

# Fixing Social Media with the Blockchain

## Extended Abstract

P. Freni

LINKS Foundation

Via Pier Carlo Boggio 61, 10138 Torino  
Italy

pierluigi.freni@linksfoundation.com

E. Ferro

LINKS Foundation

Via Pier Carlo Boggio 61, 10138 Torino  
Italy

enrico.ferro@linksfoundation.com

G. Ceci

Polytechnic of Turin

C.so Duca degli Abruzzi 24, 10129 Torino  
Italy

gabriele.ceci@polito.it

### ABSTRACT<sup>1</sup>

In today's social media context, many criticalities have emerged, particularly concerning the security of users' personal data and the unbalanced redistribution of the value generated. This work, analyzing 40 emerging platforms, investigates how Blockchain technology is reshaping the social media scenario through transparency, value redistribution, ownership awareness, decentralization of data, and censorship resistance.

### CCS CONCEPTS

• Networks ~ Network types ~ Overlay and other logical network structures ~ Social media networks • Networks ~ Network types ~ Overlay and other logical network structures ~ Online social networks

### KEYWORDS

Blockchain, Tokenization, Incentive Systems.

## 1 INTRODUCTION

Nowadays, it is nearly impossible to come across someone not sharing at least a little piece of her/his life on the Internet. As of July 2019, social media active users were 3,53 billion [12], which is 45% of the global population [31], and considering only those who have access to the Internet, the quota raises above the 80%. Such a capillary penetration into people's daily lives means that big social media companies can wedge advertising with surgical precision, generating impressive revenues. In numbers, around \$27 billion just in 2018 [13]. Those companies profit from users' data that they sell to advertisers with the promise to deliver precisely targeted commercials [2].

The intrusiveness of social networks into users' virtual lives represents a real threat to their privacy and expose them to malicious manipulation and behavior influence [9]. The

"Cambridge Analytica" scandal [8] revealed that the Facebook profiles of 50 million unaware users were harvested to create an algorithm able to influence US voters, through targeted political ads. Christopher Wylie, working at Cambridge Analytica at the time, declared: "We exploited Facebook to harvest millions of people's profiles. And built models to exploit what we knew about them and target their inner demons. That was the basis the entire company was built on". Eventually, this substantial data breach played a role in the result of the last US elections and Brexit referendum [7].

Together with data breaches, social networks are plagued by fake account bots and fake news. This phenomenon is a significant driver of misinformation and may deceive users into spam, scam, and phishing threats. Due to its nature, no precise figure about the size of this problem is currently available, but different observers agree on estimating that about 15% of social profiles are bots [21, 28].

If, on one side, the loose control of published content and users' authenticity allows for the circulation of false and harmful news, on the other, the centralization of storage and management of data endangers the freedom of information. In 2018, Google received almost 43.000 requests of content removal from Governments [14], with Russia being the first in line with more than 30.000 requests (mostly for alleged national security reasons). Furthermore, there are many examples of social media shutdown or manipulation to repress demonstrations all over the world, like the recent case of the Hong Kong protests [19].

## 2 THE ROLE OF BLOCKCHAIN

In this Orwellian scenario, Distributed Ledger Technologies (DLTs) are giving rise to a new wave of disruptive innovations, among which the Blockchain is the most prominent and is emerging as the latest paradigm for the Internet of the future [1, 36]. We are witnessing the sprouting of a large number of Blockchain-based Social Media platforms whose mission is to address the issues of current Online Social Networks [17].

The first fundamental distinction is the decentralized architecture of the Blockchain network. Currently, companies owning the platforms store users' data on their servers, giving rise to several problems concerning both the presence of a single-point-of-failure and the exposure to censorship [20]. Social networks have full control of everything that is uploaded and have the ability to indisputably decide what to make visible and whatnot, potentially hampering the freedom of expression of

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users. Conversely, Blockchain is based on a peer-to-peer architecture, guaranteeing that data is duplicated and distributed to all the nodes of the network. This way, information is made practically unassailable, being no longer in the hands of a single operator but being duplicated and spread among all the participants to the network. At the same time, decentralization ensures the immutability of the Blockchain and all the data contained within the ledger of transactions, making it censorship-proof [33].

