Designing Intellectual Property Law as a Tool for Development: Prospects and Challenges of the Ethiopian Patent Regime

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Abstract

Intellectual property rights are believed to have an indirect role in facilitating the development efforts of a particular country by encouraging investment in inventions by establishing secured property system. The now advanced countries and the newly industrialized countries used to design their patent laws in tune with their technical and economic needs. They do so, for instance by weak intellectual property systems, by excluding sensitive technological fields from protection, by violating foreign rights, by using petty-patents and encouraging imitation, adaptation and reverse-engineering. However, means available during those times are blocked by harmonization of intellectual property rights through multilateral, regional and bilateral agreements. There are also ongoing harmonization efforts. The flexibilities for policy options are impoverished by these movements. Catching up efforts by technologically non-proficient or non-industrialized countries are becoming increasingly difficult. Their low technological capability demands them to tailor intellectual property system that helps technological knowledge develop within them by encouraging learning by doing and accumulation of knowledge. Compared to the historical, theoretical and empirical lessons, the current Ethiopian patent law, though its aim is to encourage local inventive activities, build national technological capability and transfer and adaptation of foreign technologies, crushes itself by employing standards that cannot be met by domestic enterprises even in cases of minor inventions. Ethiopia should, therefore, reform its patent law in a way that can contribute to its development efforts and enhance technical learning and accumulation of knowledge by domestic enterprises via increased exposure to foreign technologies.

Chapter One

Introduction

1.1. Background of the Study

Intellectual property law is a regime of law that regulates the creation, use and exploitation of mental and creative labor. In other words, it is a general area of law that encompasses copyright, patents, industrial designs and trademarks. There are various explanations for the protection of intellectual property right (IPRs): we are entitled to control which we create (argument from creator); the creator of an intangible deserves control over its use (argument from desert); the act of creation entails embodiment of the personality of the creator as a person requires giving her some control over the intangible in which she has invested herself (argument from personhood).[1] It is also argued that IPRs' protection through intellectual property law regimes is essential for national, regional and global prosperity.[2] Theoretically speaking, society is thought to benefit from the monopoly rights arranged by intellectual property rights regime through stimulating private innovation, enabling the use of new technology in the production activity, disseminating the new knowledge and stimulating innovation by other enterprises.[3] Generally speaking, these are the major growth effects of IPRs: (1) it stimulates private innovation by providing incentive through entitling monopoly right to exploit his invention and then recover the cost of research and development (R&D) (2) the new knowledge is employed in the productive activity of the country and hence leading to higher incomes, employment and competitiveness in the economy as a whole (3) effective protection and enforcement of IPRs provides incentive for inventors to disclose their new knowledge to others and (4) the information disclosed by patent stimulates invention by other technical community, i.e., stimulating innovation around patents. There are

[1] . Spence, Michael (2007), Intellectual Property, Oxford University Press, pp. 43-74
[2] . Ibid, pp.1
[3] . Sanjaya Lall and Manuel Albaladejo (2003), Indicators of the Relative Importance of IPRs in Developing Countries, UNCTAD-ICTSD, pp. 1

also researchers that are against the protection of intellectual property rights.[4] They argued that inventions were undertaken for the sake of knowledge itself, not for the sake of incentive. They reasoned that technologies cannot be easily copied and the natural lead time for reverse engineering is enough to protect the invention. Monopoly rights that are established by patent protection may result in higher prices of the protected products and, as a result, deprives the poor from getting access to basic necessities such as pharmaceuticals and food. They also cited relevant historical instances that witnessed the development of inventions and creations without providing for the protection of IPRs. However, their exclusive nature which creates monopoly and their global harmonization is criticized and it is often argued that it is detrimental for developing countries and least developed countries.[5]

IPRs used to have only territorial applicability in a sense that they could come into being and be protected only within the territory of the country. In those times, individual countries have the freedom to tailor IPRs regime that fits with their socioeconomic needs. However, through time, international agreements concerning IPRs began to emerge that constricts country policy and legal options. Some of these conventions are Paris Convention, Berne Convention, Rome Convention, Geneva Convention for the Protection of Producers of Phonograms, the UPOV Convention, and the Treaty on Intellectual Property in Respect of Integrated Circuits. Most of these conventions, which are administered by World Intellectual Property Office (WIPO), introduced the principle of national treatment through which foreigners are protected without discrimination. The territorial protection is still preserved but the discretion left to countries in serving their needs through intellectual property rights is impoverished from time to time by the harmonization of intellectual property rights and through bilateral and regional trade agreements.[6] Literatures elaborated that all these movements were highly influenced by private

[4] . See, for instance, Spence, supra note1, Ha-Joon Chang, Intellectual Property Rights and Economic Development: Historical Lessons and Emerging Issues, TW, Commission on Intellectual Property Rights (2002), Integrating Intellectual Property Rights and Development Policy, London

[5] . As I will explain in the coming chapter, this is not absolutely true for all developing countries.

[6] . Peter Drahos (2002), Information Feudalism: Who Owns the Knowledge Economy?, Earthscans Publishers Ltd., UK (hereafter Info Feudalism). This book provides a thorough explanation of the negotiation of TRIPS Agreement and the role played by companies in the developed world in the result of the negotiation. See also, Susan K. Sell, *The Origins of a Trade-Based Approach to Intellectual Property Protection: The Role of Industry Associations*, Available at http://scx.sagepub.com/cgi/content/refs/17/2/163, (hereafter Susan) and Getachew Mengiste (2009), 'Impact of the International Patent System on Developing Countries', in Journal of Ethiopian Law, vol. no.

companies and their alliances in the developed world that generate bulk amount of IP assets and seek protection for them in foreign markets from possible piracy.[7]

There are arguments that failure to protect IPRs is a barrier to trade. It is also argued that weak enforcement mechanism available in WIPO has necessitated the inclusion of IPRs in the World Trade Organization (WTO) through the Agreement on Trade Related Aspects of Intellectual Property Rights (Hereafter TRIPS Agreement). It provides for the principles of most favored nation treatment and national treatment. Minimum standards for the protection of patents, copyright and related rights, trademarks, industrial designs, layout designs (topographies) of integrated circuits, geographical indications, and undisclosed information are stipulated under TRIPs Agreement. Patent or *sui generis* protection for plant varieties is also part of the covered rights under the TRIPS Agreement. It also incorporates other earlier agreements on IPRs by reference. The harmonization effort is not over. There are ongoing harmonization efforts of substantive patent law in WIPO.[8] The IP system under WTO is criticized for its failure to incorporate enough flexibility that fits the development needs of developing countries and raising the transaction cost for transfer of technologies.[9] In contrast, there are views that the TRIPS agreement exhibits adequate flexibilities for member countries and the problem lies in the inability of developing countries to devise wisely their science and technology policies and intellectual property laws in a way that enable them to exploit these flexibilities.

Though there is no consensus, IPR regime is recognized for its indirect effect on economic development by encouraging the innovative activity that in turn is the source of total factor productivity improvements. UNHCHR and WIPO, in their joint publication called *"Intellectual Property and Human Rights,"* held that "appropriate intellectual property protection can

[7] . CIPR, supra note 4, pp. 5

[8]. See, for instance, Getachew Mengiste (2009), 'Impact of the International Patent System on Developing Countries', in *Journal of Ethiopian Law*, vol. 23. no.1, pp. 206-210

[9]. See, for instance, Peter Drahos (2002), Information Feudalism: Who Owns the Knowledge Economy?, Earthscans Publishers Ltd. It analogizes the international patent harmonization with feudalism. The latter is a system whereby landlords gained the social subordination and services the majority along with enormous economic power and wealth. The former is a system information owners collect royalties and licens fees from the majority of the world population that can't generate the same. See the same on page 1-3.

contribute to the economic, social and cultural progress of the world's diverse population" (introductory note of the publication). The empirical evidence from East Asian economies such as Japan, South Korea, Taiwan, Hong Kong, Singapore, Malaysia, Thailand, Indonesia, and China which had records of miraculous growth rate over the 1960-90.[10] Many researches reached consensus that this fastest growth rate was recorded due to the countries' ability to imitate, absorb, assimilate, replicate or 'duplicative imitation' of foreign innovations.[11]

Ethiopia is not a member of the conventions mentioned above. Nor is a member of WTO though the accession process is commenced and still in the initial phase. Ethiopia came up with her National Science and Technology Policy in 1993 and the Patent Proclamation was promulgated in 1995. The Ethiopian Intellectual Property Office and the Ethiopian Science and Technology Commission (now reorganized as Ministry) are the main actors in the enforcement of the policy and the IP laws. The policy recognizes the positive link between IPRs and economic development. There were moves to review the National Science and Technology Policy with a view to further IPRs' role in pursuing the development endeavors of the country. Accordingly, the policy was reviewed and a new policy document has been prepared and opened for discussion since 2006. It is reported that the experience of East Asian countries had played a vital role in designing the policy. But the country did not witness improvement in its IP laws.

1.2. Statement of the Problem

Ethiopia is one of the 48 countries that appear on the current United Nation's list of least developed countries (LDCs). It has gone through various structural adjustment programs (SAP) and poverty reduction strategy which were financed by the World Bank. Recently, it adopts Growth and Transformation Plan (GTP) that envisaged to end poverty and to graduate to middle

[10]. Nagesh Kumar, *'Intellectual Property Rights, Technology and Economic Development: Experience of Asian Countries'*, Commission on Intellectual Property Rights, Study Paper 1b, Available at http://www.twnside.org.sg/title2/FTAs/Intellectual_Property/IP_and_Development/IPR_TechnologyandEconomicDevelopment-Nagesh_Kumar.pdf , pp. 4

[11] . Ibid

income earning countries after the coming ten years. There are various developmental needs of the country as it is least developed in terms of various parameters.

The country recognizes the role of IPRs (innovation- a term used in the policy document) in economic development. Accordingly, it introduces various reforms in different sectors, especially in the education sector. It adopts a 70:30 ratio of the natural science and social science students to be enrolled in higher education respectively. It recognizes the need to create a link between higher education (Universities and technical and vocational schools) and the industry. The science and technology policy is eager to imitate technologies of advanced countries and to build the capacity of graduates from higher educational institutions to this effect. For instance it aims at devising appropriate legal, fiscal, and financial instruments for selection, importation, absorption, and adaptation of foreign technology and ensuring establishment of institutional facilities for relevant technology information provision and assimilation of imported technology.[12] This is learnt from East Asian countries. However, it is questionable whether the country can continue pursuing the policy's objectives (achieving fastest economic growth through facilitating innovation by employing weak IP laws as a tool) given the current legal and institutional framework and its move to join WTO.

This paper will try to uncover the various policies, institutions and laws of the country and their implementation in relation to IPRs. It will also try to examine the legal and practical difficulties that hinder the achievement of goals stated in the policy document. Emphasis will be given to the country's move to join WTO and its possible impact on the policy and the related economic development.

1.3. Research Questions

This paper tried to answer the following major research questions;

[12] . Ethiopian Science and Technology Commission (1993), National Science, Technology and Innovation (STI) Policy of Ethiopia, Draft for Discussion, Second Draft: also available at http://www.most.gov.et/National%20STI%20Policy%20Draft.pdf

i. Is there a link between economic development and intellectual property rights regime?
ii. Is the current policy, institutional and legal framework of IPRs in Ethiopia addresses the development needs of the county?
iii. Is it possible to pursue the objectives of the National Science and Technology Policy and patent law within the WTO IPR system?
iv. What are the practical, legal and institutional problems that impede advancement in national innovation and development related to it?

1.4. Objective of the Study

This paper aims at:

a) Examining the nexus between economic development and IPRs
b) Examining whether the current legal and institutional framework of the country provides conducive environment for local innovation, imitation of foreign technology and related economic development;
c) Searching for the actual and potential local and global challenges on the realization of economic development through facilitating innovation; special focus will be given on the consequences of WTO accession on the national science and technology policy and patent law and economic development of the country.
d) Indicating possible solution for the identified problems and informing stakeholders, mainly the government and its agents, thereof.

1.5. Methodology of the Research

The research made use of both primary and secondary sources. It employs interviews of concerned personnel in the field as primary sources of data collection.

Books, journals articles, laws (domestic and international), archives and internet sources will be consulted to discover the policy, institutions and lows with respect to IPRs and the experiences

of other countries, special emphasis will be given to the experiences of Asian Countries like South Korea, China and Taiwan because it is based on these countries' experiences that the national science and technology policy is adopted. The availability of data is also taken into consideration. Therefore, the research used mixed approach because it involves issues to be quantified and qualified as well.

1.6. Significance of the Study

This study will:

- Acquaint stakeholders with the necessary knowledge as to the legal and institutional frame work of IPRs in Ethiopia.
- Inform the stakeholders as to the nexus between economic development and IPRs and the actual and potential problems that may impede the realization of economic development through IPRs.
- Enable the government to come up with policy, law and institutional rearrangements to cope up with the challenges and purse development goals
- Serve as the basis for further studies in the area

1.7. Limitations of the Study

Due to shortage of time and finance that is necessary to come up with comprehensive research it is confined to these issues: The nexus between economic development and IPRs as elaborated theoretically and in practice, recognition of this nexus in the policies and patent law of Ethiopia, challenges of the realization of the objectives thereof and solutions to overcome these challenges. Special concern is given to patent law-related challenges with specific reference to patent and utility model certificates. Part of the proclamation that deals with industrial design is excluded from the scope of this research.

1.8. Structure of the Thesis

This paper is organized in the following way: Chapter two incorporates review of literature on the relationship between protection of IPRs and economic development. It also analyses how developed countries and the newly industrialized countries shaped their IP laws with their economic and technological needs in their history. Chapter three reviews literature on the use of IP laws as a tool for development in India, South Korea, Japan and Taiwan. Their history reveals that IP protection is not an end by itself but tailored as a tool utilized to realize certain public policy. It also reviews literature on the use of compensatory liability regime, particularly for technologically non-proficient developing countries and least developed countries which are generally understood as non-industrialized. Chapter four examines whether the Ethiopian patent regime is a pro-development tool or suits its economic and technological needs and provides alternative measures to be taken. The last chapter, chapter five, provides conclusion of the discussions and recommendations.

Chapter Two

Connection between Intellectual Property Rights and Economic Development

2.1. Introduction

The relationship between intellectual property rights and economic development is very complex and vague as research findings proved.[1] Mercurio summarized this complexity by stating that "economic literature is equivocal, with some studies concluding that the connection is strong while others conclude it to be fairly weak (and that there may not even be a connection for LDCs)".[2] According to Kumar, the strength of the IPR regime could affect economic growth indirectly in the following three ways:

> *IPR may affect the innovative activity that in turn is the source of total factor productivity (TFP) improvements and thus contributes to growth. The IPR regime could affect the inflows of FDI and technology transfers and thus contributes to growth. (2) Given the international dimension of IPR regimes, there could be implications for international trade of countries, for instance, on the ability of countries to export certain goods. (3)Finally, the changes in IPR regimes may imply some redistribution of income between the countries and between communities within the country.*[3]

It is also argued that IPRs protection can be used to generate revenues, improve balance of payment, provide access to international markets, creates confidence to investors by providing a secure property system, increase employment opportunities, improve productivity, alleviate poverty and provide technical know-how to the developing countries.[4] These are the main growth effects of IPRs summarized above by Kumar: Facilitating investment for invention by providing incentive, enhancing the inflow of FDI and accelerating trade flows of capital goods. However, the link between strength of IPRs and economic development lacks causal relationship because there are many poor countries, especially Sub-Saharan African countries, which exhibit

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[1]. K.E. Maskus *et al*, Intellectual Property Rights and Economic Development in China, (hereafter Maskus *et al*), pp. 4

[2]. Bryan Mercurio, Reconceptualizing the Debate on Intellectual Property Rights and Economic Development, Quoting P. Moser and K. E. Maskus, pp. 65

[3]. Nagesh Kumar, *'Intellectual Property Rights, Technology and Economic Development: Experience of Asian Countries'*, Commission on Intellectual Property Rights, Study Paper 1b, Available at http://www.twnside.org.sg/title2/FTAs/Intellectual_Property/IP_and_Development/IPR_TechnologyandEconomicDevelopment-Nagesh_Kumar.pdf, pp. 13

[4]. Pervez Z. Janjua, Intellectual Property Rights and Economic Growth: A Case Study of Middle Income Developing Countries, pp.5. It should be noted that the growth effects mentioned above are with particular reference to middle income countries.

strong IPRs regime.[5] The relationship becomes positive after a country attains some level of technological and economic progress that can benefit from stronger protection of IPRs.[6] According to Lall, the optimum level of per capita income for a country to attain strong IPRs is $7,750 (in 1895 prices).[7]

There are researchers who argued that intellectual property has nothing to do with development especially if the country in question is least developed country and technologically non-proficient developing countries. In such cases, IP may, to the contrary, hamper development efforts. It may result in reduction of economic activity as a result of monopoly and longer-term growth potential in the granting country by discouraging copying and reverse-engineering.[8] On the other hand, there are researchers who argued that intellectual property rights promotes development by stimulating investment in research and development (and hence stimulating local innovation by showing the signal that investors are likely to get the return of investment through their monopoly rights), attracting foreign technology (via formal mechanisms like Foreign Direct Investment (FDI) and licensing), facilitating the cross border flows of technology-intensive capital goods and disseminating technological information and thereby creating conducive environment for the development of other innovators and entrepreneurs who can invent around patents. The overall arguments on stronger protection of IPRs are summarized by the report of the Commission on Intellectual Property Rights as follows:

> *On the one side, the developed world side, there exists a powerful lobby of those who believe that all IPRs are good for business, benefit the public at large and act as catalysts for technical progress. They believe and argue that, if IPRs are good, more IPRs must be better. On the other side, the developing world side, there exists a vociferous lobby of those who believe that IPRs are likely to cripple the development of local industry and technology, will harm the local population and benefit none but the developed world. They believe and argue that, if IPRs are bad, the fewer the better.*[9]

On the other hand, there is a middle ground argument that relied on the relative importance of IPRs. There are researches that rely on the relative importance of IPRs and against the 'one-size-fits-all' movement of the harmonization of intellectual property rights. They tacitly classify the world economies into developed countries, "technologically proficient" developing countries and

[5] . Nagesh Kumar, supra note 3, pp. 13
[6] . Ibid, pp.14
[7]. S. Lall (2003), Indicators of Relative Importance of Intellectual Property Rights, UNCTAD & ICTSD, (hereafter S. Lall), pp. 1
[8] . Ibid, pp.9
[9]. Report of the Commission on Intellectual Property Rights (2002), Integrating Intellectual Property Rights and Development Policy (hereafter CIPR), London, pp. iii. For more understanding of the developing world side see Peter Drahos (2002), Information Feudalism: Who Owns the Knowledge Economy?, Earthscans Publishers Ltd, pp. 2. It explained that the basic source of learning and acquisition of skills for non-industrialized countries is copying and imitation and stronger protection of IPRs hamper this process by raising the cost of borrowing technologies.

technologically non-proficient developing countries. The relative importance of strong IPRs declines when one goes down the line of their order. Developed countries can acquire benefits from stronger protection of IPRs because they have the national economic strength, established legal mechanisms, and wealth and infrastructure to triumph over the challenges associated with stronger protection.[10] Technologically proficient countries can also benefit from it though they faced challenges with regard to adjustment costs because they were relied on imitating foreign technologies.[11] Developing countries with low technological capability and LDCs with no viable technological base would emerge as net losers in providing stronger IPRs because they lack the finance, experts and institutions for generating IPRs that could benefit from protection.[12] This view is the most accepted stand in recent empirical and theoretical researches upon which this chapter bases.

