

MANAGEMENT OF DIGITAL ART STARTUPS IN THE AI ERA

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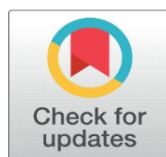
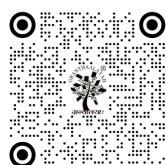
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ABSTRACT

The recent aggressive adoption of the creative economy by Artificial Intelligence (AI) has transformed how digital art startups are run, funded, and even their morals. The article provides a detailed pattern of how AI-driven creative businesses should be governed and concentrates on the interplay of the technological factor, creativity as an art, and responsible management. The study by conceptualizing, empirically investigating and case based evidence identifies strategic aspects that involve AI augmented creativity, hybrid leadership, data-driven infrastructure, and sustainable financial modelling as the key elements to establish competitiveness in digital art industry. These findings show that the startups that apply the human-AI cooperation are more scalable, effective in the dimension of innovation and attract the audience in comparison with the traditional ones. However, these benefits have been pegged on the availability of strong governance structures to address algorithmic bias, intellectual property and cultural sensitivities. The article proposes a single management framework, which would align the creative procedure to the anticipatory analytics, blockchain openness, and moral AI management. That combination of theoretical and empirical knowledge enables the research to contribute to the existing discourse of the sphere of digital entrepreneurship and to suggest the practical opportunities of how the innovative businesses may evolve in the AI age in a responsible manner.

Keywords: Digital Art Startups, Creative Entrepreneurship, AI Governance, Hybrid Intelligence, Predictive Analytics, Blockchain Provenance, Cultural Technology



1. INTRODUCTION

A collision between man creative and computational intellect is historically occurring within the 21st century art ecosystem. Artificial Intelligence (AI) is now an actual technological tool and a collaborative inventive companion, which is identifying the outskirts of digital entrepreneurship freshly. The context that is being operated in by digital art startups is a networked environment where machine learning, cloud computing, blockchain and generative design systems blend together to create, share and generate artistic content at scale. This paradigm shift extends further than the traditional ideas related to authorship and artistic agency within which the AI-Art Nexus is introduced as a symbiotic relationship between the algorithmic intelligence and the human creativity in which the creative process is not replaced by the AI, but rather supplemented [World Economic Forum. \(2020\)](#). The change of manual production to the generative model of GANs and diffusion models is a fresh era of cultural production and entrepreneurship approach. The management of art startups in the context of a digital economy shifts out of aesthetics and into the field of data-driven decision-making and the use of AI-enhanced functionality as a source of organizational smartness. To the extent of automation of the process of concept generation, trends market prediction, tailoring online experience, and complicated logistics of online art marketplaces, creative entrepreneurs are resorting to AI [Yan and Mercado \(2023\)](#). As the AI tools have been democratized, the startups can now experiment at the low overheads, optimize on creative output through real-time analytics and create scalable business models. The concept of AI in the work process has not only increased the efficiency of the working procedure but also altered the creative work nature, as it turned a product-oriented process to a process-oriented one. This change presents a challenge to the classic management theories because new hybrid structures, which integrate design thinking, cultural intelligence, and computational creativity, are needed [Santisteban et al. \(2021\)](#).