A further data-related advantage is the management of intellectual property [4]. Whenever someone uploads content on current social media platforms, they lose control over their ownership in almost all cases. Conversely, thanks to the Blockchain, it is always possible to keep track of whoever comes into possession of the uploaded content and to monitor it continually [22].

Moreover, many marketers and creators have no awareness and control about how platforms like Facebook or Instagram index all the uploaded content, and in which order this content appears on users' personal feeds [23]. Those platforms keep an opaque veil of confidentiality on the algorithms underlying the hierarchization of content. In contrast, the new Blockchain-based platforms make these logics explicit, transparently explaining how content is evaluated and shown to other users, and in some cases enabling users to modify such logic.

## 2.1 A focus on Blockchain-based Social Media

The *OverTheBlock* observatory<sup>2</sup> thoroughly examined the role of Blockchain in Social Media in the context of HELIOS, an EU-funded project aimed at developing a next-generation contextual Social Media platform to empower meaningful relationships based on users' natural environment [15, 16]. This investigation was intended to map the Blockchain-enabled ecosystems and identify prominent market players and their strategic positioning, highlighting emerging business model archetypes.

The driving research questions the observatory has been addressing are:

Q1—*What is the positioning and maturity level of Blockchain-based social media platforms?*

Q2—*Which differential value proposition do they offer to users, compared to incumbents?*

Q3—*What is the role played by tokens in their business models?*

Q4—*What are the main open issues?*

## 2.2 Methodology

The complex nature of the Blockchain demands an exploratory case study approach [34] due to the absence of established and consolidated theories on the subject and the lack of consensus on the key variables to consider and their mutual relations. 40 case studies were scrutinized, selecting companies that have developed Blockchain-based solutions, including:

- *Social Media*: platforms that allow the creation and sharing of content such as articles, songs, podcasts, photos, videos;

- *Social Networks*: platforms focused on creating connections among users who participate, allowing people with similar interests to have a meeting point, and share information;
- *Calling/Instant Messaging*: platforms that allow two or more users to get in touch via calls or private messages.

Within the pool analyzed, Social Media platforms are predominant, with particular relevance of generic content sharing (such as photos, videos, texts), as shown in Table 1.

**Table 1: Classification of analyzed platforms**

Platform type	Primary offering	n.
Social Media	Content Sharing	18
	Images Sharing	2
	Music Streaming	1
	News Platform	1
	Open-Source Contribution	1
	Sports Sharing Platform	2
Social Network	Video Streaming	4
	Dating App	1
	Microblogging	2
	Professional Networking	2
Calling/Instant Messaging	Q&A social network	1
	Calling Platform	1
	Instant Messaging	4

A *short list* of 10 case studies has been isolated, out of the complete pool, to address the second research question and to aim at sampling a highly heterogeneous group of platforms and verifying the retrievability of exhaustive material for a more detailed analysis. Furthermore, from the initial assessment of the *long list*, two more selection criteria have been identified:

- *Empirical criterion*: selection of success cases based on the number of users of the platform and their engagement;
- *Theoretical criterion*: selection based on the relevance of the platform's differential value proposition compared to off-chain counterparts, for specific categories of users.

## 2.3 Mapping the Social Media space

The new Blockchain-based platforms are moving in a space crowded with prominent incumbents. Therefore, it is essential to delineate their current positioning and evaluate how far they are from having a competitive relevance. Two dimensions have been used to define the maneuvering space:

- the *number of users* (generally, registered users or number of accounts), that provides a proxy of the diffusion of the platform and adoption in the first place;
- the *Alexa Global Rank*[3], that is an estimate of the popularity of a website and provides a measure for the users' engagement on the platform and their retention<sup>3</sup>.

<sup>2</sup> <https://overtheblock.io/>

<sup>3</sup> Note: the lower the value is, the better the engagement performance of the platform is.

