

APPLICATION OF EFFECTIVE TECHNOLOGY MEASURES IN PROTECTING COPYRIGHT IN THE NETWORK ENVIRONMENT¹

APLICAÇÃO DE MEDIDAS TECNOLÓGICAS EFICAZES NA PROTEÇÃO DE DIREITOS AUTORAIS NO AMBIENTE DE REDE

NGUYEN THI NGOC TUYEN

Ph.D. Candidate, University of Economics and Law, Ho Chi Minh City, Vietnam and Vietnam National University, Ho Chi Minh, Vietnam.

tuyenntn19710@sdh.uel.edu.vn

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Corresponding author:

ntntuyen@ctu.edu.vn



tecnológicas eficazes para salvaguardar os direitos de autor no ambiente de rede. Ao mesmo tempo, o artigo também abrange regulamentações de outros países onde há desenvolvimento e liderança no controle eficaz da tecnologia. O conteúdo do artigo baseia-se no uso da tecnologia na proteção dos direitos autorais, mencionando assim algumas limitações e propondo soluções para a legislação vietnamita na implantação eficiente da tecnologia na proteção dos direitos autorais no ambiente digital.

Palavras-chave: Trabalho. Controle. Medidas tecnológicas eficazes. Direitos autorais. Ambiente de rede.

Abstract: Effective technology measures have been recognized as emerging points in the Intellectual Property Law in Vietnam, amended in 2022. The article analyzes regulations on effective technology measures to safeguard copyright in the network environment. At the same time, the article also covers regulations of other countries where there is development and leadership in effective technology control. The article's content is based on the use of technology in copyright protection, thereby mentioning some limitations and proposing solutions to Vietnamese law in deploying technology efficiently in the protection of copyright in the digital environment.

Keywords: Work. Control. Effective technological measures. Copyright. Network environment.

Resumo: Medidas tecnológicas eficazes foram reconhecidas como pontos emergentes na Lei de Propriedade Intelectual no Vietname, alterada em 2022. O artigo analisa regulamentos sobre medidas

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1. Introduction

Copyright was first recognized in 1986 in Decree No. 142/HDBT of November 14, 1986, of the Council of Ministers on copyright. However, the provisions on copyright are mainly expressed as censorship without provisions to protect the author's rights to the work and ensure the author's economic benefits. Therefore, at this time, the whole mechanism of self-protection through technological measures needs to be mentioned.

In 1994, after nearly ten years of implementing the policy of economic renewal, our country has made significant developments, and most people's material and spiritual life has been markedly improved. At the same time, the demand for copyright protection from people operating in the field of creativity and art has also been increasing. All of the above changes have affected the legal system of intellectual property protection in general and copyright protection in particular. In response to the requirements of the new situation, on December 10, 1994, the decree on Copyright Protection was promulgated by the National Assembly Standing Committee. This Ordinance provides detailed provisions on the rights and obligations of authors and owners of works. It is a significant step forward from Decree No. 142/HDBT of December 14, 1986. The recognition of copyright is mentioned in the 1995 Civil Code but has yet to be recorded on the technological measures used.

Following the 1995 Civil Code, many legal documents of the Government have been promulgated detailing and guiding the implementation of the provisions on intellectual property rights, helping the principle-based stipulations regarding intellectual property rights in the 1995 Civil Code to be implemented in life. In the field of copyright, on November 29, 1996, the Government issued Decree No. 76-CP guiding the implementation of several provisions on copyright in the Civil Code. In the late twentieth and early twenty-first centuries, the international legal system on intellectual property has been growing and expanding. Not only that trend, the Vietnamese State also strives to perfect the national legal system on intellectual property with a determination to accelerate economic development and deep integration into the world economy. Before 2005, Vietnam's legal documents on intellectual property were assessed to be complete and compatible with the WTO TRIPS Agreement. However, they have not been rationally arranged and are scattered in many legal documents. The legal validity could be higher because most of the legal documents on this issue are sub-law documents, leading to low enforcement effectiveness.

In 2005, the introduction of the Civil Code and the Intellectual Property Law marked a significant turning point in the development of Vietnam's legal system on intellectual property. The introduction of these two legal documents is an inevitable result of efforts to renew and develop the country, meeting the requirements of the integration process. At the beginning of this time, the recognition of the application of technological measures for self-protection appeared. However, the practice of applying these measures is minimal. Because this time also has yet to develop a robust digital environment for electronic works.

