

Artists: NFTs are the future

NFTs:



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Doge Brogan

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Abstract

Given the advent and market boom of NFTs, this thesis concerns itself with observing how NFTs are shifting the art market, and how those shifts can be explained, as the two seemingly disparate markets have different actors, processes and characteristics. In order to answer these questions the thesis takes an abductive case study design and employs an actor-network theory (ANT) approach to observe shifts in the markets by both human and non-human actors. These observations are then supplemented with tracing how capital is being converted by different actors through employing Bourdieu's use of the three forms of capital, which are conceptualised in economic, cultural, and social dimensions. Following ANT methodology, the thesis makes use of Venturini's cartography of controversies, to observe actors and experts and trace shifts, by conducting a method assemblage of semi-structured interviews, document analysis, and recording observations. The analysis found that indeed market shifts are taking place: NFT technologies provide solutions for issues the art market has struggled to find solutions for, such as secondary resale conditions and royalties, and certificates of authenticity. Furthermore, some art market actors, like galleries, have already begun to work with NFTs, marking a clear shift from how galleries conduct their business before and moving to reconcile the two markets in pursuit of facilitating easier sales processes and more financial gain. However, other art market actors are seeing their belief systems conflicted when it comes to diversity and sustainability, where the NFT market presents a reverse shift to the art market. Throughout the analysis NFTs displayed non-human agency as a quasi-object, an inscription device that passes through the collective and acts as a condition for society to exist, and as a vessel that contains moral and political values of the collective. When it came to the conversion of capital there was a clear divide: NFT market actors converted their economic capital to social and cultural capital, while art market actors converted their social and cultural capital into economic capital. The discussion outlines how the NFT market attempts to facilitate wide-spread adoption of blockchain technology through cultural diffusion.

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1 Introduction

If you have come across news about the market or Crypto recently, it is hard to miss NFTs: they are here to revolutionise and financialise everything, democratise the art world and free it from the shackles of gatekeepers, essentially changing the very life as we know it. However, there are also some people who are a bit less enthusiastic about NFTs, arguing they are “conservative, reactionary, neoliberal in the very worst sense” (Bauman et al., 2021), “the equivalent of toxic masculinity as a medium” as they “take up way too much attention and use up all the oxygen in the room” (Steyerl, 2021), and just “not great content” as Marina Abramović put it (Morris, 2022). But at the same time, “art goes where money flows” (Rozendaal, 2022), implying market acceptance is unlikely to be avoided. These quotes serve to briefly highlight the current actors and their voices in the controversy surrounding the NFT and art markets, with debates being centred around changing and challenging long-held notions and routines.

Traditionally, the art market has been very opaque and digitalisation-adverse, characteristics the NFT world is targeting and promising it can deliver better on. However, galleries rely on internal client vetting processes, while NFT marketplaces let anyone buy if they have the economic means to do so, resulting in a paradox for the two markets on how to go forward, as markets do not have set boundaries but are instead social fiction enacted, performed, and reinforced by consumers every day. Our general assumption is that these markets are being run by people, but what about the technologies and devices that facilitate our lives, and what about the values and meanings that we inscribe to non-human objects? Given the prevalence of technology and non-human objects in the NFT and Crypto-world, as well as the overwhelming focus on the material objects and ownership in the art market, this thesis will apply an actor-network theory (ANT) approach to understand both humans and objects as capable of possessing agency, to answer the research question how are NFTs shifting the infrastructure and networks of the art market? In order to understand the motivations behind actors pursuing and enacting these shifts, the thesis will further make use of the three forms of Bourdieu’s capital, and trace the conversion between economic, cultural, and social capital.

Previous research has mainly concerned itself with focusing on the NFT market and its potential for opportunities and challenges (Wang et al., 2021; Wilson, 2021;), trends and trade networks (Nadini et al., 2021), legal ramifications and intricacies of minting and hosting processes (Herian, 2021), and the use of the blockchain in the creative industries (Rennie et al., 2019). This thesis attempts to supplement and address the existing gap by conflating the NFT and art markets and observe the controversy surrounding the possible reconciliation of the two markets.

Section 2 will start with a short introduction into the development, actors, and ideas behind the development of Bitcoin, Ethereum, and NFTs, followed by sections describing NFT transaction processes and market participants. Thereafter a section reviewing literature and market characteristics of the traditional art market follows. This is then followed by reviewing and outlining ANT, its application within contemporary art, and Bourdieu's forms of capital: together these provide the theoretical underpinnings of this paper. Section 3 forms the methodological assumptions of the thesis, and outlines research design, Venturini's (2010; 2012) methodological ANT toolkit through observing and following controversies, Bourdieu's application of capital, and considerations and limitations on conducting research with this methodology. Section 4 presents the analysis, and is followed by a discussion in section 5 and conclusion in section 6.

2 Background & literature review

2.1 A short intro to Bitcoin, Ethereum, and NFTs

After accumulation of excessive financial risk resulted in the 2008 financial crisis, trust in central banks and fiat currencies dwindled (Gudgeon et al., 2020), inspiring Satoshi Nakamoto to publish the now-infamous whitepaper *Bitcoin: A Peer-to-Peer Electronic Cash System*, to introduce a new system for online payments that would eliminate the need to trust mediating third-parties, thereby excluding them from the process (Nakamoto, 2008). The technology outlined in the paper is able to eliminate trust by proposing that any two parties are able to transact directly with each other, using the so-called proof-of-work mechanism as a solution to the double-spending problem, and recording all transactions in a decentralised public ledger, called the blockchain (Nakamoto, 2008). Transactions are recorded in blocks on the blockchain, with each block having to be validated by a number of validators, or so-called nodes, who compete to find the answer to a cryptographic maths formula, to confirm the next block and set of transactions. This has a dual-purpose, as each block creation issues a new coin, termed BTC, thereby serving as incentive to participate in the validating process and distributing coins into circulation, since a central issuing authority is absent (Nakamoto, 2008). Each node hosts a full set of the blockchain transactions, making the chain hard to hack and underlining its security (Harm, 2020).

But although the system has been praised for its innovative features, simplicity, and transparency (Urquhart, 2016), it has not achieved the wide-use adoption Nakamoto intended, instead having gained traction to become the preferred payment system on dark-web sites, such as Silk Road, which was dubbed the "Amazon for drugs" (Trautman, 2014), to facilitate the trade of illegal products and services, given the benefits of anonymity connected to Bitcoin. Since then there have been multiple crackdowns on dark-web sites

and the use of Bitcoin for illegal purposes, and public discourse around Bitcoin has shifted from fringe use to investors using Bitcoin mainly for investment purposes (Selgin, 2015), mostly in more speculative capacities (Baeck & Elbeck, 2014). Contrary to fiat currencies, Bitcoin's supply is finite, therefore imbuing scarcity as a vital component of this currency and making it susceptible for speculation purposes. Given the finite supply, the accumulation of as many coins as possible has attracted the professionalisation of mining, with several miners congregating into mining pools (Kaiser et al., 2018). More than 75%% of all Bitcoin mining is performed by six mining pools, of which five are located in China (Tuwiner, 2022).

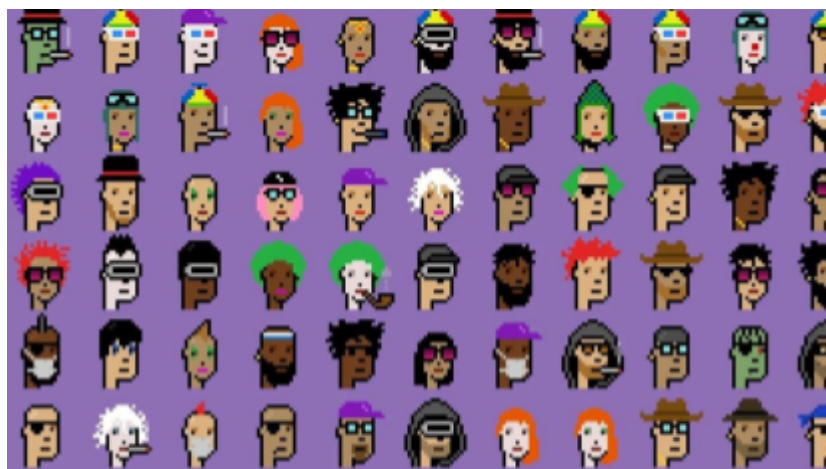
Speculation value due to scarcity and the focus on mining may however not be the only reasons why Bitcoin has yet to see wide-spread adoption; claims regarding simplicity and efficiency have long been contested, arguing that validation and transaction processes are vulnerable to lengthy delays, while the associated amounts and costs of energy are tremendously high. While the financial service giant VISA handles 1,700 transactions per seconds on average, Bitcoin processes 4.6 in the same amount of time (L., 2019). And while one Bitcoin transaction consumes 2,257.49 kwh, 100,000 VISA transactions consume mere 148.62 kwh (de Best, 2022), showing obvious issues of Bitcoin's scalability, and undermining the justification for Bitcoin being an object of speculation and investment once more.

Seeing these shortcomings, and believing that the blockchain's potential to have not been fully leveraged with powering digital currencies, Vitalik Buterin published his *Ethereum Whitepaper* in 2014, outlining how, in addition to Ethereum's native currency ETH, the blockchain could host a multitude of different assets, such as web applications, organisations, financial derivatives, loan programmes, and wills (Chow, 2022). Instead of using the proof-of-work mechanism, the Ethereum blockchain works with proof-of-stake for validation, which has enabled it to reduce transaction times and cut its energy consumption per transaction (Cao et al., 2020). However the main difference between Bitcoin and Ethereum does not lie in transaction speed or energy consumption, but in Ethereum's introduction of smart contracts to the blockchain. Smart contracts are pieces of code that are executed on the blockchain (Anoaica & Levard, 2018) and have several use cases, such as streamlining insurance processes by defining conditions when the smart contract will execute and enact a pre-defined result, or making supply chain management systems more reliable and transparent by using smart contracts at different levels of the process (Mohanta et al., 2018). Ethereum has also become the platform powering the decentralised finance (DeFi) sector, which is an alternative financial infrastructure built on top of the Ethereum blockchain, which utilises smart contracts to replicate financial services in a more open and transparent way (Schär, 2021).

Ethereum and smart contracts have also given rise to the phenomenon of non-fungible tokens (NFTs). NFTs represent unique tokens that can digitally mirror physical

objects (for example the DeFi trader group Injective Protocol converting a painting by Banksy into an NFT and then proceeding to burn the physical work [Boucher, 2021]), or be digital-only assets such as virtual property in Decentraland or digitally-native art. NFTs are inherently different to the concepts of Bitcoin and Ethereum coins that are designed to be equivalent and indistinguishable, whereas NFTs cannot be exchanged like-for-like (Wang et al., 2021). Instead of acting as a currency or platform on which to host different applications, NFTs are designed to use smart contracts to achieve a number of different things such as proving existence and ownership of digital assets, earning royalties upon success of future trades, as well as enabling seamless peer-to-peer exchanges (Wang et al., 2021). The majority of attention regarding NFTs however lies in their ability to authenticate unique ownership and safely store them on the blockchain (Musan, 2020).

