a-days considered as a pre-condition for FDI. Economic analysis also shows that sufficient IPRs protection is an essential component of increased inward FDI and trade flows in IPRs-sensitive goods for countries cherishing to make economic development since the IPRs-initiated FDI brings in investment securities for IPRs-owning countries through effective rent payments.[90] FDI transfers technology from the parent firm to the subsidiary or through labour mobility between subsidiaries and domestic enterprises or through vertical FDI where different plants produce products that can be used by the plant above it as an input to their product,[91] and helps technological goods produced by subsidiaries to find uses locally or creates jobs boosting the local economy.[92] In addition, such transfers help recipient countries develop their own capacity to export high-tech goods and learn-by-exporting.[93] However, most of

[86] Ram C Acharya and Wolfgang Keller, 'Technology Transfer through Imports' (NBER Working Papers 13086, National Bureau of Economic Research, Inc 2007).

[87] UNIDO, above n 74, 29.

[88] Ibid.

[89] Ibid.

[90] Gene Grossman and Edwin L.-C Lai, 'International Protection of Intellectual Property' (2004) 94(5) *American Economic Review* 1635; W G Park and D Lippoldt, 'International Licensing and the Strengthening of Intellectual Property Rights in Developing Countries during the 1990s' (2005) 40 *OECD Economic Studies* 7. See also Michele Boldrin and David K.Levine, *Against Intellectual Monopoly* (2008) 42-64. They recognise the need for innovators to be rewarded and to have the right of sale with regard to their ideas. However, they challenge the right to regulate the use of innovations after their sale, they first sell their ideas.

[91] CA Primo Braga and C Fink, 'The Relationship between Intellectual Property and Foreign Direct Investment' (1998) 9 *Duke Journal of Comparative and International Law* 163, 172-3.

[92] Gervais, above n 5, 376.

[93] B Hoekman and B S Javorcik (eds), *Global Integration and Technology Transfer* (2007) 118-20.

the studies conducted so far show that such countries require a minimum economic development threshold, technology absorption capacity and large market conditions.[94]

Despite the role of IPRs in attracting FDI and ultimately following-on innovations, required with other components for economic development, some studies illustrate IPRs as technology transfer obstacle since MNCs are often likely to avoid transfer of their technology through FDI on the ground of having not strong enough IPRs therein, in spite of these countries' efforts in paying costs for technology.[95] To test this assumption, Smarzynska examines 24 transition economies and finds that weak IPRs regimes deter FDI in high-tech sectors (i.e. drugs, cosmetics and health-care products, chemicals, machinery and equipment and electrical equipment) with some evidence suggesting that FDI is deterred in other industries too.[96] In 14 countries surveyed, Lee and Mansfield find stronger evidence that the strength of IPRs affects the volume and composition of the US MNCs' FDI decisions in host countries.[97] However, it is also found in other studies that IPRs play less of a role in high-tech industries due to the difficulty in imitating these industries' products, while in low-tech industries other factors may be more important in determining FDI flows.[98]

Having realized the role of FDI in economic development, government officials from a range of economies have pointed to strengthened IPRs as a floorboard in their strategies to enhance FDI inflows and trade.[99] For example, experts in some poor developing countries have seen the institution of trademark protection as a vehicle for reassuring investors in manufacturing industries that they can combat knock-offs. For wealthier countries, enhancement of IPRs may be seen as a means to draw in high technology that can boost worker productivity and contribute to intensification of growth.[100] This realization is reflected in the empirical research of Qian who analyses a sample of 92 countries from 1978 to 2002. She finds technology transfer primarily proxied by FDI establishments and the subsidiaries established by MNCs in the country of interest as the most successful IPRs-driven economic development component.[101]

[94] Robert Wade, *Governing the Market* (2nd ed, 2003) 268-9; Thomas Cottier, 'From Progressive Liberalization to Progressive Regulation in WTO Law' (2006) 9 *Journal of International Economic Law* 779, 802; P O Goldsmith, D K Nauriyal and W Peng, 'Seed Biotechnology, Intellectual Property and Agricultural Competitiveness' in Jay P Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (2007) 19-37; Maskus, above n 22, 70-1.

[95] Grossman and Lai, above n 90, 1635; Carsten Vogel, 'The Impact and the Implications of TRIPs in a Knowledge-based Global Economy: A Developing Country's Perspective' (2006) 2(1) *Asia-Pacific Trade and Investment Review* 47.

[96] Beata Smarzynska Javorcik, 'The Composition of Foreign Direct Investment and Protection of Intellectual Property Rights: Evidence from Transition Economies' (2004) 48(1) *European Economic Review* 39.

[97] Jeong-Yeon Lee and Edwin Mansfield, 'Intellectual Property Protection and U.S. Foreign Direct Investment' (1996) 78(2) *Review of Economics and Statistics* 181.

[98] UNIDO, above n 74, 32-3.

[99] Ibid.

[100] Ibid.

[101] Qian, above n 67, 191-213.

However, in a recent analysis of the FDI component and its relation to IPRs, Professor Yu shows on China that the growth of FDI does not seem to be correlated to increases in the level of intellectual property protection or political reforms. This suggests that in some cases at least, there are considerations of geopolitical realities that trump intellectual property concerns.[102]

3.3.4. Licensing

IPRs protection increases licensing since MNCs are mostly unwilling or hesitant to license their high-tech technologies to unaffiliated firms in countries with weak patent rights.[103] A study demonstrates that IPRs protection brings widespread licensing of new technologies in Japan and helps it to improve its system of utility models, which contributed positively and significantly to its post war rise to productivity.[104] However, studies also show that when MNCs license their technologies to unaffiliated firms in countries with weak patent rights, they are very often found to charge excessive fees in security of their investments in R&D.[105] Such higher fees may lead to price increases of products making them inconsumable for the LDCs people. In addition, an increase in IPRs strength in these countries, while reducing the risk of imitation slightly, would also increase the monopoly power of the licensor.[106]

There are other ways of technology transfer like joint ventures which combine many of the properties of FDI and licensing and hence will also involve technology transfer. In such a case IPRs is an issue with other factors of market conditions.[107]

From the discussion above, it appears that IPRs can directly stimulate local innovations as well as indirectly encourage the transfer of technologies that foster local innovations. For most developed countries, strengthening IPRs raises growth at least partly, due to increased innovation and technology dissemination. However, for developing and least developed countries as the evidence suggests there needs initially some weak IPRs system that helps these countries to shift from imitation to innovation. The development experience of India is an example where weak IPRs protection helps it in building up local capabilities in

[102] Peter K Yu, 'Intellectual Property, Economic Development and the China Puzzle' in Daniel Gervais *Intellectual Property, Trade and Development: Strategies to Optimize Economic Development in a TRIPS Plus Era* (2007) 173- 220.

[103] Edwin Mansfield, 'Intellectual Property Protection, Foreign Direct Investment and Technology Transfer' (IFC Discussion Paper 19, The World Bank, 1994).

[104] K Maskus and Christine R McDaniel, 'Impacts of the Japanese Patent System on Productivity Growth' (1999) 11 *Japan and World Economy* 557.

[105] Guifang Yang and Keith E Maskus, 'Intellectual Property Rights and Licensing: An Econometric Investigation' (2001) 137 *Weltwirtschaftliches Archiv* 58.

[106] UNIDO, above n 74, 34.

[107] Ibid, 40; Dermot Leahy and Alireza Naghavi, 'Intellectual Property Rights and Entry into a Foreign Market: FDI versus Joint Ventures' (2010) 18(4) *Review of International Economics* 633.

pharmaceuticals.[108] However, it is also evident in some cases that stronger IPRs protection encourages foreign firms to transfer technology in LDCs since most LDCs will not have significant imitative or innovative capability in the near future.[109]

In the age of global trade, the costs and benefits arising out of the relation between intellectual property rights and economic development demand much attention for an LDC like Bangladesh.[110] Previously, the economic development in Bangladesh largely depends on traditional agriculture and trading and services of products chiefly reverse-engineered of low technologies informally acquired. And, for economic development through innovations, Bangladesh does not have in fact sustainable R&D infrastructure in the most fields of technology or to a great extent it cannot afford the cost of formal technology transfer by way of licensing for follow-on innovations or reverse engineering.[111] Such stumpy economic progress disjointed with technology does not necessitate Bangladesh to take up the challenge of merging intellectual property rights with economic development. However, being included in the outskirt of trade liberalization, Bangladesh intends to achieve economic development entering others' market with its products and opening its market especially for foreign direct investment by lowering tariffs, removing trade restrictions, granting privileges to FDI and enforcing IPRs.[112] However, such aspirations of achieving economic development put an LDC like Bangladesh in the obligations of protecting others' intellectual property rights, not for exclusively protecting its own economic interests.[113]

[108] UNIDO, Ibid.

[109] Ibid.

[110] Yong-Shik Lee, 'Economic Development and the World Trade Organization: Proposal for the Agreement on Development Facilitation and the Council for Trade and Development in the WTO' in Chantal Thomas and Joel Trachtman (eds), *Developing Countries in the WTO Legal System* (2009) 291-319.

[111] e.g. UNDP, *Human Development Report 2000* (2000) 84. It notes that 'Developing countries have little to gain from the stronger patent protection from the TRIPS agreement because they have little research and development capacity. Research and development for a new drug is estimated to cost around $150–200 million, but no developing country has a pharmaceutical sales volume of even $400 million. There is little evidence so far that patent protection has stimulated research and development in or for poor countries or that it offers the potential to do so.'

[112] Adams, above n 65, 725.

[113] Gervais, above n 5, 371.

