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Decentralized Ledger Journalism: An Uninvestigated Frontier of Data-Driven Reporting

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Abstract. Proposes are offered Decentralized Ledger Journalism (DLJ) as a distinct and timely subfield within data journalism, emerging at the intersection of technological innovation and investigative practice. Drawing on the unique affordances of blockchain and other distributed ledger technologies (DLT), this approach positions public, immutable records not merely as supplementary datasets, but as primary sources for journalistic inquiry. From financial transactions and smart contract events to decentralized governance and identity systems, distributed ledgers offer a new evidentiary terrain – structured, transparent, and resistant to alteration. Beyond their utility as data sources, these systems provide native mechanisms for content authentication, including cryptographic timestamping, verifiable provenance, and censorship-resistant publication infrastructures. Such tools enable new methods of verification and preservation, allowing journalists to secure both the integrity of their sources and the durability of their outputs. By exploring the methodological and epistemological implications of blockchain-based journalism, this study outlines how decentralized ledgers can serve both as subject and substrate of inquiry. DLJ, we argue, offers a novel framework for enhancing journalistic integrity in a digital environment increasingly shaped by opacity, manipulation, and central control.

Keywords: data journalism, distributed ledger technology, blockchain, transparency

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Журналистика децентрализованных реестров: новый этап в развитии журналистики данных

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Аннотация. Предпринимается попытка концептуализации журналистики децентрализованных реестров как самостоятельного направления в рамках журналистики данных. Это направление формируется на пересечении технологических достижений в области распределенных реестров (Distributed Ledger Technology, DLT) и современных аналитико-расследовательских практик. Распределенные реестры, включая технологии блокчейн, рассматриваются как потенциальные первичные источники информации, пригодные для системного, верифицируемого и воспроизводимого анализа. К числу таких источников относятся транзакционные данные, события, зафиксированные в смарт-контрактах, результаты голосований в децентрализованных автономных организациях (DAO), цифровые удостоверения личности, а также иные элементы ончейн-инфраструктур. Отдельное внимание уделяется внутренним возможностям распределенных реестров: криптографической отметке времени, подтвержденному происхождению данных и механизмам публикации, устойчивым к цензуре и модификациям. Рассматриваются потенциальные способы интеграции этих механизмов в процедуры сбора, проверки, хранения и распространения информации. Кроме того, анализируются эпистемологические последствия использования неизменяемых и общедоступных цифровых реестров в качестве объекта, среды журналистского исследования. Автор приходит к выводу, что журналистика децентрализованных реестров – перспективная концептуальная и практическая рамка, способная усилить транспарентность и верифицируемость журналистской деятельности в условиях роста цифровых манипуляций, недостоверных источников и концентрации контроля над информацией.

Ключевые слова: журналистика данных, технология распределенного реестра, блокчейн, прозрачность

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Introduction

The wave of quantitatively oriented journalism (Coddington, 2014), including data journalism, emerged as a paradigm wherein large datasets – often originating from governmental open data, corporate records, or user-generated information – serve as raw material for producing evidence-based stories (Gynnild, 2014; Lewis, Usher, 2013; Parasie, Dagiral, 2013; Stalph, 2017). The purpose of data journalism is to enhance public understanding by revealing hidden trends or correlations that

may otherwise remain obscure. However, the specifics of traditional data journalism lie in its reliance on centralized data repositories that can be prone to manipulation or censorship (Bradshaw, 2017).

In the context of journalism, distributed ledger technologies (DLT) – including blockchain – introduce new methods for securing and verifying data (Chabini et al., 2022; Mohammed, 2024; Niloy et al., 2024; Pfeiffer et al., 2021). By definition, DLT is a decentralized database maintained by multiple nodes in a network, where each record is cryptographically linked to previous entries (Antal et al., 2021; Ølnes et al., 2017). This cryptographic linkage confers immutability, making retroactive manipulation highly challenging (Nakamoto, 2008). When integrated into journalistic practice, DLT allows for unprecedented levels of transparency in source verification, timestamping of content, and real-time public scrutiny of on-chain data flows.

