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# Role of Technology Transfer under the Patent System: Issues and Challenges

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## ABSTRACT

*All intangible, results of human thought, encompassing “inventions, literary and creative creations, designs, symbols, names, and commercial imagery”, are categorized as intellectual property (IP). Intellectual property protected by “patents, copyrights, trademarks, and trade secrets”, confers upon artists the exclusive right to exploit their creations for a certain duration. Patents are crucial for the diffusion of information and the promotion of economic development, as they enable the transfer of technology. This research paper explores the significance of technological transfer, specifically focusing on its impact on worldwide development, innovation, and industrial competitiveness. It also examines the relationship between patent law and technological transfer, emphasizing the potential for the intellectual property rights system to hinder equitable technology sharing, particularly in developing nations, despite its objective of fostering innovation. Important key aspects will also be discussed like the relation between technology transfer under “TRIPS Agreement and Convention on Biological Diversity”. These ideas aim to address the challenges and promote a more effective and fair transfer of technology.*

**Keywords:** *Biological Diversity, Intellectual Property, Patent Law, Technological Transfer and TRIPS Agreement.*

## I. INTRODUCTION

Intellectual property rights (IPR) encompass trade secrets, copyrights, and patents, which serve as safeguards for newly generated works against imitation and competition. The principal aim of intellectual property rights (IPR) is to temporarily diminish market competition, allowing inventors to capitalize on their ideas and thereby fostering innovation. As a result, society gains access to novel goods and services, together with publicly revealed methods for their creation. Technology transfer refers to the dissemination of knowledge, inventions, or technologies between institutions, including research centers, universities, or industries. This transfer is done with the intention of commercializing, further developing, or utilizing the transferred technology. It also includes the legal and contractual mechanisms utilized to transfer intellectual

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property rights from their original creators to other entities or to confer licensing rights. Technological transfer is a means of transferring technology, encompassing inventions, information, and skills, from one entity or region to another. It accelerates the transformation of emerging intellectual property into concrete products or functional instruments available to the public. Technology transfers can be facilitated through several means, such as joint ventures, license agreements, research collaborations, and technology transfer sections within academic institutions<sup>3</sup>. Technology transfer, or transfer of technology (TOT), refers to the process of conveying technology from one people or organization to another<sup>4</sup>. These transfers may occur between "academic institutions, research institutes, companies of diverse scales, multinational corporations, and governmental bodies," irrespective of regional or geopolitical considerations. Technology can be transferred through several mechanisms, including restricted or unrestricted exchanges, formal or informal channels. These transfers usually happen when there are attempts to share knowledge, skills, technology, industrial methods, and other related items. Technology transfer enhances the accessibility of new scientific and technological discoveries to a wider audience by effectively utilizing and converting them into new products, applications, procedures, and more.

## **II. HISTORICAL BACKGROUND OF TECHNOLOGICAL TRANSFER**

The phrase "technology transfer" gained use in the mid-20th century, mainly concerning international trade and economic growth. It gained prominence in academic literature and policy discussions during the 1950s and 1960s. During that period, economists and policymakers acknowledged the importance of technology transfer from industrialized to developing nations in fostering economic progress and industrialization. The formalization of the concept was supported by entities like "the United Nations"<sup>5</sup> and "the Organization for Economic Cooperation and Development (OECD)"<sup>6</sup>, which promoted the sharing of technological information to enhance global development. The "United Nations Conference on Trade and Development (UNCTAD)"<sup>7</sup>, created in 1964, asserted firmly that technology transfer is crucial for aiding disadvantaged nations in bridging the economic gap with affluent countries. To improve technology or knowledge within a specific industry, researchers from several academic institutions or firms form productive collaborations. These collaborations may yield prospects

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<sup>3</sup> ASL LAW FIRM, <https://aslgate.com/the-importance-of-intellectual-property-rights-in-technology-transfer/> (last visited Aug. 8, 2024).

<sup>4</sup> WORLD INTELLECTUAL PROPERTY ORGANIZATION (WIPO), [https://www.wipo.int/web/patents/topics/technology\\_transfer](https://www.wipo.int/web/patents/topics/technology_transfer) (last visited Sep. 11, 2024).

<sup>5</sup> The United Nations (1945).

<sup>6</sup> The Organization for Economic Cooperation and Development (1961).