4. TRIPS Agreement and Economic Development: Implications and Challenges

4.1 Theoretical Background

Being lagged behind developing countries in terms of competition in cheaper technology trade, industrialised countries claim that free-riding discourages industry to invest in goods, and leads to underproduction of innovative commodities. This logic has also been extended to suggest that industry would not invest in countries where IPRs protection was weak. Subsequently due to strong lobbying from developed country industries, the TRIPS Agreement appears with extensive IPRs protection and lays down the ground rules for what must be protected by some kind of intellectual property right including plant varieties and pharmaceuticals.[114] This standard-setting streamlines the use and licensing of technology and trademarks to independent firms, subsidiaries and joint ventures[115] and is believed to secure the IPRs owners' rent-seeking interests.[116] The TRIPS also incorporates some disjointed technology use or transfer provisions in Articles 7, 8, 24, and 66.2 on the face of huge resentment over streamlining of IPRs. However, such standardarisation of technology transfer provisions holds monopolised approach and restricts developing and least developed countries' use, reverse engineering or imitation and adaptation of patented technologies to develop new technology and thus leading to less competition and thus innovation.[117]

This dubious role of the TRIPS itself in technology transfer questions the promotion of economic development objective as inserted in the TRIPS Preamble and in the body especially for a developing or least developed country. For its protective approach in relation to subsistence goods with the extent and duration of IPRs protection, some commentators are of the opinion that the TRIPS Agreement keeps up fused relationships with economic development insofar as investments interests of developed countries are secured and developmental needs of developing and least developed countries are concerned.[118] There are other commentators who describe the relation as frustrating for the economic developmental objectives as enunciated in the neo-liberalising WTO due to the TRIPS' monopolised and competition fearing attitude as regards technology and its dissemination to least developed countries.[119] Commentators like Jerome Reichman finds the TRIPS friendly with innovating

[114] Dutfield and Suthersanen, above n 1, 272 -77.

[115] TRIPS Agreement, Articles 7, 8, 27.2 and 66.2.

[116] Derek Eaton, 'Intellectual Property Rights in Plant Breeding and Biotechnology: A Comparative Institutional Analysis' (Paper prepared for the 11th Annual Conference of the International Society for New Institutional Economics (ISNIE), Reykjavik, Iceland, 21-23 June, 2007).

[117] TRIPS Agreement Articles 7-8, 66.2.

[118] Maskus, above n 64, 457.

[119] Cameron Hutchison, 'Does TRIPS Facilitate or Impede Climate Change Technology Transfer into Developing Countries?' (2006) 3(2) *University of Ottawa Law & Technology Journal* 517.

countries' economy uplifting but at the same time terms this trend as one-sided drive to re-regulate the worldwide economy from an uneven position between developing and developed countries since the streamlining of technology use and its diffusion leads to less innovation and consequently hinders global economic development in the long run.[120]

From the discussion above, it appears that the TRIPS role in driving economic development is assessed through the economic development variables of innovation and technology transfer.

4.2. Strengthening IPRs in the TRIPS and Innovation based Economic Development

The main argument for strengthening IPRs in the TRIPS is to provide better conditions for appropriability of innovations. Evidence shows that strengthening IPRs improves prospects for innovative enterprises in developing nations to develop new products and enter markets.[121] However, evidence also shows that the TRIPS encourages domestic innovation in countries having significant domestic capacity for innovation and development but it has little impact on innovation in countries with a small innovative capacity.[122] In addition, strengthening IPRs particularly patent protection varies from industry to industry and is most effective only in chemical and pharmaceutical industries.[123] In a study, Mansfield shows that around 65 per cent of pharmaceutical and 30 per cent of chemical inventions would not have taken place but for patent protection. And such inventions could take place in developed countries that invested in R&D, and strengthening IPRs protection could help these countries to promote their economic development.[124] However, a number of studies conducted in developing countries empirically demonstrates that pharmaceutical and biotechnological patents or trade-secrets protection could affect much of the R&D activity which is of an adaptive nature and raise imitation or follow-on innovation costs for the use of new technologies, with the bulk of those costs being transferred to foreign patent owners as economic rents (profits), and place considerable pressures on imitative and innovative enterprises in developing economies causing significant drop in the number of inventions.[125] For example, the number of global patents

[120] Jerome H Reichman, 'Nurturing A Transnational System of Innovation' (2007) 16(2) *Journal of Transnational Law and Policy* 143.

[121] Maskus, above n 52, 143-170.

[122] Gould and Gruben, above n 51, 323.

[123] Ibid.

[124] Mansfield, above n 103.

[125] R Basant and B Fikkert, ` Impact of R&D, Foreign Technology Purchase and Technology Spillovers on Indian Industrial Productivity: Some Estimates' (Working Paper no.11, Institute for New Technologies, United Nations University Masstricht, (1993). It suggests that a 'weak patent regime may allow spillovers simultaneously to promote R&D and to have a positive direct effect on productivity' and concluded that the adoption of a 'stronger patent regime may not be optimal from either the short- or long-run perspectives'. See also A Kumari, 'Productivity Growth in Indian Engineering Industries during Pre-Reform and Post-Reform Period: An Analysis at Company Level' (Institute of Economic Growth, Delhi, (2000).

originating in the 50 countries identified by the UN as LDCs has dropped from an average of 66 per year in the early 1990s to just 10 per year between 2000 and 2004.[126] Incidentally, the US net surplus of royalties and fees increased from US$14 billion in 1991 to US$22 billion in 2001, while developing countries suffered a deficit of nearly US$7.5 billion in 1999 alone.[127] So, for innovation based economic development in developing countries, softer regime rather than the TRIPS appears to be helpful. The study by Kumar and Saqib supports this statement when it finds Indian chemical industry enterprises to be among the more innovative ones in the Indian industry. And they attribute this to the weak patent laws viz. absence of product patents in India which enabled Indian enterprises to undertake alternative process development.[128] In another study, Haksar finds that the return to R&D in pharmaceutical industry particularly large and explains it to be possible since the development of alternative processes of known drugs takes place in absence of patents on pharmaceutical products. [129]

So, it appears that the role of strengthening IPRs as a determinant of innovative activity in developing countries is quite weak. In fact, stronger IPRs may actually affect the innovative activity adversely by chocking the absorption of knowledge spillovers that are important determinants of innovative activity. Mazzoleni and Nelson conduct a survey of theoretical and empirical studies and conclude that 'there is reason for concern that the present movement towards stronger patent protection may hinder rather than stimulate technological and economic progress.'[130]

4.3. Strengthening IPRs in the TRIPS and Technology Transfer based Economic Development

The TRIPS being included in the WTO's free trade scheme of market liberalisation urges members to benefit out of trade in IPRs goods. It asks members especially IPRs-using developing countries to strengthen IPRs with the aim to incentivising developed countries' investments in IPRs goods. In return, the Agreement calls upon innovating developed countries to transfer their technology either through FDI, trade or licensing to developing country users for reaching production, raising product quality or adaptation to local circumstances leading to fulfilment of consumption needs and economic goals.[131] Such strengthening of IPRs-led

[126] UNCTAD, *Trade and Development Report,* 2007 (2007) 62.

[127] Adams, above n 65, 725.

[128] Nagesh Kumar and Mohammed Saqib, 'Firm Size, Opportunities for Adaptation and In-House R&D Activity in Developing Countries: The Case of Indian Manufacturing' (1996) 25 (5) *Research Policy* 712.

[129] Haksar, Vikram, 'Externalities, Growth and Technology Transfer: Application to the Indian Manufacturing Sector, 1975-90' (International Monetary Fund, Washington DC, 1995)

[130] Roberto Mazzoleni and Richard R Nelson, 'The Benefits and Costs of Strong Patent Protection: A Contribution to the Current Debate' (1998) 27(3) *Research Policy* 273.

[131] Alireza Naghavi, above n 53, 55.

technology transfer appears as economy enhancing not only for developing countries acting as a source of total factor productivity improvement and contributing to growth but also for innovative countries increasing the technology trade or licensing in goods, brand and brand names.

To benefit mutually out of trade in IPRs goods, the TRIPS makes explicit the signatories' intention to promote economic development as part of the general objectives of the Agreement by strengthening IPRs and facilitating technology transfer. For example, Article 7 includes a corresponding reference:

> The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.

In addition, depicting patent rights, Article 28.2 of the Agreement provides for a mechanism for rights holders to transfer their property for use by others: 'Patent owners shall also have the right to assign, or transfer by succession, the patent and to conclude licensing contracts.'

The Agreement also includes provisions preventing abuses that would limit technology transfer. For example, Article 8.2 states the principle that:

> Appropriate measures, provided that they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology.

Article 40 sticks on control of anti-competitive practices in contractual licences, specifying the approach to dealing with this issue, beginning with the following point of understanding:

> Members agree that some licensing practices or conditions pertaining to intellectual property rights which restrain competition may have adverse effects on trade and may impede the transfer and dissemination of technology.

Article 66.2 incentivises technology transfer from developed countries to LDCs:

> Developed country Members shall provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least-developed country Members in order to enable them to create a sound and viable technological base.

For the implementation of Article 66.2, ministers issued a decision at the WTO Ministerial Conference in Doha in November 2001:

> Reaffirming that the provisions of Article 66.2 of the TRIPS Agreement are mandatory, it is agreed that the TRIPS Council shall put in place a mechanism for ensuring the

> monitoring and full implementation of the obligations in question. To this end, developed-country members shall submit prior to the end of 2002 detailed reports on the functioning in practice of the incentives provided to their enterprises for the transfer of technology in pursuance of their commitments under Article 66.2. These submissions shall be subject to a review in the TRIPS Council and information shall be updated by Members annually.[132]

Furthermore, in its Decision of 19 February 2003, the TRIPS Council puts in place the reporting mechanism asking developed countries to submit annual reports on their actions in relation to Article 66.2.[133] However, a review of such annual reports at the October 2006 meeting of the TRIPS Council finds continuing divergence between some developed and developing countries in the interpretation of Article 66.2. The minutes from this meeting and other Council documents highlight differences with respect to the definition of technology transfer, the ability to measure technology transfer and the role of both developed and developing countries under the Agreement, among other issues.[134] For example, whether technical assistance related to implementation of the TRIPS Agreement can be considered as contributing to satisfaction of Article 66.2 gives rise to a debate.[135]

Another significant step was taken at the 2007 G8 summit, at which the 'Heiligendamm Process' was agreed with the launching 'a new form of co-operation'.[136] It aims 'to achieve tangible results within two years'.[137] The summit included a dialogue between the G8 and the so-called 'Outreach 5' (or 'O5') countries, namely Brazil, China, India, Mexico and South Africa. According to the programme of the Summit:

> The planned topics for the Heiligendamm Process are also to be ''innovation'' and ''technology co-operations''. The G8 countries are to share their know-how with the emerging economies especially when it comes to energy efficiency. At the same time, agreement is to be reached on more effective international property rights: protection against replicated machines, copied brand products and counterfeit medications.[138]

[132] WTO document WT/MIN(01)/17, para 11.2.

