Controversy of Copyright Application and the China Plan of Metaverse Products

Abstract: The controversy over copyright theory in the metaverse scenario mainly arises from the issue of copyrightability of metaverse products. Metaverse products have initially reached the standard of originality and formally conform to the dichotomy of thought and expression, however, the incompatibility of object types has led to controversy over its copyright theory. In addition, the three types of disputes and difficulties based on the “behavior” element: original acquisition and derivative acquisition, original products and derivative products, and public domain and private domain, are not just copyright disputes in the metaverse scene, but also a difficult problem that the copyright system cannot reconcile. In this regard, this article draws on overseas experience, introduces the theory of copyright expansion, and combines the needs of China’s judicial practice and China’s national conditions, trying to solve the copyright legal issues in the metaverse scenario one by one through the “source of communication” theory, behavior restriction theory and interest game theory, and propose China’s response to the problems caused by the generalization of digital technology from the three dimensions of originality standard identification, object classification, and rights restriction rules.

Keywords: metaverse; metaverse products; three-dimensional digital model; copyright law; protection of objects

1 Introduction

The term metaverse originated in the science fiction novel “Avalanche” in 1992. In December 2021, it was selected as the 2021 “hot word” of the Collins Dictionary. To be precise, the metaverse concept is not new, nor does it describe a new technology. More like a rebirth of a classic concept, the term refers to a concrete concept in the
context of new technologies such as extended reality,\(^1\) blockchain, cloud computing, and digital twinning. Metaverse products refer to products created with the help of tools in the metaverse. For example, there is a tool in the metaverse called a “pen”; in that context, the so-called pen is actually “artificial intelligence” for which the user follows specific instructions, and the resulting creations are generated by artificial intelligence. Another example involves creations that are technical solutions for real-time interactive demonstrations. Today, the concept of the metaverse is constantly being updated and defined, and even people in different fields have different definitions of the metaverse. When people in various fields, industries, and technical modules have sought to define the metaverse, they have tended to define the concept as a technical concept within their field of study and application. Therefore, when technology has not yet been “capped”, standard concepts are chaotic, and those in various fields are unable to reach a consensus, three core questions must be answered: Are metaverse products copyrightable? What are the problems with existing applicable copyright laws for metaverse products? How should the copyright legal system be protected? There is a certain logical progression relationship among these three issues, but it is obviously the second issue that fundamentally determines the theoretical differences. On the surface, it is difficult to define the types of objects and to clarify the boundary of rights due to the rich application scenarios and diverse forms of metaverse products. This undoubtedly leads us to think about the copyright system: when the law protects innovation, what is it indeed protecting? Thus far, this problem continues to plague us, and the significance of the efforts of legal scholars in various countries is not to brainstorm in the academic collision of learning from friends and confidants and exchanging brush and ink, and to reach a consensus in cultural comparison and transcending philosophical thinking?

The structure of this article is as follows. The first part briefly introduces the pre-existing issues with three logical progressive relationships that metaverse products are protected by copyright law under the background that the technology of the metaverse has not yet been capped. The second part explains the copyrightability of metaverse products and its copyright debate that the “behaviour” factor driven by rights directly affects the “result” of such rights, in particular, disagreements easily arise based on the nature of derivative metaverse products. Taking as an example the application scenarios in the architecture field, the rights ownership of metaverse products is analysed through three behavioural models (Sections 2.1 and 2.2). Meanwhile, focus of the controversy also exists in whether metaverse products apply to the application of copyright or industrial property rights? This is not only a matter

\(^1\) Extended reality is a general term for immersive technologies such as virtual reality, augmented reality and mixed reality.
of the application of copyright law but also a controversy between copyright law and patent law (Section 2.3). The third part mainly analyzes the impact of the theoretical expansion of copyright on the legality of metaverse products, starting from the impact of the “source of communication” theory on the source of interactive behavior acquisition (Section 3.1), the behavior restriction theory from “monism” to “pluralism” (Section 3.2) and analyzing the interest games and trade-offs between “public domain” and “private rights” (Section 3.3) one by one, we found that various signs of copyright expansion have made creatures in the metaverse have to make some trade-offs and choices when applying copyright law. The fourth part puts forward the China plan of applying copyright law to metaverse products. This part emphasizes that metaverse products should meet at least two levels of originality requirements of “independence” and “creation” (Section 4.1). The object standard is analyzed from the perspective of technical characteristics, and it is posited that metaverse products are more in line with the evaluation standards of works of applied art. This part further clarifies that the concept of “model works” is extensively interpreted but the applicable standards and content regulations are restrictively interpreted (Section 4.2). Specific suggestions are made regarding the limitation of copyright law rights through “fair use”, “Benefit Weighing Strategy” and “Technical Protection Measures” (Section 4.3). The fifth part further reflects on how long current copyright law can last in the face of the continuous upgrading of emerging technologies. New technologies force humans to passively make compromises, concessions and changes in the application of the rules of the physical world. Perhaps the legal protection order constructed within the metaverse can provide opportunities for the development of copyright law.

2. Copyright Disputes in the Metaverse

2.1 The Dispute over Copyrightability Based on the Dichotomy of “Ideas and Expressions”

The copyrightability judgment method can be based on the degree of independent creation of the work, the method of reference, the boundaries of ideological expression, and the uniqueness of the expression method. The actual copyrightable issues involved in metaverse products mainly include three aspects: originality standards, dichotomy between ideas and expressions, and object type judgment.
2.1.1 Criteria for Judging the Originality of Metaverse Products

The “independence” in the originality standard refers to the independence of the creation of the work. The independence here does not mean that one person creates alone, works completed by two or more people also have independence, only those who participate in the creation can become the author. One who only organize work for others to create works and provide some consulting opinions, material conditions or perform some other auxiliary work cannot be regarded as creation.\(^1\) Therefore, when discussing whether metaverse products are original, it is necessary to clarify whether the production tools or materials provided by the metaverse shared space material library can be counted as “other auxiliary labor”? Taking the customization of the virtual anchor image of the metaverse as an example, the application system uses a three-dimensional digital model to draw, split, model and finalize the real person, and complete the creation of the virtual character in the form of a real body replica, the character is not only a cartoon image but the combination of realistic images can also complete preset instructions based on actions, sounds, clothing and other elements in the material library.\(^3\) To complete this set of character images, the creator generally needs two steps to achieve it. One is to input the real body image or actions (such as photos, 3D scan data, etc.), and the other is to “click” the mouse to use the intelligent system of the metaverse to generate automatically. These two steps are not complicated in terms of operation complexity, and are even a bit childish. From a technical point of view, the production system and material library that relies too much on metaverse scenes are more like products automatically generated by the metaverse. Therefore, is this system still considered auxiliary labor? Can metaverse products meet the originality standard?

