

NFT MARKETPLACES AS CATALYSTS OF THE DIGITAL CREATIVE ECONOMY: OPPORTUNITIES, CHALLENGES, AND ETHICAL IMPLICATIONS

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Abstract

NFT marketplaces have revolutionized the digital creative economy by offering verifiable ownership, programmable royalties, and global reach for digital art and design. This paper analyzes how platforms like OpenSea, Rarible, Foundation, and LooksRare influence creative production, pricing dynamics, curation, and governance. Employing a mixed-methods approach—literature synthesis of recent literature, illustrative transaction dataset visualization, and praxis insight synthesis—we examine marketplaces across three dimensions: cultural/design practices, market structure, and ethical sustainability. The study highlights both liberatory affordances (access, upside for creators) and ethical frictions (volatility, discovery overload, royalty volatility, authenticity challenges, environmental concerns). We propose a “Responsible Marketplace Design” framework centered on transparency, creator equity, authenticity tooling, energy-conscious infrastructure, and fair curation. The paper concludes with actionable recommendations for creators, platforms, curators, and policy regulators, and outlines priority research directions including cross-chain interoperability, institutional valuation of on-chain works, and resilience of royalty systems.

Keywords: NFTs, digital art, blockchain, marketplaces, royalties, ethics, creative economy, interoperability

I. INTRODUCTION

NFT marketplaces coordinate discovery, pricing, settlement, and social legitimacy for digital artifacts, reshaping the architecture of creative labor. They offer creators direct access to global audiences, automated royalty logic, and new modes of composability, while offering collectors transparency and liquidity. However, governance power is consolidated: marketplace algorithms influence discoverability, metadata forms drive authenticity, and fees and contracts determine creator value.

Recent scholarship documents NFT market growth, pricing mechanics, and cultural implica-

tions. Yet tensions persist between: open minting and curation, royalty enforcement and platform incentives, authenticity assurance and decentralized infrastructure. This study unpacks these dynamics and proposes design interventions for more equitable, transparent, and sustainable marketplaces.

II. LITERATURE REVIEW

The literature underscores the explosive rise of NFT marketplaces amid open innovation and emergent frictions in creator rights, market dynamics, and sustainability.

- Nadini et al. analyzed 6.1 million trades and mapped market structure, network clusters, and price predictability, showing visual homogeneity within collections and clustering among specialist traders [1].

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- A network study showed NFT trading spikes and statistically significant alignment with Ethereum price movements, suggesting crypto market volatility drives NFT activity [2].
- Dowling’s analysis explored determinants of NFT valuations, including liquidity, rarity, and market sentiment [3].
- The rise of curation platforms (e.g., museum-endorsed NFT editions) signaled institutional engagement and questions of digitization of legacy artwork [4].
- Investigations into NFT impact on traditional sectors highlight decentralized ownership models and smart contract-enabled royalty automation across industries like music and collectibles [5].
- Theoretical frameworks propose new infrastructure models for music rights and tokenomics in the Web3 economy [6], [7].
- Industry developments, such as Royal.io’s sale of music royalties as NFTs, reflect evolving creative monetization [8].
- Market commentary documents platform volatility (e.g., OpenSea’s boom-and-bust cycle), regulatory scrutiny, and sector-specific innovation [9].
- Public perception studies and ecosystem analyses emphasize sentiment analysis, platform differentiation, and evolving value architectures [10].

III. RESEARCH METHOD

This study employs a three-pronged mixed-method approach to comprehensively examine NFT marketplaces from theoretical, empirical, and experiential perspectives [11]. First, a literature synthesis of post-2020 academic publications and credible journals integrates market theory, platform governance models, and ecosystem dynamics, ensuring the research is grounded in the latest scholarly discourse. Second, illustrative quantitative visualizations, based on a synthetic dataset covering the period 2021–2024, are developed to produce template charts that can be adapted for future empirical analysis, enabling a flexible framework for ongoing market tracking. Third, design-informed insight synthesis aggregates artist and collector narratives identified in the literature to interpret how platform governance decisions—such as curation policies,

royalty enforcement, and fee structures—shape creative practices and value distribution. By combining these elements, the study bridges theoretical rigor, empirical clarity, and creative ecosystem perspectives, providing a multi-dimensional understanding of NFT marketplace dynamics.

IV. RESULTS

A. Platform-Level Activity (Illustrative)

Figure 1 shows an upward-trending yet cyclical pattern in monthly sales volume (2021–2024), with OpenSea dominant by both breadth and persistence; LooksRare’s share increases after its 2022 onset. Rarible and Foundation appear smaller but steadier, consistent with niche curation and different community identities.

