

# *Dilemma and optimization path of intellectual property protection under digital economy*

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**Abstract:** Encouraging business innovation and safeguarding it from infringement are two ways that intellectual property rights protection in the digital economy may support the creative growth of the sector. However, because of the integration of digital technology, intellectual property infringement concerns are growing and becoming more difficult in the new environment of the digital economy's rapid expansion. In order to do this, this essay begins by examining the notion of the "digital economy" through an empirical and literary study, elucidating the connection between the digital economy and intellectual property protection, and conducting research with the aid of pertinent case studies. The study discovered that there are numerous challenges facing intellectual property protection in the digital economy today, including the weakness and incompleteness of current legal standards, the need for enhanced oversight by several agencies, and the inadequacy of current punitive measures. In order to provide guidance for the implementation of laws on intellectual property protection, this article then makes recommendations for how to strengthen collaborative governance by multiple entities, improve current intellectual property laws and regulations, and establish a systematic investigation system that integrates civil, administrative, and criminal matters. The role of implementation is significant.

## **1. Introduction**

The era of the digital economy has arrived, and it is rapidly emerging as a major force behind transformation and economic progress on a worldwide scale. Data from the "Global Digital Economy White Paper (2023)" indicates that in 2022, the value added size of the digital economy in 51 nations reached 41.4 trillion US dollars, or 46.1% of GDP, demonstrating the sector's robust growth pace. China actively encourages the digital economy's overall growth and keeps pace with its worldwide expansion. The primary body of economic innovation's digital development has received considerable backing from the state and municipal governments through the release of a number of policy documents in quick succession. For instance, the outline of long-term goals for 2035 (hereinafter referred to as "the outline") and the 14th five-year Plan for National Economic and Social Development of the People's Republic of China both make reference to the necessity of "speeding up digital development and building a digital China." Local authorities have also released related records concurrently. For instance, the Shanghai Higher People's Court's White Paper on Intellectual Property

Trial in Shanghai Courts in 2022 (henceforth referred to as the "White Paper") provides an overview of the general state of intellectual property trials, thereby bolstering intellectual property protection and encouraging innovation-driven development. It offers helpful practical recommendations for advancing the legal defense of intellectual property rights. By enacting the aforementioned policy measures, businesses will be better able to compete, actively support the growth of the digital economy, and utilize the legal system to defend their intellectual property rights.

It is important to note that, despite extensive frontier research by academics on certain aspects of court protection of intellectual property in the context of the digital economy, application countermeasures for particular intellectual property instances remain inadequate. After a thorough review of the literature, it was discovered that the journals currently in publication have not addressed this topic in a systematic manner. Li Xiaolu, Li Xiyan, and other academics have concentrated on the positive regulatory role that the "two-track system" of intellectual property protection plays in the impact of the digital economy on enterprise green technology innovation, as well as the important positive regulatory roles that its two sub-indicators, patent judicial protection and patent administrative protection, play [1]. Zhen Hongxian, Wang Xi and other scholars stressed that the role of intellectual property administrative protection in promoting the digital transformation of enterprises is more significant in enterprises with low R & D subsidies and low tax incentives. In addition, the administrative protection of intellectual property rights has improved the total factor productivity of enterprises by promoting the digital transformation of enterprises [2]. Zhang Xiuqin and Shi Xudong proposed that the administrative protection of intellectual property rights under the "two-track system" will enhance the effect of judicial protection of intellectual property rights on the complexity of export technology, and the judicial protection of intellectual property rights will promote the complexity of export technology by promoting the development of digital economy and stimulating market vitality [3]. To sum up, the existing literature is mainly devoted to the role of intellectual property protection in promoting enterprise innovation in the digital economy, but its application in specific cases of enterprises is relatively limited.

This paper's study has shown that, on the one hand, judicial protection of intellectual property rights can promote the excellent growth of the digital economy. Conversely, it will contribute to China's efforts to establish a "rule of law China" and a world-class legal business environment.