Figure 1

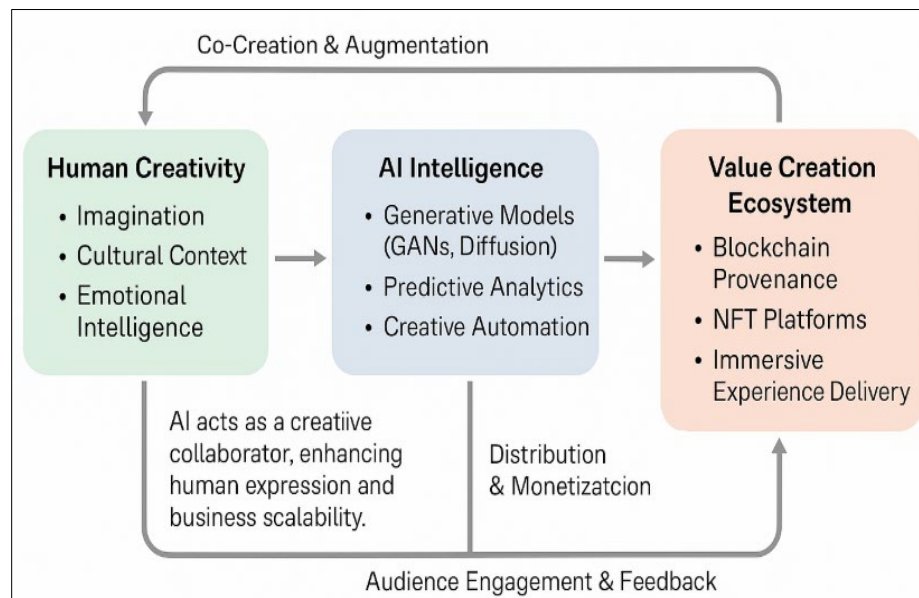


Figure 1 Conceptual Framework of the AI-Art Nexus in Digital Art Startup Management

The AI-art synergy is revolutionizing the cultural economies on a macroeconomic level, since it alters the manner in which art is appreciated, listened to and distributed. The AI-based startups do not just change the style of conducting business but also contribute to the democratization of cultural access [Schwertner \(2017\)](#). Online gallery platforms and artificial intelligence-based recommendation systems allow digital artists a chance to experience more than ever before with the implementation of blockchain-based provenance systems as shown in [Figure 1](#). The managerial focus, in its turn, will be forced to shift towards creating responsive strategies, digital capabilities, and aligning the technological possibilities with the creative agendas. This paper seeks to explore the way digital art startup can best function, retain talent and innovation pipeline in the AI era - place a map in position to grow on a long term sustainable basis within a fast-paced creative technology ecosystem [Scott \(2013\)](#).

2. STRATEGIC FOUNDATIONS OF DIGITAL ART STARTUPS

The process of strategy-making, then, is less about market positioning as it is about harmonizing a dynamic interaction between the creative arts, computer-like intelligence and the scale of the business enterprise [Saaty \(1972\)](#). The new paradigm is based on creative capital, which is the ability of an artist to ideate and innovate, and technological capital, which is the ability to operationalize AI and data to generate value. Thriving startups do not see AI as a tool but as a part of the strategy which impacts all spheres of production, marketing, and customer experience. Managerially, a digital art startup lifecycle is similar to the lifecycle of a technology-based business, which includes ideation, incubation, scaling, and sustainability. During the ideation phase, the founders usually use AI to find new aesthetic opportunities, like creating novel visual patterns, forecasting aesthetic taste, or optimization of color and composition based on neural feedback-looping [Cheng \(2022\)](#). The allocation of resources and technological infrastructure is also critical in incubation; the availability of cloud-based generative platforms and creative APIs is what defines how fast a startup can prototype, test and repeat the artistic products.

Table 1

Table 1 Strategic and Managerial Pillars for AI-Based Art Startup Management			
Pillar	Key Components	Operational Objective	Example Tools / Methods
AI-Augmented Leadership Grba (2022)	Data-informed creativity, adaptive strategy	Build innovation culture and adaptive leadership	Predictive analytics, AI dashboards
Networked Collaboration Art Collection and Now Art (2024)	Decentralized co-creation, smart governance	Enable distributed creative workflows	Blockchain, collaborative platforms
Knowledge Integration Lee et al. (2021)	AI-orchestrated knowledge systems, cultural analytics	Enhance forecasting, insight generation	Knowledge graphs, cognitive analytics
Ethical and Cultural Governance Shen et al. (2023)	Transparency, fairness, inclusivity	Build trust and long-term sustainability	XAI, ethics audits, compliance logs

The concept of leadership in digital art enterprises has also transformed the changing AI ecosystem. The executives will be supposed to be transdisciplinary: possessing both art, technology, and business skills. The collaboration with creative teams is connected with the establishment of an environment that would lead to the examination of AI models and ensure that it is implemented without any ethical and discriminatory problems [Mourtzis et al. \(2022\)](#). This trend of distributed leadership is consistent with hierarchical leadership, as the philosophy of collaborative production of digital art is based on the partnership of both human and machine agents. Startups are in a better position to deploy network effects when they foster such a culture of innovation, raise capital and do sustainable scaling. In a larger scale, AI-based art startups are not lone entities, but the nodes in some larger cultural-technological system, which is distributed over the social network, the platform of NFTs, and online exhibition halls [Prins et al. \(2018\)](#). The long-term viability of the product is to which they are able to cope with intellectual property, maintain cultural integrity, and devise business models that compensate the artist creativity and the value of algorithms. The familiarity with such underpinnings is the foundation of subsequent discourse of how AI, operational modeling, and some type of governance can be integrated into the creative economy.