But there are many misconceptions that the NFT is synonymous with the digital asset that is being bought or traded. Take for example CryptoPunks, a collection of 10,000 24x24 pixel sized images of randomly generated figures that have different characteristics in punk mannerisms (the lowest trading punk is currently valued at 71 ETH, or \$244,799.47 USD [Larva Labs, 2022]). Upon the successful purchase of a CryptoPunk the buyer does not receive a punk in the image seen below, but instead receives a line of code that on one hand ascribes true ownership and the uniqueness of the NFT (which creates the true value of the NFT [Wang et al., 2021]) and on the other hand contains a URL that points to the location where the .jpg of the image is hosted. This is an important distinction, as the image itself is therein not recorded on the blockchain, and the URL may at times be faulty, or the server the image is hosted on may cease to store the content purchased with the NFT, questioning the reliability and longevity of these storage structures (Das et al., 2022).



Selection of CryptoPunks (Schmalzried, 2021) © Larva Labs

2.2 A closer look at the NFT market

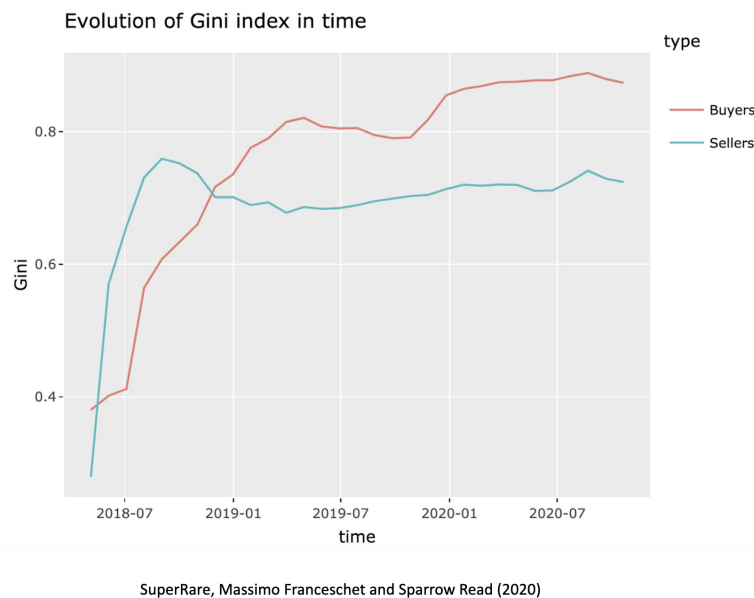
Assets sold as NFTs are generally organised as collections, which are typically sets of NFTs that share common characteristics (as for example the CryptoPunks described above). Collections can take different forms, but most of them can be categorised in six categories: art, collectible, games, metaverse, other, and utility, with 75% of all collections consisting of less than 37 unique assets (Nadini et al., 2021). It is important to note that there are drastic differences in terms of share by volume and share by transactions: the art category accounted for 71% of the total market volume in July 2020, while only contributing to 10% of the number of transactions (Nadini et al., 2021). The most exchanged categories are games and collectible, which account for 44% and 38% respectively, with the latter making up for 12% of the transaction volume (Nadini et al., 2021), meaning that on average



NFTs in the art category sell for far higher values than in the other categories. This trend seems to be continuing, as market volume for the art category is steadily increasing while the number of transactions is decreasing (Nadini et al., 2021).

What also continues to increase is the inequality of buyers and sellers operating in the NFT market. As the NFT market volume gains traction, so does Gini index for both buyers and sellers as shown in the adjacent chart. What is expected in a way is that there is inequality between sellers: since the art category accounts for a small amount of transactions but the overwhelming majority of market volume, there are bound to be a few artists that reap more income than the rest of NFT creators and artists. What is surprising however is that there is such large inequality between buyers. This is partly due to the sheer

wealth some of the buyers have amassed prior to their NFT activity (Olson, 2022), but also a result of the easy transferability of NFTs: the top 10% of NFT traders account for more than 85% of all transactions, and trade 97% of their assets at least once (Nadini et al., 2021). This



underlines their speculative capacity (Herian, 2021) that has been viewed as an inherent part of the Crypto-industry (Baeck & Elbeck, 2014). It is also clear that the top buyers are aware of the influence their positions bring with them, as they prefer not to connect to other traders based on the similarity of their connection patterns, meaning that they choose to trade with traders possessing less buying power than themselves (Nadini et al., 2021).

There is a big gender disparity between male and female NFT collectors: in a recent survey 45% of the male respondents said they were collectors, with 15% saying they collect NFTs, while only 22% of the female respondents identified as collectors and 4% collecting NFTs (Silverman, 2021). This could be due the majority of NFTs and collectibles on offer being male-centric (Silverman, 2021). This is slowly changing, as for example NBA Top Shot started introducing WNBA NFTs alongside their traditional market offering. However, NFTs with female content seem to be trading at lower market values than with male content: CryptoPunks with male avatars sell at higher price levels than their female counterparts, although female avatars are rarer (Egkolfopoulou & Gardner, 2021). Female participants are further disadvantaged as the majority of individuals entering the Web3 and NFT space were already established in Web 2.0 (Stevens, 2020). Millennials are the leading collector group, with 42% identifying as collectors and 23% collecting NFTs (Silverman, 2021). This share was even higher in the most infamous NFT sale to date, Beeple's \$69,346,250 sale at Christie's in 2021, where millennials accounted for 58% of the bidders (Christie's, 2021). The auction also reflected the global attention the NFT market has received yet being dominated

by the United States, with more than 55% of bids stemming from American bidders, 27% and 18% of bids coming from Europe and Asia respectively (Christie's, 2021). The average NFT buyer has an income of more than \$150,000 (reinforcing the idea of high barriers of entry), and viewing NFTs as a speculative investment for short-term gain (Butovich, 2021).

NFTs are traded on marketplaces, with some of the earliest being OpenSea, Rarible, SuperRare, AtomicMarket and Foundation (Bridget et al., 2021). There are both open marketplaces where any creator can upload their work to be sold, which includes OpenSea and Rarible, as well as closed marketplaces like SuperRare where creators are vetted (Bridget et al., 2021). Marketplaces also specialise in certain types of NFT categories: AirNFT focuses on esports and games, NBA Top Shot and Autograph trade sport-oriented NFTs, and NFT TONE is specialised in music. The list of marketplaces is seemingly endless, with new marketplaces emerging constantly. NFT marketplaces however differ from traditional marketplaces, in that they are essential in the creation of the product that is being offered, as they serve as the issuing authority of the NFT itself (Rennie et al., 2019). It is therefore somewhat understandable that a marketplace that generates the highest traffic would also be the most sought after when it comes to issuing, or in NFT vocabulary minting. This has led to a few marketplaces developing monopoly-like characteristics (Rennie et al., 2019). Such characteristics can become especially problematic for creative industries, once successful businesses move to exploit their positions (Rennie et al., 2019). These issues are further exacerbated by the fact that the NFT sphere remains largely unregulated, as potential policy implementations are currently at the proposal stage (Herian et al., 2021). While many Crypto-proponents like CryptoPunks CEO Cyrus Younessi argue that the NFT industry is too rooted in decentralisation preventing the emergence of monopoly-like companies (Brandom, 2022), OpenSea's massive growth amounting to a 600 fold-growth in 2021 alone (Clifford & Mathews, 2022) has resulted in the marketplace accounting to 90% share (Chalmers, 2022) of a market that boasted \$25 billion in 2021 (Howcroft, 2022).

Unlike other marketplaces, OpenSea does not participate in the vetting process of creators minting NFTs to sell on their platform, following a non-interventionist attitude generally assumed in Crypto-affiliated companies, or at the very least rejecting the idea of a human-controlled authority (Lustig, 2022). This has led to OpenSea falling victim to scandal, fraud and scam, with senior-ranking positions resigning over insider-trading (Gottsegen, 2021), millions of dollars lost through continuous phishing-scams on the OpenSea website and malicious emails (Bevan, 2022; Trend Micro, 2022), and most dramatically more than 80% of NFTs created through OpenSea's free-minting tool being stolen artwork (Pearson, 2022). This sheds some light on the dangers for the creation and creators of NFTs on non-vetted marketplaces, where recourse for stolen artwork, copyright infringement, and scamming and phishing is near-impossible, as OpenSea is merely a brokerage platform, and

once logged on the blockchain, transactions cannot be reversed (Heidorn, 2022). Vetted marketplaces on the other hand have managed to forego such issues. These marketplaces specialise in high-end and one-off digital artworks (NFT Tech, 2021). Vetting takes place in different forms: while SuperRare accepts applications from artists who then undergo a rigorous screening process to prove their identities as original creators of their work, Foundation takes a different approach where creators are not vetted in an application process but instead are invited to join the marketplace by existing creators (NFT Tech, 2021).

2.3 A counterpoint to NFTs: the (unusual) contemporary art market

While the NFT market has exploded within an incredibly short period of time, the art market has taken decades to get to the point where it is now. Although it could be argued that ancient Greece and Rome were the first examples of commerce centred around art, the art market that resembles the current model starts to emerge in the 16th century during the Renaissance (Minniti, 2015). Already then the market operated in two segments. The primary market was concerned with production and first-time sale of works, and its development was mainly linked to the development of artistic techniques and trends. The secondary market on the other hand focused on resale and collecting, and growth was linked to art dealing in Renaissance merchant cities. These market structures have survived to this day (aside from secondary market dealing being concentrated in Florence, Bruges or Antwerp). This dichotomy is the main tangent along which actors in the art market operate and through which tensions arise. These tensions increased with the further development of the market, which during the 20th century saw the shift from Paris and London as cultural centres, dealing mostly in Impressionism and Old Masters respectively, to New York after the Second World War where the focus shifted to modern art (Minniti, 2015). This change was significant, as in the 1970s the focus on art shifted from patronage to art as an alternative asset class (Minniti, 2015), introducing a new type of collector that was more interested in financial gain than cultural and artistic production. The introduction of collectors from Asia in the 1980s and 1990s brought a vast influx of new money into the market and saw the first auction sales of double- and triple-figure-million sums (Minniti, 2015). The turn of the century marked an important for the art market as the art world became more corporate: strides in digital development had democratised the market through making available historical price data, while art fairs had gotten sponsorships by UBS and Deutsche Bank. Expansions soon followed, both physically and digitally. The creation of digital marketplaces like Artsy contributed tremendously to the development of online art sales which grew from \$6 billion in 2019 to \$12.4 billion in 2020, in a market that boasts global sales of \$65 billion (McAndrew, 2022).