In 2009, the National Assembly passed a Law amending and supplementing some Articles of the Intellectual Property Law. These amendments and supplements aim to make the legal system on intellectual property more suitable to the practical situation and compatible with the contents of multilateral treaties, protecting the interests of Vietnamese organizations and individuals in the integration process. Most recently, the third Intellectual Property Law was amended and supplemented in 2022, and the 2022 Intellectual Property Law amended and supplemented officially took effect on January 1, 2023. The IP Law of 2022 has amended many points to suit the practical situation better and international treaties to which Vietnam is a signatory, thereby improving the effectiveness of protecting intellectual property rights in general and copyright in particular. One of the innovation highlights is that the acceleration in the application of "effective" technological measures is mentioned quite clearly to meet the general requirements of the time of digital technology to take the throne. Meanwhile, for the US, France, China, and South Korea legislation, the regulation of technological measures is quite detailed and has clear procedures. Notably, the regulations on the control of effective technological measures follow separate documents.

However, recognizing new regulations on effective technological measures is also a challenge to the application practice for Vietnam. Moreover, controlling technological measures in Vietnam needs an entity governing this management mechanism. In addition, applying technological measures also requires coordination between the subjects from the rights holders, intermediary service providers, and state management agencies. The application of technology to protect rights is not only technical but also requires the operation of mechanisms to control such technical measures for electronic works in the digital environment.

2. Methods

This article has been written based on data collected using a library-centred data collection. The authors have analysed data obtained from the laws of Vietnam and publications relevant to the research area.

3. Results

3.1 Contents of the provisions on effective technological measures

The right to use technological measures is recognized by Vietnamese law right from the 2005 IP Law and continued through amendments (in 2009², 2019³, and 2022⁴) (referred to as the IP Law). Currently, the IP Law provides that copyright holders have the right to apply by themselves or designate other parties to apply technology to protect rights, provide rights management information, or apply other technological measures to prevent acts of copyright infringement⁵. Previously Decree 105/2006/ND-CP detailing:

“Technological measures specified at Point a, Clause 1, Article 198 of the Intellectual Property Law include: (i) Putting indication information on the grounds arising, protection titles, owners, scope, duration of protection, and other information on intellectual property rights on products, means of service, originals, and copies of works, fixations of performances, phonograms, video recordings, broadcasts (hereinafter referred to as products) in order to notify that the product is an object of intellectual property rights being protected, and recommend others not to infringe; (ii) Using means or technical measures to mark, identify, distinguish, protect protected products.”

From the science and technology perspective, technological protection measures (TPMs) are software, components, and other equipment copyright holders use to protect works. TPM has two main types: technology that controls access to the work and technology that controls the use of the work. Access control TPMs are TPMs that control how a user can view, read, listen to, or otherwise access the content of a work. Several forms of TPM

² Intellectual Property Law (No. 50/2005/QH11) dated November 29, 2005, amended and supplemented by the law amending and supplementing several articles of the Intellectual Property Law (No. 36/2009/QH12) dated June 19, 2009.

³ Law amending and supplementing some articles of the Law on Insurance Business and the Intellectual Property Law (No. 42/2019/QH14) dated June 14, 2019.

⁴ Law amending and supplementing some articles of the Intellectual Property Law (No. 07/2022/QH15) dated June 16, 2022 (effective on January 1, 2023).

⁵ Point a, clause 1, Article 198 of the IP Law.

control access to the work, such as passwords, fee walls, access time limits, and the number of concurrent users,... TPM use control is a TPM that allows authors and copyright holders to limit the behavior of users even if they have access to the work. Authors and copyright holders may restrict the viewing, copying, communicating, broadcasting, or other forms of use of the work to a certain extent. Some forms of TPM control the right to use the work, such as blocking download, copying, printing, labeling, and watermarks on the work,...