In the author’s opinion, the intelligent system products in the metaverse have the ability to create independently, and have achieved a leap from auxiliary labor to creative labor, but the key to meeting the originality standard lies in whether people are willing to admit their “creation” creativity. The reason is: First of all, judging from the “unique” in originality, the creative material library in the Metaverse scene may be collected from the public domain, or it may come from private domain materials uploaded by users, but no matter which method of creation, the metaverse products is the product of an individual’s “independent” operation, it is not borrowed from the hands of others, nor is it divided into multiple people’s cooperation, from the perspective of the main composition and creation method, the products of the

metaverse meet the “unique” standard. Secondly, judging from the “creation” in originality, original metaverse products have less controversy over creativity standards, while derivative metaverse products have greater creative controversies, mainly focusing on the consideration of comprehensive factors such as the degree of reference and absorption of prior materials, the content of reinvention, and the concrete expression form of ideas, this is also the key to the controversial nature of the originality criterion. Finally, as discussed in the application scenario of placing the metaverse, due to its technical characteristics of mapping, virtuality and interactivity, the operation of accurately mapping physical objects in the physical world to the virtual world is equivalent to a “copying” behavior, and this behavior whether everything in the produced virtual world can still meet the “creation” standard is judged based on subjective perception, it has to be said that more and more metaverse scenes incorporate rich elements of prior matter in the public domain and meet the requirements of “creation”, whether it is determined to be a work protected by copyright law will raise another question: whether introducing prior art from the public domain into the private domain of the metaverse would risk squandering public resources and expanding private domain protection. To discuss this issue, we can first clarify whether the metaverse products conform to the “expression” form of the work, then identify the object types, and sequentially analyze the “public welfare-private rights-sharing” copyright paradigm transition under technical rationality.

2.1.2 Metaverse Products Are Formally Consistent with the Dichotomy of Thought and Expression

Following the judgment of the above-mentioned originality standard, the classic “idea-expression” dichotomy of copyright law is first introduced. The biggest difference between the creation process of metaverse products and traditional human creation focuses on the presentation form of the work. This presentation may be a visual feast, auditory impact, sensory stimulation, etc. The form of presentation is no longer a deductive expression that simply changes novels into TV series and movies, oral works into audio or audiovisual works, and graphic design drawings into physical models or model works. Everything in the metaverse world can be physical objects in the physical world or original virtual objects, the metaverse world itself is an interactive space of digital life. The expression form of the metaverse products

transcends the scope of literature, art and science, and incorporates human behavior and thought dynamics. To cite a common typical example in life – the AI anchor virtual character sold on Taobao, including not only appearance design, but also application design. Regarding application design, designers can set up AI anchors to sell goods. They only need to enter needs and behaviors into the system, and then they can “sit back and relax” and rely on the AI anchors to help designers sell goods and make money. I would like to ask, for the same AI anchor, is there any difference in “expression” between the AI anchor with application attributes and the AI anchor with appearance design? To address this issue, existing copyright theories and institutional arrangements need to start from the perspective of artistic and functional expression. Appearance design AI anchors can be easily defined as fine arts due to their unique artistic beauty. However, AI anchors with application attributes may become design patents and cannot fall under copyright law because they have both artistic and practical functions. The implication is that a simple beautiful AI anchor standing still may be a beautiful painting, but if dynamic attributes such as movement, language, style (roaring or gentle wind) are added, she will become an Internet celebrity AI anchor, and also add based on the design of the application attributes for selling goods, judging from the results, the Internet celebrity AI anchor is indeed a new expression of artistic and practical design, and even this expression eventually made it protected by patent law. Although different “expressions” will also produce different object types, it is at least clear that the products of the metaverse conform to the dichotomy between ideas and expressions in copyright law.

2.2 Arguments on Access to Rights Based on “Behaviour”

2.2.1 The “Behavioural” Factor of Rights Acquisition: Original Acquisition and Derivative Acquisition

As one of the elements in obtaining civil rights, behaviour can be divided into juristic acts, factual behaviour and quasi-juristic acts. Generally, acquisitions based on factual behaviour are original acquisitions, and acquisitions based on juristic acts and quasi-juristic acts can be original acquisitions or derivative acquisitions. In the metaverse scenario application, there is a difference between original acquisition and derivative acquisition based on “behavioural” factors. Original acquisition refers to a situation in which rights are not acquired on the basis of the rights or

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intentions of prior objects in the physical world or the rights or will of prior right-holders but the way in which the rights of metaverse products are acquired through legal provisions or factual behaviour. Original acquisition contains two scenarios: (1) There is no prior rightholder, as in the cases of construction acquisition and preemptive acquisition, in the application of metaverse scenarios. (2) There is a prior rightholder, but the right is not obtained according to his will, as in the preemption of something in the application of the metaverse scenario. Derivative acquisition refers to the acquisition of the rights of metaverse products through juristic acts according to the will of the prior rightholder. It is further divided into creation acquisition and transfer acquisition. The former refers to the creation of other rights by prior rightholders for others with regard to physical objects in the physical world (including rights arising in the metaverse world). The latter means that the prior rightholder transfers his physical objects in the physical world or virtual objects in the metaverse world to others through certain juristic acts (such as obtaining ownership through a sales contract). In short, original acquisition means that the right belongs to the rightholder from the beginning, rather than being procured from others. Derivative acquisition refers to the rights acquired by inheritance from the prior rightholder.

2.2.2 Argument on the Consequences of “Behavioural” Factors: Original Products and Derivative Products

There are two types of metaverse products: original products and derivative products. An original product refers to visual stereo imaging with the data representation of length, width and height based on 3D modelling technology that is presented in a virtual environment. Parameter settings such as structure, function, shape and colour are all created by the designer. The 3D model data of original products in the metaverse are the concrete expression of the designer’s ideological labour, and should belong to the protection scope of copyright law. Derivative products refer to the visual stereoscopic imaging generated by three-dimensional rendering, processing, transformation and other technologies based on the structure, function, shape, colour and other elements of the prior object. Whether the three-dimensional model data of metaverse derivative products can be included in the protection scope of copyright law should be determined according to the specific situation of whether the referenced prior object is in the public domain or the private domain. The greatest difference between modern society and traditional society is that in a traditional society, where materials and resources are both scarce, innovation is indeed a process of “creating something from nothing”. In contrast, in a modern society with abundant materials and advanced technology, innovation has become a process of “from having to being superior, and from being superior to being perfect”,
and the object of copyright protection generated is largely dependent on existing knowledge or prior knowledge and is a reinnovation on the achievements of others. To determine whether this kind of “reinnovation” can generate copyright, the source of rights acquisition or rights generation must first be identified.

### 2.2.3 Tenure Disputes under the “Behavioural” Model: Public Domain and Private Domain

Usually, the prior objects involved (here, the prior objects include not only physical objects but also existing ideas or knowledge) are divided into those in the private domain and the public domain. The use or exploitation of prior objects in the private domain has strict copyright boundaries, and the crossing of such boundaries constitutes infringement. Some of the prior objects in the public domain have flowed into the public domain from the private domain, and some have been freely available to all from the time of their creation, the use and reference of prior objects in the public domain are not only the source of human knowledge recreation, but they also exist within a space that must be reserved for the protection of public rights by copyright law. Under this premise, there are also strict institutional norms and specific rules in the copyright law for the private and public domains to prevent any party from amplifying overwhelming social interests. For example, originality requirements, fair use and other systems in copyright law are all institutional designs for classifying intellectual achievements into the private domain or the public domain in the process of producing, learning, imitating and recreating works. This has also become part of the basis and criteria for judging whether the act of “twinning” the prior object of the physical world in the metaverse application scenario generates copyright. To better understand the focus of copyright disagreement in the metaverse world, we now take the application scenario in the field of architecture as an example and analyse several behavioural modes of acquiring the rights of metaverse products.