2.2. Relation between the Strength of IP Rights and Economic Development

Growth in income levels is one of the factors that influence the issuance of national policies.[13] The basic reason behind this line of argument is the fact that protection of invention without the existence of large proportion of society that can pay for protected inventions could not generate meaningful contribution for the development of the protecting country.[14] The relationship between income level and strength of IPRs is positive after the turning point is reached. Maskus and co-authors described the political economy of the process as follows:

> *The poorest countries allocate virtually no resources to invention or innovation*[15] *and have little intellectual property to protect. As incomes and technical capabilities grow to moderate levels, some inventive capacity, particularly of the adaptive kind, but competition remains based on imitation and the majority of economic and political interests prefer weak protection. As*

[10]. Ibid
[11]. Ibid
[12]. For more analysis, see Bryan Mercurio (2010), *Reconceptualizing the Debate on Intellectual Property Rights and Economic Development*, available at http://www.bepress.com/ldr/vol3/iss1/art3/, (hereafter Mercurio), Walter G. Park & Juan C. Ginrate (1997), 'Intellectual Property Rights and Economic Growth', *Contemporary Economic Policy*, Vol. XV, (herafter Ginrate and Park) Sanjaya Lall and Manuel Albaladejo (2003), Indicators of the Relative Importance of IPRs in Developing Countries, UNCTAD-ICTSD, Shamnad Basheer and Annalisa Primi *WIPO Development Agenda: Factoring in Technologically Proficient Developing Countries*, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1289288&download=yes, WIPO, Intellectual Property in Asian Countries: Studies on Infrastructure and Economic Impact, available at http://www.wipo.int/freepublications/en/intproperty/1018/wipo_pub_1018.pdf, supra note 3 above and infra note 10 below.
[13]. Maskus *et al*, supra note 1, pp. 4
[14]. CIPR, supra note 9, pp. 111
[15]. According to the authors, invention referred to as creation of new knowledge while innovation is the "commercialization" aspect, i.e., the development of marketable products from the generated new knowledge.

> *an economy develops additional inventive capacity and demand for high-quality products emerge, more firms lobby for effective protection, a process that is abetted by foreign firms interested in servicing growing markets. Finally, protection shifts up sharply at the highest level of income.*[16]

Lall also demonstrates that evidence from econometric cross-section "suggested an inverted U-shaped relationship between the strength of patents and income levels. The intensity of patenting first falls with rising incomes, as countries slacken patents to build local capabilities, then rises as they engage in more innovative effort".[17] To explain the relative importance of IPRs for developing countries, Lall classifies the targeted 87 countries into four groupings based on technological activity, industrial performance and technology imports. The four classifications are the "world technological leaders" (countries with intense technological activity and considerable innovative capabilities), countries with "moderate technological activity" (countries undertaking R&D and having medium levels of industrial development), countries with "low technological activity", and "countries with no significant technological activity"[18] (the least industrialized countries with the simplest technological structures).[19] Countries categorized under the first two groups are likely to benefit from strong IPRs.[20] The importance of strong IPRs for countries with "low technological activity" is contingent upon the "level of domestic technological capabilities and their reliance on formal technology inflows."[21] However, there is virtually no importance of IPRS for the last category. They are likely to "gain least, and lose most, from strict patent rules. They will tend to pay the costs (higher prices for protected products and technologies) but gain little by way of technology development or transfer."[22]

Poorest countries may provide for stronger protection of IPRs. Since effective enforcement of such regime requires them to spend resources for their administration and management, they will eventually fail to enforce. The reason is that "expansion of legal rights without significant

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[16]. Makus *et al*, supra note 13, pp.4. This is consistent with many research results which are against the "one-size-fits-all" scenario of the international patent system established by the TRIPS. See, for example, Nagesh Kumar, *'Intellectual Property Rights, Technology and Economic Development: Experience of Asian Countries'*, Commission on Intellectual Property Rights, Study Paper 1b, Available at http://www.twnside.org.sg/title2/FTAs/Intellectual_Property/IP_and_Development/IPR_TechnologyandEconomicDevelopment-Nagesh_Kumar.pdf, Linsu Kim, Technology Transfer and Intellectual Property Rights: The Korean Experience (2003), Lee. G. Branstetter, 'Do Stronger Patents Induce More Local Innovation?', in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime* (2005), Ha-Joon Chang, Intellectual Property Rights and Economic Development: Historical Lessons and Emerging Issues, TWN. This is consistent with the historical and cross-section evidence that "many rich countries used weak patent protection in their early stages of industrialization, increasing protection as they approached the leaders". See Sanjaya Lall and Manuel Albaladejo (2003), Indicators of the Relative Importance of IPRs in Developing Countries, UNCTAD-ICTSD, pp. 1

[17]. S. Lall, supra note 7, pp. 1

[18]. Ethiopia is one of the countries which are categorized under this group. The group consists of countries like Tanzania, Zimbabwe, Malawi, Senegal, Uganda, etc. See Ibid, pp. 15 & 17

[19]. Ibid, pp.2

[20]. Ibid

[21]. Ibid

[22]. Ibid

interests in its behalf is unlikely to be well enforced or effective."[23] This argument, therefore, requires countries to wait until their economies become sufficiently developed before adopting strong regimes of IPRs.[24]

To the vice versa, IPRs also have simulative impact on the process of economic development. The generation of new knowledge and imitation and adaptation of the already existing technologies requires investment. Investors will engage in such sort of investments if the legal regime secures their expected return from their investment. If there is no such legal protection, thus, enhancing attitudes of invention, creativity and risk-taking will be difficult.[25] Consequently, the economy will decline in such a way that only coping and counterfeiting is reinforced.[26] Technology follower countries use effective systems of utility models (petty patents) to foster the technological learning through imitation and adaptation of available technologies that yield small advancement in process and product designs.[27]

2.3. The Role of Intellectual Property Protection for Economic Development

The following arguments are usually forwarded by scholars that support the importance of stronger protection of IP for the development of local innovation. It is also important to note that most of the arguments provided are workable especially in countries where imitation capacity is feasible. Even for countries like China, where there is large market for new technological products, companies in the developed world enter the market regardless of the ineffective enforcement of IP and higher probability of imitation. [28]The next chapter will provide historical and empirical evidences that support the argument that weak protection of intellectual property induces local innovation and economic development in least developed countries.

2.3.1 IPRs and Trade Flows

Trade in capital goods is one of the mechanisms by which developing countries are able to get access to foreign technologies. Maskus and his co-authors found that intellectual property have its own impact on trade flows when the goods that flow across national boundaries are

[23]. Ibid, pp.1
[24]. Ibid. However, Maskus *et al* did not advise developing countries to adopt weak IP regime because of, they argue, the long-run benefit that they can reap from stronger protection of IP.
[25]. This is one of the underlying arguments that usually appear in favor of intellectual property protection in general. See also the introductory chapter, pp. 1
[26]. Ibid,
[27]. Ibid
[28]. Peter K Yu, Intellectual Property, Economic Development, and the China Puzzle, available at http://ssrn.com/abstract=978301, (hereafter K Yu), pp. 175

knowledge-intensive.[29] Import of knowledge- intensive goods is enhanced by strengthening IPRs because the level of counterfeiting is minimized when the importing country adopts stronger protection and enforcement of IP. This is well expressed in the words of Lall who argued:

> *"Stricter IPRs may facilitate the transfer of technology across national borders as well as increase local diffusion by providing an enforceable legal framework. This is likely to be of special significance for technology-intensive products and activities, where innovators are averse to saving technology to countries with weak IPRs, where leakage is a real possibility."*[30]

The whole work of Lall is on the relative importance of IPRs for economic development. Therefore, the importance of IPRs for developed and developing countries is not one and the same. It is dependent on two conditions: technological nature of the activity and nature of the economy.[31] The mere assumption that strong IPRs regime may result in the enhanced transfer of technology across border does not mean that developing countries may reap benefit out of it. Their benefit is contingent upon many factors which Lall elaborated as follows:

> *The economic benefit in developing countries depends on the presence of local agents capable of purchasing, absorbing, and deploying new technologies exist, particularly complex high technologies. If no technologies exist, strict IPRs offer no benefit for technology transfer. If no such agents exist, the size of the benefits depends on two things: the extent to which strict IPRs raise the cost of buying technologies and whether the alternatives of copying and reverse engineering would have been feasible, cheaper and more rewarding in building up local technological capabilities.*[32]

Therefore, stronger protection is not the only factor that influences the inflow of capital goods. In case it affects the inflow of capital goods, its benefit is maximized when a receiving country has a capacity to absorb technologies. Hence non-industrialized least developed countries are unlikely to benefit in this regard simply because they have strong IP protection.

2.3.2. IPRs and Technology Transfer

[29]. Fink Carsten and Carlos A. Primo, *How Stronger Protection of Intellectual Property Rights Affects International Trade Flows,* Available at, http://ideas.repec.org/p/wbk/wbrwps/2051.html, pp. 2
[30]. S. Lall, supra note 7, pp. 9.
[31]. Ibid, pp. 10
[32]. Ibid

Empirical studies show that transfer of foreign technology is the crucial source of innovation for developing countries.[33] There are diverse modalities of technology transfer such as non-equity (e.g. acquisition of machinery and equipment, imitation through reverse engineering and other means, technical assistance provided by Original Equipment Suppliers) and equity forms, informal and formal (e.g. turn-key agreements, licenses, FDI) mechanisms.[34] Correa argued that the making use of dissimilar style of technology transfer "varies as the firms and the industry evolve through different stages."[35] He further elaborated that "at the imitation stage in the industrialization process, mostly mature technologies are incorporated by firms in developing countries through non-equity forms of technology transfer" and "technologies need to be acquired through more formal modes where complex processes and plant lay-outs are difficult to imitate."[36] The table below shows these modalities.

Figure 1: Different Modes of Technology Transfer (Adapted from Linsu Kim, 2003)

Market Mediated	Foreign direct investment, foreign licensing, turnkey plants, technical consultancy, made-order machinery	Standard (serial) machinery
Non-market mediated	Technical assistance by foreign buyers, technical assistance by foreign vendors	Imitation, (reverse engineering), observation, trade journals, technical information service

Technology transfer is a mechanism by which they can facilitate their industrialization process and economic development.[37] The question, therefore, is whether developing countries can

[33]. Carlos M. Correa, 'Can the TRIPS Agreement Foster Technology Transfer to Developing Countries?' in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime*, pp. 229

[34]. Carlos M. Correa (2007), Trade Related Aspects of Intellectual Property Rights: Commentary on the TRIPS Agreement, Oxford University Press, pp. 97-98

[35]. Ibid

[36]. Ibid

[37]. Ibid.

attract inflow of foreign technology by strengthening their IPRs regime. The research findings in this regard are inconclusive. On the one hand, there is evidence that stronger protection of IP can foster the "diffusion of new innovations from outside the country".[38] Branstetter, for instance, advised that "when dealing with high-technology multilateral firms, developing countries should heed the following slogan: built it (strong IPRs) and they will come".[39] However, he recognized that strengthening patent protection is not the only condition to attract foreign technology. It should be backed by effective enforcement.[40]

On the other hand, there are research findings that consider IP protection as one of – but not the most important- factor to attract foreign technology.[41] The Commission on Intellectual Property advised that:

> *What is clear… is that strong IPRs alone provide neither the necessary nor sufficient incentives for firms to invest in particular countries. If this was the case, the large countries with high growth rates but weak IPR regimes would not have received large foreign investment inflows in the past and even now. This includes many of the East Asian and Latin American economies which have received the bulk of such flows. If the question is addressed in terms of what factors are most important in determining foreign investment, it is quite common for IPRs to be omitted altogether.*[42]

Other important factors are, among others, 'strong absorptive capacity to imitate foreign products and technologies' and a "sufficiently large market to enable foreign firms to capture economies of scale or scope".[43] In addition, there are investments which are less sensitive to IPRs protection or more sensitive to it. Accordingly, investments decision to relocate manufacturing facilities take into considerations like "market size and growth, local demand patterns, transport costs and distance from markets, low wage costs in relation to labour productivity, abundant natural resources, and trade protection that could encourage "tariff jumping" investments".[44] Investment decisions to relocate R&D establishments are more influenced by the "level of education and training of the local workforce, the condition of its financial sector, the health of its legal system, and the transparency of governmental procedures".[45]

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[38]. Lee. G. Branstetter, 'Do Stronger Patents Induce More Local Innovation?', in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime*, quoting Kamal Saggi pp. 317-18,
[39]. Ibid, pp.318
[40]. Ibid, pp. 319
[41]. See, for example, Carlos M. Correa, supra note 33, Pedro Roffe, infra note 48, K Yu, supra note 28.
[42]. CIPR, supra note 9, pp. 23
[43]. Peter K Yu, supra note 28, pp. 177
[44]. Ibid
[45]. Ibid

C. Correa also reached on similar conclusion that "IPRs are but one of many factors- and arguably not the most important factor- that affect cross-borders flows of technology."[46] He also argued that, the effect of IPRs on transfer of technology, if any, is limited to scenarios where "cutting-edge and easy-to-imitate technologies are at stake" and where "'tacit', non-codified knowledge is an essential component of the technology package".[47] Other research also indicated that "the impact of IPRs on transfer of technology depends on the level of economic and technological development in specific receiving countries".[48] This view is further strengthened by C. Correa that emphasized on the fact that, despite the demand of foreign technologies on the part of developing countries, technology transfer is not an easy task. He said that "technology is not just information that can be easily communicated, but its transfer requires a capacity to learn and investment to incorporate it into the firm's production system."[49] Another empirical research on the Korean Experience concluded that

> *The effects of IPRs on technology transfer to, and local innovation in, developing countries will vary according to countries' levels of economic development and to the technological nature of economic activities, and that these countries can reap long-term benefits from strong IPRs only after they reach a certain threshold level in their industrialization. Indeed strong IPRs would thwart developing countries from attempting industrialization at the very early stage. And under such an IPR environment, few are likely to emerge as newly industrialized economies.*[50]

This shows that the investment decisions of low technology industries that, most often, technologically least advanced countries need to attract are unlikely to be affected by IPRs.[51] Therefore, it is the advice of the above mentioned researchers and others too that developing countries and especially the least developed countries should take into consideration the costs and benefits of stronger protection of IPRs and in joining the multilateral and bilateral agreements that narrow the policy space available for them in pursuing their economic development by tailoring their patent regime in a way that can enhance local technological capability.

2.3.3 IPRs and Innovation

A great deal of empirical and theoretical researchers found that it is unlikely that stronger IPRs regime (like that of TRIPS) stimulates local innovation in developing and also some

[46]. Carlos M. Correa, supra note 33, pp. 228.
[47]. Ibid, pp. 231
[48]. Pedro Roffe (2005), Comment: Technology Transfer on the International Agenda, in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime*, pp. 262. CIPR's report also asserted that the evidence regarding the function of IP in trade and investment associates with those developing countries which are more technologically advanced. See CIPR, supra note 9, pp. 24
[49]. Carlos M. Correa, supra note 33, pp. 230
[50]. Linsu Kim(2003), Intellectual Property and Technology Transfer: The Korean Experience, UNCTAD & ICTSD (hereafter L.Kim), pp. 1
[51]. CIPR, supra note 9, pp.23

technologically developed countries.[52] It is possible to conclude that most researchers agree on the detriment of stronger IPRs regime for developing countries. As it is shown in the next section, learning is an important aspect in the development of local technological capabilities in these developing countries. Strong monopolistic rights hamper this process by converting "the collective knowledge available to the technical community as a whole into artificial private preserves, which have to be negotiated and combined to support investment in research and development".[53] This in turn raises costs of R&D. Report of the Commission on Intellectual Property Rights confirmed this by stating:

> *In most law income countries, with a weak scientific and technological infrastructure, IP protection at the levels mandated by TRIPS is not a significant determinant of growth. On the contrary, rapid growth is more associated with weak IP protection. In technologically advanced developing countries, there is some evidence that IP protection becomes important at a stage of development, but that stage is not until a country is well into the category of upper middle income developing countries.*[54]

In his analysis of 87 countries' relative importance of IPRs for development, Lall agreed with the above assertion by stating that technological activity in developing countries "consists mainly of learning to use imported technologies efficiently rather than to innovate on the technological frontier. Weak patents can help local firms in early stages to build technological capabilities by permitting imitation and reverse engineering."[55] He further argued:

> *Where the economy undertakes technological activity of and absorptive and adaptive kind- the great bulk of informal and R&D effort in newly industrializing countries- stronger IPRs may have no effect in stimulating [local innovation]. On the contrary, to the extent that such effort involves*

[52]. Some of these works are: Lee. G. Branstetter, 'Do Stronger Patents Induce More Local Innovation?', K.E.Maskus & J.H.Reichman (eds.), in *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime,* Carlos M. Correa, "Can the TRIPS Agreement Foster Technology Transfer to Developing Countries?" in *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime,* Ha-Joon Chang, Intellectual Property Rights and Economic Development: Historical Lessons and Emerging Issues, Linsu Kim, Intellectual Property and Technology Transfer: The Korean Experience (2003), UNCTAD & ICTSD.

[53]. J.H.Reichman (2005), Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge, in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime,* pp.345

[54]. CIPR, supra note 9, pp. 22. According to World Bank's 2010 income classification based per capita income countries are classified as Low income ($1,005 or less), Lower Middle Income ($1,006-$3,975), Upper Middle Income ($3,976-$12,275), and High Income ($12, 276 or more). See, World Bank, *How we Classify Countries,* available at, http://data.worldbank.org/about/country-classifications

[55]. S. Lall, supra note 7, pp. 1

> *copying and reverse engineering innovations elsewhere, it can constrict a vital source of learning, capability building and competitiveness.*[56]

Consequently, countries with almost negligible or low technological capability cannot get benefit out of strong protection of IPRs.[57] Stimulating local innovation in these countries demands weak protection and standards of patentability that can be met by domestic enterprises.

2.3. Historical Perspective

Summarizing historical connection between IPRs and economic development, Chang described the process as follows:

> *The historical experiences of the now-developed countries when they were developing themselves show that a "strong" IPRs regime, in the sense of providing strong protection of private intellectual property rights, was not an essential condition for their economic development. Most of them accorded only very incomplete and weak protection to IPRs until quite late in their stages of development. Even the most advanced countries, like the UK and the US, established strong IPRs regimes (except for copyright protection in the US case) only in the mid-19th century, and it was until much later that such regimes came into being in the less advanced countries.*[58]

During their early stage of industrialization, the above author argued, they used to deliberately violate intellectual property rights of foreigners via smuggling of machinery, industrial espionage, poaching of skilled workers[59], allowance of patenting of imported inventions, violation of trademarks, or even through a flat refusal to adopt the patent system.[60] Switzerland showed exceptionally special experience. It kept alarming technological advancement without having patent law.[61] This view is reinforced by the CIPR report that goes:

> *Historically IP regimes have been used by countries to further what they perceive as their own economic interests. Countries have changed their regimes at different stages of economic development as that perception (and their economic status) has changed. For instance between 1790 and 1836, as a net importer of technology, the US restricted the issue of patents to its own citizens and residents. Even in 1836, patents fees for foreigners were fixed at*

[56]. Ibid, pp. 9
[57]. Ibid, pp. 2
[58]. Ha-Joon Chang, Intellectual Property Rights and Economic Development: Historical Lessons and Emerging Issues, TWN, pp. 30
[59]. It is the act of blocking the movement of skilled workers to other countries.
[60]. Ibid
[61]. Ibid

> *ten times the rate for US citizens (and two thirds as much again if one was British!). Only in 1861 were foreigners treated on an (almost wholly) non-discriminatory basis.*[62]

Assefa explained that tailoring national IP laws consistent with a particular country's technological and economic level was a usual practice.[63] This is evident in the evolution of IP law in, for instance, USA, Japan, Germany, Switzerland, and very recently, the newly industrialized countries (NICs). He also noted that "historically, each of the advanced countries today was determined to industrialize first before either 'opening up' to forces and interests that they might previously have dreaded or before calling for stronger international IP system."[64]

The work of Chang, the report of CIPR and other researchers cited above are typical reflections of the technological trajectory developed by Linsu Kim.[65] According to the evolutionary theory, innovation starts from acquisition stage. In this stage, a country with no technological capability can commence innovation through acquiring mature foreign technologies from the already technologically advanced countries. Exposure for these technologies leads to "learning by doing"[66] and, therefore, to incremental innovation.[67] The next stage, then, is duplicative imitation whereby firms in these countries can assimilate foreign technologies to produce products with slight difference from the original. When income levels are growing and with the enhancement of local scientific and engineering personnel of engineering, the country will upgrade to the stage of intermediate technology or creative imitation. It is during this stage that the production of "facsimile technologies with new performance features"[68] and learning through R&D investment takes place. To facilitate this technological learning, countries should adhere to weak IPRs regime. Strong IPRs regime hampers this process by limiting access to protected technologies by raising transaction costs and payments for royalties. It should be after ensuring that sufficient technological capabilities to generate emerging technologies are embodied in local industries so that they can challenge firms in the developed world, those developing countries find strong IPRs regimes are in their interest.[69]

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[62]. CIPR, supra note 9, pp. 18. See also S. Lall, supra note 7, pp.11

[63]. Assefa Endeshaw (1996), Intellectual Property Policy for Non-Industrialized Countries, Dartmouth Publishing Company (hereafter), pp. 120

[64]. Ibid

[65]. L. Kim, supra note 50, pp. 9-11

[66]. This is further elaborated by Carlos M. Correa to mean "Knowledge is localized at the level of particular firms, and that it evolves and is accumulated as the firms gain experience in its application and improves upon it." See Carlos M. Correa, supra note 30, pp.229.