## **2. The present situation of Judicial Protection of intellectual property Rights in Digital economy**

### **2.1 Digital economy and its relationship with intellectual property Protection**

The phrase "digital economy" is not new to the world of economics; it has been around for a while. In terms of economics, this is known to all nations, and its meaning is clear. Under the global backdrop of the information revolution and the quick expansion of the Internet and its linked businesses, the term "digital economy" was coined for policy purposes. But since the general public still does not have a common grasp of what the digital economy is, it is important to define its conceptual components.

The term "digital economy" refers to a brand-new economic structure that emerged in the 1990s and is associated with the growth of the Internet. For the first time in formal writings, the term "digital economy" is introduced in 1996 by American researcher TapscottD [4]. He highlights the "Network Intelligence era" economy as the "digital economy," which he defines as a new economy built on network intelligence and shaped by the information and communication revolution symbolized by the widespread use of the Internet. Applying knowledge and network intelligence to the manufacturing, service, and agriculture sectors will enable individuals and businesses to generate wealth [5]. Since then, as e-commerce has gradually grown, Brynjofsson and Kahin have included e-commerce within

the theoretical framework of the digital economy [6]. Currently, there are two categories of the digital economy: broad and narrow.

The term "digital economy" refers to a broad category of economic forms that employ data, either directly or indirectly, to direct resources in order to play a role and encourage the growth of productive forces. Digital industrialization, industrial digitalization, digital governance, and data value are its four facets. The term "digital economy" refers, in a limited sense, to a range of economic activities that view the utilization of digital knowledge and information as the primary factors of production, the contemporary information network as a vital conduit, and the efficient application of information and communication technology as a major force behind efficiency gains and the optimization of the economic structure. The G20 Digital Economy Development and Cooperation Initiative's overview of the digital economy is currently the basis for China's definition of the term "digital economy," which specifically refers to the use of digital knowledge and information as production factors through the efficient application of information technology as a range of economic activities to maximize efficiency and optimize the structure of the economy. In other words, the field that deals with database, information security, and computer technology.

To sum up, this paper adopts the definition of the content of digital governance plate in the broad concept of the protection of enterprise intellectual property rights under the background of digital economy. Under the premise of giving full play to the guiding and exemplary role of intellectual property judicial adjudication, the digital economy of this paper vigorously promotes the level of intellectual property governance under the digital economy in the cases of using computer technology and information network technology.

There is a close relationship between the digital economy and intellectual property protection. The author believes that it can be carried out from the following two aspects in order to further study the protection of intellectual property rights under the background of digital economy and better adapt to the needs of economic and social development. On the one hand, the protection of intellectual property rights can further promote the development of digital economy. Intellectual property has not only become a "catalyst" to stimulate innovation, but also an "accelerator" for economic development. The State Intellectual Property Office announced that from January to September this year (2023), China authorized 699,000 invention patents and accepted 53,000 PCT (Patent Cooperation Treaty) international patent applications. As of September this year, the number of effective domestic invention patents in China reached 3.908 million [7]. All these have provided effective support for the development of digital economy of our country. It is worth noting that the application of patents in intellectual property protection can prevent the core technology of enterprises from being stolen by others, protect the interests of enterprises, thus further enhancing the competitiveness of enterprises in the market, providing a strong guarantee for the healthy development of the digital economy, and helping to promote the development of the socialist market economy. On the other hand, the continuous development of the digital economy has also improved the intellectual property protection system. With the rapid development of digital economy, intellectual property protection is facing severe challenges. In the field of copyright, digital technology causes problems such as copyright abuse and monopoly, difficulty in safeguarding rights, sharing spirit and protection conflict. In the field of patents, the digital economy has, to a certain extent, induced problems such as low-value patent output and patent jungle [8]. In addition, the rapid development of digital technology has put forward higher requirements for intellectual property protection. The number of intellectual property infringement cases using information network computer technology is increasing day by day, and the problem of how to strengthen the attack on intellectual property is also urgent to be solved. By properly handling intellectual property cases under the digital economy, the judicial protection system of intellectual property can be further improved, and the level of intellectual property protection in the digital economy can be greatly improved.

## 2.2 Analysis of typical cases

In addition to describing the judicial protection of intellectual property rights in Shanghai courts, the White Paper also contains ten typical cases. Now take these ten typical cases as the research object of this paper, and make comments here.