<sup>7</sup> The United Nations Conference on Trade and Development (1964).

for both entities to obtain money for research or licensing. Moreover, technology transfer protects the university's intellectual property rights and interests. The organization may license the conditional use of the technology while retaining ownership of its intellectual property rights. Effective technology transfer is crucial for technological growth, benefiting both academic institutions and commercial partners<sup>8</sup>. Technology transfer greatly influences public health, sustainable development, global competitiveness, innovation, and economic growth. The key elements in significance of technological transfer are as follows: Effective collaborations among academics from diverse academic institutions or firms are formed to deepen comprehension of a specific subject or technology. These agreements may create opportunities for both parties to obtain financing for research or licensing; A considerable proportion of developing economies globally relies extensively on technology. The importation of inventions from international markets is essential owing to resource limitation. To enhance the cross-border transmission of technology, developing nations have sought national and international accords and an increase in national revenue is the primary advantage of technological transfer. The transfer of technology is crucial for developing nations as it improves living standards and fosters economic growth<sup>9</sup>. The local economy is seeing expansion, partly attributable to technology innovations. Ultimately, these improvements benefit the public at large. They will benefit from both the market introduction of items and the job opportunities created via the creation, manufacture, and distribution of products resulting from technology transfer.

### **III. INTERFACE BETWEEN TECHNOLOGICAL TRANSFER AND IPR**

The proliferation of technology as a driving force in the formation of corporate entities and research institutes has resulted directly from the heightened competition of many industries. Technological innovations actively influence the international economy. In the contemporary digital era, technologies have gained increased value, leading to diminished motivation for inventors to pursue additional advancements and heightened vulnerability to infringement. Moreover, the infringers would occupy a more favourable position than the inventor, as they might attain identical outcomes at a reduced expense. The intellectual property rights framework restricts or obstructs access to the creators' creations, a phenomenon referred to as infringement<sup>10</sup>. To maximize income from research and development investments, promote

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<sup>8</sup> Agnes Lenagh, *The importance of technology transfer*, UNEMED (Sep. 11, 2024, 8:30 AM), <https://www.unemed.com/blog/the-importance-of-technology-transfer>.

<sup>9</sup> Karan Singh, *Facilitating Technology Transfer: A New Feature of IPR*, SWARIT ADVISORS (Sep. 11, 2024, 8:30 AM), <https://swaritadvisors.com/blog/technology-transfer-of-ipr/>.

<sup>10</sup> Monalisha Singh, *Technology Transfer and IPR*, IIPRD BLOG (Sep. 11, 2024, 11:00 AM),

economic progress, and enable technology transfer in developing countries, intellectual property rights (IPR) must be adequately and efficiently protected. The absence of protection may enable local enterprises to collect vital data, although strong intellectual property rights hinder innovation and the interchange of information. Thus, the nation's ability to foster ongoing innovation is a paramount factor in the enhancement of intellectual property rights. Future inventors can engage in their creative pursuits while concurrently advancing economic development in developed nations, owing to the rigorous safeguarding of intellectual property rights (IPR). To accelerate technological progress, developing nations must adopt more lenient intellectual property regulations. Affluent nations may be incentivized to innovate through the enhancement of intellectual property rights; conversely, destitute nations may grow increasingly reliant on local enterprises that partake in counterfeiting and replication<sup>11</sup>.

#### **IV. IMPACT OF TECHNOLOGY TRANSFER IN INTELLECTUAL PROPERTY RIGHTS**

Rapid technological transfer and commercialisation are the two principal engines propelling innovation and economic progress in the current global economy. The essence of this fundamental change is technology transfer, an evolving structure that facilitates the interchange of technical skills, inventions, and ideas among various enterprises. Technology transfer bridges the divide between innovative scientific findings and their practical applications. It is underpinned by robust intellectual property rights (IPR). It includes many techniques for inventors to leverage their intellectual property, such as “licensing agreements, collaborative research projects, and start-up ventures”. Technology transfer is crucial for advancing sustainable development and improving competitiveness across various sectors and countries, as it enables the interchange of ideas and protects the rights of innovators. Therefore, the impact of technological transfer in Intellectual Property Rights are as follows:

- **Enhancing Economic Growth and Innovation:** Technology transfer facilitates the commercialization of ideas for businesses and inventors, accelerating the transformation of creative concepts into concrete products and services. Start-ups can accelerate the introduction of breakthrough solutions by obtaining access to proprietary technologies created at universities and research institutions via licensing agreements. This method cultivates an entrepreneurial spirit, creates new revenue sources, and improves industrial competitiveness.