3. AI-DRIVEN TRANSFORMATION IN CREATIVE ENTERPRISES

The emergence of Artificial Intelligence has turned out to be the trigger of a fundamental structural change in the digital-art ecosystem, altering the structure of creativity, production, and business processes. Generative models, e.g. GANs, diffusion networks, and large multimodal transformers, are used in creative businesses as assistants and collaborators in AI contexts. They study stylistic information and reproduce new aesthetics, create art in accordance with changing feelings of people [Qiao et al. \(2019\)](#). The creative process is modified by this algorithmic augmentation to become a process of co-evolution between human intuit and machine cognition. Digital art startups use these systems not just to reproduce creativity, but often push its boundaries such that abstract ideas are digitized as computationally-optimal versions that can be distributed as virtual or physical goods. The initial significant aspect of this change is AI-improved pipelines of creation [Li et al. \(2020\)](#). The startups embed neural design engines with capabilities of learning

on past art corpora, color psychology, and human-user interactions. These tools shorten the time taken to complete ideation and allow them to continuously experiment at a very low cost. With the assistance of AI-driven feedback tools, allowing artists to cycle hundreds of stylistic variations in minutes, artists are able to explore hundreds of stylistic variations [Villamarín, and Menéndez \(2021\)](#). Repetitive design tasks being automated, human creators are able to concentrate on conceptual innovation hence amplifying productivity and originality. Also, adaptive generative networks have the advantage of inclusive co-creation, in which communities are involved in the process of setting AI parameters to create culturally varied art.

