3D 打印与知识产权：冲突渐起

Intellectual property and 3D printing: A clash in the rising

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作为实用的替代性制造方案，3D 打印日益在全球各行业普及，但在印度却还驻足不前，一个主要原因是其应用涉及高昂的操作成本，而且对于这项技术可在哪些领域有效利用还没有清晰的界定。

3D 打印技术常被形容为“更环保、更顶尖”，它有巨大的潜力去刺激印度的制造业及其政府计划如“印度制造”（Make in India）的发展，并肯定会渗透印度的制造业。但这项技术也给知识产权执法和保护带来了许多挑战，涉及对受知识产权保护的产品进行未经授权的复制。未来几年，这个问题在印度一定会变得越来越重要。

什么是 3D 打印?

3D 打印又称为增量制造，是根据数码文件制造固体三维物件的过程。3D 打印物件是通过增量过程制造的。在这个过程中，机器连续铺设一层层材料直到整个物件被制造出来。每一层都可以被看作是最终成型物件的超薄水平横截面。

用 3D 打印技术制造物件，必须先从物件的虚拟设计开始。这种虚拟设计创建于通过 3D 建模程序或 3D 扫描生成的 CAD (Computer Aided Design) 文件中。3D 建模程序用以设计全新的物件，而 3D 扫描仪扫描现有物体对其设计进行数码复制。3D 扫描仪用不同技术去生成 3D 模型，包括飞行时间法 (time-of-flight)、结构光或调制光 (structured or modulated light)、容积扫描 (volumetric scanning) 等。输入CAD文件后，相应的 3D 物件就被制造出来。

> *“[3D 打印技术] 带来了知识产权执法和保护方面的许多挑战”*

知识产权和 3D 打印

3D 打印技术的运用目前只限于印度的工业市场，但随着个人消费者越来越容易获取便利的打印工具，这可能会造成知识产权侵权行为的泛滥。例如，侵犯权利人知识产权的 CAD 文件可能被创建并被上传到网络。这会马上被全球的消费者使用 3D 打印机下载或打印，CAD 文件可能会被稍加修改或原封不动地照搬。这样，窃取及侵犯知识产权就会成为大问题，因为个人侵权者会很难被定位。在 3D 技术可以被有效利用并使所有利益相关者满意之前，这个问题应该得到解决。

基于 3D 打印的特性，它将会影响几乎所有类别的知识产权，包括专利、设计、著作权和商标。但是，首当其冲的知识产权权利人应该是以制造或者设计为基础的行业。

在知识产权的执法过程中也会面对各种挑战。执法机构将面临的最大挑战之一是确定侵权者。考虑到多数侵权活动是以数码形式为开端，最终在侵权者住所内完成，海关等传统执法机关可以做的并不多。而且，一旦通过 3D 打印机实施知识产权侵权行为，不同当事人的连带责任就需要得到适当的判断。例如，当侵权的 3D 打印产品被其他人制造出来，对于 3D 打印机的制造者或者 CAD 文件的创建者是否应该承担责任就存在疑问。一旦监管制度变得清晰，执法机构就可以更方便地阻止违法行为。

尽管应对 3D 打印侵权案件的法律框架和执法机制可能与其他知识产权侵权案件有所不同，诉讼和替代性争议解决 (ADR) 策略在多数情况下都差不多。如同很多其他知识产权违法或者侵权案件，第一步是将案件中潜在的知识产权情况告知侵权者，并要求其停止侵权。如果对方没有回应或者侵权行为没有停止，通过诉讼或替代性争议解决方案处理问题就变得有必要。

需要做什么?

各市场或行业的参与者都要对网络保持警惕，搜索侵犯其知识产权的 CAD 文件并要求删除这些文件。新的知识产权登记人也可以设法将对其专有权的保护范围扩展至涉及其产品设计的CAD文件的创建行为，尽管能否做到这点视乎具体的法律框架。

但是，做出适当的立法回应，考虑 3D 打印对知识产权的影响，这是协助知识产权人以及相关部门的最好办法。到目前为止，还没有看到印度在立法、监管或者行政层面尝试解决这个问题。

由于 3D 打印属于新兴科技，印度需要调整法律框架以最恰当的方式去解决相关问题。首先，法律框架需要界定 CAD 文件适用的知识产权保护性质和范围，以及这种保护是否需要延伸到最终的打印产品。

下一个问题就是可能因应用 3D 打印技术而遭侵犯的知识产权。考虑到多数侵权行为可能为个人而非商业性质，在目前知识产权法律下，对私人适用的例外情况必须重新评估。

考虑到 3D 打印技术基本上是一种增量制造机制，专利以及设计拥有者可能会成为最大的侵权受害者。在这样的背景下，著作权法下的某些条款也可以延伸到这些领域，以处理数码复制问题。■

While 3D printing is increasingly being used as an attractive alternative manufacturing option in different industries across the globe, the application of 3D printing technology has yet to gather momentum in India. This owes mostly to the high operational costs involved and lack of clarity on the right sectors where the technology may be viably utilized.

