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Artificial Intelligence Technologies in Media and Culture: Legal Regulation*

Victoria Ivashchenko,[1] Daria Ivashchenko,[2] Yuliia Honcharova,[3] Roksolana Dyachenko,[4] Olha Koreniuk[5]

[1, 4] Borys Grinchenko Kyiv Metropolitan University, Kyiv, Ukraine

[2, 3, 5] State University of Trade and Economics, Kyiv, Ukraine

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Abstract

The purpose of the study is to fill the gaps in the literature concerning the legal consequences of artificial intelligence use. The study combines experimental modelling of the interaction of artificial intelligence with media content and cultural artefacts. Methods of machine learning, in particular natural language processing and deep learning, were used. Comparative-legal analysis of the regulatory framework with LexisNexis and Westlaw resources was conducted. Qualitative methods such as regression and analysis of variance evaluated correlations between the influence of artificial intelligence and content changes. The findings showed significant differences in the effect of artificial intelligence on media platforms and cultural institutions. Artificial intelligence has a larger influence on content recommendations and user engagement in media rather than in culture. Tukey Honestly Significant Difference test confirmed the statistical significance of these results, indicating the need for adapted regulatory approaches. Artificial intelligence technologies can improve media content and cultural participation, but current regulations do not correspond to new challenges. The findings underline the necessity of the development of special regulatory norms for ethical artificial intelligence use, in particular within aspects of intellectual property and digital rights management.

Keywords: Artificial Intelligence; Cultural Technologies; Legal Regulation; Media Content; Media Technologies

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[1] **Victoria Ivashchenko.** Doctor of Philology, Professor, Department of Media Production and Publishing, Borys Grinchenko Kyiv Metropolitan University, 18/2, Bulvarno-Kudriavska Str., 04053, Kyiv, Ukraine. Email: ivashchenkovika@gmail.com. https://orcid.org/0000-0002-8044-4116

[2] **Daria Ivashchenko.** Ph.D. in International Law, Associate Professor, Head of International Relations Office, Department of International, Civil and Commercial Law, State University of Trade and Economics, 19, Kyoto Str., 02156, Kyiv, Ukraine. E-mail: darynapr90@gmail.com https://orcid.org/0000-0003-4123-6821

[3] **Yuliia Honcharova.** Ph.D. in Law, Associate Professor, Department of International, Civil and Commercial Law, State University of Trade and Economics, 19, Kyoto Str., 02156, Kyiv, Ukraine. E-mail: yuliiaprof@gmail.com https://orcid.org/0000-0003-4679-3715

[4] **Roksolana Dyachenko.** Ph.D. in Study of Art, Associate Professor, Departments of Advertising and Public Relations, Borys Grinchenko Kyiv. Metropolitan University, 18/2, Bulvarno-Kudriavska Str., 04053, Kyiv, Ukraine. E-mail: roksolana1112@gmail.com https://orcid.org/0000-0002-8177-2357

[5] **Olha Koreniuk.** Ph.D. in Law, Associate Professor, Department of International, Civil and Commercial Law, State University of Trade and Economics, 19, Kyoto Str., 02156, Kyiv, Ukraine. E-mail: olha.koreniuk@gmail.com https://orcid.org/0000-0001-5272-8990

**Corresponding author: ivashchenkovika@gmail.com

A. INTRODUCTION

Integration of artificial intelligence (AI) in the media and cultural sphere changes methods of content creation, organisation, and perception. AI systems provide recommendations on platforms such as Netflix and YouTube and offer new interactive experiences in museums and galleries. The influence of AI on media and culture increases, raising important issues on the adequacy of the current legal regulations (Pierson et al., 2023). There are not enough studies on the legal regulation of AI in these contexts. There is a lack of analysis of intellectual property legislation on the protection of works created by AI, as well as evaluation of practice of digital rights management and ethical consequences. Legal aspects of changes and recommendations of content, created by AI, as well as its influence on cultural heritage, require detailed studying (Goossens et al., 2024). This study aims to critically evaluate the legal consequences of AI introduction in media and culture, based on the analysis of the efficiency of regulatory systems and determining areas for reforming. The tasks of the study are: 1). To analyse legal regulations, regulating AI in media and culture, including cultural property and ethical aspects, 2). To evaluate the efficiency of regulatory measures using comparative legal analysis of different jurisdictions, 3). To detect gaps in regulation and development of reforms for better protection of content and cultural heritage.