Consequently, Decentralized Ledger Journalism (DLJ) can be conceptualized as a specialized branch of data journalism that primarily relies on the new type of data derived from decentralized, cryptographically secured ledgers. This paper explores the defining features of DLT Journalism, its key use cases, and the challenges news organizations face in adopting this emergent practice.

Methodology

This study employs a qualitative, exploratory research design situated at the intersection of media studies, digital technologies, and epistemology. The methodological approach integrates case study analysis, thematic synthesis of academic and gray literature, and a conceptual framework construction grounded in interdisciplinary theory. The objective is not to test a hypothesis in the conventional empirical sense, but rather to articulate, define, and critically evaluate the emerging contours of DLJ as a subfield of data journalism.

Given the novelty of the phenomenon under investigation, a descriptive and interpretative approach was chosen to identify the key features, practices, challenges, and epistemic assumptions embedded in blockchain-integrated journalistic workflows. This study does not seek to measure adoption quantitatively across the industry, but rather to map the conceptual foundations, infrastructural affordances, and methodological shifts enabled by distributed ledger technologies. The research is thus both diagnostic and speculative: it identifies early real-world implementations and extrapolates their implications for journalism theory and practice.

The core empirical component is based on a comparative analysis of prominent case studies involving blockchain or distributed ledger implementations in journalism. These cases – *ANSAcheck*, *Associated Press* and *Everipedia*, *The New York Times' News Provenance Project*, The *WannaCry* ransomware case, The *Silk Road* investigation, *Verizon's* blockchain newsroom, blockchain-based platforms like *Civil*, *Steemit*, *PubDAO*, *Mirror.xyz*, and community-driven fact-checking solutions—were selected using purposive sampling based on the criteria included relevance to core DLT affordances (immutability, provenance, decentralization), public documentation, and diversity of institutional contexts (mainstream media vs.

startups). The analysis of case studies was guided by a thematic synthesis around four core dimensions:

- Data provenance and integrity (how DLT is used to verify, timestamp, or preserve journalistic outputs);
- Decentralization and autonomy (the extent to which systems reduce reliance on centralized infrastructures);
- Transparency and accountability (how verifiability and auditability of content are enhanced through blockchain);
- Epistemic shifts (how the integration of DLT reshapes journalistic notions of evidence, authorship, and trust).

These dimensions were informed by prior research in data journalism (Bradshaw, 2017; Coddington, 2014), blockchain studies (Beck et al., 2016; Iansiti, Lakhani, 2017; Zheng et al., 2018), and media epistemology (Carlson, 2015; Lewis, Usher, 2013; Borges-Rey, 2020). Through comparative analysis, each case was evaluated to assess how it contributes to or challenges the emerging paradigm of DLJ.

Literature Review

Emergence of Data Journalism

Data journalism emerged from the foundations of precision journalism and computer-assisted reporting (CAR). In the 1970s, Meyer (1973) introduced quantitative methods, including surveys and statistical analysis, into reporting. CAR in the 1980s and 1990s then advanced these techniques, using databases and spreadsheets to investigate systemic issues in airline safety and law enforcement (Appelgren, Nygren, 2014; Gynnild, 2014). The digital revolution and the rise of big data accelerated data journalism's growth, supported by open data initiatives and freedom of information laws (Gray et al., 2012). Newsrooms recognized the importance of analyzing these datasets to produce investigative work on government spending, corporate malfeasance, and social trends (Parasie, Dagiral, 2013). Leading newspapers, *The Guardian* and *The New York Times*, integrated multidisciplinary teams – programmers, designers, and data experts – to create interactive visualizations that made complex information accessible (Fink, Anderson, 2015). Over time, specialized tools and workflows – such as R scripts, Python libraries, and data visualization platforms – became integral to these practices (Bradshaw, 2017).

Theoretical reflection on data journalism in Russia began with the works of researchers, who framed it as part of the broader digital transformation of media (Shilina, 2013; Simakova, 2013; Vartanov, 2017). Several studies focus on conceptual definitions (Lisitsyn, 2018), the role of open data (Panyukova, 2015; Valeeva, 2017), and the specifics of sources and formats in Russian media (Shilina, 2019).

