

CRYPTOCURRENCY AS A POSITIVE FORCE OF CHANGE  
IN THE CLASSICAL MUSIC INDUSTRY

Ava Figliuzzi

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If the arts world were a county fair, the classical music industry would be the tilt-a-whirl. Any fairgoer can count on the great big fruits, year after year, to be reliably tilting and whirling in neat circles. Sometimes the rusted apples even get a new coat of red paint. Often, it is ridden to please a middle-aged relative, but ridden all the same. This keeps the line respectably long, albeit modest.

The biggest difference between the classical music industry and the tilt-a-whirl is that no matter how much each tilt-a-whirler appreciates the experience, a ticket is paid for, and given to a sunburnt fourteen-year-old in order to gain entry to one of the apple's cores. There are not millions of people tilt-a-whirling for free while the media suggests that the fair should try painting an apple blue to increase ticket revenue.

In the words of Sam Brukhman, artistic director of the Verdigris Ensemble, a Dallas-based choral group with a penchant for the cutting edge, "...art has value and rarity and therefore deserves to be seen and purchased."<sup>1</sup> Although Brukhman's statement is not technically a fact, it is important to remember the issue it addresses: The classical music industry's trouble lies not necessarily with the product, or the creator, but how the creator is compensated. The tilt-a-whirl doesn't need to add a blue apple if it's getting paid fairly for the red ones.

A widespread trend for established soloists, orchestral musicians, as well as young, up-and-coming musicians is using social media platforms such as Instagram, YouTube, and TikTok to share content and perspectives. Some of these musicians succeed in garnering a relatively large, virtual following. However, the minute publicity gained by a handful of new followers, after a certain threshold of online fame, does not continue to equal compensation for

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<sup>1</sup> Sam Brukhman, Drew Alexander Forde, Kim Noltemy, Nicholas Reeves, Cristina Spinei, "NFTs and Classical Music," interview by Aubrey Bergauer, September 9, 2021, YouTube, 1:17:50, <https://www.youtube.com/watch?v=Xd8uWTHUi8s>.

the time and effort expended to produce content. Social media's goal, as shared by all capitalist companies, is first to make users think they personally gain something from using their interface. Then, it's to finesse as much money — and valuable data in the case of social media — out of the consumer for as long as possible. As Daniel Hövermann, head of investment banking at Texas Capital Bank, famously says in the documentary *The Social Dilemma*, “If you're not paying for the product, then you are the product.”<sup>2</sup> How can a musician avoid being the tilt-a-whirl that gets ridden for free, while retaining the exposure and other benefits of an accessible, worldwide platform?

This persistent problem is where the emerging technology of blockchain has potential for positive change. Earlier in the same interview with Verdigris Ensemble's Brukhman, violist and entrepreneur Drew Alexander Forde initiates the conversation on blockchain with a concise definition: Blockchain is a record of transactions written in code that can be found on numerous internationally dispersed computers called nodes. These nodes are notably not owned by one centralized body, such as a bank.<sup>3</sup> Each individual node stores the complete record of transactions for a certain cryptocurrency, i.e. they store the blockchain. Individuals can launch their own nodes, but since it can be complicated and time-consuming, most entrepreneurs use node-provider companies.<sup>4</sup>

Blockchain is a decisively secure way to complete transactions with cryptocurrency because nodes are not owned by one entity, there are a large number of them, and they are spread out geographically. These criteria classify the blockchain as decentralized. If a hacker attempts to

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<sup>2</sup> Jeff Orlowski, *The Social Dilemma*, Exposure Labs, 2020, Netflix.

<sup>3</sup> Brukhman, Forde, Noltemy, Reeves, Spinei, “NFTs and Classical Music,” YouTube.