**Assumption 1:** No prototype, pure originality. The three-dimensional digital architectural model designed in the metaverse application scenario is the original work of

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8 The copyright system not only specifies what type of object can become the object of protection in the private domain but also specifies what type of object cannot obtain exclusive rights in the private domain and should naturally become an object of protection in the public domain. For example, copyright law stipulates that works belonging to ideology, works that have exceeded the term of protection, and laws cannot become the object in the private domain of copyright.
the designer “from scratch”, which meets the requirements of originality and naturally falls into the object protection scope of copyright law.

**Assumption 2:** There is a prototype, and it is public. If the 3D digital architectural model designed in the metaverse application scenario is based on a famous ancient building (prior object) and the architectural plan has already been made public, then the digital model is only converted from physical three-dimensional to digital three-dimensional, and it is a copy of an ancient building and not novel, so it cannot be protected by copyright law.

**Assumption 3:** There is a prototype that has been published, the term of copyright protection is over, and there is innovation. Taking a famous ancient building as the prototype, the ancient building design plan has been published and entered the public domain. It is only under the premise of exceeding the term that the metaverse architectural model designed by the designer can be protected by copyright law, and that is the case only when the unique design and expression are added.

Among the above three categories of rights acquisition behaviours, the first two cases are easier to apply to the copyright system, which involves the judgement and application of existing rules. The last assumption is much more complicated. The difficulty lies in using prior objects that have flowed into the public domain as reference prototypes. To what extent should the added “creation” element be able to generate new copyrights? Should the benefits of the creation of the new copyright be distributed to the prior rightsholders of the prior objects? Can the post-rightholder assert the exclusive right to prohibit others from using the “equivalent” technology and at the same time have the right to use it and licence others to use it? This series of problems is not a special difficulty in the application scenario of the metaverse, but is also a difficult problem to solve in the existing system design of copyright such as “originality standards”, “object classification” and “distribution of public interests and private interests”. The following will provide universal application suggestions based on system debugging based on analogies to overseas experience and China’s national conditions.

### 2.3. Disputes over Object Identification Based on “Standards”

Article 3 of China’s “Copyright Law” lists 9 types of “works”, which consist of three elements: A is the expression of thoughts or feelings; B is originality; and C is the form of expression that conforms to the work. Based on this, the abovementioned original

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products and “secondary creation” derivatives of metaverse products basically meet requirements A and C, and as long as they meet the requirements of requirement B – “original”, they can become objects protected by copyright law. In this regard, it is necessary to identify the types of works by screening out metaverse products that meet the object standards of copyright law. Still taking the three-dimensional digital building model in the metaverse city application scenario as a model for discussion, whether it is ultimately applied in literature, art or science, it is necessary to choose one of the types of “works of applied art” or “works of applied architecture” or “model works of applied architecture” to become the object of copyright protection; however, the final determination of the object type has not yet been finalized. 11 Thus far, the problem of the typification of works inevitably leads to a more thorny problem, that is, in the definition of object types for metaverse products, how to distinguish the appearance design between works of applied art and industrial products, and how to distinguish works of applied art and fine art, confusing concepts between copyright and industrial property rights?

For works of applied art and industrial design, this debate over concepts existed as early as one or two hundred years ago. Countries such as Iceland12 and Austria,13 which advocate “substitution theory”, equate works of applied art with industrial design, arguing that the two are indistinguishable and can be substituted for each other. Countries that advocate “parallel theory” clearly treat the two differently. For example, the United States, the Netherlands, Malta, Tunisia, and Kenya clearly state that copyright law protects “works of applied art” and that patent law protects “industrial design”. “Juxtaposition theory” denies that the two “overlap”; however, it does not explain the “overlapping” contradiction between the two. Instead, it regards industrial design as a part of works of applied art simply because works of applied art can be mass-produced product designs, handmade products or designs used for

11 China’s “Provisions on the Implementation of International Copyright Treaties” (1992) clearly gives copyright protection to foreign-related works of applied art, and there is no clear answer as to whether copyright is granted to works by domestic authors. However, it should not be assumed that Chinese copyright law does not explicitly protect works of applied art such that works of applied art created by foreigners are copied and used in the metaverse products trade for export. This is bound to infringe the copyright or design right of the country in foreign countries. The copyright law of 2001 is “internal and external”; that is, the domestic author of the works of applied art is also given the same protection as foreign authors, but the boundaries and recognition of works of applied art are not involved.
12 Article 10 of Iceland’s Copyright Act 2006 provides that 'Patterns and designs shall be protected as applied art, provided they fulfil the conditions of utility and artistic characteristics'.
13 Article 3(1) of the Austrian Copyright Act of 1989 combines industrial designs and works of applied art, collectively referred to as “industrial works of art”.
decoration in the form of handmade products. On the other hand, industrial design can be determined as long as it conforms to “mass production” or “handmade products”.

For works of applied art and works of fine art, countries that advocate “substitution theory”\(^\text{14}\) believe there is no essential difference between the two and include works of applied art as works of fine art under copyright law for protection. The United States\(^\text{15}\) and the World Intellectual Property Organization (WIPO),\(^\text{16}\) which advocate “side-in-the-class”, believe that the two are different: works of fine art are artworks that are only for “appreciation”. In addition to aesthetic design for the purpose of “appreciation”, works of applied art also require actual creation and use and have “utility” value.

In addition to clarifying the concept that copyright and industrial property rights are easy to confuse, the argument behind it is also needed because the concept of “works of applied art” is not clear in the history of the copyright protection object and has long been subject to judicial practice and theoretical abandonment. The “Berne Convention for the Protection of Literary and Artistic Works” (1886) (hereinafter referred to as the Berne Convention) did not list works of applied art as protected objects. This issue was not revised until 1908 in Article 2 of the Berne Convention, which expanded the type of object protection as follows: “each member state can be protected in accordance with national legislation and protect works of applied art”. In other words, works of applied art were not the “must protect” objects of various member states at that time but, rather, “protected” objects. It was not until 1948 that the Berne Convention was listed as the target of Convention Protection. It stipulated that countries can protect works of applied art as general art (wide range) and only the industrial design portion of works of applied art (narrow range). This explains why the process of “abandonment” generated by the concept of applied art is so time-consuming. It is conceivable that the difficulty of dividing the boundary or disadvantage of the concept of the side is also increased. In addition, metaverse products have posed a challenge to the proposition of disputes in a new state of appearance, which can be described as “more difficult”.

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14 Hungary’s Copyright Act 1994, ss 46, 51.
15 The U.S. Supreme Court drew the line between works of applied art and artworks in the “Mazer v. Stein” case. This case held that only works of art that are created for practical use or have been successfully created and actually put into use are considered to be works of applied art. See Mazer v. Stein [1954] 347 US 201.
3 The Expansion of Copyright Theory in the Metaverse

3.1. The “Source of Communication” Theory Gradually Unravels the Source of Interactive Behavior Acquisition

The rights acquisition of metaverse products mentioned above is divided into original acquisition and derivative acquisition due to the “behavior” element. There is not much controversy about the acquisition of rights in the original acquisition behavioral model, and there is no need to explain it in detail. This article is intended to explain the copyright theoretical disputes that may be involved in the protection of copyright law by metaverse products under the derivative acquisition behavior model.