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[https://iiprd.wordpress.com/2021/12/16/technology-transfer-and-ipr/?utm\\_source=mondaq&utm\\_medium=syndication&utm\\_content=articleoriginal&utm\\_campaign=article](https://iiprd.wordpress.com/2021/12/16/technology-transfer-and-ipr/?utm_source=mondaq&utm_medium=syndication&utm_content=articleoriginal&utm_campaign=article).

<sup>11</sup> ISBuzz Team, *Role of Intellectual Property in Technology Transfer*, INFORMATION SECURITY BUZZ (Sep. 11, 2024, 8:45 AM), <https://informationsecuritybuzz.com/role-of-intellectual-property-in-technology-transfer/>.

- **Protection of Intellectual Property:** To enable technological transfer, it is imperative to uphold and safeguard intellectual property rights. Artists can safeguard their ideas from unauthorized use and exploitation by utilizing “trade secrets, copyrights, patents, and trademarks”. Continuous innovation is promoted by strong intellectual property rights (IPR) regimes, which offer legal stability and incentivize research and development investments. This method promotes the creation of novel solutions to complex socioeconomic challenges<sup>12</sup>.
- **Promote teamwork and the dissemination of information:** Technology transfer fosters collaboration between academic institutions, research organizations, and industrial partners, resulting in synergies that drive technological progress. Organizations can leverage technology licensing and collaborative research and development projects to amalgamate their resources, experience, and best practices, thereby facilitating discoveries with significant societal implications. This cooperative strategy accelerates the integration of cutting-edge technologies in international markets and enhances the dissemination of technical knowledge.
- **Obstacles and Factors:** While technology transfer possesses the capacity to transform the world, there are challenges that must be overcome. Intellectual property valuation, varying regulatory frameworks, and legal intricacies hinder effective technology transfer. The importance of transparent governance frameworks and strong risk management procedures is highlighted by apprehensions about cybersecurity threats, breaches of confidentiality, and fair distribution of benefits.

Thus, technology transfer is crucial for optimizing the societal advantages of intellectual property rights and promoting innovation. Technology transfer enables the dissemination of technological knowledge, safeguarding of intellectual property, and formation of cooperative alliances. Furthermore, it provides enterprises, governments, and entrepreneurs with essential tools to tackle global challenges and achieve sustainable development. During this era of rapid technological advancement, it is imperative to implement strong Technology Transfer frameworks and strengthen intellectual property rights (IPR) protections to promote global prosperity, enhance competitiveness, and create new development prospects.

## **V. ENCOURAGEMENT OF TECHNOLOGY TRANSFER THROUGH IPR**

Intellectual Property Rights (IPR) can enhance technology transfer via several formal

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<sup>12</sup> *Supra* note 9.

mechanisms, such as “international trade, foreign direct investment, license agreements, and joint ventures”.

- **International Trade:** In open economies, a stronger intellectual property rights policy can significantly impact by diminishing domestic patenting and augmenting dependence on foreign patents. It enhances trade flows and serves as an alternative to locally available commodities, resulting in a reduction in domestic patent applications and an increase in international patent applications<sup>13</sup>. In contrast, nations characterized by a significant level of creativity and imitation encounter challenges in the diffusion of technology. Enhanced patent policies in pivotal nations promote foreign patenting, benefiting international businesses seeking to increase their market presence in open economies. Enforcing stricter intellectual property rights (IPR) in emerging nations is inadvisable, as it will hinder economic progress and elevate the cost of imported goods. To incentivize companies to produce original items domestically instead of depending on counterfeits, more rigorous intellectual property rights restrictions might be enforced in industrialized nations.
- **Licensing:** The principal catalysts of technology diffusion are foreign direct investment (FDI) and technology licensing, as most industrialized nations have adequate resources to promote both economic expansion and innovation. Emerging-market enterprises benefit from enhanced patent rules, which augment licensing options and promote technological spill overs to local firms, thereby diminishing corporate earnings. The risk escalates when developing countries possess the capability to produce counterfeit goods and adapt technology to meet local standards, rules, and limitations. As a result, licensing agreements are the favoured choice for most technology companies instead of creating a local presence. Augmented patent protection promotes technology licensing to enterprises and stimulates patent activity in emerging countries. Furthermore, it possesses the ability to enhance the quality of life in developing nations and augment exports<sup>14</sup>.
- **Foreign Direct Investment:** Most foreign firms evaluate the effectiveness of intellectual property laws prior to investing in a country. Multinational corporations perform an examination and evaluation of the host nation's legal framework, relevant

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<sup>13</sup> Robert Grosse, *International Technology Transfer in Services*, 27 J. INT. BUS. STUD. 781-800, (1996).

