Problems of Legal Protection of Trademarks on the Internet: A Case Study of Kazakhstan

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Abstract

[Purpose] The study aims to assess the existing legal mechanisms for the protection of trademarks on the Internet in Kazakhstan to identify their shortcomings and develop proposals for their improvement.

[Methodology/approach/design] The study conducted a comprehensive analysis of the Civil Code of Kazakhstan and Law No. 456-I "On Trademarks, Service Marks, and Appellations of Origin" using the formal legal method, assessed digital threats through a technology audit, and compared international approaches to trademark protection.

[Findings] The main results of the study revealed the problems associated with the protection of trademarks in the Internet environment. Significant gaps in national legislation that hinder the effective suppression of online trademark infringement were identified. A comparative analysis of the legal systems of the United States, China, Germany and France showed that the approaches to intellectual property protection in Kazakhstan differ significantly from international standards, making it difficult for right holders to enforce their rights outside the country. The study also showed that existing

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enforcement mechanisms are often ineffective in the digital environment, where the distribution of content and anonymity of users create additional challenges. Based on these findings, recommendations were made to improve trademark protection in Kazakhstan, emphasizing the development of more adaptive legal instruments for the digital age.
[Practical implications] The article highlights gaps in Kazakhstan's trademark protection and suggests legal reforms and tech innovations to improve enforcement and ensure fair competition.
[Originality/value] This paper highlights deficiencies in Kazakhstan's digital trademark protection and proposes innovative solutions, offering valuable guidance for policymakers and businesses.

Keywords: Intellectual Property. Brand. Blockchain. Adaptation of Legislation. Counterfeiting. Digital Environment.

INTRODUCTION

With the rapid growth of the digital economy and the active development of e-commerce, the protection of trademark rights is becoming particularly important. As the volume of online transactions increases and e-commerce platforms become more popular, there is an increase in intellectual property infringements, such as counterfeiting and unauthorised use of trademarks. Technological innovations, such as automated cybercrime systems and algorithms for creating fake websites, add a new level of complexity to the protection of trademark rights. Considering these challenges, it remains crucial to improve the tools for protecting intellectual property rights in the digital space.

The main issue addressed in the study is the growing challenge of effectively protecting trademark rights in the digital space, a concern that has become increasingly critical with the rapid expansion of the digital economy and e-commerce. The volume of online transactions continues to rise, and as digital platforms gain more prominence, the risks associated with intellectual property infringements, such as counterfeiting and unauthorized trademark use, have become more widespread. These infringements not only threaten businesses' brand integrity but also undermine consumer trust in online markets. Moreover, the emergence of advanced technological tools, including automated cybercrime systems and algorithms for creating fake websites, has added a layer of complexity to enforcing trademark rights.

In today’s globalized and interconnected world, the ability to protect trademarks online is not just a matter of legal compliance; it is fundamental to maintaining fair competition and ensuring consumer protection. As e-commerce platforms continue to dominate the global market, counterfeit products, often facilitated by digital technologies, can harm both businesses and consumers alike.

Without effective legal frameworks and technological solutions in place, businesses are left vulnerable to exploitation, which erodes their market value and reputation. The urgency of improving trademark protection tools in the digital realm cannot be overstated. With outdated national laws that fail to keep pace with the rapid evolution of digital technologies, addressing these gaps is essential for safeguarding intellectual property and maintaining a fair and secure online marketplace. The relevance of the study for Kazakhstan lies in the need to adapt national legislation to effectively protect trademark rights in the digital economy and the growth of e-commerce. Despite the existence of relevant laws, modern technologies, such as automated cybercrime systems and algorithms for creating fake websites, complicate the protection of trademark rights on the Internet. Therefore, it is important to improve legal mechanisms to ensure the protection of intellectual property and support fair competition in the digital environment.

Considering the lack of effective tools, other authors also highlight the complexity of this problem and emphasise the importance of improving legal mechanisms. For instance, Bican (2024) emphasised how the transfer of value between patents and trademarks complicates the integration of intellectual property rights, which requires the adaptation of legal rules to new conditions.

Jan (2022) noted that existing legislation often fails to keep pace with technological changes, leading to legal gaps and insufficient protection of intellectual property. Prawirayuda et al. (2020) addressed the problem of counterfeiting in e-commerce, emphasising that traditional enforcement mechanisms are ineffective in the digital marketplace, and suggesting increased international cooperation to combat counterfeiting. The same conclusion was reached by Imayani et al. (2024), emphasising that legal mechanisms should be strengthened to adequately respond to modern challenges, including the use of technology to distribute counterfeit goods. Despite the important reached conclusions, there remains a significant gap in the development of specific and effective legal instruments for the protection of trademarks in the digital environment.

Another problem in this area is the global nature of the Internet and the ability of users to remain anonymous, which creates serious legal difficulties when trying to protect trademark rights. Infringers can operate from anywhere in the world, avoiding direct interaction with the legal authorities of the country in which the trademark is registered. Thio et al. (2024), studying this issue, also emphasise that current legal mechanisms are not effective enough to protect trademarks in the digital age and suggest the use of more advanced technologies to track and identify infringers. Dharmawan et al. (2023) analysed in detail the problem of legal protection of trademarks from the practice of deep linking, which allows infringers to use links directly to protected brand elements, bypassing

legitimate pages. The authors concluded that the unification of law enforcement measures at the global level is a key step to effectively suppress such actions.