Literature review

Technological determinism states that technologies influence society in the way determined before. This assumption is based on the idea that technologies cause social changes. Thus, AI is viewed as an autonomous power, significantly affecting media and cultural behaviour. Rangel (2022) studies AI possibilities in harmful commercial content management on the Internet, in particular for minors' protection. He focuses on the ability of AI to filter online content to ensure the safety of young users. Rangel underlines the efficiency of AI in the detection of inappropriate content and the necessity of updating rules for adaptation to new technologies and ensuring the protection of vulnerable users. Social-legal theories consider the interrelation between the law and society, as well as the influence of technological progress on legal activity. Helberger (2024) analyses the influence of the law on AI in the media sector, in particular content creation and distribution. He describes the changes the new law makes to the legal basis for news organisations, presenting strict requirements for the content created by AI. These rules aim at transparency increase, elimination of prejudice and disinformation, as well as consideration of the changing role of AI in public discourse formation. Lewis and Moorkens (2020) emphasise that human rights

are key to increasing trust in AI in social networks. Their study emphasises the necessity of AI compliance with the main rules such as confidentiality and freedom of expression. They offer to develop legal standards to manage AI influence on social interaction and content moderation.

Post-humanism studies the way AI and the latest technologies transform human experience and identity. Vilá (2023) studies AI influence on the art market in the post-digital era, including processes of art creation and evaluation. He criticises applicable legislation in relation to the art created by AI and offers reforms to solve copyright issues and commercialising such works. He also underlines the necessity to update regulatory acts to reflect new artistic forms and market tendencies. Lebedeva et al. (2023) conducted a historical analysis of media regulation in Western countries. They describe the evolution of laws from traditional media to digital platforms, indicating the influence of previous models on modern mass media regulation and their consequences for AI. So (2023) analyses legal challenges arising due to AI use in mass media, in particular copyright and disinformation issues. He studies watermarks and other strategies for these issues reduction and underlines the necessity of legal reforms to improve AI accountability and misuse prevention. DeChant (2024) analyses cultural and regulatory obstacles in the US legal system, complicating effective AI use. He criticises current norms and cultural views, which prevent AI integration in media and culture, and offers reforms for their elimination.

Regulation theories study processes of creation of marks and policy for the control of technological innovations. Birkstedt et al. (2023) present a detailed analysis of AI governance, defining key themes and areas for further research. They underline the importance of multidisciplinary strategies to solve AI governance issues and the necessity for the creation of a harmonised legal framework. Culturology theories study the way technologies transform cultural practices. Mantello et al. (2023) study the effect of recognition technologies and their social consequences, emphasising the attitude of society toward AI systems, able to interpret human emotions. They emphasise the necessity for legislative frameworks for solving ethical issues and technologies perception by the society. Ruschemeier (2023) evaluates AI Act limitations, considering its potential influence on legal regulation. The necessity for complex legal strategies for the control over the development of AI possibilities and its influence on different areas is underlined.

Regardless of the important data on AI regulation in media and culture, there exist significant gaps. There are not enough studies comparing AI regulation in different jurisdictions, in particular between Western and non-

Western countries. Such comparisons may enable an understanding of how different legal systems cope with AI issues. Many studies are concerned with the existing AI programs, leaving new technologies without attention. Regulatory consequences of innovations require studying. There is no single opinion on the efficiency of regulatory approaches, which emphasises the necessity of additional empirical studies. AI's influence on culture, in particular, cultural production and consumption also requires studying. Most studies focus on Western countries, leaving regulation in other regions without attention. Extending studies to different cultural and legal contexts can provide a wider understanding of AI regulation and its influence on media and culture.

B. METHODS

Study procedure

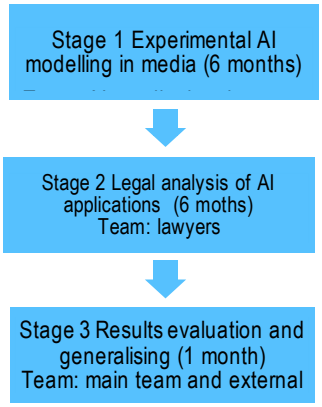

Figure 1. Study stages
Source: construed by the author based on Minitab (2024) data

Sample formation

The study focuses on the specific AI use in media and culture 20 media platforms using AI and 10 cultural institutions, actively implementing these technologies, were analysed (see Table 1).

