BLOCKCHAIN TECHNOLOGY: A VERITABLE TOOL FOR COMBATING MUSIC PIRACY IN THE NIGERIAN MUSIC INDUSTRY

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Abstract
Disruptive technologies have always been the result of human growth and development, because development brings new challenges, thus needing new solutions. The Nigerian commercial music arena is fraught with numerous challenges requiring new approaches for seeking solutions. Among these many challenges is the nagging problem of music piracy. Musicians within the industry should be able to get commensurate reward in terms of revenue accrued to them. This is however not the case due to the dangerous activities of pirates and other middle men within system. The obvious solution lies in finding ways to eliminate these middle men and all forms of third-party interferences, thereby bridging the gap between the artistes and the music consumer. One effective way of doing this is by engaging the use of the blockchain technology, an advanced database mechanism that allows transparent information sharing within a decentralized network. The objectives of this paper therefore is to highlight the problem of music piracy and other negative activities within the Nigerian music industry, explain and advocate for the adoption of blockchain technology as a solution to these problems, and also highlight other applications of the new technology. The paper adopts the descriptive method of research. Sources of data include books, journals, and the internet. Findings show that blockchain technology, which is based on a decentralized system, is an excellent solution to many problems associated with the Nigerian commercial music ecosystem.
Keywords: Blockchain; Music piracy; Technology; Decentralized systems; Artistes

Introduction
New technologies are discovered for solving problems. In the Nigerian music industry, piracy has constantly been a thorn in the flesh for artistes. Musicians struggle to make their music, going through the various stages of music production, marketing and distribution. Negative practices by some industry players range from production and multiplication of fake copies of music, to outright theft of intellectual properties, and charging exorbitant marketing and distribution fees. These individuals end up fleecing music artistes who end up with little or nothing to show for their intense

labour. It is the position of this paper that blockchain technology can be used to mitigate these problems, and turn the tide in favour of musicians and even the final consumer.

A blockchain is a data structure that makes it possible to create a digital ledger of data and share it among a network of independent parties (Laurence, 2017). Due to its immutability, when data is recorded in a blockchain, it is extremely difficult to change or remove it. When someone wants to add a record to a blockchain, also called a transaction or an entry, users in the network who have validation control verify the proposed transaction. These are called nodes, and every node on the blockchain must agree to validate. Every blockchain has a slightly different method on how this works and who can validate a transaction. The boldness of the Blockchain system lies in implementing a shared database that everyone has access to their information (Zheng, Xie, Dai, Chen, & Wang, 2017). The level of security and trust built around blockchains is only possible because of the use of encryption and the consensus protocol, which in Bitcoin's blockchain implementation is called Proof-of-Work (PoW).

From the foregoing, it is clear that among the many amazing and developed high-level technologies of the current revolutionary era, blockchain technology can easily qualify as one of the most complicated and advanced. This can be regarded as the ultimate level of the Fourth Industrial Revolution as a testament to human historical advancement and development. It is the possibility of harnessing this technology in such a way as to bring in some level of stability and sanity into the Nigerian music industry that this paper seeks to discourse in details.

Theoretical Framework

The Token Economy Theory, initially proposed by B.F. Skinner in the 1950s within the context of behavioral psychology, has evolved significantly with advancements in digital technology. Skinner (1953) posits that behavior is shaped by its consequences; rewarding certain behaviors encourages their continuation. This principle led Skinner to develop token economy systems, initially tested on lab rats and pigeons and later applied to humans. The strategy involves giving tokens instead of immediate rewards. These tokens can be accumulated and exchanged for larger rewards later. This shift enhanced the versatility of using rewards to condition behaviors effectively.

In the realm of blockchain and decentralized systems, this theory now plays a pivotal role in understanding how digital tokens can create and manage decentralized economies. This theory applies directly to the music industry, particularly in addressing the persistent issue of piracy within the Nigerian commercial music arena. Token Economy Theory, as adapted for blockchain technology, emphasizes the use of digital tokens to incentivize and govern behaviors within a decentralized network. The theory implies that by using blockchain-based tokens, the music industry can create a transparent and secure environment where artists, producers, and consumers interact directly, eliminating the need for intermediaries. This process involves converting music tracks into non-fungible tokens (NFTs), which are unique digital assets stored on a blockchain (Laurence, 2017).