Analysing this issue, Jin (2024) emphasised the need for regional cooperation and international harmonisation of trademark law to ensure more effective application of the law in the face of rapid technological change. Ma (2024) discussed the protection of intellectual property in the context of cross-border e-commerce, noting that differences in legislative approaches and the lack of common standards make it difficult to control infringements, which highlights the need for more harmonised and adaptive protection mechanisms. He (2024) analysed the issues related to digital trademarks and technological challenges, focusing on the need to integrate new technologies into enforcement to improve infringement detection and enhance the effectiveness of legal protection in a global environment. At the same time, despite the value of the authors' conclusions, specific technologies for automating breach monitoring, the impact of specific tools on business, and the details of the practical integration of new technologies into existing legal systems remain insufficiently researched.

The analysis of these studies concluded that several unresolved issues remain in the field of trademark protection on the Internet. Therefore, this study aimed to identify key challenges related to the protection of trademarks on the Internet, as well as create recommendations for improving legal instruments and methods aimed at more effective enforcement of intellectual property rights in the digital environment. The main research objectives include analysis of existing legal instruments and systems used for trademark protection and assessment of their effectiveness; comparison of approaches to trademark protection in different countries to identify best practices; development of proposals for improving legal mechanisms and instruments aimed at more efficient enforcement of trademark rights in the digital market.

MATERIALS AND METHODS

The study used a formal legal method to analyse the legal instruments and systems used to protect trademarks, which ensured a comprehensive and detailed study of regulatory documents. This method included a consistent and systematic study of the texts of legislative acts, including the Civil Code of the Republic of Kazakhstan (2012) and Law of the Republic of Kazakhstan No. 456-I "On Trademarks, Service Marks and Appellations of Origin" (1999). The formal legal method was used to analyse the trademark registration procedure, which included a detailed review of application procedures, document requirements, trademark uniqueness verification processes and terms of legal protection. This method was used to identify existing gaps and shortcomings in the legal system of Kazakhstan that impede effective trademark protection, as well as to identify areas requiring

further improvement. The formal legal method also included a critical analysis of the existing procedures and enforcement mechanisms, which was used to assess their practical applicability and identify how well they meet the modern requirements of the digital space.

A technology audit method was applied to investigate technologies used in the digital space in the context of trademark misuse. This method involved the systematic evaluation and analysis of various technological solutions and tools that could potentially be used to infringe intellectual property rights on the Internet. The technology audit included the examination of software, platforms, algorithms and monitoring systems that could be involved in the illegal use of trademarks. The method included a detailed assessment of technologies such as web scraping, automated systems for creating counterfeit goods and fraudulent advertising platforms. The method identified the main technological vulnerabilities and threats that contribute to trademark infringement and assessed the effectiveness of existing remedies and defence strategies used to counter such infringements. The analysis also covered innovative technologies such as blockchain and machine learning (ML) used to prevent and detect infringement, making it possible to identify their potential benefits and limitations in the context of intellectual property protection.

A comparative method was used to compare approaches to trademark protection in different countries and identify best practices. This method involved a systematic comparison of legal systems and trademark protection mechanisms in different jurisdictions. First, data on legislative acts from several countries were collected, namely the United States, China, and the European Union countries of Germany and France. Digital Millennium Copyright Act (1998), the Trademark Law of the People's Republic of China (1993), the Law of the Federal Republic of Germany “On Copyright and Related Rights” (2021) and the Intellectual Property Code of France (2024) were studied. This was followed by an analysis of key elements, such as trademark registration procedures, protection and enforcement measures, as well as dispute resolution and enforcement mechanisms in the digital space. As part of the comparative method, examples of successful application of various approaches in international practice were also studied, which was used to identify effective strategies and tools. This method was used not only to identify the strengths and weaknesses of different systems but also to develop recommendations for integrating best practices into national legislation.

RESULTS

Trademarks are unique designations used to identify and distinguish the goods or services of one manufacturer from those of other market participants. They are a crucial element of the intellectual property protection system,

providing owners with exclusive rights to use their marks in commercial activities. Trademarks can take many forms, including words, phrases, symbols, images, or combinations of these elements that are associated with a particular brand and guarantee its authenticity and quality (Widiatmika et al., 2023). In the context of globalisation and the rapid growth of e-commerce, the importance of trademarks has increased significantly, as they play a key role in strengthening brands and maintaining consumer confidence in the digital space. However, with the growth of online commerce and the expansion of the Internet space, trademark protection is facing new challenges related to infringement of intellectual property rights, counterfeiting and misuse of marks on a global scale.

National trademark protection in Kazakhstan is regulated by several legislative acts, among which the Civil Code of the Republic of Kazakhstan (2012) and Law of the Republic of Kazakhstan No. 456-I (1999) is central. The Civil Code of the Republic of Kazakhstan is a fundamental document regulating the legal protection and use of trademarks in the country. According to its provisions, trademarks are classified as objects of civil rights belonging to the category of property goods and rights. This means that trademarks, as part of the property, have an independent value and may be the subject of civil transactions, such as sale, transfer or pledge. The Civil Code of the Republic of Kazakhstan establishes key principles relating to the legal protection of trademarks, which include registration rules confirming the owner's right to exclusive use of the mark in commercial activities. The owner of a trademark has the right to use it for individualisation of goods or services, as well as to prevent its unlawful use by third parties. Thus, the Code provides seemingly comprehensive regulation of issues related to the legal protection, use and defence of trademarks, considering them as important objects of civil rights and a key element of property turnover.