Table 1. Sample formation

Category	Name	Description
AI-based media platforms		

1.	Netflix	Uses AI algorithms for content recommendations and personalisation.
2.	YouTube	Uses AI for video recommendations and content moderation.
3.	Spotify	Uses AI for music recommendations and playlist compilation.
4.	Amazon Prime Video	Uses AI algorithms for content recommendations and viewer analytics.
5.	Hulu	Implements AI to offer shows and movies based on user preferences.
6.	Apple TV+	Recommendations for content detection based on AI.
7.	Facebook	AI for personalised news feeds and content targeting.
8.	Twitter	Uses AI for content moderation and personalised tweets.
9.	TikTok	Uses AI algorithms for channel content customization and recommendations.
10.	Instagram	AI for photo and video recommendations and content filtering.
11.	Google News	AI-based news aggregation and personalised news feeds.
12.	Snapchat	Uses AI for augmented reality filters and content recommendations.
13.	Reddit	AI for content control and moderation of posts created by users.
14.	Pinterest	Uses AI to suggest pins and boards based on users' interests.
15.	Twitch	Uses AI for stream recommendations and content moderation.
16.	Dailymotion	Video and tag recommendations based on AI.
17.	Vimeo	Uses AI to detect and analyse video content.
18.	HBO Max	AI for personalised content recommendations.
19.	Peacock	Uses AI to offer shows and movies based on the review history.
20.	Quibi	AI-based recommendations for short video content.
Cultural institutions		
1.	Louvre Museum	Uses AI for digital art restoration and visitors' interactive experience.
2.	The British Museum	AI for cataloguing artefacts and virtual exhibitions.
3.	The Museum of Modern Art (MoMA)	Uses AI for art analysis and visitor engagement using interactive installations.
4.	Smithsonian Institution	Uses AI to digitise collections and virtual museum tours.
5.	Tate Modern	AI-based instruments for art analysis and visitors' experience improvement.
6.	Rijksmuseum Amsterdam	AI for cataloguing and expanding access to digital art collections.

7.	The Metropolitan Museum of Art	Uses AI for art restoration projects and virtual exhibitions.
8.	Victoria and Albert Museum	AI to improve visitors' interaction and digital archives.
9.	Museo Nacional del Prado	Uses AI to analyse and restore works of art.
10.	Solomon R. Guggenheim Museum	AI-driven articles for the curation of art and interactive exhibitions.

Source: construed by the author based on the data of Gillis (2023), Buffer (2024)

The objects were selected because of their influence on media and cultural trends. 30 objects, which combine AI platforms and cultural organisations, were analysed. This enabled detailed examination and profound analysis of each of them. The selected objects demonstrate a wide range of AI applications in culture, including recommendation systems and works of art. Object selection was based on AI use, their legal significance and data accessibility. Attention was also given to geographical diversity, particularly in Europe and North America.

The study involves a combination of methods for data collection and analysis:

1. Experimental modelling of AI interactions analysed media content under controlled conditions. Methods using which AI changes, classifies and recommends cultural content were studied using machine learning algorithms such as natural language processing (NLP) and deep learning.
2. Comparative legal analysis of the effectiveness of regulatory acts, regulating AI in media and culture, was conducted. Legislation, judicial practice and political documents of different legal systems were evaluated. The analysis is focused on intellectual property, digital rights management and ethical aspects of AI, using content analysis to detect regulatory gaps.
3. Mathematical modelling included regression analysis to detect correlations between AI interaction and changes in cultural content. The models were cross-validated. The results were evaluated with the use of statistical tests such as analysis of variance, and Chi-squared test with further Tukey's Honest Significant Difference (HSD) test for group differences detection.

Instruments: 1). Experimental modelling of AI interactions: TensorFlow, PyTorch; 2). Data analysis instruments: Pandas, Scikit-learn; 3). Legal study: LexisNexis, Westlaw; 4). Qualitative analysis: NVivo; 5). Statistics: R, Python; 6). Mathematical analysis: MATLAB.