The at times sky-high sums collectors pay for works are not rooted in some type of easily ascertainable material or utility value, but instead works of art are appreciated for their intangible, symbolic and artistic attributes (Caves, 2000). In order for this value to take root, the market is contingent on an art world or field (Becker, 1982; Bourdieu, 1983) that places artists and their works in institutional structures that define the meaning and value of art (Velthuis, 2008). This has resulted in the emergence of localised art markets each with their own institutional fields that are made up of ecosystems containing artists, dealers, galleries, critics, museums, collectors, advisors (Velthuis, 2015a). Given the experiential and intangible nature art has as well as its consumption's social component (Bourdieu, 1986; Caves 2000) collectors have sought to engage with these ecosystems directly, reinforcing the localisation of market exchange patterns (Velthuis, 2015a). However, while the contemporary art market has become globalised, the cross-border flow of actual works and artists remains comparatively insignificant (Velthuis, 2015b), underlining the significance of these local ecosystems.

In line with the global expansion of contemporary art, the study of art markets has expanded as well, from focusing on art history to a more interdisciplinary field, combining sociological, anthropological and economic perspectives to study cultural production, venues and markets (Zarobell, 2021). This has been particularly useful to study the emergence of contemporary art accounting for the major share of the market in terms of value transactions, and identifying mechanisms like international art fairs and biennials for contemporary art amplifying its visibility and creating availability and access to a broader public audience (Zarobell, 2021). Within the art market studies stable dichotomies have emerged that have come to be viewed through a "hostile worlds" perspective, in which there is an apparent animosity between artistic production and commercial interests, embodied through dealers, pricing, and fairs (Velthuis, 2008). The ubiquitous nature of commerce in the art world has prompted research into how the cultural and economic dimensions of the art world intersect, and found that (what is at times cynically assumed) fairs and the market do not drive decisions of global cultural institutions, but rather conversely that fairs and markets actually respond to institutional developments (Baia Curioni et al., 2020). Further research regarding the influence of art world participants in driving the market have found that the market does at times play a vital role in driving developments: auction houses appear to be successful in framing categories in emerging market sectors (Archer, 2018). In this process, multinational auction houses have sought to consolidate regional art categories in a transnational market, which developed value through cooperative activity restricted to certain sectors of the art world in which local influences dominate (Archer, 2018).

Given that there is no clear driver, the art market is to be understood just as a cog in a broader system: a dynamic art system that designates certain participants with cultural or

economic value, however possessing an agency of its own (Baia Curioni et al., 2020). Following this, the art system can be seen as a mediating practice being carried out through specific institutional frameworks, and thereby exceeding traditional economic definitions of a market focusing on market agency centred around dealing the efficient allocation of resources (Baia Curioni et al., 2020). This idea can be taken further to what many art world actors feel, that they are operating in a unique, one-of-a-kind market. This is for example visible in the approach gallery owners long assumed, neglecting the relevance of management in their businesses due to the belief of operating in a secluded and insulated environment where inefficiency, market failures, bankruptcy, or digitalisation have no effect on them (Resch, 2011). This is also possibly where the hostile worlds perspective comes from, as the attempt to commercialise the gallery or art world is seen as an affront (Resch, 2014). Galleries see themselves as a myriad of things, such as talent agents who represent artists, tasked with the development of an artist's career through organising exhibitions, placing works in institutions, and through this create and grow an audience (Levey, 2021). This is solely situated in the locus of the primary market, in which galleries take on financial risk and resources to build markets for an artist. While in virtually any other market the main qualifier to buy a certain product is the ability to pay for it, galleries apply different qualifiers to potential buyers. Because the number of artworks is finite and scarce, galleries have to place works with the right buyers, which is why it is seldom that transactions are instantaneous, and instead require a lengthy process of getting to know the client and build a relationship (Levey, 2021). This happens through a vetting process, in which potential clients are assessed according to their collection, connections and intentions. This is perhaps best explained by translating this process into a different scenario. Take for example a car purchase, in which the buyer knows the model and cost, and is then asked by the dealer: "Let's get to know each other a bit. Where do you live, what's your neighbourhood like? What sort of cars do your neighbours drive? What other cars do you own, or have you owned? What sort of cars do your parents own? What do you plan to do with this car after you're done with it? Do you plan to sell it or perhaps donate it to an institution - and if so, what institution? Do you happen to be friendly with or related to anyone on the board of that institution?" (Levey, 2021).

This uncovers two points. The first is that there is a definite hierarchy in which potential clients are assessed to be suitable buyers. Institutions are a crucial element to build an artist's career (Levey, 2021), as they help build the reputation of an artist and raise awareness for their practice (Levey, 2021). This influences the long-term reputation of an artist, which is a big concern of galleries (Levey, 2021), so clients with connections to institutions are favoured. This is inextricably linked to the second point, which is that the gallery has a vested interest in what happens to work of art post-sale. Although after a work

is paid for possession transfers to the buyer, galleries try to influence this ownership: it is of little value that works sit in private homes or storages, as this provides no visibility, whereas institutional visibility is a major artist career driver (Levey, 2021). Institutions are also the safest place for works of art, and the hierarchy exists to deter speculation. This is why galleries often require signing a contract before transactions are completed, which will give them the first right of refusal if a work is to be resold (Levey, 2021). This is a large concern for galleries, as they want to control the circulation of the works of their represented artists, and because the secondary market for contemporary art is very lucrative, enabled by auction houses. Towards the beginning of this section it was described that the way art is judged is by its aesthetic and symbolic traits. These values are first set by galleries on the primary market. Auction houses on the other hand take the stance that these values can only be really confirmed once a work is being resold, to ascertain its 'true' or 'actual' value (Levey, 2021). This places auction houses in an antagonistic position to galleries, or in other words exemplifies the clash between the primary and secondary market.

2.5 An approach to understand actors and their relations: Actor-Network Theory (ANT)

Given the vast number of different actors that interact in a multitude of ways through various media in the NFT world and art markets, the following section will lay out the principles of actor-network theory (ANT). ANT posits that everything in the social and natural world exists in always-shifting networks of relationships. These relationships are situated in heterogeneous networks of different types of actors (Law, 1992). Actors, or actants, when usually considered to be human in nature, can refer to both human and non-humans in ANT, and so things become actants as well, and not only people but objects too possess agency (Alexander, 2020), such as speed bumps for example (Latour, 2005). This makes the theory particularly suitable to study and theorise the relational dimensions between artefacts (for example technology) and people (Cordella & Shaikh, 2006). Relationships are simultaneously material, or in between things, as well as semiotic, between concepts. These form the subjects of heterogeneous networks, which consist of a collection of diverse materials: people, machines, animals, texts, money, architectures, etc. This view assumes that all of our interactions with other people are mediated through objects of one kind or another (Law, 1992): non-humans are crucial participants in heterogeneous networks, and by implication in social relations. These social relations are held together by things (Latour, 1986), or to be more specific by things in relations between heterogeneous actors, arguing that human interaction alone cannot hold social relations in place (Jackson, 2015). The influence of human interaction to hold the social together has been decreasing due to the effects of industrial and technological advances, such as the agrarian revolution,

industrialisation, the advent of the internet, and led to the increasing interactions between humans and non-humans (Jackson, 2015). This has resulted in an enduring and stable social order in which relations are held in place by material objects (Jackson, 2015), underlining the influence ANT ascribes to non-humans in our social world. This is understood through the idea of the generalised symmetry, which treats humans and non-humans as a priori equal.

ANT was first developed as a method assemblage in order to study science and technology in social settings under the strand of science and technology studies (STS). The theory assumes that scientific knowledge and technology do not develop by themselves but that these fields in fact participate in social environments that facilitate building a world they envision in order to act and make others act in specific ways and vice versa (Chimenti, 2021). Latour utilised ANT in order to study the way technologies and material resources (such as chemicals and instruments) are converted into different types of “texts, theories, claims, artefacts to illustrate how inscriptions are made mobile and unchangeable for transportation across time and space” (Chimenti, 2021), and therein found that knowledge and information never travel by themselves (Latour & Woolgar, 1979). In *The Pasteurisation of France*, Latour (1988) describes how Pasteur’s scientific achievements were not the sole result of his cognitive genius, but rather the collective effort of the Pasteur network, consisting of many different elements, or actors and actants, in this case “laboratories, domesticated strains of bacteria, notebooks, statistics, [...] journalists, [...] politicians”, etc. (Callon & Law, 1997). Latour was able to map the network and understand their relations by employing an essentialist stance, and dismissing any a priori assumptions about the elements present. This essentialist stance underlies ANT; it rejects the idea that either objects or people in general determine the character of social change or stability and the idea that one drives the other (Law, 1992). This is to say that knowledge and power in our social reality have no singular impetus and are dependent on distribution by individual actors in chains of translation (Latour, 1986).

These chains of translation are a central element in ANT. This process is how different claims, substances, or processes are equated with one another (Callon & Law, 1982), enabling actors to produce ordering effects to negotiate and manoeuvre other’s interest to one’s own with the aim of mobilising support, also known as enrolment (Jackson, 2015). In order for actors to facilitate translation an intermediary or inscription device is required, which can transform and thereby perpetuate a material substance into figures or illustrations (Chimenti, 2021), essentially embodying translations into a different medium or material (Jackson, 2015). This process is essential to ANT, as it is able to show “how the morphology of specific truth claims and the representations of ‘the original substance’ can take on different forms while becoming embodied in texts, machines and other

intermediaries” (Chimenti, 2021). In doing so, translation builds an actor-world from different entities and attaches characteristics to them and establishes more or less stable relationships between them (Callon, 1986). These characteristics can be understood to contribute to a definition of roles, and therefore facilitates the distribution of these roles and placing them in delineations of different scenarios (Callon, 1986). The defining and distributing of roles is not a seamless process however: there can be resistance, challenges, undermining and destruction, when entities refuse their roles within the network or betray the role they have been assigned (Jackson, 2015). These reactions can lead to retranslation (reassignment of roles) or disintegration of the actor-network (Michael, 1996).

Describing the ways in which actors come (or do not come) to take on specific roles and identities within a network can help understand power relationships and positions (Callon, 1986), as translators can make decisions to silence, mobilise or ignore voices from the periphery (Chimenti, 2021). Translation is therefore not understood as a process that is unilateral, but instead multilateral, including both capturing and yielding of others (Michael, 1996). Power in ANT can be followed by analysing the methods and strategies that were utilised in the process by enrolling actors to ensure conformity of target actors and then negotiations that may take place between the actors (Law & Callon, 1992; Jackson, 2015). Power is therein not considered as something that is located in the self (Fox, 2000), but rather power, akin to agency, is considered as something that is distributed between actors within a network and that can arise as a result of collective action of the actor-network (Jackson, 2015). It is therefore perceived as relational, as actors gain their powers through sets of relations they construct with other actors, and thereby are considered as effects or outcomes of these sets of relations (Law, 1991).