Most of the contents of the metaverse products obtained through derivative come from the reference and inspiration of prior objects, in addition, the integrated media environment of the metaverse can confuse the infringement determination of derivative acquisition behaviors through “deep linking” behavior. As a result, the “source of communication” theory in the sense of copyright law qualitatively explains the “initial act of making the work available” of information network communication rights. Article 8 of the World Intellectual Property Organization Copyright Treaty (“Treaty”), “right of making available”, only regulates the requirement of “initial communication”, and states in the “Treaty” that “initial act” is not the act of simply providing server space, communication connections, or facilitating the transmission of signals or routers. Article 23, paragraph 1, of Japan’s Copyright Law reveals the relationship between the “initial act” and the “source of transmission.” “The author shall have the exclusive right to publicly transmit his work, and his work shall be automatically transmitted publicly (interactively mode transmission) state, it is in a state that can be transmitted.” The above provisions are similar to the content of the information network communication right in China’s Copyright Law, and their function is to control interactive communication behavior. It can be seen that interactive communication behavior must objectively form a “communication source” before it can become a sub-right of the information network communication right, and the identification standards tend to be loosened.

18 WIPO Doc, CRNR/DC/5, Basic Proposal for the Substantive Provisions of the Treaty on Certain Questions Concerning the Protection of Literary and Artistic Works to be Considered by the Diplomatic Conference, para. 10.10.
Then, projecting this theory into the metaverse scene, the “initial behavior” may affect the legal status of derivative metaverse products. Generally, in the interconnected space of the metaverse, the act of derivative may make the prior works in the metaverse available to the public again. At this time, the act of derivative does not fall into the derivative behavior regulated by the right of information network dissemination. The result of the identification of this act is that the act of derivative can only be used once like the act of publication. That is, the public state of the metaverse creation is irreversible and can only be publicly published once by the prior rightholder. Obviously, this conclusion goes against common sense. And it is contrary to the market operation rules and value orientation of copyright. Therefore, from the evolution of the “propagation source” theory’s criteria for identifying derivative behaviors, we know that the derivative behavior in the metaverse scene will involve propagation behavior, so that the “propagation source” of the metaverse derivatives can be communicated to the public. However, the interactive communication behavior of integrated media in the metaverse scene should be based on the identification standard of “wide entry and strict exit” to stimulate the re-innovation of derivative behavior, and use loose communication behavior standards to lower the communication threshold of metaverse derivative products, and then pass tightened creativity standards enhance innovation capabilities.

3.2. Behavior Restriction Theory from “Monism” to “Pluralism”

The original products and derivative products of metaverse products have similar appearance of rights and interests. The intangibility of digital objects and their rights attributes meet the requirements for copyright object protection. The difference is that the former is an original intellectual achievement, while the latter is a re-innovated deep-processing product. The “deep processing” means a deeper transformation of the original product through specific technical reproduction methods. Deep processing also includes the results produced by intellectual and technical (algorithm) input that meet the originality requirements or investment requirements in copyright law. Further speaking, the Metaverse derivative products themselves can be roughly divided into Metaverse derivative resources, Metaverse derivative products and Metaverse derivative assets according to the degree of processing. The connotative attributes of the three are progressive in sequence, and their extension scope is getting wider and wider. It can be seen that after deeply processed Metaverse derivatives are more or less original in terms of private law, especially the copyright dimension. However, the processing metaverse derivative

products will inevitably cause varying degrees of infringement on the vested interests of prior rightsholders due to “copying” behavior or unauthorized “fair use” situations.20 The “lawful source defense” stipulated in Article 59, paragraph 1, of China’s Copyright Law also confirms this view.21

Regarding copying, when the right holder of the derivative products of the metaverse can prove that the derivative products have legal sources (purchased from legal operators through formal channels) and are not at fault (they did not know that the relevant derivative products were infringing copies), Although its issuance constitutes direct infringement, it is not liable for compensation for losses.

Regarding fair use, the rights holder of metaverse derivatives should meet the specific circumstances that constitute fair use listed in China’s Copyright Law and Regulations on the Protection of Information Network Communication Rights. In essence, metaverse derivatives have no rights over the original products. The reasonable prerequisites for processing and transformation are: first, the original product has been made public (published); second, it must be properly cited. In this regard, Article 10, paragraph 1, of the Berne Convention stipulates: “Quotations from works that have been lawfully made public are allowed, provided that such quotations comply with fair practices and do not exceed the scope of what is legitimately necessary to achieve the purpose.”

The evolution from “the four factors”22 of original “US Copyright Law” to “transformative use” theory23 and then to the “three-step test”24 of the Berne

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21 Article 59(1) of Copyright Law of the People’s Republic of China provides that ‘Where a publisher or producer of copies fails to prove that its publication or production is legally authorized, or a distributor of reproductions or a lessor of copies of an audiovisual work, computer software, sound recording or video recording fails to prove the legal source of the copies for distribution or lease, it shall bear legal liability’.
22 United States Copyright Act 1976, s 107. In 1841, Justice Story summarized the “multifactor approach” to judging fair use in the Folsom v. Marsh case, which was incorporated into Article 107 of the 1976 U.S. Copyright Act. It has since evolved into the “four-factor” standard for judging fair use in the United States. See Folsom v. Marsh. [1841] 9 F. Cas. 342.
23 In 1994, Judge Leval first proposed “transformative use”, which refers to the use of a work not simply to reproduce the literary or artistic value of the original work or to achieve its intrinsic function or purpose, but to change its original function or purpose by adding new aesthetic content, perspectives, ideas, or by other means that give new value, function, or nature to the original work in the process of being used. See Campbell v. Acuff-Rose Campbell v. Acuff-Rose Music, Inc. [1994] 510 U.S. 569.
24 Article 9(2) of the Berne Convention provides that ‘It shall be a matter for legislation in the countries of the Union to permit the reproduction of such works in certain special cases, provided that such reproduction does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author’.
Convention suggests that the standard for determining fair use has experienced an expansion from “monism” to “pluralism”. This expansion is mainly manifested in the metaverse: first, the “first element” (the purpose and character of the use) in “the four factors” is highly compatible with the applicable standard of “transformative use” theory, such that the metaverse products of the constituent elements of these two theories are subject to multidimensional standard scrutiny. In the metaverse world, if the original work is used or processed for a second time, resulting in the addition of new expressions, new meanings or new functions of the metaverse product, then the metaverse derivative product should be considered a fair use behaviour that changes the purpose or method of using the original work. However, the standard of “transformative use” of “content” and “purpose or function” in metaverse derivative products needs to be disproved in specific cases. Second, when the three-step test method verifies whether the metaverse products are fair use, there is a possibility that the “right of reproduction” will be extensively interpreted as “different-dimensional copying”. Article 13 of the “TRIPS” concluded by the World Trade Organization (WTO) in 1994, which is consistent with Article 9, paragraph 2, of the Berne Convention “Three-Step Test”, stipulates that WIPO shall. In the field of emerging technologies, Article 10 (1) of the World Intellectual Property Organization Copyright Treaty (WCT) (1996) and Article 10 of the WIPO Performances and Phonograms Treaty (WPPT) 16 and other international treaties are still the test methods for the limitation of rights that the member states of the convention are willing to recognize and abide by. In the process of the technical inspection and rebuttal of the metaverse, the specific inspection steps are as follows: Step 1, whether the behaviour of the prior object in the “twin” physical world of the metaverse product conforms to the fair use conditions listed in the Copyright Law of the member states of the Convention; Step 2, the behaviour of the digital “twin” must not affect the normal use of the original work (or the prior object in the physical world), for example, when using 3D scanning equipment to “reproduce” the data of a certain artwork that is being displayed or displayed in the physical world, if the equipment is too large or other factors hinder the exhibition or display effect, which should be regarded as affecting the normal use of the original work; Step 3, the “twin’s” behaviour in the metaverse shall not exceed a reasonable limit to damage the legitimate interests of the copyright owner, that is, the “twinning” behaviour or the competitive relationship formed between the metaverse product and the original work, or the resulting market substitution effect, etc., are all “unfair” uses that damage the legitimate interests of the copyright owner.