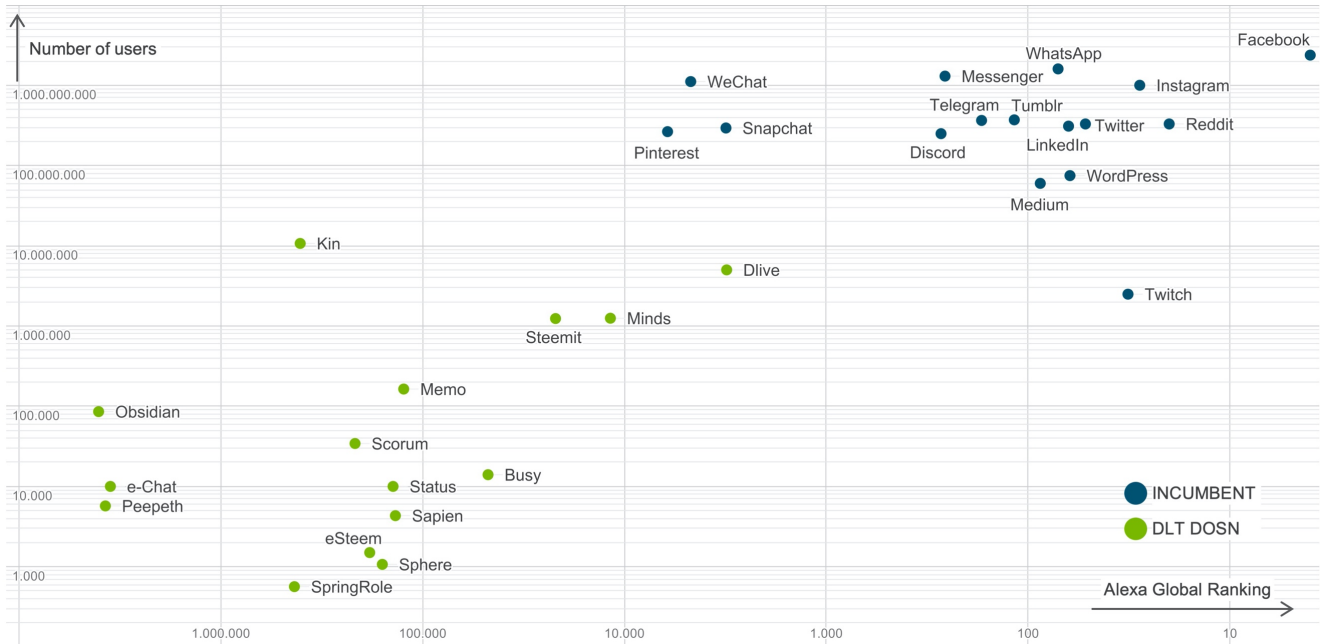


Figure 1: Mapping of the Social Media Space

From the mapping (Fig. 1), it is clear that even if some Blockchain-based players are gaining some traction, the gap with incumbents is still far from being filled.

### 3 ANALYZING THE DIFFERENTIAL VALUE PROPOSITION OF EMERGING PLATFORMS

In the following, the shortlisted case studies are described in detail, grouped by target users' type.

#### 3.1 General users

The majority of Online Social Networks users are flooded continuously with advertising while using social media services. Their navigation habits are meticulously tracked and monetized as advertising opportunities: in fact, users' attention is a scarce resource, and it is traded as a common good. The issue is that general users are the only supplier of their attention, and they give it away for free, not having other options until recently.

The Blockchain enables users to appropriate again of the value of their attention. *Brave*<sup>4</sup> is notably one of the most relevant initiatives in the arena of the attention economy. It is a Chromium-based web browser that integrates a rewarding mechanism for web surfers who watch ads on an opt-in basis, leveraging a dedicated token issued on the Ethereum blockchain, the Basic Attention Token (BAT) [6].

