Research Paper

NFTs - Marketplaces of Digital Mining; an Ecological Nightmare

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Abstract

The epoch of great digital radicalization and transformation along with the breakthroughs in communication and information technology supplemented by artificial intelligence has approached already. With the rapid transformation in this technologically advanced era, we have entered an age of a revolution in finance with the emergence of the blockchain economy that has resulted in the creation of digital tokens. The non-fungible token (NFTs) is one such product of this technology, with its own digital marketplaces. Even though the NFTs have benefitted the circle of artists, the question is whether is it extending any advantage to the global community? The point of contention here is also how the NFTs have, despite their glorious appeal to budding artists, have had environmental implications. This paper adopts a digital ethnographic approach, exploring the commonalities in the lives of young people who engage in the NFT trading online, either as a seller, a buyer, or a collector. It further underpins the drawbacks of NFTs and the blockchain economy on the environment. In addition to that, the paper also looks into how the NFTs perpetuate the economy of appearances.

Keywords

non-fungible tokens, blockchain economy, ethereum, marketplace

1. Introduction

The epoch of great digital radicalization and transformation along with the breakthroughs in communication and information technology supplemented by artificial intelligence has approached already. It is no wonder that with the help of advanced technology, we have encountered arduous challenges and resolved intricate problems transpiring upon us. With this ability that technology has extended to us, there is a strong case for it to have implications in the social, cultural, economic, and environmental realms. As of late, diligent attention has been imparted to the avant-garde digital finance revolution amplified by the cutting-edge technological expansion (Mills et al., 2016 in Mofokeng and Matima, 2018). Clue to this, the past 10 years have seen the advent of Bitcoin as the premiere "decentralized, global cryptocurrency" (Mofokeng and Matima, 2018). The surfacing of bitcoin to such heights not only placed the focus on cryptocurrencies but at the same time, its elementary technology blockchain caught up with fame (Chen, 2018 in Mofokeng and Matima, 2018). What really allowed it to gain considerable prominence was its decentralizing power. With such a parameter it stood antithetical to the conventional transactions occurring between organizations and people that are still, at large,

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centralized and overseen by a third party involvement such as that of banks (Yli-Huumo, 2016 in Mofokeng and Matima, 2018). With blockchains, the need to have intermediary parties is entirely eliminated, thereby, economizing the process and resulting in heightened efficiency (Underwood, 2016 and Zheng et al., 2017 in Mofokeng and Matima, 2018). Apart from the key element of decentralization, blockchain also offers "immutability, security, auditability, and availability" as some of its central characteristics. Such technology has resulted in the modeling of "digital tokens" indicative of assets that are precious and unique and has irrefutably reshaped the entire sphere of entrepreneurship (Chen 2018 in Mofokeng and Matima, 2018).

The archaic practice of people to invest their wealth in resources and valuables that were sparse and rare was not something that people could also pursue in the capitalization of digitally tradable assets. One principal reason for this was that the digital assets were not regarded with the same grandeur and poise that the material physical assets were sought after with. There was also this notion that digital assets could be painlessly reproduced. It was not until non-fungible tokens (NFTs) appeared at the forefront that the entire perception of digital trading refashioned itself (Mofokeng & Matima, 2018, p.2).

2. Research Question

With the expanding acclaim for crypto art, numerous digital marketplaces popped up that allowed collectors to participate in the trade of digital work. The most renowned digital marketplaces are Zora, SuperRare, and Nifty Gateaway. Whoever buys these artworks automatically becomes legible for exclusive ownership rights. However, there is a certain paradox involved with this kind of ownership because while you do have the license for its usage and of keeping it, the digital work can still be limitlessly replicated. And so the possession of digital art is really a matter of pride and status, in the words of Lindsay Howard, Foundation's head of the community. (Kastrenakes, 2021)

However, the point of contention here is how the NFTs have, despite their glorious appeal to budding artists, have had environmental implications. Susanne Köhler, a life cycle analyst at a university in Denmark studying blockchain technology stated, "I know it's difficult to comprehend. You just click on a button or type a few words, and then suddenly you burn so much energy" (Tabuchi, 2021). It becomes evident enough that with such an enormous amount of technical input and computing facilities to create and channel a digital artwork, there is inevitably twofold greenhouse emission (Tabuchi, 2021). This paper will be looking into the dimension of how the NFTs are reproducing global digital frontiers by underpinning themselves as scale-making projects, thus, giving rise to the economy of appearances while impacting the climate seriously.