According to Vietnamese law, Clause 10a Article 4 of the IP Law defines “*A technological measure to protect rights is a measure of using any technique, technology, equipment or component in the course of normal operation with the main function of protecting copyright, and related rights for acts performed without the permission of the copyright owner or related right owner.*” Rights holders use the technological measures specified in Clause 10b, Article 4 of the Intellectual Property Law. Accordingly, a proper protection technological measure is a measure of using any technique, technology, equipment, or component during regular operation with the primary function of protecting copyright and related rights to acts performed without the permission of the copyright owner or related right owner. However, for copyright protection of electronic works such as e-books, it is best to apply effective technological measures⁶ under law, which are “technological measures to protect the rights to which copyright or related rights holders control the use of works, performances, phonograms, video recordings, broadcasts, satellite signals carrying encrypted programs through access control applications, protection processes, or copy control mechanisms.” As such, *effective* technological measures are technological measures that protect the rights to which copyright or related rights holders control the use of works, performances, phonograms, video recordings, broadcasts, satellite signals carrying encrypted programs through access control applications, protection processes, or copy control mechanisms. Expressly noted: (1) Access control application means an application that uses techniques, technology, equipment, or components to control access to a protected copy; (2) Protection process means a measure that uses techniques, technology, equipment, or components to prevent or minimize the performance of any act that constitutes an infringement of copyright or related rights to a protected copy; (3) Copy control mechanism means a measure that uses techniques, technology, equipment or components to control the copying from a protected copy.

⁶ Clause 10c, Article 4 of the Intellectual Property Law.

There are many ways to protect copyright by technological measures that have been implemented such as digital content copyright management called DRM (short for Digital rights management) is a solution related to the control and protection of IP copyright digital content, including eDocument, eBook, Picture, Music, Film, Software, Game... circulated in the digital environment. DRM allows the content business (Content Business)-the owner of the service that provides digital content can restrict what users can use this content even if they are paying for the purchase. In addition, a new direction is now the application of blockchain technology to prevent piracy initially, which also proved quite effective. The blockchain is like a book that records content creators' time, location, and identification. There is no centralized server, and no one controls the database. Once the data is recorded in this book, no one can delete or change it. Each transaction or block of information generated will be transmitted to all system members and must be confirmed by each member through complex algorithms. When a block is confirmed, it will be added to the book or chain of information.

However, TPMs can also be turned off to infringe upon protected copyrights, raising the issue that TPMs also need to be strictly protected. Article 11 of the WCT states:

“The Member States shall provide adequate legal protection and effective legal enforcement measures for the nullification of effective technological measures used by the author in the exercise of his rights under this Treaty or the Berne Convention and for the prevention of acts which are not authorized by the author or prohibited by law in respect of the work.”

Accordingly, there are 03 necessary and sufficient factors for a TPM to be protected by law as follows:

First, TPMs must be effective. Some research suggests that the word “effective” ensures that TPMs that are too easily broken are not protected by law. Another study explains that a TPM broken during inactivity or improper operation, such as software failure, is not protected by law. It can be seen that the above studies do not indicate the correct interpretation of the word “effective.” To clarify this point, Clause 10c Article 4 of the IP Law defines: “*An effective technological measure is a technological measure that protects the right of a copyright or related right holder to control the use of a work, performance, phonogram, video recording, broadcast, satellite signal carrying a program encrypted through an access control application, a protection process or a copy control mechanism.*”

Second, TPMs are used by authors in the exercise their rights under the WCT or Berne Convention. It means that protection for TPMs is granted only to TPMs used by copyright holders while exercising their rights to works, and these rights must be provided for in the WCT or Berne Convention. Such provision excludes the protection of TPMs not applied by the copyright holder or TPMs that apply to works not protected under the provisions.

Third, TPMs must be applied to prevent acts that are not authorized or not permitted by law for the work. Only acts that break the TPMs used for the above purpose are considered violations.

Current Vietnamese law is also compatible with the WCT Treaty⁷ in Article 12, recording acts deemed to be infringing upon rights: (i) dismantling or changing any electronic rights management information without the author's consent; (ii) distributing, importing for distribution, broadcasting or communicating to the public without author's permission, works or copies of works knowing that electronic rights management information has been dismantled or has been illegally changed. The specific identification of one of the acts of copyright infringement is the intentional destruction or invalidation of effective technological measures taken by authors or copyright holders to protect the copyright to their works in order to commit other acts of copyright infringement under the WCT Agreement.

3.2 Acts of infringement of technological measures using copyright protection

First, Acts of direct infringement upon effective technological measures to protect copyright.

