

SUSTAINABLE GOVERNANCE IN DIGITAL ART AND CREATIVE FINTECH: INTEGRATING GREEN INNOVATION WITHIN VISUAL CULTURE INDUSTRIES

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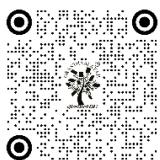
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Received 23 March 2025

Accepted 27 July 2025

Published 20 December 2025

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DOI

[10.29121/shodhkosh.v6.i3s.2025.6966](https://doi.org/10.29121/shodhkosh.v6.i3s.2025.6966)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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ABSTRACT

Green innovation is presented as a systematic approach to the process of integrating green into models of governance that can be used to define digital art platforms, creative markets, and FinTech-based cultural economies. Based on the sustainable governance theory, eco-digital transformation frameworks, and ethical literature in the area of FinTech, the research constructs a conceptual framework connecting environmental responsibility with transparency, accountability, and cultural value creation. The paper presents a study of the digital art- FinTech ecosystem placing emphasis on platform frameworks, assetization through NFT, tokenized forms of ownership, and the environmental impact associated therewith. It follows a mixed-method research design, which involves a qualitative policy and platform analysis and quantitative evaluation of energy consumption, the carbon intensity, and efficiency measures in case studies. The evidence shows that energy-efficient blockchain protocol, green FinTech instruments, and circular practices of digital production have an enormous impact on reducing the environmental footprint and increasing trust and economic resilience in the long term. In addition, governance systems, which tie sustainability measures to platform policies, smart-contracts and economic incentives, can be used to encourage responsible innovation without limiting artistic expression.

Keywords: Sustainable Governance, Digital Art Ecosystems, Creative Fintech, Green Innovation, Visual Culture Industries

1. INTRODUCTION

With the fast-growing phenomenon of the convergence of digital art, creative industries and financial technologies, the visual culture production, distribution, monetization, and governance frameworks have been altered. Online communities, blockchain systems, non-fungible tokens (NFTs), and algorithmic FinTech systems have made possible new forms of creative ownership, valuation of creative labor, and market involvement around the world. Although such developments have increased access and economic opportunities in the visual culture industries, they have also posed critical issues that have been raised on the sustainability, governance, and environmental responsibility [Li et al. \(2022\)](#). In digital art and Creative FinTech spaces, regulation becomes more than compliant with the law and is invigorated by design decision-making, financial structures, payment models and code and algorithm ethics. The industries of visual cultures, which were traditionally based on material practices, now work in highly abstracted digital infrastructures in which the environmental effects are not as visible yet equally important. The invisibility tends to push responsibility aside, and sustainability is therefore a lesser priority within creative creative markets led by innovations. Consequently, the introduction of green principles in governance structures is no longer a choice but a necessity to its sustainability in the long-term [Harfouche et al. \(2024\)](#). Creative FinTech is a key to the formation of modern digital art economies. The use of tokenization, decentralized finances, smart contracts and algorithmic pricing systems have an effect on the way creative value is produced and traded. [Figure 1](#) illustrates integrated governance in line with green innovation, blockchain, sustainable creative FinTech ecosystems. Nonetheless, such financial innovations often focus on speed, scalability and profitability at the expense of environmental costs.

