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Transformation of the Photographic Image through Artificial Intelligence: Artistic Possibilities, Ethical Constraints, and the Problem of Authenticity

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Abstract

This study examines how artificial intelligence transforms photographic images, focusing on the interplay among artistic possibilities, ethical constraints, and questions of authenticity. The research addresses a gap in existing literature: while the technical capabilities of generative AI have been extensively documented, their implications for intellectual property law, market dynamics, and photographic identity remain underexplored as an integrated problem. Employing systematic literature review, comparative legal analysis, and case-study methods, the study draws on peer-reviewed sources. Results indicate that generative adversarial networks and latent diffusion models have expanded expressive possibilities for photographers while simultaneously creating substantial legal ambiguity over authorship and copyright ownership, particularly in commercial marketplaces such as Amazon, Etsy, Wildberries, and Ozon. The author proposes an original IP risk assessment framework tailored to AI-transformed photographs and identifies actionable recommendations for legal practitioners, platform administrators, and creative professionals. Findings will benefit legal scholars in the fields of intellectual property and digital media, as well as policymakers and businesses seeking to align creative innovation with regulatory compliance.

Keywords: *Artificial Intelligence, Photographic Transformation, Intellectual Property, Copyright, Generative Adversarial Networks, Diffusion Models, Digital Authenticity, Marketplace Regulation.*

INTRODUCTION

Photography has always negotiated between technical mediation and the documentary claim of capturing reality. The introduction of artificial intelligence into photographic production represents a qualitative shift rather than a mere incremental upgrade: generative AI tools do not simply adjust an existing image but can synthesize, interpolate, and fabricate visual content at a scale and speed that earlier post-processing software could not approximate. As of 2024, the global AI image generator market was valued at approximately USD 425 million and is projected to exceed USD 917 million by 2030, growing at a compound annual rate of 17.4% [1]. More telling is the volume of output: over 15 billion AI-generated images have been produced since 2022, with roughly 34 million new images created daily [2]. These figures place AI-mediated visual production on a trajectory that intersects, and in some sectors already displaces, conventional photographic workflows.

The rapid diffusion of platforms such as Stable Diffusion, Midjourney, and DALL-E has moved AI image generation from research laboratories into commercial marketplaces. On Etsy, one of the most studied cases, human illustrators reported revenue declines ranging from 30% in 2022 to 98% by mid-2024 as AI-generated art flooded product listings at lower price points [3]. Amazon sellers adopted AI tools for product imagery at comparable speed: by 2024, more than one-third of Amazon sellers and brands used AI to create or optimize product listings [4]. In Russia, the two dominant e-commerce platforms, Wildberries and Ozon, together counted several million active sellers as of May 2024, with logistics networks covering over 80% of e-commerce deliveries [5], yet neither has introduced explicit AI-image disclosure requirements comparable to those adopted by Etsy in 2024. This divergence in regulatory stance across major global marketplaces illustrates the core tension this study addresses: the absence of a coherent legal and ethical framework for AI-transformed photographs in commercial contexts.

Legal uncertainty runs parallel to the market disruption. The United States Copyright Office confirmed in March 2023 that AI-generated images lacking sufficient human creative control are ineligible for copyright registration [6]. In December 2023, it rejected Ankit Sahni's application for an AI-filtered photograph styled on Van Gogh's Starry Night, ruling that the applicant had exerted insufficient creative control over the final work [7]. Concurrently, the class-action lawsuit filed in January 2023 by visual artists Sarah Andersen, Kelly McKernan, and Karla Ortiz against Stability AI, Midjourney, and DeviantArt proceeded toward discovery after U.S. District Judge William Orrick declined to dismiss the core copyright infringement claims in August 2024 [8]. These cases have not resolved the underlying questions; they have clarified only what remains unresolved.

Scholarly attention has addressed individual dimensions of this problem, including the technical capabilities of generative models [9], the philosophical questions of authorship and authenticity in AI art [10], and legal analyses of copyright in AI-generated works [11]. However, no prior study has integrated the artistic, ethical, and legal dimensions of AI photographic transformation with an explicit focus on comparative marketplace regulation and the perspective of intellectual property practitioners. The scientific novelty of this study lies in proposing an original IP risk assessment framework that connects the technical parameters of AI-image generation with actionable legal guidance across US, EU, and Russian e-commerce contexts.