Acts of infringing upon effective technological measures to protect copyright include acts of intentionally destroying or invalidating effective technological measures taken by authors or copyright holders to protect copyright over their works and acts of “producing, distributing, importing, offering for sale, selling, promoting, advertising, marketing, leasing or storing for commercial purposes equipment, products or components, introducing or providing services when knowing or having grounds to know that such equipment, products, components or services are manufactured or used in order to invalidate effective

⁷ WIPO Treaty on Copyright.

technological measures to protect copyright”⁸. Technological measures are increasingly promoted in copyright protection, especially in the digital environment. International legal documents also refer to the need to bring technological measures to be protected, thereby better-protecting copyright in the digital environment. The provision that the infringement of effective technological measures is an infringement of copyright is also one of the essential new points of the IP Law, amended and supplemented in 2022.

Currently, in Vietnam, most of the software being used again is unlicensed software; not only individuals but also enormous organizations and units have the situation of using pirated software. With the command to search for jailbreaking software on the Internet, users can easily download any software without losing money to buy the copyright to still use the software they need. In order to get this pirated software, some people have taken the action of cracking the access to the software stealthily, stealing the software, and making a software product from paid, copyrighted, usable becomes free when activated. It infringes effective technological measures to protect the copyright of computer software⁹.

Second, Acts of infringing upon rights management information.

Clause 10d Article 4 of the Intellectual Property Law defines:

“Right management information is information identifying works, performances, phonograms, video recordings, broadcasts, encrypted satellite signals carrying programs; about authors, performers, copyright holders, related rights holders, and conditions for exploitation, and use; numbers, and codes expressing the above information. Rights management information must be attached to a copy or appear simultaneously with a work, performance, phonogram, video recording or broadcast when the work, performance, phonogram, video recording or broadcast is transmitted to the public”.

Precisely , information for managing copyright comprises data such as author’s name, holder of the copyright ; date of birth, year of death (if any) for individuals; Date of establishment, year of dissolution (if any) for organizations; Name of the work; What is contained in the work ; Scope of authorization; validity of the authorization contract; Activities of licensing, collection, and distribution of royalties, remuneration, material

⁸ Clause 4, clause 5, Article 28 of the Intellectual Property Law.

⁹ VTV Digital: “*Alarming software copyright infringement in Vietnam*”, VTV News, <https://vtv.vn/cong-nghe/bao-dong-tinh-trang-vi-pham-ban-quyen-phan-mem-tai-viet-nam-20201124145131312.htm>, posted on November 24, 2020 [accessed on April 27, 2023].

benefits; Activities of the copyright collective representative organization, and other relevant information¹⁰.

The group of acts of infringing upon copyright management information includes the intentional deletion, removal, or alteration of copyright management information without the permission of the author or copyright owner and the intentional distribution or importation for distribution, broadcasting, communication, or public supply of copies of work when knowing or having grounds to know that the copyright management information has been deleted, removed or altered without permission of the copyright owner; when knowing or having grounds to know that the performance of such act will incite, enable, facilitate or conceal the act of copyright infringement¹¹.

For example, to protect digital photo copyright, online entrepreneurs often insert logos or store name watermarks on their product images but still appear to be infringing upon copyright when others download, modify, use a logo or other name to hide the original store name, and use the image for business purposes without the permission of the rights holder.

Third, Failing to comply with or insufficiently complying with regulations to be exempted from liability of enterprises providing intermediary services.

Intermediary services are services of a bridging nature, bringing works to the public by technological means such as telecommunications services, Internet services, online social network services, and others. In other words, enterprises providing intermediary services do not directly create digital information but only provide servers, transmission lines, storage, and other user services. The most superficial level is the Internet connection provider, commonly known as “networker,” such as VNPT, Viettel, FPT, SCTV,... In contrast, the most complex level is the server, such as Oracle Cloud or Amazon Web Services, which is a place to register a domain name, cloud storage, and set up a website or online payment tool. However, because it is not a place to directly create digital content, the two forms are less known to users. Platforms that are more familiar to users include portals, search engines (Google, Bing, Baidu, and so on), and especially social networks such as Facebook, Instagram, Youtube, TikTok, and other networks and E-commerce exchanges such as Shopee, Tiki, Lazada, and others are also classified into social networks by this classification. The activities of these subjects play a significant role in communicating and distributing

¹⁰ Article 46 of Decree 22/2018/ND-CP.

¹¹ Clause 6, clause 7, Article 28 of the Intellectual Property Law.

works to the public. In copyright infringement, the intermediary service provider is the first entity capable of preventing the infringement. Therefore, this entity plays an essential role in the transmission of works and copyright protection.