Figure 1

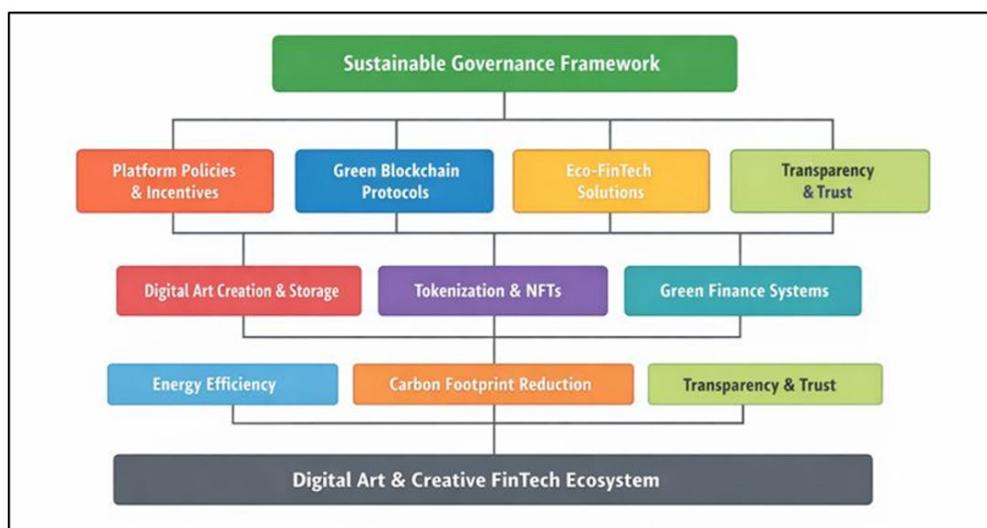


Figure 1 Architecture of Sustainable Governance for Digital Art and Creative Fintech Ecosystems

Failing to provide sustainability-centered governance poses a threat of strengthening extractive digital forms of operation, which erode the ethical principles of cultural production. The solution to this dilemma is interdisciplinary, which means combining financial innovation with the ecological responsibility and cultural sustainability. Green innovation provides a tactical route of re-inventing digital art systems and FinTech systems to be sustainable [Oliveira and Gomes \(2024\)](#). It includes energy-saving technology, low-carbon blockchain models, green data management, and models of the circular economy adjusted to the digital environment. Green innovation can provision decision-making at various levels when integrated into governance structures, whether it is the choice of protocols and platform policy, the financial incentives and the creative processes. Significantly, this integration is to be done in a manner that is considerate of the autonomy and experimental practice of art and at the same time environmentally accountable.

2. THEORETICAL FOUNDATIONS AND LITERATURE REVIEW

2.1. SUSTAINABLE GOVERNANCE THEORIES IN DIGITAL AND CREATIVE ECONOMIES

The theories of sustainable governance offer a theoretical framework through which the development of economic activity, technological innovation, and social values can be coordinated to promote the overall environmental and cultural welfare in the long-term. Governance in digital and creative economies is not limited to the purpose of more traditional regulatory institutions but rather through platform architecture, algorithmic regulations, participatory rules and networked coordination [George et al. \(2021\)](#). The idea of intergenerational responsibility is another concept added to sustainable governance, as the current digital innovation should not undermine future ecological and cultural possibilities.

2.2. GREEN INNOVATION FRAMEWORKS AND ECO-DIGITAL TRANSFORMATION

Green innovation models center around the creation and use of technologies, processes, and organizational practices that minimize the environmental impact and maintain economic and social value. These frameworks have been traditionally used on manufacturing and energy sectors, but are now also being applied to digital environments where ecological costs are inbuilt into data centres, the computational processes and network infrastructures [Novillo-Ortiz et al. \(2021\)](#). Eco-digital transformation is the concept that implies the digitization and orientation to the sustainability agenda with the focus on efficiency, dematerialization, and sustainable consumption of resources [Linnenluecke et al. \(2020\)](#). Green innovation in the industrial landscape of visual culture has been applied to energy-efficient computing, blockchain protocols that are low-carbon, sustainable data storage, and sustainable design practices. The literature emphasizes that digital technologies may contribute to the crime and reduce the environmental pressures. On the one hand, the high level of computational requests consumes more energy, on the other hand, digital tools can optimise, monitor and produce to create a circle of value. The green innovations systems are thus focused on systemic change as opposed to the single-technology solutions. One of the theoretical contributions is related to the implementation of the principles of the circular economy into the digital ecosystem [Page et al. \(2021\)](#). This involves the lengthening of the digital life, reduction of unnecessary calculations and encouragement of reusability and interoperability of creative information.

2.3. FINTECH GOVERNANCE MODELS AND ETHICAL DIGITAL FINANCE

FinTech governance models study the nature of regulation, structure, and ethical orientation of digital financial systems operating in highly automated and decentralized, and highly innovating contexts. Conventional financial governance has depended on centralized control and institutional intermediaries but modern FinTech ecosystems are comprising more platforms, algorithms and distributed ledger technologies. This is changing the current regulatory framework and putting accountability, transparency and systemic risk into question [Haddaway et al. \(2022\)](#). Ethical literature in digital finance broadens the governance issues that exist to go beyond financial stability to cover fairness, inclusiveness, data security, and environmental sustainability. FinTech governance models thus unify regulatory control, self-regulation and inbuilt moral values in technology. Smart contracts, e.g., represent rules as part of financial operations making governance executable. Although this makes it more efficient and more trusted, there is also a need to design it carefully to avoid ethical blind spots and unintended consequences. The recent research focuses on sustainability as a new aspect of FinTech regulation [Rosário and Figueiredo \(2024\)](#). Table 1 demonstrates that current studies have not come up with integrated governance between sustainability, creativity, and FinTech systems. Green FinTech projects include environmental metrics in the financial decision-making process, low-carbon investments, and environmental impact reporting transparency. Within a creative economy, FinTech governance has a direct effect on the process of monetizing and distributing artistic value.