The research goal is to analyze the artistic possibilities and ethical constraints of AI-based photographic transformation and to identify the legal mechanisms through which questions of authenticity and intellectual property can be addressed in contemporary commercial and judicial contexts. The working hypothesis is that AI photographic transformation does not inherently eliminate the protectable human contribution to an image, but the extent of that contribution, and therefore the scope of copyright protection, depends on verifiable and documentable acts of creative decision-making by the human operator.

The study carries several methodological boundaries. It relies on published case law and policy documents current as of mid-2024; legislative developments after that date fall outside its scope. The comparative analysis covers three jurisdictions, the United States, the European Union, and the Russian Federation, selected for their relevance to the major commercial marketplaces under discussion, but it does not constitute an exhaustive survey of international IP law. The research does not conduct primary empirical data collection and therefore cannot quantify causal relationships between specific AI tools and market outcomes. These boundaries do not diminish the practical value of the study for practitioners in intellectual property law, for photographers navigating commercial platform policies, and for policymakers seeking to connect domestic regulations with international trends.

MATERIALS AND METHODS

This study employs a multi-method research design combining systematic literature review, comparative legal analysis, and illustrative case study. Each method addresses a distinct dimension of the research problem.

The systematic literature review covered peer-reviewed publications indexed in Scopus, Web of Science, Springer, IEEE Xplore, and ACM Digital Library from 2018 to 2024. Initial keyword searches used the terms "AI image generation," "photographic transformation," "GAN photography," "diffusion models art," and "AI copyright." Publications were screened for relevance to the study's three thematic axes: technical processes of AI image transformation, ethical and philosophical questions of authenticity and authorship, and legal frameworks governing intellectual property in AI-generated visual works.

The comparative legal analysis examined statutory law and administrative guidance in three jurisdictions: the United States, the European Union, and the People's Republic of China . Marketplace policies of Amazon, Etsy, Wildberries, and Ozon were analyzed as secondary legal texts that operationalize these frameworks at the platform level.

RESULTS AND DISCUSSION

The following section presents findings organized around four thematic clusters: the technical landscape of AI photographic transformation, artistic possibilities and their contested limits, the legal and ethical framework governing authenticity and authorship, and marketplace dynamics across the US, EU, and Russian contexts. Within each cluster, the analysis integrates empirical data, legal precedents, and the author's original synthesis.

Generative adversarial networks, introduced by Goodfellow and colleagues in 2014, operate by training a generator network to produce images indistinguishable from real photographs, with a discriminator network providing adversarial feedback. By 2022, the GAN framework was largely superseded for high-quality image synthesis by latent diffusion models, which operate by applying noise to a compressed latent representation of an image and then using a denoising U-Net to recover samples with specified attributes [9]. Stable Diffusion, released by Stability AI in August 2022, brought this capability to consumer hardware; within months it had attracted 10 million monthly users and was generating approximately 2 million images daily [12].

The three commercially dominant systems differ in architecture and in the degree of creative control they afford users. Stable Diffusion operates in an open-source environment and supports fine-tuning on user-supplied datasets, offering high customizability. Midjourney, a proprietary subscription service, generates stylistically distinctive output that tends toward aesthetic coherence even from minimal prompts, attracting approximately 15 million users by 2023 [13]. DALL-E 2, developed by OpenAI, combines a CLIP image-text embedding model with a diffusion decoder, enabling prompt-guided photorealistic synthesis and controlled style transfer [14]. The table below provides a comparative technical summary.

Table 1. Comparative overview of principal AI image generation systems (compiled by the author based on [9, 13, 14])

System	Architecture	Release	Primary use case	Users (2023)
Stable Diffusion	Latent diffusion (LDM)	2022	Open-source style transfer, fine-tuning on custom datasets	~10M monthly
Midjourney	Proprietary diffusion	2022	Aesthetic synthesis, minimal-prompt artistic creation	~15M
DALL-E 2/3	CLIP + diffusion decoder	2022-2023	Text-to-image, photorealistic synthesis, style transfer	>1M

The artistic possibilities opened by these tools extend in two directions: expanded access to photographic creation, and qualitatively new expressive forms that have no analogue in conventional photography. Regarding access, tools like Midjourney and Stable Diffusion allow practitioners with no prior training in digital post-processing to generate images of high technical quality, effectively decoupling photographic output from photographic skill. Regarding expressive form, photographers who have integrated AI into established practices report qualitative changes in their creative process. Stable Diffusion enables style transfer at scale, allowing practitioners to apply learned visual grammars, the color palette of a specific era, or the tonal rendering associated with a named photographer, to new source images [15].