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27 Article 13 of Agreement on Trade-Related Aspects of Intellectual Property Rights 1994 provides that ‘Members shall confine limitations or exceptions to exclusive rights to certain special cases which do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the right holder’.
3.3. The Game of Interests Between “Public Domain” and “Private Rights”

Metaverse products have had a huge impact on the theoretical expansion of copyright, and the creation, use, and dissemination of “works” in the metaverse are fundamentally different from how traditional works have been generated. It can even be said that the integration of works in the metaverse has had a subversive impact; in particular, there is a trend of expanding the scope of copyright protection, the content of rights and the term of protection. In particular, the private copyright (exclusive rights) formed by the “conversion use” or “recreation” of prior objects by derivative products in the metaverse constantly erodes the public interests of public rights (public domain), resulting in the problem of the separation of rights allocation and the imbalance of interests among stakeholders becoming increasingly serious. That is, the private rights of the exclusive rights of the metaverse and the copyright of metaverse products are overly protected while the collective interests of creative commons in the public domain are ignored. In this regard, it is necessary to analyse the origin of the public domain in copyright theory and to review the game demonstration of the protection of the public domain copyright by digital technology from a global perspective. Tracing the legal source of the historical development of the public domain, the theoretical system of public property in the ancient Roman Empire pointed out, “The things that people depend on for their lives, such as sunlight, water, air, etc., are shared by all, and it is strictly forbidden to use such public property as one’s own private property”. The Statute of Anne promulgated in 1710 stipulates, “Works that have passed the protection period can be freely used by the public”, which is the real legal source of the public domain of copyright, that laid the foundation for the theory of copyright in the public domain. As the famous scholar Litman said, “Establishing a public domain system is the public price of copyright.”

In judicial practice, the use of public domain works is determined on a case-by-case basis. For example, in the International News Service case, the court held that “the facts belong to the public and can be freely obtained and used by anyone.” In the “Bill Graham Archives case”, the court held that “the copyright owner’s use method does not rule out the possibility of affecting the market of the original work, but it should be recognized that the value of public interest in this case is higher than the value of the author’s interests.” In the case of “Monge v. Maya Magazines”, the court pointed out that the secondary use should have a purpose different from the original work and

30 See Bill Graham Archives v. Dorling Kindersley Ltd., 448 F. 3d, 614–615 (2d Cir. 2006).
be conducive to the realization of the public interest. Chinese scholars also have taken different positions and perspectives on the protection of works in the public domain. Some scholars maintain that the public domain belongs to the natural domain, and laws and regulations should not interfere with “mandatory” colours. Some scholars have proposed that although the public can freely apply the content of the work in the public domain, it must be limited to the scope of “fair use”, and application beyond this scope constitutes infringement of the copyright owner. It can be seen that although the public domain theory has a history of hundreds of years, there is still no unified consensus among domestic and foreign academic circles.

The game of interests between the “public domain” and “private rights” mapped to the metaverse is mainly reflected in the nonretrospectability of the public domain, which causes metaverse products to obtain strong “path dependence”, as indicated in the statement that “Copyright is the son of technology from the beginning”. The metaverse is a “rising star” of emerging technology. However, the dissemination and use of metaverse products in the public domain cannot be presumed to be “what remains after excluding all copyright protection methods”, which belongs to the shared knowledge in the public domain. Once set, the users and disseminators of metaverse products will fall under the protection of “nothingness” without boundaries, and copyright owners will lose the work rights of metaverse products. The nonretrospectability of this kind of interest circulation is a unique manifestation of the copyright public domain because the free use of the public in the public domain generates a “trust interest” that will evolve into a “path dependence”. If metaverse products in the public domain transcend the “tolerance limit of social generalization” and return to the exclusive domain, then this

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31 See Monge v. Maya Magazines, Inc., 688 F. 3d 1164, 1174 (9th Cir. 2012).
37 The concept of “tolerance limits of social generalization” is derived from the restriction of privacy in the law of personality, which refers to the interference caused by the pursuer’s pursuing behaviour to the pursued person without rationalization, and it exceeds the psychological level acceptable to the public. In the metaverse scenario, AI technology, algorithmic control, digital twinning, virtual reality and other technologies will break through the interference with physical objects (including people) in the physical world, and the degree of interference can be compared to the tolerance limit to determine whether it is accepted by the public. See Wang Zejian. 2013. Personality right law. Beijing: Peking University Press.
will damage the “trust interests” of the public and lead to the emergence of “public rights” and “private rights” in copyright of the imbalance.

In this regard, German copyright law adopts a compromise attitude between public interests and private rights, that is, any behavior that does not constitute a substantial “free use” of public domain knowledge content is defined as another defense for infringement, the “free use” here and “fair use” are not the same concept, the former is to control the act of re-transformation away from the original products of the metaverse, while the latter is an exception to the limits and extent of “reference” to the original products of the metaverse derivatives. In judicial practice, the transformative use function of the public domain (content transformation and purpose transformation) provides a basis for judgment. As the German court pointed out in the “Mattscheibe case”, “the reference or imitation of the original content must achieve the purpose of ridicule and the new work must be recognizable to the public and have sufficient internal distance compared to the original work.” The implication is that public interests in the public domain need to be maintained, but private rights obtained by reshaping public domain knowledge are encouraged, this is also the legal response of the copyright system under the weighing of the pros and cons of the market and value to promote and inspire “potential market or value” for the purpose of innovation. Of course, there are exceptions. For example, the United States, a member state of the Berne Convention, after joining the Convention, will re-enter the exclusive copyright domain for works that have entered the public domain according to the protection period stipulated in the Convention, this is an example of a public domain work falling back into the proprietary domain under special circumstances.

As shown above, the “waiver space” of the copyright system has become a focus of debate over the encroachment of private rights on the public domain. Emerging digital technologies affect creative commons under the copyright system. When transformational use is not enough to justify the mixed behaviour of the user’s creation of a work as a noninfringing act, the “waiver space” and the waiver system emerge as the

41 Lawrence Lessig pioneered the theory of creative commons, which holds that each organization or individual contributes efforts that publicly renounce some of its property rights as a way to increase the amount of information freely available to some users. See Lawrence Lessig. 2005. “CC in Review: Lawrence Lessig on Supporting the Commons” Creative Commons. https://creativecommons.org/2005/10/06/ccinreviewlawrencelessigonsupportingthecommons/ (accessed October 27, 2023).