[133] WTO document IP/C/28.

[134] WTO document IP/C/M/52.

[135] Discussions on Implementation Of Recommendations on Technology Transfer at the Fourth Session of the CDIP held from November 16 To 20, 2009 (extracted from CDIP/4/14 Prov.).

<http://www.wipo.int/edocs/mdocs/mdocs/en/cdip_4/cdip_4_14_discussions.pdf > 10 July 2010.

[136] Daniel Gervais, '(Re)implementing the Agreement on Trade-Related Aspects of Intellectual Property Rights to Foster Innovation' (2009) 12(5) *Journal of World Intellectual Property* 348.

[137] German Federal Government, 'G8 Summit 2007: The Heiligendamm Process' (Press release) <http://www.g-8.de/nn_92160/Content/EN/Artikel/__g8-summit/2007-06-08-heiligendamm-prozess__en.htmli/> 10 July 2010.

[138] German Federal Government, 'G8 Summit 2007: Breakthrough on Climate Protection' (Press release) <http://www.g-8.de/nn_92160/Content/EN/Artikel/__g8-summit/2007-06-07-g8-klimaschutz__en.htmli> 10 July 2010.

In addition to the general objective of promoting innovation and the transfer and dissemination of new technology referred to earlier (Article 7), the TRIPS also contains some specific requirements for developed country members to provide incentives for technology transfer to least developed countries. For example, the disclosure requirement of a patent application (that is, that applicants disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art) is one of them. This provision helps for the transfer of and access to technology by providing information readily about from whom the technology can be obtained for the duration of the patent term or the information when the disclosed invention falls into the public domain and is freely available to all at the patent expiry or by enabling the experimental use of an invention in the name of 'limited exceptions' to the patent rights under Article 30.[139]

The TRIPS Agreement also allows for cases where, if technology (whether patented or not) is in the control of a government, that government is free to transfer the technology on concessional terms if it so wishes. Similarly, there is nothing in the TRIPS, which would prevent a government or international financial institution from providing financial assistance to permit the voluntary transfer of privately-held proprietary technology on concessional terms.[140]

Such initiatives to transfer technology within the strengthened IPRs framework of the TRIPS is likely to promote economic development for developed countries with ensured rents and facilitating technology transfer to help developing countries for follow-on innovations making economic progress to them through domestic consumption and exports. However, evidence also shows that technology transfer can have a significant impact on economic growth leading to economic development once a country has reached a certain level of development, as measured by initial GDP per capita.[141] For this Thompson and Rushing employ threshold regression techniques finding a threshold at an initial level of GDP of US$3,400.[142] For countries below this value, Falvey and foster find no significant relationship between IPRs-based technology transfer and growth, but above, the relationship is positive and significant.[143]

To resolve such dilemma, developing countries have made proposals at the WTO and WIPO citing issues in relation to their economic development in the TRIPS context. Forums like Quake United Nations Office, the South Centre, ICTSD and UNCTAD have in help with very useful and high quality documentation in support of developing countries. Two important

[139] Carliene Brenner, 'Intellectual property rights and technology transfer in developing country agriculture: rhetoric and reality' (OECD Development Centre Working Papers No 133, OECD, Development Centre (1998) 25-6.

[140] Ibid.

[141] Grossman and Lai, above n 90, 1635.

[142] Thompson and Rushing, above n 4, 1.

[143] UNIDO, above n 74.

proposals came to draft an Access to Knowledge (A2K) Treaty[144] and for WIPO by establishing a Development Agenda[145] to address the development-related interests of developing countries. Such proposals covered technical cooperation, transfer of technology and other issues. With regard to WIPO's mandate, it is noted that as a UN agency WIPO should be guided by the UN's development goals including the MDGs. [146]

However, it is true that for countries below the minimum development level, informal technology transfer is the only alternative means of achieving economic development in developing and least developed countries and even in some NICs as well. With stopping this, the TRIPS re-regulated technology transfer provision appears as a technology blockade to developing and least developed countries like Bangladesh which have the comparative advantage in imitation and adaptation of foreign technologies.[147] In effect, adding value to and improvements of the existing technological base is likely to be impeded in LDCs after the TRIPS compliance.[148]

5. TRIPS in Agriculture and Economic Development: Implications and Challenges

5.1. Theoretical Background

As part of IPRs standard-setting, the TRIPS speaks of the international IPRs regime governing plant genetic resources (PGRs). It includes a sui generis provision for the protection of IPRs associated with agriculture, commonly known as plant varieties protection (PVP). This provision appears to balance the interests of variety of actors involved in agricultural trade. For instance, PVP encourages investments in agricultural innovations especially plant breeding even by domestic companies although only in a limited group of major crops, namely, soybean, corn, wheat, and cotton.[149] It also helps agriculture-prone LDCs like Bangladesh building up agricultural economy through or transfer/trade of agricultural technology especially seeds.[150]

[144] 'Access to Knowledge (A2K) Treaty' <www.cptech.org/a2k/a2k_treaty_may9.pdf> 10 July 2010.

[145] 'Development Agenda' <http://www.wipo.int/export/sites/www/ip-development/en/agenda/recommendations.pdf> 10 July 2010.

[146] Dutfield and Suthersanen, above n 1, 275-81.

[147] Ramanna, above n 18, 188-9.

[148] Correa, above n 60, 227.

[149] J M Alston and R J Venner, 'The effects of the US Plant Variety Protection Act on Wheat Genetic Improvement' (2002) 31 *Research Policy* 527.

[150] Ha-Joon, above n 23, 273-98; Robert Tripp, Niels Louwaars and Derek Eaton, 'Plant Variety Protection in Developing Countries: A Report from the Field' (2007) 32 *Food Policy* 354, 356.

As part of building up agricultural economy, this regime enriched with the new protection arrangements in the name of PVP is found to encourage seed trade to promote the seed industry, boost exports, protect seed quality, and contributes in general to promote economic development in agriculture-prone least developed countries like Bangladesh with better yields in a small piece of agricultural land compared to the dense population.[151] This regime is also found to help public research institutes with the better ability to protect their innovations especially new varieties or biotechnology, and ultimately to benefit from licensing and royalty revenues.[152] However, such agricultural economy invigorating element of the TRIPS is not free from shortcomings. For example, PVP which is similar to patents acts as a means of creating genetic use restriction technologies which do not help seeds reproducing.[153] This causes an agriculture-prone LDC like Bangladesh to have extra economic burdens on farmers. Such role of PVP appears as contradictory to economic benefit approach of the WTO's trade liberalisation and lends support to general scepticism about the role of IPRs in economic development.[154]

5.2. Strengthening IPRs in Agriculture and Innovation-based Economic Development

In agricultural innovation based economic development and for achieving food security, R&D in PGRs and biotechnology is a sine qua non.[155] To this end, the TRIPS comes up in help for incentivising investments in biotechnology with a major contribution in the post-WTO scenario. Some empirical research substantiates this assertion when it shows that stronger IPRs in agriculture help enhancing research and development efforts in PGRs and biotechnology, and greatly boosting up the potential utility areas especially economic interests of the world's genetic resources.[156] On such counts, IPRs primarily in the forms of patents and PVP appear to provide the exclusivity needed to earn returns to invention and innovation. For instance, the US biotechnology industry with patents in place generates a yearly income of US$13 billion.[157]

[151] Mywish K Maredia, James F Oehmke and Derek Byerlee, 'Economic Aspects of Intellectual Property Rights in Agricultural Biotechnology' in F H Erbisch and K M Maredia (eds), *Intellectual Property Rights in Agricultural Biotechnology* (2004) 107 -24.

[152] Brenner, above n 139, 33-9.

[153] C S Srinivasan and Colin Thirtle, 'Potential Economic Impacts of Terminator Technologies: Policy Implications for Developing Countries' (2003) 80(1) *Environment and Development Economics* 187.

[154] Tripp, Louwaars and Eaton, above n 150, 354.

[155] Punjab Singh, 'Technology Options for Achieving Food Security in South Asia' in Suresh Chandra Babu, and Asok Gulati (eds), *Economic Reforms and Food Security: The Impact of Trade and Technology in South Asia* (2005) 163-173.

[156] R Kennedy, 'International Conflicts over Plant Genetic Resources: Future Developments' (2006) 20(1) *Tulane Environmental Law Journal* 1, 6-7.

[157] International Chamber of Commerce, *Intellectual Property: Source of Innovation, Creativity, Growth and Progress* (2005) <http://www.iccwbo.org/uploadedFiles/ICC/policy/intellectual_property/Statements/BASCAP_IP_pub.pdf> 10 December 2010.