It is however a fallacy to believe that it is humans who are the prime movers of relations within actor-networks: our stable social order and its relations are held together by quasi-objects, or non-human entities that are necessary for the collective to exist (Serres, 1982), or any object that passes through a social group, and which in doing so forms relations between members of that group (Carr & Downs, 2004). The emergence of social relations through an object is perhaps best explained by considering a game of football: while it may appear that the ball itself, the quasi-object, is being manipulated, it is in fact the players changing their positions according to how the ball moves. Thereby the ball creates relationships between them as the quasi-object circulates within the collective (Serres, 1982). Without the ball there is no game, and thus we can accept that humans are not necessarily the prime movers in relations (Valentine, 2002; Akrich, 1992). Latour expands on this notion, as he perceives the boundaries between humans and non-humans as permeable (Jackson, 2015). Latour argues that because associations between humans and non-humans are ubiquitous, all entities should be viewed as hybrids (Prout, 2000); that

entities do not exist in pure forms but are products of their associations, as quasi-objects (non-humans) and quasi-subjects (humans) (Latour, 1993). This serves to articulate the mutually co-constructive relationship between human and non-human (Jackson, 2015).

In more recent years ANT has been applied in a variety of different fields, including economics. In this context the term economisation has become utilised to map processes through which “behaviours, organisations, institutions, and [...] objects” are constituted as being economic (Caliskan & Callon, 2010). Within economisation, marketisation is concerned with the evolution of markets, how they differ over time, and the efforts actors go to assemble networks of heterogeneous actors constituting these networks (Pellandini-Simanyi, 2016). This marks a stark departure from studying and viewing the market as a singular entity from the outset, and instead considers marketisation an ongoing process of strategic arrangements of dynamic actor-networks (Kirkegaard, 2015). This enables research that does not only look to markets that are already stabilised and operating, but at efforts to establish “metrological systems, devices, norms, conventions, definitions, discourses” that may all eventually contribute a network, system, or other market-like modes of economic organisation akin to markets (Chimenti, 2021).

One way in which ANT addresses market modalities is through highlighting the role of controversies and their influence on economic organisation (Akrich et. al., 2002; Czarniawska, 2008; Chimenti, 2021). Chimenti (2021) argues that the market can be viewed as a forum in which commerce, politics, and community converge to confront interests and beliefs to negotiate conditions of exchange. Controversies therein provide entry points to these interests and beliefs and serve as a way to understand the formation and changing of markets caused by heterogeneous actors (Venturini, 2010; Blanchet and Depeyre, 2015), enabling the tracing of inconsistencies and presuppositions of routines and processes that may reveal failures in translation (Chimenti, 2021).

2.6 ANT in the art market

There are several intersections between ANT and contemporary art: the French curator Nicolas Bourriaud coined the term relational aesthetics to describe a tendency in art that sought to take as its theoretical and practical points of departure all of human and social relations within their context, as opposed to viewing them as independent and private spaces (2021). In this sense artists are seen rather as facilitators than makers, and art is regarded as information to be exchanged between the artist and their audience, through which ultimately the audience receives access to power and means to change the world (Halsall, 2016). While artists are described by Bourriaud as facilitators, their function is very much akin to that of a mediator within the process of translation in ANT. The fact that Bourriaud describes art as information from the artists' perspective, but as power from the

audience's perspective implies two things: first, the information only becomes power when it is accessed by the viewers post-translation, and second, that power resides within relations of human and non-human actors.

This relational aspect, and by implication the idea of the network, is very prominent within the art world. While ANT makes use of networks in order to trace the complex interdependence between science, technology, and society, the art market is equally interdependent: it is inherently dependent on networks of display and distribution for art to exist as art (Halsall, 2016). Foucault recounts how paintings by El Greco and Manet that appropriated motifs from High Renaissance and Renaissance masters were the first *actual* museum paintings, as they acknowledged in their paintings the substantial relationship of painting itself, as manifestations of the existence of museums, and the particular reality and interdependence that paintings acquire in museums (Halsall, 2016). This shows an awareness that the medium of painting relies on a historically configured network of protocols and references (Halsall, 2016), but furthermore points to other actors that provide a similar type of support that Latour (1984) described in the Pasteur network.

Another intersection can be observed when considering again the example of the ball as a quasi-object: in an art context art can be viewed as a token that gives access to a number of different systems of distribution and display, that essentially form the economic and institutional networks making up the support structure for contemporary art, such as the market, galleries, biennales, fairs, and more (Halsall, 2016). In the very same way in which there would be no game without the ball, there (quite obviously) would be no art world without art, and by implication no support structure either. Since objects are essential to the constant negotiation of social relations in ANT, art would therefore be considered as “the very substance of the networks that they are embedded [in] and from which they are inseparable” (Zell, 2011). Although this argues that art is the very substance of the network it is embedded in, this in no way means that it takes any precedence over other actors within the network; as ANT assumes the principles of generalised symmetry, in which no a priori distinction about humans and non-humans are made, and the flat ontology, meaning that no hierarchy between elements, agents, and things exists (Harman, 2010). This is particularly important, since ANT has therein shifted the judgement from taste and subjectivity, from “Is this beautiful”, to ontology, “Is this art” (de Duve, 1998; Halsall, 2016).

2.7 Bourdieu's capital

As the previous sections have outlined, actors within the art system have tremendous potential to enact influence and imbue other actors with power. Within the art market, power extends past the basic financial means that are generally associated with it, as for example galleries assessing potential clients beyond their ability to pay and instead applying different

qualifiers, considering their institutional links and social standing. This provides a fitting entry point for different conceptualisations of power and influence, such as Bourdieu's work on the capital he produced in line with his primary concern to study the dynamics of power in society. Bourdieu (1986) argues that "it is in fact impossible to account for the structure and functioning of the social world unless one reintroduces capital in all its forms" instead of solely focusing on the economic conceptions of capital. He argues that instead there are three forms of capital: cultural, social, and economic. Bourdieu's conception of economic capital does not deviate much from the traditional thought in that it represents material assets that are "immediately and directly convertible into money" (1986), such as commodities or property. While it is generally assumed that economic capital is the most crucial for smaller firms (Winborg & Landström, 2001; Brinckmann et al., 2011), Bourdieu (1984) argues that this is a "culturally grounded social construction" (Pret et al., 2015). This section will therefore focus on cultural and social capital, and give a brief introduction into their conceptualisations.

Cultural capital exists in three different forms: embodied (forming long-lasting dispositions of the mind and body), objectified (in the form of cultural goods), and institutionalised (a different type of objectification that assigns original properties on cultural capital that it is supposed to guarantee) (Bourdieu, 1986). Embodied cultural capital is linked to cultivation, a process built on self-improvement, that cannot, much like a suntan, be completed or achieved in an instant nor by someone else, and influenced by the time period, society, and social class, and is also acquired subconsciously over time (Bourdieu, 1986). It is therefore both a mix of passive absorption and conscious decision-making. This type of capital cannot be acquired beyond the person in the process of obtaining it, and is therefore inextricably linked to its bearer, making it fitting then that embodied capital is subject to passive hereditary transmission. Embodied capital is more invisible than other types of capital; it is less tangible regarding visibility when compared to for example the transmission of economic capital, like property. It therefore acts in a symbolic capacity (ascribing prestige, honour, social standing, etc.) and exerts authority in fields where economic capital is not the "legitimate competence" (Bourdieu, 1986), or what I previously referred to as qualifiers, such as in cultural institutions or organisations centred around generosity and welfare. This adds another element to cultural capital, as it allows its holders to "read in a world of illiterates" (Bourdieu, 1986), giving owners of this capital an advantage over others who do not have the economic and cultural means to "cultivate" themselves or their children. It is from this uneven distribution that specific effects such as the imposition of rules and orders for functioning within a given field take their roots.

Objectified cultural capital comes in the form of cultural goods. Bourdieu (1986) argues that these goods possess a number of properties that only exist through their

relationship with cultural capital in its embodied form. When cultural capital is objectified into a material object, such as writing, a painting, or a monument, its materiality becomes transmissible. To acquire and achieve possession of these objects an actor only needs economic capital, but to access and appropriate them in accordance with their purpose as defined by cultural capital, the owner must themselves possess or have access to embodied capital (Bourdieu, 1986). For example, being able to buy a great work of art does not automatically mean that the owner has access to the cultural significance this work may hold; they need to possess embodied cultural capital, the understanding or the tools to understand the work, to access the work's cultural capital.

Institutionalised cultural capital enables the objectification of embodied capital that was previously inaccessible (Bourdieu, 1986), or in other words invisible and materially intangible. This is most prominently applied to academic qualifications that are legitimised through certificates, which ascribe a similar inherent possession and non-transferability to their owner as present in the embodied state.

Social capital can be considered as the aggregate value of resources that are linked due to possessing access to a durable network of semi-institutionalised relationships, or "membership in a group", providing the group with credit to the collectively-owned capital (Bourdieu, 1986). These relationships can exist simply through the upkeep of practical or material purposes, or can be maintained by symbolic exchanges. Furthermore, they can take form in socially instituted forms, or through the application of a common name, such as a family name, a social class, tribe, or a school. The volume of social capital depends on the size of the network and the number of connections an actor can readily mobilise, as well as the amount of capital that the connected entities possess. This implies that social capital owned by a single actor is therefore never independent, because it relies on the concentration of it to derive the full benefit of a multiplier effect. Being a member in such a group can reward different types of profit: material profits that come from different services accrued from useful relationships, as well as symbolic profits which are derived from associating with rare and prestigious groups. The network of relationships is not a natural given, but is instead the product of tireless attempts at instituting relations, in which institution rites constitute the "essential moments that are necessary to produce and reproduce lasting, useful relationships" securing material or symbolic profits (Bourdieu, 1986). This means that establishing a network of relationships is achieved through continuous types of investment strategies, both individually and collectively, with the aim of directly using them in the short or long term to create or reproduce social relationships that can transform things like familial ties, the workplace, or the neighbourhood into "relationships that are at once necessary and elective" (Bourdieu, 1986). These relationships then require either obligations that are subjectively felt, such as feelings of gratitude, respect, or

friendship, or institutionally guaranteed concessions like rights. Obligations are traded between social institutions, such as a relative, brother, sister, or other type of entity like a knight, heir or elder. This symbolic constitution is endlessly reproduced through the exchange of obligations, like gifts or words or favours, which produces mutual knowledge and recognition. The exchange changes the obligation itself that was exchanged and can be viewed as a token of the group as it is used to reproduce the group's existence. Each member of the group is therefore a custodian of the group, as they are partaking in the maintenance of the network. Reproduction of social capital itself requires a continuous series of exchanges and efforts of sociability, that focus on the affirmation and reaffirmation of recognition, or in other words confirmation and reconfirmation of the legitimacy of social adherence to a group. This presupposes expenditure of time and energy, or economic capital, which is only profitable if invested in a specific competence or knowledge of relationships and connections along with the skill to utilise them, in addition to being able to maintain this competence. Profitability of this investment of accumulating and maintaining social capital increases proportionally with the size of the capital. But the social capital being accrued from relationships is much greater than this: actors who possess inherited social capital, which can be symbolised by a great name for example, are able to transform all of their circumstantial relationships into lasting ones, hence making sociability a highly productive tool to acquire social capital. Every group has institutionalised forms of delegation, in which the collective capital is concentrated and utilised to mandate a single actor or a small number of actors to represent the group. This also has a regulating capacity, as this mandate can also protect the group and excommunicate members who are threatening the group's capital, for example by tainting its social standing (Bourdieu, 1986).