Blockchain's decentralized nature ensures that music assets are securely recorded and verifiable, making it extremely difficult for unauthorized parties to duplicate or distribute pirated copies. Each transaction involving these tokens is recorded on an immutable ledger, providing a transparent and tamper-proof record of ownership and distribution (Zheng, Xie, Dai, Chen, & Wang, 2017). This transparency not only deters piracy but also ensures that artists receive fair compensation for their work. Token Economy Theory also highlights the potential for direct monetization through blockchain

platforms. Artists can sell their music directly to consumers as NFTs, receiving payments instantly and without intermediary fees. This direct interaction fosters a closer relationship between artists and fans, while also ensuring that a larger share of the revenue goes to the creators. Additionally, smart contracts—self-executing contracts with the terms directly written into code—ensure that royalty payments are automatically and accurately distributed.

An Overview of the Nigerian Music Business Industry
The Nigerian commercial music industry is a burgeoning market with investments running into billions of Naira. Sunday-Kanu (2021) defines the music business as a segment of the entertainment industry where performers, producers, composers, analysts, and publishers earn a living. It involves producing music for economic gain, encompassing services like concerts and recitals and goods like CDs, MP3s, and music scores. Emielu (2014) supports this, noting the industry includes tangible products like sound carriers and intangible ones like intellectual property rights.

Nigerian music is one of the most vibrant and rapidly growing music ecosystems globally, with a rich history and diverse genres like Afro-pop, Hip-hop, Afrobeat, Fuji, Afro-fusion, and traditional folk music (Forchu, 2009). According to a February 16, 2023, report in the Premium Times, the industry generates over $2 billion annually, driven largely by digital streaming and downloads. This growth has made it a significant contributor to Nigeria's economy, providing jobs and income to thousands. Nigerian musicians have gained global recognition, winning awards and collaborating with international artists.

The unfortunate aspect of this seemingly wonderful story of the Nigerian music industry is the distribution model of the huge revenue that the industry generates. The artistes who are the owners of the music only gain access to a portion of this revenue which is not commensurate with what they put in. This is a major challenge. Pirates and other middle men in the business of music making and selling have, through their activities, constituted themselves into major drain holes sapping up major chunks of generated revenue. This is done through fake copies of albums, illegal streaming and downloading platforms, and exorbitant management and distribution fees. Adedji (2010) puts it this way:

> The major challenge that the industry is facing stemmed from the exit of the major labels, which marked the collapse of the structure for artists. This collapse can be linked to the decline in the economy which also created piracy and abuse of intellectual property. Piracy has not allowed those that remained to be properly remunerated and it is stifling the artists as well (p.264).

On the menace of music piracy and its history, Okoroji (2009) traces the roots to the 1980s with the introduction of cassette technology:

> The cassette tape was quietly taking over as the major carrier of music, [but] the music industry in Nigeria was slow to notice this development. There was virtually no established facility for the production of legitimate music cassettes. Yet there was a huge demand for them. While the industry ultimately reacted, the pirates had moved in long before… [and a] pirated version of every successful release on vinyl appeared in the market sometimes even before the official release of a record (p. 23).

However, a closer look into the music industry yields the surprising discovery that there exist some kind of symbiotic relationship between music pirates and music artistes whose works are being pirated. Tade & Akinleye (2012) remark that, owing to the cost of production, pirates provide upcoming artistes with publicity and reduce the cost of production. As a result, pirates see themselves as legitimate marketers and promoters.

Although music artistes perceive pirates as criminals, they certainly agree to have enjoyed their 'support' and assistance at some point in their career, especially the early stages. Pirates use their network, which includes disc jockeys (DJs), and radio and television presenters to promote budding and high profile artistes. They, as self-styled promoters have made themselves vital if, not indispensable in the music industry. Despite the negative effects of theft of intellectual properties and drain on finances, both upcoming and popular artistes accepts that music pirates provide fame for a large number of artistes (Tade & Akinleye, 2012).

Blockchain Technology

Having detailed some of the challenges in the Nigerian music industry, this paper proposes a solution based on a decentralised technology which brings the artiste and the end-user together, eliminating most of the middle men. Laurence (2017) views Blockchain as a data structure that makes it possible to create a digital ledger of data and share it among a network of independent parties. It can be thought of as distributed databases controlled by a group of individuals where information can be stored and shared. The central feature of this networked technology is that central control of data flow is absent. Three main types of blockchains have been identified: Public, Permissioned and Private Blockchains. All three types of blockchains use cryptography to allow each participant on any given network to manage the ledger in a secure way without the need for a central authority to enforce the rules. Laurence (2017) states: "The removal of central authority from database structure is one of the most important and powerful aspects of blockchains" (p. 8).