DLT and Journalism

Academic discourse on blockchain and journalism remains emergent yet steadily expanding. Early studies highlighted blockchain's potential to counter censorship, offer micro-payment models, and enhance content traceability (Al-Saqaf, Edwardsson,

2019; Lokot, Diakopoulos, 2016). Scholars also point to solutions for journalism's wider crises – including declining trust, financial instability, and content manipulation – through decentralization, immutable records, and smart contracts (Artemov, Savin, 2018; Ivanitsky, 2018; Niloy et al., 2024; Shilina, 2019).

Current research explores applications such as secure provenance tracking (Kataeva, 2022; Pfeiffer et al., 2021), fake news mitigation (Chabini et al., 2022; Patnaik, Biswal, 2023), and the protection of intellectual property (Mohammed, 2024). Yet high transaction costs, technical complexity, and data permanence challenges impede large-scale adoption (Ølnes et al., 2017; Liu et al., 2021). As blockchain frameworks mature, they hold promise for reconceptualizing trust, accountability, and funding within journalistic ecosystems (Sari et al., 2021).

Results and Discussion

Theoretical Framework: DLJ as an Epistemic Regime

DLJ invites a rethinking of foundational journalistic concepts: source, testimony, trust, and verification. In DLJ, the 'witness' is often not a person, but an automated on-chain event: a transaction, a smart contract's logic, a cryptographic signature. This shift calls for a redefinition of "primary source" and "evidence" in the digital age.

DLJ can be understood as a transition from empirical to computational epistemology: truth is not reported by a subject but calculated by a system. Blockchain substitutes institutional trust (based on reputation) with cryptographic verifiability (based on code and decentralized consensus). In this sense, DLJ aligns with notions of "post-metaphysical truth" (Habermas, 1993) or "distributed veracity" (Floridi, 2011). Thus, DLJ operates as a distinct epistemic regime – one in which authorship is decentralized and trust is established through technical procedures rather than social institutions.

Toward a Definition

Scholars have long debated the precise definition of data journalism (Appelgren, Nygren, 2014; Coddington, 2014). Following Coddington, we refer to data journalism as "journalism based on data analysis and the presentation of such analysis" (p. 334). Broadly, this process can manifest in two ways: a "hypothesis-driven approach," where data are evaluated in relation to predetermined assumptions, or a "data-driven approach," where journalists rely on data processing to uncover emergent and unexpected stories (Parasie, Dagiral, 2013).

Building on this foundation, DLJ is here defined as a specialized form of data journalism that employs decentralized ledgers – commonly public blockchains or permissioned distributed networks – as a primary source of data for investigative reporting and for verifiable publication processes. Whereas traditional data journalism typically draws upon sources such as open government datasets, custom web scrapes, or leaked materials (Coddington, 2014), DLJ focuses on "on-chain" data, including transaction records, smart contract events, and other metadata intrinsic to a blockchain. By harnessing the trust architecture of blockchain – its

immutability, distributed consensus, and cryptographic timestamping – this approach aims to enhance the credibility and traceability of journalistic outputs.

Core attributes of DLJ

Novel data sources. Blockchains offer openly accessible transaction histories and metadata, forming a new class of verifiable data (Beck et al., 2016; Nakamoto, 2008; Ølnes et al., 2017). Investigative journalists can trace financial flows, asset transfers, and contractual relationships through cryptographically secured records. Unlike traditional banking systems, which often obscure these flows, blockchain enables a new form of auditability grounded in transparency and computational integrity.

Immutable timestamping. Blockchain-based timestamping mechanisms allow journalists to hash articles, images, or documents and anchor them to public ledgers. This generates tamper-evident proofs of publication time and content integrity (Lokot, Diakopoulos, 2016). Such a mechanism ensures that once published, a piece of content can be verified as unchanged since its initial release, reinforcing journalistic credibility.

Decentralized verification. DLTs eliminate reliance on central authorities for data validation. Each transaction is verified by a decentralized network of nodes, minimizing the risk of unilateral manipulation or censorship. For journalism, this creates a resilient infrastructure in which both source material and published reports can be independently validated by any participant in the network.