Table 1

Table 1 Comparative Analysis of Related Work on Sustainable Governance, Digital Art, and Creative Fintech

Domain Focus	Governance Model	Core Technology	Sustainability Dimension	Key Methodology	Major Findings
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Digital Creative Economy Xiao et al. (2022)	Platform Governance	Cloud Platforms	Resource Efficiency	Conceptual Analysis	Highlights need for sustainability-aware platform design
Blockchain Art Markets	Decentralized Governance	Blockchain	Energy Consumption	Comparative Review	Identifies high carbon cost of early blockchains
FinTech Systems Rosário, and Figueiredo (2024)	Regulatory Governance	Digital Payments	Green Finance	Policy Analysis	Links regulation to sustainable finance adoption
NFT Ecosystems	Protocol Governance	NFTs, Smart Contracts	Carbon Footprint	Case Study	Shows environmental trade-offs in NFT minting
Creative Platforms Ciacci et al. (2024)	Hybrid Governance	AI + Blockchain	Eco-Digital Efficiency	Mixed Methods	Governance improves sustainability performance
Digital Art Markets	Market-Based Governance	Tokenization	Lifecycle Optimization	Empirical Study	Token resale extends asset lifecycle
Sustainable FinTech	Ethical Governance	Green FinTech Tools	Low-Carbon Finance	Survey Analysis	Ethics-driven FinTech improves trust
Cultural Industries Toli and Murtagh (2020)	Institutional Governance	Digital Platforms	Cultural Sustainability	Qualitative Interviews	Emphasizes governance for creative equity
Web3 Creative Economy	DAO Governance	DAOs	Energy Efficiency	Comparative Case Study	DAOs enable participatory governance
Digital Asset Finance Zaloznova et al. (2020)	Algorithmic Governance	Smart Contracts	Emission Reduction	System Modeling	Algorithms optimize financial efficiency
Visual Culture Platforms	Platform Governance	Cloud + AI	Data Sustainability	Empirical Evaluation	Efficient storage reduces energy use
Sustainable Blockchain	Technical Governance	Green Blockchain	Carbon Neutrality	Experimental Analysis	Confirms effectiveness of low-energy protocols

3. DIGITAL ART AND CREATIVE FINTECH ECOSYSTEM ANALYSIS

3.1. ARCHITECTURE OF DIGITAL ART PLATFORMS AND CREATIVE MARKETPLACES

The creative marketplaces and digital art platforms are complex and multi-layered infrastructures, which combine content creation applications, data management systems, financial systems, and interfaces with users. The main building block of these platforms is content layers which enable the creation, propagation, curation and visualization of digital artworks, frequently based on cloud-based storage and performance computing. An outermost layer around this one is a platform governance layer that determines access privileges, pricing frameworks, licensing regulations, and modifying rules with algorithms and rules of the platform [Fekete and Rhyner \(2020\)](#). Creative market places also integrate the facilities of transactions and monetization, allowing sales, auctions, subscriptions, royalties, and micro-payments. Such layers are getting more and more fueled by FinTech solutions which automate valuation, paying settlements, and distributing revenue. Platform architecture is not a neutral concept with regard to governance; design decisions directly affect the results of sustainability [Wang et al. \(2023\)](#). Centralized architectures can be efficient and controllable and are dependent on large data centers and require much power.