3D printing technology often is touted as "greener and leaner". It has huge potential to stimulate India's manufacturing sector and governmental initiatives such as Make in India, and is sure to permeate India's manufacturing sector.

The technology presents a host of legal enforcement and protection challenges pertaining to unauthorized reproduction of products that may be protected by intellectual property rights, thus the issue will definitely gain importance in India in the years to come.

What is 3D printing?

3D printing, also known as additive manufacturing, is the process whereby solid, three-dimensional objects are produced from an electronic file. A 3D printed object is created via additive process. In this process, an object is created by laying down successive layers of material until the entire object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.

It all initiates with creating a virtual design of the object one wants to create. This virtual design is made in a CAD (computer-aided design) file generated using either a 3D modelling program, which is used to design a totally new object, or a 3D scanner, which creates a digital imprint of an existing object to replicate its design.

3D scanners use different technologies to generate 3D models such as time-of-flight, structured or modulated light and volumetric scanning. A 3D printed object can be created once the CAD file is inputted into the machine.

IP and 3D printing

3D printing technology has until now been limited to industrial markets in India. Affordable, user-friendly 3D printing equipment is increasingly becoming accessible to the individual consumer, and this may facilitate rampant IP violation.

To give an illustrative example, a CAD file which infringes a holder's IP rights (IPR) in some manner may be created and uploaded to the internet. This file can then be immediately downloaded by consumers across the globe, who can then print the object using a personal 3D printer with or without additional customization of the design. IP theft and violation thus is a major issue when it comes to 3D printing, insofar as it would be difficult to locate individual violators. This needs to be resolved before 3D printing technology can be efficiently exploited to the satisfaction of all stakeholders.

3D printing is expected to impact almost all categories of IP including patents, design, copyright and trademark due to its nature. However, the industries which base their output on manufacturing and design are the biggest IP holders expected to suffer as a result of popular 3D printing availability.

There are many challenges to IPR enforcement in these cases. One of the biggest challenges to be faced by enforcement agencies is identifying the infringer. Most of the infringing activity will be electronic, and this activity will be performed within the four walls of the violator's residence. Considering this, traditional enforcement authorities such as Customs may be unable to do much in terms of enforcement.

Further, concomitant liability of different actors once IP rights infringement via 3D printers occurs also needs to be determined properly. For instance, there is the question of whether the maker of the 3D printer or the creator of the CAD file would be held liable when an infringing 3D printed product was made by a different actor. Once this scheme is clear, enforcement agencies will more easily be able to prevent violations.

Techniques in common

While the legal framework and enforcement mechanisms to deal with 3D printing infringement cases may vary from other instances of IP violation, the litigation and alternate dispute resolution (ADR) techniques would mostly remain the same.

Like any other case of IP violation or infringement, the initial course of action would be to inform the violators

> *"[3D printing] presents a host of legal enforcement and protection challenges"*

of the underlying IPR and demand that they stop. If there is no response or the violation does not cease, it becomes essential to resort to litigation or ADR.

What needs to be done?

Markets or industries need to be vigilant online, searching for CAD files that infringe their IPR and asking that these infringing files be removed. New IP registrants can also look at ways to extend their exclusive rights protection to include the creation of CAD files of their design, though this may depend on the legal framework.

An adequate legislative response which takes into account the implications of 3D printing on IP rights is the best way to assist IP rights holders and authorities. As of now, there has been no legislative, regulatory or administrative attempt to address the issue in India.

Since 3D printing is an emerging technology, the legal framework needs to be shaped in a way that addresses the issues involved in the most appropriate way. The framework first needs to demarcate the nature and extent of IP protection CAD files would be eligible for and whether this protection also extends to the final printed product.

Next is the issue of those IPR which are likely to be infringed through use of 3D printing technology. Considering that most of the infringement could be personal rather than commercial, private use exceptions in current IP laws need to be evaluated.

3D printing technology is essentially an additive manufacturing mechanism, therefore patent and design holders may be the hardest hit victims. In this context, certain provisions incorporated into copyright legislation to deal with digital reproduction could also be extended to these areas. ■

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