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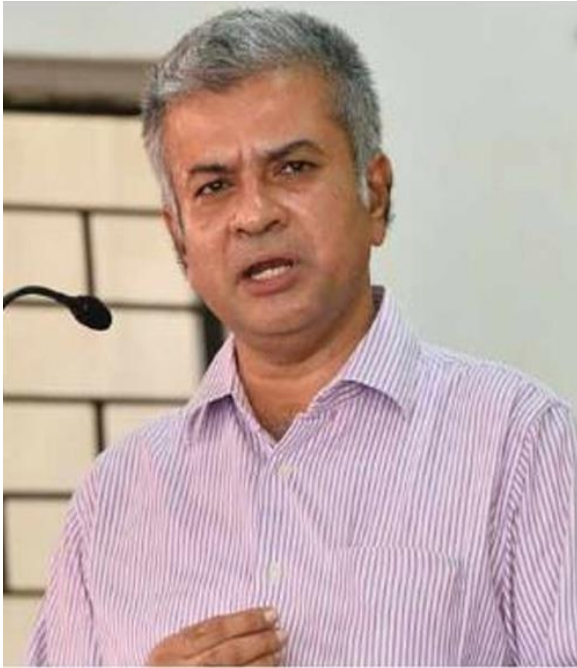
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Ms. Sumiti Ahuja, Assistant Professor, Faculty of Law, University of Delhi,

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E.MBA, LL.M, Ph.D, PGDSAPM

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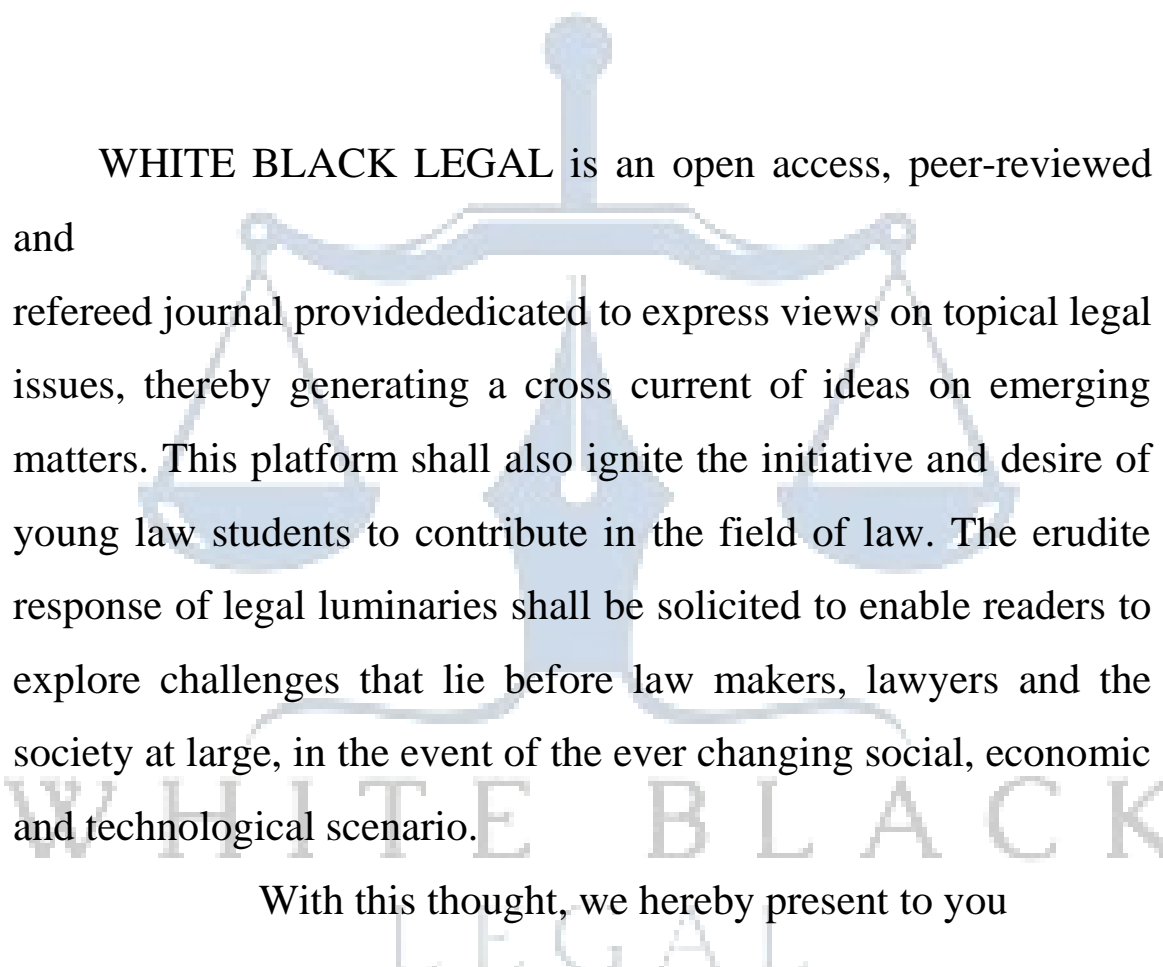