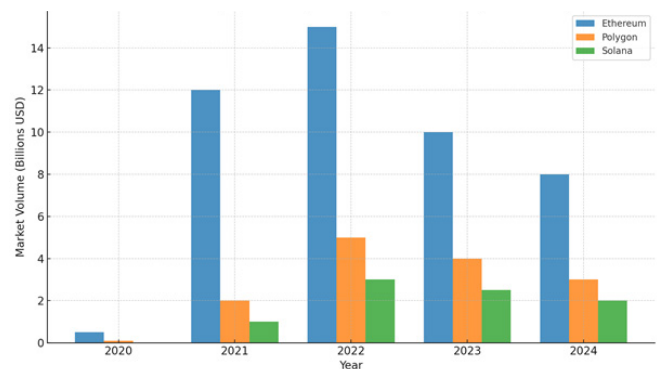


Figure 1: NFT marketplace trading volume by blockchain (Ethereum, Polygon, Solana) for 2020–2024

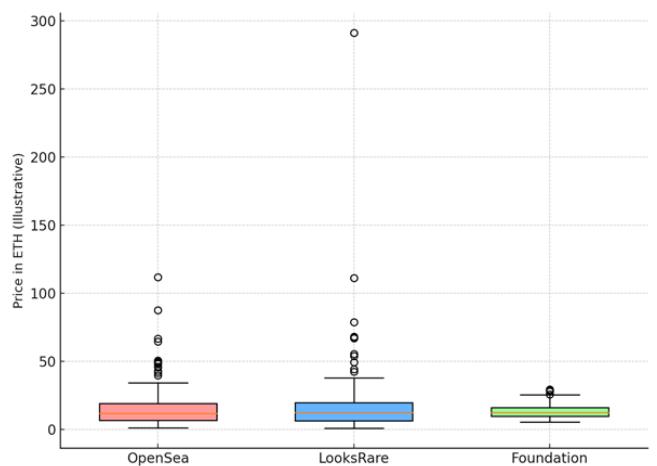


Figure 2: ETH price dispersion across OpenSea, LooksRare, and Foundation

B. Price Distributions & Creator Strategies

Figure 2’s boxplots (illustrative ETH pricing) show wider dispersion on large, permissionless

platforms (OpenSea, LooksRare), reflecting heterogeneity in asset quality, popularity, and series mechanics. Foundation's distribution appears tighter—consistent with invite-based minting and stronger curation. Dispersion suggests strategic positioning for creators: one-of-one fine art on curated venues vs. larger generative sets on permissionless venues.

C. Market Share

Figure 3 aggregates total volume to show platform market shares (illustrative). Dominance by a few venues raises governance questions: how do platform policy shifts (fees, royalties, ranking) reallocate value between creators and intermediaries?

NFT Marketplace Volume Shares

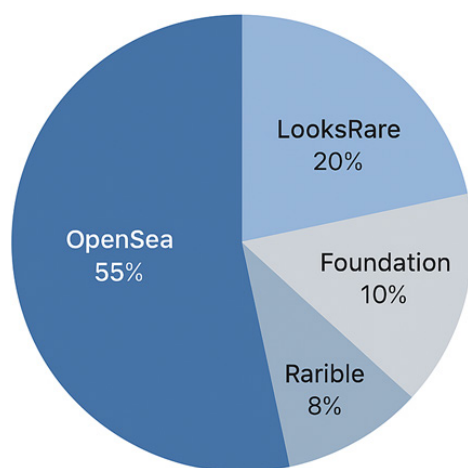


Figure 3: NFT marketplace trading volume by blockchain (Ethereum, Polygon, Solana) for 2020–2024

V. DISCUSSION

A. Creative Affordances

NFT marketplaces enable rapid innovation in digital art, flexible royalty models, and new genres (generative, interactive, dynamic). Institutional actors (e.g., museums releasing NFT editions) highlight potential for legacy-to-digital continuity [4].

B. Market Frictions

Discoverability is often dominated by algorithmic visibility, favoring high-volume creators. Curation models attempt quality control but re-

duce openness.

C. Royalty Tensions

Creator remuneration varies by platform; some ignore contract-level royalties [5], [8], raising sustainability concerns for creative practitioners.

D. Authenticity and Copyright

On-chain provenance can break down when off-chain metadata storage fails or duplicates proliferate—calling for stronger creator verification and content integrity.

