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The Economy of Attention on Blockchain in the Brave Browser

Introduction: The economy of attention, advertising, and journalism

Once again, new forms of content production and consumption have put professional journalism in the state of economic crisis (Nielsen 2016). Due to global reach and participation, digital media have fostered and amplified a particular set of social and commercial relationships collectively described as the 'economy of attention' (T. H. Davenport and Beck 2001; Webster 2014; Wu 2017; Yakob 2015). This economy involves a variety of actors, from the highest valued technology companies (Gilder 2018) to exclusively "Instagram-famous" celebrities (Marwick 2015). To gain profit, these actors utilise the attention of internet users of various forms of online content, redirecting attention into advertising (Yakob 2015). Advertisers invest significant funds into these economies of attention as they compete for new customers. The stakes become particularly high in such lucrative spheres as IT and finances, where the cost of attracting one potential client ('lead') has always been the highest (e.g. Lindemann 2017).

The value of online advertising is estimated and projected in the ways that are principally different from traditional print media such as newspapers. For large-scale campaigns, the attention of internet users is translated into quantifiable measures by help of different metrics, derived from personal and behavioural data collected online. Most commonly, display advertising campaigns on the web are planned, delivered, and paid for based on such metrics as CPC (cost-per-click), which establishes the cost of clicking on the link from a referring site to a destination site, and CPM (cost-per-thousand), which refers to one thousand views, or 'impressions', of an online ad (e.g. Chaffey and Ellis-Chadwick 2019). Impressions remain one of the most used indicators to measure the effectiveness of advertising campaigns in social networks (Raudeliūnienė et al. 2018). Yet another indicator, click-through rate (CTR) is commonly used to adjust ad campaigns, although it is very low and not completely representative for banner ads (Chaffey and Smith 2017, p. 394). More abstract and complicated metrics may be used when advertisers target narrowly defined audiences and set specific goals in their ad campaigns, which require tracking particular behaviours on the customer's journey down the 'marketing funnel' (Chaffey and Ellis-Chadwick 2019). Finally, as the competition for attention becomes more intense, advertisers can bid against one another by setting higher CPC and CPM costs in global networks of algorithmic advertising (such as the ones owned by Facebook and Alphabet).

As the business model of algorithmic advertising has scaled to the global level, it has raised many concerns. Users are rightfully concerned about companies tracking their personal information and online behaviour. Advertisers almost inevitably lose a fraction of their investments to ad fraud, which becomes even more problematic when more intermediaries – ad buyers and sellers – appear between the advertiser and the target viewer of the ad, if there even is such a person (Edelman 2014; Zhu et al. 2017). More importantly, in the context of our chapter, algorithmic advertising has had detrimental side effects on news journalism (Nielsen 2016; Myllylahti 2018). Social media platforms that derive most of their profits from ads also siphon much of revenue that previously kept the quality news media running (Lynn 2018; Sullivan 2020). Finally, when news journalism starts following the principles of the economy of attention, we see more 'clickbait' headlines and 'fake

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news': this type of content attracts more attention, which increases revenue from advertising regardless of the actual quality of the news.

Meanwhile, even this business model can be subverted by readers who prefer quality content but do not want to be distracted by ads. Such users install 'ad blockers', which decreases both ad impressions and revenue (Mughees et al. 2017). The users of ad blockers tend to have the highest income (Malloy et al. 2016), most likely correlated with higher technological literacy. Paradoxically, this makes this particular group of internet users an even more desirable audience for advertising campaigns. Not coincidentally, the Brave browser that we discuss in this chapter, has the built-in ad blocker, which is often presented as its core value proposition (Brave 2020b), even though it still serves ads from its own selected pool of advertisers. However, this audience potentially can afford to pay for quality news content directly – with real money, and not just with their attention – and Brave has offered a technological solution for this as well.

Arguably, the advertising-based business model of news journalism has many problems (Alexander et al. 2016; Levy & Nielsen 2010; Myllylahti 2018; Sullivan 2020), and some of these problems are addressed in other chapters of this volume. Here, we focus on one particular technological solution that aims to disrupt the current economy of attention in the best interests of internet users, advertisers, and content producers, including journalists, primarily, at least in the initial project agenda of Brave Software (Brave Software 2018b).