<sup>4</sup> Deen Newman, “Blockchain Node Providers and How They Work,” *InfoQ*, March 3, 2021, <https://www.infoq.com/articles/blockchain-as-a-service-get-block/>.

alter the code on one node, it will be detected easily because all the other nodes will show the correct code.<sup>5</sup>

Ethereum, the second-most popular cryptocurrency after Bitcoin, is where the music industry has inherent relevance. It is the first cryptocurrency to come with a “smart contract” built in.<sup>6</sup> In short, this smart contract is a section of the blockchain code for any transaction using Ethereum and can replace the use of publishers, performing rights organizations, record labels, and public performance licensing organizations.<sup>7</sup> This convoluted chain of companies and transactions often results in lost and delayed artists’ royalties, as well as the artist having less control over their own work. Smart contracts instantly pay royalties to an artist’s cryptocurrency wallet and ensure the absence of illegal copying and streaming.

Audius, an up-and-coming Spotify competitor, is leading the way into artist-focused, decentralized streaming with blockchain technology centered around their own tokens, known as AUDIO. “Audius aims to stand apart from its competitors by directing 90% of music revenue to artists,” compared to the current estimate of a meager 12%.<sup>8</sup> Audius is currently focused around non-classical music, but the model is replicable, innovative, and has shown several early signs of success.

The security and functionality that blockchain provides digital art has already made way for trailblazing musical works released as non-fungible tokens, or NFTs. Nicholas Reeves,

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<sup>5</sup> Brukman, Forde, Noltemy, Reeves, Spinei, “NFTs and Classical Music,” YouTube.

<sup>6</sup> Prabhjote Gill, “Ethereum 2.0’s first upgrade will happen this month- a step closer to denting the competitive advantage of ‘Ethereum Killers’,” *Business Insider India*, October 8, 2021, <https://www.businessinsider.in/investment/news/ethereum-altair-hard-fork-threatens-competitive-advantage-of-solan-a-cardano-and-others/articleshow/86863524.cms>.

<sup>7</sup> Bruce Balensiefer, “Blockchain Music Rights in (About) 3 Minutes,” February, 15 2018, YouTube, 3:15, <https://www.youtube.com/watch?v=1LUKgbWihGU>.

<sup>8</sup> Zoltan Vardai, “What Is Audius and Could It Be the Next Spotify?” *Forkast*, September 22, 2021, <https://forkast.news/what-is-audius-could-it-be-the-next-spotify/>.

composer of *Betty's Notebook*, the first classical music NFT sold on the blockchain, defines NFTs as immutable assets such as digital music, real estate, or access to an event, represented as a token.<sup>9</sup> NFTs can also stand alone as digital iconography with associated, cultural value — like baseball cards.

Because of its smart contracts, Ethereum is the cryptocurrency used for any NFT purchase. NFTs, representing these digital and material items, are not exchangeable, i.e., non-fungible, and there is only one original. Before blockchain, and more specifically before Ethereum's smart contracts, it would be far less wise for freelance, classical musicians to invest time, money, and energy into digital content that could be copied and distributed without regulation. With NFTs, the musical equivalent of art prints can be made of the original NFT. These “prints” would have less value than the original, but would ensure fair payment for any number of copies musicians wish to distribute of a recording.

This streamlined method of releasing content with the guarantee of rightful compensation has opened doors for new compositional variables to be tested out, as seen with *Betty's Notebook*.

*Betty's Notebook* contains a record of aviator Amelia Earhart's final moments before she was lost at sea in 1937 on an attempt to circumnavigate the globe. A 15-year-old girl from St. Petersburg, Florida, named Betty Klenck came across Earhart's calls for help on a shortwave radio in July 1937 and decided to record them in her notebook.<sup>10</sup> *Betty's Notebook* is now also known as the first classical music NFT and retells Klenck's story set to music. *Betty's Notebook* is more than just a piece of music with a background story. It is also the first piece of programmable music on the blockchain. Not to be confused with programmatic music, which

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<sup>9</sup> Brukman, Forde, Noltemy, Reeves, Spinei, “NFTs and Classical Music,” YouTube.