3.2. ROLE OF BLOCKCHAIN, NFTS, AND TOKENIZED CREATIVE ASSETS

The digital art industry has undergone fundamental changes through blockchain technologies which make it possible to have decentralized ownership, provenance that is transparent and transactions that are programmable. Non-fungible tokens (NFTs) and tokenized creative assets offer the benefit of giving a work of art a unique digital identity that authenticates the work, sets its scarcity, and allows peers to exchange the work among themselves without the intermediary. Artists have benefited through this innovation by having new revenue features, including automated royalty and having direct access to the market, and have also increased global involvement in creative economies. The publicly traded digital art is tokenized, with creative output increasingly turning into financial instruments, the art market becoming part of the investment market, and the speculation market becoming part of the investment market. Smart contracts are a set of governance rules in form of ownership transfer, resale terms and revenue sharing coded in the digital infrastructure and containing financial and legal logic. Although this increases transparency and trust, new power asymmetries that are determined by protocol design, platform dominance and access to technical expertise are

introduced. Regarding governance, creative systems based on blockchain are disruptive to existing regulatory frameworks. Decentralization makes the reliance on centralized authorities less but it seems to make it difficult to hold accountable and resolve disputes, and monitor sustainability.

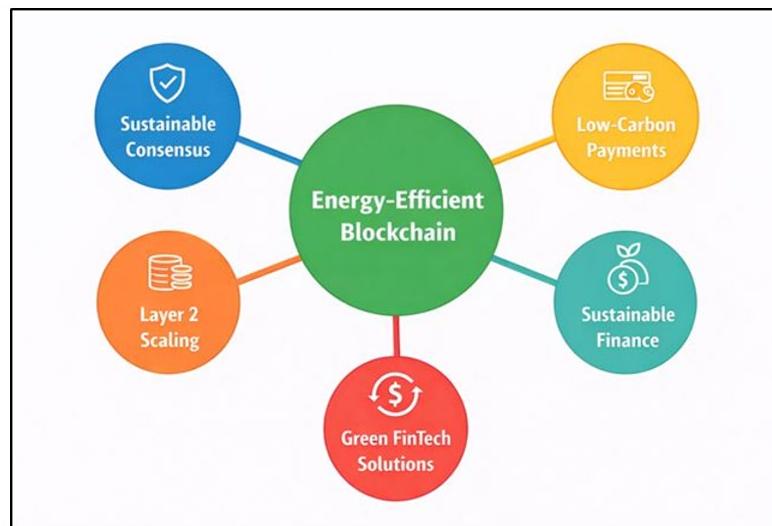
3.3. ENERGY CONSUMPTION AND ENVIRONMENTAL IMPACT ASSESSMENT

One of the most important sustainability issues of digital art and Creative FinTech ecosystems is energy consumption. Digital platforms are based on persistent data processing, storage and transmission, which are supported by energy-intensive systems of data centers and distributed computer networks. The demands have been increased through the use of computationally intensive validation processes, which is a feature of blockchain technologies and, in particular, early consensus mechanisms. The cumulative environmental impact of digital art markets increases as they grow in scale across the world. Frameworks of the environmental impact assessment in the digital environment aim to measure the energy consumption, carbon footprint, and resource intensity throughout the lifecycle of digital resources. This involves development of works of art, coinage and exchange of tokens, storing high-resolution media and preservation of data in the long run. According to scholars, environmental costs are frequently externalized and are made invisible to artists and consumers, which makes it difficult to achieve accountability. Sustainable governance should therefore have transparent systems of measurement and reporting mechanisms. The recent literature focuses on comparative evaluation strategies to estimate alternative technological designs, including various blockchain protocols, hosting strategies, and compression schemes. What these tests demonstrate is that the governance decisions, including the choice of protocol, frequency and scalability of the platform, have a direct impact on environmental results. By incorporating the environmental impact assessment in the platform governance, it becomes possible to make evidence-based decisions and facilitate the taking of more sustainable innovation routes. Such evaluations play a very important role in ensuring that the development of creativity is in tandem with environmental responsibility in the visual culture industries.

4. GREEN INNOVATION STRATEGIES IN VISUAL CULTURE INDUSTRIES

4.1. ENERGY-EFFICIENT BLOCKCHAIN AND LOW-CARBON FINTECH SOLUTIONS

One of the core concepts of green innovation in visual culture industries is energy-efficient blockchain and low-carbon FinTech solution. Initial blockchain systems were constructed with the main emphasis on security and decentralization, and those commonly used energy-intensive consensus mechanisms. The recent innovations are based on an alternative architecture, which shows a significant reduction in the demand of computational power without any loss of trust and transparency, in response to the increasing environmental concerns. Green financial technologies that fall within creative FinTech environments also extend sustainability goals by incorporating environmental indicators in financial activities. FinTech Low-carbon solutions are efficient payment processing systems, automated distribution of royalties, and transparent accounting of operations without the waste of energy. Governmental systems are very important in establishing sustainability criteria, promoting energy saving measures, and disincentivizing designs that degrade the environment. [Figure 2](#) indicates energy-efficient blockchain that facilitates the low-carbon, sustainable, and ethical Creative FinTech operations. In the case of digital art platforms, the move to energy-saving blockchain infrastructures allows artists and institutions to engage in decentralized markets without affecting the environmental responsibility.