3 Methodology

3.1 Designing research with ANT

The previous sections discussed ANT and how it intersects with contemporary art from a theoretical perspective. The following section highlights ANT's primacy as methodology and outlines the assumptions I have made in this thesis. This thesis sets out to study how the emergence of NFTs is shifting the art market infrastructure. I chose to study this subject because I am deeply interested in the art market, having worked in a gallery previously. In fact I was working at a gallery when Christie's hosted the Beeple auction which brought in a staggering \$69,000,000. This was the first time that I was truly stumped at an auction-record sale, and I imagine that this is the way people outside of the art-market react to record-breaking auctions, that I have gotten used to. I distinctly remember being in absolute disbelief, which prompted me to follow the subject of NFTs. On one hand I felt like it

was part of my obligation in my professional capacity working within the art market. But there was also something very enigmatic about NFTs that I did not understand, and I wanted to find out if my reservations could be alleviated if I understood the subject more. Several other participants in the art field have held similar reservations towards NFTs, the people that buy them, and what they can mean for their business and culture. But markets do not have fixed boundaries, they are instead fluid, part of our social fiction, and are performed and enacted by consumers everyday: since the market-boom more and more art world participants have embraced NFTs. This is reminiscent of ANT, in which actors are continuously defining their roles and relations to others, and (re)negotiating the boundaries of the network that is situated within broader organisational systems (Arias, 2021). This can lead to situations of friction and tension, which ANT would describe as controversies. And it is exactly this idea of a controversy that will allow studying the actors and their networks (or vice versa) to show how NFTs are shifting the art market. The thesis will follow Venturini's accounts and instructions (2010; 2012) on how to utilise the cartography of controversies to trace the shifts of actors and their networks. Following controversies will structure the analysis and allow attempts to "fully comprehend the many idiosyncrasies of markets" (Chimenti, 2021) by paying attention to the disputes and friction during the process of translations between and across actors and their complex associations (Bijker & Law, 1992; Akrich et al., 2002).

The controversy framework will be deployed within the design of a case study, which however deviates from the traditional understanding of what a case is. Generally accepted understandings of a case in social science research include the study of a single organisation, a single location, a single position, or a single event (Bryman & Bell, 2011). Case studies focus on a bounded situation or system, or entities with a purpose and possessing functioning parts. The actor-network that Latour describes is not such a bounded system; it is in constant flux and change and in a sense neverending, as in the example of Pasteur each next actor was situated within another network made up of different actors constituting another network, etc. But if we follow the idea of Bryman and Bell, that a case can be considered through a single event, then it is possible to equate and frame disputes in the translation process over roles, definitions and beliefs as a case. The controversy of how the NFT and art market intersect, and the frictions and debates that emanate from this controversy therefore constitute the case that is the subject of study. This is an appropriate design, as case studies are the preferred design to carry out the intensive examination of a setting (Bryman & Bell, 2011), which is similar to Venturini's (2010) account of observation which will be described in-depth in the following section. In assuming an intrinsic stance, I hope to understand and gain insight into the particularities of the situation surrounding these markets, instead of gaining insight into other cases or generic issues (Stake, 1995). The design of a case study also aligns well with the subject of the research: revelatory cases

centre around opportunities to observe and analyse phenomena that were previously inaccessible to scientific investigation (Yin, 1984). The NFT mania has sprung up only in the past year and their impact is very difficult to ascertain but within this short span numerous texts, articles, and books were written, symposiums, talks, and discussions held, and marketplaces, galleries, and organisations created that make it now possible to enter and conduct research within this field. These objects, events, and organisations have a dichotomous purpose in this thesis: on one hand they provide the material that is analysed, but they are also the subject of analysis themselves. They can be both actors acting as translators and mediators, but at the same time be inscription devices and quasi-objects or quasi-subjects.

The purpose of the case study is to produce an intensive examination of the controversy surrounding the NFT and art market, and is not concerned with generalising or extending the results to other populations. Instead the aim is to engage in a theoretical analysis through taking an abductive approach. An abductive approach focuses on the objective of “new things - other variables and other relationships.” (Dubois & Gadde, 2002). This seems especially relevant, as Venturini describes a methodological emphasis on discovery (2010), and the abductive approach being specifically interested in relationships that are prevalent in ANT. I further seek to find explanations for the shifts uncovered by observing the controversy as instructed through Venturini (2010; 2012) and ANT, with Bourdieu’s theoretical model of the capital. Bourdieu’s theoretical additions constitute an important addition: ANT and controversies instruct us to observe and practice second-degree objectivity, but Bourdieu argues that in cultural context there is no such thing as objectivity when it comes to hierarchical differences. Judgements about cultural distinctions, like distinguishing “between good and bad, refined and vulgar, sophisticated and common, [...] respectable and chavvy”, are used to reproduce social distinctions that set up boundaries and barriers making people belong to certain places and social circles and excluding others from the very same circles (McKinnon, 2017). Ultimately, these distinctions say more about the actor making the distinction than it does about the cultural objects or practices themselves (McKinnon, 2017). In this sense it is important to differentiate that this thesis is not interested in theory confirmation or generation; instead, following Dubois and Gadde’s account of the abductive approach the utilisation of Bourdieu’s capital is a part of theory development, a reconfiguration and modification of existing frameworks (2002).

It is important to again point out that ANT is to be understood as a method assemblage in this thesis (or as a methodology that can be a part of an assemblage), opposed to viewing it as a guiding theory. Without conceptualising and viewing non-humans to possess agency the shifts in infrastructure and network could not be detected accurately. However, in order to perform this observation and follow traces it is important to make

distinctions as to how ANT views agency of actors, and specifically give guidance into how to understand the agency of non-humans. Sayes (2014) even goes so far and argues that without understanding ANT methodology we cannot understand how it is that non-humans have agency. This is furthermore important as with ANT there is a semiotic addition and performativity which is grounded in material objects and how they interact. These distinctions therefore serve as a practical instruction to understand ANT's performativity in methodological application, and add to the methodological robustness of the research design. ANT prescribes to methodologically view non-human agency as 1) actions and capacities as conditions for the possibility of human society (Latour, 1993; Latour, 1996, Sayes, 2014), 2) mediators continually modifying relations between actors (Latour, 1999; Latour, 2002, Sayes, 2014), 3) vessels transporting morality and politics of the collective (Callon, 1991; Sayes, 2014, and lastly 4) gatherings of actors from other times and spaces through constant rapport and interaction (Sayes, 2014). These distinctions will guide the thesis' understanding of non-human agency and help pursue creating a coherent account of a complex assemblage that does not separate the natural from the social, economic, and political (Nimmo, 2011; MacLeod et al., 2019).

3.2 Tracing shifts: controversies as tools for observation

In order to limit any potential bias and personal idiosyncrasies I may have due to my experience working for galleries it is important to build a thorough understanding and toolkit of how to identify and analyse controversies. This is an important distinction, as it is vital to truthfully depict the actual controversy, instead of the controversy that I may perceive due to having "a horse in the race". The following section will therefore give a detailed account of Venturini's cartography of controversies (2010; 2012) on how to identify and observe controversies and provide the basis to build a rigorous framework that can withstand personal influence from affecting data collection and interpretation.

The cartography of controversies started out as a set of techniques to explore and visualise issues developed by Latour to train college students in the investigation of contemporary socio-technical debate in the context of and as a didactic tool for ANT (Venturini, 2010). Since then the scope has exceeded its didactic origin and the cartography of controversies has emerged as a full research method. At the heart of the cartography lies the exercise of creating devices to observe and describe societal phenomena, which entails no conceptual assumptions or methodological protocols (Venturini, 2010). In fact when asked about how to approach studying them, Latour replied: "just observe and describe controversies." (Venturini, 2010). This makes it sound almost too easy, which (unfortunately) it is not. Contained within Latour's "just" , Venturini identifies three consequences for studying controversies.

The first is that there is no specific theory or methodology required, and researchers are free to use every observational tool at hand, and mix them without restraint. This serves as the foundation to let surprises and curiosity guide notions and protocols, instead of the other way around. The second consequence is that the idea of impartiality being ensured because researchers follow and comply with a theoretical or methodological guideline is untrue, as observations cannot escape their origins. Objectivity can only be ensured through multiplying points of observation, in which the more numerous and partial the perspectives are regarding one phenomena, the more objective and impartial the observation of it will be. The third consequence is that researchers have to reconsider their attitudes towards their subjects of study. The cartography of controversies entails the idea that participants to social phenomena can be as informed as the researchers, because they are immersed in the research issue of interest. Researchers must realise that when it comes to art (which is of course particularly relevant in this thesis) “no one knows more than artists, critics, merchants, museum directors”, etc. (Venturini, 2010). When simplified, these consequences boil down to three guidelines:

1. No restraints to single theory or methodology when observing;
2. Observe from as many viewpoints as possible;
3. Listen to actor's voices more than researcher's own presumptions.

As previously discussed, controversies arise during instances in which actors disagree during the process of translation or during the definition and redefinition of roles, or in other words, controversies are instances in which actors agree on their disagreement (Venturini, 2010). Controversies can vary widely, but ultimately possess a number of different features that are shared between them. Controversies involve all kinds of actors, where actors are understood in the context of ANT. They are hybrid fora in which actors converge that would otherwise happily ignore each other, but are pitted against each other due to conflicting beliefs and interests. Due to these frictions, controversies display the social in its most dynamic form, in which seemingly indissoluble unitites can suddenly collapse: any actors can decompose in a loose network, and any network, no matter how heterogeneous, can come together and function as an actor. These frictions occur during situations in which old simplifications are rejected and new simplifications are still pending acceptance or waiting to be imposed. Controversies therefore often disagree on the disagreement itself. Arguments cannot easily be reduced to their most basic elements; the actors' disagreement is not confined only to the proposed answers to disagreements, but also spreads to the questions surrounding disagreements, making controversies reduction-resistant. This leads to debates being an essential part of controversies, as they mark the emergence of

conversations in which old ideas and things taken for granted are starting to be put in question; debates here are not to be understood only in their traditional and verbal sense. Controversies are thus conflicts, in which different actor worlds clash during the construction of a shared universe. They are not always issues of life and death, and can be trivial as well, but the actors involved take them seriously as for them the social hierarchy and social order of their world is at stake. At the heart of these struggles therefore always lies a contest for power; controversies are decided by the distribution of power (Venturini, 2010).