[67]. According to Linsu Kim the acquisition stage is the learning stage for countries which are short of local capabilities to establish production operations. Learning of the local entrepreneurs of these countries takes place through the acquisition of 'packaged' foreign technologies, which includes assembly process, product specification, production know-how, technical personnel and components and parts. Thereafter, they can undertake assembly operation foreign inputs to produce fairly standard, undifferentiated products. See, L. Kim, supra note 50, pp.1

[68]. Ibid.

[69]. Ibid, pp. 2-3. For short summary of the "technological trajectory framework" see Linsu Kim, supra note 50, pp. 1-2 & 9-11

In conclusion, countries used two methods to protect their economic and technological needs historically. Firstly, they abolished IP protection in order not to block the intake of technological information needed for their technological needs. Abolishing patent protection enables them to use foreign technology as an input for their effort of building technological capability without facing hurdle from foreign IPRs holders. Secondly, they used to enhance local innovation by lax requirements. These include employing an IP law that excludes foreigners, discriminates foreigners, excluding specific kinds of fields, considered important for reasons of economic and other public policies, from the scope of protection and by providing shorter term of protection to avoid overprotection.

Therefore, countries with no viable technology should tailor their IP law, that is weak IPRs, that can enhance technological learning through copying and reverse-engineering until domestic enterprises and research institutions are able to develop substantial IPRs that can benefit from strong protection. However, the optimal degree of protection requires a careful balance of different economic, social and cultural interests. In this regard the report of CIPR gives some clue as to what kind of interests should be taken into consideration while the level of IP protection is demarcated. It elaborated the contradicting interests that the issue involved as follows:

> *"If protection is too weak then the development of technology may be inhibited through insufficient incentives for R&D. If too much protection is conferred, consumers may not benefit, even in the long-run and patentees may generate profits far in excess of the overall costs of R&D. moreover, further inventions based on the protected technology may be stifled because, for instance, the length of the patent term is too long or the scope of the protection granted is too broad."*[70]

While weighing these competing interests, the country in question should take into account the level of its economic, social and technological development and the priority needs of its industrial strategy. The same report also asserted that "a pre-requisite for sustainable development in any country is the development of an indigenous scientific and technological capacity. This is necessary to allow countries to develop their own process of technological innovation and to enable them to absorb effectively technologies developed abroad."[71] This provides a clear guidance particularly for countries with low technological capability that IP reforms should primarily focus on building indigenous scientific and technological capability.

[70]. CIPR, supra note 9, pp. 14
[71]. Ibid, pp.20

Chapter Three

Experiences of Other Countries

3.1. India

In 1911, India had The Patents and Designs Act which was inherited from the colonial masters.[1] It provides for the 16-year protection of all inventions excepting those connected with atomic energy. Few domestic chemical and pharmaceutical industries were toiling to develop their technological capability in the 1960s. But they enter into confrontation with foreign patent owners that neither used their technologies for domestic manufacture or allowing them to utilize the technological information. This made them to lobby the government for the enactment of new patent law, which is to the interest of the enterprises and the country at large. Accordingly, a new law is promulgated in 1970. Verma stated that the basic philosophy of this law is that "patents are granted to encourage invention; to ensure that these inventions are developed, commercially without undue delay; that patents are not merely granted to enable the patentee to enjoy a monopoly on the imported article."[2] It was also enacted with a view to provide a proper balance between "adequate and effective protection of patents on the one hand and technological development, public interest and India's specific needs on the other."[3] Accordingly, it narrowed the scope of patentability in chemicals, food and pharmaceuticals to only processes and not products.[4] The scope of patent was significantly reduced because it is obviously possible to produce any chemical compound with a variety of processes. The elimination of product patent protection created favorable condition for Indian companies to further develop their technological capability and innovate.[5] It is during this time that the private sector in India has commenced to invest in R&D in new drugs.[6] The life time of process patents is reduced to 7 years and it is 14 years for other patents. The law also excludes products vital for the country's economy like agricultural and horticultural products, atomic energy and inventions on living matter from patent protection.[7] Compulsory license could be granted after 3 years in case of non-working. This makes the Indian patent regime softer than before. It is this law which was in

[1]. It is the problem of most developing countries that they do inherit laws directly from their colonial masters or from WIPO model laws or from the developed countries without adapting it to their own interest. See Getachew Mengiste, 'The Impact of the International Patent System on Developing Countries', in *Journal of Ethiopian Law*, Vol. 23, No. 1, pp. 163

[2]. Sanjay Kumar Verma, 'Impact of the Intellectual Property system on Economic Growth: India', in WIPO, *Intellectual Property in Asian Countries: Studies on Infrastructure and Economic Impact*, pp.46

[3]. Ibid, pp.17

[4]. Similarly, Verman explained that compulsory licensing and registration of only process patents for food, medicine or drugs, pesticides and substances produced by chemical processes which, apart from chemical substances also includes items such as alloys, optical glass, semiconductors, inter-metalic compounds, etc, were employed as instruments to enhance the philosophy of the law. See Ibid.

[5]. Ibid, pp.47

[6]. Ibid.

[7]. Ibid, pp.46

operation for the 30 years until the country made amendments in its bid to comply with TRIPS following its signing up to WTO in 1995.

After analyzing thorough empirical researches on the subject matter, Kumar concluded that the "abolition of product patents in chemicals and pharmaceuticals has facilitated the development of local technological capability in chemicals and pharmaceutical industry by enabling the domestic firms in their process innovative activity".[8] It is believed that the innovative capacity of Indian domestic enterprises was reinforced by its weak patent regime enacted in 1970.[9] Since weak IPR regime facilitate learning by reducing costs of transaction, the Indian firms witnessed a gradual build up in their technological capability. Statistics support this argument.[10] The abolition of product patents enabled Indian enterprises to develop various ways of processes of producing the product through reverse engineering.

3.2. Japan

During the early stages of its economic development, Japan had made use of intellectual property generated in other countries.[11] The research conducted by a team under the Ethiopian Ministry of Science and Technology (MoST) explained that Japan successfully carried out a technology policy of importing western technology and investing large amounts of R&D funding on adaptive technology from 1945-72.[12] They facilitated the process of catching up via the selection of relevant technologies generated overseas, long-term investment in adaptive research and marketing of improved products. This is made possible by the weak IP regime that the

[8]. Nagesh Kumar, *'Intellectual Property Rights, Technology and Economic Development: Experience of Asian Countries'*, Commission on Intellectual Property Rights, Study Paper 1b, Available at http://www.twnside.org.sg/title2/FTAs/Intellectual_Property/IP_and_Development/IPR_TechnologyandEconomicDevelopment-Nagesh_Kumar.pdf, pp. These empirical researches are Fikkert, Brian (1993), An Open or Closed Technology Policy? The Effects of Technology Licensing, Foreign Direct Investment, and Technology Spillovers on R&D in Indian Industrial Sector Firms, Ph.D. Dissertation, Yale University, Haksar, Vikram (1995) 'Externalities, Growth and Technology Transfer: Application to the Indian Manufacturing Sector, 1975-90', Washington, DC: International Monetary Fund, mimeo, and Kumar, Nagesh and Mohammed Saqib (1996) 'Firm Size, Opportunities for Adaptation, and In-house R&D Activity in Developing Countries: The Case of Indian Manufacturing', Research Policy, 25(5): 712-22.

[9]. Ibid

[10]. The following are traditional innovation output indicators: the share of high-technology products in exports (as a measure of the ability to compete internationally in technology), registered patents (as a measure of the ability to compete internationally in technology), and scientific publications (as a measure of how academic community is). See IKED (2006), Ethiopia: Innovation and Growth in International Comparison, pp.12. For a detailed statsistical data on how the Indian firms can develop their technological capability see Kumar, supra note 3, pp. 28-37.

[11]. Nagesh Kumar, supra note 8, pp. 22

[12]. MoST (2009), Preliminary Report on the Overview of National Development Policies & The Science, Technologies and Innovation Experiences of Other Countries, Vol. 1, pp. 60

government adopted deliberately to enhance development.[13] The following are the major legal measures in view of achieving the goal that is designed to serve the objective of industrial development:

- As per the Patent Ordinance of 1888, which substitute the 1885 Japanese Patent System, the pharmaceutical products, chemical compounds, food and beverage were precluded from the scope of patent protection to facilitate the process innovations.[14]
- The Utility Model Law that is introduced in 1905 protects minor adaptations and improvements on imported machineries or equipments.[15]
- Industrial designs with the qualification of novelty, and not inventiveness are accorded protection through the Japanese Patent System (JBS)
- It is the first-to-file principle which is employed by the JPS.
- The patent regime also required pre-grant disclosure, provides for compulsory license if a patent has not been worked in Japan continuously for more than three years or in public interest, and required the patent applications to be limited to a single narrow claim.

The above measures are calculated policy implementation instruments by the government of Japan to enable its domestic enterprises to absorb the spillovers of foreign inventive activity.[16] They helped the transfer, absorption and diffusion of technology by allowing reverse engineering and contributed to the total factor productivity (TFP) growth during the period of 1960-93.[17] Almost all of the utility models and industrial design patents were owned by Japanese nationals.[18] The role played by the weak patent regime is summarized as follows by J. Reichman:

> *Japanese industries specialized in adapting or improving inventions developed elsewhere for further application. They were so successful that they often drove the original inventors out of the market for not keeping up fast enough with the pace of improvements. To the extent that intellectual property played a role in this transformative process, it was the Japanese utility model law that often carried the weight. This law quickly broke its ties to industrial design as such and become a general-purpose petty patent law covering small-scale innovations generally (more or less as occurred in Italy). Among other perceived benefits, this law enabled Japanese industries to surround foreign*

[13]. Nagesh Kumar, supra note 8, pp.22. Trade policies adopted by the Japanese government that protected its industries from competition and restricted foreign investment also contributed for technological development. See Ibid.
[14]. Hiroshi Kato & Futoshi Yasuda, 'Impact of the Intellectual Property System on Economic Growth: Japan', in WIPO *Intellectual Property in Asian Countries: Studies on Infrastructure and Economic Impact,*pp.62
[15]. Nagesh Kumar, supra note 2, pp. 22
[16]. Ibid.
[17]. Ibid, pp. 23.
[18]. Ibid, Statistical data supporting this fact can be found in the same work from pp.22-23.

inventions with a bevy of lesser rights and thereby to induce their patent owners to enter into cross-licensing arrangements with improvers.[19]

It was in 1975 that the scope of patent system was expanded to include chemical and pharmaceutical products. This was done partly due to the ever increasing international pressure and partly due to pressures from domestic industries that are successful in developing their own technological capability. They need better protection for their own innovative activity.[20]

3.3. South Korea

It is Linsu Kim who contributed various researches on Korea's technological development. He makes use of varieties of his research results in the preparation of his article on *intellectual property and technology transfer* for the UNCTAD-ICTSD joint project on intellectual property and sustainable development. In this work he agreed with the argument that the importance of IPRs varies with respect to the level of economic development. He explains the process of evolutionary movement of technological development by using technological trajectory framework which is explained in the preceding chapter. According to Kim Korea passed through these evolutionary steps: from mature technology to intermediate technology and then to emerging technology.[21] He argued that this process cannot be undertaken without the weak IPRs that Korea adopted during the stage of mature technology. This stage was in the 1960s and 1970s during which Korean domestic enterprises "had acquired, assimilated, and adapted a large amount of mature foreign technologies largely through reverse engineering of existing foreign products under lax IPR protection".[22] Kim, therefore conclude that:

The Korean experience offers four lessons. First, strong IPR protection will hinder rather than facilitate technology transfer and indigenous learning in the early stage of industrialization when learning takes place through reverse engineering and duplicative imitation of mature foreign products. Second, only after countries have accumulated sufficient indigenous capabilities with extensive science and technology infrastructure to undertake creative imitation IPR protection becomes an important element in technology transfer and industrial activities. Third, if adequate protection and enforcement of IPRS is genuinely intended to enhance development, policy makers should seriously consider differentiation in terms of the level of economic development and

[19]. J.H.Reichman and Tracy Lewis (2005), 'Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge', in *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime*, pp. 339

[20]. Kumar, supra note 8, pp. 23

[21]. For a complete and short account of Korea's experience see Linsu Kim, Technology Transfer and Intellectual Property Rights: The Korean Experience, ICTSD and UNCTAD, 2003, pp. 16-24.

[22]. Nagesh Kumar, supra note 8, pp. 20

industrial sectors. Fourth, developing countries should to change current trends towards a standardized all-encompassing multilateral IPR system. They should strive to make IPR policies more favourable to them in the short-term. But they should also strengthen their own absorptive capacity for a long-term solution.[23]

Kumar also demonstrated similar historical account. According to this later scholar, it was in 1961, South Korea adopted the patent legislation. This law was not enforced effectively in Korea. It was in the 1960s and 70s that Korea had acquired, assimilated and adapted a considerable amount of mature foreign mature technologies largely through reverse engineering of existing foreign technologies under weak IPR environment.[24] During these periods, Korea was in the mature technology stage whereby incremental innovations were taking place. Its patent law which was amended in 1981 excludes products and processes to manufacture food products, chemical products and pharmaceuticals from the scope of patent rights. Later on 1986, this law is amended again due to pressures from US government through the threat of trade sanctions. Accordingly, new chemical and pharmaceutical products were provided patent protection and the patent term was extended from 12 years to 15. As was in the case of Japan, almost all of the utility models and industrial designs have been granted to its nationals.

Quoting a great deal of writers in his in-depth analysis of Korean experience, Kumar reaffirmed that:[25]

- Korea has followed an IPR regime that facilitated adaptations and imitative duplication of foreign technologies by domestic enterprises through utility models and industrial designs.
- The deliberate softening of IPR regime by the government (i.e. it tried to minimize IPR protection, formulates laws and regulations in a manner that they can meet minimal international standards and loose enforcement of the law) has resulted in the firm level success in absorbing technology and other knowledge with the help of duplicative imitation or reverse engineering and gradually emerging as innovators in their own right.
- Korea's ability to absorb foreign innovative activity through duplicative imitation has helped it to grow rapidly during the 1960-1980s. The real GDP expanded by 9.5 per cent per year during the 1965-1980 periods and by 8.6 per cent during 1980-87 periods.

Kim elaborated that Korean firms entered the mature technology stage in the 1960s and 1970s by acquiring, assimilating and improving generally available mature foreign technology through various mechanisms and evolved into the intermediate technology stage in the 1980s and 1990s through aggressive indigenous efforts to strengthen their technological capabilities.[26] During the mature technology stage Korean government and enterprises did not give attention for patent protection because local firms were not capable enough to generate emerging technologies and hence incentive to heed for patent registration.[27]

[23]. Ibid, pp. Vii
[24]. Ibid, pp.11
[25]. Ibid, pp. 5 & 23-25
[26]. Kim, supra note 21, pp. 16
[27]. Ibid, pp. 20

In 1995 Korea adopted a new patent law to strengthen the protection and enforcement of patent rights due to US pressure.

3.4. Taiwan

During its early industrialization, Taiwan deployed older machinery, mainly imported from Japan and US, and manufactured standardized products that were not subject to proprietary restrictions.[28] It collected technological information and technical know-how through non-market channels.[29] Then, till 1991, reverse engineering was the widespread way of acquiring technology and technological know-how.[30] Kumar documented a number of literatures on the Taiwan's IPR policy. It uses the following deliberate move to develop local industries:

a) A weak IPR policy to facilitate local absorption of foreign knowledge through reverse engineering in a consistent manner with the experiences of Japan and Korea.
b) Using counterfeiting as a vivid strategy to develop local industries in the mid 1980s.
c) In 1983, "an unattributed government document entitled 'Intellectual Property Rights Protection, a Republic of China Perspective,' said with remarkable candor, 'The R.O.C. government has viewed imitation as a necessary process in the evolution of human civilization and believed that commercial counterfeiting is an inevitable phenomenon in most developing countries. Local officials were cognizant of the negative aspects of counterfeiting although they made little effort to accommodate overseas interests or enhance domestic enforcement efforts when such aspects were seen to be outweighed by the positive development of the industrial base'".
d) Before amending its laws in 1980s and 1990s, the patent system of Taiwan excludes chemical and pharmaceutical products, food, beverages, micro-organisms, and new uses for products. Like Korea and Japan, it also makes use of utility model laws and design patents to stimulate local innovation though it differs from them by providing longer term of protection, 12 and 10 years respectively.
e) Taiwan's government eliminated imprisonment penalties for patent violation while it includes the same for acts that violate the utility models and design patents of Taiwan's nationals.
f) The patent law also contains a provision that expressly states that a patent owner who fails to mark its protected product cannot claim damages from infringement.