What is Brave?

Blockchain is a distributed database that uses cryptographic hashes to create immutable historical records of transactions with fungible and non-fungible tokens. There is no shortage in blockchain-based solutions proposed to solve the many problems of journalism (Gilder 2018; Ivancsics 2019, pp. 23–32; Kim and Yoon 2018; Le and Loebbecke 2020). However, none of the notable cases reviewed by Ivancsics in 2019 in his report "Blockchain in Journalism" has survived practical implementation. The Civil project, most commonly brought up in blockchain studies, is in fact an example of one of the most ambitious but eventually discontinued projects (Iles 2020). In comparison, the Brave project, launched in 2016, is the longest living operational blockchain-based startup among all mentioned by the authors above. In this section, we explain what Brave and BAT are, and in which ways their design fits their purpose.

Brave Software was founded in 2015 by Brendan Eich, the developer of the JavaScript language and the former CEO of Mozilla, among many other contributions (e.g. Eich 2016). The initial coin offering of BAT, the blockchain analogue to an initial public offering, generated 35 million US dollars in 30 seconds from investors, and many hopeful mentions and endorsements in business and marketing publications (Gilder, 2018; Harvey et al. 2018; Vigna and Casey 2018). Since its launch in 2016, the privacy-oriented browser Brave has seen considerable adoption: 20 million users as of 2020 (Brave 2020c; CoinMarketCap 2021), and arguably 30 million users in July 2021, according to the updated media kit (Brave 2021). The Basic Attention Token has been circulating in crypto communities, trading on cryptocurrency exchanges since June 2017 (Coinbase 2021; CoinMarketCap 2021). More than 99% of its maximum total supply of 1.5 billion tokens are in circulation as of June 2021. Furthermore, in the spring of 2020, Brave became one of the many

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advertising partners for PayItForward LIVE, a large-scale project by Verizon, aimed at supporting small businesses in creative industries during the COVID-19 pandemic (Brave 2020c). Makers and owners of Brave have always stated that one of their goals is to support independent creators of quality content (Eich 2016; Scott 2016), and journalists in particular (Brave Software 2018b).

What is Basic Attention Token?

Basic Attention Token (BAT) is a blockchain-based token that enables the internal economy of the user-centered advertising platform behind the Brave browser. It was specifically designed with the intent to serve "as a unit of account between advertisers, publishers, and users" (Brave Software 2018b). Its utility is derived from its application to "directly measure, exchange, and verify attention" (ibid.). Potentially, it enables fair and direct exchange of this value between content creators (e.g. news journalists), advertisers, and end users (e.g. readers of news) without a third-party broker (e.g. Alphabet or Facebook). This solution bills advertisers (in USD or BAT tokens, as of 2021 (Brave 2021)) based on the common units of advertising such as 'views' ('impressions') and 'clicks', and compensates voluntary viewers of advertising with a proportional amount of the same tokens that can be cashed out at most major cryptocurrency exchanges. Ideally, such system allows to combine the already established model of digital advertising with new forms of public support such as automated donations (similar to the digital subscription model that remains viable for many newspapers, see Nielsen 2016) and individual patronage.

The first iteration of the Brave browser relied on Bitcoin as a means of exchange (Scott 2016). Bitcoin was replaced with BAT for the sake of usability (Brave Software 2018b). Microtransactions on Bitcoin would be extremely slow and expensive even back in 2016, and this problem has only worsened with time. A relatively secure transaction may take from an hour to a week (Hou and Chen 2020).

BAT is not technically an independent cryptocurrency, but what is called a utility token, 'minted' on the blockchain platform Ethereum before the global launch of Brave's reward system. Basic Attention Tokens were created according to the ERC-20 standard for fungible tokens, which means that they are freely interchangeable and can be re-used by other applications on the Ethereum blockchain (Vogelsteller and Buterin 2015). BAT tokens can be kept in any regular cryptocurrency wallet that supports standard Ethereum ERC-20 tokens, such as the most commonly used open source Metamask wallet. The Brave browser also has its own crypto wallet that closely resembles Metamask, but this wallet does not allow to withdraw BAT tokens or exchange them for actual cryptocurrency (Brave Software 2018a). Those who wish to earn cryptocurrency from Brave will need to transfer BAT to a third party wallet and use a cryptocurrency exchange of their choice. The initial exchange rate was one ETH to 6,400 BAT on the date of the Initial Coin Offering on May 31, 2017 (Brave Software 2018b; CoinMarketCap 2021); however, its price has been decoupled from the price of Ether since the launch.