Blockchain technology epitomises an advanced database mechanism with powerful and transparent information sharing capabilities within a business network. Data are stored in blocks within the database, and these data are linked together in a chain, hence the name - Blockchain. Since there is no central authority controlling access or use of data, data is chronologically consistent and stable as the chain cannot be deleted or modified without consensus from the decentralized nodes. This attribute of decentralized control, where all have to come into an agreement for any modification to take place within the chain, is the central reason why blockchain technology offers an unalterable or immutable ledger for tracking payments, transactions, orders, accounts, and other transfers. There are in-built mechanisms within the blockchain which prevent unauthorized or malicious transaction entries and create consistency in the way these transactions appear and are seen.

The blockchain employs a peer-to-peer method of data sharing and integrity. Drescher (2017) opines that the blockchain can be considered a tool for achieving and maintaining integrity in distributed systems. Purely distributed peer-to-peer systems may use the blockchain in order to achieve and to maintain system integrity.
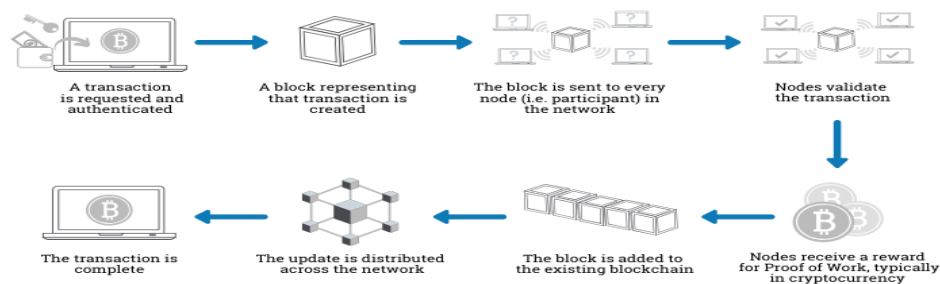
Euromoney Learning 2020's Model showing a blockchain process path

History of Blockchain

Blockchain technology, a peer-to-peer network, operates without a central authority or trusted intermediaries to authenticate or settle transactions. There are two generations of blockchain. The first generation, introduced by Satoshi Nakamoto in the 2008 paper "Bitcoin: A Peer-to-Peer Electronic Cash System," proposed a decentralized digital currency that eliminates intermediaries and the need for trust between parties. Nakamoto's solution to the double-spending problem and the development of the Proof-of-Work (PoW) consensus protocol were key innovations supporting a decentralized network (Silva et al., 2020). Bitcoin, the first cryptocurrency, was designed to handle various transaction types, but faced challenges in supporting diverse transaction requirements (Nakamoto, 2008).

The second generation of blockchain was introduced with Ethereum in 2013, which enabled the use of smart contracts. Smart contracts, a concept introduced by Nick Szabo in 1997, allow for the formalization of relationships and provide a secure model for transactions (Szabo, 1997). Ethereum's platform supports various applications beyond cryptocurrency, such as trading intellectual property, through transparent and irreversible smart contracts. This ensures that all parties are aware of contract terms before committing, enhancing security and trust in the network.

Non-Fungible Tokens (NFTs)

One of the many possible items embedded in blockchains apart from cryptocurrencies and smart contracts are non-fungible tokens (NFTs). These are unique cryptographic tokens. They are digital watermarks that can be used to establish provenance and ownership of many types of assets, from tweets to artwork, real estate, and music (Tamplin, 2023). A basic characteristic of physical money is its fungibility. It means money can be exchanged for something else worth it. Physical money can be exchanged at parity. That means one unit of physical currency is always equal to another unit. It is this characteristic of fungibility that makes money an ideal medium for daily transactions.
NFTs are items whose monetary value is quite difficult to place or ascertain. For example, it is difficult to establish the price for a valuable painting. Non-fungible tokens cannot be exchanged at parity with each other. Rather, they are used for unique artefacts with unequal valuations.

Blockchain and the Nigerian Music Industry
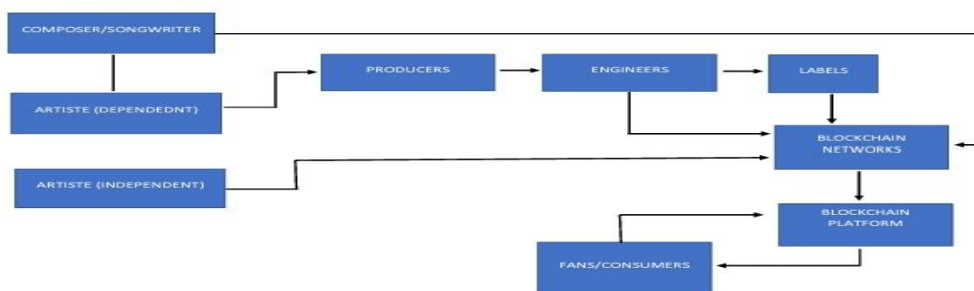
Blockchain – Music production interaction model

The Nigerian music industry faces significant challenges, including piracy, exploitative intermediaries, copyright infringements, concert ticketing issues, and high production costs. Blockchain technology can effectively address these problems. Robert Kviby, Chairman of Staccs entertainment agency, views piracy as a result of an imbalance between traction (exclusivity, quality, availability) and friction (cost, packaging, commitment, data integrity, checkout process). Piracy occurs when friction outweighs traction, indicating a need to enhance user value and streamline service processes (Tuck, 2022).

