

Working Paper accepted for the

Peer-to-Peer Financial Systems 2026 Workshop

June 2026

Cultural Sovereign Assets: A New Asset Class for Digital Public Infrastructure



P2P Financial Systems

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Extended Abstract

1. Introduction

Digital public infrastructure (DPI) has become a foundational paradigm for modern economies, enabling population-scale systems for identity, payments, and data exchange. Initiatives such as Aadhaar, UPI, and GovStack demonstrate how interoperable, modular infrastructure can drive financial inclusion, economic efficiency, and institutional trust. However, a critical layer remains underdeveloped: the ability to represent, govern, and transact **authorship and cultural intellectual property (IP)** as structured, programmable assets within digital systems.

Cultural and creative works—music, literature, visual art, archives, and oral histories—generate billions of dollars in global economic value. Yet, the systems that underpin this value remain fragmented and largely incompatible with AI-driven environments. Existing infrastructures lack mechanisms to enforce **consent, attribution, and compensation** in real time, particularly when cultural assets are ingested, transformed, and monetized by artificial intelligence systems.

This paper introduces **Cultural Sovereign Assets (CSAs)** as a new class of tokenizable, programmable assets and proposes a DPI-compatible architecture for their governance. We argue that authorship should be treated as an identity layer and that consent should function as an executable primitive within financial and computational systems.

2. Problem Statement: The Missing Layer in DPI

While DPI frameworks have successfully addressed identity (who), payments (value transfer), and data exchange (information flow), they do not natively support **authorship (origin of value)** or **consent (conditions of use)**. This omission creates systemic inefficiencies, particularly in AI-mediated environments.

Three structural gaps define the problem:

1. Absence of Verifiable Authorship

Cultural works are not consistently represented as machine-readable, verifiable entities. Systems cannot reliably determine origin, ownership, or custodial authority at scale.

2. Lack of Programmable Consent

Licensing frameworks are static, contract-based, and enforced after the fact. They are not embedded within computational pathways where assets are accessed or used.

3. Disconnection from Financial Infrastructure

Even when attribution exists, compensation is delayed or opaque. Cultural value does not flow efficiently back to originators, especially across borders or digital platforms.

As generative AI systems incorporate large volumes of cultural data without structured governance, the gap between value creation and value capture continues to widen, with implications for market integrity, financial inclusion, and trust.

3. Conceptual Framework: Cultural Sovereign Assets (CSAs)

We define **Cultural Sovereign Assets (CSAs)** as digital representations of cultural works that are:

- **Verifiable:** Anchored to persistent identifiers encoding authorship and ownership
- **Programmable:** Governed by machine-readable consent rules
- **Enforceable:** Equipped with mechanisms that detect violations and trigger responses
- **Yield-bearing:** Capable of generating and routing economic value

Unlike traditional intellectual property, which is primarily a legal construct, CSAs are designed to operate within digital infrastructure. They function similarly to tokenized real-world assets (RWAs), but with embedded governance logic reflecting multi-party authorship, lineage, and contextual sensitivity.

This framing positions cultural IP as an **active economic instrument** within programmable systems.

4. System Architecture: DPI for Authorship

To operationalize CSAs, we propose a modular architecture aligned with DPI principles:

4.1 Registry and Identity Layer

Each asset is registered and assigned a persistent identifier linking authorship, ownership, and custodial authority, establishing authorship as an identity layer.

4.2 Consent and Rights Encoding Layer

Rights holders define machine-readable permissions governing usage across AI training, inference, and distribution. These permissions are cryptographically bound to each asset.

4.3 Access and Interoperability Layer

AI systems and digital platforms interact with assets through controlled access pathways, ensuring only permitted uses occur. Integration is achieved through standardized APIs.

4.4 Enforcement and Value Routing Layer

System outputs are evaluated for attribution and lineage. When unauthorized use is detected, fallback mechanisms trigger automated responses, including license generation and **royalty routing**.

This architecture extends DPI by introducing authorship and consent as operational primitives, complementing identity and payments.

5. Financial Integration: CSAs as Tokenized RWAs

CSAs can be understood as a specialized class of **tokenized real-world assets** with distinct properties:

- **Non-fungible but composable** across derivative chains
- **Dynamically valued** based on usage and relevance
- **Governed by embedded consent logic**

This enables new financial capabilities:

Automated Royalty Routing

Payments are triggered programmatically based on asset usage, with value distributed across stakeholders.

Integration with CBDCs and Payment Systems

CSA transactions can interface with digital payment rails, enabling real-time settlement and improved transparency.

Collateralization Potential

As CSAs become verifiable and yield-bearing, they may serve as collateral, expanding access to capital for creators and communities.

This expands tokenization beyond traditional assets to include **cultural production as an economic substrate**.

6. Governance and Policy Implications

The introduction of CSAs presents several implications:

Data Governance and Consent

Embedding consent within infrastructure enables enforceable compliance rather than reliance on policy alone.

Cross-Jurisdictional Interoperability

A DPI-based model allows standardized interfaces while accommodating local legal and cultural frameworks.

Financial Inclusion

CSAs enable participation in digital economies by making cultural assets legible and monetizable within financial systems.

Institutional Roles

Archives, publishers, and cultural institutions function as verifiers and governance nodes, requiring scalable and federated models.

7. Early Implementations

Initial implementations demonstrate feasibility:

- **Publishing systems:** Attribution and tracking of AI-generated outputs
- **Archival collections:** Structured access and controlled monetization
- **Estate governance:** Management of rights and consent across lifecycle events

These use cases show how cultural data can transition into **structured, governable assets** within digital infrastructure.

8. Conclusion

As digital economies evolve, infrastructure must expand beyond identity and payments to include the **origin of value**. Cultural Sovereign Assets introduce a missing layer in DPI, enabling authorship to be recognized, governed, and compensated at scale.

By combining verifiable identity, programmable consent, and integrated financial routing, this framework provides a path toward more efficient and equitable digital systems. It also positions cultural production as a first-class participant in global financial architecture.

Future work should explore standardization, interoperability with existing DPI systems, and the broader implications of treating cultural assets as programmable financial instruments.