Figure 2

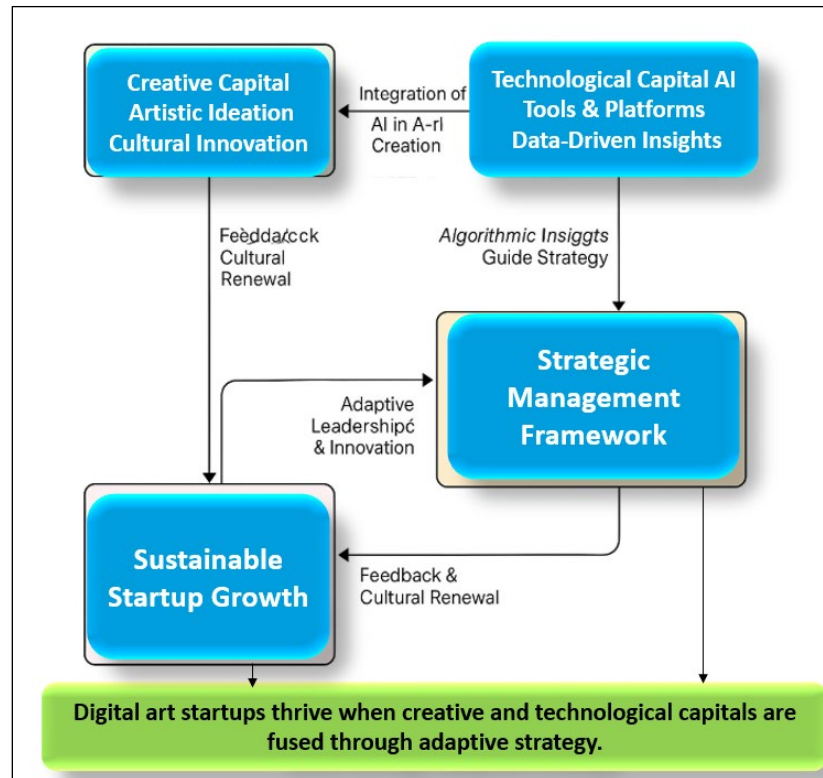


Figure 2 AI-Driven Transformation Framework for Creative Enterprises

The second dimension is smart marketing and distribution. The artificial intelligence of machine-learning suggests individual experiences of art based on the sentiment of the audience, social-media dynamics, and the transaction patterns. Predictive analytics will enable startups to schedule product releases, make pricing changes and niche collector segments in real time. Integration of smart-contracts in blockchain ensures the establishment of a transparent ownership and customer retention through AI-powered recommendation engine as is shown in [Figure 2](#). What ensues is an ecosystem that is self-optimizing where imagination, trade and information come together [Wu \(2022\)](#). The third change is within the management of the organization. The AI tools are re-defining the workflow, talent distribution and decision-making in the digital-art startups. The intelligent dashboards are synthetics of operational data in design, marketing and financial realms to make strategic decisions. Reinforcement-learning algorithms address the uncertainty in the markets and direct the adaptive allocation of resources. This data-centric governance minimizes managerial biasness, efforts to become agile, and evidencing innovation. Thus, the conventional artistic / managerial divisions dissipate, artists turn into data-sensitive entrepreneurs and managers become algorithmic creativity curators.

4. FINANCIAL AND STRATEGIC MODELING

The economic, data science, and cultural entrepreneurship multidimensional framework is the financial and strategic modeling of digital art startups in the AI era. In contrast to the traditional creative companies in which the revenue flow is linear and the business environment is stable, AI-based art businesses exist in a live ecosystem, marked by the monetization of data, platform economy and decentralized ownership. The financial sustainability does not only

depend on the sale of art anymore, it is created through the coordination of algorithmic creativity, management of digital assets, and predictive analytics [Nikolakopoulou et al. \(2022\)](#). Planning, in this manner, will have to include both hard- and soft-based assets- in which data, algorithms, and audience engagement can be measured and quantified sources of value. AI-enhanced financial projections is the starting point of this model. Reading through machine learning models like the Gradient Boosting, LSTM networks, and Bayesian models, startups are able to forecast the pattern of revenue, cost of user acquisition, and value of the content lifecycle. Social media traction predictor models as shown in [Figure 3](#), NFT market volatility, and collector behavior are predicted to help determine the best pricing strategies. These models are capable of adopting sentiment-driven markets with quick changes in cultural relevance unlike traditional methods of valuation. AI therefore allows managers to predict the liquidity requirements, manage their marketing budgets effectively, and predict consumer trends with great accuracy. The focus on strategic agility can be realized when financial models are not fixed spreadsheets but living systems, which constantly learns through transactional and behavioral information. Digitally, business architectures need to be made adaptive, where creativity meets the decision-making systems based on data.

Figure 3

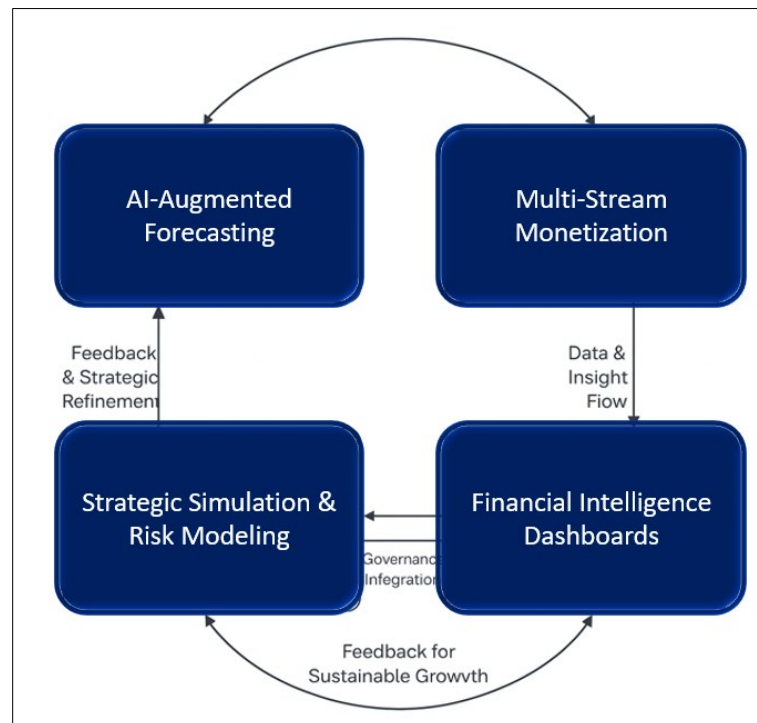


Figure 3 Financial and Strategic Modeling Framework for AI-Driven Digital Art Startups