3. Methodology

This paper adopts the digital ethnographic approach, exploring the commonalities in the lives of young people who engage in the NFT trading online, either as a seller, a buyer, or a collector. The ethnography primarily uses qualitative tools to analyze what understanding do they have of their presence in these NFT communities and how environmentally conscious they are.

The very vigorous advancement of E-commerce has rendered the Internet a vital instrument in employing a unique perspective to qualitative research (TISCHLER 2004 in Frömming, Köhn, Fox, & Terry, 2017). The whole idea is to understand cyberspace as a "field" where technology, reality, and events coalesce to form a digital environment, more so a community in which there is a lot of reconstruction of various aspects of life; self-

identity, collaborative working, politics, production, and a totally new social exchange realm. (Frömming, Köhn, Fox, & Terry, 2017)

4. Literature Review

4.1. How do NFTs Work?

Any digital artwork that has been marked with a specific coded label and kept on a virtual ledger i.e the blockchain, is known as NFT. Much of the problems encircling NFTs have a direct relationship with the problems of the changing climate (Tabuchi, 2021). The flamboyant sales of NFTs, for example, one that happened at the popular auction house, Christie's, peaked at $69 million! What the buyer received was a digital artwork collage with 5000 images and what the world received was an intricate web of greenhouse emissions. (Calma, 2021)

One must wonder what is it with NFTs that triggers this domino effect of environmental damage. Looking at the context a little bit, we come to realize that these NFTs are predominantly traded in marketplaces, such as the MakersPlace, Nifty Getaway, and SuperRare, that make use of Ethereum, a cryptocurrency that is founded on a system namely "proof of work" and one that consumes a lot of energy. "There's a fee associated with making a transaction on Ethereum — and, ironically, that fee is called gas" (Calma, 2021). As aforementioned, there is no middlemen institution in blockchain transactions, so what proof of work does is that it plays the role of a security system for Ethereum and bitcoin. To further bolster the security, knotty puzzles are generated by the system using the energy-guzzling machines through a process called mining. Once the miner is able to figure out the puzzle, it supplements the blockchain with a new 'block'. This employs a very complex level of cryptography to ratify the transactions, and as a result, consumes substantial computing energy and power equivalent to the electricity consumption of the whole of Libya! (Barber, 2021 and Calma, 2021)

The complexity level of these puzzles is directly proportional to the inflation rate of the cryptocurrency. Due to this, more computers get into the race just trying to solve the puzzle, and therefore, it begins a cycle of an even greater computer power utilization while at the same time ensuring an adequate cooling system. All of this leads to an exorbitant amount of carbon footprint. What is noteworthy here is that the attempts to complicate the puzzles is deliberate because it extends the sense of competition in the market at the cost of the climate. (Sophie, 2021)

Even though the NFTs provoked immense enthusiasm among the artists globally, as they had finally been granted a chance to showcase their work and talent to a wider audience, however, the downside could never be dismissed (Sophie, 2021). Let's consider this in the light of an analogical reference. If suddenly there was a spike in people wanting to fly to someplace, any airline's next step would be to congruently get more flights into operation and consequently leading to more carbon emissions. Susanne iterates this concept linking it to the trade of NFTs: "many NFT transactions send a stronger economic signal to the miners which may lead to increased emissions." The greater the number of devices, the more the emissions (Calma, 2021). The problem, as identified, does not lie with the NFTs themselves, it is with the system they are established on that qualifies for environmental degradation. (Sophie, 2021)

On a yearly basis, it is approximated that Ethereum exhausts 44.9 terawatt-hours of electrical energy, almost equivalent to the annual electricity consumption of small-scale countries. An estimate suggests that its carbon dioxide contribution is 21.35 metric tons. If bitcoin were to advance even further, it would not be far from increasing the globe's temperature by 2 degrees celsius, which is indeed quite alarming (Sophie, 2021).