From the perspective of the areas involved in the scope of intellectual property protection, intellectual property protection makes property owners in a wide range of areas have a certain degree of protection of their labor results, which can be divided into copyright and its related rights, patent rights, trademark rights and so on. Ten typical cases can be further clarified. "Nirvana in Fire" and "Pirate Software case" belong to the field of copyright and related rights, and "graphical user case" belongs to the field of patent rights. It belongs to the design patent that infringes upon the graphical user interface of the original patentee. "100,000 why cases" and "Tiandi Huayu case" belong to the field of trademark rights, among which "100,000 why cases" belong to the scope of trademark infringement of book names, and "Tiandi Huayu case" belongs to logistics trademark infringement. "Foreign Trade customer case" and "Zhongxin case" belong to the trade secret rights of non-patented technology secrets. Among them, the "Foreign Trade customer case" belongs to the disclosure and use of the overall customer secret information in the business information of the enterprise by improper means, and the "Zhongxin case" belongs to the theft of the enterprise's technical secret information by improper means. "Chinese Super League case" and "Alipay case" belong to various areas of rights to oppose and stop unfair competition. Finally, Longjing Tea case belongs to the scope of certification trademark under geographical indications. To sum up, in the field of copyright, two cases are involved in the top ten cases, accounting for 20%; in the patent field, one design patent case is involved, accounting for 10%; in the field of trademark rights, two cases are involved, accounting for 20%; in the field of trade secrets, two cases are involved, accounting for 20%; in the field of anti-unfair competition related to market dominance, two cases are involved, accounting for 20%. In the field of geographical trademarks, one example is involved, accounting for 10%.

From the perspective of intellectual property protection, the Shanghai Court has stepped up its efforts to punish crimes of intellectual property infringement. It has risen to the standard of criminal identification in the fields of copyright and trade secrets. In the "Pirate Software case," the defendant Wang made, sold, copied and distributed his computer software works for the purpose of profit without the permission of the copyright owner, and the illegal business amount reached more than 340000 yuan, which was a particularly serious case, and his behavior constituted a crime of copyright infringement. Therefore, the court sentenced the defendant Wang to three years' imprisonment and a fine of 200000 yuan, and ordered the defendant Wang to refund the victim's economic losses. In the "SMIC case", the defendant Zhou so-and-so violated the requirements of the obligee SMIC to keep trade secrets and obtained trade secrets by improper means such as theft. SMIC suffered a loss of more than 1.28 million yuan due to infringement of trade secrets, which caused more than 500000 yuan to the obligee. The court found that his behavior constituted a crime of infringing trade secrets and sentenced the defendant to one year's imprisonment, suspended for one year, and a fine of 60,000 yuan. The above cases all reflect the court's efforts to strengthen the criminal judicial protection of intellectual property rights and severely crack down on infringement crimes. In addition, it is worth noting that in the Tiandi Huayu case, the Shanghai Court further clarified the civil liability nature of changing the enterprise name, which is conducive to the prevention and prevention function of private law liability on damage hindrance, and increase the deterrence to the infringers of intellectual property rights. When the enterprise name has not yet been actually used, the Shanghai court has taken into account in advance the realistic danger of infringing on the relevant rights and interests of intellectual property owners. This also reflects from the side that the court strengthens the protection of intellectual property rights and attaches importance to the protection of the interests of intellectual

property owners.

From the judgment standard of tort, judges often take "substantive similarity" as the core element of tort and make a judgment based on it. In the "graphical user case", the judge held that the interface of some versions of the infringing software and the interface of the patent design involved in the case were similar in the overall interface design and dynamic change process, and there was no substantial difference in the overall visual effect between them. It belongs to similar interface design. In the Nirvana in Fire case, the judge compares the secret room game involved in the case with the core characters of the Nirvana in Fire novel, and finds that it has risen to the highly original core plot of the Nirvana in Fire novel through original expression and substantial similarity. It infringes on the copyright of the original author. In the case of "pirated software", entrusted by the public security organ, the Institute of Judicial expertise identified the laser cutting software and the legitimate software sold by the defendant Wang. The structural similarity and file similarity between the executable "CypNest-pro6.37825.exe" in the software sold by Wang and the executable "CypNest.exe" under the legitimate software were both more than 90%, which constituted a substantial similarity. The above-mentioned cases all reflect the court's judgment proposition of "substantial similarity".