C. RESULTS

Experimental modelling was conducted with the use of TensorFlow and PyTorch. AI's influence on modification, categorization, and recommendations of cultural content was evaluated. NLP and deep learning methods were used for modelling user interaction with a recommendation system. Figure 2 demonstrates the effectiveness of AI systems on media platforms.

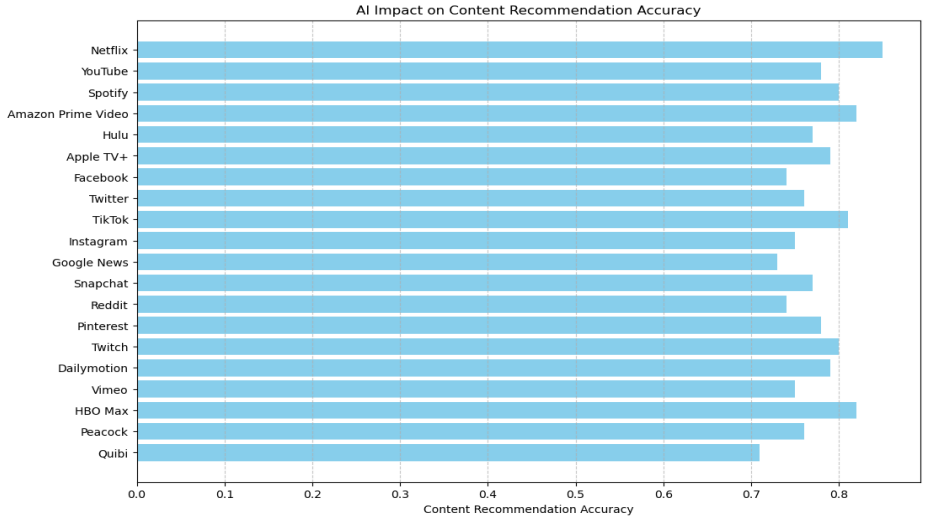

Figure 2. AI influence on content recommendation accuracy.
Source: construed by the author based on the data of Tuner (2024), Myscale (2024)

The vertical axis (Y-axis) shows the accuracy of the content recommendation system, which varies from 0% to 100%. Accuracy is defined as a share of the recommended content recognized as relevant by users. Platforms such as Netflix and YouTube demonstrate high accuracy, which indicates the effectiveness of their algorithms. Hulu and Apple TV+ show average accuracy levels, which indicates the place for improvement. Social networks such as Twitter and Instagram have lower accuracy, probably, due to content complexity or less effective AI models. The data for the analysis was obtained from journals on user interaction on platforms. Accuracy is evaluated based on interaction with the recommended content (clicks, view length). High accuracy increases patients' satisfaction, providing more personalised content. Figure 3 demonstrates the distribution of the levels of content classification among media platforms and cultural institutions, using AI.

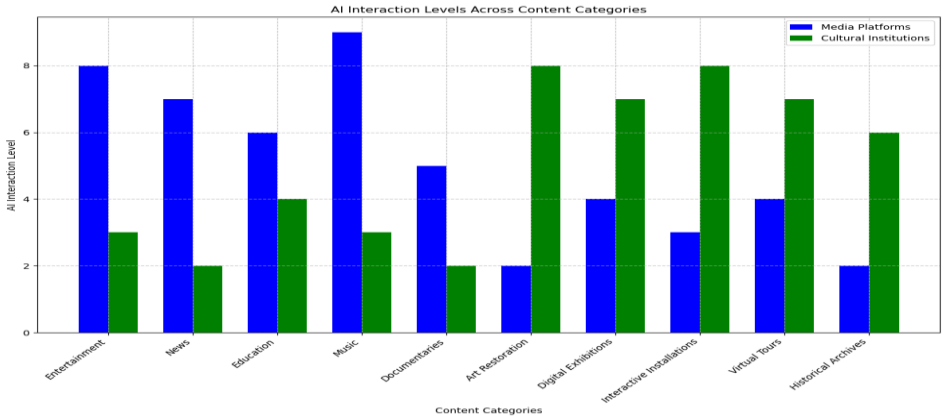

Figure 3. Tendencies of user engagement on AI platforms.
Source: construed by the author based on the data of Braze (2024), Springs (2024)

The X-axis categorises content using AI, which classifies and recommends information. The following genres may be available for media platforms: "Entertainment", "News", "Education", "Music", "Documentaries". For cultural institutions, these can be "Art Restoration", "Digital Performances", "Interactive Installations", "Virtual Tours", "Historical Archives". The Y-axis reflects the AI interaction level in each category, evaluating recommendation frequency, the complexity of algorithms or content personalisation. IA interaction is evaluated with a scale from 1 to 10. High values indicate intensive AI use. Categories "Entertainment" and "Music" have high interaction levels via Netflix and Spotify platforms, where AI provides personalised recommendations.