Knowing now the features of controversies, Venturini (2010) then gives a very detailed account on how to choose “good controversies” (detailed in the same sense as Latour instructed to “just observe”), and instructs to simply not choose bad ones. Bad controversies are constituted by being either cold, outdated, boundless, or underground; if a controversy possesses any one of these features it should be avoided. A cold controversy describes a situation in which there is harmony and a clear absence of debate, as actors have already agreed on the main questions that have been posed. A good controversy is supposed to be hot, meaning that there must be some type of action going on, and debates are in full effect. Past controversies are easily identifiable; they should be avoided as issues should be studied when they are salient and unresolved, because once agreements have been worked out and agreements have been reached controversies lose their interest. One should avoid boundless controversies due to the level of complexity they contain, as they are lively and open and it can be difficult to mobilise the resources to map debates that are simply too large; the more restricted a controversy is to a specific subject, the easier will be its analysis and mapping. Another complexity in analysing controversies appears when they are too underground, meaning that good controversies are observable and accessible, which is possible when debates are at least partially public. Confidential and classified issues, or peripheral issues surrounding sectarian groups can run the risk of drifting to conspiracy theories (Venturini, 2010).

After having chosen a “good” controversy by avoiding the characteristics outlined above, Venturini (2010) instructs how to employ different lenses for observation. Observation here is not meant to provide a holistic viewpoint, it instead seeks to multiply interferences and contaminants to map the cartography. In order to do this, researchers should switch their perspectives by employing a number of different lenses to focus their vision on different layers of the chosen controversy.

The first lense concerns itself with how statements are turned into different literatures. Every new statement, no matter how prominent or unimportant generates a response and triggers discussion. This prompts the departure from the field of established beliefs, norms, and routines and ushers in the negotiation and proposition of alternatives. It is important that cartographers recognise the complex mesh of relations among statements

in disputes: in order to find a core or centre of a dispute, cartographers map this web of references, revealing how statements are turned into literatures, which are often the subject of the dispute and controversy themselves.

The second lense focuses on the path from literature to actors. After mapping the webs of relations researchers then consider the connections statements create between different actors. When it comes to the subject of inquiring into who is an actor, it is enough to question whether absence or presence of something in a controversy would make a difference: if there is a difference which is perceived by other actors, then it is an actor, or in other words an actor is “anything doing something” (Venturini, 2010). Venturini uses the example of the monarch butterfly becoming the very representation of biodiversity after a study found they were threatened by transgenic crops (Losey et al., 1999). This shows how seemingly unimportant actors can move to the centre of controversies, and underlines the importance for cartographers to pay attention to all actors in the traditional sense of ANT.

The next lens shifts its focus from actors to networks, as there is no such thing as an isolated actor: they are always composed by and components of heterogeneous networks. Actors interact, shape relations and are themselves being shaped by relations, constituting a ceaseless process of tying and untying relations. Observations should therefore focus on the work, movement, flow and changes when looking at controversies.

Venturing away from networks the next lens considers cosmoses. Even though networks are dynamic and constantly shifting and changing, actors within them have a desire for some type of stability, meaning that actors seldom seek to destabilise networks just for the sake of destruction; instead there are underlying ideologies that motivate actors to participate in controversies to try and enact and facilitate their visions founded in ideology. These ideologies do not represent or describe the world as it is, but what an actor believes the world should look like. Whereas collective life is erratic and chaotic, ideologies are ordered and harmonious, and therefore are cosmoses and not universes. It is important to observe these cosmoses as they are what actors ascribe value to their actions and relations.

The final lens is what Venturini (2010) argues is the most complex lens, as it requires abandoning one of the most long-standing ideas of Western culture, the belief that, ideologies and controversies aside, there is some objective reality that is true in absolute terms. Following on from this, ideology and controversy are thus rooted in imperfections of human intellect: if all people could see reality as it really is there would be peaceful negotiations for our collective existence. This is on one hand too human-centric as this view neglects that not all actors are human beings, but also often leads to justifying absolutism, which actors claim to have privileged access to. The main contention of this idea is not that it is impossible for us to live in a common world, but it is not “something we come to recognise, as though it had always been here (and we had not until now noticed it.)”, instead Latour

continues that “if there is going to be one, [it] is something we will have to build, tooth and nail, together.” (2004).

These lenses enable the shifting of perspectives to understand all layers of a controversy. When working with controversies and ANT and deploying these tools there are two considerations. The first is the idea of second-degree objectivity (Venturini, 2012). This type of objectivity runs contrary to first-degree objectivity found in positivism, which assumes that there is an objective truth and describes a situation of a collective agreement. As described prior however, in controversies no one agrees, which is why this type of objectivity is unsuitable in this case. Second-degree objectivity on the other hand attempts to hone in exactly on the full extent of actor disagreement, through considering as much subjectivity as possible. The focus on the disagreement between the actors leaves little leeway for researcher bias to find its way into the data collection and interpretation, and acts as a type of deterrent for skewing observations. The second consideration emerges after having identified a controversy and mapped opposing sides. Generally an objective approach would prescribe equal treatment of both sides. However, as with many other things in ANT, this is not the case: instead, second-degree objectivity instructs to apply to each actor a representation that fits the position and relevance in the dispute and giving visibility to viewpoints according to representativeness, influence, or interest (Venturini, 2012).

Representativeness considers how many actors share a viewpoint: the more actors share a viewpoint the more visibility it deserves. Especially because ANT focuses on presenting as many viewpoints as possible, gauging the relative weight of sides within a dispute is essential. Further attention has to be paid to the influence of certain actors. Controversies have centres and peripheries, and not all positions within them are equal, as actors set out to fight to build and occupy influential positions for power to affect the actions of other actors. This is important as, naturally, actors with more power have better chances to shape controversies. While representativeness and influence address size and power, interest allows to focus on minority viewpoints that are often the very reason for the controversy itself. Even though they can be marginal, disagreeing viewpoints can always be interesting and offer original perspectives and question the status quo and taken-for-granted routines and structures.

3.3 Conducting, recording observations in the controversy following ANT principles

As instructed by Venturini, I followed his suggestion and set out to conduct observations of actors in the field, to ascertain how “artists, critics, merchants, museum directors” (2010) are situated in the controversy. Furthermore, I had to collect observation material through as many viewpoints as possible, which included conducting semi-structured interviews, attending art functions and following conversations (at different events, fairs,

exhibition openings, etc.), listening to artist talks and discussions around the topic, and gathering news articles and books written on the topic. The plethora of material that I found points to confirm that this is indeed a hot controversy: the debate is, with some exceptions, mostly public (considering that this is the generally secretive art market this says a lot), it is definitely not harmonious, current and in full effect, and confined to the NFT and art market, which can be argued to not be boundless.

I used convenience sampling when I started organising the interviews: this is a method in which researchers simply use samples that are available to them by virtue of accessibility (Bryman & Bell, 2011). The drawback for this method is that the findings are not generalisable; however, as I described earlier this thesis is not seeking generalisable results. Convenience sampling was possible for me to use due to my work experience in the field, and I was able to utilise this to reach out to old colleagues. After the first few interviews I then was able to employ snowball sampling, in which a small number of people are used to establish contact with further relevant groups for the study (Bryman & Bell, 2011). However, this sampling method is very human-centric, and implies a denial of agency towards non-human entities. But to my surprise without having to interfere or take action to change the sampling method myself, the interviewees assumed an ANT stance, most likely unknowingly, out of their own volition and did not only recommend and establish contact with other people, but suggested a wide array of different actors to consult, such as articles, talks, books, and events. This was useful in two ways: of course it provided material, but it also provided insight into what type of material these actors have used themselves to form their opinions, and how they go about this. (This becomes especially relevant when ascertaining relations between actors, and furthermore goes into the development of capital which will be outlined in section 3.4.)

In order to observe as freely as possible, it was important to remain flexible in my approach, which is why I opted for semi-structured interviews. The semi-structured interview has a degree of structure but allows “room to pursue topics of particular interest to the workers (Leidner, 1993), which is fully in line with ANT’s convictions about respecting and listening to the actors. It is further more suitable for research that aims to understand the actors’ world view without being guided by too many presuppositions or expectations, increasing the chance to see and understand and see things as the actors see them themselves (Bryman & Bell, 2011). In total I conducted ten interviews that were recorded and transcribed, of which four I conducted in person, four over Zoom, and two via telephone calls. For the interviews that contained a visual element I also recorded demeanour and behaviour by taking notes during the interviews, to collect data about what was not said. The reputation of participants in the art market is their bread and butter; due to the secretive nature and size of the art market all answers and participants were anonymised to retain and

ensure a study that is ethically compliant. Interviews within ANT are not always the formal tools as we are used to in traditional research; informal conversations, clarifying questions to elicit tacit meaning are essential parts of ANT interviews, but there are also additional elements that have more of an exploratory and didactic character (MacLeod, et al., 2019). For example, participant mapping requires participants to draw maps related to their specific practice of processes and steps involved (Fenwick & Nimmo, 2015). Another strategy is interviewing to the double, in which participants are asked to describe their work as if they were giving instructions to their doppelgänger to fill in for them for a day (Latour, 2015). I view these strategies as attempts to capture and observe macro and micro views of the networks, where I feel that due to experience and previous research the macro side of processes and practices does not deviate from participant to participant, whereas the micro side does. Due to this I put more emphasis on interviewing to the double, or at the very least kept this strategy in mind when interviewing, in order to elicit individual differences between the participants and gain the deepest and fullest observation possible.

Table: Outline of interviews

Participant 1	Gallerist	Zoom	58 minutes
Participant 2	Collector	Telephone	37 minutes
Participant 3	Gallerist	Stockholm	43 minutes
Participant 4	Publisher	Zoom	127 minutes
Participant 5	Gallerist	Stockholm	87 minutes
Participant 6	Academic	Stockholm	62 minutes
Participant 7	VC principal	Dusseldorf	52 minutes
Participant 8	Gallerist	Telephone	57 minutes
Participant 9	Artist	Zoom	54 minutes
Participant 10	Gallerist	Telephone	33 minutes

The semi-structured interviews were then supplemented with observations that I carried out during various social functions, such as exhibition openings that were all taking place in Stockholm, and events and receptions such as the Gallery Weekend in Berlin; all observations were made in 2022. These observations were a great addition to the interviews, as they presented the opportunity to collect information outside of the group of actors that I received access to with snowball sampling, therefore reducing the possibility of simply observing a nexus of people that are sharing similar beliefs and worldviews. The process of documenting these observations was however extremely difficult at times; sometimes conversations would take turns and it was difficult to remember all the points that

I had found interesting, and after long evenings to remember who said what, and accurately depict the notions and arguments. After some time I found it most effective to quickly step away and write down my thoughts and impressions on my phone, as for one my hand-writing is illegible, but it would also allow me to search for keywords when conducting the analysis later on. Rather than focusing on description and detail, ANT prescribes documenting how actors assemble, separate, and reconcile again (MacLeod, et al., 2019). This means following actors and observing their translations, or in other words documenting webs of significance in which ANT “conceptualises culture as inscriptions and materialities of all types, thereby expanding what is worthy of observation and description” (MacLeod, et al., 2019).