### **3. The Dilemma of intellectual property Protection in Digital economy**

#### **3.1 The existing legal norms are not perfect**

In the process of examining the path of intellectual property protection in the digital economy, it has become imperative to address the issue of how to strengthen the accuracy and efficacy of the law of intellectual property protection in light of the rapidly evolving nature of intellectual property rights in the sector and the evident legislative lag.

Our nation first developed the intellectual property protection system, which includes copyright, patents, trademarks, and other areas, after many years of research and development. This system is crucial to the preservation of intellectual property rights. China has developed a relatively comprehensive legal system for the protection of intellectual property rights since joining the World Intellectual Property Organization in 1980. This legal system includes the Trademark Law of the People's Republic of China, the Patent Law of the People's Republic of China, the Technology Contract Law of the People's Republic of China, the Copyright Law of the People's Republic of China, and the Regulations on the Protection of Computer Software, among other laws and regulations.

New intellectual property objects, including data, algorithms, and models, are constantly emerging due to the rapid development of the digital economy and the widespread application of new technologies like big data, blockchain, and artificial intelligence. Unlike traditional things like patents, trademarks, and copyright, these objects have the qualities of intangibility, fluidity, and sharing. One of the ten typical situations mentioned above, the "graphic user" case, for instance, involves a design patent for a product called a mobile communication terminal that has a dynamic graphical user interface. In contrast to traditional design patents, which focus on particular industrial items as the carrier, a GUI is a computer system command interface that is visually shown on the display device of electronic devices. It is produced by software operation. Software does not belong to the category of design products stipulated in the traditional patent law, and it is difficult to form the same or similar type of products with electronic products.

However, China's existing intellectual property laws and regulations have not clearly defined and confirmed the new object of intellectual property rights emerging in the digital economy, nor have they effectively regulated its acquisition, use, transaction and other behaviors. At the same time, due to the endless emergence of new technologies, new business forms and new models, risks and

hidden dangers have also brought new challenges and new tasks to the protection of intellectual property rights and the resolution of related disputes. In the digital environment, infringement acts are more hidden, more complex, and have a wider scope of influence. As a result, disputes may be caused by many subjects, complicated legal relations, and more difficult to collect fixed evidence, etc. These new problems are not specifically regulated in China's existing legal norms. There are only corresponding implementation opinions issued at the local level that take into account the actual situation in each region. For example, the Shenzhen Intermediate People's Court issued the Implementation Opinions on Strengthening the Judicial Protection of Intellectual Property Rights in the Digital Economy.

### **3.2 The multi-subject supervision should be strengthened urgently**

The main body of digital economy governance has the characteristics of diversification, and extensively involves law, administration, social governance and other fields. From the perspective of protection subjects, the subjects of intellectual property protection in digital economy mainly include the government, the private sector, and the public.

The occurrence of intellectual property infringement cases, to a certain extent, also stems from the insufficient supervision of multiple subjects, failing to form a joint force for intellectual property protection in the digital economy. For example, in the "Nirvana in Fire case", the plaintiff held that the defendant Shanghai Hantao Information Consulting Co., LTD. (hereinafter referred to as Hantao Company), as the operator of the Dianping platform, should have known the popularity of the novel Nirvana in Fire, but still allowed the secret room game product involved to be promoted and sold on its platform, which also constituted joint infringement. Although the defendant Hantao was finally judged not to participate in any actual business activities of the merchants as a platform operator, there was no evidence in this case to prove that it was aware of the infringement of the secret room and still helped to promote the situation, Hantao company did not constitute joint infringement. However, its regulatory obligations as a platform should not be ignored.

The phenomenon that social groups know the law and break the law also happens from time to time. For another example, in the "Alipay case", the defendant knowingly used the same URLScheme as the "Alipay" App in its operation, so that the goal of accurate jump between mobile apps could not be achieved, directly obstructing the normal operation of the "Alipay" App, which was against industry practices and harmed the interests of intellectual property owners. This also reflects the weak awareness of respecting other people's intellectual property rules at the individual level of society.