Subhrajit Chanda

BBA. LL.B. (Hons.) (Amity University, Rajasthan); LL. M. (UPES, Dehradun) (Nottingham Trent University, UK); Ph.D. Candidate (G.D. Goenka University)

Subhrajit did his LL.M. in Sports Law, from Nottingham Trent University of United Kingdoms, with international scholarship provided by university; he has also completed another LL.M. in Energy Law from University of Petroleum and Energy Studies, India. He did his B.B.A.LL.B. (Hons.) focussing on International Trade Law.

ABOUT US



WHITE BLACK LEGAL is an open access, peer-reviewed and refereed journal providededicated to express views on topical legal issues, thereby generating a cross current of ideas on emerging matters. This platform shall also ignite the initiative and desire of young law students to contribute in the field of law. The erudite response of legal luminaries shall be solicited to enable readers to explore challenges that lie before law makers, lawyers and the society at large, in the event of the ever changing social, economic and technological scenario.

With this thought, we hereby present to you

INTELLECTUAL PROPERTY RIGHTS AND 3D PRINTING: CHALLENGES IN ENFORCING IP LAWS FOR DIGITAL BLUEPRINTS IN THE ERA OF ADDITIVE MANUFACTURING

AUTHORED BY - RIKASHA SHAJAKAN & JANAVI MANISEKAR

ABSTRACT:

Originally employed for industrial purposes only, additive manufacturing, also known as 3D printing, is now slowly making its way into the consumer and public domains. As if looking for ideas for the application of automated additive manufacturing or 3D printing in lithium-ion batteries, expanding the borders of it to print human organs, the story of the development of this invention continues to get more and more interesting. However, with the wildcard technology being applied in various ways and attempts to make money off it, the prevalence of IP conflicts is increasing continuously. And, if one wishes to avoid an appropriate conflict over the possession of the IP assets, they must get accustomed to the current legal climate which is fast evolving alongside the technology, the very technology that has remarkable prospects and challenges.

This article delves into establishing and advancing the practice of legal strategies defining, safeguarding, infringing, and counter infringing IP within the confines of growing additive manufacturing technologies. It focuses on the emerging prospects of protection under the current patent laws and doctrines while analysing how patent law, trade secrets, copyright and other IP areas both help and obstruct practitioners in the rapidly expanding industry.

Keywords: Additive manufacturing, 3D printing, intellectual property, legal aspects

1. INTRODUCTION:

According to the World Intellectual Property Organization (WIPO), the main objective of an intellectual property rights framework is "to provide an environment which encourages creativity and innovation". Innovations are made possible since the author is granted an exclusivity period to enjoy his creation which is usually limited. The creation of a world in

which 3D printing has not only revolutionized the way products are manufactured but has also 'destroyed' every industry that relied on copyright patents or any other form of intellectual property that had to be protected as portrayed by Myths In the imagining of Overclocked which is a collection of short stories by Cory Doctorow.¹

Some of the problems that are often associated with conventional manufacturing techniques are addressed through additive manufacturing technology or rather 3d printing. Rather, many machines are employed to perform the same function and produce a very limited number of goods in the conventional way. Additive manufacturing is a distributed network which enhances supply chain agility and scalability, reduces start-up capital for operations and market entry barriers. Additive manufacturing also popularly known as 3D printing technology has impacted several industries worldwide such as consumer products, healthcare, automotive and aerospace industries. The technology is expanding rapidly in India, where it is being used for everything from the manufacturing of consumer goods and architectural models to the development of specialized medical equipment and automobile parts. Digital blueprint, sometimes referred to as Computer-Aided Design (CAD) files, are essential to this revolutionary technology because they include the comprehensive specifications needed to create objects using 3D printing.² But while 3D printing offers a plethora of chances for economic development and creativity, it also brings with it difficult problems in the area of intellectual property rights (IPR), especially when it comes to safeguarding these digital blueprints.