Article 198b of the IP Law provides that enterprises providing intermediary services shall not be automatically exempt from liability but shall first take technical measures to coordinate with state agencies and copyright holders in applying measures to protect copyright in the telecommunications network and Internet environment. It means that enterprises providing intermediary services must receive and ensure the review of the possibility of copyright infringement upon the request of the right holder.

Thus, enterprises providing intermediary services under Article 3 of Circular No. 07/2012/TTLT-BTTTT-BVHTTDL can be affected by Article 198b of the IP Law, including Enterprises providing Internet services; Telecommunications enterprises; Enterprises providing digital information storage space, including rental services of storage space in websites; Enterprises providing online social network services; Enterprises providing digital information search services. Enterprises providing intermediary services exempted from liability under the above provisions are not required to supervise their services or proactively seek evidence of infringement. Enterprises providing intermediary services that fail to fulfill their obligations to be exempted from liability shall still be liable if copyright infringement occurs.

3.3 Practice of application of technological measures to the protection of copyright in the network environment

There are currently two main groups of copyright protection technology solutions in Vietnam. The first is a solution based on supplier infrastructure. Some technologies can be mentioned as Finger Print Online content source detection technology based on user account identifiers, Digital Rights Management (DRM) technology that locks the code or encrypts the signal from the place of transmission to the receiver against the return to the screen directly from the user's display device, Watermark technology is a form of digital signature over the content,... Currently, solutions based on supplier infrastructure have been built and owned by several Vietnamese businesses. The second is the cybercrime infrastructure investigation solution, which uses brand, channel, or content recognition technology to detect violations and proceed to eliminate them after careful investigation.

In order to protect copyright in the digital environment more effectively, the Vietnam Digital Media Association (VDCA) has established the Center for Protection of Copyright. It is an agency to protect copyright in the digital environment. The Digital Copyright Center has technological solutions that help protect partners with products and can monitor the product's status in real-time, whether it is violated or not, and how much percentage of the violation. This tool will give warnings, thereby helping to prevent infringement. The center is like a tool to help state management agencies perform well copyright monitoring and protection functions. To do that, the technology development team of the Digital Copyright Center has used Video Digital Right Management (DCC VDRM) and a system to listen, scan, detect, and warn of copyright infringement of the press, music, and electronic publications (DCC Watcher). In particular, DCC VDRM combines encryption technologies and valid authentication to help prevent downloading and re-uploading video content. With DCC Watcher, the system is developed from a core of technologies including collecting, listening, scanning information on electronic newspapers and social networks, storing, analyzing, modeling, comparing data, AI technology, natural language processing, and the ability to integrate and connect the copyright database of the partner units¹².

Online Music Copyright Joint Stock Company (MCM Online) also launched the MCM Online Music Copyright Ecosystem (MCM for short). MCM is built with two technologies: Sigma DRM and Sigma Watermarking. In particular, Sigma DRM technology encrypts all music and grants a decryption key every time using the work, and each time the system key is granted counts as one use of the work. The granting of a key for each use can be like permission to use the work, and it is the foundation for transparency of the number of uses when the work is distributed on the Internet. DRM technology is now widely used globally to protect television or electronic publishing copyrights. Sigma Watermarking technology is used to mark (digitally) when wanting to distribute or derivate a music work, thereby helping authors to easily trace the origin or track the distribution and use of the work. Protection and marking solutions on each piece of music help authors to accurately measure the number of uses and track the distribution and use of the work on the Internet. Applying the above technological solutions helps MCM ensure 03 factors: protection, transparency, and traceability when providing music works in the digital environment.

¹²Trong Dat: “*Protecting digital content copyright with Make in Vietnam technology*”, Vietnamnet, <https://vietnamnet.vn/bao-ve-ban-quyen-noi-dung-so-bang-cong-nghe-make-in-vietnam-697397.html>, posted on December 14, 2020 [accessed on March 29, 2023].

In addition, nowadays, digital watermarking is also an effective method to solve the problems of communication safety and copyright protection of digital materials, especially digital photos, based on the synthesis theory of many different fields such as cryptography, information theory, communication theory, and digital signal processing, image processing¹³. Digital watermarking is the process of using information (photos, strings of bits, strings of numbers) sophisticatedly embedded in digital data (digital photos, audio, video, or text) to be then able to detect or extract markup to determine the copyright information of that work¹⁴. The purpose of digital markup is to protect the copyright to the digital data that carries markup information. With digital watermarking technology, we can use watermarks (a piece of information bearing copyright meaning) that are both invisible and inseparable from the work containing it to embed in the digital photo work; that watermark only the copyright holder knows and is used as evidence for the copyright of the work. The above watermark is used not only to indicate the copyright information but also to authenticate the information and detect the information distortion. The watermark embedded in the work at the time of comparison will be taken out to compare with the original watermark. If the watermark has a discrepancy at two points in time, it proves that the original work has been attacked and distorted. Alternatively, different watermarks can be used to embed copies of the original information before passing it on to multiple people to identify the sender or recipient of a particular information.