In turn, the specialised Law of the Republic of Kazakhstan No. 456-I (1999) details the procedures for registering trademarks, the conditions for their legal protection, and the measures that can be taken in the event of their misuse. This law also covers issues relating to service marks and geographical indications, providing a legal basis for the protection of unique goods associated with certain regions. In the context of legal protection of trademarks in the Internet space, Article 43 of the Law is notable. First, the Article stipulated that the introduction of a trademark or confusingly similar designations into circulation without the consent of the right holder is an infringement of the exclusive right. In the digital environment, this provision is of particular importance, as the Internet provides instant and massive dissemination of information, which makes it much more difficult to control and monitor the illegal use of trademarks. The infringement may be manifested through online sales, advertising campaigns or posting content on social media and other digital platforms, which makes it much more difficult

for right holders to protect their rights. In addition, the article clarifies that the use of a trademark in the media without the consent of the right holder is also considered an infringement, which in the context of the Internet includes both traditional and new media formats, such as blogs, video platforms and social networks (Shafalyuk et al., 2025).

Article 44 Law of the Republic of Kazakhstan No. 456-I (1999) regulates the mechanism for protecting the rights of trademark owners. The Article established the right of the owner to demand immediate cessation of the infringement and compensation for damages, which is particularly relevant in the Internet environment, where infringements can occur quickly and on a large scale. Paragraph 3 of Article 44 of the Law on Recognition of Goods and Their Packages with Illegal Trademarks as Counterfeit and Their Mandatory Seizure and Destruction is of great importance. In the digital environment, this also means combating online resources that distribute counterfeit goods. The Article 44 also provides for the possibility of compensation in lieu of damages, which is important in cases where it is impossible to establish the exact amount of damages, especially in the digital environment, where the extent of the damage may be difficult to assess.

However, the analysis of legislation at the national level has revealed several key issues related to the legal protection of trademarks on the Internet. The main problem is the difficulty of monitoring and controlling violations related to the illegal use of trademarks. In the digital environment, information is disseminated instantaneously, allowing criminals to quickly bring counterfeit goods to the market or illegally use trademarks without the knowledge of owners (Kondratenko & Kondratenko, 2015; Balan et al., 2025). Traditional legal mechanisms provided for by law cannot always effectively counter such challenges, as they do not have the necessary tools to respond quickly in the Internet environment. For instance, automated monitoring systems that can scan many online platforms and identify potential violations in real-time are hardly ever used. Moreover, the law does not provide mechanisms to instantly block counterfeit content, which allows infringers to act with virtual impunity while right holders go through lengthy and often ineffective legal procedures.

In addition, the process of seizure and destruction of counterfeit goods, as provided for by law, faces serious challenges in the digital environment. Contrary to traditional trade, where physical goods can be confiscated and destroyed, on the Internet, counterfeit goods can be instantly distributed through numerous online channels, including international platforms that are often outside Kazakhstan's jurisdiction. This creates significant barriers to effective law enforcement, as right holders cannot control or restrict access to counterfeit goods on foreign websites or marketplaces. Even if an infringement is detected, the

process of removing counterfeit content from such resources may be difficult or delayed due to the complexities of international legal interaction and differences in legislative norms. As a result, despite the existence of legal grounds for protection, right holders face the fact that their ability to control infringements on the Internet is significantly limited, which reduces the effectiveness of measures to protect trademarks in the global digital environment.

Another problem with the legal protection of trademarks on the Internet is the insufficient adaptation of damage mechanisms to the specific conditions of the digital environment. In traditional trade, the assessment of damages from trademark infringement can be relatively straightforward, as the damage is often associated with physical goods and their quantitative indicators (Prokopchuk & Litvinov, 2023). However, on the internet, the volume and scale of infringement can be much more difficult to define, as counterfeit goods can be distributed across multiple platforms and information can be instantly duplicated and shared globally. This complicates the process of determining the exact amount of damages, as right holders face difficulties in assessing both financial and reputational losses. Moreover, in the digital environment, it is difficult to account for all possible forms of infringement, from the sale of counterfeit goods to the use of trademarks in the context of advertising and content. As a result, existing compensation mechanisms designed for traditional forms of commerce are often ineffective and insufficiently flexible to fairly account for all factors on the Internet, making it difficult to enforce and protect intellectual property rights in the digital environment.

Thus, the above shortcomings point to the need for further improvement of national legislation, considering the specifics of the digital environment and international experience in combating infringement of trademark rights on the Internet. To develop recommendations for improving the mechanisms for protecting trademarks on the Internet, tools and methods used by infringers on the Internet were analysed (Table 1).