Three important axes of strategic models are constructed on the capability to innovate, the possibility of scaling, and the compliance with ethical standards. Innovation capability is a measure of how successfully a startup incorporates AI into its creative process, scalability potential is the ability to grow into other platforms and markets, and ethical compliance is that growth is not violating intellectual property and cultural standards. Reinforcement learning and simulation make it possible to model the scenarios that a startup could explore in the future in order to scale down or up, risky global growth, and quantify risk exposure and returns to expect.

5. RISK, REGULATION, AND GOVERNANCE IN THE AI ERA

Since digital art startups rely more on artificial intelligence to create, curate, and commercially offer their art pieces, the intersection of risk management, regulation, and governance becomes a critical element of sustainable growth. Companies that engage in this sphere should thus establish effective governance systems that could effectively mediate between innovation and accountability to guarantee that artistic freedom does not conflict with regulatory oversight and popular confidence.

Table 2

Table 2 Risk Categories, Regulatory Responses, and Mitigation Strategies				
Risk Type	Description	Example Scenarios	Mitigation Strategy	Relevant Frameworks / Policies
Technological Risk	Model bias, drift, security flaws	Inaccurate generative outputs; dataset bias	AI fairness tools, continuous retraining	ISO/IEC 42001, IEEE 7000
Ethical Risk	Authorship ambiguity, cultural appropriation	Misattribution in AI artworks	Authorship tracking, bias audits	UNESCO AI Ethics, EU AI Act
Financial Risk	Volatile NFT/token markets	Sudden devaluation of assets	Hybrid asset portfolios, forecasting models	OECD AI Principles
Regulatory Risk	IP disputes, data non-compliance	Cross-border licensing issues	Legal audits, smart contracts	GDPR, India DPDP Act (2023)
Reputational Risk	Public backlash, trust erosion	AI plagiarism controversy	Transparency dashboards, explainable AI	WIPO Creative IP Guidelines

Digital art startups based on AI face various types of risk such as technological, ethical, financial, and reputational. Algorithms bias, model drift, and cybersecurity threats are all technological risks. Such ethical risks as vague authorship, cultural appropriation, and data privacy are created. The ambiguous human and algorithmic creativity puts a strain on the issue of ownership and licensing standards. Financial risks can be apparent in the NFT and tokenized art market, where trading on the speculative market can disrupt revenue streams. Lastly, reputational risks occur when there is a controversy about plagiarism, equity, or abuse of cultural symbols, via the opaque AI systems.

5.1. REGULATORY LANDSCAPE

The issue of AI regulation in the creative industry is still disjointed and developing. The policy frameworks worldwide, which include the AI Act of the European Union, Ethics of Artificial Intelligence of UNESCO, and Digital Personal Data Protection Act (2023) by India, include the foundations of transparency, accountability, and cultural preservation. Although, these broad regulations can and should be applied to art industry, they need to be interpreted in context. An example is the IP-law, which should change to acknowledge the use of algorithms as co-creators without compromising on human authorship. On the same note, blockchain-based art economies that enforce copyright require interoperable digital rights management systems. Startups should actively implement its operational policies in accordance with the developing principles of AI governance, i.e. it should be possible to explain the creative algorithms, it should treat the data with appropriate attention and it should be unbiased in its automated decisions.

5.2. GOVERNANCE MECHANISMS

Successful governance in the AI-enabled art businesses is a complex fabric comprising of technical, organizational and ethical aspects. Technical governance is the application of auditable, interpretable, and ethical AI benchmarking models. To make the creative decision processes transparent to the stakeholders, explainable AI (XAI) methods can be combined (SHAP or LIME visualizations). To manage AI in the organization, it is necessary to develop AI ethics boards, cross-functional oversight committees, and dynamic compliance structures. These frameworks will make sure that strategic choices about dataset cleaning up, generative model updates and the utilization of intellectual property will be transparent and traceable.