The intended functionality of BAT is realised in the dedicated browser Brave, based on the free and open source Chrome browser. Unlike Chrome in its default state (when the user is logged into the Google account), Brave does not collect personal data, apart from the behavioural data from the browsing history, which is anonymous and stored locally. To further protect user privacy, the Brave

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browser automatically blocks advertising from other intermediaries, as well as behaviour trackers and cross-site 'cookies' collected by other marketers.

Ordinary internet users can earn BAT tokens by being exposed to rewarded ads or buy them on cryptocurrency exchanges. A 'smart contract' can be set up in the user's browser to automatically reward journalists and other creators with their share of advertising revenue. A website needs to join the Brave Rewards program to be eligible for compensation in BAT, and its owner also needs a certain level of blockchain literacy to cash out the earnings.

Although the real economic impact of BAT on news media remains marginal, the platform has been already implemented at many news outlets. As of July 2021, the list of content creators supported by Brave and BAT included around 73,000 titles, according to the list compiled by the community (BATGrowth 2021). They represented all types and ranks of creators, from internationally acknowledged global and local news media to blockchain-related services, esports ranking sites, indie games platforms, torrent trackers, and porn sites. From the best-known 100 Brave partners, judging by their Alexa rank, 17 websites provided news and journalism as their primary service. Most notable English language news websites were The Guardian, Washington Post, NPR and LA Times, as well as a number of lesser-known websites of varied quality and diverse political alignment. Among the most popular partners were also two Indonesian news services Suara and Matamata, the Argentinian news service Pagina12, the Japanese Asahi, and the Arabic language Al-Arabia. Moreover, 21 more websites from the same list that specialised in topics such as technology, trading, and entertaining provided current topical news on their main page. Altogether, 38 partners out of 100 most popular Brave partners in 2021 were providing news and up-to-date journalism as their primary or secondary purpose as of June 2021 (Serada 2021).

How can this fix the economy of attention?

The observed adoption of BAT in news media has somewhat complemented, if not disrupted, the advertising-based business model. Technically, blockchain may solve many problems of this model in general, such as monopolisation of algorithmic advertising and fraud at the intermediary level. As Harvard Business Review suggested in 2018, on an ideal blockchain-based ad serving platform for journalists "marketers pay consumers directly for their attention – and cut out the Google-Facebook layer" (Harvey et al. 2018). Advertising experiences can be 'encapsulated' into more transparent non-intrusive forms to which viewers or readers give fully informed consent. Indeed, creators should be rewarded for their contribution directly, with no need for partnerships with global platforms such as the Alphabet-owned YouTube.

This model has been realised in Brave, at least, on the most basic technical level. As of June 2021, the user can set up the monthly compensation from one to 20 BAT, subtracted from the earned and purchased BAT in the user's Brave wallet. This amount will be distributed among the visited websites that support Brave Rewards, proportional to the time that the user has spent on each of these sites during the month. Under normal conditions, the amount of time spent on a website is a rather fair estimation of the value of its content.

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How much a website can make by becoming the partner of Brave? Let us first look at this question from the user side. The user can choose the ad-free experience or opt in for rewarded advertising that comes in the form of push messages from the browser. These short ads contain one short line of text (usually a call to action) and a link to the advertiser's website. They can be served between one and 5 times per hour, which would be every 12 minutes in the case of full ad inventory. In the current state of the system, the inventory is exhausted long before the patience of the user. In a small-scale experiment of one of the authors, the system would serve 10–15 ads per day, or 40–50 ads per week, to one Brave user in Finland, in the first two weeks of May 2021. A week of watching unlimited ads in Brave exposed this user to about 45 advertising push messages with a total reward of around 0.2 BAT, a rough equivalent of 0.2 US dollars at the time.