<sup>10</sup> “Betty's Notebook,” Verdigris Ensemble, Accessed November 28, 2021, <https://www.verdigrismusic.org/bettysnotebook/home>.

could also be used to describe the narrative feature of *Betty's Notebook*, programmable music, “refers to the ability to customize parts of music... As a result, music becomes dynamic and changes over time.”<sup>11</sup>

There are five changeable layers, sometimes called stems, to this 21-minute piece: the Master, The Choir Layer, Betty's Voice Layer, Betty's Choir Layer, and Betty's Radio. Each part was sold in May 2021 as an individual NFT to five different buyers. There are a finite number of ways each owner can alter their layer. For example, the owner of Betty's Radio layer can choose between Jazz Combo 1, 2, or 3, which also changes the wood grain of the Master (an audiovisual composite). The Master alone sold for \$215,989, or 56.56 Ethereum.<sup>12</sup> The different combinations of these alterations, changing the composite result, are called permutations.

In October of 2021, Async Art, the same digital auction platform that hosted *Betty's Notebook*, released *MozartBeats*. This reimagining of Mozart's *Eine Kleine Nachtmusik* is made of four stems, each corresponding to a part in a string quartet, with each stem having five possible variations. This project was recorded in Vienna as a nod to Mozart completing the original work in the same city more than 200 years ago. As with *Betty's Notebook*, anyone can visit the Async website and listen to the current permutation, view the current stem owners, or listen to and bid on historical permutations.<sup>13</sup>

Including audience members and non-musicians into this programmable compositional process marks a consequential step past the chance music of the 20th century, when composers

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<sup>11</sup> “Betty's Notebook,” Verdigris Ensemble, <https://www.verdigrismusic.org/bettysnotebook/home>.

<sup>12</sup> “Betty's Notebook.”

<sup>13</sup> NFTunes, Mankind, “MozartBeats,” Released on Async Art, October 5, 2021, Audio, 4:01, <https://async.art/music/master/0xb6dae651468e9593e4581705a09c10a76ac1e0c8-3773/player>.



like Charles Ives, John Cage, and Pierre Boulez similarly surrendered a finite amount of control to dice or mathematical formulas.

The steps forward made by Verdigris and the creators of *MozartBeats* only begin to define what is possible for musicians with the efficiency and security of blockchain technology. Aside from breaking creative ground, and offering instant, simplified transactions, there is significant potential for making the crypto-financial system work for musicians and local communities more than dollars ever have.

One of the first on-record, publicly available discussions of this concept can be found in an interview organized by Groupmuse, a popular online platform for finding and hosting informal chamber music recitals. The virtual interviewee was Jake Vartanian, founder of Cryptodex, the first ever token-launch consulting firm, and of Native, a community-focused platform that uses cryptocurrency incentives to strengthen local commerce and education.

Vartanian offered the comparison of cryptocurrency to local governments; they can meet the needs of more people, since the federal currency or government cannot meet the needs of every group of people.<sup>14</sup> Although the only cryptocurrencies that have been mentioned thus far are Bitcoin and Ethereum, there are countless varieties, all easily exchangeable on the blockchain. Vartanian argues that this is far from a problem. He instead outlines a hypothetical future where every business, non-profit, educational institution, or Facebook group can have its own currency with its own specific spending incentives and benefits. This individualized currency would be like having airline miles at each store, except one could exchange these “miles” for other kinds of digital currency to purchase essentially anything anywhere.<sup>15</sup> His

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<sup>14</sup> Jake Vartanian, “Groupmuse and the Blockchain: Community Currencies with Jake Vartanian,” interview by Sam Bodkin and Christos Vayenas, Groupmuse, September 16, 2021, YouTube, 59:34, <https://youtu.be/RWcItTDkKAA>.

<sup>15</sup> Vartanian.

company, Native, assists these groups by providing a user-friendly digital-currency interface that mimics how many people use applications for online banking.

This scenario is not completely futuristic. A paper currency known as BerkShares has been in use since 2006 in the Berkshire region of Western Massachusetts.<sup>16</sup> Although BerkShares were not digitized until late in 2021, their local circulation over the last 15 years provides a material model of what Vartanian proposes cryptocurrency can achieve for other communities.