This gives rise to various Creative Commons licences, which are seen as a menu of opt-out options from which the creators themselves can choose. See Michael J. Madison, et al. 2010. “Constructing Commons in the Cultural Environment.” Cornell Law Review (4): 657–709.
times require. That said, is the “waiver space” and its institutional arrangement tending to protect the rightholder or others? How much space does the rightholder give up? In addition to the creative blow of creative commons, these propositions have actually exceeded the test of the copyright system of metaverse products but present a challenge to the human and natural laws surrounding the proposition of “waiving the Small (personal interest or individual interest) and saving the Big (public interest or national interest)”. Those who insist on creative commons are not a minority.42 The author also firmly believes that the interests of a few people must obtain more vested benefits on the premise that most people’s interests are guaranteed. However, the copyright system should indeed be combined with the characteristics of digital technology to leave room for creative commons, to reduce the waiving cost of copyright, to reasonably arrange the waiving mechanism and rules of creative commons in the copyright system under the premise of fully understanding the influence and change in the copyright market structure of metaverse products and to make up for the losses of rightholders or the waiving right by using compensation systems according to the classification of market and nonmarket in the application scenario of the metaverse. The new types of sharing method and waiving rules will no longer be “demon devils” that destroy the rationality of traditional copyright but a “balanced autonomy” eliminating the theory of threat or challenge that digital technology poses for copyright in the legal context of understanding waiver space and its mechanisms.

4. China’s Plan for Applying Copyright Law to Metaverse Products

4.1 Recognition of Originality Standard

As an essential element of the copyrightability of metaverse products, the originality standard has its own ambiguity and uncertainty.43 Under the influence of aristocratic traditional elitist values, European countries have higher requirements for the originality standard of works.44 With the development of industrialization, countries

42 Feng Xiaoqing believes that a balance should be struck between private and public rights, individual and collective, and private interests and the public good, and such a balance does require that the public domain in intellectual property law reserve sufficient space for the enjoyment and exercise of exclusive rights. Of course, the scope of creative commons is not unlimited and unrestricted. See Feng Xiaoqing. 2019. “Research on the Balance Mechanism Between Intellectual Property Rights and the Public Domain.” Journal of Political Science and Law (3): 55–71.

such as Germany and France gradually lowered their originality standards.\textsuperscript{45} By contrast, the United States, the United Kingdom and other countries followed the utilitarianist philosophy and the view of “common genius”,\textsuperscript{46} held a lower standard for determining the originality of works, and then evolved the British standard of “labour, skill or judgement”\textsuperscript{47} and the American standard of the “sweat-of-the-brow doctrine”.\textsuperscript{48} Moreover, in the Feist case, the United States abandoned the sweat-of-the-brow doctrine and instead adopted the “minimum creation” standard.\textsuperscript{49} Due to the differences in standards for determining the originality of works in different systems and different countries and regions, such differences are difficult to reconcile. Therefore, international copyright-related treaties do not clearly stipulate definitions of originality.\textsuperscript{50} Moreover, the EU region did not attempt to harmonize the originality standard when drafting the database directive or the information society directive.\textsuperscript{51} Chinese originality theories and systems not only discuss the existence of originality, but they also address the level of originality when judging metaverse products.\textsuperscript{52}

This paper proposes that the originality of metaverse products in copyright law should at least meet the requirements of “independence” and “creation”. From the standpoint of “independence”, copyright law does not protect the results of the repeated reproduction of other people’s works. In other words, metaverse products must be the creation of the rightholder rather than the results of plagiarism and the reproduction of other people’s prior products. For example, NFT (nonfungible token, NFT for short) works of fine art in the metaverse reproduce the famous paintings of Van Gogh, Monet and other famous artists in the physical world. If an NFT only


\textsuperscript{45} For example, the German Kleine Münze theory and the French Petite Monnaie theory include less original creations such as telephone number sequencing and menu compilations in the protection of copyright law.


reproduces a famous painting in digital form, even if a certain amount of labour and money is invested, it will not produce substantial changes and become an independent intellectual achievement. It is only a “copy”. This is determined by copyright law for the purpose of promoting the development of cultural sciences and encouraging substantial innovation. It is also a natural choice based on the fact that such acts will damage the market share of the original works of the prior rightsholders and constitute unfair competition. From the point of view of “creation”, copyright law focuses on the presence or absence of creativity, rather than the level of creativity, and aims to highlight that metaverse products must contain the creator’s minimum intellectual creation. Just as the scrawls of a three- or four-year-old child can become a work in the sense of copyright law as long as it has a certain degree of creativity, it is necessary to combine the author’s creative intention, personal expression, emotional colour, and the reader’s feeling of inspection to determine whether metaverse products meet the constitutive elements of intellectual creation and thus be protected by copyright. Therefore, the legal requirement for originality is low, as long as it is sufficient to establish that the work originated from the subject.

4.2 Demarcation of Object Standard

4.2.1 Object Standard Definition

From the perspective of technical characteristics, metaverse products are more in line with the criteria for judging works of applied art. If the visualization product of a metaverse product is listed as the object of copyright protection as a work of applied art, it is an applied “artwork” rather than an “applied” artworks that is protected. There is no obvious difference between the applied “artwork” and general works of fine art in the identification of the object of protection. When an infringement lawsuit occurs, the copyright owner of a metaverse product must prove that the defendant has copied the aesthetically pleasing “art” shape, which can exist independently of the “applied” function in works of applied art; only in this case can infringement be confirmed. If a metaverse product is included in the object of copyright protection as a craftwork (a type of fine art work), it will be protected by copyright law like a work of fine art, not a “craft”.

4.2.2 Classification of Object Types

Further clarify the scope of protection objects of China’s copyright law, it is necessary to adopt an extensive interpretation of the concept of “model work” but employ a restrictive interpretation of the applicable standards and content regulations. This is because the types of digital architectural models in the metaverse are often not precisely located in the application of copyright law; of course, the issue of the application of copyright objects is not only a problem of legal containment in the metaverse but also a “common problem” arising from many digital technologies under emerging technologies. Taking a famous ancient building as the prototype to derive an original metaverse architectural model as an example, does it belong to a work of fine art, a photographic work, an architectural work or a model work? On this issue, let us first consider the experience and practices of different countries and international organizations. At first, many countries did not consider including the shape of a building as the object of copyright protection, and there is no object type of “architectural work”. It was not until the Berne Convention included “architectural works” in the types of works that various countries began to follow suit, as in the case of the American “Architectural Works Copyright Protection Act” (1990) and the British “Copyright, Designs and Patents Act” (1988), Article 4. At that time, WIPO interpreted “architectural works” as including both architectural models and the buildings themselves. Chinese Copyright Law did not initially include architectural works as the object of copyright protection but “protected the buildings themselves as works of fine art”. It was not until 2001 that architectural works were separated from the extensive interpretation of “works of fine art” and became independent copyright subject matter. “Model work” is not an enlarged or reduced representation of the shape and structure of a certain prior object but a new three-dimensional model that is exaggeratedly processed and extensively modified and is different from the prior object. “Photographic works” refers to “art works that record the image of an objective object on a photosensitive material or other medium by means of instruments”, in which “art work” does not include simply re-engraving or


recording existing buildings through 3D scanners; otherwise, the term violates the legal principle of the type of object of copyright law and makes it difficult to distinguish the essential difference between works of fine art and photographic works. To address this issue, it is necessary to question the degree of connection between a metaverse product and the original famous ancient building. Professor Wang Qian, a Chinese scholar, once proposed the “pretest method of presumed three-dimensional objects” to distinguish the “image” and “figure” of a prior object. This method actually denies “different-dimensional copying” and considers that the transformation of the form or dimension of the predecessor from a “two-dimensional plane” to a “three-dimensional solid” or from a “three-dimensional solid” to a “two-dimensional plane” is not a basis for identifying “copying” conduct, which should be judged on the basis of the relationship between the “image” and the “figure” of the prior object. Based on this, it can be affirmed that the “image” of ancient buildings “twinned” in metaverse products has not actually changed, so “photographic works” are excluded from the object type. Designers have added many aesthetic techniques and beautification techniques to the “modelling” of ancient buildings, adding new artistic beauty to ancient buildings, which may also be displayed in galleries and museums as “works of fine art”. In addition, if the metaverse product is a reconstruction design plan of an ancient building in the physical world, it can be regarded as an “architectural work”, and if it is a model demonstration of the reconstruction of an ancient building or a simulation of a physical model, it can be included in copyright law objects as “model work”.