It was after 1981 that Taiwan was able to generate higher technologies in the fields of information technology, electro-optics, precision instruments, machinery, and, in the 1990s, the civil aircraft technology.[31] The Taiwan's government aggressive interest to build technological

[28]. MoST, supra note 12, pp. 83
[29]. Ibid.
[30]. Ibid.
[31]. Ibid.

capability through copying is evident from the above conscious measures. It can serve as a model for other developing countries most of which are providing strong patent protection without having an intellectual property to be protected.[32]

Finally, it is important to note that strengthening patent protection in these countries is not always beneficial for them. Here, in the case of Korea for example, strengthening patent protection resulted in a 74% decline of the valuation of pharmaceutical firms listed in stock exchange with the anticipation of its adverse effect on their future performance. See Kumar, pp. the Japanese firms face the same challenge. Branstetter documented Japanese firms could not exploit the opportunities created by the strengthened patent law because they were unable to "change the organizational structure of corporate R&D and the academic training of the Japanese R&D workforce in a way that maximizes the ability of firms to exploit the opportunities created by the new legal framework."[33] He then warns that the business of changing the laws is easy and can be done quickly. But "it may take time for institutions and practices to shift in a way that fully exploits the opportunities created by the new legal framework".[34] He further continued arguing that "if it takes time, even in a context like Japan's, for firms to take advantage of stronger and broader IPRs by restructuring their R&D activities, then we could scarcely expect to discern rapid changes in poor developing countries that remain much farther from the technological frontier."[35]

3.5. Proposed Solutions to Solve the Problems of LDCs

It is argued that the international patent system and regional and bilateral agreements hardly leaves flexibilities for LDCs to meet their development needs by using national patent laws. Different scholars propose coping mechanisms with these pressures. Some of them propose a way out by keeping the present international patent system as given and others by rejecting the same. Assefa, who developed a different set of patent system for non-industrialized countries, summarized the solution proposed by writers within the framework of the international patent system as follows:[36]

- A utility model certificate for innovations based on national or regional novelty as a possible supplement to, and not replacement for, patents;
- To introduce stringent criteria of patentability in their laws;

[32]. Getachew Mengiste, supra note 1, pp.163-164
[33]. Lee. G. Branstetter, 'Do Stronger Patents Induce More Local Innovation?', in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime* (2005), pp.317
[34]. Ibid
[35]. Ibid
[36]. Assefa Endeshaw (1996), Intellectual Property Policy for Non-Industrialized Countries, Dartmouth Publishing Company, pp. 122-123

- ❖ To attract technology by providing patent of importation to a foreign invention that may soon run out of its term of protection in industrialized countries (ICs) by overlooking the novelty requirement;
- ❖ Providing for a form of double standard whereby worked patents get preferential treatment over unworked ones;
- ❖ Advancing shorter terms for specific products or processes;
- ❖ Taking due heed in the public interest, stronger disclosure requirements, stricter provisions for compulsory licensing and revocation as remedies for non-use, strong provisions against abuses in patent licensing;

Assefa is against all the above solutions proposed by other scholars. He questions the very philosophy of the international patent system and advises LDCs to abandon it until they emerge beneficiaries from it.[37] He further argued that local inventions and innovation in developing countries would be served by a law which requires "(a) the novelty be confined to the country in question and inventiveness to the level reached at any time in that country and (b) that claims must satisfy 'workability'- not only practicability, but being applied directly."[38] The latter strategy includes requiring the inventor to provide the prototype of the invention (the product or process) alleged to be introduced into the national economy before the grant of any right.[39] Assefa reasoned that instituting local novelty and inventiveness have two potential and possible positive effects on non-industrialized countries. These are:

- it draws technologies from abroad that may be obsolete or may soon run out of protection under laws in most industrialized countries into non-industrialized countries; and[40]
- the creation of a drive for technological innovations in the non-industrialized countries.[41]

However, Getachew refused the option of parting from the international patent system because, he argued, it is a costly option in the sense that "a country couldn't build its economy on technology appropriated from other countries and expect to be admitted to the international trading system on an equal basis. The countries from whom the technology is appropriated will be moved to protect its value in their markets by barring imports from the appropriating

[37]. Ibid, pp. 142
[38]. Ibid
[39]. Ibid, pp.125. He emphasized on this precondition because he believed that "an IP system that operates within the context of underdevelopment should be designed in such a way that protection of rights for investors…of intellectual work serves national industrial development. This can only be achieved by, given the well-known stagnant and low levels of technical capabilities in the non-industrialized countries, by making the *direct* and *immediate* application of all technical ideas in industry as a *precondition* for the grant of protection or rewards and the recognition of any rights to them." See the same, pp. 124.
[40]. Ibid, pp. 127. Citing Mackley, Assefa noted that 'when technology already known in other countries is patentable in the developing country, the owners of the technology have an incentive to introduce the technology to the developing country.'
[41]. Ibid

country."[42] He added that developing countries should influence the international patent system by being active member to the same.[43]

3.6. Compensatory Liability Regime: An Alternative for Utility Model Law and Design Patents?

Professor Reichman provided an alternative for utility model and design patents that can enhance effective technological learning in developing countries.[44] As it is already expressed above in the experiences of the countries, the basic importance in using weak IPRs regime, and especially petty patents and industrial designs is to facilitate the absorptive capacity of local enterprises by allowing access to foreign technology. Reichman and Lewis saw deficiency in these systems, which they called them "hybrid exclusive property rights"[45], because they have a "cumulative tendency to generate excessive social costs that outweigh the likely social benefits".[46] The basic reason underlies in the fact that "follow-on applications on subpatentable inventions usually lie within the reach of routine engineers, especially when there is a market opening and some basis for predicting a chance of commercial success".[47] They identified the following shortcomings of utility models and industrial designs:[48]

- Overextended or hybrid exclusive rights disrupt the sharing of technical know-how that powers most scientific and technical progress, especially through spillovers that come from reverse engineering.
- They block or slow the natural progression of follow-on applications by enabling the exclusive right holder to deny them or to hold out against their use, and because third parties will not readily disclose such applications in licensing transactions affecting small-scale innovation
- They impoverish the public domain by denying access to the routine innovation of other creative engineers, who would otherwise be free to reverse engineer by honest means;

[42]. Getachew Mengiste, supra note 1, pp. 212, citing E. Kitch.
[43]. Ibid, pp.213
[44]. He has contributed two major articles alone and one with Lewis that justified the importance of compensatory liability regime and explained the danger posed by patent-like rights, i.e., petty and design patents. These are J.H.Reichman (2000), 'Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation', in *Vandervilt Law Review*, Vol. 53:6, pp. 1743-1798, J. H. Reichman (1997) (hereafter Green Tulip), 'From Free Riders to Fair Followers: Global Competition Under the TRIPS Agreement', in *International Law and Politics* (1996-1997), Vol. 29, pp.11- 93 (Hereafter Fair Followers), and J. H. Reichman and Tracy Lewis (2005), Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge, in *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime*,(hereafter Reichman &Lewis) pp. *337-366.*
[45]. Reichman and Lewis, Supra note 44, pp. 338.
[46]. Ibid, pp. 340
[47]. Green Tulip, supra note 44, pp. 1770
[48]. Reichman and Lewis, supra note 44, pp. 341. For extensive elaborations on the flaws of utility models and design patents see also Green Tulip, supra note 44, pp.1771- 1775.

- They require elaborate negotiations and other transaction costs which, in relation to the caliber of the innovation at stake are seldom worthwhile even if they could succeed;
- They potentially generate lots of litigation whose costs are disproportionately large in relation to the social value of the innovation at issue;
- They breed high duplication costs because routine engineers must work around routine innovation that was previously available from the public domain or through reverse engineering from a semicommons, so the progressive elaboration of the common technical trajectory is either aborted or retarded;
- The natural "open source" character of routine innovation operating under traditional trade secret laws is thereby destroyed;
- Overextended or hybrid regimes reward investors with exclusive rights for investing in forms of innovation that market-force competition might require them to make anyway, just to stay competitive.

The next problem is that, 'if petty patents and design patents have these enormous disadvantages, then, what is the solution?' In their effort to answer this question, Reichman and Lewis started from the difference between the economic conception of "liability rules" and "intellectual property regimes". Economists assume the scenario by which third parties are allowed to carry out certain actions irrespective of prior permission, while at the same time compensating the injured parties for all or part of the costs they cause, when they speak of liability rules.[49] On the other hand, intellectual property regimes are understood as "underlying legal structure that imposes an 'absolute permission' requirement on access to, and use of, knowledge goods protected by intellectual property rights".[50] All patent-like (such as utility model laws and laws protecting industrial designs) or copy-right like legal schemes are included in the latter case. After the lessons gained from the experiences of the above countries, most scholars recommend developing countries at the lower level of technological and economic development to make use of utility models and design patents to stimulate local innovation and economic growth.[51] Reichman and Lewis argued that such stand may emanate from the supposition that there are merely two options for them, i.e., full protection of virtually all forms of technical innovation or a mixed patent-utility model regime (as the one existed in Ethiopia currently).[52] However, the sui generis IP regimes like utility model laws and design protection laws are not effective mechanisms to stimulate local innovations because they are costly due to the reasons stated above.[53] Historical lessons demonstrated that there can be third option that can best serve the needs of the developing countries. Therefore, utility model laws should be replaced by compensatory liability regime which is usually referred to as "use and pay principle".[54]

[49]. Ibid, pp. 338
[50]. Ibid, pp. 337
[51]. Ibid, pp. 339-40
[52]. Ibid.
[53]. Reichman and Lewis, see supra note 44, pp. 341
[54]. Ibid, pp.337

Reichman's proposed liability regime provides an alternative for an interested body to employ another party's innovation under specified conditions.

3.6.1. Historical Roots of Compensatory Liability Regime

It is in the classical trade secret law[55], which provides original investors with only natural lead time[56] and allows second comer to reverse engineer any innovators new but unpatented article application of know-how to industry by proper means, that a compensatory liability regimes traces its historical root.[57] This is a pro-competitive legal framework whereby original inventors are compensated if improper means is employed while at the same time they are denied from preventing any follow on invention by proper means.[58] After recalling such historical fact, Reichman and Lewis argued that "trade secret law behaves like a liability rule (or a quasi-liability rule) with the added wrinkle that the rate or value of the entitlement is determined by the market and not by government intervention [through enacting patent or patent like laws and regulations that confer monopoly rights]".[59] 'They also noticed that in the 19th century free market economies depended primarily on the liability rules of unfair competition law (in which trade secret laws reside), and only marginally on the exclusive rights of patent law, which protected a relatively circumscribed set of nonobvious inventions beyond the reach of routine engineers because most innovations consists of cumulative and sequential applications of know-how to industry by routine engineers at work on common technical trajectories.'[60] In his earlier work, Reichman precisely demonstrated the pro-competitive role of trade secret laws in the following fashion:

> *…trade secret laws require third parties to reverse-engineer new and successful products by honest means, with a view to mastering the innovative processes from which they can manufacture competing products. Because the task of reverse engineering by honest means usually takes time and costs money, it gives subpatentable innovators a modicum of natural lead time in which to recuperate their investments and to establish their trademarks and brand names as symbols of quality. …the competitor's investment in reverse-*

[55]. It is known that protection of novel article under trade secret law is usually resorted to when innovators are confident that the secret cannot be discovered through reverse-engineering.
[56]. Natural lead time is one reason which is employed by anti-patent law scholars. It connotes the circumstance that it naturally takes time, effort and finance to learn and copy certain innovation.
[57]. Reichman and Lewis, supra note, 44, pp. 342
[58]. Ibid.
[59]. Ibid, pp. 342-43. Reichman explained this historical event in his earlier work as follows: "Trade secret laws do not confer exclusive property rights on those whose innovations fall below the now worldwide standard of nonobviousness for eligibility in patent law. This follows because routine engineers would, in theory, make these subpatentable innovations in due course if the level of investment were not unduly diminished by fears of market failure." See Fair Followers, supra note 44, pp. 59.
[60]. Ibid, pp. 343

> *engineering contributes indirectly to the relevant technical community's overall costs of research and development and it usually issues in improvements (or lower priced goods) that advance the prevailing technical paradigms.*[61]

However, through time, the protection of subpatentable innovations under trade secret law undermines the investors' interest because expected natural lead time is diminished since (1) "the end results of the designers skilled efforts became embodied on or near the face of mass-produced goods sold in the open market"[62] and (2) the development of "electronic information tools and cutting-edge technologies"[63] enabled free-riders to easily copy the designs and inventions. Therefore, in the twentieth century the developed world that exhibited comparative advantage in the field blindly run to confer monopoly rights for incremental (or "subpatentable") innovations that gave rise to artificial lead time within which innovators can recoup their investment by restraining second comer's right to reverse-engineer for a specified period of time.[64] Again, for reasons enumerated above in section 3.6, Reichman provided similar "a rational set of liability rules" in line with the classical trade secret law, but with the necessary modifications, that can stimulate subpatentable innovation by giving the innovator an opportunity to appropriate the fruits of their research and investment without denying competitors right to imitate or reverse engineer the innovation of the first comer.[65] The model avoids overprotection inherent in intellectual property protection, and under-protection caused by the trade secret scheme.[66] They argued if developing countries are eager to find appropriate alternative compensatory liability regime is instrumental because they might find themselves "equipped with a new, user friendly, intellectual property regime that would be tailor-made to their interests, in the sense that it would not block improvements or shrink the public domain, which is not true of utility models, design laws or other *sui generis* exclusive property rights."[67]

[61]. Fair Followers, supra note 44, pp. 59-60
[62]. Ibid, pp. 64
[63]. Ibid
[64]. Ibid
[65]. Ibid, pp. 59. Reichman and Lewis elaborate the responses of the then economies to alleviate the market failure created by the disincentive for investors in the field as follows: "two strategies are combined. In one, patent eligibility standards are broadened and lowered to cover investment in routine innovation, and copyright protection is expanded beyond literary and artistic works in the historical and ordinary sense to encompass computer software and other applications of know-how to industry. The second strategy is to multiply hybrid regimes of exclusive property rights, which inevitably mutate into patent like regimes that seek to suppress unauthorized follow on applications." See Reichman and Lewis, supra note 44, pp. 344-345
[66]. Reichman & Lewis, supra note 44, pp. 345
[67]. Ibid, pp. 348

3.6.2. The Green Tulip Model[68]: Alternative for Hybrid Intellectual Property Systems

Reichman's "Green Tulip Model" of a compensatory liability regime for subpatentable innovation gives a "qualifying innovator"[69] three distinct rights. These are:[70]

- **Right to prevent wholesale duplication**: this is a right to prevent second comers from competing on the same market segment for a specified period of years with a product that constitutes a wholesale duplication of the innovator's initial product.[71]
- **A right to compensation from value adding improvers**: this is the entitlement for the inventor for reasonable compensation from the second comer when the latter employs the former's technical know-how for value-adding improvements. The former inventor doesn't have the right to block second comers from making use of his protected technical know-how for purposes of making, producing and selling improved products as far as the second comer undertakes his absolute duty to pay reasonable compensation for the former. This is a mechanism to ensure that the compensatory liability regime would not result in market failure and free-riding by allowing unbridled competition. The compensation due to the second comer is a contribution for the first comer's cost of research, development and marketing. Here the issue of the difficulty of valuation of compensation may be raised. Reichman and Lewis simplified the problem by recommending these two ways of valuation: (1) an assumption that the technical contributions in case of subpatentable inventions are generally minor and greatly shaped up by prior art in the public domain and (2) understanding the improver as if he took either large, medium and small share of the originator's protected subject matter.[72] The United States experience in the valuation of patent for government use can also be resorted to while calculating the royalty to be paid for the originator.[73]
- **A right to make use of a second comer's value adding improvements for purposes of making further improvements of his or her own**: this right is available for the originator, if he uses the value-adding contribution of the second comer for purposes of for further improving the his original products. Nevertheless, he is not allowed to undertake wholesale duplication of the improved product unless he pays compensation for the second comer for making use of his technical know-how to improve the product. Reichman and Lewis claimed that this right can "function as a built-in grant-back clause,

[68]. This model is first developed by Reichman in his work titled "From Free Riders to Fair Followers: Global Competition under the TRIPS Agreement". Then it if further enriched and improved by his later work titled "Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation". Finally, he came up with mature model with his co-author, Lewis, a Legal professional in their joint article titled "Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge".
[69]. A qualifying innovator is a person who made incremental innovation.
[70]. Reichmand & Lewis, supra note 44, pp. 349
[71]. Ibid.
[72]. Ibid, pp. 350
[73]. Ibid.

roughly analogous to the dependent licenses (or "anti-blocking" licenses) available in most jurisdictions for patentable improvements to patented products."[74]

3.6.3. Potential Significance of Compensatory Liability Regime

Reichman and Lewis summarized the use of compensatory liability regime in the following manner:

> *A compensatory liability regime solves the problem of market failure arising from applications of know-how to industry under present-day conditions without the high social costs that hybrid regimes of exclusive property rights are known to generate. In particular, it encourages follow-on applications without creating barriers to entry and without impoverishing either the research commons or the public domain, as occurs under the hybrid regimes that developed countries have adopted.*[75]

It is known that developing countries rely on incremental and minor innovations in their industrial activity. These activities are usually carried out by domestic small scale and medium-sized industries which are suffering from financial capability. Unable to attract FDI and pay for high royalties for advanced technologies, they focus on reverse engineering and imitating foreign technologies. They can enhance their technological capability by accumulating knowledge by learning through imitation and reverse engineering. This compensatory liability framework is a well-suited regime for the technical and financial capabilities of these small and medium-sized entrepreneurs.[76] Without blocking improvements or access to shared know-how available from the public domain, it stimulates investment in small-scale innovation within the reach of local producers operating in developing countries.[77] Reichman also reasoned that "when unlicensed technology is transferred through self-help methods of reverse engineering, it roots the technology in the local culture, which provides a basis for future research and development. The increasing availability of technical skills in the global labour market facilitates this endeavor."[78] In addition, Kumar and Lewis stressed the importance of this liability rule for developing countries to respond to the contemporary growing pressure from protectionist movements from European Union and U.S in a manner that "did not impede their own needs to catch up and to access scientific and technical data and information generated elsewhere."[79]

[74]. Ibid, pp. 351
[75]. Ibid, pp. 365
[76]. Ibid, pp. 346
[77]. Ibid, pp. 349
[78]. Fair Followers, supra note 38, pp. 61
[79]. Reichman and Lewis, supra note 44, pp. 348

Chapter Four

The Ethiopian Patent Regime: A Pro-Development Tool?

4.1. Efforts Undertaken to Build Technological Capability in Ethiopia

4.1.1. Policy Measures

It was in 1993 that the Ethiopian government has issued the science and technology policy. This policy recognized the role played by science and technology in the development efforts. It stipulates that "in order to bring about massive social and technical changes, to accelerate industrial and agricultural productivity, to facilitate the means for a rational conservation and use of natural resources and the provisions of basic necessities of life, to modernize communication networks and to generally improve the standard of living of the peoples and to keep abreast with technological advancement of the 21st century, extensive, popular participative and sustained science and technology capacity building is a requirement."[1] It also recognizes that lack of a clearly articulated science and technology policy has hampered the growth and the application of S&T for national development.[2] It is issued to increase the supply of locally required technology, to build the country's S&T capability, to coordinate related activities, to reduce technology on foreign dependency and to enhance the contribution of S&T to the national economic development.[3] It aimed at:

- building the national capability to generate, select, import, develop, disseminate and apply appropriate technologies for the realization of the country's socioeconomic objectives and rationally conserving and utilizing its natural and manpower resources.
- improving and developing the knowledge, culture and the scientific and technological awareness of the peoples of Ethiopia, and promoting the development of traditional, new and emerging technologies.
- making science and technology activities more productive, efficient and development oriented.