The research also shows that the potential utility of IPRs helps encouraging the use of biotechnology to generate high yielding varieties leading to increase the incomes of small farmers and consumers.[158] For example, utility patents in agriculture technology brought economic development in Philippines with high yielding and exports.[159] However, the absence of some form of market exclusivity of agricultural investments through IPRs causes biotechnologies face an appropriation problem because of their inherent natural qualities that make imitation by others feasible at relatively low costs. Innovative plant varieties, as embodied in seeds also readily reproduce in identical qualities simply by virtue of cultivating the plants.[160] Furthermore, new plant varieties face competing production and sales simply at the time they are brought in the market as an act that carries an inferred licence for replication and production without enumerated rights.[161]

However, since the TRIPS recognises a trivial modification of existing PGRs as an invention, this results in an increasing number of patents, as well as the breadth of the claims which create a situation where companies conducting further research often find it difficult not to infringe the patent rights of other companies.[162] Lindner describes the variety and scope of claims made in the 'basic processes and inventions' as posing a danger of a patent gridlock for developing countries where it is virtually impossible to develop new transgenic plants without infringing one or other of these patents.[163] For example, there appears a patent gridlock in the case of Bt technology and gives rise to several hundred overlapping patent rights for it. For infringement of its patent rights for Bt technology, recently Syngenta filed two lawsuits against some of its competitors.[164] In a bid to get rid of such danger of a patent gridlock and to create more freedom for research, a new trend of mergers and acquisitions has arisen in the global food, agrochemical and seed business, leading to significant concentration of the industry. However, as a part of global mergers and acquisitions, patents in the agricultural sector are now concentrated in the hands of just a few large MNCs including Monsanto, Dupont, Syngenta, Dow, and Bayer. Such mergers and acquisitions create more monopoly causing price rise in agriculture technology.

[158] Brenner, above n 139, 27-28.

[159] John H Barton, 'Intellectual Property, Biotechnology, and International Trade: Two Examples' in Thomas Cottier and C Petros (eds), *Intellectual Property: Trade, Competition, and Sustainable Development* (2003) 285-301.

[160] Tripp, Louwaars and Eaton, above n 150, 356.

[161] Keith E Maskus, 'Intellectual Property Rights in Agriculture and the Interests of Asian-Pacific Economies' (2006) 29(6) *World Economy* 715.

[162] UNCTAD, 'The Least Developed Countries Report 2007: Knowledge, Technological Learning and Innovation for Development' (prepared by the UNCTAD Secretariat, Geneva, 2007) 125-6.

[163] Bob Linder, 'Prospects for Public Plant Breeding in a Small Country' in William H Lesser (ed), *Transitions in Agbiotech: Economics of Strategy and* Policy 561-600.

[164] Jagjit Kaur Plahe, 'The Implications of India's Amended Patent Regime: Stripping Away Food Security and Farmers' Rights?' (2009) 30(6) *Third World Quarterly* 1197.

In addition, as part of IPRs standard-setting in agriculture, the TRIPS simplifies the agricultural innovation process by facilitating intense interaction and feedback among the different parts of the system: individual research institutes, universities and industry, the scientific community and farmers, the traditional agricultural research community and biotechnologists, the public and private sectors. Industrialised countries, most notably in the US, have availed of such opportunities and made economic development through agriculture. However, in many developing countries, the linkages among the different parts of the system are weak. This is likely to inhibit, rather than facilitate, transfers of technology, innovation and economic development.[165]

5.3. Strengthening IPRs in Agriculture and Technology Transfer-based Economic Development

The TRIPS technology provisions contribute to the growth of agriculture with new developments in trading arrangements by improving the ability of private breeders to control local seed markets, and preventing unauthorized trade in protected varieties, by increasing access to privately developed foreign seed varieties on making their developers more willing to market their products there, and by retaining farmers' privileges, or the right of farmers to keep sufficient seeds from the harvest for replanting.[166] However, for transition economies, such provisions become matters of concern in technology transfer for its role of 'shutting out' rather than 'crowding in'.[167] This is because member countries are required to have legal arrangements for the protection of newly developed varieties.[168] With this caveat of the TRIPS, it is clear that agricultural technologies that were available in developing countries in an unrestricted manner will no longer be freely available. In this respect, it is to be noted that with the free use of technologies farmers had rights to produce, save, and use the varieties, and brought in once the Green Revolution.[169] So, it appears that for fulfilling welfare needs by achieving food security in developing countries, technology plays a major role, given the impressive record of technology in enhancing food grain production during the past half century. And now it has been argued that the challenge of food security cannot easily be met unless transfer of biotechnology is promoted.[170] To this end, the TRIPS inserts provisions on technology transfer as well.

[165] Brenner, above n 139, 29.

[166] Ibid.

[167] Linder, above n 163, 561-600.

[168] Maskus, above n 53, 471.

[169] Philippe Cullet, 'Food Security and Intellectual Property Rights in Developing Countries', (Working Paper 2003-3, International Environmental Law Research Center, Geneva, 2003).

[170] Singh, above n 155, 163-173.

However, agricultural technology is not likely to be available in an unrestricted manner as it was before due to the protectionist approach of the TRIPS.[171] This is because, with the creation of the TRIPS in the WTO, there arise problems in technology transfer since the technology owning MNCs regulate technology transfer with their profiteering interests, not serving the interests of local farmers. In addition, MNCs do not generally grant commercialisation licences to third parties and choose to retain the sole right to use the protected technology for commercial development. However, if the MNCs do permit commercialisation licences, rights holders seek unreasonable or unacceptable terms. As a result, it is not only subsistence farmers who are at risk but licence holders also suffer in marketing. Indeed, in countries with very little internal breeding capacity, the entry of MNCs active in this field as noted by International Plant Genetic Resources Institute (*IPGRI*) is unlikely to foster directly the development of domestic industrial capacity.[172] It is thus unlikely that domestic breeding industries would substantially benefit from the introduction of monopoly rights rather this poses a threat for food security in developing and least developed countries.[173] For example, with the TRIPS into effect in India, trade in seeds get into the hands of MNCs and as a result, the country can not utilise its substantial capabilities of making its own GMOs freely accessing MNCs-owned technology holding profiteering interests, not feeding the poor people.[174]

5.4. Technology Transfer Mechanisms in Agriculture

Little research has yet been done on transfer of technology related to agriculture specifically seeds, mechanisation, irrigation, and the application of chemical fertilizers and herbicides. The quantitative information regarding either the forms of genetic technology acquisition by developing countries or the different forms of technology transfer between OECD Member and developing countries is also little. This is because the relative importance of one form of technology transfer compared to another would, clearly, vary from country to country, in accordance with the state of development of their agriculture sector and as a function of effective demand for technology. However, in accordance with some common practice, genetic technologies appears to be transferred through the purchase of an end product (as seeds or machinery), or as an input into the agricultural research process (for example, a patented genetic mapping technique, or a patented gene). The transfer may occur in many different forms, in a commercial or market context, in a non-market or 'public good' context, or by a combination of market and non-market mechanisms. And, in technology transfer transactions

[171] Dutfield and Suthersanen, above n 1, 275-81.

[172] Phillipe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement' (2001) 45(1) *Journal of African Law* 97, 109-111.

[173] Singh, above n 155, 163-173.

[174] Pushpa M Bhargava, 'The Social, Moral, Ethical, Legal and Political Implications of Today's Biological Technologies: An Indian Point of View' (2006) 1 *Biotechnology Journal* 34.

between developed and developing countries, several different public and private partners may be involved. These may include national governments or government departments, NGOs and non-profit private foundations like the International Agricultural Research Council (IARCs).[175]

With respect to genetic technology as products, the most common form of transfer is probably the purchase or import of seeds, principally for cereal and forage crops, fruit and vegetables, and planting material for floriculture products. This would apply where countries have an important commercial farming sector, where a large share of planted area is sown to hybrids, where countries are major exporters of particular kinds of agricultural products or where countries have a dualistic system of production (large-scale commercial farming and low-income smallholders). While some small-scale farmers purchase seeds and are engaged in profitable production, among low-income, low-input farmers, the major form of technology transfer remains that of the informal exchange of seeds which are saved on farm.[176]

Another form of agricultural technology transfer is joint ventures i.e. joint ventures between companies from developed and developing countries for the development of genetic technologies. However, little published data is available on joint ventures. The recent 50-50 joint venture between the Plant Genetic Systems (since taken over by AgrEvo GmbH of Germany) and the Indian company ProAgro, set up to develop genetically modified oilseed rape and other products is one example. A number of joint ventures in seeds production and plant breeding are also being formed, particularly for the production and marketing of hybrid crops.[177]

For research purposes, the transfer or exchange of inbred or parental lines in respect to genetic materials especially seeds is also common in OECD Member countries. This form of transfer takes place usually under a trade secret arrangement. However, such transfer to a developing country depends on whether hybrids are involved and/or whether the receiving country has already introduced PBRs.[178]

For research purposes, MTAs are also used extensively to transfer genetic material. MTAs are commonly used in the framework of collaborative research, particularly in publicly or donor funded research projects and programmes, where universities and/or public research institutions are partners. It is also the favoured form of technology transfer among and by the IARCs which, inter alia, are the designated custodians of the world's plant genetic resources.

[175] Brenner, above n 139, 33-9.

[176] Ibid.

[177] Ibid.

[178] Ibid.

IARCs agreements typically require that no IPRs are sought, but do not include payment requirements.[179]

Furthermore, public/private sector partnerships for bio-prospecting work as a mode of agricultural technology transfer. Such initiatives are growing in countries rich in biodiversity which wish, at one and the same time, to maintain control and ownership over their genetic resources and to earn revenue to be reinvested in research on their identification, classification and preservation. For example, Costa Rica has negotiated a number of agreements for exploration of their genetic resources. In such agreements IPRs are negotiated on a case-by-case basis and it is also ensured that any profits from inventions and materials protected by IPRs or from products derived from those protected inventions and materials are shared by the various partners in such a way as to ensure further exploration and conservation in Costa Rica.[180]

For an LDC perspective, technology donation is another form of agricultural technology transfer. Sometimes technology is donated to a developing country and usually to a public research organisation or government to be used under certain conditions. For example, a technology donation agreement is signed between the International Service for the Acquisition of Agri-Biotech Applications (ISAAA), Monsanto and the Centre of Research and Advanced Studies (CINVESTAV) in Mexico. It involves the transfer of Monsanto patented gene technology for virus resistance in potatoes to a public Mexican research institute. There is another example of donation where an agreement between Ciba-Geigy (now Novartis) and the International Rice Research Institute (IRRI) in the Philippines, which is one of the IARCs is signed. It relates to the transfer of a synthetic Bacillus thuringiensis (Bt.) gene for insect resistance, patented by Ciba-Geigy, for use in transgenic rice research at IRRI. In both cases, the transfer was made as a royalty-free licence.[181]

6. TRIPS in Pharmaceuticals and Economic Development: Implications and Challenges

6.1. Legal Background

As part of TRIPS standard-setting of IPRs in pharmaceuticals, the TRIPS members are urged to introduce patents in pharmaceuticals. This standard-setting of IPRs in pharmaceuticals brings in the security of huge investments made in pharmaceutical innovations especially drugs and active pharmaceutical ingredients (APIs), and entitles countries with levies, taxes and royalties for the transfer of such innovated pharmaceutical products or technologies through selling,

[179] Ibid.