Strictly speaking about Online Social Networks, *Steemit*<sup>5</sup> is one of the widest adopted alternatives to share content and

comment on it. This Medium-like platform rewards its users for publishing and curating articles with an articulated system of incentives based on a set of tokens running on the dedicated STEEM blockchain [33]. Such users' incentives paradigm is intended to promote the diffusion of relevant content on an "organic" base, not in an ad-driven fashion, and counteracts the spreading of fake news, thanks to the direct moderation of users who earn rewards for contributing the content curation.

*Minds*<sup>6</sup> is built on the same principles, with a Facebook-style newsfeed in which posts are listed and shown according to a transparent and token-powered boosting mechanism [29].

Moving to a Twitter-like experience, *Peepeth*<sup>7</sup> offers a Blockchain-based alternative in which posts are stored on-chain, guaranteeing ownership, accessibility, and immutability of content.

When it comes to professional networking, accountability and trustworthiness are paramount, with particular reference to skills evaluation and certified educational background. *Indorse*<sup>8</sup> leverages the Ethereum blockchain to deliver thorough and actionable skills assessments to employers and HR managers, providing a token-based reputation accounting.

As far as messaging is concerned, *Status*<sup>9</sup> represents one of the most complete and ambitious Blockchain-based solutions. It features a decentralized and end-to-end encrypted messaging platform, combined with a Web3 browser and a crypto wallet. It

<sup>4</sup> <https://brave.com/>

<sup>5</sup> <https://steemit.com/>

<sup>6</sup> <https://www.minds.com/>

<sup>7</sup> <https://peepeth.com/>

<sup>8</sup> <https://indorse.io/>

<sup>9</sup> <https://status.im/>

empowers users giving them access to peer-to-peer transactions with meager fees and preserving their privacy.

In the fight against bots and fake accounts, *Voice*<sup>10</sup> is proposing a potential solution. The platform, launched by Block.one in February 2019 [5, 38], aims at rebalancing the value flows among the social media platform and its users. It embeds an authentication system to ensure that every user is an actual person, it promotes the creation and organic diffusion of valuable content, and it redistributes the value generated among the participants to the platform.

### 3.2 Content creators

The Internet has been a revolutionary opportunity for creatives of every kind. It provides new tools and specific formats for creating content, as well as a powerful channel to share and spread their creations, monetizing on it [18]. However, content creators have little-to-no-control on the rationale behind the processes that the publishing platforms (e.g., YouTube and Spotify) use to calculate their income. This situation brought to an extensive case for demonetization, hampering the primary source of revenue of many content creators, who reacted [37] and started to look for alternatives [40]. Blockchain-based platforms may offer a fairer alternative to content creators.

*Emanate*<sup>11</sup> offers musicians a disintermediated and decentralized streaming service, based on the direct remuneration of the artists by those who listen to their music content and playlists. It is built on the EOS Blockchain, and it has collected the legacy of the recently closed Choon platform.

*MakersPlace*<sup>12</sup> allows visual artists to sell digital limited copies of their creations that are stored on-chain, ensuring uniqueness and transparent ownership of the artwork.

### 3.3 People living in censorship-intensive countries

Blockchain represents an impactful technology for those who live in countries where the freedom of expression is not granted or is in peril [26]. The intrinsic technical features of DLTs can deliver tamper-proof freedom of expression, thanks to the decentralization and immutability of the published content.

*Civil*<sup>13</sup> was created with the mission to re-establish trust in journalism and fight censorship. Thanks to token-based community governance and a real Constitution, free-press is defended, and fake-news are kept aside.

### 3.4 Marketers

The promotion of products and services through social networks has become an everyday, often essential, element of an effective marketing strategy. Although advertising may look antithetical to the principles of emerging Blockchain-based platforms, marketing opportunities are present. Advertisers can

rely on “organic” communities and get high-quality attention from rewarded users, thanks to algorithmic transparency and token-based incentive systems.

