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Now Is the Time for Youth to Switch on To Intellectual Property Rights in Pharmaceutical Sciences

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ABSTRACT

Ideas, innovations, and creative expressions based on which there is a public desire to grant the status of property are referred to as intellectual property rights (IPR). The inventors or creators of that property to profit commercially from their creative endeavors or reputation, IPR grant them certain exclusive rights. There are various forms of intellectual property protection, including trademarks, copyright, and patent. IPR is a requirement for improved invention or creative work identification, planning, marketing, and protection. The IPR strategy used by the pharmaceutical sector is currently changing, and a better focus and strategy will be needed in the future. Reviewing the function and significance of intellectual property in pharmaceutical sciences as well as how young people can see intellectual property are the key goals of the proposed review project. The review paper also discusses several other topics, such as different forms of IPR basics, youth and entrepreneurship, IPR and its significance in pharmaceutical sciences, and IPR and creative ideas from pharmacy students as youth. Young inventors are capable of creating novel technical solutions to pressing issues, such as new drugs and environmentally friendly and digital technology. You can gain a competitive edge when starting a new business by attempting to protect your discoveries with patents and trade secrets. A large number of young artists produce paintings, sculptures, music, films, computer programs, and databases. Young entrepreneurs can establish industrial designs or trademarks for things like eco-friendly packaging, electronics, or textiles.

INTRODUCTION

Any original work of the human mind, including those in the arts, sciences, literature, technology, or other fields, is considered to be the subject of intellectual property (IP). Intellectual property rights are the legal privileges granted to the inventor or creator to safeguard their work for a predetermined amount of time. [1] These legal rights allow the inventor or creator, or his assignee, the sole right to fully exploit their idea or creativity for a specific amount of time. It is widely acknowledged that IP is essential to the modern economy. Additionally, it has been unequivocally proven that the intellectual labor connected to innovation deserves to be given the respect it deserves in order for it to serve the greater good. The price of research and development (R&D) has skyrocketed, and so have the investments needed to get a new technology to the market. 2 Since the stakes for technology developers have increased significantly, it is now imperative, at least temporarily, to safeguard information from unauthorized use to guarantee recovery of R&D and other related expenditures as well as sufficient earnings for ongoing investments in R&D. 3 Since it gives the inventor or creator of an IP an exclusive right to exploit his invention or product for a specific length of time, IPR is a powerful weapon for protecting investments in time, money, and effort. [2] By enabling healthy competition, industrial progress, and economic expansion, IPR thereby contributes to the economic development of a nation. The current review provides a succinct summary of IPR with a focus on medicines.

History: The administrative processes and rules governing intellectual property (IPR) originated in Europe. In the fourteenth century, patents were increasingly common. England was technologically more sophisticated than other European nations in various areas, which it used to entice artisans from outside Europe with favorable terms. Italy is where copyrights were originally recognized. Since Venice was the first place in the world to create laws and institutions governing intellectual property, it can be said that Venice is the birthplace of the IP system. Other nations soon followed. 4 The Indian Patent Act dates back more than 150 years. The first was the 1856 Act, which established the patent period and was based on the British patent system.[1]

Types of Intellectual Properties: Originally, the word "Industrial Property" only applied to patents, trademarks, and industrial designs, but today, the definition of "Intellectual Property" is far broader. The following ways that IPR advances technology: It offers a system for dealing with infringement, piracy, and unauthorized usage[1-4.] Since all types of IP are

published except trade secrets, it gives the general public access to a wealth of information. IP protection can be sought for a variety of intellectual efforts including:

- Patents
- Industrial designs relate to features of any shape, configuration, surface pattern, composition of lines and colors applied to an article whether 2-D, e.g., textile, or 3-D, e.g., toothbrush. [5]
- Trademarks relate to any mark, name, or logo under which trade is conducted for any product or service and by which the manufacturer or the service provider is identified. Trademarks can be bought, sold, and licensed. Trademark has no existence apart from the goodwill of the product or service it symbolizes. [6]
- Copyright relates to the expression of ideas in material form and includes literary, musical, dramatic, artistic, cinematography work, audio tapes, and computer software. [7]
- Geographical indications are indications, which identify as good as originating in the territory of a country or a region or locality in that territory where a given quality, reputation, or other characteristic of the goods is essentially attributable to its geographical origin. [8]