Lastly I sought out to collect a wide array of documents, textual and audio-visual, to mitigate the possibly Euro-centric perspective I may have recorded during the observations and interviews. Especially because the NFT and art market are the biggest in the United States this was an essential part of the data collection. This included more traditional documents, such as news articles, market reports, and policy papers regarding regulation of NFTs, as well as press releases and gallery and artist websites. Due to the NFT market being largely centred and organised through social media, it was appropriate to employ netnographic methodology as well (Kozinets, 2010), in order to collect video and social media material to capture how actors are influencing and being influenced in the controversy. Within ANT, documents are more than representations of the complex reality that produced them, and are to be viewed rather as technologies of translational mediation (Latour, 1994; Nimmo, 2011). This results in some practical considerations on what an ANT-led document analysis looks like, involving the formulation of a series of questions to help investigate the material, as described by MacLeod (et al., 2019): 1) Why is this document enduring/durable? 2) What work does the text do? 3) How are the humans in the document positioned in relation to the materials? 4) Which objects/humans/actions is this document connected to? 5) What effects emerge through this particular assemblage? An essential distinction is that actors are not using or controlling documents, but rather that they do things because of the things in their environment (MacLeod et al., 2019).

3.4 Explaining shifts through Bourdieu’s capital

After observing the controversy it became evident that this controversy embodied what Venturini described as actors disagreeing not only on answers, but the very questions that were connected to it. I then had to ask myself whether each sub-question was its own controversy, as these questions could be discussed in a non-NFT context as well. For example, debating who a good client is, or if selling via the internet is acceptable are discussions that the art market has been addressing for some time now. It was therefore

important to ascertain whether these questions are relevant and discussed under the umbrella of the NFT and art market controversy.

For this reason Bourdieu's theory on the capital comes in very handy, as it can hone in on specific actors that have had tremendous influence and explain how or why this has happened. This enables uncovering tendencies that run through all of the sub-questions within the controversy, constituting them as part of the umbrella instead of being their own controversies due to these shared characteristics. Bourdieu views culture as a site for class struggle, and through observing the controversy we can see why certain actors choose to pursue certain actions and use the distinctions of capital and their conversion to explain distinctions and actions (McKinnon, 2017). While ANT focuses on the actor-network and the relations between actors, Bourdieu can supplement this individual influence that is in some way missing in ANT.

Bourdieu is suitable in this regard given his work in the sociology of art perception. He describes three interdependent dimensions, forms or locales: the first being the artist and works themselves, which are material products produced by cultural workers, the second being a so-called social space which constitutes the local settings in which art works reside (museums, academies, cities) and overarching sets of relations in which the struggles over art occur, and the third being fields which are the audience that possess economic and cultural capital activating attitudes, artistic preferences, habits and cognitive competencies (Prior, 2005). These components serve to address what Bourdieu argues is a hierarchised system of cultural preferences that are "themselves generative of ideas, defining patterns of legitimation in culture at large" and find their root in social and economic fundamentals (Prior, 2005). Attempts have been made to create analytical frameworks to measure and address Bourdieu's capital by combining social network and multiple correspondence analysis (Elore, 2015), but these approaches neglect the agency of non-human objects, or quasi-objects and quasi-subjects, which is why ANT will be used to also ascertain the potential of non-human objects to possess and convert capital.

This is by no means a novel conflation; the work of Bourdieu and Latour has been conflated by many researchers. Prior (2008) uses Bourdieu and ANT in the field of contemporary music to understand the complex interrelations between industry, institution and practice. Bourdieu and Latour are again linked in a study of cultural production in the Middle East and North Africa by Lang (2019). Aside from cultural production, Kung (2015) problematises the individual influence of translators in the translation process (translation in the traditional sense of translating languages) and the impact of these translators working together as networks, using Bourdieu's analyses and ANT as a conceptual framework. The work of these two has also been subject of research as to why Bourdieu is underrepresented in STS, tracing similarities and differences in their work (Nelson, 2014).

3.4 Issues with coding and categorising: structuring the write-up for analysis

When it comes to establishing categories in the data to structure the analysis, the default technique for qualitative research is coding through the creation of schedules and manuals, argue Bryman and Bell (2011). One of the conditions for creating a functional and accurate schedule and manual is the formulation of coding categories that are mutually exclusive and prevent any sort of overlap. However, when looking at my data I find this hard to reconcile: as everything is nested within one controversy, arguments and data emanate from one another and are hence interconnected. I am not alone with my criticism about the instruction of stringent use of coding in research; Biernacki (2012) argues that social scientists of culture who claim advantage through coding apparatuses are “instead intuitive cultists without openly sharable procedure”. Biernacki’s grievance with coding stems from the absence, or in his words nonexistence, of natural kinds of categories that would enable meaningful contrasts (2012): researchers cannot argue that two artefacts are structurally similar and can be subjected to the same classificatory grid simply because “they look functionally similar from our way of life or happen to be found in analytically similar locations”.

The intertwined and entangled nature of the data is also reminiscent of Latour’s idea of translation: the transformative process through which actors combine and link with others (Shiga, 2007), or as Latour puts it, the creation of linkages that previously did not exist and that in a way modify two elements or agents (Johnson, 1988). This in no way fully ascribes causality, but definitely shows how narratives are interlinked and affective, rendering them difficult to code and categorise regardless of the inherent weakness the approach has as described above. This idea of a chain of translation (Latour, 1984) is in a way similar to how narratives are sequences and consequences of events (Riessman, 2002). Following narratives in the sense of personal stories I considered if this would be reconcilable with Venturini’s account of the controversy and debate, keeping in mind that personal stories would also have to extend to non-humans, and that they would also have narratives, or stories to be told. Life comes to us in the form of stories: in this sense narrative analysis is especially applicable as it accounts for diverse authenticities and the construction of coherence becoming increasingly diverse and interactive (Gubrium & Holstein, 1998). And in the same way that narrative practice pays attention to how storytellers give coherence to their lives (Denzin, 1989), ANT follows the chains of translation through which actors interact (Latour, 1984). Or to put it differently, like translation is a continuous process, so is storytelling an ongoing process of composition (Gubrium & Holstein, 1998).

I configured this approach to reconcile the storytelling of the controversy, and be cognisant of the coherence of the debate as I observed it. I therefore tried to “follow the

noise” of the controversy, being mindful that the loudest voices are not always the most important or interesting arguments, but nonetheless came from actors that received a lot of attention and were thus occupying prominent positions within the debate. Following the noise also helped to structure the write-up of the analysis, as this opened up an entry point into the chains of translation: problematisation (actors making themselves indispensable to others by pointing out that groups of interest exist), intersement (using seduction, force, persuasion to make others accept inter-definitions of problematisation), enrolment (of others in a programme of action), and mobilisation (utilising representational techniques and physical displacements to diffuse definitions of interests, goals and identities), which culminate into “the association, combination, and simplification of entities and the reduction of representatives to one or a few actors.” (Shiga, 2007). Given the intertwined nature of the data, following the coherence of narratives and the different steps in chains of translation will therefore structure the write-up of the analysis.

3.5 Considerations, challenges and limitations of ANT and Bourdieu

To say working with ANT was easy for me would be a lie; Latour put it best in a fictional dialogue between a professor and his student, who is having a hard time understanding that just because he found and described a network, ANT was not directly applicable, to which the professor responds: “Surely you'd agree that drawing with a pencil is not the same as drawing the shape of a pencil.” (Latour, 2004). Just describing things is not as reductionist as it sounds, and aside from its complexity there are other particular limitations ANT contains as an analytic framework and methodology. Following actors and observing and describing sounds easier than it is, and by choosing to follow and describe some actors, the researcher is unconsciously (or perhaps even consciously) choosing to leave other actors in the dark, that may enhance, impact, influence the actor-network in one way or another. This is what Venturini (2010) addresses, when actor-networks and their controversies are too wide in scope, as there can be too many actors to observe but there are too few resources to do so, which can run the risk of not accurately observing and depicting the actor-network.

Another limitation and criticism towards ANT also arises in relation to actors. If actors, and in ANT actors are assumed to, define themselves and others through their relationships this means that the actor-network is in a constant state of flux. If we therefore observe or describe the actor-network, we do so at a specific, singular moment in time, which critics have argued ignores historical modes that are connected to the organisation of political and economic structures (Ausch, 2000). However, we can assume that the relationships and the way in which actors relate to one another are in fact inseparable from

their lived experiences occurring outside of the network, which by extension would include their relations to their individual sociocultural, political, and economic contexts (Arias, 2021).

There are two main contentions and limitations when it comes to the work of Bourdieu. The first is that Bourdieu exclusively analyses the dominant principles structuring our society and excludes an analysis of social forces that seem to be strong enough to challenge the dominant forces, but are ultimately too weak to entirely displace them (Naidoo, 2004). Relying on these dominant principles is essentially like viewing the stills in a film scene at the beginning and end of a sequence of actions: we are unable to view the series of steps through which the initial action relates to the final action, rendering the process in which principles are produced and reproduced invisible to analysis (Naidoo, 2004). However, these tools do not prevent the incorporation of other theories and approaches; Naidoo (2004) suggests incorporating materialist approaches in this analysis, as this thesis has done with ANT to specifically understand how text or other materials act as devices and are able to act and influence things.

The second limitation of Bourdieu is that he ascribes little value and does not focus on the internal content of a given field; instead there is an “absolute substantive theory of arbitrariness” present (Li Puma, 1993), to the extent that the content of a text, painting, or theoretical development is so arbitrary that it could very well be replaced with something else that would serve the same purpose (Naidoo, 2004). Again ANT can be of aid in this regard, as within ANT such things are not easily replaced. Actors build relationships with one another; again consider the example of the football, if it were to be swapped out for another object, say an American football, the game may perhaps adapt to a different form, but the whole actor-network would be unmistakably changed, ascribing and underlining the importance of the content and subject.

4 Analysis

4.1 Approaching NFTs: understanding what they are

Without a doubt the loudest debate within the controversy was what to make of NFTs: are they art? Do they belong to the market? How should we understand them? This debate was not started by the NFT sphere however, but after the Christie’s auction where Beeple’s NFT fetched the highest price for a living artist, in which art market participants heard of NFTs for the first time, and became aware of their potential (Meier, 2021). But it quickly became apparent that this was in no way a debate along rigid industry lines; of course there were hard-liners on both sides, but the controversy opened in many different directions, including debates among actors from the same markets. This pointed to an important distinction that the omnipresent NFT-proponent, artist, curator, and writer Kenny Schachter

pointed out: “[...] my definition of the blockchain [has never] matched up with anyone else’s” (2021). Statements such as these were the start to employ Venturini’s first lens and observe how statements like this were turned into literatures or other devices that gained traction in the debate.