Within the pool of the 40 analyzed platforms, advertising was completely removed in 2 cases out of 3. In the remaining 33% of cases, five advertising mechanisms have been identified:

- *Company income*: the platform orchestrates the multi-sided engagement of advertisers (paying customers) and users, aiming at direct revenue generation, mimicking traditional platforms;
- *Token pool creation*: advertisers pay fees using platform tokens, that accumulate into a pool from which they are redistributed to users according to the value added to the platform (with content rewards and curation rewards, as explained in the following);
- *Token pool creation - freemium*: the token pool is generated by combining fees paid by advertisers as well as service fees paid by premium users that opt-in for an ad-free version of the platform;
- *Influencer reward*: as it happens in paid influencer marketing, people with an individual and established credibility receive compensation for amplifying the visibility of products/services chosen by the advertisers;
- *User attention reward*: users are paid by advertisers for their focused mental engagement, which is considered as a scarce resource.

The occurrence of the identified advertising mechanisms is represented in Fig. 2.

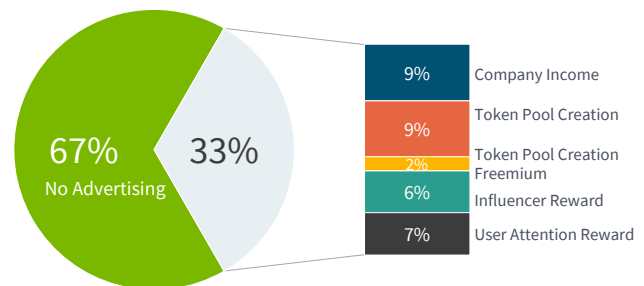


Figure 2: Distribution of identified advertising mechanisms

## 4 TOKEN-BASED INCENTIVE SYSTEMS

Platforms based on social interactions heavily rely on incentives to coordinate users’ behavior. Traditional Social Media platforms do it without necessarily making their users aware, while Blockchain-based solutions are grounded on explicit incentives, that are enabled through *tokens* [35].

All the 40 case studies exhibit the presence of one or more tokens that, together with the autonomous coordination enabled by *Smart Contracts* [11], promote and convey a redistribution of the value generated within the network. This shift towards decentralization and fair wealth redistribution is achieved through tailored incentive systems. Those incentives coordinate the actions of the actors involved, aligning them towards the

<sup>10</sup> <https://voice.com/>

<sup>11</sup> <https://emanate.live/>

<sup>12</sup> <https://makersplace.com/>

<sup>13</sup> <https://civil.co/>

direction of pursuing the same Network Objective Functions (i.e., the primary objective that the network must optimize for above everything else) [10].

Generally, Blockchain-based platforms do not disrupt the flow of activities of the users, but instead, they change the way those activities are carried out. Furthermore, they reward users for the “informal” work delivered to the platform, like creating original content and sharing it with other users on the network.

To rationalize the full spectrum of incentive systems put in place by the analyzed platforms, a restricted set of incentive archetypes has been drawn, with a particular focus on the role played by tokens and on how the platform’s users use them:

- *Content reward*: the token is used for remunerating prosumers who create valuable content, either in a direct manner or via a tokens pool;
- *Curation reward*: the token is used for remunerating prosumers who contribute to the community management by upvoting valuable content and detecting fake news or inappropriate content;
- *Attention reward*: the token is used for redesigning the incentive structure underlying advertising, if any, rewarding their attention, valued as a scarce resource;
- *Stake reward*: the token is used for granting prosumers the permission to vote, participate in the decision making, and influence the community dynamics.

Furthermore, in most of the cases, the token fulfills the function of value transaction support: the token is used as a medium of exchange and unit of account for low fee micro-transactions within the platform, and it is usually pegged to a basket of currencies (*stablecoin* [32]). It is essential to highlight that the archetypes do not mutually exclude, i.e., tokens can perform multiple functions on the same platform, and there may be more than one token within the same ecosystem.

## 5 OPEN ISSUES

Despite the disruptive potential brought by the Blockchain, some criticalities are still open and need to be addressed to pave the way for the mass adoption of this technology in Social Media and Social Networks.