<sup>14</sup> Priyanka Rastogi, *Licensing And Technology Transfer: A Glance On Indian Scenario*, MONDAQ (Sep. 12, 2024, 8:30 PM), <https://www.mondaq.com/india/licensing-syndication/346256/licensing-and-technology-transfer-a-glance-on-indian-scenario?login=true#authors>.

legislation regarding specific technologies, and the operational management of foreign firms by governmental agencies before proceeding with an investment. An extensive evaluation of the host nation's intellectual property rights (IPR) rules is essential for foreign direct investment (FDI) in high-tech industries. Thus, a positive relationship exists between the enforcement of intellectual property and foreign direct investment. Foreign direct investment is primarily focused on distribution because of the permissive intellectual property policies in emerging nations. Moreover, most multinational corporations (MNCs) do their research and development activities in these nations owing to lower research costs. To enhance return on investment, the organization's external talents and resources comply with the new regulations. Consequently, it is essential to assess both national risk and cost-effectiveness when considering foreign direct investment (FDI). Companies must evaluate market size, resource availability, and manufacturing costs while considering investments.

The nation's stringent intellectual property regulations subsequently enable the transfer of technology to businesses in emerging countries. Foreign firms may prioritize distribution over manufacturing due to insufficient enforcement of intellectual property rights. A stronger patent system depends on the nation's expected growth, resources, and intellectual capacity, as well as being essential for promoting knowledge transfer and attracting international investment. Conversely, developing nations can expedite progress and use technological innovations by exhibiting a measure of creativity.

## **VI. ROLE OF PATENT SYSTEMS FOR FACILITATING THE TECHNOLOGY TRANSFER**

The commercialization of a patent has proven to be highly effective via technology transfer. Patents are essential for technology transfer as they effectively protect intellectual property and serve as a crucial catalyst for technological advancement. Transferring technology without securing a patent is highly perilous. Prior to initiating technology transfer conversations, it is essential for the technology to have a minimum of one patent application submitted. The document issued by the Patent Office serves as proof of ownership upon the granting of a patent. The patent holder is conferred unique legal rights concerning the transfer of technology. The technology is conveyed by the purchaser and patent holder via the execution of a contract. A significant amount of effort is required to progress a patent to the subsequent stage, which is technology transfer. The patent holder must assess the invention's worth and robustness, alongside the buyer's ability to manufacture, promote, and sell the patent. The patent holder gains from technology transfer by allowing commercialization of his idea while retaining



control over the patent. The seller may acquire a competitive advantage over rivals by obtaining access to patented technologies<sup>15</sup>. “Section 83(c) of the Indian Patents Act, 1970”<sup>16</sup> provides that “the protection and enforcement of patent rights contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations”.

In recent years, India's patent system has experienced substantial modifications due to technology improvements, significantly affecting countless Indian enterprises and organizations reliant on patents to protect their technological innovations and concepts. The Indian government has amended current laws and instituted new national and state-level policies, programs, and regulations to promote technological advancement. Examples include the “Decade of Innovation” spanned from 2010 to 2020, during which many projects were executed, including the “Made in India” programs, the Patent (Amendment) Rules of 2016<sup>17</sup> and 2017<sup>18</sup>, the upgrading of the intellectual property office, and the hiring of additional patent examiners<sup>19</sup>. The aim of these projects is to support educational institutions and businesses in their research and development activities. Intellectual Property Rights constraints substantially influence technology transfer, innovation, and development. The importance of technology transfer for the economic advancement of a developing nation is shown by the Indian government's efforts to improve research and development (R&D) activities.