Tool/method	Description	Examples
Counterfeiting software	Software and applications for creating counterfeit goods using protected trademarks, including graphic editors and 3D modelling software.	Adobe Photoshop, Blender, Batch Photo Editor
Automated systems to bypass security	Algorithms and bots modify data and bypass content-blocking mechanisms using “other words”, proxy servers and programs for automated interaction with web interfaces.	Selenium, proxy servers, algorithms for text modification
Fraudulent advertising platforms	Fake websites and social media accounts that mimic legitimate commercial websites to promote counterfeit goods.	Fake online stores, fake Facebook and

		Instagram accounts
Web scraping technologies	Tools for automated extraction of data from websites used to create counterfeit goods and place false advertisements.	BeautifulSoup, Scrapy, Octoparse
Methods of bypassing detection systems	The use of virtual private networks (VPNs) and proxy servers to hide the real location and anonymise activities, makes it difficult to track and identify offenders.	VPNs, proxy servers
Blocking and tampering with digital watermarks	Removing or altering digital watermarks and metadata used to protect trademark rights, makes it difficult to track and protect original content.	Specialised software for removing watermarks, editing video content

Table 1 – Tools and methods of trademark infringement on the Internet
Source: compiled by the authors based on Koçer Özgün (2022), Erlewad et al. (2023) and Al Bdour et al. (2024).

Counterfeiting software is a key tool in the arsenal of criminals used to create counterfeit goods using protected trademarks (Smailov et al., 2025; Myronets & Ponomarenko, 2020). These programs include graphic editors such as Adobe Photoshop and Illustrator, which allow attackers to create fake packaging and logos that mimic original elements. 3D modelling software, such as Blender, can be used to create 3D models of packaging and goods, making counterfeits appear indistinguishable from the originals. In addition, there are specialised programs for automated text and image modification, such as Batch Photo Editor, which allow for mass modification of graphic elements, thus creating a large number of counterfeit trademarks with similar characteristics (Maidanevych et al., 2024; Zhuang et al., 2024). These tools greatly simplify the process of manufacturing and distributing counterfeit products, making the protection of intellectual property more difficult and time-consuming for rights holders.

Automated systems for circumventing protection – tools used by infringers to bypass systems designed to protect content and detect infringements (Kharchenko et al., 2017). These systems include algorithms and bots that can alter data and bypass content-blocking mechanisms. Algorithms can use word shuffling, which automatically changes text elements on websites to make them less visible to search and detection software. Filter circumvention software, such as proxy servers, allows infringers to hide their IP addresses and locations, making it difficult to trace the sources of counterfeit content (Butrovich et al., 2023). Scripts and programs such as Selenium are also used to automate interaction with web interfaces and bypass antibot systems that attempt to identify and block fake resources.

Fraudulent advertising platforms are a way of distributing counterfeit goods online using fake websites and social media accounts (Jurkevičius & Pleskach, 2025). Such platforms can carefully mimic legitimate commercial websites or online stores, including fake logos, designs, and reviews to create the appearance of a legitimate business (Mathur & Daniel, 2022). Social media accounts, such as Facebook or Instagram, can promote fake websites through paid advertising campaigns, sponsored posts and fake reviews, making them attractive to consumers who are unaware of the fraud. Such accounts can also use customisable ads and targeting to attract specific groups of consumers, making counterfeit advertising more effective.

Web scraping technologies are widely used by infringers to collect data on trademarks and their use, which allows them to create counterfeit goods and place false advertisements (Metelskyi & Kravchuk, 2023; Destek et al., 2024). Web crawling involves the use of specialised software tools, such as BeautifulSoup, Scrapy or Octoparse, to automatically extract information from websites. Web scraping can also be used to gather information about prices and marketing strategies on competitors' websites, which helps fraudsters customise their counterfeit goods to appear more attractive to consumers (Erlewad et al., 2023; Baryshev & Lanova, 2024). In addition, web scraping technologies can be used to automatically collect contact details and place false ads on e-commerce platforms or social media, making counterfeit offers more accessible and harder to track for rights holders.

Methods of circumventing detection systems, such as the use of VPNs and proxy servers, play a key role in the activities of criminals, making it difficult to track and detect their activities on the Internet. A VPN can be used by attackers to hide real locations by redirecting Internet traffic through remote servers in different countries, making it difficult to determine their real IP address and location. Similarly, proxy servers can be used to bypass geo-blocking and content-filtering systems by changing IP addresses and providing an additional layer of anonymity (Ezra et al., 2022). These methods make it difficult for right holders to establish the exact location of infringers and effectively stop their activities, which makes it difficult to combat the illegal use of trademarks online.

The blocking and counterfeiting of digital watermarks are a significant challenge to the protection of trademarks in the digital space (Kravchuk et al., 2024). Digital watermarks and metadata are used to identify and protect the copyright of images, videos, and other forms of content by adding unique identifiers that are difficult to remove or alter without compromising quality (Al-Bdour et al., 2024). Attackers can use specialised software and tools to remove or replace these watermarks, making it difficult to track and protect the original content. Video content posted on streaming platforms may be edited to remove

metadata associated with trademarks, making it difficult to establish authorship and protect intellectual property rights.

Thus, the existing tools and methods used by infringers on the Internet to infringe trademark rights highlight the complexity and scale of the problem of protecting intellectual property in the digital environment. Automation technologies, data manipulation, and ways to anonymise activities pose significant challenges for rights holders and regulators, making it difficult to monitor and control infringement. These methods demonstrate the need to develop and implement more effective and flexible protection mechanisms that can quickly adapt to the rapidly changing conditions of the Internet and effectively counteract trademark infringement.