[180] Ibid.

[181] Ibid.

licensing or exporting.[182] However, for countries like Bangladesh that do not have mentionable R&D in pharmaceuticals, such standard-setting is of no use but to secure developed countries' economic interests.[183] Nevertheless, the standard-setting in pharmaceuticals qualifies exception clauses like differential treatment in transition period, compulsory licensing, and parallel importation keeping in mind the prevention of anti-competitive practices of innovators and responding to emergencies. For Bangladesh, these exception clauses come in help for reverse-engineering pharmaceuticals, which qualifies one kind of innovations on accessing the transferred technologies and supplying them in the domestic and export market.[184] Such limited opportune in pharmaceutical innovation and technology transfer turns up with economic benefits to the country although there arises controversy recently as regards attempts by developed countries to block the exports of cheap HIV/AIDS drugs by some developing countries including China, India, Thailand and Brazil.[185]

6.2. TRIPS Strengthening of IPRs in Pharmaceuticals and Innovation-based Economic Development

Strengthening of IPRs in pharmaceuticals meaning the introduction of patents serves as an important incentive for pharmaceutical innovation since patents secure unambiguously the investments in innovation and turn into an economy stimulating tool by being recognised as key instruments for privately appropriating the economic benefits of innovation.[186] And patents extract the economic benefits of pharmaceutical innovation by simplifying the innovation system with minor modification (for example, in terms of dosage) of existing products qualifying as inventions resulting in more products and revenues, and by squeezing free-riding or streamlining IPRs flexibilities of compulsory licensing ensuring the maximum returns of innovating costs.[187] In fact, streamlining of IPRs secures investments in R&D of a drug formulation that costs about US$800 million.[188] And with the help of reconfigured definition of invention, global brand name pharmaceutical corporations rebrand their products, get

[182] Roberto Simonett, Éric Archambault, Gregoire Cote and Dinar Kale, 'The Dynamics of Pharmaceutical Patenting in India: Evidence from USPTO Data' (2007) 19(5) *Technology Analysis & Strategic Management* 625.

[183] Phillip McCalman, 'Who enjoys `TRIPs' abroad? An Empirical Analysis of Intellectual Property Rights in the Uruguay Round' (2005) 38(2) *Canadian Journal of Economics* 574.

[184] Gervais, above n 5, 363.

[185] 'Fight over Generic Drug Seizure Takes Centre Stage at TRIPS Council Meeting' (2009) 13(9) *Bridges Weekly Trade News Digest* 1.

[186] Francesco Laforgia, Fabio Montobbio, and Luigi Orsenigo, 'IPRs, technological and industrial development and growth: the case of the pharmaceutical industry' (KITeS Working Paper No. 206, Centre for Research on Innovation and Internationalization, Centre for Knowledge, Internationalization and Technology Studies, Universita' Bocconi, Milano, Italy, 2007)

[187] Gervais, above n 136, 348.

[188] Gunter Festel, Alexander Schicker and Roman Boutellier 'Performance Improvement in Pharmaceutical R&D through New Outsourcing Models' (2010) 7 (2) *Journal of Business Chemistry* 89.

patents on them (commonly known as patents for second use or evergreening) and seek to restrict the ability of generic manufacturers to produce and distribute essential medicines through patents or data exclusivity agreements. Such strengthening of IPRs causes significant impact on the innovative capabilities of pharmaceutical industries leading to economic development in developed countries but not in developing and least developed countries lagging behind the technological frontier and with low per capita income because broad patents on basic inventions might hinder further innovation, especially if licenses are given on exclusive terms or at very high prices which such countries cannot afford.[189] For example, almost all the empirical studies on the Indian case agree that patents in pharmaceuticals (1911 to 1970) did not help India move forward due to affordability of technology but a weaker intellectual protection system (from 1970 to 2005) encouraged the development of indigenous technological capabilities and catching-up.[190]

In addition to demoralising pure innovation based development, the TRIPS extension of intellectual property to essential medicines and the reconfiguration of the 'patentable invention' definition revolve around the rights to issue compulsory licenses, and to manufacture and export generic versions of patented and brand name drugs which come out as qualified pharmaceutical innovations.[191] However, because of the revolving, users based in poor countries, who rely on manufacture and export generic versions of patented and brand name drugs for meeting up health and developmental needs are put in a vicious shackle of MNCs' profiteering interests. To get out of the shackle, African countries in the grip of the HIV/AIDS pandemic, and countries like Brazil, India, and other developing and least developed countries and their NGO advocates seek to clarify interpretations of the TRIPS that permit compulsory licensing, parallel importing, generic manufacture and export. In response, there came the Doha Declaration supplemented by the waiver decision of 2005, which is due to be incorporated in the TRIPS as an amended Article 31*bis* upon ratification by two-thirds of the WTO members allows countries producing generics of patented drugs under compulsory licensing and supplying them home or to countries affected with HIV/AIDS.[192]

In effect, such initiatives enable some LDCs trying to develop their own capability to produce pharmaceutical products. However, due to the market size in some countries and lack of

[189] Lall, above n 32.

[190] Shubham Chaudhuri, Pinelopi K. Goldberg and Panle Gia, 'Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinolones in India' (2006) 96(5) *American Economic Review* 1477.

[191] See Gervais, above n 136, 363.

[192] WT/L/540, <www.wto.org> at 07 July 2008 (hereinafter the Decision). On 6 December 2005, the WTO members approved changes to the *TRIPs Agreement* as an amendment making permanent a waiver decision on patent and public health originally adopted in 2003. It will appear in the *TRIPs Agreement* as Article 31*bis* if two-thirds of the WTO's members ratify it within 31 December 2009 or such later date as may be decided by the Ministerial Conference. See for details, WT/L/711 21 December 2007, <www.wto.org> at 07 July 2008. <http://www.wtocenter.org.tw/SmartKMS/do/www/readDoc?document_id=89701> at 2 April 2008.

technical persons and technology in some, it does not appear to be feasible to set up plants in many of these LDCs. Such a picture is depicted in a recent survey conducted by the Business Monitor International (BMI). It reports that sixteen out of fifty LDCs,[193] have no pharmaceutical manufacturing capabilities, and other thirty three countries have very limited or insufficient manufacturing capabilities. However, compared to all LDCs, only Bangladesh has strong pharmaceutical manufacturing base, and with this infrastructure, it is broadly authorised to produce three types of pharmaceutical products. These are (a) products under compulsory license, (b) over-the-counter (OTC) drugs commonly known as brand name generics, and (c) products under licensing agreement from an original manufacturer. Except for the first type of drugs, there is no restriction to export the products to anywhere in the world. For the first category of drugs, pharmaceutical manufacturers of Bangladesh can legally copy patented pharmaceutical products since it is exempted from patenting in pharmaceuticals till the end of 2015.[194]

And after the TRIPS compliance, the Doha Declaration supplemented by the waiver decision hold economic benefits prospects. On using such opportunities, Bangladesh tends to produce a number of generics of patented and off-patent drugs and supplies them competitively at home and abroad at cheaper prices.[195] In that sense, Bangladesh is fortunately in the privileged position today to capitalize the post-2005 opportunities till 31 December 2015 in selling generics of patented drugs in its domestic market and exporting them as well to other LDCs and non-members of the WTO.[196] Analysts think if Bangladesh can avail itself of the opportunity, it could export up to TK100 billion worth of drugs annually.'[197] Keeping this in mind, the BMI's Industry Survey and Forecasts Series titled 'Bangladesh Pharmaceuticals and Healthcare Report Q 3 2008' describes Bangladesh as one of Asia Pacific's most promising drug makers.[198]

For producing various types of drugs, there are about 250 local pharmaceutical companies registered in the country. Out of this some 150 companies including 4 multinational

[193] United Nations, 'List of Least Developed Countries' <http://www.un.org/special-rep/ohrlls/ldc/list.htm> 20 July 2009.

[194] N G Amrita, 'Bangladesh Braces to Replace India in Generics 14', in T Smart (ed), *Revision to India Patent Law could Affect Future Supply of Affordable Market* (2005) 20.

[195] 'Trade Policy Review 2006' (WT/TPR/S/168, Report by the Secretariat, Bangladesh 9 August 2006) <http://www.wto.org/english/tratop_e/tpr_e/s168-00_e.doc> 8 July 2009.

[196] Enamul Haque, Azreen Karim, and Wahid Abdallah, 'Market Access Issues: EU-Bangladesh Trade Regime

A Case Study on Market Access: Myths and Realities' (Paper, International Institute for Sustainable Development (IISD), 2005) <http://www.tradeknowledgenetwork.net/pdf/tkn_market_bangladesh.pdf> 5 July 2010.

[197] See Shahiduzzaman Khan 'Pharma Sector Holds Out New Promise' Financial Express (5 January 2006)

<http://financialexpressbd.com/index3.asp?cnd=1/5/2006&section_id=1&newsid=11946&spcl=no> 5 July 2010.