Still, one BAT would not necessarily equal one US dollar. It is impossible to make such assumptions on the cryptocurrency market, however logical they may seem in the regular business of advertising where one US dollar today is still one US dollar tomorrow. In the second half of May 2021, the price of one BAT token fell from $1.4 on Sunday, 9 May to $0.6 on Sunday, 23 May. It was a commonly observed effect of the global cryptocurrency market crash, comparable to the one in late 2018. It affected all blockchain-related projects, including the correspondent segment of the advertising market. The same Brave user in the same country would only see 12 advertising messages in one week of June after the crypto market stagnated. It would bring them the reward of 0.105 BAT – almost twice less than before the market crash. This would mean the same decrease in support to content creators, even without considering the exchange rate.

Based on that, the possible earnings of content creators cannot be calculated, or even predicted, because of the high volatility inherent in cryptocurrency markets today. Such volatility, typical for this market, makes BAT suitable for occasional short term trading e.g., 'swing trading' (see Fig.1). However, it does not take into account the ultimate goal of every independent creator on the internet, which is sustainable income in the real world. It still enables BAT accumulation as possible additional income, and there are a number of partners, including news media, that benefit from the reward program of Brave. Indeed, it is the hope of any cryptocurrency that they will be a stable monetary instrument in the future.

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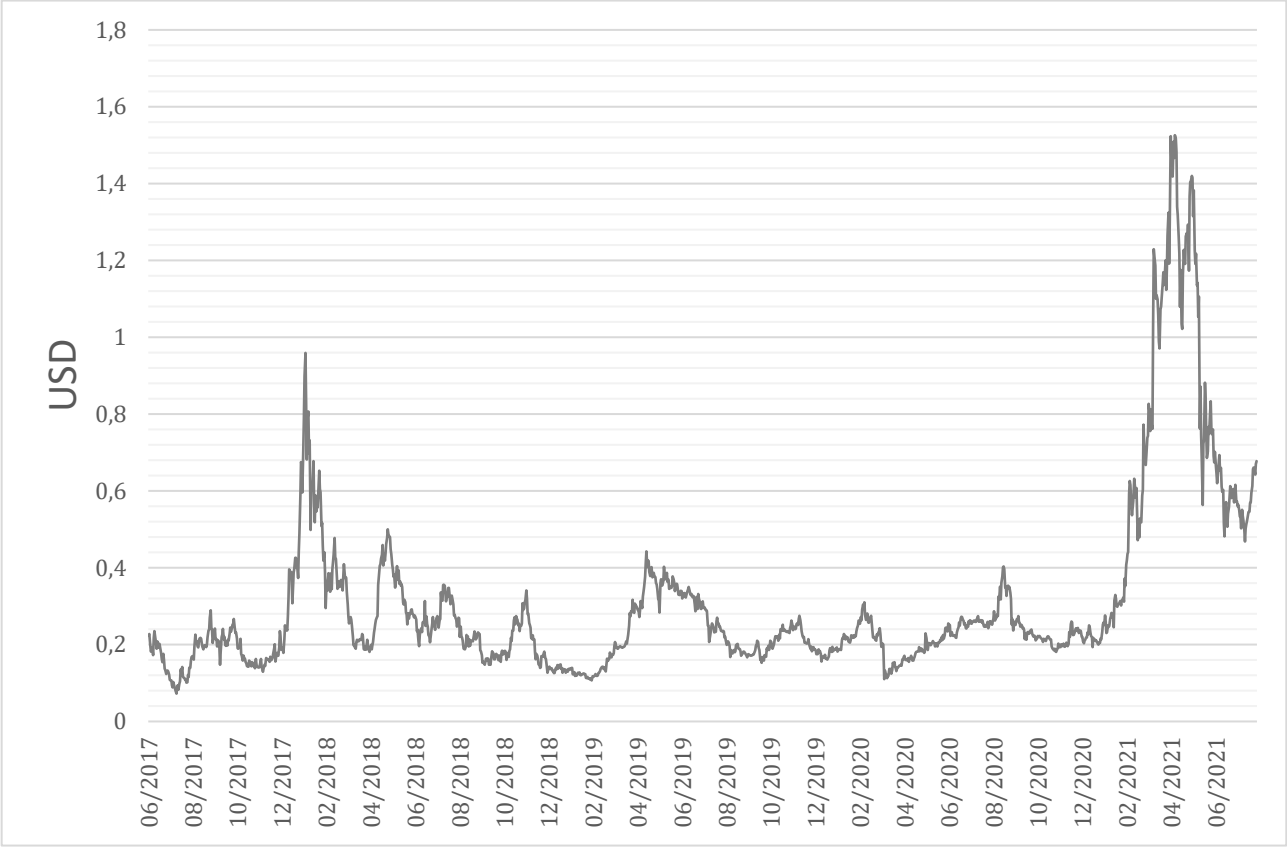