Figure 2**Figure 2** Energy-Efficient Blockchain and Low-Carbon Fintech Solutions

The environmentally friendly decision choices also boost the confidence and credibility of the population, especially when the viewers are increasingly aware of the environmental footprint of digital creativity. Through the integration of technology efficiency and the principles of ethical finance, the energy-efficient blockchain and low-carbon FinTech solutions prove that decentralized innovation and sustainability can be complementary in terms of visual culture industries.

4.2. SUSTAINABLE DIGITAL PRODUCTION, STORAGE, AND DISTRIBUTION PRACTICES

Sustainable digital production, storage and distribution activities will cover the hidden environmental costs of creative digital processes. Production of digital art more and more depends on high-resolution media, sophisticated media rendering methods, and tools that consume large amounts of data, all of which lead to increased consumption of energy. Green Innovation plans propose the optimization of production processes with the help of efficient software design, adaptive resolution criteria, and creative tools that are resource conscious, meaning that they do not generate wasteful computational load. Other important dimensions of sustainability are storage practices. Digital artworks cannot be stored in the long term using less than enormous amounts of data storage, which can often be stored in power-hungry data centers. The sustainable measures include effective data compression, selective archiving, and use of storage infrastructures that use renewable energy sources. These practices can be supported through the governance mechanisms through defining the retention policies, promoting shared repositories, and ensuring transparency on the environmental impacts related to the storage. Sustainability is also affected by distribution practices. Constant streaming, downloading and replicated data continuously with redundancy all add more energy requirements to networks. Green distribution mechanisms are concentrated on maximizing content delivery, local caching, and access based on demand, that limit the data transmission at the expense of the accessibility. Such strategies are useful in visual culture industries because they make creative content highly accessible and eliminate its impact on the environment. By integrating sustainability policies into the governance of production, storage, and distribution, it is possible to make digital art ecosystems juggle the creative growth and the sustainability of the ecological environment.

4.3. CIRCULAR ECONOMY PRINCIPLES IN DIGITAL ART VALUE CHAINS

The principles of the circular economy provide a radical approach to the redesign of digital art value chains that no longer rely on linear creation, consumption, and disposal value chains. Circularity is promoted in the digital world by focusing on maximizing the usefulness of creative resources and reducing unnecessary computations, storage, and resources. Green innovation approaches respond to the digital art that requires immaterial but resource intensive approaches through adapting the traditional concepts of the circular economy (reusing, regenerating, and optimizing

lifecycle) towards the digital format. Circular practices are also present within the digital art ecosystem, as there is the reuse of creative data, modular artwork design and platform interoperability. Digital assets can be created to be flexible and combinable rather than creating numerous, isolated copies, which can increase their lifespan in culture and economy. The tokenized ownership models also make it possible to control how artworks circulate, facilitate resale, shared ownership, and derivative generation without having to incur production expenses again. Circular economy can only be operationalized by means of governance. Sustainable behaviors that can be rewarded through financial incentives that are built into Creative FinTech systems include low-impact transactions or longer lifespan of assets. Visual culture industries can promote sustainable creativity by integrating the principles of a circular economy into the governance systems, as it would enable economic value creation to be consistent with long-term environmental stewardship.