The case of Laurie Simmons illustrates one documented adaptation: she began using DALL-E during the COVID-19 pandemic when logistical constraints prevented location shoots and developed a practice in which AI synthesis replaced physical set construction [16]. This adaptation is not unique to individual artists. In commercial photography, studios now generate digital twins of models before actual shoots to reduce logistical costs, and stock image platforms like Shutterstock recorded USD 104 million in AI data licensing revenue in 2023, rising to USD 138 million in 2024 [17]. The artistic integration of AI is therefore neither marginal nor experimental; it is embedded in commercial photographic practice at multiple scales.

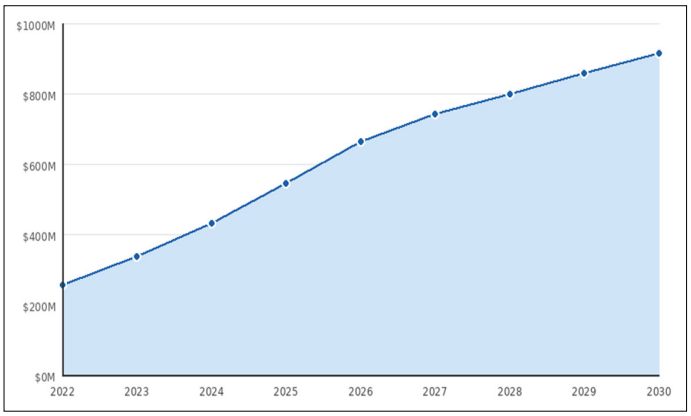


Figure 1. AI image generator market size growth, 2022-2030, USD million (compiled by the author based on [1])

The question of authenticity in photography has a longer history than AI itself. Documentary photography has always involved framing decisions that are inherently selective and interpretive; the question is whether AI-mediated transformation introduces a qualitatively distinct category of inauthenticity or merely intensifies existing problems. Cui et al. [18] argues that framing, the deliberate selection and structuring of an image, has always been the central mechanism of photographic authenticity, and that AI does not displace this mechanism but adds additional layers to takes a stronger position, arguing that a conceptual distinction between photorealism and photography is necessary to address AI-generated imagery: a photorealistic image that was never captured by a camera cannot share the indexical relationship to a real event that grounds documentary authority [19].

The deepfake problem represents the most acute expression of this concern. In 2023, deepfake incidents in the fintech sector increased by 700%, indicating adoption by actors whose purpose is fraudulent rather than expressive [20]. The deepfake detection market, valued at USD 5.5 billion in 2023, is projected to reach USD 15.7 billion by 2026, growing at approximately 42% annually [21]. However, detection accuracy on contemporary in-the-wild deepfakes has deteriorated sharply: across video, audio, and image modalities, state-of-the-art detectors evaluated on the Deepfake-Eval-2024 benchmark showed performance drops of 45-50% relative to earlier academic benchmarks [22]. This detection gap has direct implications for photojournalism and for legal evidence.

The following workflow diagram maps the AI-mediated photographic transformation process from input through output and legal assessment, identifying the stages at which human creative decisions can be documented for subsequent intellectual property claims.

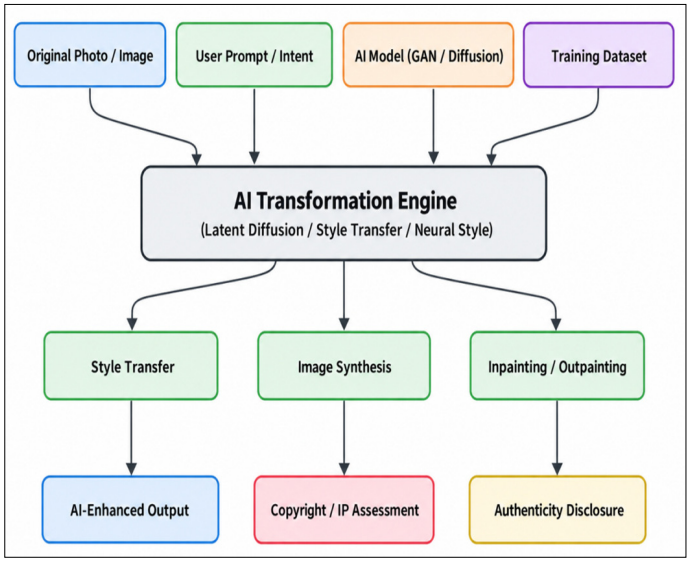


Figure 2. AI-mediated photographic transformation workflow with IP checkpoints (compiled by the author based on [9, 18, 19])