AI is actively used for digitisation and restoration of works of art, as well as virtual tour creation in cultural institutions such as museums. Educational content demonstrates high AI interaction in courses and materials recommendations. News and historical archives use NLP for data analysis and aggregation. Table 2 illustrates the results of regulatory gaps in the field of AI in media and culture.

Table 2. Quantitative evaluation of regulatory gaps

Regulation area	Number of identified gaps
Intellectual property	5
Digital rights management	3
Ethical issues	7

Source: construed by the author based on the data of Comply (2024), Michalsons (2023).

The intellectual property category includes aspects related to rights to possess, protect and enforce intellectual property rights. Within the context of AI, this is the issue of authorship rights to content created by AI, patenting of AI technologies and author's rights on AI systems. The following gaps were found: Ambiguity in authorship issues for works created by AI, Insufficient protection of AI innovations and technologies, Uncertainties in legislation regarding the role of AI in the derivative works' creation, Unclear policy of the author's material use of AI teaching, and Issues with rights ensuring in different jurisdictions.

Digital rights management (DRM) involves digital content protection, and control over use, distribution, and access. In the case of AI, this is related to data confidentiality, protection of users' information, and unauthorised access prevention. The following gaps were found: Inadequate rules of users' data protection in AI systems, Lack of standards for secure data transmission and storage, and Gaps in legislation concerning unauthorised access via AI.

Ethical issues relate to the moral consequences of AI technologies. This includes fairness, transparency, accountability, and the influence of AI on society. The following gaps were found: Insufficiency in fairness regulation rules in AI algorithms, Requirements for the transparency of the processes of AI decision-making, Inadequate mechanisms of liability for damage caused by AI, Lack of recommendations concerning ethical AI use, Gaps in the policy of AI influence on cultural diversity, Lack of clear ethical standards of interaction with users, and Insufficient consideration of the long-term effects of AI on society.

Regression analysis correlates AI influence with changes in cultural content. In Figure 4, a scatter plot shows the relationship between the level of AI integration and changes in content on media and cultural platforms.

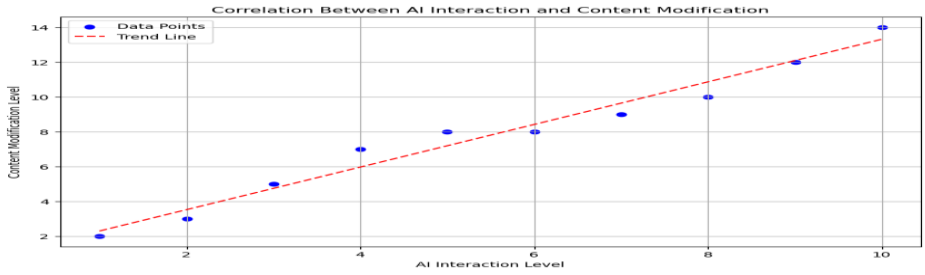

Figure 4. Correlation between AI interaction and content modification.
Source: construed by the author based on the data of A. AIContentfy team (2023)

The X-axis represents the level of AI engagement from 1 to 10, where higher values indicate more intensive use of AI technologies. The Y-axis shows the level of content modification from 2 to 14, which reflects quantitative content changes. The trend line on the plot demonstrates a linear relationship between the levels of AI engagement and content modification. It is received using linear regression and confirms general tendency. Blue points represent actual data, collected from different platforms and cultural institutions. Each point corresponds to a certain level of AI interaction and content modification. The trend line has a positive correlation, which indicates the increase in the level of content modification with the increase in the level of AI interaction. This confirms a positive correlation between AI use and changes in the content. The linear regression coefficients and statistical tests, including ANOVA and Tukey's HSD, confirm the significance of the relationship, with a p-value of less than 0.01. Table 3 contains the results of regression models, evaluating this correlation.