In the IP environment, digital blueprints are a very unique type of asset because they are files that are not only the templates of physical goods but are creative works in themselves. Their digital quality puts them in high-risk situations. They are highly likely to be misused or distributed without authorization as they are easily accessible or replicable. More specifically, in the Indian context, the current intellectual property regimes which have been formulated with physical or traditional creative products cannot fully address the challenges as posed by the need to protect digital blueprints.³ In an age when the virtual and physical realms are

¹ Doctorow, Cory. "Printerime" In Over Clocked: Stories of the Future Present, 1. Philadelphia: Running Press, 2005

² Singh, A., & Chandel, S. (2019). 3D Printer: Needs Real Treat to Intellectual Property in Indian Perspective. *Indian JL & Just.*, 10, 51.

³ Ballardini, R. M., Norrgård, M., & Partanen, J. (Eds.). (2016). *3D Printing, Intellectual Property and Innovation*. Kluwer Law International BV.

becoming much more integrated, it is important to explore how the Indian intellectual property system can be adapted to safeguard the interests of digital blueprints.

2. THREE-DIMENSIONAL PRINTING IN INTELLECTUAL PROPERTY RIGHTS:

Traditional supply channels could be disrupted by 3D printing. Avoiding the manufacturer, customers will be able to 3D print a computer-generated or 3D-scanned actual part. Almost anything can be printed using 3D printing, including styles that are patented or protected by copyright. A wide variety of supply chains could be created as 3D printing becomes more widely available. Intellectual property theft may result from this, or at the very least, the traditional manufacturer may lose control of the IP, if not outright theft. Under the existing IP laws, industrial 3D printing might be controlled.⁴ Individuals 3D printing in their homes, however, can be a danger to the intellectual property system. Due to factors including machine size, cost, production time, and lack of finish, 3D printing is still not widely utilized in homes. Hobbyist printers make up the majority of home users. But as technology develops, 3D printers may eventually be more affordable for the average person. Many legal experts think that if home 3D printing becomes commonplace, it would cause an IP regime upheaval akin to that caused by the emergence of peer-to-peer networks for media and music.

2.1 Concept

Software used in 3D printing divides the 3D model into layers, most of which are 0.01 mm thick or thinner. After the printer has finished tracing each layer onto the build plate, the build plate is lowered, and the subsequent layer is placed on top of the one before it. Because typical manufacturing methods involve taking material out of a preformed block, they are referred to as "Subtractive Manufacturing." Cutting and milling are examples of subtractive manufacturing processes. Since the material that is cut off is typically useless and is only sent out as scrap, this kind of process generates a lot of waste. Because the material is only used where it is needed and the remainder is left as empty space, 3D printing removes this kind of waste.⁵ This new technology has more than just theoretical implications for intellectual

⁴ Priyadarshini, G., & Beula, Y. P. (2020). The Existing Legal Framework of Intellectual Property and 3D Printing. *Supremo Amicus*, 19, 187.

⁵ Macik, T. (2015). Global data meets 3-D printing: The quest for a balanced and globally collaborative solution to prevent patent infringement in the foreseeable 3-d printing revolution. *Indiana Journal of Global Legal Studies*, 22(1), 149-173.

property rights. Thanks to 3D printing technology, these items are now a reality. The technology is now less expensive than some of the other technologies used for the same purpose, such as sculpting, forging, and moulding.

Numerous IP rights holders have already reported 3D printing infringement. IP rights holders would lose at least \$100 billion in 2018 as a result of 3D printing. Similar to how the emergence of file-sharing software fundamentally altered the music and film industries over the past 20 years, the rise of 3D printing will have a tipping-point effect on the business models of all parties involved if Gartner's prediction proves to be correct.

3. RESEARCH METHODOLOGY

This research follows a “doctrinal” approach. Secondary sources have been used for doctrinal legal research, including international legislations and treaties; the Copyright Act of 1957; the Patents Act of 1970 (amended in 2005); The Designs Act of 2000; and sources like reference books, journals, magazines, and the Internet.