Among those, the massive presence of bots also affects Blockchain-based platforms, as it happens on off-chain social networks, with the aggravating circumstance that those bots may alter the reward system and, eventually, be used to extract value from the network maliciously [24]. Another drawback is related to the high environmental footprint of mining (in the presence of the Proof of Work consensus mechanism) due to the computing power required to run hashing algorithms. Remaining in the technical context, the Blockchain does not represent an efficient database storage solution; therefore, large files should be stored off-chain using hybrid solutions. Moreover, the use of Blockchain technology poses a challenge in terms of scalability and network’s throughput [27]. A further concern regarding users’ data arises from the apparent incompatibility between the ledger immutability and the requirements of the GDPR (General Data Protection Regulation) [30]. In particular,

the users’ “right to be forgotten” must be granted, and a (legal) person must be appointed to ensure that personal data is handled correctly and in compliance with the new regulation.

## 6 THE REACTION OF INCUMBENTS

Traditional Online Social Networks are reacting and adapting to the new paradigm introduced by blockchain-based platforms.

Along the lines of the Steemit rewarding mechanism, Medium introduced the Medium Partner Program<sup>14</sup>, which allows writers to earn from their publications “proportionally” to the engagement they achieve. Such an initiative is intended to promote the spreading of quality content over ad-oriented clickbait and to recognize the value generated by contributors.

Trying to meet creators halfway, YouTube is offering the possibility to create paid channels subscriptions [39] to compensate for the demonetization issues caused by its indexing algorithms.

If these are examples of off-chain platforms mimicking the principles of on-chain counterparts without turning to Blockchain technology, Facebook took the big leap, announcing Libra<sup>15</sup> in June 2019 [25]. Libra long for becoming a global cryptocurrency that can be used daily, giving access to financial services to those who are excluded today. Even if the grounding principles at the base of Libra are quite far from those that guided the birth of the most known cryptocurrencies (e.g., Bitcoin), the reach potential of the Libra Association can give a spin to the entire Blockchain sector in terms of mass acceptance and adoption.

## 7 CONCLUSIONS

Going through this in-depth investigation about how the Blockchain can reshape Social Media, a recurring ambition emerges: bringing the user back at the center of the platform. This goal is pursued through transparency, value redistribution, ownership awareness, decentralization of data, and censorship resistance. The emerging platforms revolve around the user and aim at conveying meaningful content (not ads), recognizing the source of the value created and granting proper remunerations. In doing so, the emerging platforms put aside the greedy exploitation of personal data and the algorithmic opacity of the social networks we are using today.

The inherent paradigm shift is made possible by the Blockchain, which acts not only as a technological enabler but also as a carrier of openness and fairness principles.

The practical expression of such principles is realized through a tokenization process, which is an encapsulation of value in tradeable units of account, called tokens or coins. The disruptive potential lays in expanding the concept of value that can be partitioned and traded beyond purely economic terms to include, for example, reputation, work, copyright, utility, and voting rights. Once tokenized, all these manifestations of value can be

<sup>14</sup> <https://medium.com/creators>

<sup>15</sup> <https://libra.org/>

detected, accounted for, and leveraged in the context of a system of incentives and fair wealth and power redistribution.

Decentralization is the other side of the coin: the distributed architecture characterizing Blockchain-based platforms overcomes the single-point-of-failure weakness, providing shelter from the risk of data breaches, and ultimately safeguarding users' privacy. At the same time, censorship cannot be enforced, since it would require the propagation of the censorship action within the network, with a broad consensus among all the participants.

Finally, there is evidence of cross-contamination between the on-chain and off-chain worlds from which positive effects on the Social Media industry as a whole can be expected. On one side, the principles of Blockchain-based Social Media are permeating into traditional platforms, and, on the other, the moving of incumbents can pave the way to the mass adoption of this technology.

In this scenario, it is still too early to foresee which dominant design will emerge in a 5-to-10 years outlook. Blockchain newcomers have a considerable gap to fill: they need to gain the trust of ordinary and uneducated people, truly kick off network effects and ensure smooth and flawless user experience.

Nevertheless, a radical change in how people use social networks is on the horizon.

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