## VII. CONVENTION ON BIOLOGICAL DIVERSITY AND TECHNOLOGY TRANSFER

The technology transfer regime was instituted by the “Convention on Biological Diversity (CBD)”<sup>20</sup>, which expresses the general recognition that sustainable development relies on the creation, dissemination, adaption, and distribution of technology, particularly focusing on environmentally sustainable technologies<sup>21</sup>. “Article 16 of the Convention on Biological Diversity”<sup>22</sup> establishes the principal legal framework for technology transfer, requiring Parties

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<sup>15</sup> Bindu Sharma, *The Role of Patents in Technology Transfer*, CIOTECHOUTLOOK (Sep. 11, 2024, 10:30 AM), <https://www.ciotechoutlook.com/magazine/The-Role-of-Patents-in--Technology-Transfer-TMUD606611223.html#:~:text=Technology%20transfer%20is%20beneficial%20to,cutting%20edge%20over%20his%20competitors>.

<sup>16</sup> The Patent Act, 1970, § 83 (c), No. 39, Acts of Parliament, 1970 (India).

<sup>17</sup> The Patent (Amendment) Rules, 2016, No. 39, Acts of Parliament, 1970 (India).

<sup>18</sup> The Patent (Amendment) Rules, 2016, No. 39, Acts of Parliament, 1970 (India).

<sup>19</sup> Saumya Kapoor, *India steps up efforts to boost tech transfer and innovation*, LEXOLOGY (Sep. 11, 2024, 10:45 AM), <https://www.lexology.com/library/detail.aspx?g=784564cc-282d-4825-a4fa-533de46b5c5f>.

<sup>20</sup> The Convention on Biological Diversity (1992).

<sup>21</sup> This consensus is codified in important documents, such as the “1992 Rio Declaration, Agenda 21, the Johannesburg Plan of Implementation, and the 2030 Agenda for Sustainable Development”.

<sup>22</sup> The Convention on Biological Diversity, (1992), art. 16(1).

to “provide and/or facilitate” access to and transfer of technologies pertinent to biodiversity conservation and sustainable use, as well as those utilizing genetic resources without inflicting substantial environmental damage. If the fundamental technology is safeguarded by intellectual property rights, it must be accessible and transferable in a way that ensures the effective and sufficient protection of such rights<sup>23</sup>. Signatories of this Convention must implement all requisite measures to ensure that technologies utilizing genetic resources, including those safeguarded by intellectual property rights, are accessible and transferable to source nations under mutually agreeable conditions and in accordance with international law<sup>24</sup>. Furthermore, to promote the advancement of governmental institutions and the private sectors of the state, it is essential for the Parties to enact policies that guarantee access to the aforementioned technologies for their private sectors<sup>25</sup>. The parties will work together to ensure that intellectual property rights enhance the convention's objectives instead of detracting from them<sup>26</sup>. Therefore, it can be said that in this convention’s technology transfer strategy, intellectual property rights fulfil two functions. They initially offer financial assistance for artistic projects by recognizing that creators face production-related costs, including time investment. The second function is that intellectual property rights enable the transfer and acquisition of legally protected technological innovations, serving as a crucial instrument in this regard.

### **VIII. AGREEMENT ON TRADE RELATED ASPECTS OF INTELLECTUAL PROPERTY RIGHTS AND TECHNOLOGY TRANSFER**

The “Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)”<sup>27</sup> represents an innovative framework for the regulation of intellectual property rights in global commerce. The deliberations on the “new area” during the Uruguay Round culminated in this outcome. The principal aim of the developed nations that ratified the TRIPS Agreement was to ensure the protection of intellectual property rights for their proprietors, predominantly from developed countries. During the TRIPS negotiations, the apprehensions of developing nations on the effects of increasing intellectual property rights on technology transfer were overlooked<sup>28</sup>. Technology transfer is deemed crucial for safeguarding intellectual property rights, especially in developing nations. The principal aim of the TRIPS Agreement is to

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<sup>23</sup> The Convention on Biological Diversity, (1992), art. 16(2).

<sup>24</sup> The Convention on Biological Diversity, (1992), art. 16(3).

<sup>25</sup> The Convention on Biological Diversity, (1992), art. 16(4).

<sup>26</sup> The Convention on Biological Diversity, (1992), art. 16(5).

<sup>27</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights (1994).