Table 3. Regression analysis results

Model	Value R^2	P-value
Content modification	0,85	<0,01
Users' engagement	0,78	<0,05

Source: construed by the author based on the data of Regression - IBM (2024)

Content modification analyses the influence of AI interactions on the changes in cultural content. Value R^2 for this aspect is equal to 0,85, which means that 85% of variations in content modification can be explained by the level of AI interaction. This indicates a strong relationship between AI interaction and content changes. Value R^2 for the users' engagement is equal to 0,78, which means that 78% of variations in content modification can be explained by the level of AI interaction. This relation is significant, but weaker compared to content modification. The P-value is less than 0,01 which confirms the high statistical significance of the relation between AI and content modification, while the P-value lower than 0,05 confirms the lower significance of the relation with user engagement. In Table 4, the results of the analysis of variance (ANOVA) demonstrate significant differences in AI influence on different media platforms and cultural institutions.

Table 4. ANOVA results

Factor	F-value	P-value
Type of AI platform	12,34	<0,01

Type of cultural institution	9,87	<0,01

Source: Construed by the author based on the data of Datatab (2024)

A Type of AI platform includes different media platforms such as Netflix, YouTube, and Spotify, studied in this analysis. ANOVA determines the presence of significant differences in AI influence on different media platforms. F-value, which is the ratio of the variance between groups to the variance within each group, indicates whether the influence of the factors is significant.

$$F - value = \frac{Variance\ between\ groups}{Variance\ within\ each\ group}$$

The high F-value (12,34) indicates significant differences in the impact of AI on media platforms. Similarly, the high F-value (9,87) demonstrates significant differences in AI influence in cultural institutions such as the Louvre and the Museum of Modern Art. The P-value represents the possibility of receiving observed results in the absence of the effect. A P-value lower than 0,05 demonstrates statistical significance, while a P-value lower than 0,01 indicates a high significance level. The results demonstrate that both factors, the type of AI platform and the type of cultural institution, have high F values and low P values, which indicates significant differences. Tukey's Honest Significant Difference (HSD) test, presented in Table 5, is applied after ANOVA to detect specific groups with significant differences in average values.

Table 5. Tukeys' HSD test results

Comparison	**Average difference**	**Significance**
IA platforms versus institutions	0,23	<0,05

Source: construed by the author based on the data of Tukey_Hsd (2024)

The average indicator 0,23 demonstrates the difference between the groups based on the measured variable. This reflects the average difference in AI programs' influence, in particular, in their ability to interact and modify content, between AI platforms and cultural institutions. The results of the study highlight the current application of AI in media and culture, with a focus on practical and legal aspects. A P-value lower than 0,05 confirms the statistical significance of this difference. This means that the differences between AI platforms and cultural institutions are statistically significant, and not accidental. For example, significant differences in the effectiveness of content recommendations can indicate AI platform advantages.

D. DISCUSSION

Studies demonstrate the significant influence of AI on media and cultural institutions. AI is effectively used in content recommendation systems such as Netflix and Spotify. This enables enhancing audience engagement and content personalisation. Cultural institutions such as the Louvre and the Smithsonian Institution successfully use AI for digital restoration and the creation of interactive impressions for visitors. In his study, Rangel (2022) studies AI use for monitoring content that is unacceptable for minors. This is consistent with our findings of AI possibilities in content moderation. However, Rangel also underlines ethical issues, which were not studied in detail in our work. This indicates the need for the development of complex rules for AI, which shall consider ethical consequences for different user categories. Helberger (2024) analyses the influence of the law on AI in the media. His conclusions are consistent with our data, with an emphasis on the importance of AI regulation to preserve media content integrity. Although Helberger focuses on the future law implications, our study demonstrates the necessity of constant legal changes for adaptation to AI development in media and culture. Lewis and Moorkens (2020) study AI reliability in social networks from the position of human rights, which correlates with our conclusions. Still, our study pays attention to the technological efficiency of AI, while Lewis and Moorkens underline the importance of regulation for user rights protection. This indicates the necessity for a balance between technological progress and digital rights protection. Vilá (2023) analyses AI influence on post-digital art, which is significant for our study. Both studies indicate the profound influence of AI on art and culture. Vilá emphasises the economic aspect of art created by AI, while we concentrate on legal and cultural issues. This underlines the necessity of a multidisciplinary approach to AI studying.