Musicians, who are the core of the music production ecosystem, often earn the least due to profit-sharing with crew members, producers, and record companies. In Nigeria, piracy further reduces artists' earnings. Adopting blockchain technology can transform the industry by using blockchain-based platforms and smart contracts. These tools promote inclusion, integrity, transparency, privacy, security, rights respect, and fair value exchange. This shift could create a pro-artist music ecosystem, minimizing the role of intermediaries. This paper explores the potential applications of blockchain in Nigerian music production and the benefits of securing musical intellectual property on the blockchain. Some of these applications include:

1. **Elimination of Middle Men**

The Nigerian music industry faces numerous challenges, with marketers and distributors significantly cutting into musicians' earnings. Even with online streaming, artists receive minimal returns, stifling their creative freedom. This paper advocates for Nigerian musicians to utilize blockchain technology and release their music as NFTs. This approach can eliminate the high fees imposed by intermediaries, streamline distribution, and ensure more revenue goes directly to the artists.

2. **Establishment of origins**

Toki Anifowose, in the Guardian on September 19, 2022, highlighted the pervasive issue of intellectual property infringement in the Nigerian music industry. He noted that many top Nigerian artists, as well as emerging ones, have been accused of copying songs without proper attribution. This paper suggests that victimized artists themselves may contribute to this issue due to a lack of understanding of Nigerian copyright laws, which are outdated.

Blockchain technology can be a game changer. By releasing their music as NFTs, Nigerian musicians can assign unique codes and addresses to their songs, ensuring protection against intellectual theft and fraud. The immutable nature of blockchain technology guarantees that data cannot be altered, providing transparency and giving artists full control over their works. This makes illegal downloads and wrongful ownership claims impossible.

3. **Elimination of pirated copies of music**

By the end of 2022, global losses to music piracy were estimated at US$51.6 billion (Tuck, 2022). In Nigeria, a 2016 study revealed that copyright piracy alone caused losses exceeding N100 billion annually (Nnamani, 2016). By 2021, Pretty Okafor, president of the Performing Musicians Association of Nigeria (PMAN), estimated these losses, including unclaimed royalties and non-payment for Nigerian creative works, at N10.5 trillion annually (Kenechi, 2021).

The US Department of Commerce identified Nigeria as the largest African market for goods infringing intellectual property rights, with about 80% of international music CDs and 40% of local music CDs copied, counterfeited, and sold illegally. Blockchain technology can transform this situation by placing music on a decentralized, peer-to-peer (P2P) network, thus eliminating central sources of piracy (Tuck, 2022). Blockchain-based platforms offer effective anti-piracy measures by providing central storage and sharing services with integrated monitoring against infringements. Each user receives a unique digital fingerprint for content, allowing original pirated material to be quickly identified and removed (De León & Gupta, 2017).Ongoing projects using blockchain to combat piracy include Cinezen, a decentralized video-on-demand service, and MovieCoin, a blockchain-based content distribution service.

4. Reduction in cost of music creation

In Nigeria, the cost of creating, producing, and distributing music is high due to expenses from studio engineers, producers, distributors, marketers, and online streaming companies. If musicians could reach their audience directly, they could save significantly on these costs. Blockchain technology facilitates this direct connection. By releasing music as NFTs on the blockchain, artists can sell directly to listeners, with payments going straight to the artists' accounts. This eliminates the need for third-party marketers and distributors, reducing overall production costs.

5. Crowd-funding

Blockchain technology offers a win-win arrangement for music creation, allowing people worldwide to license, buy, stream, collaborate, and invest in music projects with full transparency via smart contracts on second-generation blockchains. Traditionally, fans support artists by buying records or attending concerts, but intermediaries often take a large share of the revenue. Beyond concerts, there is little engagement between artists and fans, and most revenue goes to companies, with only a small percentage reaching the artists.