4.2. Relevance to Anna Tsing's Friction: An Ethnography of Global Connection and Other Literature

What is so unique and at the same time insanely absurd about NFTs is that it could be just anything online. Twitter CEO, Jack Dorsey, sold his first-ever tweet as an NFT for $2.9 million! While at it, it is also observed that NFTs have established an entire online community based on miners in a similar manner to how people formed communities and rings of exchange in the past (Clark, 2021). In a way, NFTs can be sought after as a scale-making project, a concept given by Anna Tsing in her book Friction: An Ethnography of Global Connection. What Anna asserts is that any project that allows us to think about globality and makes our mind wander in a global dimension is undoubtedly a scale-making project. NFTs, in their very essence of being digital, perpetuate this idea further by penetrating into the economic life of miners (Tsing, 2005, p.57). Quite riveting enough, surfacing in the entire NFT episode is an 'economy of appearances' that calls out to creativity and the idea for profit to be "imagined" before it can be truly realized. It is worth mentioning the drama that goes into the blockchain economy model wherein it is about the highest bid and nothing less (Tsing, 2005, p.57).

There is a certain dramatic appearance to how the NFTs are presented in the digital world within the marketplace it is situated in. An essential feature of the futures market has been 'risk' and that is the foundation on which this business stands. It is the transient temporality of risk, one that is anticipated between the present and the future, that creates an environment of uncertainty. As much as this is a potentially dangerous realm to exist in, risk has its own share of advantages as well. It brings about prestige, an elevation in social status, and of course money. Most importantly, it accentuates the contriving of economic selves and strengthens the power foothold that risk-takers possess under their name. It can be said that economic risk-taking is an offshoot of modern capitalism that ultimately shapes market regulation (Zaloom, 2006, p.93). Usually, in debates around risk-taking, holding it in accord with a possible "danger" dismisses the productive dimension it has. Risk-taking is directly proportional to the creation of such a social space where traders devise strategies for financial exchange and thereby, composing the "economic self" (Zaloom, 2006, p.109). Again, we might be able to contextualize risk-taking as a perpetuation of the conception of the economy of appearances that Anna Tsing brings to table. There is a certain dramatic exposition involved in NFT trading and the subsequent risk involved in this exchange. It allows for the creation of such a lens that engages and draws in investment or, in this case, bidders. So to bring about the realization of a specific profit or benefit, it is pertinent to dramatize the dream and create hype around it. (Tsing, 2005, p.57)

Going forward, Arjun Appadurai, in his essay titled "Disjuncture and Difference in the Global Cultural Economy" constructs such a model that illuminates the disjunctures that exist between various global flows.

"One man's imagined community is another man's political prison" (Appadurai, 1990, p.295)

Appadurai asserts that the contemporary global cultural economy can no longer be simply confined to the models of Core and periphery, or that of push and pull or the orthodox balance of trade framework. Rather, it has to be analyzed as a "complex disjunctive order." He proffers that the current times are observing the emergence of a disorganized form of capitalism (Appadurai, 1990, p.296). Appadurai does so by underscoring the different disjunctive, interdependent, and interrelated dimensions that help in discerning the associations between these global flows. These terms are (i) ethnoscapes; (ii) technoscapes; (iii) finanscapes; (iv) mediascapes; and (v) ideoscapes. However, what concerns us with respect to this paper is the notion of mediascapes. One important thing to notice before we delve into

the idea of mediascapes is the use of the common suffix “scape” in these terms. This has been put into place by Appadurai to indicate the fluidity of global flows, unlike the stagnant interrelations that exist between nation-states. Complementing Benedict Anderson’s notion, Appadurai holds these landscapes built on ‘imagined worlds.’ By this, he means the various imaginary barricades that different groups and individuals around the globe have built around themselves following their historical trajectory (Appadurai, 1990, p.297).