The historical analysis of media legislation of Lebedeva et al. (2023) creates a context for our study. Although they focus on Western legal practices, our study underlines the need for a global approach to AI regulation. Different legislative strategies indicate the importance of international cooperation for the development of integral policy on AI. The study of So (2023) on copyright and AI in media is opposed to our findings. So, focuses on the issues of disinformation and intellectual property protection, while our study demonstrates the effectiveness of AI in content moderation. The difference in accents underlines the importance of the balanced approach to regulation. DeChant (2024) studies legal obstacles to AI implementation in the USA, which differ from our findings on successful AI integration in media and culture. The difference may be

stipulated by different legal and cultural contexts, which underlines the influence of legislative conditions on AI implementation.

Thematic analysis of AI management by Birkstedt et al. (2023) supplements our study, indicating the gaps in knowledge on AI management, in particular, ethical and legal issues. Our findings supplement this dialogue providing empirical data of AI use in media and culture, which can contribute to regulatory approaches improvement. The study by Mantello et al. (2023) on artefact recognition technologies is opposed to our findings. Their study focuses on behavioural reactions to AI, while we are analysing the technological implications of AI. This indicates the need for further study of psychological and social factors of AI's influence on culture. Ruschemeier (2023) evaluation of the Artificial Intelligence Act is consistent with the results of our study, underlining the legal difficulties of AI regulation. Our study confirms that the AI Act shall consider different AI applications in different sectors.

The results of our study confirm the hypothesis that AI use in media and culture is varied and requires special regulatory strategies. The detected differences in AI influence on these spheres emphasise the idea of the necessity of individual regulatory frameworks. AI contributes to the enhancement of user engagement and content personalisation on media platforms and plays a key role in digital art restoration and interactive cultural experience creation.

The results of the study have important practical implications. Firstly, the differences in the impact of AI on media and cultural institutions demonstrate the need for specialised policies. Secondly, successful AI use underlines the importance of its implementation in the media and cultural sphere, which shall be conducted with the control of ethical and legal standards. Thirdly, the geographical variety of the sample emphasises the need for international cooperation in forming single standards for AI.

Limitations: The study involves 30 media platforms and cultural institutions, using AI. This sample may fail to reflect the full variety of AI applications. The focus on specific technologies and legislation cannot consider new challenges and innovations in AI regulation.

Recommendations: To improve legislation on AI use in media and culture, a flexible regulatory act shall be developed. They should consider the rapid development of AI technologies. It is important to ensure the protection of intellectual property and digital rights. Fostering international cooperation on AI ethics and standards will enable the elimination of regulatory gaps and the promotion of consistent global practices.

E. CONCLUSIONS

AI implementation in media and cultural institutions causes significant changes in content creation, management, and use. The influence of AI on media platforms and cultural objects has become more and more notable. This study underlines the necessity of a better understanding of the influence of AI on these spheres and the legal norms, regulating its use.

The analysis demonstrates the importance of adapting legal norms to technological progress to protect intellectual property, and user rights and ensure ethical standards. The results of the study indicate that AI has different influences on media platforms and cultural institutions. Media platforms benefit from AI in the areas of content recommendations and user engagement, while cultural institutions use AI for art restoration and digital activation. These differences underline the necessity for specific regulatory measures. Tukey's (HSD) test detected statistically significant differences in AI influence on different sectors, underlining the inconsistency of the AI effect in different contexts. This requires the development of legal approaches, adapted to the needs of every sector. The comparative-legal analysis detected gaps in applicable norms, in particular, concerning issues of intellectual property, digital rights management and ethics. This indicates the need for legislation renewal for effective management of issues related to AI.

The study opens several practical directions. It provides a framework for the creation of more effective policies and regulatory acts corresponding to the challenges of AI in media and culture. Media platforms can improve recommendation algorithms and user engagement strategies, while cultural institutions can use AI for restoration and visitors' experience improvement. Detection of regulatory acts will contribute to the creation of a legal framework, which adapts to a rapidly changing AI environment. Future studies can focus on interdisciplinary comparisons, long-term tendencies, ethical and social consequences as well as the global perspective of AI use and relative legislation.

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