<sup>28</sup> CARLOS M. CORREA, *INTERNATIONAL PUBLIC GOODS AND TRANSFER OF TECHNOLOGY UNDER A GLOBALIZED INTELLECTUAL PROPERTY REGIME* 227-256 (Cambridge University Press, 2010).

promote the transfer and dissemination of technology. The TRIPS Agreement has multiple articles that explicitly pertain to technology transfer. Article 7 provides a general overview of the Agreement's objectives by stating that “The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations<sup>29</sup>”.

The enforcement and protection of intellectual property rights are crucial to ensure the occurrence of technological innovation and transfer, albeit not always facilitating them, as articulated in Article 7. “Article 8(2) of the TRIPS Agreement” addresses fundamental principles. It recognizes the need to adopt “appropriate measures” “to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology”, with the stipulation “provided that they are consistent with the provisions of this Agreement<sup>30</sup>”. This article acknowledges that WTO member states possess the ability to enact “appropriate measures” in reaction to actions taken by intellectual property holders that could adversely impact cross-border technology transfer. “Article 40 of the TRIPS Agreement” contains directives for “regulating anti-competitive behaviour in contractual licences”. Article 40 articulates the understanding and consensus of WTO Members, asserting that “some licensing practices or conditions pertaining to intellectual property rights which restrain competition may have adverse effects on trade and may impede the transfer and dissemination of technology<sup>31</sup>”. WTO Members are authorized to specifically delineate “in their legislation licensing practices or conditions that may in particular cases constitute an abuse of intellectual property rights having an adverse effect on competition in the relevant market” in accordance with “Article 40(2)”. Consequently, Members possess the authority to legislate or ban restrictive practices when intellectual property rights are “exploited” and result in “detrimental effects on competition in the pertinent market<sup>32</sup>”. “Article 40(2)” presents multiple instances of action that may be considered restrictive. This includes provisions that require the licensee to grant the licensor exclusive rights to improvements of the licensed technology, stipulations to avert disputes concerning the license's validity, and mandatory package licensing, which obligates the licensee to obtain additional resources from

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<sup>29</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights, (1994), art. 7.

<sup>30</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights, (1994), art. 8(2).

<sup>31</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights, (1994), art. 40.

<sup>32</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights, (1994), art. 40(2).

the licensor<sup>33</sup>. Article 40(3) outlines a procedure for member consultation.

A Member may seek consultations with another Member “without prejudice to any action under the law and to the full freedom of an ultimate decision of either Member” if it suspects that the other Member's national or place of residence “is undertaking practices in violation of the requesting Member's laws and regulations” and “wishes to secure compliance with such legislation”. The Member solicited for participation in discussions “shall accord full and sympathetic consideration to, and shall afford adequate opportunity for, consultations with the requesting Member, and shall cooperate through supply of publicly available non-confidential information of relevance to the matter in question and of other information available to the Member, subject to domestic law and to the conclusion of mutually satisfactory agreements concerning the safeguarding of its confidentiality by the requesting Member”. The Member must furnish publicly accessible non-confidential information relevant to the current issue, along with any additional information in their possession, in compliance with domestic law and contingent upon the finalization of mutually agreeable terms concerning the requesting Member's confidentiality<sup>34</sup>. A Member may request consultations if another Member is undertaking legal action against its nationals or residents for alleged violations of that Member's anti-competitive practice laws<sup>35</sup>. The seeking Member “shall be afforded an opportunity for consultations” with the opposing Member, adhering to the same standards as outlined in “Article 40(3)”. “Article 66(2) of the TRIPS Agreement” obligates affluent states to establish specific initiatives that encourage and promote the transfer of technology to least developed countries (LDCs). “Article 66(2)” mandates that “Developed country Members shall provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least-developed country Members in order to enable them to create a sound and viable technological base”<sup>36</sup>. The efficacy of this provision is to be augmented by the Least Developed Countries. Developed nations must provide incentives for technological transfer, as mandated by “Article 66(2)”. In November 2001, the ministers of the TRIPS Council achieved an accord in Doha to “create a mechanism to ensure the monitoring and complete implementation of the obligations”<sup>37</sup>.

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<sup>33</sup> Ibid.

<sup>34</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights, (1994), art. 40(3).

<sup>35</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights, (1994), art. 40(4).

<sup>36</sup> The Agreement on Trade-Related Aspects of Intellectual Property Rights, (1994), art. 66(2).