The legal treatment of AI-generated photographs diverges significantly across jurisdictions, as illustrated in Figure 3. In the United States, the Copyright Office's March 2023 Guidance established that copyright protects only material that is the product of human creativity and that human authorship is required for registration [6]. Works containing AI-generated material may be registered only to the extent that a human author's original contribution can be identified and separately disclaimed from the AI-generated portions.

The landmark class-action Andersen v. Stability AI moved toward discovery following Judge Orrick's August 2024 ruling that the artists' copyright claims were plausible:

the court found that Stable Diffusion may have been built to a significant extent on copyrighted works and created to facilitate that infringement by design [8]. A second significant action, Getty Images v. Stability AI, added trademark infringement allegations arising from outputs that reproduced Getty's watermark. Disney and Universal filed a separate action against Midjourney in 2024, citing dozens of generated images depicting copyrighted characters [23]. The table below provides a comparative overview of these proceedings.

Table 2. Landmark legal cases and institutional policies governing AI-generated images (compiled by the author based on [8, 23, 24])

Case / Policy	Jurisdiction	Central legal issue	Status / Outcome
Andersen v. Stability AI	USA	Copyright infringement via training data	Discovery phase; trial set for 2027
Getty Images v. Stability AI	USA/UK	Copyright and trademark infringement	Pending; trademark claims remain active
Disney and Universal v. Midjourney	USA	Character intellectual property infringement	Filed; injunction and damages sought
Sahni (SURYAST) v. USCO	USA	AI-filtered photograph copyright registrability	Registration denied; insufficient human control
Lee v. Liu, Beijing Internet Court	China	AI-image copyright ownership by human operator	Copyright granted to human operator

In the European Union, the EU AI Act of 2024 requires transparency: AI systems that generate or manipulate images must be labeled as such, and providers of general-purpose AI models with systemic risk face additional obligations. This transparency mandate intersects with GDPR data protection rules to create a more prescriptive framework than the US case-by-case approach. In China, the Beijing Internet Court that an AI-generated image could be protected by copyright if the human operator exercised sufficient intellectual input and creative judgment, representing a departure from the US position [11].

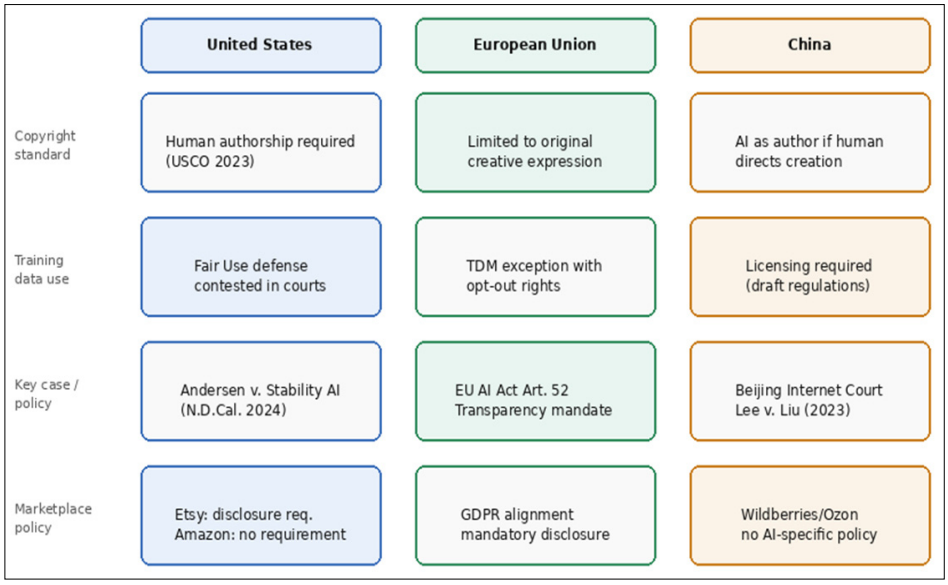


Figure 3. Comparative legal framework for AI-generated images across US, EU, and China (compiled by the author based on [6, 7, 11])

Commercial marketplaces constitute the practical arena in which abstract IP principles translate into everyday decisions. The following table compares AI image policies across the four major commercial platforms analyzed in this study.