4. RESEARCH OBJECTIVE

This study seeks to further the conversation on intellectual property rights in the digital era, by analyzing the unique environment of 3D printing in India. This paper aims to provide policy recommendations to assist India in strengthening its intellectual property rights for digital blueprints by thoroughly reviewing the country's IP structure, analyzing global best practices, and investigating technology alternatives. The study's conclusions may have ramifications for a variety of stakeholders, such as legislators, business leaders, and inventors. It aims to help India achieve its larger goals of promoting economic growth and innovation in the global digital economy.

5. RESEARCH QUESTIONS

- What challenges do IP rights holders face in protecting 3D-printed digital blueprints?
- How effective are current IP doctrines in addressing these challenges?
- What potential legal reforms or strategies could better support IP enforcement in additive manufacturing?

6. 3D PRINTING UNDER INDIAN INTELLECTUAL PROPERTY

LAWS:

India's intellectual property (IP) legal system is largely governed by laws pertaining to copyright, patents, designs, and trade secrets. Each of these frameworks has a unique function in safeguarding various forms of intellectual property, and they all apply to the 3D printing sector to differing degrees.⁶ However, these rules have particular difficulties when it comes to digital blueprints, which are essential to 3D printing technology. Because they are digital files, they are more difficult to protect under conventional IP frameworks due to their ease of duplication and distribution. The structure, use, and restrictions of each pertinent Indian IP law are examined in this section with regard to digital blueprints and 3D printing.

The Copyright Act of 1957, which governs copyright law in India, attempts to safeguard original works of literature, art, music, and drama in addition to sound recordings and cinematograph films. In other words, copyright law protects the particular way an idea is expressed, such language, artwork, or a design, rather than the underlying concept or functioning. This is because it is intended to protect manifestations of ideas rather than ideas themselves. Intricate design information required to create material things through 3D printing are contained in digital blueprints, which are frequently in the form of CAD files.⁷ Theoretically, these blueprints can be considered "literary works" or "artistic works" under Indian copyright law due to the degree of innovation involved in their presentation and design. The creator would be able to regulate how their digital blueprint is copied, distributed, and modified if it were protected by copyright.

However, there are restrictions on how digital blueprints for functional products are covered by copyright law. Generally speaking, copyright only safeguards the artistic expression of a digital blueprint; it does not cover the technical details or practical elements that permit the design to be used in production. This implies that although the blueprint's visual appeal or design layout might be protected, the functional components required to produce a tangible item might not be covered by copyright. This restriction is important for 3D printing since CAD

⁶ Dama, S., & Chinmaye, A. (2016). Printing a Revolution: The Challenges of 3D Printing on Copyright. *Geo. Wash. L. Rev. Arguendo*, 84, 68.

⁷ Daly, A., Lu, J., & Heemsbergen, L. (2019). Another dimension of digital: 3D printing and intellectual property in Asia. In *Digital Transactions in Asia* (pp. 104-118). Routledge.

files are appreciated more for their practical applications than for their artistic expression.⁸

The Patents Act of 1970 (amended in 2005) offers protection to inventions that satisfy the requirements of industrial application, originality, and novelty. An inventor who has a patent has the sole right to stop anyone from creating, utilizing, selling, or distributing their creation without their consent. Generally speaking, patent law only covers tangible innovations and procedures; abstract concepts, theories in science, and ineffective designs are frequently excluded. If the product itself satisfies the requirements for patentability, 3D printed items or goods made from digital blueprints may be eligible for patent protection. For instance, the inventor may apply for patent protection for a 3D-printed item if it is a unique mechanical device or a novel design with industrial use.⁹

Patent law protects either the process or the product. However, digital blueprints are in a gray area because they are a digital process that facilitates the construction of a product rather than a physical process or tangible product. The ease with which digital designs can be shared and altered online poses serious obstacles to the enforcement of patents. For example, under current patent rules, a patented object may avoid direct infringement if it is made using a significantly modified CAD file. It would be extremely costly and time-consuming to patent each individual 3D-printed design, particularly in sectors where design changes regularly, like jewelry or fashion. As a result, although patent law can provide protection for certain components of 3D printing, it cannot fully protect the digital blueprint, which serves as a tool for intermediate production.