5. METHODOLOGY AND RESEARCH DESIGN

5.1. RESEARCH APPROACH AND ANALYTICAL FRAMEWORK

The framework of the proposed research will be based on the mixed-method research design that will examine the issues of sustainable governance and green innovation in the Digital Art and Creative FinTech area. The research is pegged on a paradigm of interdisciplinary analysis that brings on board the research on sustainability, digital governance, cultural economics, and financial technology research. The framework theorizes systems of digital art platforms and Creative FinTech as a socio-technical space in which there is an interaction between governance, technology, and culture to produce environmental effects. This analytical model is structured around three dimensions that are interrelated and they are; governance mechanisms, technological configurations and sustainability performance. Some of the mechanisms of governance in the financial and creative infrastructures include regulatory structure, platform policies, and algorithmic rules. The technological setups consist of blockchain protocol, data storage architecture and processes of digital manufacturing. About the sustainability performance, the evaluation is done using indicators, which are related to energy efficiency, reduction of the effects on the environment and strengthening of the system over the long term. The framework can be used to study the effect that governance decisions have on technological adoption and performance on environmental facilities systematically by linking these two dimensions. This approach allows performing a comparative evaluation between platforms and case scenarios and being culturally and institutionally sensitive. The research method is centered around the interpretive analysis and an emphasis on empirical evaluation; it should also be mentioned that sustainability in visual culture industries is not merely a question of the normative value, but also an object that can be measured.

5.2. QUALITATIVE AND QUANTITATIVE DATA SOURCES

The data provided in the literature used in the study is based on a qualitative as well as a quantitative type of data to represent the multidimensionality of sustainable governance in the context of digital art as well as Creative FinTech. Qualitative data will include policies, platform governing principles, white papers, sustainability reports published on digital art platforms, FinTech providers and cultural institutions. Additional research on this analysis is enlightened by in-depth interview and remarks of artists, platform designers, financial technologists and sustainability practitioners that can provide contextual interpretation of the governance practices and decision making processes. Quantitative data has a focus on the indicators of technological and environmental performance. This would include data on energy intensity, volume of trading, platform size, platform financial efficiency indicators. In the case that this is possible, platform-level metrics and publicly reported sustainability metrics are analyzed to assess the environmental impact of different settings of technologies. Secondary data is used to supplement primary data in the form of industry reports and academic research in a bid to cross-validate and undertake comparative analysis of the research. The qualitative and quantitative information also encourage triangulation and enhances validity and reliability of the results.

5.3. CASE STUDY SELECTION AND COMPARATIVE ANALYSIS

Sustainable governance and green innovation in digital artistic and Creative FinTech settings are analysed using the case study approach. The selection of cases relies on the purposive sampling plan and it is guided to platforms and initiatives which illustrate other governance models, technological architecture and sustainability orientations. The

examples include centralized and decentralized digital art platforms, Creative FinTech services of the service of supporting an artistic market, and hybrid ecosystems of blockchain-based assetization and traditional cultural institutions. It is performed through comparative analysis to conduct a systematic evaluation of similarities and differences among cases to demonstrate how the governance structure may influence the environmental and economic results. Every case is examined using the common analytical framework and this process allows one to compare the modes of governance, technological setups, and sustainability results in a consistent manner. The patterns, best practices and trade off focused on different green innovation strategies are identified through the use of cross-case comparison. Comparative approach is also in a position to put into consideration contextual elements such as regulatory environment, market scale, and cultural values that determine governance performance. The analysis is oriented to the inquiry of the flexible principles of governance, instead of addressing the universal solutions, which can be adapted to specific visual culture ecosystems. Such a methodological design is a theory-building method that links the empirical observations to the broader sustainability and digital governance discussion that could be applied to policymakers, platform builders and creative practitioners.

6. RESULTS AND DISCUSSION

The adoption of blockchain that was energy efficient and streamlined the digital processes meant that operations footprints were minimized without limiting creative or financial innovation. Comparative analysis also showed that green innovation based on governance promotes the legitimacy of platforms and resilience in the market. These findings confirm that the sustainability outcomes within visual culture industries are influenced not as much by technology per se but how technology is directed through governance structures and how technology is used in creative-economic activities.

Table 2

Table 2 Impact of Sustainable Governance on Environmental and Platform Performance (%)			
Performance Indicator	Conventional Governance (%)	Sustainable Governance (%)	Improvement (%)
Energy Efficiency of Platform Operations	62.4	84.7	22.3
Blockchain Energy Optimization	58.9	81.6	22.7
Carbon Footprint Reduction	41.3	69.8	28.5
Transparency and Auditability Score	65.2	88.1	22.9
Stakeholder Trust Index	67.8	90.4	22.6

Table 2 demonstrates quantifiable advantages of implementing the mechanism of sustainable governance in the digital art and Creative FinTech platforms. It is evident that there is a steady improvement of all the performance indicators relative to the conventional governance models. The platform operations become energy-efficient and can be measured at 62.4 to 84.7 percent, which includes the contributions of governance-based choices like the optimization of platform structures, use of energy-conscious protocols, and responsible data management policies.