Blockchain-based crowd-funding platforms address these issues by enabling direct value transfer between fans and artists using cryptocurrency. NFTs and smart contracts ensure accurate transaction records and enforce rules. Different platforms offer varying benefits. For instance, on Audius, users earn tokens by interacting with artists and sharing playlists, allowing both artists and fans to share in the value created (Mattias, 2022). Regardless of the platform, artists receive direct payments, and fans gain benefits.

6. Authenticity of tickets and ticketing

In Nigeria, concert ticketing faces issues like fake tickets, racketeering, hoarding, and theft. Fraud schemes often target concert-goers, and even large platforms struggle with verification. Incorporating NFT technology into ticketing can solve these problems by reducing system vulnerabilities. Digital tickets become unique, valuable assets, as seen when Coachella partnered with FTX to offer fans lifetime passes and other benefits.

Middlemen often buy tickets in bulk and resell them at exorbitant prices, making it difficult for fans to purchase tickets. Placing tickets on the blockchain ensures they go directly to fans, eliminating middlemen and reducing costs. This makes tickets more affordable and accessible.

Engaging the Blockchain Technology

There are many companies and platforms that render specifically music-based blockchain services. Some of these companies offer watertight copyrights protection services, others create opportunities for fan engagements and reward systems. A few are highlighted below:

1. Sound

This fully remote platform operates by creating a more interactive relationship between artistes and fans through its Web3-based NFT platform. This process bridges the gap between the musicians and their fan base. When an artiste releases a song as an NFT, specific numbers are attached to these copies which are purchased directly by the fans. Owners of early copies use these numbers to authenticate their bragging rights which, in turn, allow them sell their NFTs for more value. The Discord hangout component of the platform allows artiste engagements with their fans.

2. Digimarc

Digimarc is located in Beaverton, Oregon. The company develops solutions for licensing intellectual property for audio, visual and image content using integrated blockchain technology in licensing music. Digimarc uses its special Barcode system as music fingerprinting technology that links to metadata in order to track music sources, measure usage and estimate payments. The digital watermarking technology works with most music files and gives a more holistic insight for music rights holders.

3. Mediachain

MediaChain, which is now a part of Spotify, is located in Brooklyn, New York. Mediachain deals majorly on issues of fair revenues and payment of royalties to music and content owners within the music industry. It is a peer-to-peer, blockchain database for sharing information across different applications and organizations. Mediachain offers open-source information by issuing unique identifiers for each piece of information, thereby leaving no one in doubt. They also work with artists to ensure they are paid fairly. Smart contracts are facilitated with musicians that directly state their royalty stipulations without the nagging problems of middle men, third parties or contingencies.

4. Royal

Royal turns music fans into invested partners, providing a platform where listeners can purchase a percentage of a song's royalties directly from an artiste. Once an artiste determines the number of royalties to put up for sale, a Royal user can buy these royalties as tokens and hold on to them or sell them on an NFT exchange. Users can facilitate transactions with a credit card or crypto, and Royal even creates crypto wallets for those who don't have accounts yet.

Conclusion

This paper considers the blockchain a veritable tool for arresting many of the ills within the Nigerian music industry. Challenges of piracy, depletion of accrued revenue, intellectual property theft and other copyright infringements, distribution and streaming, ticketing for concerts and elimination of false tickets, funding for music production, and fan base interactions can all be managed with the alignment of the industry to modern technology, specifically the blockchain.

History is replete with lots of lessons. One of such lessons is that early adopters of disruptive technologies tend to benefit the most from them. As it is currently, the world has become a global market place, many entities and individuals are already at the fore front of this revolutionizing

technology, Nigeria is already trailing behind. Nigerian music artists and industry leaders are hereby urged to embrace blockchain technologies and start thinking about new ways to leverage their possibilities. Ideas are inexhaustive and more ways of application of technology are always discovered in continuum. An additional idea may just change everything!

Recommendations
The paper makes the following recommendations:
1. Nigerian music artists who desire to break free of the status quo in the industry should embrace the blockchain technology by placing their songs and music materials on the platforms, thereby owning full control of their works.
2. Hooking unto the blockchain technology will create a win-win relationship for both the artiste and the fan base, and brings them into a closer, clearer and more beneficial relationship. It is therefore highly recommended for adoption by the music industry.
3. Government, through relevant agencies, should make copyright laws more potent and at par with current realities. This will help reduce the menace of music and intellectual piracy within the music industry.
4. The blockchain and its technical aspects should have a place within the Nigerian education system. This will help open the horizon for wider experiences and application of the technology in solving our many problems.
5. Rather than complete stifling, Government should make policies that help in regulating activities within the cyber-tech environment with the aim at exploring these technologies for national growth.

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