As outlined on the BerkShares website,

Echoing the local currencies widely used throughout the early 1900s, BerkShares serve as a tool for community economic empowerment, and development toward regional self-reliance. Dubbed a “great economic experiment” by The New York Times, the currency distinguishes the local businesses that accept the currency from those that do not, fostering stronger relationships between the responsible business community and the citizens of the region. The people who choose to use the currency make a conscious commitment to buy local, and in doing so take a personal interest in the health and well-being of their community by laying the foundation for a truly vibrant, thriving economy.<sup>17</sup>

Over 400 businesses in the Berkshire region participate, including banks who have an agreed-upon exchange rate of one dollar to one BerkShare. This allows risk-free participation in using and accepting BerkShares.<sup>18</sup>

The innovation in applying this model to cryptocurrency will be reflected in individualized incentives that organizations can offer consumers with their unique tokens, using platforms like Vartanian’s Native. In the BerkShares model there are only generalized incentives: local solidarity and marginally (approximately 5%) lowered prices for goods and services that

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<sup>16</sup> “About BerkShares,” BerkShares Currency of the Berkshires Region, November 18, 2021, <https://berkshares.org/>.

<sup>17</sup> “About BerkShares.”

<sup>18</sup> “About BerkShares.”



are purchased with BerkShares over dollars.<sup>19</sup> Future incentives would have the ability to provide more tangible, tailored benefits beyond the current goodwill or moral incentive that largely serves as the motivation behind shopping locally. Here are two examples of how communities could take advantage of this technology.

#### Community Currency Model: Scenario No. 1

Consider an imaginary town with a local grocery store named Martin's. Martin's offers a membership sold in tokens called "Marts." Members get a pair of discounted tickets and free popcorn once a month at a local movie theater. They also get a 10% discount on groceries purchased with their Marts. Marts have a favorable exchange rate with tokens of several businesses in the area that each have their own membership benefits. These businesses form a symbiotic web of relationships, built with ones as between Martin's and the movie theater, and collectively agree to donate a set number of memberships to the local domestic violence shelter. More necessities can be purchased with these memberships than with dollars. The businesses financially benefit from donating memberships, rather than donating a lump sum, because of the profit inherent in returning customers that feel supported by their local community.

Rather than all the businesses in the area using one currency, as seen in the Berkshires, these hypothetical businesses are more in control of which businesses and organizations they want to develop relationships with. It is also important to note that growth and adaptation is slower and more limited in the BerkShares model; individual organizations would not be able to change the model unless agreed upon by the board at BerkShares. There is creative and entrepreneurial freedom that comes with individualized token use.

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<sup>19</sup> David Z. Morris, "Is community crypto the future of money?" *UnHerd*, August 9, 2018, <https://unherd.com/2018/08/community-crypto-future-money/>.

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The community currency model presents one possible solution to social media devaluing the content that musicians release for free online. As Vartanian suggests in his interview with Groupmuse, people can be incentivized to buy a few tokens to back their interest in a group with calculable, financial value instead of relying on likes and follows to show support.<sup>20</sup>

In addition to providing solutions to devalued online content, this model will also begin the movement away from the arts organizations relying on goodwill donations to stay afloat. This application can take many forms depending on if the subject at hand is an individual freelancer, or an ensemble, and whether the product is digital, material, or a live experience.

#### Community Currency Model: Scenario No. 2

Let's consider a small, non-profit music festival that has historically relied on donations from predominantly older patrons to offset ticket costs for younger audience members they are trying to attract. Any local individual or business can purchase any number of tokens that immediately support the festival. These tokens can be kept to either be used on a purchase within the festival, or if not used within the festival, they can be traded with a number of locally participating businesses that have an interest in supporting the festival. There are a limited number of tokens available from the festival, which gives them value. Any festival related purchase is cheaper in tokens than in dollars. Additionally, the festival has a system of awarding its tokens in exchange for Facebook likes and shares.