To develop recommendations for improving the mechanisms for protecting trademarks on the Internet, the experience of other countries with advanced systems for protecting intellectual property in the digital environment was studied. In the United States, legal protection of trademarks on the Internet is ensured through a set of mechanisms based on the Digital Millennium Copyright Act (1998). This law provides for procedures for the prompt removal of counterfeit content from Internet platforms. Right holders can use so-called takedown notices, which are notices of infringement sent to Internet platforms, demanding that they remove or block access to counterfeit content. Internet platforms are obliged to respond to such notices within a specified timeframe to avoid liability for hosting illegal content. In addition, the US is actively developing and applying automated monitoring systems that use ML and data analysis technologies to detect and prevent trademark infringement. These systems can scan huge volumes of content, identifying and flagging potential infringements, which significantly increases the effectiveness of intellectual property protection on the Internet (Rimmer, 2017). The combination of legal and technological measures in the US makes the process of trademark protection more efficient and effective, which helps to minimise damage from counterfeit products in the digital environment.

In the European Union, legal protection of trademarks on the Internet is ensured through directives and regulations that oblige Internet platforms to take measures to remove illegal content. For instance, the Directive of the European Parliament and the Council No. 2004/48/EC "On the Enforcement of Intellectual Property Rights" (2004) and the Digital Services Act (European Commission, 2022) establish obligations for online platforms to promptly remove counterfeit content at the request of right holders. In Germany, the Law of the Federal Republic of Germany "On Copyright and Related Rights" (2021) requires platforms to immediately remove infringing content upon receipt of a notice. France also actively uses trademark protection mechanisms through cooperation

with online platforms that are required to verify the authenticity of goods before they are posted on the site (Intellectual Property Code of France, 2024). These measures, based on cooperation between right holders and Internet platforms, help to significantly reduce the number of trademark infringements in the European Union.

In China, where online commerce is particularly high, the use of artificial intelligence (AI) to protect trademark rights online is being actively developed. Platforms are implementing AI-based systems to automatically detect and remove counterfeit goods (Trademark Law..., 1993). For instance, Alibaba's platform uses image recognition technology to compare images of products uploaded by sellers with a database of original brands to quickly detect counterfeits. In addition to this, AI analyses text descriptions and reviews to help identify suspicious products and sellers. China is also adopting blockchain technology to track supply chains and authenticate goods, allowing rights holders and consumers to verify the origin and quality of products (Ferrante, 2024). These innovative approaches render China one of the leaders in trademark protection in the digital space, despite the high volume of online commerce.

These examples underline the importance of a comprehensive approach, including both legal and technological solutions, to effectively protect trademarks on the global web. Based on international experience, the following recommendations can be offered to improve the mechanisms of legal protection of trademarks on the Internet at the national level in Kazakhstan (Table 2).

Recommendations	Description	Examples of implementation
Implementation of automated systems for monitoring and detecting violations	Adaptation of AI and ML to automatically monitor content and detect violations on the Internet.	Implementation of AI-based projects, such as research into the development of automated monitoring systems.
Creation of effective interaction between rights holders and Internet platforms	Development of laws requiring platforms to respond promptly to complaints and remove illegal content.	Adoption and implementation of a draft law on the regulation of interaction with online platforms, for example, new rules in the Law of the Republic of Kazakhstan “On Trademarks, Service Marks, Geographical Indications and Appellations of Origin”, which oblige platforms to respond more actively to requests from right holders.
Development and implementation of AI and for the protection of trademarks	Investment in AI to scan the Internet and detect counterfeit content by creating	Creation of a joint project with IT companies to develop AI systems, for example, the Digital Protection project, which uses AI to monitor the Internet.

	trademark databases.	
Mandatory use of digital watermarks and blockchain technologies	Implementation of digital watermarks and blockchain to track and protect content from counterfeiting.	Pilot projects, such as an initiative to introduce blockchain technology to track the origin of goods in partnership with Kazakh manufacturers and IT companies.
Establishment of a specialised body to monitor and enforce trademark rights on the Internet	Creation of a body to monitor and coordinate the protection of trademarks on the Internet.	Establishment of a new body, for example, the "Agency for the Protection of Intellectual Property" under the Ministry of Justice of the Republic of Kazakhstan, which will monitor violations and interact with Internet platforms.

Table 2 – Recommendations for improving the protection of trademarks on the Internet
Source: compiled by the authors based on the Digital Millennium Copyright Act (1998), Act on Copyright and Related Rights (2021) and Intellectual Property Code (2024).

The introduction of automated monitoring and infringement detection systems in Kazakhstan may represent a key step in improving trademark protection on the Internet. The US experience with takedown tools shows that automating the process of identifying infringing content can significantly speed up and simplify its removal. In Kazakhstan, similar technologies can be adapted using AI and ML to analyse large amounts of data in real-time. Such systems can automatically scan websites, social networks and online shops for use of registered trademarks, identifying illegal copies of logos, images and text. AI and ML can learn from existing infringement data, enabling them to identify potential threats with high accuracy and respond quickly, sending automatic notifications to online platforms and rights holders for further action (Yessenbek et al., 2025; Khan et al., 2025). This will help reduce the burden on rights holders and speed up the process of remedying infringements, which will strengthen the protection of intellectual property in the digital space of Kazakhstan.