6. EMPIRICAL ANALYSIS AND CASE STUDIES

Empirical data is very important to confirm the theoretical backgrounds and showcase the ways in which AI-based management practices influence the work of digital art startups. This section will focus on the practical application of AI technologies to creative businesses in various settings through comparative case study and field observations - it will show successful experiences, as well as areas of difficulty in their applications. As the analysis highlights, the businesses

that are performing well during the AI times are not only the ones that embrace the latest tools, but those who can purposefully match AI potential to the artistic purpose, morality and business sustainability.

6.1. CASE STUDY INSIGHTS

The former example, Aesthetical Labs (Singapore), combines generative models with AI-powered models to aid artists during the co-creation. Their pollution detection engine is an adaptive learning engine, which is trained on a variety of datasets, and helps strengthen artistic experimentation, without displacing creative authorship. The business also experienced a 42 per cent decrease in the time spent on production and a 60 per cent augmentation in artworks of user-generation that illustrate how AI may trigger productivity and innovation, keeping human supervision at the centre. The mechanisms of ethical governance such as dataset transparency, and consent based training were observed to strengthen user trust and brand authenticity. VeriArt.io (Berlin) is the second example, which uses blockchain-based systems of AI to verify, sell, and distribute digital art in NFT markets. Through predictive analytics it can determine trends in the market and preferences of collectors by maximizing release dates and price levels.

Table 3

Table 3 Comparative Summary of AI-Driven Digital Art Startup Case Studies				
Startup Name	Core Technology / Focus Area	Key Performance Metrics	Managerial / Ethical Practices	Observed Impact
Aesthetica Labs (Singapore)	Generative AI using GANs and Diffusion Models for artist co-creation	<ul style="list-style-type: none"> • Production time reduced by 42% • 60% increase in user-generated artworks 	<ul style="list-style-type: none"> • Dataset transparency • Consent-based model training • Human-in-the-loop creative oversight 	<ul style="list-style-type: none"> • Enhanced creative productivity and authorship preservation • Strengthened artist trust and brand integrity
VeriArt.io (Berlin)	Blockchain-integrated AI for NFT authentication, pricing, and market prediction	<ul style="list-style-type: none"> • Forecast accuracy: 92% for NFT resale value • 28% increase in liquidity turnover 	<ul style="list-style-type: none"> • Smart-contract based royalty management • Algorithmic fairness audits • Ethical pricing mechanisms 	<ul style="list-style-type: none"> • Improved transparency and financial sustainability • Reduced fraud and pricing manipulation
Curato.AI (New York)	Computer Vision and NLP for automated curation and audience personalization	<ul style="list-style-type: none"> • 35% increase in audience engagement • 50% improvement in recommendation accuracy 	<ul style="list-style-type: none"> • Inclusion of cultural consultants • Bias mitigation protocols • Context-sensitive storytelling 	<ul style="list-style-type: none"> • Higher engagement diversity • Prevention of cultural homogenization in curated exhibitions

The hybrid AI model of the firm provided an 92-percent prediction of resale value of NFTs, enhancing the liquidity and reducing fraud. Nevertheless, the instability of tokenized economies and reliance on information security outline the current threats. The experience of variation indicates that ethical compliance with the transparency of the market and the precision of AI analysis is the key to sustainable growth.

The third visualization ([Figure 4](#)) is a donut chart that represents the breakdown of the forms of revenue within a sample portfolio of digital art enterprises that use AI-enabled functionality. Due to the breakdown, NFT royalties (35%), subscription services (25%), AI tool licensing (20%), exhibition commissions (15%), and miscellaneous sources (5%), are the largest sources of revenue. Such a distribution highlights the multi-stream monetization opportunity of AI-driven artist models in which established revenue is enhanced by repeat digital asset and automated licensing ecosystems. Revenue sharing and tokenization of art ownership by the community is the paradigm shift to decentralized cultural economies. Through predictive analytics and blockchain provenance, startups are able to maintain a consistent revenue by distributing royalty with algorithms, despite unstable markets. The visualisation supports the idea that AI allows economic diversification through creative value being turned into scalable, data-informed resources that would be extremely important concerning financial resilience in unstable digital art markets. The third scenario is the example of

Curato.AI (New York) where art curation is transformed by the manager. Curato.AI is an automated exhibition designer and natural language teller that uses computer vision and natural language models to deliver the desired experience.