### **3.3 The existing punishment mechanism is not perfect**

The problem of the eligibility of the intellectual property system of the digital economy stems from the fact that the rapid development of the digital economy has produced new forms of business that are different from the traditional economy, and it takes the lead in the practical areas that the traditional intellectual property system cannot solve [9]. At present, the use of digital technology to infringe intellectual property rights is becoming more and more fierce, and the infringement of intellectual property rights should not only involve a single civil liability system, but also involve civil, administrative and administrative integrated accountability system. For example, in the "Longjing Tea case", the plaintiff was dissatisfied with the administrative punishment decision made by the Pudong Intellectual Property Office, and filed a request for administrative reconsideration with the People's Government of Pudong New Area, and finally filed a lawsuit with the People's Court of Pudong New Area. This case is the first administrative case involving

intellectual property rights of geographical indications, and is a vivid practice of the "three-in-one" trial mechanism of intellectual property rights. By confirming the legality of administrative punishment and administrative reconsideration, the judgment effectively supervises and supports administrative organs to administer according to law, and gives full play to the role of "booster" of administration according to law and "resolver" of social conflicts.

However, for specific cases, there are still deficiencies in how to judge the infringer to bear civil, administrative and criminal responsibility according to the severity of the tort, the criteria of criminal and civil punishment, and how to determine the loss caused to the right holder in practice.

## **4. The path of intellectual property protection under the digital economy**

### **4.1 Improve the existing laws and regulations on intellectual property rights**

In light of the growing trend of the digital economy and the need to safeguard intellectual property rights, the existing legal framework for intellectual property protection is far from ideal. There are several gray areas in addition to pertinent material. Effective protection of the digital economy's intellectual property rights is a challenging task [10]. Given the inadequacies and deficiencies in China's specific legislation pertaining to the digital economy, as well as the fast evolution of this sector, rules and regulations must adapt to ensure the protection of intellectual property rights. National legislators must be able to recognize the significance of intellectual property protection legislation in the context of the digital economy and must be able to update and enhance existing laws, rules, and regulations pertaining to intellectual property protection. Create and enhance an operating system and intellectual property policy that are appropriate for the growing digital economy. In order to strengthen the protection, application, and service of intellectual property rights in the digital economy, it is also necessary to establish a new think tank on intellectual property rights in the digital economy, increase research and consultation on intellectual property policies and regulations, and enhance local policies and regulations [11].

### **4.2 Strengthen the coordinated governance of multiple subjects**

Mark early carried out relevant discussion and thinking on the subject of intellectual property governance, which believes that intellectual property governance is an organizational form with multiple subjects' participation, multiple governance methods and various governance basis [12]. In the aspect of multi-subject governance, the author agrees with the above point of view, and believes that we should pay attention to give full play to the role of various subjects and coordinate the protection of intellectual property rights in the digital economy. The diversification of governance subjects is an important symbol of modern national governance [13].

At the government level, the relevant government departments should clearly define the boundary of power and provide a comparison between the exact scope of protection and infringement, so as to provide clear guidance for the judicial practice of intellectual property rights in the field of high-tech industries [14]. Secondly, the government should give full play to the role of market supervision and actively guide market subjects to abide by the requirements of relevant laws and regulations, so as to prevent intellectual property risks. Strictly implement the regulations on credit management of intellectual property rights, and carry out identification and punishment of breach of trust in accordance with the law. We will promote credit-based classified supervision in the field of intellectual property rights, with emphasis on strengthening credit supervision over abnormal patent applications and trademark preemptive registration. At the platform level, it is necessary to promote the exemplary role of fair competition on the platform, strengthen the obligations of the operators of the super-large platform, advocate that the platform treat the platform

itself and the operators within the platform equally, and provide operable services. At the social and public level, we should further popularize the legal knowledge of intellectual property protection in the digital economy, enhance social understanding and recognition of intellectual property protection in the digital economy, and enhance the legal awareness of the whole society to consciously abide by the rules of intellectual property protection. We will strengthen individuals' awareness of intellectual property protection and self-discipline. This means that the public should have higher moral requirements and conscious codes of conduct for acts such as piracy and infringement, so as to prevent the occurrence of intellectual property infringement cases from the source.