It identifies eleven priority areas based on the country's development policy directives with a view to eradicate the basic and urgent problems of the peoples. These priority areas are agriculture, natural resources development and environmental protection, water resources development, energy, industry, construction, transport and communications, mineral resources,

[1]. Ethiopian Science and Technology Commission, National Science and Technology Policy, 1993
[2]. Ibid
[3]. Ibid

health and population planning, education, and new and emerging technologies. For instance, in the field of agricultural technologies, the policy targeted to:

- To support activities for self-sufficiency through improved food supply,
- Support and encourage research to raise productivity of crops, animal resources and production implements in kind, quality and quantity, taking into account environmental protection as well as people's tradition and culture,
- Encourage the use of irrigation schemes of different scales and forms to secure reliable production,
- Encourage and support research on methods of reducing pre and post harvest loss during agricultural production employing appropriate technologies for prevention, handling & processing,
- Encourage and support techniques for the development of appropriate and productive fish species in rivers, lakes and artificial ponds and encourage its wider and sustained availability for consumption,

In new and emerging technologies, the policy aspired to assist the generation of appropriate methodologies for the application of biotechnology in the fields of health and agriculture and to organize and support the development of facilities, manpower, workshops, support centers, and the publication of journals in order to promote and coordinate biotechnology activities and their diffusion. However, much of commitments under this policy, including the pledge to allocate 1.5% of the annual GDP for science and technology activities, and to exempt equipment and materials imported for R&D activities from all kinds of taxes, and to chair the National Science and Technology Council by the prime minister, were not effectively implemented.[4] It is also criticized because it was too general in its content, did not apply the concept of National Innovation System (NIS) that emphasizes innovation, emphasized too much on research and research result dissemination, and not copying technologies, and had not considered the role of business enterprises.[5]

In 2006, there was a draft National Science, Technology and Innovation (STI) Policy of Ethiopia prepared by the Ethiopian Science and Technology Agency and was open for discussion. In its introductory part, it recognized the role played by science, technology and innovation in the process of economic development. It asserted the nexus in the following manner:

> *The ability of a country to sustain rapid economic growth in the long-run is highly dependent on the effectiveness with which its institutions and policies*

[4]. For a better understanding of the analysis of the policy and problems faced in the implementation thereof see Mulugeta Amha and Abebe Mekuriaw, *A Preliminary Review of the S&T Policy of Ethiopia in the Framework of the National System of Innovation*, available at http://www.iked.org/ethiopia/web/paper/A%20Preliminary%20Review%20of%20the%20S&T%20Policy%20of%20Ethiopia%20in%20the%20Framework%20of%20the%20National%20System%20of%20Innovation.pdf

[5]. MoST (2010), Green Paper on the National STI Policy of Ethiopia: Building Competitiveness Through Innovation, Policy Research Directorate (unpublished)

> *support the knowledge generation, technological transformation and innovativeness of its enterprises. Science, technology and innovation are the corner stones of progress upon which a nation depends to attain economic growth and vibrant integrated self-sustaining economy.*[6]

It also explained the country needs the following institutions to wholly adopt science, technology and innovation:[7]

1. Functional system comprising of institutions that generate knowledge and technology that can be applied to increase the efficiency of production and use of goods and services;
2. Scientific and technological services to provide current information on the development trends of scientific knowledge and technology to the national innovation system partners;
3. Centers that have the capacity to select, copy, adapt and apply knowledge and technology; and
4. An overall institutional set up for coordinating, managing and funding science, technology and innovation activities.

One of the major reasons for revising the 1993 policy was a strong desire to gain from the opportunities of the global advancement in scientific knowledge and technology by strengthening the federal and regional government scientific and technological institutions, the universities and the private sector to constructively interact in the generation, transfer and application of scientific knowledge and technologies within the national system of innovation.[8] It is also due to a desire to clearly articulate the legal instruments for effective utilization of resources.[9] It claimed that the revision of the policy is based on the assessment of the prevailing science, technology, and innovation policy of the country and the direction of different sectoral policies and strategies.[10] Among others, it pledged to:

- Encourage science and technology institutions to generate funds by commercializing their services and outputs and utilize the fund for the promotion and expansion of their science and technology activities;
- Strengthen national capability for the development of indigenous technology and attainment of a national capacity for the assessment, selection, acquisition, adoption and adaptation of foreign technology;
- Strengthen and make efficient the national intellectual property system to promote and support local creativity, technology development and innovations;
- Establish technology parks, business and technology incubation centers, and export processing zones to facilitate technology transfer and innovative activities;

[6]. Ethiopian Science and Technology Agency (2006), National Science, Technology and Innovation (STI) Policy of Ethiopia, Draft for Discussion, pp.1
[7]. Ibid.
[8]. Ibid.
[9]. Ibid, pp.2
[10]. Ibid

- Develop, strengthen, and modernize the country's engineering and technology base to build a strong national economy and to assist the chemical, textile, agro-industry, mineral and other production sectors which are necessary to meet the demand for basic consumer goods.

This draft policy was better than the previous one in its clarity and use of national innovation system. It also recognizes the use of intellectual property rights as a tool to implement the policy though whether the move to strengthen IP law may benefit the country is unlikely as it is scrutinized in the coming sections. However, it was not approved by the Council of Ministers and, as explained in section 4.1.3 below, MoST prepared another Draft STI policy awaiting approval from same.

The industrial strategy of the country, i.e., Agricultural Development Led Industrialization (ADLI), emphasized on the development of national technological capability by strengthening national capacity for the transfer and adaptation of technology and promote the diffusion and development of the same; promoting and coordinating R&D activities between vocational and high level technical training institutions; creating an institutional capacity for the identification and selection of suitable technologies; and promoting technological adaptation and innovation by introducing appropriate legal and incentive mechanisms.[11]

4.1.2. Institutional Setups

Ministry Of Science and Technology (MoST)

For the first time, in December 1975, a governmental institution referred to as science and technology commission was established by proclamation No.62/1975. Following the change in government in 1991 and with the issuance of the new economic policy, the Commission was re-established in March 1994 by Proclamation No.91/94. Following the establishment of Federal Democratic Republic of Ethiopia, the commission went into its 3rd phase of re-institution on the 24th of August 1995 by Proclamation No.7/1995 as an Agency.

The Agency is upgraded by the government as one of the Cabinet ministries accountable to the prime minister and the council of ministers in 2008 by the proclamation No. 604/2008 and reestablished recently too in October 2010.

The Ministry envisions to elevating the country to a technology exporting state by 2025.[12] It commits to create a sound science and technology foundation and to coordinate the national technological capacity building efforts so as to enhance competitiveness of the economy and

[11]. MoST (2009), Overview of National Development Policies and Strategies, Working Paper 1, (unpublished) pp. 10

[12]. This is also manifested in the Green Paper, supra note 5, and Draft National Science, Technology and Innovation Policy.

reduce technological dependence of the country. Its powers and duties, as stipulated in the establishing proclamation, are the following:[13]

- Prepare national science and technology research and development programs based on the country's development priorities, and upon approval by the government provide necessary support for their implementation, follow up and evaluate same:
- In cooperation with the concerned bodies, establish a system for technology need assessment, identification, acquisition, packaging utilization and disposal, and follow up the implementation of same;
- Register technology transfers made in every sector, coordinate codification and technology capability accumulation efforts, and ensure successive use of same;
- Coordinate science and technology development activities and national research programs, ensure that research activities are conducted in line with the country's development needs;
- Organize science, technology and innovation database, compile information, set national standards for information management, prepare and ensure the application of science and technology innovation indicators;
- Facilitate interaction and collaboration among government and private higher education and research institutions and industries with a view to enhance research and technological development;
- Prepare and follow up the implementation of the country's long-term human resource development plans in the field of science, technology and innovation; cooperate with the concerned organs to ensure that the counties educational curricula focus on the development of science and technology;
- Facilitate capacity building of public and private sector institutions and professionals involved in science and technological activities;
- Establish and implement a system for granting prizes and incentives to individuals and institutions who have contributed to the advancement of science, technology and innovations;
- Establish, coordination and support councils that facilitate the coordination of research activities;
- Encourage and support professional associations and academies that may contribute to the development of science and technology.

Ethiopian Intellectual Property Office

The Ethiopian Intellectual Property Office (hereafter EIPO) was established in 2003. The preamble of the establishing proclamation[14] stipulated that the office was set up with a view to launch a government body that is responsible to implement or follow up the implementation of national laws governing intellectual property as well as to build the necessary capacity to render efficient and effective services. Some of its powers and functions are:

[13]. Proclamation
[14]. Intellectual Property Office Establishement Proclamation No. 320/2003

- To receive applications for patent and trademark registration certificate and give appropriate decisions after undertaking or causing to be undertaken the necessary examination in accordance with the relevant law.
- To follow up the exploiting of legally protected foreign and local inventions and issue compulsory licenses when necessary,
- To receive search requests and render search services to determine the existence of similar inventions prior to an application for patent is filed or before a research activity to solve a technical problem is undertaken;
- To receive search requests and render search services to determine the existence of similar registered trademarks before a trademark application is filed;
- To publish and disseminate Intellectual Property Rights Gazette;
- To create an information system on intellectual property rights and provide services to users;
- To implement laws and regulations on intellectual property rights issued by the government;
- To select and disseminate technological information contained in patent documents in priority areas and encourage their utilization for economic and social benefits;
- To receive, organize and decide on applications for extension and renewal of patent and trademark protection in accordance with the law;
- To facilitate conditions that will help to create linkages between intellectual property owners and entrepreneurs who wish to exploit their creative works.[15]

Intellectual property offices are important institutions in the collection and dissemination of patent information. This enables potential inventors to invent around patents and to imitate technologies.[16] EIPO has accumulated more than 30 million patent informations from around the globe, and mostly from USA and planned to collect additional 20 million in the coming five years.[17] It identifies nine priority areas for the country's technological needs and tries to disseminate to universities, research institutions and technical and vocational education and training institutions.[18] Table 1 shows patents and utility model certificates granted by EIPO.

[15]. See Ibid, Art. 6 for fuller account of the powers and responsibilities of EIPO
[16]. Kamil Idris, Intellectual Property: A Power Tool for Economic Growth, WIPO, available at http://www.wipo.int/freepublications/en/intproperty/888/wipo_pub_888_1.pdf, pp. 99-105
[17]. Interview with Fikirte Moges , Junior Expert, Patent Information Center, EIPO
[18]. Ibid. The selected priority areas of the government are textiles, metal works, leather and leather products, chemicals and pharmaceuticals, agro processing, agricultural technology, biotechnology, information and electronics and construction.

Table 1: Patents and Utility Model Certificates granted till Oct, 2011

	Foreigners	Ethiopian nationals	Total (granted)	Total (applications)
Patents	43	1	44	192
Patent of Introduction	-	72	72	95
Utility model certificates	8	362	370	955

Source: patent database, EIPO, 2011

Table 2: Classification of Utility Model Certificates with respect to the type of holders.

Type of Institutions	Number of utility models (granted)
Universities	4
Private enterprises	307
TVET	47
Individuals	2
Research institutions	5
Unidentified	5
Total	370

Source: Patent Database, EIPO, 2011

Universities

Ethiopia witnessed aggressive expansion of public universities in the last decade. Nowadays there are 21 public universities in operation and other 10 universities under construction. However, the quality of education is seriously questioned by many researchers.[19] The Ministry of Education (hereafter MoE) decided to enroll 70 per cent of the students in public institutions in hard sciences, out of which 40 per cent are in engineering, and the other 30 percent are enrolled in social sciences. The Higher Education Proclamation[20] requires universities to establish research and innovation fund and to allocate sufficient fund especially for research focusing on technology transfer and innovation. It further emphasized that every institution (i.e., both private and public higher institutions) should focus its research on promoting the relevance and quality of education and on the country's development issues focusing on transfer of technology, define its core research areas and themes on the basis of the priority needs of the country, the institution's comparative advantages, and in consultation with the key stakeholders, undertake research that shall, more specifically, take into account the priority needs of the

[19]. MoST, supra note 11, pp. 27, INSEAD (2011), Global Innovation Index 2011, pp.156, MoST (2010), Green Paper, supra note 5.
[20]. Higher Education Proclamation No. 650/2009

country and enable the country to solve its challenges and build its capacity through technology transfer and equip students with basic knowledge and skills that enable them to undertake further and relevant studies and research.[21] In addition, they are also obliged to have an institutionalized system that enables it to carry out planned research and conduct joint research projects with other national and international institutions, research centers and industries.[22] According to the EIPO database, it is only Addis Ababa University that has registered 4 utility model certificates and no university has registered patent.[23] Assessment conducted in 2006 showed that also indicated that absence of IP policy and management in public and higher institutions for the use and exploitation of IP assets inhibits them from benefiting from the generated assets.[24]

Research and Development Institutions

Agricultural research institutions are among the pioneer research institutions in Ethiopia.[25] The Ethiopian Agricultural Research Organization (EARO) is responsible for generating, improving and adapting technologies and coordinating, encouraging and assisting research activities in order to fulfill the current and long-term agricultural requirements.[26] With the same objectives, other agricultural research institutions were established in different regions of the country.[27] The Ethiopian Health and Nutrition Research Institute and National Veterinary Institute are among the major research institutions in Ethiopia.[28] According to the database of EIPO, it is only institute of agricultural research that have succeeded in having 1 patent and 5 utility model certificates registered by EIPO.

Technical and Vocational Education and Training Institutions

Technical and Vocational Education and Training Institutions (hereafter TVET) are institutions that are established for the purpose of providing trainees with apprenticeship training in the productive and service rendering enterprises.[29] The proclamation concerning TVET aimed at establishing a uniform system for the determination of levels of competence and accreditation of

[21]. Ibid, Art. 2 (9) cum Art. 24
[22]. Ibid. this indicates that the government has a plan to adhere to the practice of countries that explained the fruitfulness of the cooperation among government, universities and industries for developing domestic technological capability. It also creates a favorable condition for the innovation or commercialization of inventions that are generated from universities.
[23]. However, earlier research stated that there are other universities like Arbamich University, Jimma University College of Agriculture, and Adami Tulu Agricultural Research Institute have applied for utility model certificates. However, as I mentioned in table 4, I did not get supporting evidence from the database of EIPO. In this research, the number of utility models owned by AAU are 5 but I found only 4 in the database. See, Getachew's Assessment, infra note 25, below, pp.60-61
[24]. Ibid, pp.57-59.
[25]. See Getachew Mengiste (2006), Intellectual Property Assessment in Ethiopia, EIPO, pp. 51-55 (hereafter Getachew's Assessment) and Green Paper, supra note 5
[26]. Getachew's Assessment, supra note 25, pp.52
[27]. Ibid, pp.53
[28]. Ibid, pp. 53-55
[29]. Technical and Vocational Education and Training Proclamation No. 391/2004

training institutions and for the certification of trainees.[30] It also envisaged the setting up of a mechanism providing for the participation of governmental and non-governmental organizations in the preparation of training programmes and curricula as well as in their evaluation and management.[31] Very few TVET centers have succeeded in having their utility model certificates registered by EIPO. According to EIPO's database only Selam TVET and Mount Fudy TVET have 34 and 13 utility model certificate respectively.

Small and Medium Scale Enterprises (SMEs)

SMEs have given emphasis in the National Urban Development Policy of 2005. The strategy undertakes to promote SMEs through creation of centers for technical training and technology development to ensure the sustainable production of technicians and improvement of technology; provision of demand driven technical and managerial training to new entrants to the SME sector and continuous skill upgrading, support for small scale financial institutions which extend credits to SMEs and promote the creation of enterprises that rent machinery to SMEs and sell on long-term payment.[32]

4.1.3. Legal Measures

In 1995 Patent Proclamation was promulgated.[33] It is this Proclamation which is the major concern of this paper. The following years witnessed the issuance of proclamations concerning copyright and neighboring rights[34], trademark[35], and plant briders' right[36]. The concern of this paper is the Patent Proclamation (hereafter the proclamation). This chapter analyzes whether this proclamation is a pro-development tool that can stimulate local innovation and economic growth. In doing this, the writer makes use of, in addition to the proclamation, the regulation for the enforcement of the proclamation, earlier works and statistical data.

4.1.4. Recent Developments

MoST is currently undertaking research to improve the national Science and Technology Policy of 1993. The draft STI policy, awaiting approval by the Council of Ministers, aims at creating a sound science and technology foundation and coordinating the national technological capability building efforts to enhance competitiveness of the economy and reduce technological dependence of the country. It emphasizes on the technological accumulation that lead to indusatrialization. To this effect, it defines innovation in Ethiopian context as "an acquisition and assimilation of knowledge and technology in order to use it for technology transfer to rapidly and

[30]. Ibid
[31]. Ibid
[32]. MoST, supra note 11, pp. 14-15
[33]. Proclamation Concerning Inventions, Minor Inventions, and Industrial Designs (commonly known as Patent Proclamation), Proc. No. 123/1995
[34]. Copyright and Neighboring rights Protection Proclamation, Proc. No. 410/2004
[35]. Trademark Protection Proclamation, Proc. No. 510/2006
[36]. Plant Breeder's Right Proclamation, Proc, No. 481/2006

continuously change productivity with quality." It recognized that the national innovation system[37] of the country has never been clearly defined and the interactions between the scientific knowledge and technology generators, the supporting intermediaries and the users are not clearly defined and nurtured. It also commits to develop adaptive research that is geared towards rapid technology transfer and technology adaptation. It is in stark contract with its predecessors because of the following reasons:

- It clearly identifies entities in the national system of innovation and what should their link look like to achieve the goal;
- It approaches the issue taking due heed to the Ethiopian context;
- It identifies the basic strategy suitable to Ethiopia, that is, it claims that the technological capability should be built through the production process by copying, adopting and adapting foreign technologies and through the production process by working on the system, machinery and manpower. It also asserts that technological change in Ethiopia shall occur primarily by learning the technologies that already exist in more advanced economies and not by pushing the knowledge frontier further. It calls for attention to be given for research activities that aimed at adapting foreign technologies to the needs of domestic enterprises.
- It is very specific in spotting the policy tools that fits with the needs of the country such as the use of non-market channels of technology transfer, intellectual property and standard information as source of foreign technology, and emphasis on the use of a utility model system of protection to cope with the Ethiopian innovative environment which is dominated by local incremental innovation.[38] (emphasis mine)

MoST envisioned to see Ethiopia undertaking coherent STI initiatives so that the country begins to export its own technologies by 2025.[39] The draft policy targets at using copying and adapting foreign technologies and building technological capability through the production processes by working on the system, machinery and manpower. It gives considerable emphasis to the non market channels of technology transfer. The country is also pledged to join WTO and currently it is aggressively facilitating the process. Ethiopian Academy of Sciences was also established with a view to foster scientific culture and innovation and advance the knowledge of natural and social sciences, engineering, medicine, history, literatures, languages and traditional cultures of Ethiopia for the benefit of the Ethiopian society. MoST undertook research and prepare new draft National Science, Technology and Innovation Policy awaiting approval from the Council of Ministers.