Youth are the Backbone of A Nation: It has always been believed that youth make up the majority of any population. Youth are unavoidably a nation's backbone, bringing about major changes in a country's structure and functioning through their enthusiasm and energy. The most important segment of the population is made up of young people since they are creative, imaginative, enthusiastic, and active by nature. Young people are the most valuable human resource for promoting the social, economic, and political development of any nation because of their intense passion, drive, and desire to achieve something. They possess every quality required to make a country powerful and able to compete with its enemies. They are more resilient than their elder counterparts when it comes to overcoming the difficulties that globalization has brought forth. They are a nation's most prized resource because of their eagerness to compete and tenacity to pick themselves up after falling. They have the power to create a social shift and create a society that is open to experimentation and the adaptation of new methods and initiatives via their ongoing hard work and desire to question the long-driven orthodox standards. Youth have traditionally been seen as contributing to sustainable development as engaged citizens and inventive digital innovators. However, in order to make the maximum use of their skill, appropriate policy measures and motivational strategies are required to focus their energy on suitable objectives. [8-14]

Youth Innovating for a Better Future: The youth population in the age range of 15 to 24 years was anticipated to experience some rise from 233 million in 2011 to i251 million in 2021 before declining to 239 million in 2036, per the Government of India's Population Projections for India and States 2011–2036. This age group has a sizable population in India. If we only take into account those under the age of 35, the percentage might be greater. 90 percent of the 1.8 billion young people (aged 24) who currently live in the world are from developing nations. In India, we are at the top of the pyramid for the young. To plan for the next ten years, we must utilise the youth's dynamism, innovation, and capacity for taking risks to the fullest. For youth innovation to become a reality, generate cash, create jobs, and have a good impact on society, it must be protected by IP rights. Youth education and awareness-raising on IPR must be a top priority. The prevailing consensus is that young people lack familiarity with IPR principles. They start their firms without securing their creative output, which could be disastrous later.

It is important to encourage startups, young university faculty, and students to register their inventions with patents, copyrights, designs, etc. In fact, for the next ten years, all educational institutions must place the highest focus on teaching children about the value of IPR. The Government of India has several activities to encourage young people to file IPRs. Some plans also permit the submission of applications from abroad. The filing fees for new businesses, university faculties, and students enjoy special discounts. All stakeholders must be informed of these plans via social media, the internet, television, and radio. The government has allocated Rs 1000 crore as a seed fund under the Start-up India scheme to help them during the early stages. A program dubbed "Fund of Funds" has also been introduced to aid startups in growing and scaling.

Children are also able to request and obtain IPR lawfully. There are a few instances where kids as young as 4 years old have received patents. Children in India have been urged to take part in numerous science competitions held by the government and enterprises during the past ten years. However, there is no legal framework in place to safeguard their intellectual property. Women have made significant contributions to the field of invention. They excel in innovation because of their ability to multitask, especially when several IPR aspects are taken into account at once. They must be pushed forward and inspired to become entrepreneurs, start-up founders, and inventors.

Many nations are looking into potential strategies to tap into young people's innovative potential worldwide. To fully utilize young people's intellect, imagination, and creativity, awareness and education are crucial. Since today's youth are digital natives, educating and training them in digital science and technology would not only boost their creativity but also significantly contribute to the development of the national IP ecosystem.

Youth Entrepreneurship: Youth entrepreneurship can prevent any country from being engulfed by a sea of high unemployment, poverty, and stagnation. The advantages that young entrepreneurs bring to a country are innumerable. However, many business owners still find it challenging to sustain their endeavors for an extended period of time, with many of them closing their ventures in between for a variety of reasons. An "entrepreneurial revolution" that would inspire young people in the society to adopt an entrepreneurial mindset is therefore urgently needed. It is crucial to create an environment that is conducive to youth entrepreneurship, where there will be room for experimentation, innovation, and learning, where failure will be accepted and success will be celebrated, and where there will be no restrictions on the sustainability of start-ups, where young people will be respected for their ideas, and where even established businesspeople will consider it a privilege to assist youngsters.

Outline on Intellectual Property Rights and Pharmaceutical Sciences [15-22]: The largest supplier of generic drugs worldwide is India. More than half of the world's demand for vaccines, 40% of generic medications in the US, and 25% of all pharmaceuticals in the UK are supplied by the Indian pharmaceutical industry. India is the third-largest pharmaceutical producer in the world by volume and the 14th-largest by value. 10,500 production units and 3,000 pharmaceutical companies operate in the domestic market. India plays a significant role in the global pharmaceutical industry. The nation also has a sizable pool of scientists and engineers who can advance the industry. IPR supports a company's efforts to safeguard its invention. It encourages healthy market competition, which benefits a nation's economy. Additionally, it helps to protect their time, money, and effort while promoting economic development and industrial advancement.