Establishing effective interaction between rights holders and Internet platforms in Kazakhstan requires the development and implementation of legal mechanisms that would ensure mandatory cooperation based on clearly defined regulations. European experience demonstrates that directives and regulations requiring online platforms to respond promptly to complaints from rights holders and remove illegal content significantly increase the level of trademark protection. In Kazakhstan, it would be advisable to develop legislation that would establish the obligations of Internet platforms as legal entities to timely review claims of infringement and impose sanctions for non-compliance with these requirements. The legal framework must provide for clear deadlines for processing complaints, as well as the obligation of platforms to notify rights holders of the measures

taken. It is also necessary to provide a mechanism to hold online platforms liable for untimely or insufficient actions to remove counterfeit content, which would encourage them to cooperate more actively with right holders. This legal regulation will help to create a more transparent and effective system of trademark protection on the Internet in Kazakhstan.

The development and implementation of AI for trademark protection is a promising area, based on the successful experience of China, where AI is used to detect counterfeiting and trademark infringement. In Kazakhstan, it is necessary to create conditions for the development and implementation of such technologies that could automatically scan the Internet space and identify counterfeit content. To do this, it is necessary to invest in the creation of powerful algorithms capable of analysing images, text and other elements related to trademarks, as well as forming databases of original trademarks for comparison with potential infringements. This approach will allow for a prompt response to infringements, minimising damage and increasing the effectiveness of intellectual property rights protection in the digital environment.

The mandatory use of digital watermarks and blockchain technologies can significantly strengthen the protection of trademarks in the digital space. Digital watermarks provide unique identification of content, making it easy to trace its origin and changes, which makes it difficult to counterfeit or misuse goods (Malyarets et al., 2019). The blockchain, in turn, offers a decentralised accounting system where information about each stage of the creation, modification and transfer of goods is recorded in a secure and immutable chain of blocks. The introduction of such technologies in Kazakhstan will make the trademark protection system more transparent and reliable, reducing illegal activities and counterfeiting risks.

The creation of a specialised body to monitor and protect trademark rights on the Internet could significantly enhance the effectiveness of the fight against infringements in the digital environment (Tkachuk, 2023). This body, whether a new agency or a subdivision within existing structures, will oversee continuous monitoring of the Internet space, detection of illegal use of trademarks and coordination between right holders and Internet platforms. A specialised body would be responsible for promptly responding to complaints, using modern technology to detect infringements, and developing strategies to improve trademark enforcement. In addition, it could serve as a central point for information exchange between right holders, platforms and state authorities, which would simplify the process of suppressing infringements and taking action.

Thus, the proposed recommendations will help Kazakhstan to improve the protection of trademarks on the Internet, minimising the risks associated with counterfeit products and infringement of intellectual property rights in the digital

space. The implementation of the proposed measures for improving trademark protection in Kazakhstan is expected to have significant economic benefits. By introducing automated monitoring and detection systems, Kazakhstan can reduce the time and resources spent on identifying and removing counterfeit content. This efficiency will not only help businesses protect their intellectual property more effectively but also reduce the economic losses caused by counterfeit products. Additionally, the development of a legal framework that ensures prompt action from online platforms will create a more transparent and reliable environment for businesses to operate in, encouraging investment and fostering fair competition.

The integration of AI and machine learning technologies to monitor trademarks in real-time will enhance the ability to prevent infringements before they can cause widespread damage, protecting both the financial and reputational interests of trademark holders. Furthermore, the adoption of digital watermarks and blockchain technologies will improve traceability and authentication, reducing the risk of counterfeit goods entering the market. This will promote consumer confidence and contribute to the overall integrity of the digital marketplace.

DISCUSSION

The study effectively identifies the need for reform in Kazakhstan's trademark protection laws to address challenges in the digital economy but lacks a deeper exploration of the legal and institutional barriers preventing the adoption of more advanced measures. While drawing on international best practices, the study does not sufficiently address the challenges of adapting these solutions to Kazakhstan's specific legal context. It could have provided more practical recommendations for overcoming these challenges. The study emphasizes technological solutions like AI and blockchain but overlooks the financial, technical, and legal challenges Kazakhstan may face in implementing these tools. Issues such as data privacy and cybersecurity, which are crucial in the digital age, were not fully examined. Over-reliance on automated systems for detecting infringements could lead to false positives, so a more nuanced approach that combines technological advances with fair enforcement mechanisms is needed.

Primarily, the study identifies key problems in the legal protection of trademarks in the Internet space of Kazakhstan. The main difficulties are related to the insufficient adaptation of national legal mechanisms to the specifics of the digital environment, which is manifested in the weak effectiveness of monitoring and control over infringements, difficulties in implementing measures to remove and block counterfeit content, and the limited availability of existing mechanisms for compensation for losses. Similar conclusions can be traced in the works of other authors. For instance, Zheng (2024) addressed the complexities associated

with cross-domain infringement of trademark rights in the Internet space. The author highlighted that with the development of the global network, there are many cases when the same trademark is used in different domain zones, which leads to conflicts between right holders from different jurisdictions. The author's conclusion that these conflicts are exacerbated by the lack of uniform international standards and legal mechanisms for resolving such situations, which makes it difficult to protect trademarks on the Internet, is noteworthy. K. Zheng also highlighted several key challenges, including jurisdictional difficulties, blurred legal boundaries in the virtual environment, and difficulties in establishing priority of trademark rights when the same mark is registered in different countries. Authors emphasize jurisdictional difficulties and the ineffectiveness of traditional trademark protection methods in the digital age. Their work points to the urgency of creating uniform international standards to resolve cross-border trademark disputes, especially when infringing trademarks are used in different domain zones. This global perspective underlines the growing challenges for Kazakhstan, which must navigate not only local legislative reform but also international coordination to address cross-border violations.