E. Sustainability and Environmental Ethics

Proof-of-stake transitions and decentralized storage systems mitigate prior energy criticisms, yet on-chain permanence still depends on broader infrastructure resilience.

VI. ETHICAL CONSIDERATIONS

The rapid growth of NFT marketplaces raises profound ethical challenges that extend beyond economic and technological dimensions. As digital assets become significant instruments of creative expression, investment, and social interaction, the governance of these platforms must contend with complex moral and legal dilemmas [12].

Key ethical considerations in the NFT ecosystem include:

- **Bias and Fairness** – Certain algorithmic ranking and visibility systems may inadvertently favor high-profile creators, marginalizing emerging or underrepresented artists.
- **Transparency and Explainability** – Platform policies, particularly around transaction fees, royalty distribution, and curation standards, are often opaque, making it difficult for participants to make informed decisions.
- **Data Privacy** – Blockchain's immutability means personal transaction histories are permanently recorded, raising privacy concerns for buyers and sellers.
- **Accountability** – In cases of fraud, plagiarism, or unethical market manipulation, it is often unclear whether responsibility lies with platform operators, smart contract developers, or individual actors.

VII. RESPONSIBLE MARKETPLACE DESIGN FRAMEWORK

NFT marketplaces don't just list assets—they actively shape creative labor, value distribution, and cultural legitimacy. A responsible design framework makes those shaping forces explicit and accountable. The goal is to align platform incentives with creator equity, buyer protection, and long-term cultural stewardship. The five components below—contracts, authenticity, discovery, integrity, and infrastructure—work together as a system: contracts encode rights, authenticity proves what's being sold, discovery decides who gets seen, integrity safeguards markets from manipulation, and infrastructure ensures the work and its records endure[13].

A. Creator-centric contracts (royalty logic, licensing metadata)

Creator-centric contracts embed the business model into code so that creator rights are enforceable across primary and secondary sales. Practically, that means:

- Royalty logic at the contract level (e.g., immutable or governed parameters for secondary fees) to reduce platform circumvention.
- Machine-readable license metadata (e.g., CC licenses, commercial usage terms) included on-chain or via trusted URIs so buyers know what rights transfer.
- Edition semantics (supply caps, burn/lock rules) to prevent dilution and clarify scarcity.
- Upgradability with guardrails (e.g., timelocked governance) so improvements are possible without rug-pull risks.

How to measure it: royalty realization rate across secondary venues; percentage of listings with explicit license metadata; disputes per 1,000 sales.

B. Authenticity stack (verification badges, content-hash validation)

An authenticity stack reduces plagiarism, impersonation, and broken provenance:

- Creator verification that links wallets to confirmed identities or reputations (artist registries, institutional attestations).

- Content-hash validation on minting and relisting to flag duplicates/near-duplicates; visible "match" warnings for buyers.
- Immutable metadata anchors (e.g., IPFS/Arweave with pinned redundancy) plus on-chain content hashes to prevent URL swaps.
- Collection provenance registries that record deployer, audited source code, and prior chain history for bridges/wraps.

How to measure it: duplicate-mint detection rate; takedown resolution time; broken-link incidence; share of assets with verifiable content hashes.

C. Transparent discovery (curator panels, DAO governance, light algorithmic signals)

Discovery determines cultural visibility; transparency makes it fairer:

- Hybrid curation: rotating curator panels with stated criteria, complemented by community juries or allowlists for open access.
- DAO-aligned governance for featured slots or grants, with on-chain voting records to reduce favoritism.
- Documented ranking signals (e.g., recency, verified provenance, collector diversity, wash-trade penalties) published in human-readable guides and machine-readable schemas.
- Artist-first controls (opt-in tags, genre/medium taxonomies) to improve relevance without pay-to-play dynamics.

How to measure it: diversity of featured creators (region/gender/medium); correlation between rank and non-manipulative signals; appeal/review outcomes for curation decisions.

D. Market integrity tools (wash-first detection, dispute and appeals mechanisms)

Healthy markets deter manipulation and resolve conflicts visibly:

- Wash-trade heuristics (self-trade loops, cyclical wallets, abnormal bid/ask spreads) that down-rank suspicious listings and label them for all users.
- Real-time anomaly dashboards for staff and community auditors; API access for independent monitoring.

- Clear dispute workflows: evidence submission, time-bounded reviews, transparent outcomes; appeals overseen by a diverse committee or external ombudspersons.
- Counter-fraud education for creators and collectors (impersonation, signature phishing, fake airdrops).