[198] Business Monitor International, 'Bangladesh Pharmaceuticals and Healthcare Report Q 3 2008'

<http://www.researchandmarkets.com/reports/655812> 8 July 2009.

companies are actively engaged in producing quality medicines.[199] On finding their operation less profitable due to the Drug (Control) Ordinance 1982 which favours local pharmaceutical companies, most multinational pharmaceutical companies have actually either left or sold out their interests in Bangladesh (i.e. Organon). Amongst 150 companies, only 20 companies like ACI, Beximco, Square and some other leading local pharmaceutical industries are certified by ISO 9000 for their unique quality systems with state-of-the-art manufacturing facilities and are enjoying a market share of more than 80 per cent while the multi-nationals are holding 20 per cent.[200] With its very strong finished formulation-manufacturing base, Bangladesh exploits all the advantages for its strategic location in the South Asian pharmaceutical region and among the LDCs, and remains on top with 97 percent of total pharmaceutical production in LDCs and is growing up with 50 percent annually. Currently the entire pharmaceutical manufacture in the country holds an annual turnover of about US$500 million, and is exported to over 70 countries.[201] In a bid to boost its export further, the Government declares 'Pharmaceuticals' as the product of the year in 2008. Such a move is the first in the country and pharmaceuticals has been singled out considering its tremendous prospect in the global market and diversification of export basket as well.[202] For such initiatives and export outcomes, a World Bank report prepared on Bangladesh shows the export potential in pharmaceuticals more likely to be up for some years to come. However, its per capita expenditure on medicine which is only about US$4 per year compared to the per capita GDP of US$450 with the growth rate at over 6 percent a year poses health concerns since this is one of the lowest not only in the world but also in the subcontinent.[203]

Nevertheless, to prove its efficiency as drug manufacturer, Bangladesh began small-scale export of drugs and medicines back in the late 80s. Only two local manufacturers, namely, Beximco and Square pharmaceuticals took initiatives on their own to export pharmaceutical products to some less-regulated overseas markets like neighbouring Myanmar, Nepal and Sri Lanka in the absence of any official support and incentives. In the early 90s, a few more companies joined the race and Bangladesh could make inroads in some of the partially regulated markets, including Russia, Ukraine, Georgia and Singapore.[204] In the year 2003-2004, Bangladesh exported pharmaceutical products worth of TK556 million that has increased from TK367

[199] da Cunha, above n 63, 7-15.

[200] Md. Shah Amran, Maruf Ahmed, Sm Shaheen, Sheikh Niaz Morshed, Md. Jahangir Alam Khandakar, Md. Masudur Rahman, Md. Mosiur Rahman & Md. Amjad Hossain, 'A Study on the Packaging Information of Essential Drug Products Used at Union and Thana Health Complex Level in Bangladesh' (2007) 20(4) *Pakistan Journal of Pharmaceutical Science* 327, 331.

[201] <http://www.asiapharma.org/APE/south_asian_pharmaceutical_expo.php> 11 March 2009.

[202] K M Gopakumar, 'TRIPs Implementation and Public Health Safeguards' in CENTAD (ed), *South Asian Yearbook of Trade and Development* (2005) 234-235.

[203] Ibid.

[204] Ibid.

million in the year 2002-2003.[205] Towards the European Union, in the year 2003-2004, Bangladesh exported pharmaceutical products worth of TK14 million to France and TK13 million worth of to Germany.[206] Pharmaceutical export rose to US$17.64 million in the first five months of FY07-08 while it was US$11.86 million during the same period of FY06-07. To have more access in highly regulated markets like the EU and the US, Bangladeshi pharmaceutical products have to pass through highly restrictive regulatory regime and require stern certifications.[207] To this end, existing big pharmaceutical companies in Bangladesh have commenced manufacturing in world class plants as MDI (Metered Dose Inhaler) plant and are going for certification in the regulated markets. Recently the Beximco Pharmaceuticals Limited, one of the leading pharmaceutical companies in Bangladesh, has invested US$50 million on a new plant conforming to the US FDA (Food and Drug Administration) standards. [208]

The success in entering highly regulated markets is viewed as a major breakthrough for the Bangladesh pharmaceutical industry. For such success, there are many factors to credit with. Along with successful technology diffusion tools, the multidisciplinary professional education of the pharmacists ensured the quality of pharmaceutical products.[209] In other developments as recent findings suggest the pharmaceutical industry in Bangladesh is actively involved in the production of Active Pharmaceutical Ingredients (APIs). At present, 21 different companies manufacture locally 41 such products comprising only 20 percent and the rest are mostly imported from China and India.[210] Along side that, auxiliary or linkage industries (packaging, paper, plastic, bottles, caps, tubes, and ampoules, printing etc.) are also developed.[211] However, as this has been well below the full potentials of the country for meeting domestic needs and exports, the government has approved the establishment of an API industrial park at an estimated cost of US$30bn on 300 acres of land in Munshigonj. The World Bank mission has agreed to provide necessary funds only after the completion of a study on social and environmental aspects of the project. Another development partner, the United Kingdom

[205] Annual Export Receipts, Statistics Department, Bangladesh Bank, 2003-04.

[206] Ibid.

[207] Masud Ali, 'Implementing TRIPs Agreement: Case Study of Bangladesh' in Centre for Trade and Development (ed), *South Asian Yearbook of Trade and Development: Harnessing Gains from Trade: Domestic Challenges and Beyond* (2009) 205, 208.

[208] Haque, Karim, and Abdallah, above n 196.

[209] M S Amran, 'TRIPS, Pharmaceuticals and Bangladesh'

<http://www.bangladeshinfo.com/news/special16.php> 8 July 2010.

[210] World Bank, 'Public and Private Sector Approaches to Improving Pharmaceutical Quality in Bangladesh' (Paper No. 23, Bangladesh Development Series, Human Development Unit, South Asia Region, March 2008) 16.

[211] M S Amran, 'Pharmacy as Education and Profession' (As cover story in the Magazine of the daily Bangladesh Observer, 07 November 2003).

Department for International Development (DFID) has agreed in principle to conduct the study. [212]

In order to set up the proposed park, Bangladesh Small and Cottage Industries Corporation (BSCIC) has been assigned. The project is expected to be completed by 2011. The Corporation will develop the infrastructure with state-of-the-art facilities including a central effluent treatment plant (ETP) and incinerator for solid and liquid wastes management. After completion of infrastructure development, a total of 40 industrial plots will be allocated to individual companies for setting up API plants. The park will be operated through a public-private partnership.

At the API Park, a total of 30 drug companies have already applied for plots. They have the money ready to establish plants. The companies will start producing APIs within six months after the government hands over the plots to them. It is really impossible to be competitive in the international medicine market if a company doesn't produce its own raw materials. Bangladeshi companies need to invest in a big way in API Park if they want to have a big slice of the export pie. [213]

The park is expected to turn the drug industry a major export earner and improve the country's economy immensely. However, this depends on the quick set up of the park since Bangladesh is now enjoying a special benefit to export drugs to all over the world under the TRIPS waiver deal which allows LDCs to export patent-free drugs to anywhere in the world between 2006 and 2016. In addition, it is estimated that country can save at least 70 per cent of the import amount of TK15 billion as spent in 2009 by producing raw materials at the API Park and API products worth US$750 million per annum could be exported over the next five years.[214]

6.3. TRIPS strengthening of IPRs in Pharmaceuticals and Technology Transfer-based Economic Development

Since pharmaceutical R&D is very expensive and needs large markets to recoup the investments, pharmaceutical companies like to transfer technologies to different markets. To this end, pharmaceutical companies press for well-defined IPRs in countries contributing to the development of markets for technologies and to the commercialization of inventions. The large markets in developing and least developed countries initially attract pharmaceutical MNCs to capitalise their intentions but to secure huge investments they insist on IPRs, in transfer of technology through FDI and possibly related R&D, licensing or joint venture agreements,

[212] Shahiduzzaman Khan, 'API Park to Give Pharma Industry a Major Boost' 1 June 2008, The Financial Express <http://www.thefinancialexpress-bd.com/2008/06/01/35266.html> 8 July 2010.

[213] Ibid.

[214] 'Bangladesh Pharmaceuticals and Healthcare Report Q3 2009' (Business Monitor International June 2009).

manufacture and market pharmaceuticals products, and make economic development. To such ends, IPRs come in help. They provide a legal basis for negotiating contractual arrangements that transfer technological information among firms and across borders. They also facilitate market transactions and often act as the legal foundation around which strategic investment decisions, especially about technology transfer, are made.[215] However, the survey researches of Branstetter, Fisman, Foley, and Saggi,[216] Lee and Mansfield,[217] and Maskus[218] made it clear that pharmaceutical MNCs generally seek to avoid the transfer of strategically sensitive technology of pharmaceutical ones to unaffiliated parties, regardless of the perceived strength of the IPRs regime.

6.4. Technology Transfer Mechanisms in Pharmaceuticals

It is established that for strategic technology transfer decisions in pharmaceuticals, MNCs often depend on ownership, location and internalization (OLI) conditions. Since they possess ownership, the further conditions of location and internalization must be met for them to transfer technologies overseas.[219] Location advantages are essential to make the business more profitable in the foreign country in terms of minimum transportation costs and tariffs, low input prices, access to distribution networks and local regulatory and enforcement environments. The MNCs interpret the protection of IPRs in the host country as a location advantage, as IPRs are territorial in nature, and hence differ across national boundaries.[220] In addition, internalization of production appears to be more profitable for firms rather than to sell or license their IPRs to independent local firms in the foreign country.[221] Such advantages take the form of avoiding transaction costs with potential licensees, controlling inputs and protecting quality.[222] Different levels of protection in national IPRs regimes may influence where an MNC decides to locate its business or to internalize or externalize its intellectual

[215] Keith E Maskus and Ruth L Okediji, 'Economic and Legal Considerations for the International transfer of Environmentally Sound Technologies' (ICTSD Initiative on Climate Technology and Trade, Second Expert Meeting, Bonn, 8 June 2009).