Fig. 1. BAT price chart from June 2017 to June 2021. Open data obtained from Coingecko.

Conclusion: Blockchain projects as random acts of support

The discussed business model for news media and independent creators has demonstrated noticeable level of adoption and considerable viability, especially in comparison to other blockchain-based journalism-related projects, none of which has lasted for as long as five years. Brave Software has the potential to help bypass intermediaries between the producers of content and their online audience, while respecting the privacy of its users, and the news media indeed comprises a significant segment of its beneficiaries. The Basic Attention Token (BAT) can be used to measure and 'tokenise' the value derived from user attention to websites, even if it does not allow the level of granularity offered by algorithmic advertising. Dedicated users create value by consciously enabling advertising banners, interacting with pop-up messages, visiting partner websites, and spending a meaningful amount of time on them. Theoretically, this platform allows for a fairer reward system to the creators who create the most engaging content, in which the payment would come from the advertisers that compete for the attention of internet users, as well as from the users themselves. After five years, this particular economy of attention is technically working as intended, although there are not enough advertisers yet to fill the inventory and compete for ad placements.

The risks that we have outlined here are financial sustainability and ad fraud. BAT becomes subject to the same market manipulations as cryptocurrencies, traded alongside and exchanged for Ether and Bitcoin. Its creators do not approve of it – BAT was openly "not intended to be a digital currency,

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security, commodity or any other kind of financial instrument" (Brave Software 2018a). However, Brave Software would not be able to stop the usage of BAT as a financial instrument due to the decentralised nature of blockchain solutions. As a consequence, the current public discussion of BAT and its value features many enthusiastic voices of its adopters calling for its price to go “to the Moon!”, which means that they are interested, first and foremost, in speculation with BAT that is often earned by ‘farming’ ads. This goes against the initial economic model of BAT, where the value would be derived from utility rather than speculation: “As BAT transactions increase, the exchange rate becomes dominated by the transactions rather than future expectations of utility” (Locklin 2018), according to the blueprint of its virtual economy.

Since the monetary value of cryptocurrency derives from a speculative ecosystem, their utility as a means of exchange remains dubious. As Xu and Huang (2020) note: “The blockchain society attempts to anchor the value of cryptocurrency with real values by employing smart contracts and linking it with computation resources and the digital-productivity that have value and demands in the real world. However, their attempts have some undesirable effects due to a limited number of practical applications. This limitation is caused by the dilemma between high performance and decentralisation (universal join-ability).” (Xu and Huang 2020, p. 33). In the case of BAT, performance is normally uninterrupted and the ability to join is universal – until users and creators attempt to cash out their earnings into real world money. This painstaking experience is beyond the scope of this chapter.

Eventually, after five years of relatively smooth performance, a number of prominent quality news outlets do benefit from Brave and BAT, even though the factual amount of this contribution in real-world money is almost impossible to estimate. However, the proposed business model has attracted only a very particular set of advertisers so far, mostly from the blockchain start-up industry and the world of cryptocurrency trading. Ad fraud on the level of internet users and developers is not eliminated, but publicly encouraged by the developers themselves. In this situation, the advertisers who already own BAT from cryptocurrency trading are in a privileged position to invest it into advertising on Brave, with very little competition and seemingly minor losses on fraud as compared to the cost of accessing a specific segment of technically savvy audience that is interested in finances and new technologies. Upon hands-on experience with Brave, we can see the potential beginning of a new platform economy, rather than the disruption of the old economy of attention and its flaws. As long as it does not represent reputational risks for news media, blockchain-based economies of attention may be an additional, even if random and unpredictable, source of funding for journalism.

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