In general, copyright holders, related organizations, and agencies have paid more attention to the use of the right to apply technological measures to protect copyright in the digital environment under the provisions of the IP Law. However, there have been many achievements in the study of advanced technological measures and achieved many initial results in limiting acts of copyright infringement in the digital environment. However, Vietnam's speed of embracing new and effective technological measures is still slower than other countries due to several limitations in legal provisions and scientific and technical levels.

4. Discussion

¹³ Nguyen Thi Ngoc Tuyen: Measures to protect copyright under Vietnamese law – Comparison with the CPTPP Agreement, Journal of Science and Technology Development - Economics - Law and Management, 5, 1780-1787, 2021.

¹⁴ Tran Thi Tu Uyen: Digital watermarking system and digital watermarking application in digital photo copyright protection, VNU University of Engineering and Technology, 2017.

4.1. Some inadequacies in the application of effective technological measures to protect copyright in the network environment

Firstly, Vietnamese law provides that copyright holders have a right to use technology to prevent infringements of their copyright in the digital environment. However, which measures are the most feasible and effective, as well as the practical application, are legally open to the subjects to choose but must comply with the Law on Information Technology, the Law on Cybersecurity, and relevant legal documents¹⁵. It allows rights holders to freely choose the most appropriate and effective technological measures for each type of work. It also makes it difficult for rights holders to select the type of measures and learn how to apply them. The law does not limit the application of copyright protection technology nor the exceptions allowed to circumvent the above technological measures. The application of technological measures is only generalized without specific guiding provisions, leading to some rights holders being afraid and ignoring the use of technological measures. As a result, it inadvertently creates conditions for other individuals and organizations to infringe upon their copyright.

Secondly, Vietnam's technological infrastructure has yet to meet the requirements for applying high-tech solutions. For example, blockchain technology is considered adequate in digital copyright but is still very new in Vietnam and has yet to be studied in depth. It is widely applied in the issue of copyright protection. In addition, when a technological measure to protect the right was born, in a short time, the offender created another technology to combat it. For example, fingerprinting technology is used to combat the unauthorized posting of football matches; when users watch football, they will see small text running on the screen to help trace if someone sneaks. To combat fingerprinting technology, the intruder applies artificial intelligence technology to recognize the character and obscure the text. When the rights holder applies technology to compare the screens with each other to detect the intruder, they seek to trim the screen, insert more images, or flip the image from left to right to reduce similarity¹⁶. Besides the technology problem, the human factor is a big

¹⁵ Nguyen Thi Ngoc Tuyen: *Measures to protect copyright under Vietnamese law – Comparison with the CPTPP Agreement*, Journal of Science and Technology Development - Economics - Law and Management, 5. 1780-1787, 2021.

¹⁶ Thanh An: “*Copyright protection in the digital environment: Between matrices*”, Development Sciences, <https://khoahocphattrien.vn/khoa-hoc/bot-khi-trong-champagne-xuat-hien-the-nao/20230427022416643p1c160.htm>, posted on April 28, 2023 [accessed on May 1, 2023].

obstacle because only some human resources have high technology qualifications to catch up with the new solutions and trends.

Thirdly, while technological measures are effective, the process in Vietnam still needs to be optimized, especially when applying effective technological measures. Measures to block access to infringing websites are the most effective, fast, and least expensive solution. Many countries, such as the UK, France, and the US, consider this one of the leading technological measures to prevent copyright infringement on the network. For example, YouTube is doing a great job of doing this when imposing heavy fines or even closing accounts for repeated violations¹⁷. However, blocking access in Vietnam has only recently been documented under Decree 17/2023/ND-CP, which takes a long time to implement blocking through ISPs. While the US process is quick with a shorter time, specifically the notification and removal process under the DMCA¹⁸.