Need of Intellectual Property in Pharmaceutical Sciences: IPR is necessary for pharmaceutical companies to locate, organize, market, and safeguard their inventions. It is also a vital instrument for preserving investment, time, and effort as well as for fostering healthy competition, which supports economic growth and industrial advancement. New, life-

saving pharmaceuticals as a result of these discoveries need to be protected by IPRs. Patents give pharmaceutical companies the only right to advertise their products and forbid third parties from selling, producing, or manufacturing them for a period of 20 years.

Importance of IP in the Pharmaceutical Industry[22-25]: In the pharmaceutical sector, intellectual property is crucial for the ongoing development of new medications. The following points illustrate why:

- **Patent Protection of Drugs:** A patent is used to safeguard a drug after it has been created or discovered. It's possible to reverse engineer the drug, and inventive security measures can be implemented. However, the innovative production technique used by that pharmaceutical company is protected. A patent provides superior protection when compared to trade secret laws. Since India currently lacks a trade secrets statute, patent protection is the only line of defense for pharmaceuticals.

- **Progressive Economic Growth:** Intellectual property supports the nation's economic development. Giving the inventor the rights enables him to profit while making investments in drug research and development to produce more medications and advance those already found. That is economical and customer-friendly. A nation's economy benefits from research and findings because they increase market competition.

- **Consumer Protection:** Public safety is the main concern, and IPR helps safeguard the interests of the general public. The consumer's mind is at peace when a patent is awarded since it ensures the product's quality and safety. It supports the consumer in selecting wisely. Additionally, the companies compete and help to drive down the price of the product in the Indian market, where neither the product nor the manufacturing process are protected, benefiting the whole consumer base.

- **Safeguard against potential infringement:** Thanks to intellectual property laws, the pharmaceutical industry is taking strong action against fake drugs. These rights support governments in maintaining the security of their medical advancements all over the world. Potential infringers who produce counterfeit pharmaceuticals face prosecution for engaging in illegal customer fraud that is prohibited by the law.

- **Protection of Medical Invention:** Once a person or business has created a novel drug or medical procedure, they must either file a patent application for it or keep it a trade secret to

protect it. Contrarily, a patent provides far more robust protection because a drug cannot be reverse-engineered in the case of trade secrets, which could result in the innovation being stolen.

- **Promotes Competitiveness and Economic Growth: By granting the sole intellectual property rights to the creator of a prescription or treatment, intellectual property contributes significantly to the financial expansion of a pharmaceutical company. The exclusive owner of the invention's marketing rights, with the option to sell or license it, is the inventor.**

- **Protection of Families and Customers: In the pharmaceutical sector, intellectual property is primarily concerned with promoting public safety by assisting customers in making wise decisions when choosing medical products. By guaranteeing quality, intellectual property rights aid in ensuring a standard, which further builds a dependable and efficient public health infrastructure.**

- **Generates Solutions to Global Challenges:** Innovation promotion is crucial, but finance is also required to make it happen. Intellectual property rights in the pharmaceutical sector encourage the development of medicines and vaccines for the new diseases that are being found constantly. They offer incentives for developing novel concepts into potential new medicines.

- **Protection Against Potential Infringers:** Pharmaceutical companies can take tough action against fake pharmaceuticals thanks to intellectual property rights. Without these rights, nations all over the world would struggle to guarantee the security of their medical inventions.

Importance of Patents in Pharmaceutical Drugs: Drugs are quite expensive to make, but once they are sold, they are usually very easy to duplicate. Due to their simplicity, a container of pills is frequently purchased from the store. In addition, if you had the right tools, knowledge, and abilities, you could typically figure out what was inside and make a fairly accurate reproduction of it. However, before a pharmaceutical can be utilized for therapy, it may take years of development and possibly billions of dollars in expenditure. This implies that the public goods conundrum, which we covered earlier in this course, will have a significant impact, particularly on the pharmaceutical industry. That is to say, without any kind of protection, in this case the patent system, there would be little to no incentive to

develop these medications. Your entire effort will essentially be wasted because free riders, rivals, and others will simply buy your drug off the shelf and copy it as soon as you manufacture it, investing billions of dollars. The best way to try to solve that situation is certainly to safeguard those drugs. Typically, we use patents to achieve this. As a result, if you sell the drug and make it widely accessible, you won't have to worry about your rivals or other people utilizing it if you can successfully patent it. Even if they could reverse engineer the medication and identify the ingredients, they couldn't even sell the medication themselves. Consequently, that gives people the security and inspiration to start producing narcotics in the first place. Because of this, drugs, particularly pharmaceutical drugs, are frequently referred to as the case study for patents. This is the ideal circumstance for patents: you have a very expensive product that was challenging to produce, and took a long time, but is also very easy to copy. Therefore, as you can see, patents are necessary if we are to have adequate protection and create incentives for inventing these products. Certainly, as obviously as it is visible.