Miao (2024) analyses in detail the negative effects of the use of keywords in online advertising that may lead to trademark infringement. The author highlighted the problem of the so-called "traffic hijacking" when competing companies use trademarks of other brands as keywords to advertise their products. This can be confusing to consumers and create a false impression of a connection between brands, which can damage the reputation of trademark owners. The author also emphasised the complexity of law enforcement in such situations, as traditional methods of trademark protection are not always effective in the Internet environment, which was also confirmed in the study. The results of the study also showed that modern infringers in the digital space are actively using a wide range of technological tools and methods to circumvent trademark protection and create counterfeit products, which significantly complicates law enforcement and the protection of intellectual property. However, Miao's argument on the complexity of law enforcement in keyword-based trademark infringement can be contrasted with the potential benefits of technological solutions. While Miao stresses the inadequacy of conventional trademark protection methods, the study suggests that the use of automated systems and AI could offer a more effective means of detecting and addressing such violations in real-time. This contrast points to the tension between traditional legal frameworks, which are not always suited to the digital age, and the emerging role of technology in enhancing enforcement.

Zakir et al. (2023) emphasise that on social media platforms, infringers actively use automated systems to promote counterfeit products, which poses a significant threat to trademark protection. These systems include algorithms and

bots that allow attackers to quickly create and distribute advertising posts, fake accounts and fake reviews. Notably, this makes it difficult to identify and remove infringements, as content can be distributed and modified in real-time, making the work of rights holders and regulators more difficult.

The same conclusions were reached by Li (2024), emphasising that in Chinese cross-border e-commerce, criminals are actively using sophisticated web scraping technologies and fake online reviews to distribute counterfeit products. Web scraping allows attackers to automatically extract data from websites, including information about trademarks, pricing and marketing strategies, which helps to create counterfeits that mimic original products (Chyrun et al., 2019; Havrysh et al., 2023). These technologies underline the importance of automated tools in the digital context and confirm the conclusions of the study on the need to develop more effective methods of monitoring and protecting intellectual property on the Internet. Gasimova (2023) argues that the seizure of domain names for their subsequent sale is the main method of circumventing trademark protection on the Internet, with which we can only partially agree. While this method does pose a significant problem, especially in the context of registering domain names containing well-known trademarks, its relevance to more modern threats is limited. While cybersquatting focuses on the capture and speculation of domain names, modern methods, such as the use of counterfeiting software, automated defence circumvention systems, and web scraping, provide broader and more complex approaches to trademark infringement. In contrast to Gasimova's (2023) focus on domain name seizure, the study argues that modern challenges in trademark protection go beyond cybersquatting. While capturing domain names for speculation still poses a risk, it is the widespread use of technology-driven methods that now present the more pressing challenge. For instance, counterfeiting software and automated circumvention systems can create and distribute counterfeit goods rapidly across multiple platforms, rendering traditional legal approaches less effective. Author's analysis does not fully address the complexity introduced by these new technologies, which require a more nuanced and adaptive response. Therefore, while cybersquatting remains a problem, it is the rise of digital tools enabling mass infringement that demands urgent legal and technological reform to protect intellectual property in the online space.

As a result of the study, based on the analysis of foreign experience, recommendations were developed to improve trademark protection on the Internet, which include the introduction of automated monitoring systems using AI, which will ensure faster detection of counterfeit content, effective cooperation between rights holders and online platforms, supported by legislation, the development of AI technologies, digital watermarks and blockchain technologies,

and the establishment of a specialised monitoring body, which will enhance coordination and responsiveness. Other authors have also developed strategies for improving trademark protection. Badrulhisam (2013) emphasised that automation of monitoring and detection processes is a prerequisite for effective anti-counterfeiting. The author noted that modern tools, such as automated systems for detecting illegal content and big data analytics, can significantly speed up the process of identifying and removing counterfeit goods, which is confirmed in the study.

Roy and Marsoof (2024) suggested removing the human element from trademark enforcement, arguing that automation can increase efficiency and reduce the cost of processing cases. They argue that the use of algorithms and AI to analyse and make decisions can speed up the process and reduce the human factor that often leads to errors and bias. However, one cannot fully agree with the authors about the complete automation of the trademark protection process. While automation can speed up the process, it may not be able to handle the nuances and complexities inherent in specific cases. Algorithms may have difficulty interpreting context or considering the unique circumstances that are important to properly assess infringement. As a result, automated systems can make errors, especially in cases that require a nuanced legal assessment and understanding of complex situations. However, this approach raises concerns about the potential for over-reliance on technology, which may fail to interpret nuanced legal contexts that are crucial for fair decision-making. While automation could undoubtedly streamline processes, it might also overlook the unique circumstances that require human judgment. This is particularly important in cases of trademark infringement where the implications for business reputation and consumer trust are at stake.