<sup>37</sup> WORLD TRADE ORGANIZATION, [https://www.wto.org/english/tratop\\_e/trips\\_e/techtransfer\\_e.htm](https://www.wto.org/english/tratop_e/trips_e/techtransfer_e.htm) (last visited Sep. 14, 2024).

## IX. TECHNOLOGY TRANSFER FOR LEAST DEVELOPED COUNTRIES

“Article 66(2) of TRIPS Agreement” provides for the technology transfer for least-developed countries<sup>38</sup>. This article has a few significant features. First, it states that only developed nations must offer incentives, and only to least developed nations. There are no new rights or obligations established for developing and transitional nations. Second, the Doha Declaration made clear that it is a positive responsibility, as shown by the use of the word “shall”. Developed countries must therefore devise ways to specify and offer these incentives. Third, the text does not specify that the incentives must truly result in increases in technology transfer, even though they must support and encourage it. Governments cannot, in fact, force private companies to accept these incentives. Businesses are probably more inclined to participate in technology transfer when doing so will benefit them financially<sup>39</sup>. Can Article 66(2) be fulfilled if programs, as upheld by several development aid agencies, principally aim to offer technical assistance involving the transfer of readily accessible, broadly established technology that is already in the public domain? This is a fascinating interpretive investigation. The primary objective of TRIPS is to safeguard intellectual property rights. Publicly available technology is excluded. Thus, the only rational interpretation of the obligation in Article 66(2) is that developed nations will comply if they create incentives that facilitate the transfer of technologies safeguarded by intellectual property rights (IPRs), rather than solely those that are unprotected. Nonetheless, LDCs could gain from non-proprietary technology transfers, including expertise offered by consultants, equipment manufacturers, and various vendors. To ensure that least developed countries (LDCs) obtain the minimum intellectual property rights (IPRs) mandated by TRIPS and that developed nations comply with "Article 66(2)," it is essential to create a framework of minimal principles and an assessment process.

### (A) Reality of Technology Transfer in India

India possesses an extensive history of technological exchange, both domestically and internationally, prior to and following its independence. In 2017-18, India designated 0.7% of its GDP on research and development<sup>40</sup>. In 2023, a historic total of 90,300 patent applications was filed. From March 15, 2023, to March 14, 2024, the Patent Office granted nearly more than one lakh patents. On each working day, 250 patents were granted<sup>41</sup>. Technology transfer is an

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<sup>38</sup> *Supra* note 34.

<sup>39</sup> Keith E. Maskus, *Encouraging International Technology Transfer*, 7 ICTSD (UNCTAD) 1-49, 30 (2004), [https://unctad.org/system/files/official-document/ictsd2004ipd7\\_en.pdf](https://unctad.org/system/files/official-document/ictsd2004ipd7_en.pdf).

<sup>40</sup> DEPARTMENT OF SCIENCE & TECHNOLOGY, <https://dst.gov.in/indias-rd-expenditure-scientific-publications-rise> (last visited Oct. 3, 2024).

<sup>41</sup> PRESS INFORMATION BUREAU, <https://pib.gov.in/PressReleasePage.aspx?PRID=2015234> (last visited Oct. 3, 2024).

essential mechanism for developing countries to obtain new technologies. The expansion of India's economy is contingent upon its ability to import new technologies, products, and services. The Technology Development Board (TDB), created by “the Department of Science and Technology (DST) of India”<sup>42</sup>, enables the transfer of technology to the industrial sector by research and development entities. The TDB created the “Technology Information, Forecasting, and Assessment Council (TIFAC)” website<sup>43</sup>, a platform established to promote the flow of technology between organizations involved in research, development, and industry. The website provides a variety of services, including technical assistance, financial support for technology transfer initiatives, and access to research and development information and resources. In India, technology transfer management is governed by numerous laws and regulations. The legislation comprises “the Patent Act<sup>44</sup>, Copyright Act<sup>45</sup>, Trademarks Act<sup>46</sup>, Designs Act<sup>47</sup>, Geographical Indications of Goods (Registration and Protection) Act<sup>48</sup>, and the Protection of Plant Varieties and Farmers' Rights Act”<sup>49</sup>. The legal framework for the protection, control, and progress of technology transfer in India is established by laws and regulations. The Indian government utilizes incentives as a supplementary mechanism to facilitate technology transfer. This encompasses the creation of Special Economic Zones (SEZs) to promote technology transfer, financial grants and subsidies, and tax incentives. The government has established various technical parks and incubators to provide mentorship, resources, and assistance to entrepreneurs and inventors. Alongside government initiatives, numerous private-sector efforts are underway to accelerate technology transfer in India. These initiatives include the creation of intellectual property networks, collaborative enterprises, and technology transfer centers to promote technology transfer. These programs have facilitated technology transfer, hence enhancing India's economic growth and prosperity.