Figure 3

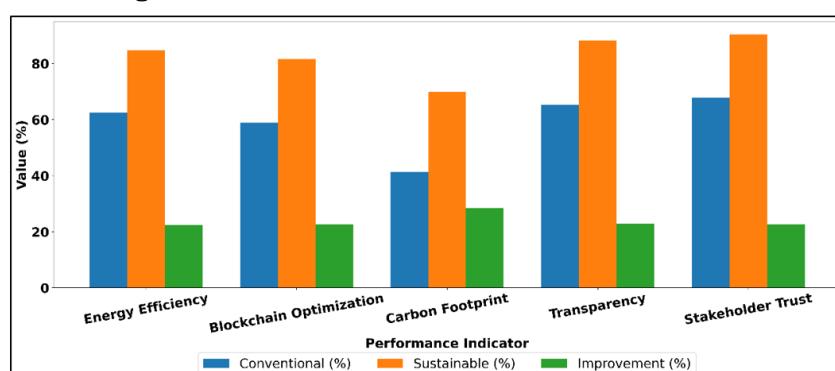


Figure 3 Governance Performance Comparison

Blockchain energy optimization is also enhanced by 22.7, which proves that governance decisions have a direct impact on the environmental cost of the decentralized transaction systems. In [Figure 3](#), sustainable governance does better in environmental and platform performance measures in comparison to conventional models. The biggest improvement is seen in the decrease of carbon footprint, which has increased by 28.5 percent, which shows that the sustainability-oriented governance is able to effectively convert the efficiency of technologies into real environmental impact. [Figure 4](#) presents governance indicators which indicate sustainability-based advancement in transparency, efficiency, and trust. Institutional quality is also improved through governance reforms in addition to environmental measures.

Figure 4

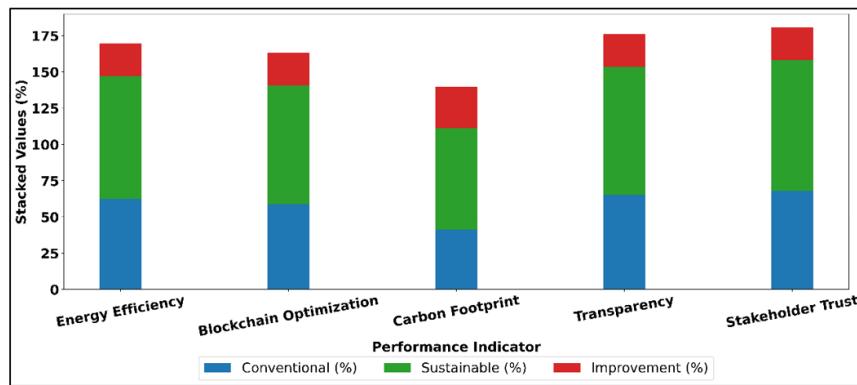


Figure 4 Visualization of Governance Metrics

It increases accountability in platform operations and financial transactions by increasing transparency and auditability to 88.1. Trust index among stakeholders goes to 90.4 percent, emphasizing the environmental responsibility as a tool in enhancing user trust, artist involvement, and investment trust. On the whole, the table corroborates the findings that sustainable governance does not only reduce the negative consequences on the environment but enhances platform legitimacy, resilience, and long-term performance in the visual culture industries.

7. CONCLUSION

This paper has discussed the topic of sustainable governance in digital art and Creative FinTech by considering how green innovation may be implemented in the systems that determine visual culture industries. Since the digital creativity of the future is dependent on data-heavy infrastructures and monetized digital resources, environmental sustainability becomes a form of rule rather than an off-the-record issue. The study shows that the rule structures, such as platform structures and protocol design, monetary incentives, and policy alignment, are decisive factors that predetermine the ecological outcome of the digital art ecosystems. The discussion points out that artistic freedom and financial innovation can exist together with energy-efficient blockchain and low-carbon FinTech systems and sustainable practices of digital production when they have consistent governance structures. Digital art marketplaces can be used to minimize environmental externalities, increase transparency, accountability, and trust by implementing sustainability measures in platform rules, smart contracts, and financial operations. The principles of a circular economy also prolong the lifecycle of digital creative assets so that it is possible to retain value without consuming a lot of resources. Theoretically, the research would add to the scholarship of digital governance and creative economy by redefining sustainability as a socio-technical issue of governance instead of a technical optimization issue.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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