Table 3. Comparative AI image policies on major global marketplaces as of mid-2024 (compiled by the author based on [3, 4, 5])

Platform	Country	AI image policy (2024)	Disclosure required	Enforcement mechanism
Amazon	USA (global)	Permitted; AI tools actively promoted for sellers	No formal requirement	Content review on complaint basis only
Etsy	USA (global)	Permitted with mandatory seller disclosure in listings	Yes (seller listing label)	Minimal; community flagging; reports of non-compliance
Wildberries	Russia	No specific AI image policy as of mid-2024	No	No mechanism specific to AI-generated imagery
Ozon	Russia	No specific AI image policy as of mid-2024	No	No mechanism specific to AI-generated imagery

Etsy's 2024 policy permitting AI-generated art with mandatory disclosure produced measurable market effects. Human illustrators reported steep revenue declines; one UK-based illustrator with a decade on the platform reported a 98% sales decline attributable to AI competition [3]. Amazon's approach has been less prescriptive: in 2024, roughly one-third of its sellers used AI for product imagery, with 14% having fully automated their marketing content production [4]. Neither Amazon nor the Russian platforms Wildberries and Ozon had introduced AI-specific disclosure requirements as of mid-2024, creating asymmetric disclosure obligations across global markets that complicate the position of international IP practitioners.

Drawing on the legal, technical, and market analysis above, the author proposes an original IP risk assessment framework for AI-transformed photographs, illustrated in Figure 4. The framework operates as a decision tree that a photographer, legal practitioner, or platform administrator can apply to any AI-transformed image to assess its copyright status and disclosure obligations under US law, with adaptations for EU and Chinese jurisdictions noted.

The first node of the framework asks whether the training data used to generate or transform the image was licensed or obtained with opt-out rights. A positive answer substantially reduces the risk of direct infringement at the input stage, consistent with the position advanced in the EU AI Act. A negative answer requires the practitioner to proceed to the second node: whether the human operator exercised sufficient creative control over the expressive elements of the output.

Creative control, as operationalized in this framework, is not defined by the number of prompts submitted but by the degree to which the human operator made identifiable decisions about composition, subject selection, aesthetic register, and specific visual outcome. This operationalization is consistent with the Copyright Office's case-by-case approach: the USCO has registered works combining AI-generated and human-authored material where the human contribution is clearly perceptible in the final output [24]. If creative control is sufficient, the human-authored elements can be claimed under copyright with the AI-generated portions disclaimed. If creative control is insufficient, the work falls outside copyright protection under US law and is also unprotectable under the EU and Chinese frameworks as currently interpreted.