Based on the above analysis, it is controversial whether model works under copyright law can cover model works displayed by metaverse products. After all, when interpreting “model work”, various countries and regions described forms using words such as “shape” and “structure”, which only describe appearance. A three-dimensional digital model in the metaverse exists more to show the internal structure, details and operation mechanism of the object; such a three-dimensional digital model that shows internal characteristics and a model work that shows only a surface appearance seem similar in the copyright law; however, they are not completely equivalent. Therefore, it is suggested that, drawing on the provisions of Article 2, Paragraph 1 of the Berne Convention on “scientific models”, for the “model works” stipulated in Article 3 of China’s Copyright Law, “extensive interpretation” can be considered to cover the metaverse. Three-dimensional digital

58 Article 2(1) of the Berne Convention provides that ‘… illustrations, maps, plans, sketches and three-dimensional works relative to geography, topography, architecture or science’. Such models often have practical functions and will transform physical objects, so that they can be creatively protected by copyright law.
models, especially the interpretation of the concept of “model works” in the “Copyright Law Implementation Regulations”: “Model works refer to three-dimensional works made to a certain proportion based on the shape and structure of the object for the purpose of display, experiment or observation.” The “three-dimensional works” here include but are not limited to the object types of three-dimensional digital models in the metaverse. Here, it is necessary to adopt a teleologically restrictive interpretation in the identification standards, applicable criteria and rights content of digital models. Digital three-dimensional models of the metaverse that are enlarged, reduced, or made to the same scale as real objects must not be included, and “replicas” in the metaverse must be strictly excluded through purposeful restriction.\(^{59}\) Because the “twinning” act of a metaverse product to a prior object in the physical world may harm the interests of the prior rightsholder. Therefore, stricter requirements should be put forwards in terms of “originality”, “different-dimensional copying” and “technological protection measures”.

### 4.3 Restriction of Rights

To solve problems of the blurring of rights boundaries or object types, there is a path that can be tried. First, a reasonable interpretation can be applied for “catch-all provisions” or “elastic clauses” to ensure that the new objects generated in the metaverse application scenario will not be restricted due to the situation of their being “not expressly stipulated by the law”. Second, on the basis of current copyright law, judicial personnel or reviewers should complete the identification and classification of metaverse products; attention must be paid so that in this process, the occurrence of “judge-making laws” and “creative interpretation” are avoided, and judges are not allowed to create new rights objects or rights content. Third, the method of “analogical application” should be used to verify whether a certain metaverse “object” can be invoked in the general legal norms of copyright law to draw an unbiased conclusion of opinio juris. However, the above method is only a theoretical conception of the application of copyright law to new technologies, and more specific problems will be encountered in specific situations and cases. This article proposes suggestions for reference from three specific problems of copyright law rights limitations, specifically, “fair use”, “different-dimensional copying” and “technological protection measures”.

4.3.1 Rules of Fair Use

Set open fair use rules instead of imposing strict restrictions. A metaverse product formed by the comprehensive use of digital modelling; simulation; machine learning and intelligent control and other multiprogram, multitechnology and multimethods is not fair use if it is only simple picture reproduction. If the purpose and character of the use are changed, and new expressions, new meanings or new functions are added, even if it appears to be “copying and use” in form, it can actually be regarded as fair use rather than infringement. Considering the copyright laws of various countries, the common practice in most countries and regions is to add catch-all provisions on the basis of the old law.60 For example, Article 24 of China’s Copyright Law enumerates the last article of fair use, which is “other circumstances prescribed by laws and administrative regulations”. On the surface, catch-all setting regarding the fair use of “other circumstances” seems to have some elasticity and openness to apply,61 however, it is in fact a stricter additional restriction on digital technology. This is because the metaverse often needs to use works that actually exist in the physical world. Even if the use behaviour fully complies with the specific types of statutory exemptions for fair use listed in Article 24 of China’s Copyright Law, it must be subject to the verification and standard review of the first step of the three-step inspection method, “certain special circumstances”. Such a provision actually results in a further “closing” rather than an “opening” of the fair use system,62 and it is even less conducive to breaking through the boundaries of digital technology innovation and development.

It is therefore recommended that, first, the most urgent task is to obtain general terms of fair use by “holistic analogy” to verify the initial and subsequent loopholes brought by new technologies to build elastic and open fair use rules. Second, set up more inclusive “tolerated use”63 and expanded implied licensing rules64 to leave enough room for rights holders to make concessions in creative sharing. Third, regarding the structure of interest distribution between prior rightsholders, disseminators, and users of metaverse products,65 on the one hand, interest distribution

60 Op. cit. 44.
designers should consider retaining the absolute dominance of copyright property rights for intellectual achievements. On the other hand, prior right holders can moderately delegate non-property rights (value in aesthetic or practical sense) to the public. In this way, “chilled innovation” will not be caused by the exclusive rights of copyright. Besides, the “copying use” mentioned in the second step of the three-step test will raise new questions in the metaverse application scenario: is ““different-dimensional copying” “copying”? With this question in mind, it is necessary to advance the following discussion.

4.3.2 Judgement of Different-Dimensional Copying

The behaviour of the metaverse application scenario “twinning” the physical-world prior object belongs to different-dimensional copying, and different-dimensional copying is included in the reproduction right. In the metaverse application scenario, the “copy” of the physical world’s prior object is a necessary process for the reasoning and simulation of the entire technical solution. It is also an important criterion for judging whether metaverse products can become copyright objects; if it is forbidden to “copy” anything in the physical world, it is equivalent to restricting the progress of technology and the sharing of knowledge. This is not the legislators’ original intention for design copyright, nor is it a situation that technology developers and market openers are willing to see; therefore, the different-dimensional transformation of the three-dimensional digital model involved in the metaverse product from a two-dimensional plane to a three-dimensional model, and from a three-dimensional object to a three-dimensional model, cannot avoid the topics of different-dimensional copying and copy infringement. Objectively, the conversion data source of 3D objects to 3D models that frequently appear in metaverse products are often the surface data of the prior objects captured by 3D scanning equipment, which is unable to obtain the exact data on the internal structure of the prior objects.66 Designers create secondary creations by “creatively” adding and modifying the internal structure, scene, colour, shape, etc., of prior objects to generate 3D digital visualization with more practical functions and better expression. This leads us to realize that “different-dimensional copying” in the metaverse is not a copy-and-paste behaviour in the traditional sense as we understand it, but a composite behaviour that combines “copying” and “creation” into one.