The Designs Act of 2000 safeguards an object's distinctive visual appeal, including its form, arrangement, pattern, embellishment, or arrangement of lines and colors used on any object, whether it is two-dimensional or three-dimensional. A design must be unique, new, and not just functional in order to qualify for registration and protection under the Designs Act.

Digital blueprints that depict a unique and innovative visual design may be protected under design rights. For instance, the visual design of a unique consumer object (like jewelry or

⁸ Rajam, S., & Jha, A. (2018). 3D Printing-An Analysis of Liabilities and Potential Benefits within the Indian Legal Framework. *NUJS L. Rev.*, *11*, 361.

⁹ Desai, D. R., & Magliocca, G. N. (2013). Patents, meet Napster: 3D printing and the digitization of things. *Geo. LJ*, *102*, 1691.

furniture) designed using a digital blueprint may be protected under design law. In this case, the owner would have the exclusive authority to stop others from creating or marketing similar products.¹⁰

However, when it comes to 3D printing, there are a number of restrictions on design rights: In India, a product's functional features are not protected by design rights. This restriction limits the extent of protection for 3D printing plans, which frequently include both functional and aesthetic aspects. Unlike copyright or patent protections, design rights have a limited protection span (usually 10 to 15 years), which may leave some designs unprotected when their life cycle comes to an end. Design law does not protect the underlying blueprint file, only the finished product's look. This implies that unless a 3D blueprint creates a design that meets the requirements for protection as an aesthetic work, it is not covered in and of itself.

7. INTELLECTUAL PROPERTY LEGISLATION IN UNITED STATES RELATED TO 3D PRINTING

The DMCA, or Digital Millennium Copyright Act:

The US's adoption of the DMCA represents one of the first attempts in the history of cyberspace to safeguard copyright holders' interests in the digital age. After months of contentious negotiations over its provisions, the US Congress finally passed the Digital Millennium Copyright Act (DMCA) on October 12, 1998. In addition to containing additional provisions addressing related matters, the Act is intended to implement the treaties signed during the World Intellectual Property Organisation (WIPO) Geneva conference in December 1996.¹¹

The following are some of the DMCA's key characteristics:

- a) Makes evading the anti-piracy safeguards included in the majority of commercial software illegal.
- b) Prohibits the production, distribution, or sale of code-cracking tools for unauthorised software copying.
- c) Does allow for the cracking of copyright protection devices, but only for the purposes of testing computer security systems, conducting encryption research, and evaluating product interoperability.

¹⁰ Asarkar, K. (2022). Intellectual Property Issues in 3D Printing. *Issue 2 Int'l JL Mgmt. & Human.*, 5, 283.

¹¹ Bhat, S., Venkatesh, M. P., Balamuralidhara, V., & Kumar, T. P. (2019). Comparison of 3D Printing in USA, Europe and Australia and IPR. *Journal of Pharmaceutical Sciences and Research*, 11(7), 2515-2520.

- d) Under certain conditions, grants non-profit libraries, archives, and educational institutions exemptions from anti-circumvention laws.
- e) Generally, prohibits Internet service providers from being held accountable for copyright violations for merely sending data over the Internet.
- f) On the other hand, content that seems to violate copyright must be taken down from users' websites by service providers.
- g) Restricts non-profit higher education institutions' liability for copyright infringement by faculty members or graduate students in specific situations and when they provide online services.
- h) Demands that "webcasters" reimburse record labels for licensing fees.
- i) Demands that recommendations on how to advance distance learning via digital technologies while "maintaining an appropriate balance between the rights of copyright owners and the needs of users" be submitted to Congress by the Register of Copyrights following consultation with pertinent parties.
- j) Clearly states that "nothing in this section shall affect rights, remedies, limitations, or defences to copyright infringement, including fair use..."

8. LACK OF PROTECTION OF 3D PRINTING IN INDIAN INTELLECTUAL PROPERTY LAW REGIME:

While each of the laws pertaining to copyright, patents, and design provide some protection for digital blueprints and 3D printing, none of them offers a comprehensive solution, according to the report. The distinctive characteristics of digital blueprints, that blend artistic expression with practical usefulness, lead to a vulnerability in the existing intellectual property structure.