[37]. The draft policy defines national innovation system in the Ethiopian context as "a system that anchors its root firmly in national quality education that favors S&T in primary, secondary and tertiary education, its trunk in research organizations and production systems; while its fruit is the quality product and services."
[38]. For better understanding see table 1 below which shows that there are 370 utility model certificate holders which are Ethiopian residents when compared with only one patent holder and null patent of introduction holder.
[39]. Green Paper, supra note 5

4.2. Do the Economic and Technological Interests of Ethiopia Require Strong Protection of Patents?

It is already stated that the view that the importance of IPRs varies according to countries' economic level is widely accepted and empirically supported.[40] Countries with low per capita income and technological capability are unlikely to benefit from IPRs. Ginrate and Park reasoned that "IPRs affect economic growth by stimulating the accumulation of factor inputs like research and development capital and physical capital."[41] Consequently, "countries not conducting innovative research or conducting a limited amount would enjoy few, if any, of the benefits of intellectual property protection because an innovation sector through which IPRs affect economic growth is absent."[42] Lall argued that the four[43] theoretical benefits that may accrue from the protection of IPRs for developing countries can only be materialized when the country that protects them have technological capability to invent.[44] He added that this does not mean that there is no technological activity at all. He recognized that developing countries can embark on substantial technological activity to "master, adapt and improve upon imported technologies".[45] Nevertheless, such kind of technological activities does not lead to "patentable innovation and therefore does not need strong IPRs."[46] Another important publication from World Bank worthy to be quoted demonstrated this linkage in the following way:

> *Countries with a high ratio of R&D in gross domestic product (GDP) or a high proportion of scientists and engineers in the labour force have markedly stronger patent rights than others. Interests in encouraging low-cost imitation dominate policy until countries move into a middle-income range with domestic innovative and absorptive capabilities. Least developed countries devote virtually no resources to innovation and have little intellectual property to protect. Thus the majority of economic interests prefer weak protection.*[47]

According to current UN list, Ethiopia is one of the 48 least developed countries (hereafter LDCs) in the world which are characterized by weak human and institutional capacities, low and unequally distributed income, and scarcity of domestic financial resources.[48] There is negligible

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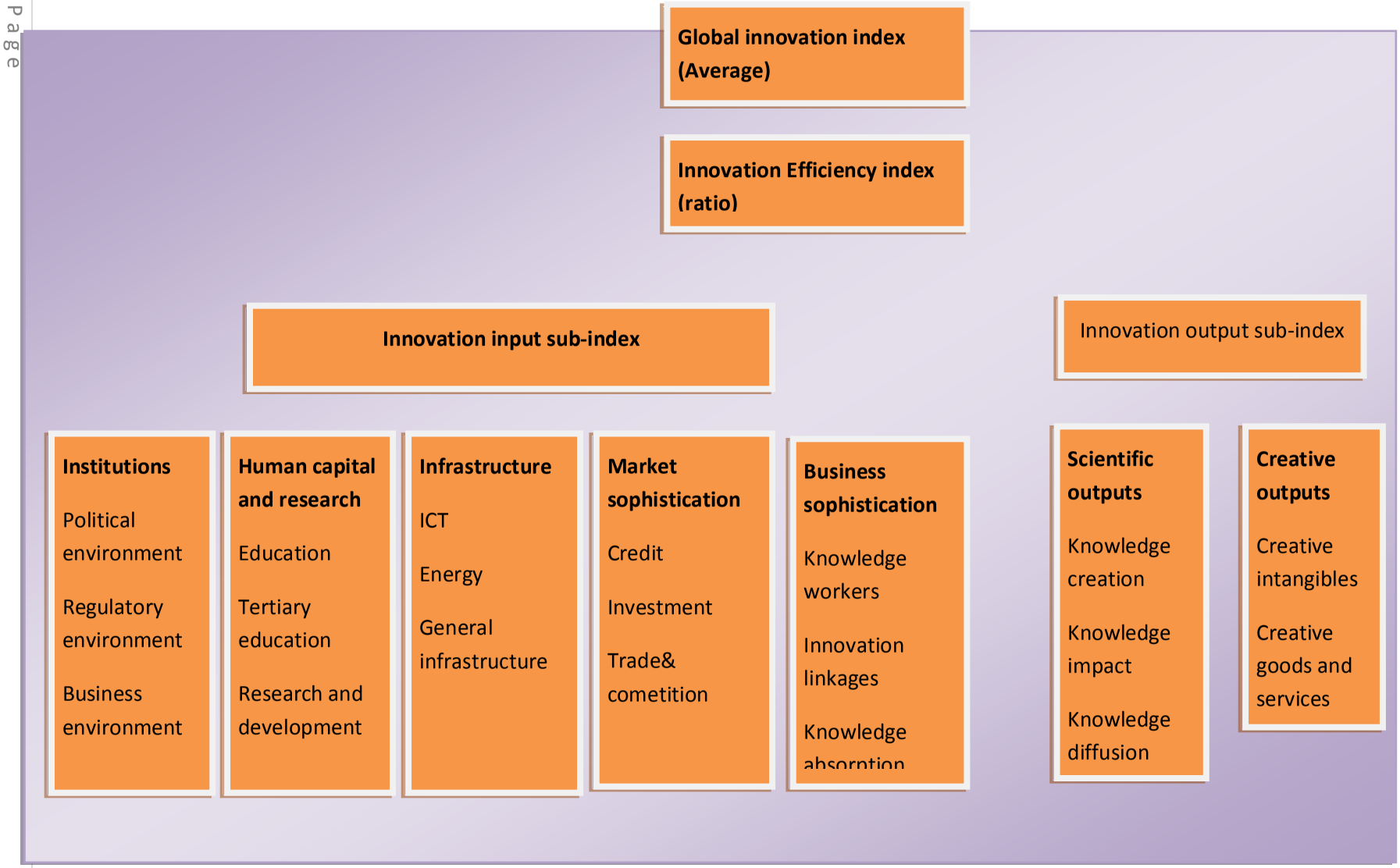
[40]. See Chapter 2, section 2.2
[41]. Walter G. Park & Juan C. Ginrate (1997), 'Intellectual Property Rights and Economic Growth', *Contemporary Economic Policy*, Vol. XV, pp. 51 (Hereafter Ginrate and Park)
[42]. Ibid
[43]. See chapter 1, section 1.1
[44]. Sanjaya Lall and Manuel Albaladejo (2003), Indicators of the Relative Importance of IPRs in Developing Countries, UNCTAD-ICTSD, (hereafter S. Lall) pp. 9-13
[45]. Ibid, pp. 35, end note 5
[46]. Ibid
[47]. World Bank (2001), 'Intellectual Property: Balancing Incentives with Competitive Access', in *Global Economic Prospects*, 129-150, pp.131-132. See also, Commission on Intellectual Property Rights, Integrating Intellectual Property Rights and Development Policy, (hereafter CIPR), pp. 26
[48]. United Nations, avialble at http://webapps01.un.org/cdp/dataquery/displayResults.action.

existence of manufacturing industries.[49] According to Kim technological capability is "the ability to innovate and improve products and processes."[50] With specific reference to LDCs, it is also defined as the "capacity to select, absorb, assimilate, adapt, imitate and perhaps improve given (imported) technologies."[51] According to World Investment Report 2005, Ethiopia is a low performing nation in technological innovation.[52] The innovation capability index of the report measures technological activity (R&D personnel per million population, United States patents granted per million population, and scientific publications per million people) and human capital (literacy rate, secondary school enrolment and tertiary enrolment). Ethiopia scored very low in these measures. Out of 117 target economies, Ethiopia stood 113th. Another empirical research on the relative importance of IPRs revealed that Ethiopia has insignificant domestic technological basis[53]. The author used technological effort index that measure R&D finance by productive enterprises and the number of patents taken out internationally by the 87 sample countries including Ethiopia. It is among the 21 countries which had negligible outputs in all the measures employed. These countries are categorized under the group of countries labeled as 'countries with no significant technological activity' which are characterized by "simplest technological structures".[54] Very recent research result has shown that Ethiopia ranked 121st from 125 countries in the world followed only by Niger, Yemen, Sudan and Algeria.[55] While measuring the technological capability of these target economies, the research make use of innovation input index (such as, institutions, human capital and research, infrastructure, market sophistication and business sophistication) and innovation output index (scientific outputs and creative outputs).[56] For the sake of better understanding of the details, I reproduce the following table from the same research result.

Figure 2: Measuring inventive capability (Adapted from Global Innovation Index, 2011)

[49]. Green Paper, supra note 5.
[50]. Yoon, Bang-Soon L. (1992), 'Reverse Brain Drain in South Korea: State-led Model', in *Studies in Comparative International Development*, Vol.27, No.1, pp.4-26.
[51]. Mursitama, T.N, *Determinant of Technological Capability of Indonesian Firm*, pp. 2
[52]. UNCTAD, World Investment Report 2005, pp. 114
[53]. S. Lall, supra note 44, pp. 17
[54]. Ibid, pp.14
[55]. Soumitra Dutta (ed.) (2011), The Global Innovation Index 2011: Accelerating Growth and Development, INSEAD, (hereafter GII), *pp.*xxii
[56]. Ibid, pp.9


Global innovation index (Average)
Innovation Efficiency index (ratio)
Innovation input sub-index
Innovation output sub-index
Institutions
Political environment
Regulatory environment
Business environment
Human capital and research
Education
Tertiary education
Research and development
Infrastructure
ICT
Energy
General infrastructure
Market sophistication
Credit
Investment
Trade& cometition
Business sophistication
Knowledge workers
Innovation linkages
Knowledge absorption
Scientific outputs
Knowledge creation
Knowledge impact
Knowledge diffusion
Creative outputs
Creative intangibles
Creative goods and services

The following tables shows the facts in figure in every measure demonstrated in figure 2 above

Table 3: Ethiopia's rank in various innovation capability measurements

Measures	Elements of the measure	Score (out of 100)	Rank (out of 125 economies)	Average score	Average Rank
Institutions	Political environment	31.5	113	51.8	96
	Regulatory environment	37.6	110		
	Business Environment	86.5	29		
Human Capital and Research	Education	22.8	124	16.8	123
	Tertiary education	15.2	107		
	Research and Development	12.2	109		
Infrastructure	Information and communication technology (ICT)	8.5	119	20.0	112
	Energy	23.4	47		
	Generated Infrastructure	28.0	109		
Market Sophistication	Credit	20.4	109	26.8	116
	Investment	28.7	62		
	Trade and Competition	31.2	123		
Business Sophistication	Knowledge Workers	31.2	84	31.1	82
	Innovation Linkages	38.5	37		
	Knowledge Absorption	23.7	109		
Scientific Outputs	Knowledge Creation	4.8	81	19.1	89
	Knowledge Impact	33.8	53		
	Knowledge Diffusion	18.7	106		

Creative Outputs	Creative Intangibles	25.2	118	13.8	121
	Creative goods and Services	2.4	114		

Source: Adapted from Global Innovation Index 2011, pp. 25-37

Table 3 above shows that Ethiopia is far behind the catching up process. This is evident from its low performance in human capital and research (ranks 123rd) and creative outputs (ranks 121st). The research result showed that, in Ethiopia, there is high-tertiary outbound mobility (brain drain), negligible gross R&D expenditure and quality research institutions.[57] The ability to absorb knowledge is also important in the catching up process.[58] However, Ethiopia scored less in this measure (scored 23.7 out of 100 and ranked 109th) which means that it lacks the ability to pay for royalty & license fees, to import high-tech imports and to attract FDI.[59] Poor performance in creative output showed that the country cannot commercialize its inventions, if there is any.[60]

A recent study conducted by IKED[61] demonstrated that the technological capability of Ethiopia is very low in all the traditional measures of technology output.[62] Getachew explained that "the level of the manufacturing sector in Ethiopia is in its infancy and the country's industrial base is weak. The intermediate and capital goods industries are insignificant. The industrial sector is heavily dependent on imports of semi-processed goods, raw materials, spare parts and fuel."[63] Background surveys undertaken by MoST for the preparation of Green Paper for the National Science, Technology and Innovation (STI) Policy proved that Ethiopia is in the primitive stage of technological development.[64] It is indicated that the manufacturing industries are mainly engaged in the production of consumer goods like food, textiles and beverages.[65] Exports are dominated by low-technology products, and primarily consisting of low value primary

[57]. See also GII, supra note 55, pp. 156
[58]. Ibid
[59]. Ibid
[60]. Ibid
[61]. International Organization for Knowledge Economy and Enterprise Development
[62]. IKED (2006), *Ethiopia: Innovation and Growth in International Comparison*, available at www.**iked**.org/pdf/**Ethiopia**.pdf, pp.11-14
[63]. Getachew's Assessment, supra note 25, pp.11
[64]. The research results produced in the process of preparing the Green Paper are:
1. Overview of the National Development Policies and Strategies
2. Overview of the STI Experiences of Selected Countries
3. Analysis of the STI Experiences of Selected Countries
4. Report on the Consultative Discussions with the Major Stakeholders
5. Analysis of Socioeconomic and STI Situation of Ethiopia
6. The Role of Quality Infrastructure in Technology Transfer
7. Alternative Ways of Technology Transfer and Diffusion
8. Establishment of S&T Information Center
9. The National Innovation System of China
10. The National Innovation System of Tunisia

[65]. Green Paper, supra note 5,

agricultural products and the country is highly dependent on imported technologies and pharmaceutical products. There is also inadequate capability to ensure quality education.[66] It also lacks organized research centers focusing on adaptation of foreign technologies.[67] The current ratio of R&D expenditure to Gross Domestic Product is 0.2 which is one of the lowest in the world.[68] The data collected 2005 showed that the total number of researchers in Ethiopia was only 1572, which is 0.45 researchers per 10,000 labor force.[69] This is far below the LDCs average for researchers and scientists, i.e. 1.76 researchers per 10,000 labor forces.[70] As shown in table 1 above, patent is granted for only 44 persons out of whom only one is Ethiopian national. According to the 2011 Global Innovation Index, Ethiopia's per capita income is $934.4.[71]

These facts revealed that Ethiopia is in the low level of economic development and technological capability. Given the very low per capita income, the great share of the population is unable to pay for high prices which are the results of stronger protection of IP. In addition, there is no domestic technological base, not only to invent new products or processes, but also to imitate the mature (old) technologies using adaptation and reverse engineering. This is evident from 370 utility model certificates granted within almost 16 years operation of the proclamation. In the words of Kim almost all the improvements that received utility model certificates are very old and simple.[72] Let alone pushing on frontier technologies, Ethiopia's domestic enterprises have not yet developed imitation and copying of technologies through reverse engineering. The non-existence of patent holders which are Ethiopian nationals or domestic enterprises explain the fact that there is no significant social benefit out of providing fifteen years (and possibly 20 years) of patent protection for invention in almost every field of technology.[73] The low level of technological activity in the country demands weak protection of IPRs which enables enterprises and research institutions acquire and accumulate technological learning through reverse engineering. Stronger protection inhibits the very process of building technological capabilities by raising the prices for protected products and processes and costs of licensing. It will be beneficial to domestic enterprises and the society only after the number of domestic industries depending on imitation declines and with the increase of industries which develop IPRs in their own right. This is evident in Lall's conclusion that goes:

> *Easy capabilities may be acquired by brief training combined with learning-by-doing (i.e., repetition without technical support, investment or*

[66]. Ibid
[67]. Ibid
[68]. Ibid
[69]. Ibid
[70]. Ibid
[71]. GII, supra note 45, pp. 45 and 156. This is far below the recommended income level to benefit from the stronger protection of IPRs, i.e., 7,750 USD (in 1985 prices).
[72]. Linsu Kim (2003), Technology Transfer and Intellectual Property Rights: The Korean Experience, UNCTAD & ICTSD, pp.17
[73]. The Proclamation, infra note 80

> *experimentation). More difficult capabilities necessarily require more training and technological effort to master, with concomitant risk and uncertainty. As technologies grow more complex, the development of capabilities runs into problems of appropriability, externalities, lumpiness and requirements of very specialized skills.*[74] (Emphasis mine)

The enterprises are highly dependent on low technologies as shown in table 1 above because majority of domestic enterprises applied for utility model certificates and only one public research organization (i.e., institute of agricultural research) has succeeded in owning patent. The report of the Commission on Intellectual Property Rights concluded that:

> *The simplest evidence of the impact of the IP system is how it is used, particularly by nationals. The propensity to take out patents will reflect some judgments as to benefits, albeit private rather than social benefits. In sub-Saharan Africa in 1998 (excluding South Africa), 35 patents were granted to residents compared to 741for no-residents. By contrast in Korea, 35900 patents were issued to residents, compared to 16990 to non-residents. In the US, the corresponding figures were 80292 and 67228.*[75]

In the Ethiopian situation, the majority of technologies improved by local industries do not demand stronger patent protection. There is no substantial application for patent protection by Ethiopian residents. This is simply because of the fact that the problem of exploiting invention arises once enterprises acquire capability to invent new technologies. Providing stronger protection of patents in this early stage hampers them from developing their technological capability so as to benefit from stronger protection in the long-run. Assefa argued that "the level of inventions found in non-industrialized countries such as Ethiopia call for the law that takes care of [minor inventions] and not favor major inventions which arise rarely or are largely to be found in the industrialized countries."[76] It is argued that IPRs are instruments of public policy that "confer economic privileges on individuals and institutions solely for the purposes of contributing to the greater public good".[77] In the absence of viable technological base and domestic enterprises that seek protection, the social costs of stronger protection outweigh the benefits. The kind of legal framework the current technological and economic reality of Ethiopia demands is that the one that enables it to build its domestic technological capability and stimulates local innovation. The policy and legal framework should encourage the accumulation of knowledge by facilitating learning by doing through copying, imitating and reverse engineering. It should also encourage the bulk inflow of foreign technologies that increase exposure to these technologies to domestic enterprises. This should be the primary concern for Ethiopia without which the countries sustainable development is unlikely. This can be done by

[74]. Lall S.(1992), 'Technological Capabilities and Industrialization', in *World Development*, Vol. 20, No.2, pp. 181
[75]. CIPR, supra note 47, pp. 22
[76]. Assefa Endeshaw (1996), Intellectual Property Policy for Non-Industrialized Countries, Dartmouth Publishing Company, pp. 269
[77]. CIPR, supra note 47, pp. 6

taking care of minor inventions than major inventions which occur rarely. This measure is consistent with the low level income in Ethiopia. As explained in the report of the Commission on Intellectual Property Rights, "the patent system cannot stimulate inventions that are useful to society if the potential beneficiaries cannot pay for them, or someone else is not prepared to pay on their behalf."[78] The following section examines whether the current patent system can serve the interest of the Ethiopian economy.

4.3. The Ethiopian Patent Regime

4.3.1. General

The Inventions, Minor Inventions and Industrial Designs Proclamation (commonly referred to as Patent Proclamation, and hereafter the Proclamation) was enacted in 1995 after two years of the adoption of the National Science and Technology Policy. Ethiopia followed the mixed patent-utility model regime. That is, the proclamation protects patents, petty patents and industrial designs. It provides a strong protection of inventions. The term of protection is 15 years with likely extension to 20 years because the only requirement is the proper working of the patented invention in Ethiopia.[79] It virtually provides protection for inventions in almost all fields of technology. It excludes the following inventions:[80]

a. Inventions contrary to public order or morality;
b. Plant or animal varieties or essentially biological processes for the production of plants or animals;[81]
c. Schemes, rules or methods for playing games or performing commercial and industrial activities and computer programmes;
d. Discoveries, scientific theories and mathematical methods;
e. Methods for treatment of the human or animal body by surgery or therapy, as well as diagnostic methods practiced on the human or animal body;
f. Works not protected by copyright;

These exclusions are those which are allowed in the international patent regime manifested in the Agreement on Trade Related Aspects of Intellectual Property Rights (hereafter TRIPS).[82] In addition, it also provides exclusive rights for minor incremental innovations and for industrial designs.[83]

[78]. Ibid, pp. 123
[79]. The Proclamation, supra note 33, Art. 16
[80]. Ibid, Art.4
[81]. Plant varieties are provided with *sui generis* protection by plant breeders' right protection proclamation.
[82]. Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), Annex 1C of the Marrakesh Agreement (hereafter TRIPS Agreement), Art. 27 (2) & (3)
[83]. The proclamation, supra note 33, Arts. 38-51. According to the proclamation, Industrial Design is "any composition of lines or colours or any three dimensional form whether or not associated with lines or colours

4.3.2. Patent Coverage

Experiences of the countries examined in the third chapter showed that countries did not provide patents to all fields of technology. They used to exclude sectors which are very sensitive for the needs of their technological and economic development efforts. That is, they were able to make use of foreign technologies freely and without facing obstacles from foreign claims. India, for example, noticed the exclusion of chemicals and pharmaceuticals from the scope of patent protection.[84] Within twenty years its domestic enterprises gained technological capacity to imitate technologies and produce generic drugs, and also produce their own technologies. The same is true for Japan where pharmaceutical products, chemical compounds, food and beverage were precluded from the scope of patent protection to facilitate the process innovations. In Taiwan, government publicly encourage domestic enterprises to copy foreign technologies in addition to excluding chemical and pharmaceutical products, food, beverages, micro-organisms, and new uses for products. The 1961 South Korean patent law also excluded products and processes to manufacture food products, chemical products and pharmaceuticals from the scope of patent rights.

A great deal of researchers agreed that the deliberate measures of these countries to adopt weak patent law enabled them to enhance their technological capacity building effort in their early phase of industrialization.[85] Though there are research results[86] that demonstrate the long-term benefits of stronger protection of IPRs, a widely accepted empirical research results found that the costs of such a regime is immediate and this would hamper the efforts of industrialization.[87] C. Correa, a prominent authority in intellectual property rights, noted that "strong IPRs may impair the capacity of potential recipients in the developing countries to gain access to, and pay for, needed technologies. IPR owners enjoy, in principle, the legal power to decide the power whether to exploit products and processes in such countries and how to do so."[88] He added that stronger IPRs have a considerable negative impact on the process of caching up in developing countries by excluding imitation through reverse engineering on a wider scale while "the cost of obtaining licenses are likely to increase, if they are obtainable at all."[89]

The Ethiopian case is different from these countries' experiences. Its patent regime provides strong protection virtually in all fields of technology that satisfy the standard requirements of novelty, non obviousness (inventive step) and industrial applicability. The proclamation makes

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provided that such composition or form gives a special appearance to a product of industry or handicraft and can serve as a pattern for a product of industry or handicraft." Art. 2 (2).