[216] L Branstetter, R Fisman, F Foley, and K Saggi, 2007, 'Intellectual Property Rights, Imitation, and Foreign Direct Investment: Theory and Evidence' (NBER Working paper 13033).

[217] Lee and Mansfield, above n 97, 181.

[218] Maskus, above n 52, 70-1.

[219] Rajnish Kumar Rai, (2009) 11(5/6) *Journal of World Intellectual Property* 404; J H Dunning, 'Explaining Changing Patterns of International Production: In Defense of Eclectic Theory' (1979) 41 *Oxford Bulletin of Economic Statistics* 269; J H Dunning, 'Explaining the International Direct Investment Position of Countries: Towards a Dynamic or Developmental Approach' (1981) 117 *Review of World Economics* 30.

[220] Rai, Ibid.

[221] Ibid.

[222] L Branstetter, R Fisman, F Foley and Kamal Saggi, 'Does Intellectual Property Rights Reform Spur Industrial Development' (revised NBER Working paper 13033, December, 2009)

assets.[223] The OLI framework and the arguments put forward, thus, suggest that IPRs protection is one of many factors influencing firms' decisions to transfer technologies to a particular country. However, the effects of strengthened IPRs protection are often dependent on its interrelationship with the effects of other factors, such as the size of the domestic market, the structure of factor supply, productive infrastructure and the degree of stability of the macroeconomic environment.[224]

In view of the OLI construction and significant IPRs protection framework, Bangladesh qualifies as a pharmaceutical technology transferee. This is because it is more attractive as a location to transfer pharmaceutical technologies through investment, licensing or outsourcing for its having bigger local market than most of the LDCs and in terms of geographical location. In addition, Bangladesh has the potential to manufacture cheaper medicines out of accessed technologies and exports them all over the world. To qualify as a transferee, Bangladesh does already have reliance on the TRIPS transition period and the waiver decision, and starts exporting medicines to a country who is a developing country or least developing country Member of the WTO and has not yet enacted the patent protection law or to a country who is a Member of the WTO and provides patent protection but has granted compulsory licenses for the import of medicines, or to a country who is not the member of the WTO.[225] Another big advantage for Bangladesh is gaining the markets, where India and Brazil used to sell until 2005, because these countries are now precluded from supplying medicines subject to patents, thereby strengthening the competitive positions of Bangladeshi producers of medicines.[226] In addition, almost in all such cases, medicines are reverse-engineered out of technologies transferred here informally availing of the TRIPS transition period or of off-patent technologies. And, it is interesting to note that the existing Patents and Designs Act, 1911 (Patents and Designs Act) [227] framed during the British colonial rule does not recognise the TRIPS transition opportunities of informal technology transfer for domestic consumption needs and exports.[228]

To utilize such markets after the TRIPS compliance depends on formal modes of technology transfer. However, in Bangladesh, a small amount of formal technology transfer in pharmaceuticals takes place through licensing, FDI and joint venture.[229] To have more

[223] C Braga and C Fink, 'The Relationship between Intellectual Property Rights and Foreign Direct Investment' (1998) 9 *Duke Journal of Comparative and International Law* 163.

[224] Rai, above n 219, 404.

[225] World Bank, above n 210, 17.

[226] Ibid.

[227] Act II of 1911, *Bangladesh Code* Vol. VI.

[228] See Ferdaus Ara Begum, Mesbah Uddin, and Sharifa Khan, 'Assessing Technical Needs for Implementing the TRIPS Agreement in Bangladesh' (Presentation made at the Ministry of Industries, Dhaka, 22 January 2009).

[229] Mustafizur Rahman, 'Globalisation, Developed Country Policies, and Market Access: Insights from Bangladesh Experience' in Robert Picciotto & Rachel Weaving (eds), *Impact of rich countries' policies on poor countries: towards a level playing field in development cooperation* (2004) 67, 91.

technology transfer, Bangladesh has lately signed bilateral investment treaties with the EU and the US containing technology transfer provisions.[230] Such treaties require Bangladesh to broaden definition of IPRs. In addition, it has currently been under pressure to resume the pending talks with the US on reaching a deal named the Trade and Investment Framework Agreement (TIFA).231 The proposed Agreement contains a technology dealing asking Bangladesh to insert TRIPS-plus provisions on patentability in its legislations and limiting the TRIPS transition period as pre-conditions for technology transfer.[232] Such agreements provide for the transfer of know-how in manufacturing to managerial practices. These explicit transfers are negotiated in addition to implicit transfers that occurr simply through the introduction of foreign personnel and techniques. This type of transfer has the effect of shifting the productive frontier of an economy and improving short-term economic performance. So, any resultant technological progress is expected to be crucial to the long-run growth process.[233] However, such US and EU initiatives are likely to block the change or flexibility in the compulsory licenses clause through TRIPs-plus agreements affecting the availability of essential drugs at reasonable price within the domestic market of Bangladesh and other Third World and developing countries.[234]

In addition to the OLI formulation of technology transfer, technology transfer also takes place in an LDC like Bangladesh through outsourcing or patent disclosure. To put such means through, many of the firms in India and China who are champion reverse engineers are recently interested to outsource their production in Bangladesh as a potential manufacturer of generic versions of patented products which they cannot produce in their own country after 2005.[235] Furthermore, although the Patents and Designs Act 1911 does not endorse outsourcing as a means of transfer of technology, it recognises disclosure of patent details.[236] Such disclosure helps for early generics approval serving in local and international markets. However, this does not happen to all patent applications stored in the mail box set up in

[230] See *European Union-Bangladesh Cooperation Agreement on Partnership and Development 1999*, signed 22 May 2000, LEX-FAOC036142 <http://faolex.fao.org/docs/pdf/bi-36142.pdf> 2 April 2008; *United States-Bangladesh Bilateral Investment Treaty* 1986 signed 12 March 1986; entered into force 25 July 1989 Treaty Doc.99-23 Congress; see also E Mansfield, 'Intellectual Property Protection, Foreign Direct Investment and Technology Transfer' (Discussion Paper Number 19, International Finance Corporation, World Bank, Washington, DC 1994).

[231] 'Bangladesh to Resume TIFA Negotiation Talks with US, *The New Nation*, 3 February 09.

[232] Mamun Rashid, 'Transit, TIFA and Bangladesh' *The Daily Star*, Monday, July 20, 2009.

[233] See Linda Y Yueh, 'Global Intellectual Property Rights and Economic Growth' (2007) 5(3) *Northwestern Journal of Technology and Intellectual Property* 436.

[234] Prosenjit Chakraborty, Syded Ferhat Anwar and Mahjabeen Ahmad, 'Strategies under the WTO Regime: The Pharmaceutical Sector in Bangladesh' (2003) 5(2) *Journal of Bangladesh Studies* 42, 44-46.

[235] Srividhya Ragavan and Jamie Mayer O'shields, 'Has India Addressed Its Farmers' Woes? A Story of Plant Protection Issues' (2007) *20 Georgetown International Environmental Law Review* 97.

[236] Ibid.

accordance with the executive order requiring the Department of Patents, Designs and Trademarks (DPDT) since it asks for data exclusivity.[237]

7. Strategies to Be Framed

7.1. Points of Departure

For both of its costs and benefits, the TRIPS Agreement is neither inherently good nor bad for economic development in an LDC like Bangladesh, as current discussions seem to suggest. However, the opportunity for economic benefits which accrue through technology acquisition, follow-on innovations and their uses can not be achieved without adopting all out strategies. The strategic policy framework requires being such that supports trade liberalization, establishing incentives to attract FDI, and strengthening of IPRs. Such policy framework may be contained to reform their IPRs regime to maximize economic gains, while limiting the potentially adverse effects of improved protection and to facilitate access of local entrepreneurs to the IPR system as has been done in India, Thailand, and South Korea. It is also to be noted that the developed and those developing countries that have achieved substantial growth rates have all fine-tuned their IPRs system to match their development needs, rather than blindly implementing a comprehensive IPRs policy.[238] So, the TRIPS Agreement appears to hold economic development prospects for Bangladesh if the existing IPRs regime gets fine-tuned upon a policy that establishes a balance between intellectual property protection and welfare needs at the national and international levels. To have the balance, the TRIPS needs to be neutralised in the local legislations by minimising imitation or follow-on innovation costs raised by pharmaceutical and biotechnological patents or trade-secrets protection or by expediting the pace of technological development by spreading the flow of R&D spillovers that are important inputs in research.

Since the TRIPS Agreement of the WTO is a reality, which least developed countries like Bangladesh have to exist with, ways and means related to the TRIPS prior to 2016 and post 2016 require to be considered with the view to harnessing local consumption needs and economic welfare goals. This consideration involves national and international strategic trade partnership and legal preparations covering use of technology and technology trade in agriculture and pharmaceuticals.

[237] DPDT/P&D Law/2007/74/129 (Government Order issued in Bangladesh by the Department of Patent, Design and Trademarks, 7 January 2008) [hereinafter DPDT Order]; see also <http://www.wto.org/english/tratop_e/trips_e/implem_para6_e.htM> 2 April 2008.

[238] Dolfsma, above n 27.

7.1. Issues for National Action to Moderate the Adverse Effect

7.1.1. TRIPS Transitional Period

As part of forming national strategies covering use of technology and technology trade in agriculture and pharmaceuticals, two sets of preparations can be taken in LDCs like Bangladesh, namely, strategy for the TRIPS transitional period and strategy for after the TRIPS compliance.