Among the primary difficulties are:

Digital blueprints frequently include both functional and aesthetic components, while IP rules frequently make a distinction between the two. Because only aesthetic elements may be safeguarded, leaving functional components unprotected, this makes it more difficult to apply copyright and design legislation. Digital designs are easily copied and shared, it might be difficult to enforce intellectual property rights. It can be challenging to regulate the dissemination of digital files or successfully prosecute infringement claims once they are on the internet.¹²

¹² Ballardini, R. M., Mimler, M., Minssen, T., & Salmi, M. (2022). 3D printing, intellectual property rights and medical emergencies: In search of new flexibilities. *IIC-International Review of Intellectual Property and Competition Law*, 53(8), 1149-1173.

Digital blueprints are not specifically covered by Indian IP rules, nor is there a clear framework for their protection. This gives authors fewer choices for enforcement and restricts their legal possibilities. Since intellectual property rights are frequently geographical, safeguarding a digital blueprint in India does not guarantee that it will be protected overseas. For Indian creators, this creates further enforcement issues because digital file sharing is global.

The current intellectual property rules in India, which cover copyright, patent law, design rights, and trade secrets, are not suited to handle the unique difficulties presented by digital files used in 3D printing.¹³ For example, while the creative elements of a digital blueprint may be protected by copyright law, the practical elements required for manufacturing are frequently left unprotected. Although they provide protection for innovative ideas and beautiful designs, patent and design regulations have limitations when it comes to CAD files. Creators, companies, and industries are left susceptible by this lack of legal protections, which makes it difficult for them to enforce their intellectual property rights and stop the exploitation of their assets in both domestic and foreign markets.

9. SUGGESTIONS

Evidence suggests that consumer-oriented software tools will advance dramatically over the next several years as software vendors become more cognisant of the needs for customisation and design. As a result, the technical proficiency of customers will grow and become more creative as a result of the renewed popularity of 3D printed goods in the community and at home. As 3D printing keeps expanding, it's critical to address the intellectual property concerns that come up in this field. Therefore, it would be wise to take action to create an environment that is better equipped to address upcoming intellectual property issues more effectively and in a way that considers the interests of all parties involved.

More precise guidelines are required to determine whether a CAD file qualifies for copyright protection. Because copyright law is territorial, online platforms and CAD files shared on them are also territorial, which could result in future ambiguity and complicated problems.

It is advised that the government-established Indian Intellectual Property Office (IIPO) form a Working Group to discuss the different IP rights that might need to be addressed in the future.

¹³ Mendis, D., Nordemann, J., Ballardini, R., Brorsen, H., Calatrava Moreno, M. D. C., Robson, J., & Dickens, P. (2020). The intellectual property implications of the development of industrial 3D printing.

Clarity regarding the state of CAD files and their optimal applications in industry should also be provided by the Working Group. The Group should also think about the best way to handle 3D printed spare parts traceability.

More knowledge and comprehension of the various licence types should be made available by online platforms. This can be accomplished by using straightforward language to explain the subtleties associated with each licence, as opposed to merely 'encouraging' the user to accept a specific licence type. With 'optout' as a choice, online platforms can also automatically assign the most suitable licence. It is advised to keep an eye on spin-offs and by-products provided by online platforms as their use and numbers continue to increase.

One suggestion for the industry would be to embrace a "pay-per-print" business model by implementing secure streaming of 3D CAD files via an Application Programming Interface (API), which would allow for a variety of 3D retail locations.

This will prevent a system like a "one-stop-shop" for (spare) parts from tying the manufacturer into a contract. A one-stop shop can reduce manufacturing, shipping, and storage expenses while lowering the risk of IP violations, but it can also result in a monopoly, which is something that should be avoided. The traceability of 3D printed spare parts should be taken into account by the automotive industry, especially when it comes to the part's usability and safety. Lastly, this paper makes recommendations for changes to the Repair-Reconstruction Doctrine, the DMCA protections, traditional sales models, and our use of the Fair Use Doctrine.

10. CONCLUSION

The extent, application, and regulation of 3D printing in the replacement parts, tailored goods, and high-value small status goods sectors are not adequately covered by the current laws. As a result, the current study outlines the intellectual property implications while offering insight into the use, adoption, and regulation of 3D printing in the chosen industries. The laws and regulations in place now deal with these problems and point out those that need more focus. The problems arising from intellectual property law will be the main focus. Next, in that order, we go over copyright law, patent law, design rights, and trademark law. The purpose of this paper is to examine each of these topics from a practical standpoint, identifying the risks and outlining strategies for reducing them.