[84]. See chapter 3, section 3.1

[85]. Ibid

[86]. See chapter 2

[87]. CIPR, supra note 47

[88]. Carlos M. Correa, 'Can the TRIPS Agreement Foster Technology Transfer to Developing Countries?' in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime*, pp.254

[89]. Ibid

use of universal novelty in the sense that an invention is considered new if it is not anticipated by the prior art generated everywhere in the world.[90] It also stipulates that an invention shall be considered involving an inventive step, if having regard to the prior art, it would not have been obvious to a person having ordinary skill in the art.[91] The industrial applicability requirement is satisfied where the invention can be made or used in handicraft, agriculture, fishery, social services and any other sectors.[92] The novelty and inventive step requirements are very stringent to be attained by local enterprises given financial and human capital constraints and, therefore, cannot benefit them. The only institution that passed through these stringent requirements and acquired ownership of patent is the Ethiopian Institute of Agricultural Research in the sixteen years of the laws operation. This explains that the very objective of the law to encourage local innovation is defeated. The fact that virtually all fields of technology are protected under Ethiopian patent law can be inferred from the exclusions in the proclamation.[93] The very low per capita income of the population demonstrated that markets for protected inventions are greatly negligible. As I have noted in the previous section, the technological activity in Ethiopian is significantly low. There are hardly any significant technological inventions of domestic enterprises and individual persons that seek strong patent protection. This can only be overcome by adopting a patent system that could facilitate technological learning. Increased exposure to foreign technologies is important to build technological capability of domestic enterprises. This is evident in the TRIPS Agreement which is primarily the advocate of stronger protection for IPRs. Article 66 (1) of the TRIPS Agreement states that:

> *in the view of the special needs and requirements of least developed country members, their economic, financial and administrative constraints, and their need for flexibility to create a viable technological base, such members shall not be required to apply the provisions of this Agreement, other than Article 3, 4 and 5, for a period of ten years from the date of application as defined under paragraph 1 of Article 65. The Council for TRIPS shall, upon duly motivated request by a least developed country Member, accord extensions of this period.*

Member LDCs were provided with longer transition time than developing countries taking into account the non-existence of viable domestic technological base in former countries.[94] This is a tacit recognition among the negotiators that countries with simple technological base cannot benefit from providing stronger patent protection in the level endorsed by the TRIPS Agreement. In his commentary of TRIPS Agreement Article 66 (1), Correa explained that:

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[90]. The proclamation, supra note 33, Art. 3(2)
[91]. Ibid, 3 (4)
[92]. Ibid, Art. 3 (5)
[93]. Ibid, Art.4
[94]. TRIPs Agreement, supra note 82, Art. 66 (1). However, Art. 65(2) of the same provides that a developing country member is entitled to delay, for a further period of four years, the application of the Agreement. This may be taken as another implicit recognition of the negotiators in the relative importance of IPRs depending on the level of technical and economic progress of a particular country.

> *The wording of this provision suggests that in order to develop a 'viable technological base' LDCs need a flexible intellectual property system, that is, less protection than that required under [the TRIPS Agreement]. This is in [stark] contrast to the main argument of the proponents of the TRIPS Agreement, in the sense that more intellectual property protection would almost automatically lead to more innovation, and is rather in tune with developing countries demand for more flexibility and policy space to develop their own technological capacities.*[95]

The question of appropriability may arise only after the country achieved in capitalizing on complex innovations.[96] In the absence of local enterprises capable of purchasing, absorbing and deploying new technologies, strong IPRs do not have the benefit of enhancing technology transfer.[97] Rather, they require the society to expend on the protection of IPRs without benefiting from doing so. In addition, local innovative capabilities cannot be stimulated by providing for strong IPRs in LDCs.[98] In addition, stronger protection of patents may result in hampering innovation if the effort of building it involves copying and reverse engineering of foreign innovations.[99] These are the main sources of technological learning for such countries.

One may ask, therefore, if weaker protection of IPRs is to the interest of the country, why the legislature had adopted a stronger regime. One explanation for this may be the influence of the then pro-TRIPS argument from the developed world and the expectation that the country will become a member of WTO.[100] This can be inferred from the preamble of the proclamation. The two major reasons to come up with patent protection, as expressed in the preamble, were to create favorable conditions in order to encourage local inventive and related activities thereby building up national technological capability and to encourage the transfer and adoption of foreign technology by creating conducive environment to assist the national development efforts of the country. However, the use of stronger IPRs to foster local invention and transfer and adoption of foreign technology is not uniform across all economies.[101] It is dependent on the level of economical development and technological activity.[102] For LDCs like Ethiopia, the costs outweigh the benefits. It is not easy to establish a strong IPR regime. It requires the country to allocate a great deal of resources to establish the necessary institutions and to train experts for its effective enforcement. Given the negligent amount of R&D expenditure and ownership of IPRs in these countries, such a regime is not in their best interest. The expectation that stronger IPRs

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[95]. Carlos M. Correa (2007), Trade Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement, Oxford University Press, pp. 495-496
[96]. Lall S., supra note 74
[97]. S. Lall , supra note 44
[98]. Ibid.
[99]. Ibid. See also Carlos M. Correa, supra note 88, pp. 253-254
[100]. FIkremarkos Merso (2008), 'Patents and Access to Drugs: Will Ethiopia's Accession to the WTO Make A Difference?', *Series in Ethiopian Business Law*, Vol. 2, pp. 166-167
[101]. See chapter 2, section 2.2
[102]. Ibid

protection might result in the increased inflow of foreign technologies to these countries is proved to be a mere promise without effective implementation even for those LDCs which are members to WTO.[103] In this respect, Basheer and Primi advised LDCs as follows:

> *"For those countries with no technological base at all, it may be the case that rather than focusing too much on innovation incentives- be they traditional IP rights or alternative paradigms such as prizes- one is better off building up technological capability through education and infrastructure. In other words, for such countries, a disproportionate deployment of resources towards IP norms may not be optimal."*[104]

Therefore, the writer of this paper is of the opinion that, right at this stage, Ethiopia should not adopt a strong IP law at all because there are virtually no domestic industries seeking for protection. However, abolishing the system at all is not a feasible option for it has a negative signal for trade partners. The change in IP law of India, South Korea and Taiwan was strongly influenced by pressures from trade partners, and particularly from USA.[105] However, the exclusion of some kind of technologies that are demanded by the majority of the poor people, like food, beverages, fertilizers, agro processing, pharmaceuticals and chemicals should be reconsidered. The nine priority areas identified by the government may also help in the selection of the technologies to be excluded from the scope of patent protection.[106] The country's move to accede to WTO may not allow this measure, but it is not absolutely impossible.[107] The negotiators can protect the country's interest by seeking transition time to comply with the TRIPS Agreement.

However, in their analysis of the accession agreements of 21 countries, Correa and Abbott explained that countries were required to comply with TRIPS-plus terms during accession.[108] The flexibilities in the TRIPS Agreement are denied to acceding countries due to the pressures from the giants. LDCs, such as Cambodia, Nepal and Vanuatu, are not exceptions in this regard.[109] They were given only three years transition time from the date of their accession.[110]

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[103]. C. Correa, supra note 88

[104]. Shamnad Basheer and Annalisa Primi (2010), WIPO Development Agenda: Factoring in Technologically Proficient Developing Countries, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1289288&download=yes, pp. 109

[105]. See Chapter 3. However, without the capacity of domestic enterprises to imitate new and emerging technologies, pressures are unlikely to appear. See Chapter Two sections 2.3.1, 2.3.2, and 2.3.3

[106]. See supra note 12 above.

[107]. It is article xii of the Marrakesh Agreement Establishing WTO that governs the accession process. It stipulates that "any state or separate customs territory possessing full autonomy in the conduct of its external commercial relations or for the other matters provided for in this Agreement and the Multilateral Trade Agreement may accede to this Agreement on terms to be agreed between it and the WTO." (Emphasis mine). There is no guidelines on how to negotiate on "terms to be agreed".

[108]. See Quaker United Nations Office (2007), World Trade Organization Accession Agreements: Intellectual Property Issues, (hereafter Quaker) pp. 1-60

[109]. Ibid, pp. 11, 19-20 and pp.41

This included disregarding the Doha Declaration on TRIPS and Public Health that allow developing countries to exclude pharmaceuticals until 2016.[111] The decision of General Council, dated 10 December 2002, that requires members of the WTO to "exercise restraint in seeking concessions and commitments on trade in goods and services from acceding LDCs, taking into account the levels of concessions and commitments undertaken by existing WTO LDCs members", has not been adhered because TRIPs-plus requirements were imposed on LDCs during their accession.[112] These include commitment to consider importation as sufficient to justify exploitation of patents and limit the situation for granting compulsory license in case of lack or insufficiency of working, patenting of computer programs and business methods which lack technical effect and industrial applicability, and to join intellectual property treaties and free trade areas that impose TRIPS-plus obligations. They committed not to roll-back in the sense that the TRIPS-consistent measure already in place should not be subject to transitions.[113] These experiences showed that the probability to secure long time for transitions may be unlikely for Ethiopia. Consequently, if the negotiating giants, such as US and EU, as they did in earlier negotiations, press the country to comply, another way out should be devised. That is, pushing up the standard for non-obviousness or inventive step so that inventions unable to satisfy the requirement are excluded from the scope of patent protection and will get sui generis protection. As discussed in section 4.5 below, there is alternate system of sui generis protection that suits with the needs of domestic enterprises for inventions failing to meet this standard than utility model certificates (petty patents).

4.3.3. Patent of Introduction

Patent of introduction, which is also referred to as 'patent of importation', is that "importing an invention which is patented abroad with the justification that such importation facilitates the transfer of technological information from abroad and with the hope that such importation would be important for domestic developments."[114] Patent of Introduction is a patent right issued for an invention which has been patented abroad and not expired but has not been patented in Ethiopia.[115] The terms and conditions for granting patent of introduction are similar with those for granting patent of invention.[116] The law requires interested party to furnish a declaration showing that he/she takes full responsibility.[117] In addition, he/she is required to indicate, on the application, the number, date and origin of the foreign patent or the requisite source of

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[110]. Ibid, pp.41. With respect to certain matters, they were required to comply with TRIPS Agreement immediately as of the date of accession. For details see also Ratnakar Adhikari & Navin Dahal, LDCs' *Accession to WTO: Learning from the Cases of Cambodia, Nepal and Vanuatu*, available at www.un-ngls.org/orf/SAWTEE.doc,
[111] . Ibid.
[112]. Quaker, supra note 108.
[113]. Ibid
[114]. Seyoum Adane (2008), *Patent of Introduction Under the Intellectual Property Law of Ethiopia* (unpublished), LLB Thesis, Addis Ababa University, pp. 34-37
[115]. The Proclamation, supra note 33, Art. 18
[116]. Ibid, Art.19 (1)
[117]. Ibid,

information if he does not know the details.[118] The term of protection for patent of introduction is ten years with the owner's corollary obligation of proving the working of the invention in Ethiopia each year as from the third year after it has been granted and paying the relevant annual fees. The patent of introduction shall be invalidated if the owner of the foreign patent files a corresponding application before the expiration of the period of one year.[119] In this case, the invalidation shall be declared by court upon the request of interested party.[120] Failure to prove working of the invention and failure to pay the annual fees are other reasons for invalidating the same.

Countries examined in the third chapter, particularly Japan, were able to build their technological capability by patenting imported inventions.[121] The system is very instrumental for Ethiopia too because it provides incentives for those who need to import foreign invention with the necessary industrial establishments to work the same in Ethiopia. However, this cannot be realized without the government's active involvement to attract scientists and researchers of Ethiopian nationals or of Ethiopian origin abroad as was done in South Korea.[122]

In addition, for a country like Ethiopia, the transfer of information via patent of introduction cannot stimulate local innovation, at least in the short and medium-term because there is no viable technological base able to make use of the information for further invention. Still, there is no Ethiopian resident able to import foreign technology and own patent of introduction. As shown in table 1 above, all patent of introduction are owned by foreigners. Therefore, it only served foreigners by extending protection when they find that seeking protection is to their own interest.

4.3.4. Compulsory License

Compulsory license is often considered as a tool for enhancing technology transfer.[123] The proclamation provides for conditions that compulsory license may be issued. These are: dependency between patents[124] and failure to work the patented invention without legitimate reason.[125] 'Working the patented invention' is defined as "the manufacture of a patented article or the application of a patented process by an effective and serious establishment existed within Ethiopia."[126] (Emphasis mine). As shown in the India's experience, in chapter three, compulsory

[118]. Ibid, Art. 19 (2)
[119]. Ibid, Art. 20 (1)
[120]. Ibid, Art. 20 (2)
[121]. See Chapter Three
[122]. Kim, supra note 55
[123]. Carlos M. Correa, "Can the TRIPS Agreement Foster Technology Transfer to Developing Countries?" in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime*, pp. 240
[124]. The Proclamation, supra note 33, Art. 29 (1) & (2)
[125]. Ibid, Art. 29 (3)
[126]. Ibid, Art. 2 (9). Correa defines working as "industrial execution of the invention." See C.M. Correa, supra note 123, pp. 240

license was issued in case of lack/insufficient working because the patent system is not devised to enable the patentee to enjoy a monopoly on the imported article. Theoretically speaking, the same is also applicable in the Ethiopian case. The reference of the proclamation to "effective and serious establishment existed within Ethiopia" reveals the intention of the legislature to put the patented information into productive activities within the country so that it can contribute to the development needs of the country. This is further evident in the disclosure requirement established in the Inventions, Minor Inventions and Industrial Designs Council of Ministers Regulation No.12/1997 (hereafter the regulation). According to this regulation, the description of the invention shall:

- Disclose the invention in a manner sufficiently clear and complete so as to enable a person having ordinary skill in the art to carry it out and state its advantageous effects, if any, with reference to the background art;[127]
- Set forth at least one mode contemplated by the applicant for carrying out the invention;[128]

These effective disclosure requirements are conditions that are believed to support the effectiveness of the issuance of compulsory license because they enabled licensees to get ready-made information to easily deploy them in the production activities. There are countries like India which were unable to use this system during their early industrialization stage as a tool of technology transfer and economic development due to lack of capacity. In the Ethiopian case too it is unlikely to enhance transfer of technology through compulsory license because domestic enterprises lack the capacity to make use of the information in productive activities. The ability to absorb foreign technologies is very low as research findings, examined in section 4.2 above, revealed.

The basic justification for patent protection is that the new knowledge generated and protected is set out in the production activities of the country and thereby enhances competitiveness, employment and creation of new business. It is the EIPO that is empowered to follow up the exploiting of legally protected foreign and local inventions and issue compulsory licenses when necessary. So far, however, inventions in Ethiopia (both patents and petty patents) are not checked whether they are put to practice or not and no compulsory license was issued.[129] This measure is very important for economic development efforts in Ethiopia by creating favourable environment for employment and technological learning, at least with respect to minor inventions if the EIPO undertakes its power.[130] However, this is not an effective tool with respect

[127]. The Inventions, Minor Inventions and Industrial Designs Council of Ministers Regulation No.12/1997, Art. 11 (1) (d)
[128]. Ibid, Art. 11 (1) (g)
[129]. Interview with Tamire Haile, Legal Study and Dissemination Senor Expert, EIPO and Girma Bejiga, Patent Protection and Technology Transfer Directorate Director, EIPO. The former told me that such undertaking was not performed not because there is no problem, but the office did not try to follow on inventions it granted.
[130]. It should be noted that compulsory license also works for minor inventions in case of non-working according to Art. 45 of the proclamation

to frontier technologies in the absence of local capability to absorb knowledge and putting it into productive activities.

4.5. Utility Model Certificates

Table 4. Applicantions for utility model certificates

No.	Applicants	Number of applications	Number of UM granted
1	Engineering Design and tool enterprise and Yemane Ghid	15	3
2	Leggio Aluminum P.L.C	25	7
3	Dan Technocraft	31	13
4	Amel Fiber Engineering	2	-
5	Wassie Ayalew	1	1
6	Raymond F. Patne	1	-
7	Hussein Mohammed	1	1
8	Tesfaye Mamo	3	-
9	Addis Ababa University	5	4
10	Processing Polyindustry Chemicals	7	5
11	Bekas Chemicals plc	53	23
12	Selam TVET	96	34
13	Izur Renewable Energy Consulting	7	2
14	Beta Electrical Control and Service Engineering Plc	7	-
15	Maru Metal Industry	21	5
16	Ethiopian Tire and Rubber Economy Plant plc	35	6
17	Sara Garment Designers & Manufacturers	28	9
18	Elroi plc	4	3
19	Mount Fuddy TVET	31	13
20	Catholic Relief Service	17	10
21	Health Care Food Manufacturers plc	52	18
22	Aybar Engineering plc	69	50
23	Chan Chun Plc	14	7
24	Mekuria Engineering Inc.	106	65
25	Yabel Industrial	2	2
26	Ethiopian Institute of Agricultural Research	8	5
27	Angada General Business Plc	7	5
28	Rift Valley Water Technology plc	104	31
29	Y.E.S. Maternity Care Products plc	13	10
30	Y.T Heavy Construction	16	12

	Machinery Operators Training Center plc		
31	Amstel Fast Food and Vegetable Manufacturing plc	69	10
32	Africa Humanitarian Aid & Development Agency	17	9
33	Lydetco plc	23	1
34	Modern Industrial Automation plc	20	2
35	International Development Enterprise	4	-
36	Ministry of Water and Energy	8	-
37	Fnot Advertizing & Information Enterprise	9	-
38	Ashenafi Bekelle	1	-
39	Solomon Haile	1	-
40	Daniel Asrat	1	-
41	Moges Gorfe	1	-
42	Teshome Debele	1	-
43	Desta G/Egziabher	1	-
44	Ebrahim Seid	1	-
45	Dawit Desta	1	-
46	Solomon Sebsibe	1	-
47	Mulugeta Terfey	2	-
48	Not identified	76	5
	Total	955	370

Source: Patent database, EIPO, 2011

Utility model certificates are certificates issued to a minor invention which is fit for practical use.[131] It confers upon inventors ("authors" in the wording of the Proclamation) exclusive rights over the inventions which are new and industrially applicable.[132] The minor or incremental invention lacks only the nonobviousness requirement to satisfy the requirement for patent. That is, the inventions are partly in the public domain in the sense that they are within the ambit of the knowledge of routine engineers, and partly protected rights.[133] Utility model certificates are therefore, granted for minor incremental inventions based on patented article or an invention which term of protection lapses. This is evident in the exclusions of the proclamation. Protection of minor invention through utility model certificate is not available for the following:[134]

a. Changes in the shape, proportions or material of a patented object or of one that is public property, except where such a change alters the qualities or functions of the object thereby producing improvement in its use or the effects of its intended functions;

[131] . The Proclamation, supra note 33, Art. 2 (8)
[132] . Ibid, Art. 38
[133] . Ibid, Art. 40 (1)
[134] . Ibid, Art. 40 (1)-(3)

b. The mere replacement of elements in a known combination by other known elements having an equivalent function, which does not thereby producing an improvement in its use or the effect of its intended functions; or
c. Minor inventions that are contrary to the public order or modality.

As explained in the third chapter, utility model certificates play a significant role in the technological capability building of South Korea, Japan and Taiwan. It enhances adaptation of foreign technology through reverse engineering and hence technological learning. Especially, in the case of Japan, utility model certificates helped domestic industries to "surround foreign inventions with a bevy of lesser rights and thereby to induce their patent owners to enter into cross-licensing arrangements" with them.[135] Compared to patents granted, utility model certificates have a good record of success in Ethiopia too. As shown in table 4 above, the existing innovation activity in Ethiopia is dominated by incremental improvements in the sense that almost all of the utility model certificates are owned by Ethiopian residents. However, the number of institutions that generate minor improvements and get protection for them by utility model certificates are very few. As shown 3 above, the total 955 applications are made only by 33 institutions and 12 individuals. This shows that technical knowledge is maintained in very few enterprises.