It is therefore recommended that, in the metaverse application scenario, if the “twin copying”\(^{67}\) of the physical-world prior object involves the appearance of the existing copyrighted prior object, the “twinning” behaviour without permission constitutes an infringement of the reproduction right. In addition, even if the metaverse product depicted by the model or graphic is not the appearance of an industrial product or a work of fine art, if it is a three-dimensional digital model manufactured according to two-dimensional product design drawings, engineering design drawings, etc., it should also belong to the scope of different-dimensional copying. The inclusion of different-dimensional copying into the reproduction right limits the designer’s “source of inspiration” to a certain extent, but it is a realistic demand for the development of the cultural industry.\(^{68}\) It is a kind of replication behaviour that aims to stimulate the designer’s innovative vitality, expand the control scope of the reproduction right, and enable it to cover different dimensions and different spaces involved in the application scenarios of the metaverse. It is necessary to carefully distinguish the composite behaviour combining “different-dimensional copying” and “manufacturing” into one.

4.3.3 The Trade-off Strategy Between “Public Domain” and “Private Rights”

Regarding the game of interest competition in “public domain” and “private rights”, the competitive equilibrium theory of the famous British economist Joan G. Robinson can be introduced as a preliminary guide. Regarding the research on the reaction of monopoly profits on the number of companies producing a given product, she believes that changes in the number of companies will change the demand and cost curves of the companies. This law and economics theory can be used to examine the number of users in the metaverse scenario and the impact of its innovative products on monopoly innovation in the public domain, and provide theoretical support for making next-step recommendations.

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\(^{67}\) A two or three-dimensional object from the physical world is reproduced into a digital display screen by a 3D scanner and other device, and all trajectories, laws and phenomena associated with them are simulated and emulated. The act of reproduction may be the conversion of the physical world to the digital world in various dimensions (including “dimension-increase copying” and “dimension-reduction copying”).

\(^{68}\) It has not been clarified and explained in the current law that different-dimensional copying infringes on reproduction rights. Different-dimensional copying is an inescapable issue of legal application in metaverse products. If different-dimensional copying is excluded from the regulation of intellectual property law or copyright law, then it will greatly frustrate the enthusiasm of the rightholder’s creation and generate an extralegal place for the market to make unfair commercial profits.
Assume that AC and MC are the average cost curve and marginal cost curve of products created by Metaverse users respectively, AR is the demand curve for the public domain, MR is the marginal revenue curve, and OM is the output of products produced when the Metaverse users is alone in an equilibrium state, MH is the average cost of output OM, and MP is the price of the metaverse products. In Figure 1, users are obtaining excess returns from the products of the Metaverse. However, although the user is said to be in a state of equilibrium, the metaverse scene to which he belongs is not. The rate of return on innovation in the Metaverse scenario is represented by the area FPHG. In Figure 2, users are obtaining the innovative benefits of normal metaverse products. H and P in the figure coincide (average cost equals price), and the area FPHG disappears. The dual conditions of equilibrium are achieved when the demand curve is tangent to the average cost curve.69

Based on the above analysis, under conditions of perfect competition, the average cost curve must have a lowest point, that is, in the Metaverse scenario, once the output of products (privatized attributes) transformed by a user using the public domain exceeds this lowest point, the average cost of innovation in the metaverse scenario begins to increase. Of course, this is actually a highly simplified speculation on various conditions of physical media that are popular in the public domain in the physical world. The conclusion is: the more open the public domain is, the higher the number of private rights that users have, and the more innovative the market will be. On the contrary, the more closed the public

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sphere is, the number of private rights will be reduced sharply, the lower the innovation activity will be.

In this regard, more specific suggestions are put forward on the procedural rules in copyright law. First, it is recommended to shorten the practical copyright author protection period to “lifetime + 50 years after death” because this part of copyright has an immediate impact on the social development of the physical world and the real economy. Second, regulate the reasonable use behavior of metaverse users, optimize the injunction system, the indirect infringement liability system of network service providers, etc. to ensure the legitimacy of the copyright relief system. In general, these two suggestions aim to speed up the circulation of copyrighted private domain products, thereby stimulating the creative vitality of users in the metaverse scene. After all, users’ creativity affects the transformation and application capabilities of metaverse scenes, and even affects the re-innovation of knowledge and the supply and demand relationship in the public domain.

4.3.4 Protection of Technological Measures

The “twin” feature of the metaverse application scenario determines that metaverse products must be designed with the help of the prior object in the physical world. The part excavated from the public domain and the creative part are integrated, and it is difficult to distinguish them, which will inevitably lead to the use of the creative part by others in the digital environment, thereby damaging the legitimate interests of the rightholder. However, neither high-intensity technological measures nor technological measures that sacrifice public interests are the original intentions of legislators, and the leverage between them must be leveraged through reasonable “technological measures”. Especially in the application scenario of the metaverse, the behaviour of metaverse “twinning” (copying or exploiting) can be limited to the
scope of “adequate legal protection” and “effective legal remedies” through reasonable technological measures.70

It is therefore recommended that, reasonable technological interventions should be used to minimize the possibility of rightsholders being infringed upon. Here, the idea of a “reasonable limit” has two meanings. First, it does not use transitional technological measures to impose intervention, resulting in metaverse products being imprisoned in an isolated island of technological measures and rendered useless. Second, the limited standards and rules are not necessarily strictly controlled from the source, but some specific and normative technological revisions are made in the process of dissemination in combination with the fair use system, the reproduction right system and the compensation system to protect the copyright while encouraging innovation. Third, the copyrights of the massive amounts of metaverse products controlled by the “digital centralizers” in the metaverse (leading digital merchants or large platforms) need to be moderately “delegated”, and be wary of the “rights monopoly” phenomenon in the metaverse that restricts market circulation.

5 Conclusion

The openness and inclusiveness of copyright law make it possible for digital technology to be accommodated in the legal system, but it cannot ignore the flaws of copyright methodology that emphasize technology and ignore paradigms in the construction of the system. Because of the concern that digital technology will bring about imaginary problems of legal application of copyright law, it is accustomed to using the path of extensive interpretation and appending catch-all provision to solve problems. The laws, regulations and policy documents promulgated under the reformation show a certain lack of trust, and they even expose the disconnection and conflict between overall research and local knowledge. Undoubtedly, issues such as object diversification, the fuzzification of rights fusion, application contextualization, and the standard fragmentation caused by metaverse products all need to be clarified by copyright law. In the context of copyright law, reunderstanding the normative meaning of protecting metaverse products, granting reasonable rights to creators, and realizing the basic goal of institutional integration, it can be found that the purpose of protecting metaverse products is not to protect the technology itself or subject rights but to determine whether the incentive effect of digital technology output can create more market value for society. At this point, we can further reflect on how long the current copyright law will last to meet the challenges of digital

technology in the face of the constant upgrading of the metaverse. In the author's opinion, new technologies such as digital twins, artificial intelligence, the metaverse, and virtual reality force human beings to passively make compromises, concessions and changes in the application of the rules of the physical world. Perhaps the legal protection order built on the basis of metaverse products can open the door to a new world for us.

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