Censorship resistance. In contexts where information is tightly controlled, DLJ offers a pathway for bypassing suppression. Content hosted or referenced via blockchain can be distributed across many nodes, making deletion or alteration difficult without detection. This resistance to centralized control provides a critical safeguard for freedom of information in authoritarian or conflict-ridden regions.

Case Studies and Infrastructural Innovations

Recent case studies and experiments. Emerging DLJ projects demonstrate different responses to journalistic challenges in the digital age. *ANSAcheck*, developed by Italy's *ANSA* news agency in partnership with EY, employs a permissioned blockchain (*EY OpsChain*) to certify news stories at the source, helping readers verify their provenance and reducing the spread of misinformation (EY, & ANSA, 2020). Similarly, the *News Provenance Project* by *The New York Times* utilizes *IBM's Hyperledger* to track metadata for visual journalism, responding to the increasing sophistication of image manipulation (Tameez, 2020) (Table 1).

Other initiatives adopt more radical decentralization models. *Civil* sought to reimagine newsroom governance through tokenized incentives and *Ethereum*-based voting mechanisms, though it struggled with onboarding and sustainability. *Po.et,* which recorded timestamped hashes of articles on *Bitcoin*, aimed to simplify content licensing and attribution but was ultimately discontinued. These cases underscore both the ambitions and limitations of blockchain's integration into the journalism ecosystem.

Community-oriented platforms have also emerged. Fact-checking projects like *Trive* and *Credibility Coalition* explore how distributed ledgers might support decentralized verification, using blockchain as a back-end infrastructure for recording consensus judgments or sourcing trails (Chabini et al., 2022).

Table 1

Recent projects and experimental platforms

Project/Initiative	Technology	Focus/Function	Notes
ANSAcheck	EY OpsChain (permissioned blockchain)	Certifying official news content at source	Partnership between ANSA and EY; deployed in live newsroom environments
News Provenance Project (NYT)	IBM Hyperledger	Image metadata tracking and visual journalism authentication	Prototype stage; addressed risks of manipulated media
Civil	Ethereum (smart contracts, tokens)	Decentralized newsroom governance and staking-based trust	Ambitious but discontinued due to user onboarding issues
Po.et	Bitcoin blockchain	Timestamping and licensing for creative content	Discontinued; early example of blockchain publishing infrastructure
Trive	Custom blockchain	Crowd-sourced fact-checking with token incentives	Experimental; limited adoption
Credibility Coalition	Mixed protocols (DLT-integrated tools)	Collaborative verification metrics and annotation standards	Research-driven; piloted metadata-based trust indicators

Source: completed by Alexandra G. Shilina.

Investigative applications: Blockchain as a forensic and journalistic tool. Beyond platform design, blockchain has proven valuable in investigative reporting. In the aftermath of the 2017 *WannaCry* ransomware attack, journalists used public blockchain explorers to trace *Bitcoin* ransom payments, with Quartz's Keith Collins creating a real-time *Twitter* bot for transaction monitoring (BBC News, 2017). Likewise, the *Silk Road* investigation showcased how both journalists and law enforcement can follow cryptocurrency flows to expose criminal networks and state corruption.

These examples highlight blockchain's utility as a forensic resource, enabling journalists to "follow the money" with publicly verifiable data. Tools such as *Elliptic*, *Chainalysis*, and *Blockchair* have further professionalized blockchain analytics, suggesting that future newsrooms may integrate crypto-forensics as a core investigative method (Table 2).

Blockchain platforms and infrastructure. DLJ relies on various blockchain infrastructures tailored to different needs. *Ethereum* provides flexible smart contract capabilities and underpins platforms like *Mirror.xyz* and *Lens Protocol,* which enable decentralized publishing, crowdfunding, and NFT-based authorship models. However, high gas fees and technical complexity may impede wider adoption (Ivancsics, 2019). *Bitcoin*, while limited in programmability, remains a preferred anchor for content timestamping services due to its security and longevity (Nakamoto, 2008).