It was reasonable to adopt such a system during that period (i.e., 1995) because there was no other effective alternative available in the practice of other countries. However, as Assefa noted, provisions made for minor inventions involve some ambiguity. He further explained the situation as follows:

> *"On the one hand, the reference is to utility models which do not normally cover all minor inventions as such. On the other hand, the stringent requirement of novelty, in Article 39, removes any benefits that those coming up with small inventions might gain from it."*[136]

Article 39 of the proclamation established a strict requirement of novelty for minor inventions to grant utility model certificates. It stipulates that a minor invention shall not be considered new if, at the time of the application, it has already been described in printed publications, made available to the public or has already been publicly used in Ethiopia. In the words of Assefa, this amounts to applying the requirement for "universal inventions" to "minor inventions", as a result of which the possibility of protection may be reduced, and "treating them as exceptions rather than the main concerns of the law."[137]

[135]. J.H.Reichm an and Tracy Lewis (2005), 'Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge', in *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime,* pp. 339
[136] . Assefa, supra note 76, pp. 269
[137] . Ibid.

The other ambiguity is that the exclusive nature of the rights may discourage the technological capability building effort to be undertaken mainly by Small and Medium Sized Enterprises (SMEs). Exclusive rights confer the right holder the monopoly right to preclude third parties from exploiting the protected object. The proclamation stipulates that the grant of utility model certificate shall confer the exclusive right to exploit the minor invention and prevent third parties from exploiting the minor invention without the authorization of the holder of the certificate.[138] These enterprises are suffering from shortage of finance. The non-existence of venture capital added fire to the fuel.[139] The exclusive rights inhibit the process of local technical learning because it entitles the owner of the right to raise costs of bargaining because the use and exploitation of the right cannot be exercised without his authorization. UNCTAD's review of investment and innovation policy of Ethiopia stated that, with respect to SMEs in Ethiopia, "inter-firm partnerships can be effective mechanisms for investment flows, technological learning, knowledge sharing, technology transfer, market access and the development of innovative capabilities."[140] The policy framework that fosters the advancement of these SMEs is the one that "encourages continuous technological learning, investment in key sectors and ensuring that innovative strengths and core competencies which exist within individual enterprises do not remain isolated."[141] Exclusive rights system of utility model lets individual enterprises to remain isolated because it strengthens their bargaining power and raises cost of transaction for other enterprises that seek to use the formers' technology for further improvement and commercialization. In addition it inhibits competition among them. As it is shown in table 4 above, utility model certificates are owned by few enterprises and monopoly right established by them hampers the effort of widening the knowledge base.

Though utility model certificates were proved efficient in helping the selected countries develop their domestic technological capability, the legal regime should be tailored in such a way that it suits the Ethiopian domestic reality and changes in the global scenario. [142]Without viable technological base, granting exclusive rights for improvements of articles already in the public domain or for technical knowledge within the reach of routine engineers may thwart the very process of building domestic technological capability. Exclusive rights for nonobvious inventions unnecessarily impoverish the public domain and it is usually labeled as overprotection. Inter-firm relationships may be hampered and technical know-how existing within individual enterprises may remain isolated because improvements on the protected article cannot be undertaken without the permission of the right holder. This, in turn, raises the social

[138] . Art. 38 (3)
[139]. Mulugeta and Abebe, supra note 4
[140]. UNCTAD (2002), Investment and Innovation Policy Review: Ethiopia, pp. 109
[141]. Ibid
[142]. Assefa elaborated this in his book by stating that small inventions were operating as a subsidiary instrument in those countries where there are also major inventions. Therefore, the problem they sought to solve in these countries is different from the situation in non-industrialized countries. See Assefa, supra note 76, pp.142

costs of producing and gaining access to scientific and technical information.[143] This is further elaborated as follows:

> *Patent-like solutions (such as utility model certificate) will give the [right holder] a relatively strong legal monopoly for undertaking an investment in routine innovation motivated by his own business judgment about market opportunities. The public will obtain no significant creative contribution in return for rewarding [the right holder] with monopoly rights (monopoly rents) to undertake an investment that the right holder's own business judgment inclined him to make anyway, at least in the absence of intolerable free riding by second comers. While the public stands to benefit from the [incremental innovation], solving the free rider problem by misbundling exclusive property rights imposes burdensome transaction costs on the relevant technical community, frustrates entrepreneurial initiative, and saddles the public with the social costs of misdirected, top-down incentives that deny equally capable second comers access to inputs from the public domain.*[144]

The importance of compensatory liability regime for the protection of minor incremental innovation for Ethiopia is substantial when one takes into consideration the fact that utility model certificates are subject to national treatment according to the recent decision of WTO appellate body and Ethiopia's move to join the international trading system in WTO.[145] This will significantly diminish the public domain available for domestic industries that they can deploy as input for their industrial capability building effort. In addition, this unreasonable impoverishment of the public domain will make difficult to country's hope to emerge as innovating country by its own since the chance to learn through imitation will be totally blocked. Those countries with comparative technological and economic superiority may dominate the minor innovation and bar domestic companies from entering the market. As noted in the third chapter, minor inventions are carried out simply for competitive advantage and they are in the scope of the knowledge of the technical community. If the legal system confers exclusive rights for incremental adaptations, it will result in the unreasonable shrinkage of the public domain. However, it is not to mean that incremental innovations should not be protected. Undertaking adaptive research and innovation involves huge investment and lack of protection inevitably discourages investment in the sector. Therefore, adapting the system of compensatory liability regime should be given due and timely attention. The system is based on a "use and pay" principle that allows second comer to pay for using the technical knowledge of the first comer for commercialized improvement. Firstly, this enables domestic enterprises to use others technical knowledge for further improvement of the

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[143]. J. H. Reichman (2000), 'Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation', in *Vandervilt Law Review*, Vol. 53:6, pp.1772

[144] . Ibid, pp. 1772-73

[145]. United States – section 211, Omnibus Appropriations Act of 1998, Appellate Body Report, WT/DS176/AB/R (2 Jan.2002), available at http://www.wto.org/english/tratop_e/appellate_body_e.htm

product without their authorization with the only obligation to pay for the use of their know-how. Secondly, it helps first comer to recover its investment cost of improving a product. Strengthening trademark protection will help improvers and follow-on inventors to compete by upgrading quality of the product. This will benefit the public at large by reducing price and increasing quality of competing products which is the result of competition. Compensatory liability regime avoids compromising competition by blocking entry through monopoly and overprotection of minor inventions by patent-like solutions like utility model.

Chapter Five

Conclusion and Recommendation

5.1. Conclusion

Intellectual property law is a regime of law that regulates the creation, use and exploitation of mental and creative labor. In other words, it is a general area of law that encompasses copyright, patents, industrial designs and trademarks. These are the main growth effects of IPRs are those summarized above by Kumar: Facilitating investment for invention by providing incentive, enhancing the inflow of FDI and accelerating trade flows of capital goods. The role played by IPRs, and in this specific research, of patents, to development endeavors of a given country was subject of many researches especially after their harmonization through TRIPS Agreement. The pro-TRIPS arguments claim that stronger protection of IPRs stimulates local invention and fosters technology transfer. Theoretical arguments reasoned that countries with low technological capability will reap long-term benefits through encouraging investments in innovation. This gives incentives for investors to invent new technologies and collect the return thereof by exercising monopoly in appropriating the knowledge. There are also research findings that decisions regarding technology transfer are influenced by the strength of IPRs protection.

However, the view that “one-size-fits-all” strategy in the protection of IPRs is objected by many researchers. Firstly, the impact of IPRs on stimulating innovation and technological transfer depends on many factors including, among others, level of economic development, the kind of technological activity, and domestic technological capacity to absorb foreign technologies. There is consensus among researchers that countries with low technological capability and per capita income are unlikely to benefit from stronger protection of IPRs. They have no human expertise and domestic enterprises that can benefit from stronger protection of IPRs. If a given country (especially LDCs) does not consider the stronger protection of IPRs as an end by itself, weaker protection a better means in benefiting the society at large. Secondly, the experience of, among others, India, South Korea, Japan, and Taiwan and the history of the now technologically developed countries proved that weaker protection can foster technological development. The history of the now technologically advanced countries revealed that they used to violate IPRs and even abolished them to strengthen their domestic enterprises and develop their domestic technological capability. They also amend their laws in accordance with the needs of the economy through time. During their early stage of industrialization they used to deliberately violate intellectual property rights of foreigners via smuggling of machinery, industrial espionage, poaching of skilled workers, allowance of patenting of imported inventions, violation of trademarks, or even through a flat refusal to adopt the patent system (Switzerland is a typical example in this regard). For LDCs, including Ethiopia, which is characterized by low technological capability, low per capita income and extreme poverty and industrial activity that

heavily depends on agriculture, providing stronger protection of IPRs result in raising social costs without meaningful social benefit.[1] In other words, the social surplus expected of such strong regime is unlikely to be materialized at least in the short-run and medium-run. Research results from World Bank and CIPR and many other researchers advise these countries that providing such a strong regime of IPRs would frustrate the very process of building a viable domestic technological base. Therefore, it is important to tailor IPRs that suits their socioeconomic needs by undertaking the necessary cost-benefit analysis.

The other argument that stronger protection of IPRs fosters technology transfer through trade in capital goods, FDI and licensing depends on many other factors. These include, among others, market opportunity or higher levels of income, human expertise, and ability to absorb foreign technology of the recipient country. In the absence of these preconditions, countries are unlikely to attract inflow of technologies. In addition, in earlier stage of industrialization, countries can rely on cheaper and informal ways of getting technological information, for instance, from trade literatures, engineering publications, independent consultants, reverse engineering, observation and technological information center.

Ethiopia promulgates IPR laws and Science and Technology policy and established institutions for their administration and enforcement. The proclamation for the protection of patents and petty patents was issue in 1995. The law provides a 15 years (with a possible extension for additional 5 years) protection for patents virtually in all fields of technology and for products and processes that satisfy the standard requirements of novelty, inventive step and industrial applicability, a 10 years protection for patent of introduction and a 5 years (with a possible extension for additional 5 years) protection for minor improvements.

As explained in the preamble of the proclamation, its purpose was to create favorable conditions in order to encourage local inventive and related activities thereby building up national technological capability and to encourage the transfer and adoption of foreign technology by creating conducive environment to assist the national development efforts of the country. Ethiopia is one of the LDCs which are generally non-industrialized. Many researches indicated that Ethiopia has very low technological capability. In this case, the process of building technological capability cannot be enhanced by providing for the current stronger protection of IPRs. The standard criteria cannot be met by domestic enterprises. This is explicit in the database of EIPO where only one institution has been granted patent since 1995. It is, therefore beneficial for foreign industrialized countries that can generate emerging technologies that satisfy novelty and inventiveness in the global level. Hence, domestic technological capability can better be build by providing for weaker protection that enhances technological learning through imitation by reverse engineering. The relatively better success of generating minor improvements by Ethiopian residents and domestic enterprises, when compared with patents and patent of introduction, explains the economic importance of imitation for Ethiopia. Since the enforcement

[1] . This is true not only for LDCs, but also for technologically non-proficient developing countries.

of the proclamation, 44 patents were granted out of which only one is domestic enterprise. All the 72 patent of introduction are owned by foreigners. Almost all of the utility model certificates granted for minor improvements lacking nonobviousness are owned by Ethiopian residents. Providing patent protection in the absence of domestic industries seeking for, or benefiting from, protection may result burdensome social costs. Administering and enforcing IPRs in the absence of a capacity to generate substantial IPRs benefits private individuals and foreigners at the expense of the society. It thwarts the promise of catching up and follow-on inventions through reverse engineering. This may also result in raising the prices for imported products and new technologies under IPR protection, loss of economic activity by the closure of economic activities and possible abuse of protection by patent holders, especially large foreign companies. Even though the country succeeded in having domestic enterprises that develop IPRs in their own rights and commercialize them, it is very burdensome for them to bear the costs of acquiring and maintenance thereof, and specifically the cost of litigation where disputes arise. Weighing the benefits and costs of the IPR regime is very important to tailor it as a tool for economic development. Therefore, tailoring IP law that fits with the country's level of economical development and its development needs should be given priority than strengthening patent protection until it emerges to benefit out of it.

5.2. Recommendation

It is already stated that Ethiopia has not yet developed a viable technological base able to generate substantial IP assets that demands stronger protection. As a low-income country, it has not yet a considerable market for protected technologies. Therefore, the argument that stronger protection of IPRs will stimulate local innovation is not feasible in the case of Ethiopia. It is also stated that there is no conclusive proof that stronger protection of IPRs will facilitate the inflow of technologies, even in the case of LDCs that are members to the WTO which are deprived of benefiting from the compulsory obligation imposed by TRIPS Agreement on developed countries to this effect. In addition, there is only one successful government enterprise that succeeded in getting patent protection to its invention by satisfying the standard requirements for patentability. This indicates that there are no substantial number of domestic industries that are capable of developing their own invention and technological activity is dominated by copying, imitation and adaptation. Therefore, with respect to patents, the writer of this paper is of the view that the Ethiopian patent regime should be amended in either of the following two workable manners.

Firstly, it should be crafted in such a way that it precludes sensitive technological sectors from the scope of patent protection.[2] There are nine technology priority areas identified by MoST.

[2]. Researchers found that it is possible to deal with excluded technologies (products as well as processes) through contracts. See, for instance, Assefa, infra note 4, pp. 142 and Carlos M. Correa, 'Can the TRIPS Agreement Foster Technology Transfer to Developing Countries?' in K.E.Maskus & J.H.Reichman (eds.), *International Public Goods and Transfer of Public Goods Under a Globalized Intellectual Property Regime,* pp. 231

These are textiles, metal works, leather and leather products, chemicals and pharmaceuticals, agro processing, agricultural technology, biotechnology, information and electronics and construction. In this respect, however, excluding pharmaceuticals, foods and beverages is a lesson that the country should consider from the common practice in India, Taiwan, South Korea and Japan in their earlier stage of development.[3] For a country that envisioned being exporter of its own technologies after about 14 years and which is currently a net importer of technologies, a lower income country and with low innovational capability, excluding certain technologies, processes and products from patent protection is of paramount importance to specialize in planned technologies the country sought to have comparative advantages. Reducing the term of protection to the optimal level should also be considered. This enables the country to serve the interests of the majority of the society that cannot afford rising prices for protected technologies by encouraging competition in those fields. It also enables the country to access technological inputs freely without constraints from right holders. Strengthening patent protection is optimal only after attaining a certain level of economic and technical progress that can benefit from stronger protection of IPRs. Since Ethiopia is on the process of acceding to WTO, this option could work only if the negotiators place the issue on the negotiation table in the accession process and can succeed in guaranteeing sufficient transition time to comply with TRIPS Agreement. In addition, in line with "an alternative system of IP for non-industrialized countries" developed by Assefa Endeshaw and with respect to non-excluded technologies, replacing the universal standard of novelty and inventive step with local ones with an immediate and direct precondition of working of the invention may result in increased inflow of foreign technologies and accumulation of knowledge by local institutions and increased technological effort by domestic enterprises.[4] In doing so, determining the optimum level of term of protection should be dealt with. In addition, LDCs like Ethiopia should focus on immediate working of the existing inventions so that they can increase economic activities, employment opportunities and competitiveness of products. Providing a compensatory liability regime, as a system of *sui generis* protection, for inventions lacking inventive step should also be considered. Though it is possible to adapt the level of novelty and inventive step with local needs is a TRIPS-consistent measure[5], reducing the term of protection than that provided by TRIPS Agreement amounts to violation of the same.

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[3]. In this regard, china is also another country that could be a typical example. Basheer and Primi noted that "while [china] wants stronger protection for its fast-growing industries, it prefers weaker protection in fields related to pharmaceuticals, chemicals, fertilizers, seeds and food stuffs, due to its huge population, continued economic dependence on agriculture, the leader's worrying about public health issues and their concerns about the people's overall well-being.". See, Shamnad Basheer and Annalisa Primi *WIPO Development Agenda: Factoring in Technologically Proficient Developing Countries*, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1289288&download=yes**,** pp. 109

[4]. Assefa Endeshaw (1996), Intellectual Property Policy for Non-Industrialized Countries, Dartmouth Publishing Company, pp.116-142.

[5]. See Carlos M. Correa (2007), Agreement on Trade-Related Aspects of Intellectual Property Rights: A Commentary, Oxford University Press, pp. 270-281, and Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), Annex 1C of the Marrakesh Agreement, Art. 27 (1).

Secondly, and if the effort to guarantee sufficient transition time[6] for compliance fails, it is better to strictly interpret the minimum requirement for patenting inventions, especially the novelty and inventive step requirements, so that other inventions short of satisfying the requirements can get *sui generis* protection that best suits the needs of the country. This is a measure in conformity with the TRIPS requirements. This enables the country to refrain from patenting any kind of invention so that the scientific community cannot be hampered from using the technological information. While granting patents, narrowing down the claims is also crucial to help domestic industries to invent around the patent. Granting patent protection for any invention does not have any economic or technological contribution to Ethiopia because ability to generate new and emerging technologies, if not imitating and adapting mature or obsolete technologies, is non-existent. The useful strategy to Ethiopia is, therefore, designing a patent law that allows domestic enterprises to undertake reverse-engineering and imitation by leaving great bulk of technologies out of protection and thereby facilitating the accumulation of knowledge and building indigenous technological capability.

Concerning the *sui generis* protection, the country can foster the process of building domestic technological capability by abolishing the utility model certificates and by replacing them with compensatory liability regime. The former amounts to overprotection for small-grained inventions by conferring the improvers with monopoly rights for their appropriation. This gives them the power to exclude second comers from using their improved inventions for further improvement. The improvements do not involve substantial research and development costs. Especially when the improvement is undertaken on public domain information, it is requiring the public to pay for patent information which it had once paid. However, individuals and enterprises should not be left without protection because they invest finance in the process of improving and adapting technologies. The protection should be designed, however, in such a way that it did not hamper competition and use of the protected improvement for further useful improvement. In the Ethiopian case, and for our urban development plan based on SMEs, compensatory liability regime is very important for technological development because it fits with their financial needs and encourages the technological learning activity by diminishing the bargaining power of the right holder. This arrangement is very timely and important when examined in light with the recent WTO Appellate Body decision that renders utility model certificates subjected to national treatment. The current utility model system unreasonably shrinks the public domain and impedes the development of domestic technical capability by conferring exclusive rights for minor improvements which often involve insignificant R&D costs and which are normally carried out for market advantage.

Parallel with the use of compensatory liability regime, effective protection of trademarks and designs should be given due heed because it enables the improvers to compete by upgrading quality, and it also facilitates competition among them.

[6]. There is no accurate formula to determine the optimal level of transition time. But, the time is ripe for patent reform towards stronger protection when the country is able to benefit from it.

The experiences of the countries selected elaborated that IP laws are not the only factors for their success history in technological and economic development. They also undertook other policy measures such as governance, stability, agriculture and industrial policy, wider trade, competition, education and health policies. Investments in skill development, strong export orientation, strong government incentive of R&D are other contributing factor for technological and economic development. Though enterprises are principal agents of innovation, they need to cooperate with government, public research institutions, universities, financial institutions and other knowledge creating bodies because they seek human resources for innovation and finance for funding innovation efforts. Pursuing technological development also needs effective educational system and availability of financial resources. Therefore, in addition to changes in the legal framework, the Ethiopia government should pay due consideration to generate quality human capital and extend financial incentives for SMEs and other domestic industries involved in inventions and commercialization of inventions.

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