4.2 Recommendations to complete the application of effective technological measures to protect copyright in the network environment

Firstly, detailed guiding documents should specify specific technological measures suitable to the digital space, especially measures safeguard existing works in digital content, so that copyright holders can apply them accurately, avoid losing time, and achieve higher protection efficiency. At the same time, additional provisions prohibit the infringement of the application's technical equipment that the rights holder uses to protect his work in the digital space. Regarding the scope of the application of technological measures to protect copyright in the digital environment, it should be clearly stated that the application of technological measures is appropriate and does not exceed the permissible scope when applying technological measures to protect copyright as well as additionally provide for the exceptions allowed to break technological measures to protect copyright. For example, under Chinese law, provided that the means used to circumvent technological measures are not provided to others and do not infringe upon other rights of copyright holders, individuals, and organizations are allowed to circumvent technological measures when performing official duties of state agencies according to administrative, supervisory, and judicial

¹⁷ Ha Thanh: "Copyright infringement: A pain in the World Cup season", Urban Economics, <https://kinhtedothi.vn/vi-pham-ban-quyen-nhuc-nhoi-mua-world-cup.html>, posted on November 23, 2022 [accessed on May 2, 2023].

¹⁸ The Digital Millennium Copyright Act 17. USC

procedures; testing the security performance of computers, and their systems or networks; conducting coding research or research into reverse engineering of computer software, etc.¹⁹.

Secondly, step by step, deploy the research and development of high technologies to protect copyright; integrate digital copyright management, research, and development of technologies to collect copyright fees by blockchain, and so on. At the same time, refer to and draw experience from applying technological measures to protect copyright in the digital environment in other countries. For example, about solutions to prevent online video piracy in France, Celine Boyer, Head of Cyber Security of Canal+ Group, shared her experience: “In France, using the method of blocking all pirated websites accessible from the country, regardless of whether the source is in the country or abroad. Shorten the blocking time by the authorities setting up a tool to connect with broadcasters and owners, thereby finding unauthorized websites to block. In addition, to increase the awareness of the community, in addition to blocking domain names, it is possible to redirect them to a website that states the website they are trying to access is pirated, at risk of malware infection, and directs them to legitimate services.”²⁰ In particular, since technology is constantly changing, and violators may create another technology to disrupt technological measures to protect rights, it is necessary to focus on upgrading technological infrastructure, constantly researching, updating, and upgrading technological solutions to protect copyright in the digital environment.

Thirdly, like many countries strong on anti-piracy in the world, Vietnam needs a more effective tool and mechanism to connect 03 components as copyright owners, state management agencies, and intermediary service providers to shorten the process of removing content infringing copyright. Accordingly, the copyright owner only needs sufficient evidence of infringement sent to the intermediary service provider that the website will be automatically blocked or the infringing content will be removed. In this case, the state management agency only plays a supervisory role, and the copyright owner is responsible for the above evidence.

Fourthly, an agency should directly control effective technological measures and detect, warn, and handle acts of infringement in the network environment. For example,

¹⁹ Article 50 of the 1990 China Copyright Law (amended and supplemented in 2001, 2010, and 2020).

²⁰ La Duy: “*What solutions prevent video piracy?*”, People’s Army, <https://www.qdnd.vn/van-hoa/doi-song/giai-phap-nao-ngan-chan-hanh-vi-vi-pham-ban-quyen-video-701932>, accessed on April 3, 2023.

South Korea has built a specialized “copyright police agency”²¹ in the field of copyright. The Agency for the Management of Digital and Audiovisual Communications in France is specified in Article L331-12 of the Intellectual Property Code. Thus, it is also necessary for Vietnam to gradually build this particular agency to clearly and promptly prevent acts infringing upon copyright in the network environment and ensure effective control mechanisms for effective technological measures.

5. Conclusion

In the digital era of digital technology, works in the digital environment have become quite popular. Therefore, applying technological measures is an active prevention of infringements and a basis for detecting infringements from the beginning. At present, Vietnam must also adapt to this strong development. Therefore, learning experience from other countries in building effective control mechanisms of technological measures is essential in the application of technological measures. (1) Selecting appropriate technical measures for digital works in the network environment. (2) Building effective control mechanisms of technological measures must have particular management subjects or judicial police. (3) Coordination mechanism between copyright holders, state agencies, and intermediary service providers in the network environment.

²¹Operational regulations of the Special Judicial Police,
<https://www.law.go.kr/LSW/admRulLsInfoP.do?admRulSeq=2100000086189>, accessed on April 23, 2023.

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