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<sup>20</sup> Vartanian, "Groupmuse and the Blockchain," YouTube.

The festival's newest youth initiative is a partnership with the local high school's summer music camp. Any parent who owns a certain number of the festival's tokens gets a discount on the camp tuition fee. In return the festival offers a few master classes at the high school.

The festival has minted a number of NFTs this season, including the only digital copy of the season poster signed by all participating musicians, a video showing the conductor from the musicians perspective, displayed side-by-side with the score for one movement of repertoire, and an audio track of the festival ensemble playing without the soloist as a practice track for a savvy youth musician.

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These scenarios show how business, education, and the arts can support each other more effectively at the local level because of the accessibility and mutual benefits. This model also provides a clearer path away from the corporate hegemony that resulted from the second large wave of America's globalization following the Cold War.<sup>21</sup> It is commonly understood today that success in classical music is at least in part defined by how internationally an artist performs or the sheer number of ears their music touches. Many bios of professional musicians list how many continents or countries they have concertized.

Is art of more value just because it has been geographically distributed? What is lost when the focus is on a number over what else can be found in an audience? What if an artist or ensemble was able to financially incentivize a loyal, local audience instead of feeling compelled to constantly find new masses of audience members?

The classical music industry would benefit if the goal was to have audience members return. Any and all movement away from globalization, corporate control, and a budget reliant

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<sup>21</sup> Douglas S Massey, "Globalization and Inequality: Explaining American Exceptionalism," *European Sociological Review* 25, no. 1 (2009), doi:10.1093/esr/jcn036.

on wealthy donors, towards community currencies that support local organizations, both music-related and not, will act as a positive force of change in the classical music industry.

Recalling Vartanian's aforementioned analogy of federal and local government, freelance musicians that have focused on local career goals are not going to be served equally well by the same financial tools that international soloists are best served by. This could be viewed as a downside to the community cryptocurrency model; it will not be the solution for every musician's finances. International soloists who have a longstanding, profitable record deal are a prime example of musicians who are being served well by the centralized financial system and who benefit from the effects of globalization. Unless they feel that the middlemen take an unfair profit, cryptocurrency may not be a strategic direction for them to go.

Another downside of entering the world of cryptocurrency as a classical musician, as outlined by composer Cristina Spinei, is the damage that has been done to the reputation of NFTs by celebrities, who are not artists or musicians, hastily releasing NFTs as a one-time money grab. The buyers of recent NFTs released by John Cena and Paris Hilton experienced serious losses because there was no perceived value except their tabloid-worthy origin.<sup>22</sup> Spinei calls this behavior "distasteful" in terms of the creative potential NFTs offer artists.<sup>23</sup> In response, Dallas Symphony Orchestra President and CEO Kim Noltemy forewarns ensembles entering the cryptocurrency community to avoid the distastefulness Spinei mentioned.

Noltemy recommends first ensuring there are enough people with enough work hours to invest into new cryptocurrency-related programs. Noltemy continues, "...you don't do an

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<sup>22</sup> Olga Kharif and Kim Bhasin, "Celebrity NFTs Risk 'Catastrophic Failure.' Just Ask John Cena," *Bloomberg*, November 15, 2021, <https://www.bloomberg.com/news/articles/2021-11-15/nfts-by-celebrities-like-grimes-john-cena-and-a-ap-rocky-fall-in-value>.

<sup>23</sup> Brukman, Forde, Noltemy, Reeves, Spinei, "NFTs and Classical Music," YouTube.

education program and show up at a school once a year and, you know, do a class and then not see them again...”<sup>24</sup> She gives this advice from experience. The Dallas Symphony Orchestra had successful releases of several NFTs commemorating a pandemic-collaboration with unemployed members of the Metropolitan Opera Orchestra. The DSO easily sold their various NFTs and successfully employed fellow musicians that were desperate for work. Even so, Noltemy felt that the ensemble and administration were not truly acculturated into the NFT community. She acknowledged that it takes time and genuine creativity to avoid any resemblance of producing art for a trendy reputation or money-grab.<sup>25</sup>