Figure 4

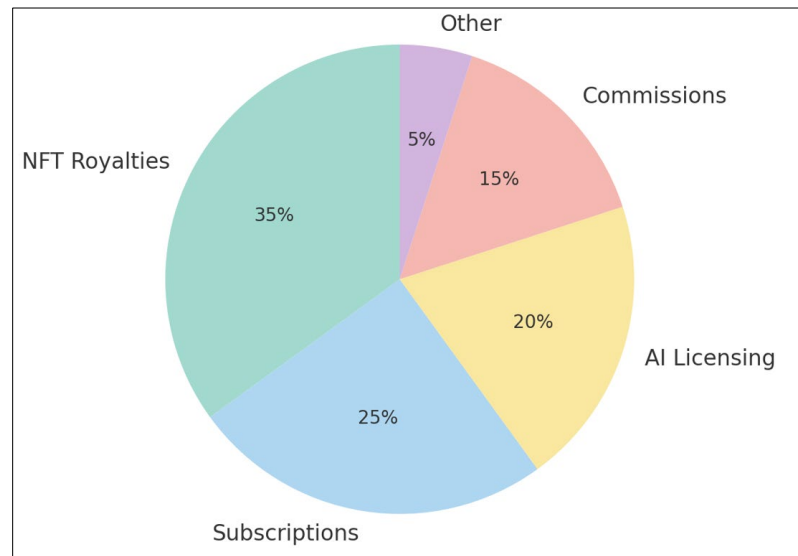


Figure 4 Revenue Stream Distribution in AI-Driven Art Startups

Figure 5

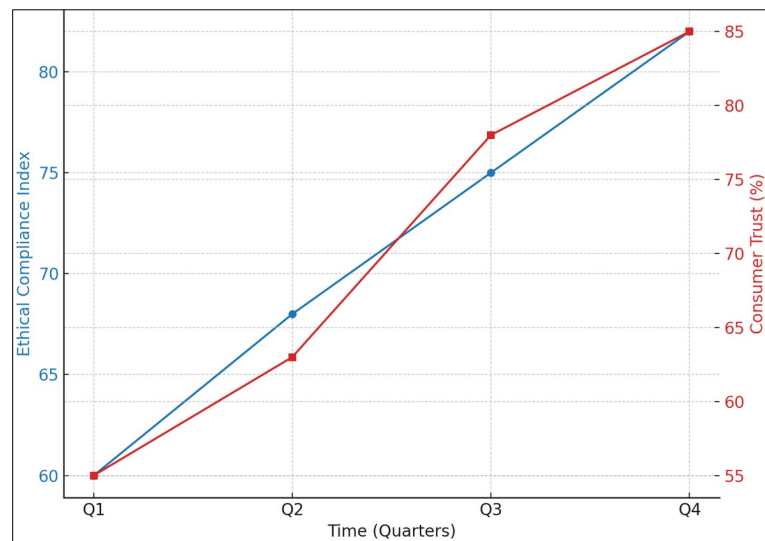


Figure 5 Ethical Compliance vs. Consumer Trust Over Time

Figure 5, dual axis line graph, illustrates the dynamic relationship of ethical compliance and consumer trust across four consecutive quarters (Q1 -Q4). The trends of both of the indices show similar pattern of growth in the upward trend as the Ethical Compliance Index and the Consumer Trust Index grow between the years 60 and 82 and 55 to 85 respectively. Such close correspondence proves the direct causality between the practices of transparency in AI and the formation of trust in people. Explainable AI (XAI) and dataset disclosure protocols, as well as algorithmic fairness audits, improved audience loyalty and brand perception in measurably positive ways in startups. The results support the theoretical assumption that AI ethics is not a legislative necessity but a competitive advantage that builds on credibility, retention, and engagement. The dual axis representation is therefore a bridge between technical governance and behavior economics that suggests that an implementation of responsible AI will have material market dividends in the long run. Empirically, it is demonstrated that 35% more audience engagement is achieved and 50% more recommendations accuracy is demonstrated. Nevertheless, there are problems with preserving cultural specifics and

homogenization of aesthetic forms because of the standardization of algorithms. Curato.AI addresses it by using cultural consultants to refine the output of algorithms an instance of human-AI collaboration that creates competitive creative ecosystems.