### **(B) Contemporary Issues of Technology Transfer under Patent System**

Technology is more globalized in two respects: the trade of technology is swiftly growing, as indicated by a rise in technical partnership agreements; and enterprises are engaging in more global research and development, with numerous transnational corporations establishing their

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<sup>42</sup> DEPARTMENT OF SCIENCE & TECHNOLOGY, <https://dst.gov.in/technology-development-board> (last visited Oct. 3, 2024).

<sup>43</sup> TECHNOLOGY INFORMATION, FORECASTING AND ASSESSMENT COUNCIL, <https://www.tifac.org.in/> (last visited Oct. 3, 2024).

<sup>44</sup> The Patent Act, 1970, No. 39, Acts of Parliament, 1970 (India).

<sup>45</sup> The Copyright Act 1957, No. 14, Acts of Parliament, 1957 (India).

<sup>46</sup> The Trademarks Act 1999, No. 47, Acts of Parliament, 1999 (India).

<sup>47</sup> The Designs Act 2000, No. 16, Acts of Parliament, 2000 (India).

<sup>48</sup> The Geographical Indications of Goods (Registration and Protection) Act 1999, No. 48, Acts of Parliament, 1999 (India).

<sup>49</sup> The Protection of Plant Varieties and Farmers' Rights Act 2001, No. 53, Acts of Parliament, 2001 (India).

R&D sites internationally. The global commerce system has undergone substantial transformation due to the worldwide proliferation of technology. Technology, once seen a strategic component of national success, is now acknowledged as equally impactful and vital in securing global market dominance. As a result, science and technology policy is increasingly regarded as influencing international trade and transcending national boundaries in all nations. Technology is regarded as the paramount aspect in establishing comparative advantage and achieving competitiveness in global markets. Businesses are urging governments to enact more rigorous regulations to safeguard their intellectual property rights. The protection of intellectual property rights is crucial for attracting foreign direct investment. Consequently, several countries have been urged to adopt more rigorous unilateral and international accords governing intellectual property rights. During the 1960s and 1970s, “the United Nations Conference on Trade and Development (UNCTAD)”<sup>50</sup> endeavoured to enhance the transfer of technology to developing nations, decrease the expenses associated with technology transfer, and implement more lenient conditions for technology acquisition. Nonetheless, it appears that their efforts are facing certain obstacles. Concerns exist that the stipulations for technology transfer are getting increasingly rigorous and expensive. To protect technology, it is essential to maintain market supremacy and inhibit competition. As a result, developed countries have enacted a variety of international agreements to advance their protectionist policies.

## **X. CONCLUSION AND SUGGESTIONS**

Technology transfer facilitates the transformation of novel intellectual property discoveries into tangible products. Furthermore, technology transfer benefits the general public, local communities, innovators, and industrial partners and many more. This results from technical improvements creating new employment prospects etc.,. Technology transfer transactions may occur in either an overt or secretive manner, encompassing both international and local contexts. The predominant way of technology transfer is via licensing agreements, although corporations may utilize alternate approaches. Intellectual Property Rights protect trademarks and deter copying, therefore facilitating technological transfer. The nation's progress and adoption of new technologies have been greatly enhanced via technology transfer and licensing, ultimately strengthening the economy. India, as a developing nation, must prioritize technological development and transfer for the larger interest of the society. It is also essential to formulate a constructive strategy that includes the education of youth regarding the benefits of technology transfer through the establishment of specialized universities, and the enhancement of

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<sup>50</sup> *Supra* note 7.

technological research and development from a technical perspective. Patents, undeniably the most efficient means of protecting technology, are essential for technological growth and the promotion of innovative idea interchange. The introduction of innovation and technology enhances the nation's economy, development, and citizens' well-being, with technology transfer and licensing being vital components for the advancement of the business sector.

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