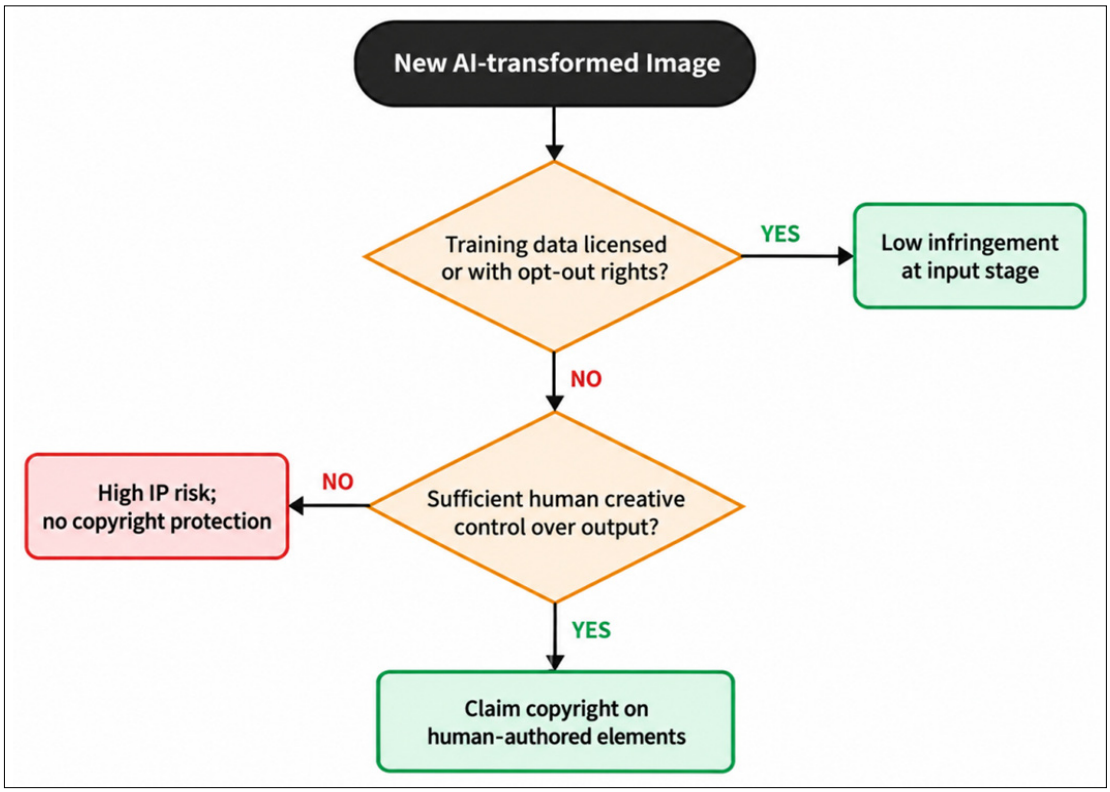


Figure 4. Author-proposed IP risk assessment framework for AI-transformed photographs (compiled by the author based on [6, 7, 24])

This framework offers a practical tool for intellectual property attorneys advising clients who produce or commission AI-transformed photographs. Its application does not resolve the broader policy question of whether the threshold for sufficient human authorship should be revised in response to the proliferation of AI tools, but it provides a structured approach to the existing legal landscape. The author recommends that IP practitioners document the creative process of AI image transformation through timestamped logs of prompt iterations, reference image selections, and post-generation edits, creating an evidentiary record that can support a copyright claim if challenged.

Beyond the individual case level, the analysis supports three recommendations for platform policy. First, mandatory disclosure of AI-generated or AI-transformed images should be harmonized across major global marketplaces to prevent regulatory arbitrage by sellers who shift AI-content sales to platforms with weaker disclosure requirements. Second, marketplaces should implement technical provenance systems, such as those developed by the Adobe Content Authenticity Initiative, to provide buyers with verifiable information about image origin [17]. Third, platforms operating across jurisdictions should develop legal compliance matrices that map disclosure obligations to the applicable law of the seller's country of residence, the buyer's country, and the platform's country of incorporation, rather than applying a single lowest-common-denominator standard.

CONCLUSION

This study set out to analyze the artistic possibilities and ethical constraints of AI-based photographic transformation and to identify legal mechanisms through which authenticity and intellectual property questions can be addressed in commercial and judicial contexts. The analysis confirms the working hypothesis: AI photographic transformation does not eliminate the protectable human contribution to an image, but documenting and preserving that contribution requires deliberate practices that most current photographic and legal workflows do not systematically support.

The results demonstrate that generative AI has expanded photographic possibilities in ways that range from legitimate artistic extension to fraudulent fabrication, and that existing IP frameworks in the United States, European Union, and China provide partial but inconsistent protections. The landmark US proceedings in Andersen v. Stability AI and the EU AI Act's transparency mandate represent steps toward regulatory clarity, but they address different aspects of the problem and have not yet converged on a coherent international standard. The comparative marketplace analysis shows that regulatory divergence between US platforms and Russian e-commerce environments creates unequal conditions for human creators competing against undisclosed AI content.

The author's IP risk assessment framework provides intellectual property practitioners with a structured tool for evaluating copyright exposure in AI-transformed photographs, grounded in the existing legal record rather than anticipated legislative change. The three platform policy recommendations, disclosure harmonization, technical provenance systems, and jurisdiction-aware compliance matrices, address gaps identified in the literature and in contemporary commercial practice.

The practical significance of this work is greatest for intellectual property attorneys specializing in digital media and visual arts, for photographers and creative studios integrating AI into commercial practice, and for policymakers in jurisdictions currently formulating AI-specific regulations. Future research should examine how courts respond to the evidentiary record produced by the documentation practices recommended here, and how the anticipated legislative responses to the Andersen v. Stability AI trial shape the standard for human authorship in AI-assisted creative work.

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