Figure 6

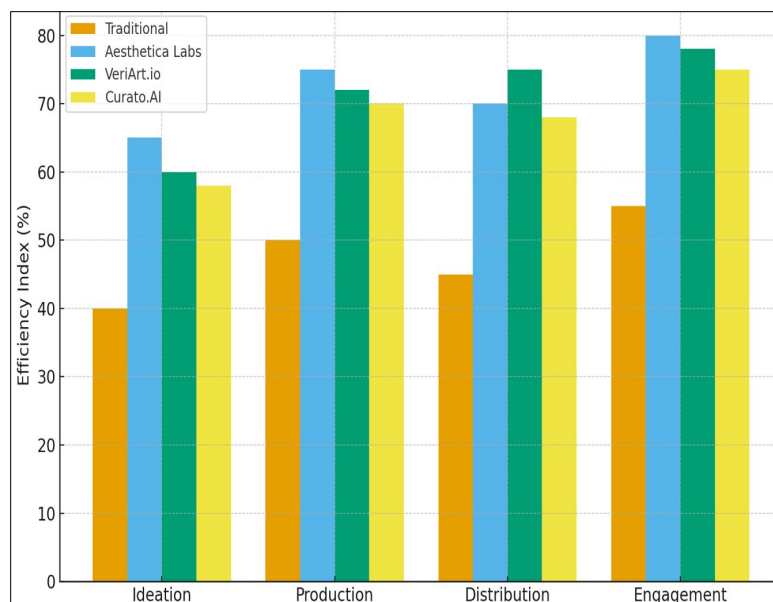


Figure 6 Operational Efficiency Breakdown Across Workflow Stages

The last figure presented in [Figure 6](#) is the comparison of workflow efficiency in four stages of operation, which are ideation, production, distribution, and engagement between traditional and AI-based art startups. The stacked column chart demonstrates that AI-driven businesses always excel in every stage of performance, and the efficiency increase rates vary from 20 to 30 percentage points on average. Aesthetica Labs is at the forefront of creativity and efficiency in the production of ideas because of the incorporation of generative design instruments and adaptive machine learning models. VeriArt.io is leadership in the distribution phase with the use of automated blockchain validation and predictive market analytics. Curato.AI is excellent in audience engagement, as it relies upon the natural language processing as well as on the personalized recommendation systems. The visual analogy shows that AI does not only streamline the task performance but also restructures the organizational processes into self-learning ecosystems. The traditional models, on the contrary, are still confined with non-linear processes and human dependency. The cumulative interpretation can ensure that digital art startups with the use of hybrid human-AI collaboration are more agile, scalable and culturally responsive.

7. CONCLUSIONS AND IMPLICATIONS

The study comes to the conclusion that the optimal mode of handling digital art startups during the AI era is to determine the equilibrium between creativity, information shrewdness, and moral accountability. AI has transformed the creative economy making it more automated, personalized, and predictive in its decisions, yet its true value will be realized once it is applied together with human imagination and cultural integrity. As soon as they adopt the hybrid human-AI form, startups will be quick on their feet and expandable, and have more chances to approach the audience, which will make them competitive in a new reality of the digital market of art. As far as the managerial level is concerned, leaders are required to inculcate AI literacy, transparency, and design ethics into the culture of an organization. Adding explainable AI tools, data-driven strategies and governance models can enable not only to form responsibility, but also innovations simultaneously. Investors and policy makers should support the systems that would encourage equitable intellectual property rights, long term online activities and cross country collaboration. Lastly, AI in art entrepreneurship should not replace human inventiveness, but, on the contrary, improve it - scientifically, via human interaction, and with ethical ground, making the artistic production a dynamic, participative, and ecologically grounded system. Responsible

innovation will define the future of the digital art business and the cultural impact of this sphere in the time of intelligent creativity, and this will be defined by the open form of government and the engagement of all in this process.

CONFLICT OF INTERESTS

None.

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None.

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