The word “volatility” often gets thrown around as a reason to stay out of cryptocurrency. It is true that during early stages of anything there is less data to predict patterns. However, there is less volatility associated with Vartanian’s community currency model discussed earlier. If a worker-owned cooperative like Groupmuse, which has a mere 15 employees, all agree that having a Groupmuse currency is of mutual interest, there is very little volatility moving forward. They can have limited numbers of tokens available, and decide that their token will always equal a certain dollar amount. The token may become more desirable, at the same dollar conversion rate, because of the limited number. There may also be events or products only available by token purchase.<sup>26</sup> The value of small-scale, diversified cryptocurrencies is both created and stabilized by the citizens who have local interest in the organizations.

It is important to note that, lying outside the scope of this discussion, is the volatility of investing in certain cryptocurrencies. The discussion at hand is very specifically unrelated to investing in Ethereum, Bitcoin, or other small-scale currencies mentioned. The volatility of

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<sup>24</sup> Brukhman, Forde, Noltemy, Reeves, Spinei.

<sup>25</sup> Brukhman, Forde, Noltemy, Reeves, Spinei, “NFTs and Classical Music,” YouTube.

<sup>26</sup> Vartanian, “Groupmuse and the Blockchain,” YouTube.

purchasing a work of art with subjective value — even if the currency used is cryptocurrency — and allowing digital art to have value in the first place, is discrete from the stock market.

There are still major concerns among environmentally conscious people who are interested in cryptocurrency. The reason behind blockchain's security is also the reason it necessitates an extreme amount of energy. The current system that verifies transactions for both Bitcoin and Ethereum on the blockchain, called proof-of-work, requires cryptocurrency miners to solve complicated, energy-gobbling computational puzzles on their nodes. Once they verify blocks, they receive rewards in cryptocurrency. This decentralized effort is extremely secure, but not environmentally friendly. Due to concerns about global warming, Ethereum has been transitioning to a new verification system, called proof-of-stake, that will cut emissions by a predicted 99.95%.<sup>27</sup> In proof-of-stake, designated validators, those that own a certain amount of the token from which a transaction is being validated, will stake their own currency as collateral while validating new blocks assigned to them. The only downside to Ethereum's transition to proof-of-stake is its delay from December of 2021 to June of 2022. This system is viewed just as securely as proof-of-work, and will very soon ease the conscience of any musicians concerned with ethical participation in cryptocurrency.<sup>28</sup>

Perhaps classical music has outgrown the analogy of the tilt-a-whirl. *Betty's Notebook* and *MozartBeats* have certainly shown the world the capability of classical music to stay a few steps ahead of the times. The key to success of these projects was the presence of a system that ensured the creators that their concept's rarity would be valued and securely rewarded once

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<sup>27</sup> Ryan Duffy, "Proof-of-Stake Could Make Ethereum 99.95% more energy-efficient. How does it work?" *Morning Brew*, May 19, 2021, <https://www.morningbrew.com/emerging-tech/stories/2021/05/19/proofofstake-make-ethereum-9995-energyefficient-work>.

<sup>28</sup> Duffy, "Proof-of-Stake," <https://www.morningbrew.com/emerging-tech/stories/2021/05/19/proofofstake-make-ethereum-9995-energyefficient-work>.



created. The blockchain has enabled this musician-centric system in an efficient and accessible way, which is how existing companies, made of non-artists, that receive profit in the music industry will become less dominant. When musicians are no longer required to go through large companies for copyright and financial assistance, there is increased freedom to fashion a career as locally as preferred. This general movement away from globalization and corporate power can be practically carried out with Vartanian's community currency model. Not only does the blockchain provide the basis for strengthening classical music, it gives incentive for different local groups and businesses to invest in each other.

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“About BerkShares.” BerkShares Currency of the Berkshires Region, November 18, 2021.  
<https://berkshares.org/>.