It is critical to talk about financescapes, especially now that the course of global capital is strenuous to keep track with as stocks and currency markets transition money in bulk across borders and at unfathomable speeds (Appadurai, 1990, p.298). Alongside the financescape, mediascapes are very important to be put under the spotlight in this discussion of NFTs. According to Appadurai, mediascapes is such a dimension whereby electronically produced data, information, and visuals are circulated widely among public and private networks. Part of this dimension involves a “repertoire of images” that generate narratives and metaphors. (Appadurai, 1990, p.299) This is similar to what we see in the entire realm of NFTs. These are part of the mediascapes that constitute a plethora of images and visuals that promulgate certain narratives and extend onto various metaphors. It involves risk-taking and a leap of faith. We can see this through the example of the auction of the famous GIF, Nyan Cat. To mark 10 years of its existence, its creator decided to sell his endeared work as crypto art. IN the words of Torres, the meme creator, it is “a way to directly profit off of work that has otherwise spread freely across the web.” (Kastrenakes, 2021)

With the rapid transitioning of our physical realities to a virtual world, it becomes extremely pertinent to not entirely separate the two, for they both are codependent. As is seen from the NFTs, there is much in play that appears to the eye. Despite their potential as a platform to support the artist community at unimaginable levels, it has also generated hazards for the physical environment and unsustainable practices.

A direct relationship between cryptocurrency trading volume and the energy it consumes has appeared at the forefront. The domination and ascendency of cryptocurrency have kept on proliferating, not just in the immediate future but also for an unforeseeable time. According to a study conducted by Schinckus et al, the findings suggest that the greater the frequency of cryptocurrency activities, the higher the energy consumption and thus, an even greater impact on the environment. (Schinckus et al., 2020) It is an established fact that anthropogenic greenhouse gas emissions exhibit grave difficulties and dangers for the climate and human living conditions. Approximate displacements of people as a result of climate change goes up to 24 million annually. It has been estimated that over 143 million people would be displaced by 2050 across the Global South (Kinstler, 2019 in Howson, 2020). To address such a catastrophe, there are changes emerging in the economic sector, especially the rise of blockchain technology. But its role in mitigating disasters remains unclear and in most cases, is entirely dismissed (Howson, 2020). Blockchain is not all rainbows and sunshine. To process transactions, there is a need to solve a cryptographic puzzle that, in turn, generates algorithmic validation, which as aforementioned is also termed as proof of work. Despite the fact that it is simply used for security purposes, when the cryptographic problem is generated it is sent to all accessible nodes with only one node to be declared triumphant, other nodes end up utilizing computational energy without receiving any reward which implies a great ecological concern. (Schinckus et al., 2020) Due to this consumption of power at a massive level, it has been predicted that by the year 2034, global temperature could rise as high as 2°C. (Schinckus et al., 2020)

5. Digital Ethnography

For the purpose of this paper, the demographic of the participants that were subject to the digital ethnography herein were all youth belonging to the age bracket of 20 - 15 years old. They were situated in 3 different parts across the globe; Malaysia, Saudi Arabia, and Pakistan. Though, varied levels of expertise, they all exhibited very strong opinions about the general concept of NFTs, their role and participation in NFT trading, how has it changed their perception regarding trade and exchange, and the environmental implications it has.

A Malaysian resident, who is actively involved in NFT trading as a 2D and 3D designer - minting and listing projects made over the course of years on the NFT platforms, such as, FND, HEN, and Kalamint - provides a very insightful and critical response on their own concept of NFTs.

“NFTs first came around in 2015 and gradually received the fame and popularity that we observe today. In NFT projects, in addition to holding onto ETH (ethereum), one also obtains access and membership to exclusive clubs. It even goes on to receive invitations to be part of gated groups. NFTs, at their core, essentially solve a problem that we’ve had for generations i.e. verification of things be it in the form of puzzles, captcha codes, anagrams etc. Even though the majority of operations you can reckon come with a standard set of the verification process, however, none of them can set foot near to that provided by NFTs because to put it simply, it breaks the transaction down into millions of hashes (or blocks) and these hashes get verified by thousands of sources around the world and all of this is recorded on something like Etherscan.io which makes it almost impossible to fake. The benefit is simply that I gain the ability to acquire different crypto coins like XTZ on Tezos blockchain or ETH on Ethereum’s blockchain and decide whether to liquidate it immediately or hold it until it appreciates in value.”