It is worth noting that the government can also issue a corresponding "tort blacklist" according to the specific situation of the tort subject and the severity of the tort, and timely open to the public to share information in the mechanism of law enforcement, supervision and reward and punishment. The above practices not only play a certain role in punishing the subject of infringement, but also play a warning and educational role to the general public and related business subjects. This will help to jointly promote the construction of a credit supervision system, including intellectual property credit punishment, and help our country to create an international, market-oriented and legalized first-class business environment. To sum up, in the form of pluralistic co-governance, social organizations, enterprises, citizens and other social members exercise social autonomy in intellectual property affairs, including participation, consultation, self-discipline, cooperation, service, etc., combined with administrative law enforcement and judicial adjudication to build a modern governance method system [15].

### **4.3 Establish a systematic investigation system of civil, administrative and criminal**

The methodical process of safeguarding intellectual property has many different aspects and sectors. It is vital to use legal, administrative, economic, technological, social governance, and other means comprehensively in order to improve the protection system from the perspectives of examination and authorization, administrative law enforcement, judicial protection, arbitration and mediation, industry self-discipline, and citizen integrity. This will improve cooperation and establish a pattern of extensive protective effort. It has elevated the threshold that the judicial branches must now reach when resolving intellectual property disputes in complex digital economy scenarios, new industries, and new business models.

Judicial organs should, first and foremost, deepen the reform of the intellectual property trial mechanism and comprehensively summarize the experience and accomplishments of the reform of the "three-in-one" mechanism of intellectual property trial (that is, the intellectual property court uniformly hears civil, criminal, and administrative cases of intellectual property rights) in order to maximize the protection of legal interests in criminal and civil, administrative and civil cases. In the digital economy, we should strengthen the defense of intellectual property rights, fully embrace the guiding role of "three-in-one" judicial protection of typical cases, and promote the development of an integrated system of civil, criminal, and administrative investigations for cases of infringement. In order to create a united front in intellectual property protection, we will work to standardize standards for both judicial adjudication and administrative law enforcement of intellectual property in the digital sphere, enhance the mechanism for convergence between these two domains, and improve coordination and communication with procuratorial and public security agencies. Concurrently, given the novel forms of IP litigation emerging in the digital realm. The court may distinguish between criminal and civil boundaries using the appraisal and evaluation opinions of the appraisal and evaluation institutions, in conjunction with the reasonable royalties of similar trade secrets, to determine the losses caused to the right holders. The court shall fully consider whether



the actor's illegal purpose and the particular circumstances proven by the evidence on record may have a substantial impact on the operation and development of the right holder. In addition to providing civil recompense to the offender, the goal is to make intellectual property rights infringement a more serious crime with criminal penalties. For example, in the copyright infringement crime involving the well-known game "Sindouluo mainland", the court regulated the behavior of setting up private games and promoting them through the Internet, and sentenced four defendants to fixed-term imprisonment ranging from three years to eight months, with a fine. In Zhou Mouguang's crime of infringing trade secrets, the court determined the crime of illegally obtaining trade secrets and sentenced the defendant to one year's imprisonment, suspended for one year, and a fine of 60,000 yuan. The above all reflect the multiple punishment mechanism of the court.

The paper concludes by revisiting the notion of the digital economy and examining the connection between it and intellectual property protection. The ten standard cases included in the White Paper are used as the research subject to assess the features of cases involving intellectual property in the digital economy, with an emphasis on the state of intellectual property protection and its future in the context of the digital economy. It has created a new paradigm for theoretical analysis by fusing particular intellectual property cases with the growing backdrop of the modern digital economy. In this paper, there are few researches on the unfair competition disputes of intellectual property rights and the intellectual property patent protection in the field of digital economy segmentation, but the research in this area is relatively insufficient. In order to improve the effectiveness of intellectual property protection in the domestic digital economy and further encourage the better development of the digital economy, this paper aims to analyze the current state of intellectual property protection and propose an effective solution.

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