This is the BerkShares website that provided background information of the origin, current use, and future of the currency in the Berkshires. There is a directory to search participating businesses, an employee directory, and a link to sign up for the digitized BerkShares app waitlist. Unsurprisingly, there is also a section of the site highlighting the local visual artists whose work is featured on the bills.

Balensiefer, Bruce. “Blockchain Music Rights in (About) 3 Minutes.” February, 15 2018.  
YouTube, 3:15. <https://www.youtube.com/watch?v=1LUKgbWihGU>.

Balensiefer is an expert in music technology who received his education from the University of Miami’s Frost School of Music. This videos walks viewers through a simple, hand-drawn diagram. It shows how publishers, performing rights organizations, record labels, and public performance licensing organizations will be unnecessary with the use of blockchain technology and smart contracts. Notably, this video is from 2018- an expert prediction of years to come.

“Betty’s Notebook.” Verdigris Ensemble. Accessed November 28, 2021.  
<https://www.verdigrismusic.org/bettysnotebook/home>.

This is the website of the Verdigris Ensemble, the Dallas-based vocal group that produced Betty’s Notebook. They have tailored sections of the site with a wealth of background information labeled “For the Musician”, “For the Historian”, and “For the Techie”. Although the permutations are held on the Async Art website, samples of the layers are available to listen on the Verdigris site.

Bruhman, Sam, Forde, Drew Alexander, Noltemy, Kim, Reeves, Nicholas, Spinei, Cristina. “NFTs and Classical Music.” Interview by Aubrey Bergauer. September 9, 2021. YouTube, 1:17:50. <https://www.youtube.com/watch?v=Xd8uWTHUi8s>.

This interview hosted by California Symphony Executive Director, Aubrey Bergauer, is one of the main reasons I decided to research the relationship between classical music and cryptocurrency. She interviews Sam Brukman, artistic director of the Verdigris Ensemble, Drew Alexander Forde, Juilliard-trained violist and entrepreneur with a massive social media following, Kim Noltemy, Dallas Symphony Orchestra President and CEO, Nicholas Reeves, the composer of *Betty's Notebook*, and Cristina Spinei, a Nashville-based composer who has produced several NFTs. This interview starts with definitions of basic terms related to NFTs and the blockchain, goes through the projects that each interviewee is associated with, and addresses the downsides to the cryptocurrency community for classical musicians.

Duffy, Ryan. "Proof-of-Stake Could Make Ethereum 99.95% more energy-efficient. How does it work?" *Morning Brew*, May 19, 2021.

<https://www.morningbrew.com/emerging-tech/stories/2021/05/19/proofofstake-make-ethereum-995-energyefficient-work>.

This article summarized the extremely complicated process of how cryptocurrency mining differs in the proof-of-work and proof-of-stake models. Proof-of-stake's energy efficiency nulls one of my proposed arguments against the cryptocurrency community. This article also covers the other benefits of proof-of-stake aside from the energy efficiency.

Gill, Prabhjote. "Ethereum 2.0's first upgrade will happen this month- a step closer to denting the competitive advantage of 'Ethereum Killers'." *Business Insider India*, October 8, 2021.

<https://www.businessinsider.in/investment/news/ethereum-altair-hard-fork-threatens-competitive-advantage-of-solana-cardano-and-others/articleshow/86863524.cms>.

This article offers a quick explanation of the differences between types of cryptocurrency and which aspects give one currency a competitive advantage over another. I learned from this source that Ethereum was the first cryptocurrency with a smart contract, giving it an advantage over Bitcoin, and that its move to proof-of-stake from proof-of-work will give it an advantage over the other less popular currencies with smart contracts.

Kharif, Olga, and Bhasin, Kim. "Celebrity NFTs Risk 'Catastrophic Failure.' Just Ask John Cena." *Bloomberg*, November 15, 2021.

<https://www.bloomberg.com/news/articles/2021-11-15/nfts-by-celebrities-like-grimes-john-cena-and-a-ap-rocky-fall-in-value>.