Intellectual Property and Innovative Ideas in Under-graduate Students of Pharmacy: Innovation is defined as a novel action that enhances a good, method, or service. The protection of many breakthroughs is possible thanks to intellectual property (IP) laws. The foundation of innovation is invention. A new approach to a technical issue is an invention, which is subject to patent protection. By guaranteeing that an inventor can control the commercial use of their innovation, patents protect the rights of inventors whose inventions are truly novel and commercially successful. A person or business with a patent has the legal authority to bar others from producing, offering for sale, retailing, or importing that technology. This gives innovators the chance to market, exchange, or license their patented inventions to other parties who might be interested in using them. National IP laws specify the requirements that must be met to receive a patent; these requirements can vary from one nation to another. But typically, in order to get a patent, an inventor must show that their technique is innovative, beneficial, and not immediately apparent to someone working in a similar sector. They must explain the operation and capabilities of their technology to accomplish this. A patent may be held for up to 20 years, but to maintain the patent's validity, the owner typically must make annual payments. In actuality, this implies that if a technology has no financial potential, the patent holder may choose to revoke the patent, at which point the technology enters the public domain and is available for use without restriction.

Undergraduate students of KLE College of Pharmacy, Belagavi, KLE Academy of Higher Education and Research, Belagavi, Karnataka, India, carry out creative and innovative projects. In the future, it will assist the students in disseminating their information regarding their concepts and ways of thinking that can make use of intellectual property, enter the market, and earn royalties. The innovative ideas are developed by undergraduate students of the institution were discussed below:

- Development of Conductometric Method for Quantification of Metformin HCl in Bulk and Pharmaceuticals
- Execution and Development of a Website to Improve Medication Non-Adherence
- Innovative and Advanced Nano-System for Anticancer-Targeted Delivery of *Muntingia Calabura* Leaf Extract
- Development of Berberine Nano-micelle for its Improved Anti-inflammatory Efficacy
- Innovative Tools and Advances in the Management of Health Care
- Advancement and Innovation in the Development of Herbal Emulgel Loaded with *Coccinia grandis Extract for its Anti-inflammatory Action*
- Artificial Intelligence in Health Care Management
- Advancement and Innovation in the Development of Novel Analytical Methods for the Determination of Dapagliflozin
- Innovation and Advancement in *e*-Learning in Pharmacy Education
- 3D Printing in Pharmaceutical Sciences
- Precision medicine

CONCLUSION

Young inventors are capable of creating novel technical solutions to pressing issues, such as new drugs and environmentally friendly and digital technology. Youth can gain a competitive edge when starting a new business by attempting to protect your discoveries with patents and trade secrets. A large number of young artists produce paintings, sculptures, music, films, computer programs, and databases. Young entrepreneurs can establish industrial designs or trademarks for things like eco-friendly packaging, electronics, or textiles. The traditional local industries, such as those producing some wines, champagne, and crafts like Bohemian crystal, that may be protected by geographical indications are another place for young people to develop their passion. Owning intellectual property will help you distinguish from the competition. It enables young people to safeguard their inventiveness, creativity, and

investment in quality to assist their careers or businesses. With the use of intellectual property rights, you can fend against competitors' copying. Young people have a lot of potential for innovation in the pharmaceutical sciences field. Intellectual property is essential for the continued development of new drugs in the pharmaceutical industry. Pharmaceutical firms need IPR to find, arrange, market, and protect their inventions. Additionally, it is a crucial tool for safeguarding investment, time, and effort as well as for promoting healthy competition, which promotes economic progress and industrial innovation. As a result of these discoveries, novel, life-saving drugs must be protected by IPRs. Patents prevent third parties from selling, producing, or manufacturing pharmaceutical items and grant pharmaceutical corporations exclusive rights to advertise their products. It is crucial that young people think critically and create original works in the field of pharmaceutical sciences. Now is the Time for Youth to Switch on to Intellectual Property Rights in Pharmaceutical Sciences.

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