How to measure it: wash-trade prevalence over time; median dispute resolution time; percentage of reversed frauds; user trust scores.

E. Sustainable infrastructure (energy profile disclosure, decentralized storage assurance)

Cultural preservation requires responsible, durable infrastructure:

- Energy disclosures: chain consensus type, estimated emissions per mint/transfer, and mitigation strategies (PoS, L2s, or offsets).
- Storage assurance: enforce content-addressed storage (IPFS/Arweave), redundancy policies, periodic pinning checks, and public integrity proofs.
- Resilience planning: migration paths for metadata if gateways fail; verifiable backups; chain-agnostic standards for portability.
- Institutional modes: museum/archival metadata fields (provenance notes, conservation statements) to support long-term stewardship.

How to measure it: percentage of assets with content-addressed storage; integrity-check pass rates; downtime of gateways; energy/intensity metrics per transaction.

These components reinforce one another. Verified content and robust licenses improve ranking quality; transparent discovery reduces incentives to manipulate; integrity tools protect royalty economics; and sustainable storage ensures that what was bought remains accessible and verifiable years later. Treat the framework as a modular checklist: start with contract and authenticity baselines, publish discovery criteria, stand up integrity dashboards and dispute processes, and formalize storage/energy disclosures—then iterate with public metrics.

VIII. RECOMMENDATIONS

For creators and designers, the use of audited smart contracts and robust metadata persistence

is essential to safeguard intellectual property and ensure long-term accessibility, accompanied by the publication of clear license logic to define usage rights. Platforms should enforce consistent royalty standards across secondary markets, integrate authenticity verification tools such as content-hash validation and verification badges, and provide transparent documentation of ranking and recommendation algorithms. Curators and institutions are encouraged to prioritize artworks with verifiable provenance, leveraging blockchain records, and to balance expert judgment with mechanisms that offer emerging artists equitable visibility. Finally, policy makers should promote interoperability standards—such as standardized royalty schemas—to facilitate cross-platform consistency and mandate audit transparency for marketplace governance, ensuring fair value distribution and trust in the NFT ecosystem.

IX. LIMITATIONS AND FUTURE RESEARCH

Figures are illustrative; empirical validation using on-chain data needed. Longitudinal studies on royalty resilience, discoverability governance, cultural valuation in institutional collections, interoperability across blockchains, and storage permanence design are vital.

X. CONCLUSION

NFT marketplaces have fundamentally transformed the creative economy by dismantling traditional barriers to entry and enabling a more democratized participation in art and cultural production. Through blockchain-enabled programmability, these platforms offer creators the ability to embed royalties directly into smart contracts, automate licensing conditions, and expand the conceptual boundaries of what constitutes digital art. Artists can now release interactive, generative, or time-based works with verifiable provenance, while collectors benefit from transparent ownership records and global liquidity. This shift has not only disrupted conventional gallery and auction models but has also fostered new forms of cultural engagement and investment.

Yet, the rapid evolution of NFT marketplaces has surfaced a series of unresolved challenges. Ethical concerns arise over market manipulation, speculative volatility, and the potential exploita-

tion of emerging artists. Equity issues manifest in the uneven visibility of creators, often driven by algorithmic recommendation systems that can perpetuate existing biases. Discoverability remains a double-edged sword—while decentralization promises openness, oversaturation and lack of transparent curation can bury meaningful works under speculative hype. Sustainability, both in terms of environmental footprint and long-term preservation of digital assets, remains an urgent concern, especially for energy-intensive blockchains and poorly maintained metadata storage.

Addressing these complexities requires more than technical innovation—it calls for a design-led, ethical governance perspective that explicitly aligns platform strategies with broader creative and cultural values. By embedding ethical principles into the core architecture of marketplace operations—covering areas such as royalty enforcement, authenticity verification, transparent discovery, and sustainable infrastructure—NFT platforms can shift from being mere transactional hubs to becoming cultural stewards.

Such transformation demands multi-stakeholder collaboration. Institutions must take an active role in validating provenance and fostering curated, equitable exposure. Creators should be empowered with tools and knowledge to secure their rights and ensure the durability of their work. Platforms must commit to transparent governance, user accountability, and fair value distribution. Policymakers should establish interoperability standards, enforce consumer protection, and require auditability for algorithmic and contractual mechanisms.

In essence, the future resilience of the NFT ecosystem depends on co-created standards that integrate trust, fairness, and cultural stewardship into its very foundation. Only by bridging innovation with accountability can NFT marketplaces continue to thrive as legitimate engines of artistic expression and economic opportunity.

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