This is a surface-level article I found to expand on a downside of the NFT community that composer Cristina Spinei mentioned in the YouTube interview with Aubrey Bergauer. She noted the distastefulness of celebrity NFT releases that were obviously not investments in the artistic future of NFTs. I wanted to know which celebrities she might have been referring to.

Massey, Douglas S. "Globalization and Inequality: Explaining American Exceptionalism." *European Sociological Review* 25, no. 1 (2009). doi:10.1093/esr/jcn036.

This article served as a refresher in the entire history of American globalization and the negative effects it had on class inequality. Although I barely used the vast amount of knowledge it covered, I needed to make sure I was referencing the concept of globalization accurately in order to make the assertion that it negatively affected the classical music industry. Essentially, I wanted to make sure it was factual to claim that the prevalence of globalization and corporate dominance equals less success for freelance musicians.

Morris, David Z. "Is community crypto the future of money?" *UnHerd*, August 9, 2018. <https://unherd.com/2018/08/community-crypto-future-money/>.

I wanted to make sure I had an additional source discussing BerkShares, aside from the BerkShares website. This article does not provide any key points in my argument, but it was important to my background knowledge and formulation of the community currency model. Since it was written in 2018, it held some predictions for the future, based on the operations of BerkShares. It also strengthens my point, with examples of other historical local currencies, that official currency does not work for everyone, especially those in lower income brackets.

Newman, Deen. "Blockchain Node Providers and How They Work." *InfoQ*, March 3, 2021. <https://www.infoq.com/articles/blockchain-as-a-service-get-block/>.

Without this source, I only knew that nodes stored the blockchain and were not owned by a centralized entity. This article gave me just enough insight into what is required to be a cryptocurrency miner and how node providers were set up in order to streamline the process for businesses built on blockchain technology.

NFTunes, Mankind. "MozartBeats." Released on Async Art. October 5, 2021. Audio, 4:01. <https://async.art/music/master/0xb6dae651468e9593e4581705a09c10a76ac1e0c8-3773/player>.

Async Art is the platform that released both *MozartBeats* and *Betty's Notebook*. This site displays the current permutation of MozartBeats.

Orlowski, Jeff. *The Social Dilemma*. Exposure Labs, 2020. Netflix.

I watched this documentary soon after it was released. It is one of the first instances I have seen featuring multiple accredited adults verifying the predatory nature of social media. This concept strengthened my argument that social media companies want artists to believe that exposure is sufficient compensation for content.

Vardai, Zoltan. “What Is Audius and Could It Be the Next Spotify?” *Forkast*, September 22, 2021. <https://forkast.news/what-is-audius-could-it-be-the-next-spotify/>.

This source says Audius plans to pay 90% of revenue to the artist, instead of the current estimate of 12%. This statistic offers a more tangible result of eventually eliminating the middleman companies, and puts even more positive emphasis on the freedom and security that comes from blockchain technology.

Vartanian, Jake. “Groupmuse and the Blockchain: Community Currencies with Jake Vartanian.” Interview by Sam Bodkin and Christos Vayenas. Groupmuse, September 16, 2021. YouTube, 59:34. <https://youtu.be/RWcItTDkKAA>.

This interview, in addition to the one by Aubrey Bergauer, was one of the initial sparks to my research in the beginning. Vartanian unofficially introduces the diversified community cryptocurrency model, and explains it in a variety of ways like using the local and federal government comparison. This interview is also notable because the Groupmuse employees are able to voice their concerns and doubts from the specific standpoint of a small, classical music organization. Vartanian also uses the first part of the interview to go over background information on the history of cryptocurrency. His expertise as a token launch consultant as well as his community-minded vision made him by far the most valuable resource to my research.

Verdigris Ensemble, Brinkman, Bryan. “Betty’s Notebook.” Released on Async Art. May, 8 2021. Audio, 21:09. <https://async.art/music/master/0xb6dae651468e9593e4581705a09c10a76ac1e0c8-1592/player>.

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