Sadeghi et al. (2023) explored the use of blockchain technologies for the protection of intellectual property, noting that blockchain can significantly increase the transparency and reliability of the system by providing an unalterable record of the origin and changes to goods. This technology indeed provides better tracking and verification of intellectual property, making it more secure against counterfeiting and infringement. At the same time, Singh and Yagyasen (2020) highlighted the criminalisation of intellectual property infringements, proposing stricter criminal measures. They believe that criminalisation can create a strong incentive to respect rights, but this approach can be controversial. Harsh criminal sanctions can lead to undue pressure on enforcement and neglect flexible and more adaptive approaches, such as administrative measures or alternative forms of dispute resolution. Overly harsh measures may also place an additional burden on judicial systems and law enforcement agencies, which may reduce the overall effectiveness of enforcement. Thus, while the idea of criminalising infringements

may be attractive, it is important to consider the possible negative consequences and to strike a balance between strict measures and more flexible approaches to ensure fairness and efficiency in the protection of intellectual property. Singh and Yagyasen (2020) advocate for the criminalization of intellectual property infringements, arguing that stricter criminal measures would serve as a strong deterrent and encourage respect for intellectual property rights. While this approach may initially seem attractive, the study reveals significant concerns regarding its broader implications. The authors point out that harsh criminal sanctions could place undue pressure on enforcement, potentially crowding out more flexible and adaptive solutions, such as administrative measures or alternative dispute resolution mechanisms. This view contrasts with the approach advocated in the study, which emphasizes the importance of a balanced, multifaceted strategy to protect intellectual property, rather than relying solely on punitive measures.

Thus, the legal protection of trademarks in the Internet space of Kazakhstan needs to be significantly improved to adapt to the challenges of the digital economy. The study identified several key issues, including the ineffectiveness of existing legal mechanisms, jurisdictional difficulties and new technological threats. To improve the situation, a comprehensive approach that combines technological solutions (such as automated monitoring systems using AI and blockchain technology) with improved legal frameworks and enhanced cooperation between all stakeholders is necessary. At the same time, a balance between automation and human involvement in the process of protecting intellectual property, given the complexity and uniqueness of each case of trademark infringement, should be implemented.

CONCLUSIONS

The study highlights the growing importance of trademarks in the digital economy, emphasizing the need for enhanced legal protection in Kazakhstan's digital space. It identifies significant gaps in the current trademark protection mechanisms, particularly the challenges posed by rapid online distribution and the use of advanced technologies by infringers. Key issues include the difficulty of monitoring and controlling trademark violations, especially when counterfeiting occurs at scale across international platforms beyond Kazakhstan's jurisdiction. The study suggests that existing legal mechanisms are not equipped to effectively respond to these challenges, and there is a need for legislative reform to adapt to the fast-evolving digital environment.

The study proposes a comprehensive approach to improving trademark protection, drawing from international experiences. It recommends the introduction of automated monitoring systems using AI and machine learning,

which could enhance real-time detection of infringements and significantly reduce response times. The use of blockchain technology and digital watermarks is recommended to strengthen the authentication and traceability of goods, improving overall protection against counterfeiting. The study also stresses the importance of fostering better cooperation between rights holders and online platforms, with clear legal mechanisms to ensure prompt action against trademark violations.

The study analysed a wide range of technologies used to infringe trademark rights on the Internet. Counterfeiting software, including graphic editors and 3D modelling, allows for the creation of convincing copies of protected trademarks and packaging. Automated circumvention systems, such as bots and algorithms, use "other words" and proxy servers to bypass content detection and filtering systems. In addition, fraudulent advertising platforms have been found to mimic legitimate commercial websites, using fake logos and testimonials to attract consumers. Web scraping technologies, in turn, are used to automate the collection of trademark data and their use, which facilitates the creation of counterfeit products. Methods of blocking digital watermarks and removing metadata make it difficult to identify and protect original content. It should also be noted that these technologies are constantly evolving, which poses serious challenges for trademark protection systems and requires the development of more advanced countermeasures.

Based on the analysis of international experience, namely the practices of the United States, the European Union and China, comprehensive recommendations were developed to improve the trademark protection system in Kazakhstan. A key element is the introduction of automated AI-based monitoring systems capable of analysing huge amounts of data in real-time to identify potential infringements. An effective mechanism of interaction between right holders and Internet platforms based on clear legal norms obliging platforms to respond promptly to complaints and remove illegal content is necessary. It is proposed to use digital watermarks and blockchain technologies to protect goods from counterfeiting. An important step is the creation of a specialised body for the protection of trademark rights on the Internet, which will coordinate the efforts of all stakeholders and ensure a prompt response to violations. These measures are aimed at creating a more efficient, transparent and responsive system for the protection of intellectual property in the digital space, capable of adapting to constantly changing technological challenges.

The recommendations can be implemented practically by gradually integrating technological and legal reforms into Kazakhstan's trademark protection system. Initially, automated monitoring systems using artificial intelligence and machine learning should be developed to detect infringements in

real-time. This would require collaboration with information technology companies to create such systems. At the same time, legal frameworks should be updated to ensure mandatory cooperation between trademark owners and online platforms, establishing clear deadlines for responding to infringement claims.

Future research in this field could focus on the development of more advanced automated monitoring systems that utilize artificial intelligence and machine learning to detect trademark infringements across multiple platforms. Exploring the integration of blockchain technology for enhanced transparency and traceability of intellectual property in digital environments would be valuable. Research could also examine the effectiveness of international cooperation in trademark protection, particularly in cross-border infringement cases.

Limitations of the study include the rapidly changing nature of technologies and methods of Internet violations, which requires constant adaptation of the proposed solutions. To improve the results in the future, it is recommended to research the implementation of the proposed technologies, as well as to expand international cooperation in the exchange of experience and technologies for the protection of trademarks in the digital environment.

DECLARATION OF CONFLICTING INTERESTS

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