Another very compelling response hinted towards NFTs fundamental role in the Web 3.0 revolution. For context, Web 1.0 was the internet, Web 2.0 was the social media revolution and now the Web 3.0 revolution is all about decentralization and ownership. In the Web 3.0 revolution, cryptocurrency and blockchain have an extremely crucial role to play. The respondent goes on to say, “now with the announcement of the metaverse by Facebook CEO, Mark Zuckerberg, people are buying virtual real estate on ethereum, which is insane!” They mentioned that just in a span of one month after the metaverse announcement, land bought for $5K peaked to a net worth of $7.2M! Imagine virtual land being sold for millions of dollars and its value going up by the minute.

Talking about how NFTs have altered the perception of exchange and trading, the participants greatly emphasized the notion of decentralization of trade and maintained that the conventional practices of trade have remained intact; the only difference is that it has translated on digital platforms. We can observe a considerable similarity between Kula rings and NFT trading here. Kula rings were about prestige and obtaining a certain social stature, involving a complex trading system that required the circulation of two valuable articles i.e the arm shells and necklaces of shell discs. They were circulated in a direction exclusive to each one of them; the arm shells traveled from the South to North while the necklaces voyaged on the opposite path. An underlying tenet of this exchange was that the circulation did not stop for any duration; it periodically continued in the same direction as mentioned above. (Malinowski, 1920, p.97,100). This practice of the Kula ring transpired as material warfare. The mere difference was that instead of involving swords, it penetrated through the social circles and ranks, only to see who can preserve their political status by generously spending the most. (Mauss, 2002, p.47)

Similar is the case with NFT transactions because "the JPEG is not the product, it is just a representation. The physical and real benefits of being part of the NFT communities and groups, such as CryptoPunks, BoredApe, NBA Top Shot, is the product." Moreover, the decentralizing of trade in the NFT sphere means there are no questions asked. Isn't that the ideal way of exchange with no central authority's involvement?

The future of NFTs is less in the value of that artwork or what it really is and more with the fact that to who does it belong and the artist's ability to brand themselves.

Providing an elaborate response on how there are many repercussions of the proliferating blockchain economy, one Pakistani youth who owns no NFT under their name but closely follows the community says: "Putting it precisely, the vital facet of all things in the digital era begins with ease of something. In the current moment, yes, there is for sure a growing demand for NFTs, however, the processes behind it are not at all sustainable nor easy which is why you see new Defi NFT platforms come out almost every week because there are so many issues to address as this concept is scaling up." Another participant asserts that in their opinion, "the benefits pertaining to the digital era are still vague and it's not clear whether the current pattern of things will be sustainable even five years down the line." This really puts into perspective the whole idea of NFTs being an ecological nightmare and draws upon the creation of a digital frontier, one which is exploitative and harms the environment.

Expressing serious concern regarding the future of NFTs, blockchains, and their environmental implications, a participant, who has been consistently involved in selling their artwork online stated, "I am witnessing history being made here."

6. Conclusion

We have seen how the burgeoning blockchain economy of NFTs has radically transformed the spaces in which economic transactions and exchange occur. It is indeed a critical moment in history to observe the shift from physical realities to those that only exist in the virtual realm. With human interactions undergoing this transition, it is inevitable that such an unorthodox and unconventional change would occur. Though NFTs have been the talk of the town, there is much to unveil behind that fancy screen with graphs going higher and higher. These zones of interaction are nonetheless a driving force in the depleting climate of our planet. There is just too much evidence to deny this fact. Regardless that the NFTs provide agency to budding artists, it has simply conjured up a dramatic performance to expand its scale and show its commitment to globalism. While what is really happening in the very real world is the onset of an irreversible climate crisis. Claims to achieve sustainability in practices of cryptocurrency are far from being accomplished anytime soon.

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