Table 2

Investigative applications of blockchain in journalism

Case/Example	Tool/Platform	Function	Impact
WannaCry ransomware	Bitcoin blockchain, block explorers, Twitter bot	Tracking ransomware payments in real time	Enabled live financial transparency and public engagement
Silk Road investigation	Bitcoin blockchain, Chainalysis, subpoenaed exchanges	Forensic tracing of illicit transactions	Established techniques for pseudonym identification and fund tracing
тавилаAssociated Press x Everipedia	Ethereum & EOS via OraQle	Publishing verified election results immutably	Created verifiable, tamper-proof election data
Verizon Full Transparency initiative	Proprietary blockchain-based newsroom log	Logging article publication and correction history	Reinforced editorial accountability and transparency

Source: completed by Alexandra G. Shilina.

Enterprise-focused frameworks such as *Hyperledger Fabric* and *EY OpsChain* cater to organizations prioritizing controlled access and auditability. Their private or consortium-based architecture makes them attractive to established media institutions seeking verifiable yet compliant systems. In contrast, decentralized storage protocols like *IPFS* and *Arweave* are increasingly used to distribute journalistic content in a censorship-resistant manner, though their open architectures introduce ethical and regulatory challenges (Al-Saqaf, Edwardsson, 2024; Benet, 2014; Niloy et al., 2024; Williams, 2019) (Table 3).

Table 3

The Web 3 journalism stack

Layer	Function	Platform examples	Description
Identity	Decentralized user authentication and reputation	Lens Protocol, Forefront	Establishes portable social identity, authorship, and credibility across Web3
Publishing	Content creation and dissemination	Mirror.xyz, Paragraph, Steemit, Hive	Enables on-chain publishing, token-gated content, and collaborative writing
Funding	Crypto-native economic models for media	PubDAO, JournoDAO	Introduces crowdfunded journalism, contributor DAOs, and public goods financing
Verification	Fact-checking and trust validation	Trive, Credibility Coalition, Civil	Supports community-led verification and immutable trust registries
Archiving	Censorship-resistant storage and timestamping	IPFS, Arweave, OIP/ Alexandria, Po.et	Provides durable, tamper-proof storage for journalistic content and metadata

Source: completed by Alexandra G. Shilina.

Key Themes and Observations

A comparative analysis of blockchain-based journalism projects reveals five key themes shaping the potential and challenges of DLJ. First is the trade-off between censorship resistance and editorial control. Platforms like *Ethereum* and *IPFS* prevent censorship but complicate content moderation and corrections, while semi-permissioned systems such as *Hyperledger* offer a compromise by allowing limited editorial oversight.

Second, sustainability remains a hurdle. Projects like *Civil* and *Po.et* explored token-based funding to support independent journalism, but adoption has been limited by cryptocurrency volatility, public unfamiliarity, and regulatory ambiguity.

Third, technical complexity continues to impede broader use. Although some initiatives have improved usability through dashboards and plugins, the underlying blockchain infrastructure remains difficult for many journalists to navigate.

Fourth, the immutability that strengthens credibility also raises ethical concerns. Permanent records make it hard to correct or retract content, challenging journalistic standards around accuracy and accountability.

Finally, while blockchain can verify the integrity and timestamp of content, it cannot guarantee factual accuracy. Verifiability must therefore complement – rather than replace – traditional editorial processes like fact-checking and source verification. DLJ strengthens the infrastructure of trust, but it does not absolve journalists of epistemic responsibility.

Conclusion

DLJ reimagines the infrastructure of trust in journalism. By embedding verifiability, provenance, and resistance to manipulation directly into the medium, DLJ offers a new epistemic regime – where facts are not only reported but cryptographically anchored. It reframes journalism as not just a narrative practice but a protocol-driven system of public knowledge.

Yet this shift demands caution. Immutability brings ethical dilemmas; decentralization complicates responsibility. DLJ does not replace traditional journalism – it augments it, offering new tools to secure truth in a media environment saturated with noise. The future of journalism may not be fully decentralized, but it will be verifiable – or it will not be trusted at all.

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