There is historical precedent that modern developed countries often undertook policies that would be considered piracy by today's standards. In practice, the rationale is a proven method for advancing technological and economic development, tested frequently and successfully by many of today's developed countries during their history. Developing countries that have weak IPRs protection are doing nothing more than following historically proven methods for advancing development. So, it is rational for most of the least developed countries that have little incentive to adopt the TRIPS to obtain IPRs as inexpensively as possible by adopting policies that support formal and informal technology transfer and grow their IPRs protection level in parallel with economic development and according to their own industrial and commercial strengths.[239]

Among the policy responses that developing country governments can take at the national level in order to promote economic development include exploiting the policy spaces available in the TRIPS fully for formal and informal technology transfer and exploit the technologies for follow-on innovations including petty patents and industrial design patents. Although LDCs can continue informal technology transfer meaning piracy in the transition period, it is better to bring such informal technology transfer in legal coverage to avoid loosing market access in developed countries. And for this, there needs: incorporating the provisions of compulsory licensing in the IPR legislation, incorporating the research exception, early working exception or 'Bolar' provision, allowing parallel imports or grey-market imports, incorporating breeders' exceptions and farmers' exceptions in sui generis plant variety protection. The experience of several East Asian countries suggests that such steps help them in acquiring technology that leads to petty patents and industrial design patents, and ultimately prove to be effective means of encouraging domestic enterprises to undertake minor adaptive innovations and foster an innovation based rivalry among them.

For this advantage to take into use in Bangladesh, the existing Patents and Designs Act 1911 needs to incorporate transitional provisions allowing the use of technology and technology trade with informal technology access and facilitating exports to countries having no infrastructure of reverse engineering and failing to support people with low cost life saving medicines or food. However, there arises a question of legality as regards reduction or

[239] Ostergard, above n 7, 115-55.

withdrawal of the already protection. This is because where least-developed countries do provide some kinds of intellectual property protection even though they are not required to do so under the TRIPS Agreement, they are obliged not to reduce or withdraw the protection that they currently give.[240] So, unless and until the TRIPS Council or the WTO panel makes a decision on this, it is deemed to be a valid option to adopt informal technology access for a least developed country like Bangladesh during the TRIPS transition period and manufacture low cost drugs including the HIV/AIDS drugs, agricultural products and others for the uses at home or abroad.

However, for producing and supplying low cost HIV/AIDS drugs, strong lobbying shall have to be made with the importing countries and also with the World Health Organization authorities who selects the potential suppliers to supply medicines for HIV/AIDS in the African countries. In addition, in order to facilitate exports of medicines, the pharmaceutical plants and the products must comply with the standards set by the importing countries. In many cases, it means that both the products and the plants are approved by the drug administration of the importing countries.

Furthermore, strategies to be made for encouraging countries like China, Brazil, India and others to outsource in Bangladesh for producing medicines or APIs on taking its advantage of special and differential treatment in terms of the TRIPS compliance. In this connection, it is to be noted that the limited outsourcing of low innovation coding or other functions (e.g. customer care call centres) tends to evolve to progressively more complex coding tasks and higher innovation activities, leading to significant innovations in the recipient (outsourced to) country. And this outsourced low innovation becomes a form of technology transfer and serves as a stepping stone to higher innovation functions, and eventually to world-class competitiveness for some countries.[241] For example, through outsourcing by the US and the EU among others, China has become a power in technology although at the beginning it had not achieved a level of intellectual property protection and enforcement the US and the EU considered sufficient.[242] For Bangladesh, however, there might arise some issues raised from local pharmaceutical companies for competition with foreign companies. In that case outsourcing in pharmaceuticals can be restricted only to manufacturing of APIs.

[240] Some analysts have questioned the legal validity of this "no roll-back" provision and regard it as being beyond the mandate of the WTO Council for TRIPs, for example see S Musungu, 'A Conceptual Framework for Priority Identification and Delivery of IP Technical Assistance for LDCs during the Extended Transition Period under the TRIPS Agreement' (Quaker United Nations Office: Geneva, 2007).

[241] Gervais, above n 5, 384.

[242] Ibid, 389.

7.1.2. After TRIPS Compliance:

The strategy for after the TRIPS compliance requires taking advantage of flexibilities which allow some sort of informal technology transfer and preparing the country to attract formal technology transfer in the way of FDI, licensing or joint ventures. However, the costs for preparations impose a considerable financial burden on developing countries, particularly LDCs like Bangladesh. For example, a World Bank study notes that implementing the TRIPS obligations would require the LDCs to invest in buildings, equipment, training and so forth that would cost each of them US$150 million for many of the LDCs this represents a full year's development budget.[243] The UNCTAD provides some rough estimates of the administrative costs of complying with TRIPS in various developing countries.[244] For Bangladesh, it anticipates one-time costs of administrative TRIPS compliance (drafting legislation) amounting to US$250,000 and over US$1.1 million in annual costs for judicial work, equipment, and enforcement efforts.[245] However, these estimates do not include training costs. Such potential costs explain the reluctance of many developing economies to strengthen their regimes.

As part of preparation by drafting IPRs legislation for agricultural products, the country can legislate for a *sui generis* regime as indicated in Article 27.3 of the TRIPS for protecting local plant varieties in addition to the new varieties developed by local and MNCs. This protection strategy is likely to attract MNCs with FDI or joint venture in agricultural sector for its being an agriculture-prone country or convince MNCs to license their agricultural technologies especially biotechnologies to the country. Such technologies which already prove to be helpful in high yielding in India, Thailand or the Philippines may benefit hunger-stricken Bangladeshis with food and economic means. This regime is also supposed to protect farmers' traditional rights to re-sow and exchange seeds. Such initiative can save local farmers from spending money each time they sow seeds and help them fulfilling subsistence needs. With a view to compliment the *sui generis* regime, the country can amend its Seeds Ordinance 1977[246] to encourage seed trade to promote the seed industry, boost exports, and protect seed quality. Such schemes are expected to provide adequate rewards to stimulate successful R&D of plant varieties without compromising local needs and would promote breeders exclusively as a means to promote agricultural trade since both over-protection and under-protection detrimentally affect trade, and discount food security issues.[247]

[243] J M Finger, 'The WTO's Special Burden on Less Developed Countries' (2000) 19(3) *Cato Journal* 425.

[244] UNCTAD, *The TRIPS Agreement and Developing Countries* (1996)

<http://www.unctad.org/en/docs/ite1_en.pdf > 10 July 2010.

[245] Ibid.

[246] Ordinance No. XXXIII of 1977. Published in the *Bangladesh* Gazette, Extraordinary, dated the 19th July *1977*.

[247] Ragavan and O'shields, above n 235, 97.

In addition, the Patents and Designs Act 1911 which is inherited from the colonial times provides for protection of all inventions including pharmaceuticals. So, in some respect Bangladesh is already in the TRIPS arena but the protection has hardly managed only four MNCs subsidiaries to have their operations in Bangladesh. It is also true that because of the protection some pharmaceutical enterprises have tried to develop their own technology in producing generics of in-patent and off-patent drugs. However, this gain is nothing compared to India since the weak IPRs regime started in 1970 could bring in the rapid evolution of Indian pharmaceutical industry in building local capabilities and now it stands seven in the world ranking with a rising trend of residents in patent ownership in India, and in terms of the ability of India to raise her share in the US patents. Not only that, it also accounts for 70 per cent of the bulk drugs production and 80 per cent of formulations produced in the country. So, it is not IPRs but the technological capabilities of Indian companies and institutions which have attracted leading MNCs to open R&D joint ventures, hire contract research and establish R&D centres. Ranbaxy, Abbot Laboratories, Parke Davis, and Smith Kline and Beecham, among others are the examples of such Indian technology adventures.[248] So, in addition to strengthening IPRs which is a reality now, Bangladesh should give attention to building local capabilities by joint ventures, commissioning contract research and setting up R&D centres as India did.

7.2. Issues for International Action to Moderate the Adverse Effect

Among the steps that developing country governments can unitedly take at the international level include building a consensus on the moratorium on further strengthening of IPRs regime, granting flexibility to low income developing countries below a certain level of per capita income in implementing the provisions of TRIPS, pressurizing the TRIPS Council to consider ways and means to operationalize the 'best endeavour' nature objective and principles in respect of transfer and dissemination of technology to developing countries, particularly the least developed countries[249] with the incorporation of specific provisions for transfer of technology, and adopting differential pricing strategies for developed and developing countries. In addition, one of the ways of compensating the low income countries for the adverse effects of strengthened IPRs regime is to provide increased technical assistance and international R&D funding to local enterprises to help them build local capabilities. Developed countries' donation of a substantial proportion of technology license fees collected from low income

[248] For instance, Eli Lilly established a joint venture with Ranbaxy in the mid-1990s for development of a cost effective process for synthesis of Cefaclor, among other products, taking advantage of the latter's process development capabilities. Similarly, Bayer contracted Ranbaxy to develop single doses formulations of its proprietary Ciprofloxacine. A number of leading MNEs have also contracted Indian public funded R&D institutions for synthesis of new molecules and process development. For more details, see Kumar, above n 4.

[249] Carlos Correa, 'The TRIPS Agreement and Transfer of Technology' in Kevin P Gallagher (ed), *Putting Development First: The Importance of Policy Space in the WTO and IFIs* (2005) 126-145.

countries to a fund created in the respective countries could also be possible to assist inventive activities of domestic enterprises. After all, developing countries should oppose any attempt of developed countries to introduce TRIPS plus patent regime and ever-greening of patents.[250]

8. Concluding Remarks

The analysis reviewed here claims that strengthening IPRS in the TRIPS web-netting agriculture and pharmaceuticals caries mixed economic prospects and concerns for an agriculture-prone and densely populated LDC like Bangladesh. The TRIPS standard-setting in relation to agriculture and pharmaceuticals does not help the country to fulfil subsistence needs or promote economic development through innovations. Because, neither the Agreement nor the existing Bangladesh IPRs legislations take into account the general subsistence needs and economic development of the great majority of poor people. However, exception clauses and special and differential treatment in terms of compliance deadline and technology transfer promises can help an LDC like Bangladesh to reverse-engineer existing knowledge products and supply them to home and abroad with the broader view of meeting survival needs and making economic progress. To qualify for such treatments, Bangladesh legislations need to streamline existing provisions that define patentable inventions, compulsory licensing and other differential treatment, and the TRIPS needs to be more specific on technology transfer arrangements, which are currently in paper, not in practice.

[250] Kumar, above n 4.