Several participants I interviewed referred to the notion that NFTs were first and foremost a technology (Participants 4, 5, 8, 9, 10), emphasising their utility to replace certificates of authenticity, stipulating conditions restricting secondary sales for a certain amount of time (Participant 10), and including a *droit de suite* element that would let artists share in any profits should secondary sales occur in the future (Participant 5). Certificates of authenticity are generally issued by galleries, which view themselves as legitimising authorities. One participant however pointed out that many galleries are prone to closing down due to limited sales and having to maintain a high-cost apparatus: “And what if the gallery closes? What then?” (Participant 8). This highlights the false sense of security gallery-issued and ephemerality certificates of authenticity possess, whereas certificates on the blockchain would last eternally (if we are to believe the promises of the Crypto-sphere).

Following this notion, it became apparent that the problematisation in this translation is mostly enacted and presented by firms providing solutions through the utilisation of NFTs, addressing issues that galleries have been dealing with for a long time. Problematising how certificates of authenticity and provenance can be easily forged, the blockchain and NFT provide the benefit of non-fungible, and certain authenticity. The NFT in this scenario therefore becomes an actor containing morals and politics (Sayes, 2014), by addressing moral obligations of galleries towards their artists and collectors. Self-fulfilling smart contracts further add to the actor’s agency by restricting further sales or triggering processes after certain actions are performed. Observing interessement through appeals to morals can be viewed as a type of soft-force; if collectors and artists knew there was a better way to protect their interests, galleries would be obliged to utilise them. The mobilisation of actors within the network would therein not only mean galleries legitimising this model, but the NFT with its inbuilt smart contract would have agency itself; acting as a vehicle for moral obligations and marketing potential. This is a scenario in which actors are attempting to redefine the roles of galleries, shifting the role of arbiters of authenticity from galleries to NFTs and their technological underpinning.

The enrollment and mobilisation of galleries is essential for the legitimisation of these services in aiding their goal to acquire a customer base situated within the traditional art market. This is because the service itself does not possess any cultural or social capital; instead they try to persuade and entice actors by promising an increase in economic capital, in order to gain access to the social and cultural capital these actors possess. On one hand this could mean access to the aggregate of the social capital of the actor-network, but also

result in NFTs becoming objectified cultural capital (although not physical it would still be considered a good that can be traded). For this conversion to take place, it would help if actors with embodied cultural capital, such as galleries in this case, would champion this cause, as only these actors can access cultural capital in this specific chain of translation.

Another element in the debate surrounding smart contracts and their agency an interesting distinction emerged when utilising Venturini's lens focusing on the shift from statements to literatures (2010) to observe how traditional galleries and NFT marketplace and blockchain operators spoke about secondary sales: gallerists referred to *droit de suite* (Participants 3 & 10), whereas NFT proponents spoke of royalties (DeNorch, 2021; Soares, 2021), marking a clear discursive divide. Whereas *droit de suite* is a term from and for the art world, royalties have a more general application and are understood in a more commercial context. The primary commercial aspect is underlined by NFT marketplaces, which suggest minting NFTs in higher edition numbers and lower prices to get them into circulation and increase secondary sales (DeNorch, 2021), conveniently omitting that they also receive royalties from secondary sales.

Employing a lens to view networks it becomes apparent that the circulation of NFTs also connects to them being used as marketing tools to raise awareness about an artist's practice (Meier, 2021), with the avid help from collectors: whereas in the traditional art market there is a distance between collector and artist, NFT collectors and artists are in close proximity and actively working together to promote their work and make money (Paula Fernandez, 2021), which could be viewed as a group of shareholders who have a vested interest in the performance of a company (Participant 6). The relevance of the community is also materialising in different physical cultural spaces, in which membership enables access to Discord servers, research papers, and other resources (Participant 8). NFTs are further configured as tickets for future events (Soares, 2021), such as giving access to exclusive events for certain token holders (Participant, 4). The artist Jonas Lund has gone so far and outsourced the decision-making process of his career to JLT (Jonas Lund Token) holders through a decentralised autonomous organisation (DAO) consisting of art world professionals and collectors (Lund, 2022), underlining the communal aspect of NFTs. The NFT as an actor serves as a gathering of actors from different spaces and engages in constant interaction (Sayes, 2014), and shifts the role of marketing and guiding an artist's career from the gallery as cultural agency to marketplaces and communities focusing on participation and shared decision-making.

The problematisation is thereby enacted by multiple different actors focusing on the power of the community. NFTs are used as inscription devices for *interessement*, giving access to exclusive events and becoming a member of the community, binding actors on social and economic levels, as actors are interested in shared success of projects. Once

actors have purchased an artist's NFT and been admitted to the community through joining a specific Discord server for example the enrolment process is completed. In all scenarios it becomes clear that the NFT acts as a quasi-object: without it no relations would be formed within the actor-network, as its circulation and existence are the network's *raison d'être*. This indicates NFTs as possessing agency with the capacity to act as a condition for the possibility of a society (Sayes, 2014), as at least for the actors involved, the processes of their society are governed by smart contracts and the blockchain, through which NFTs traverse.

We can view these communal actions as attempts to establish social capital paralleling that of the traditional art market, as aggregate social capital allows for building economic capital, as well as eventually stipulating conditions for cultural capital. Furthermore, through interacting with the community actors are able to accumulate embodied cultural capital that may be independent from the cultural capital of the art market: knowledge about an own vocabulary and processes inherent to the NFT sphere. However, Jonas Lund's DAO's decision-making board consists of actors from both markets, creating an interesting hybrid in which NFT works are being guided by traditional art market professionals that possess embodied capital and social capital to introduce Lund's work to the traditional market. This implies that institutional gatekeepers are in fact still needed, which runs contrary to what the NFT market has been claiming that they can be done away with (van den Dorpel, 2021).

The notion of NFTs as technology was brought up again when discussing with participants what would qualify NFTs to be part of their galleries' programmes by honing in on how statements turn into literatures; understanding literatures as devices that stand in for manifestations of conviction (Venturini, 2010). For participants 1 and 3 it was very important that NFT art contextualises and takes the technology as its subject, that the NFT is not simply a thoughtless extension of an artist's practice but builds on what has been previously done (Meier, 2021), and has a firm justification for being an NFT. This is for example visible in Harm van den Dorpel's series *Mutant Garden*, in which a new work is created every time a new block is added to the ETH blockchain by taking the current block hash and the birth hash as the basis for generation, and working with stipulations situated in the work's smart contract (DeNorch, 2021). This is an important distinction, as this is evidence of galleries already stipulating requirements for when they might want to start working with NFTs, marking a clear shift in the willingness to work with this technology.

The NFT in this scenario is an actor with a multitude of roles: serving as a relay device that translates incoming transactions into artworks, and thus displays a rigour participants identified would be reconcilable with their programmes. Understanding an oeuvre as a position in a programme, the NFT would therein become an inscription device

for galleries to display their values, a reflection of the embodied cultural capital of the directors who have central decision-making authority. A galleries programme would therefore consists of multiple quasi-objects, which legitimise a gallery's cultural capital, and at the same time provide evidence of their commitment to cultural production; this is why NFTs have to display the same type of rigour as the rest of the programme, so it does not seem like an NFT position is pursued simply due to the monetary hype that is currently attached to the market (Participant 1). This is indicative of how mediators and actors are constantly modifying their relations between actors (Sayes, 2014): additions to the programmes have to be seriously considered, any changes may affect reputation and therein the relational ties in the network.

4.2 Moving from understanding to selling

Another point of contention within the controversy was how, where and to whom NFTs and art are being sold and should be sold to. While the traditional art market conducts most of its business at art fairs, NFTs are predominantly sold on their own marketplaces. Recently these boundaries have diminished, and NFTs have found their way into art fairs and traditional gallery exhibitions.

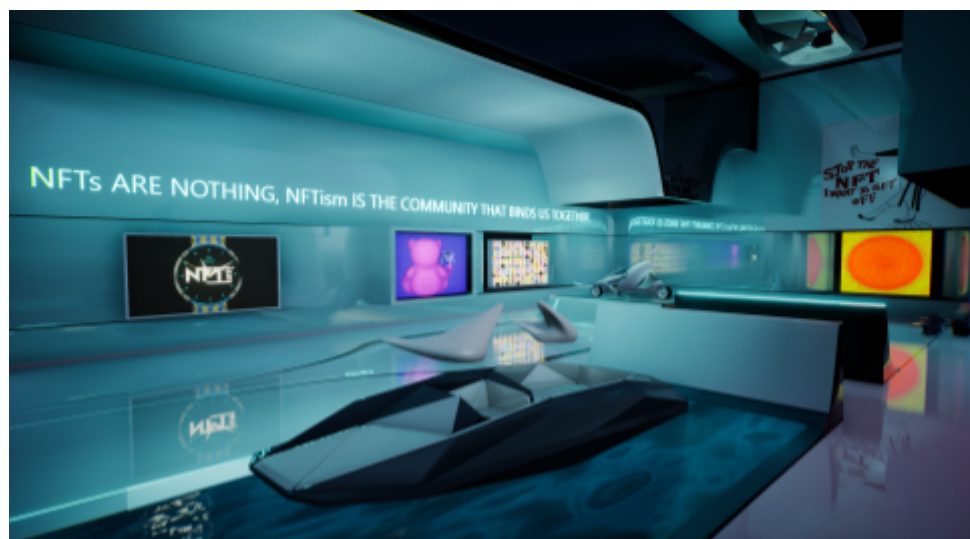
Employing a lens of focusing from actors to networks I observed a collaboration between Kenny Schachter and the gallery Nagel Draxler, who for their fair participation installed an LED wall presentation, or what they called a Crypto Kiosk, that led to an interactive gallery space situated in the Metaverse (Nagel Draxler, 2021). This was an extension from an exhibition that was organised prior to the fair, centred around "NFTism", a coin termed by Schachter encompassing everything Blockchain, Crypto, NFT, etc. For the



Nagel Draxler's Art Basel Miami Booth 2021 with the Crypto Kiosk on the right

fair Schachter and the gallery produced a watch that read NFTism, in conjunction with an NFT of the same watch.

The gallery elucidated the problematisation themselves, stating that NFTs will not go away, and there are two approaches to deal with NFTism: being purely affirmative and wanting to participate in the hype, or being creative and trying to make a difference (Nagel Draxler, 2021). In this instance not only the NFT is an actor passing through the collective and binding actors and building relations, but a human actor as well in the form of Kenny Schachter; together they form an interplay of quasi-object and quasi-subject. Although NFTs are not (yet) viewed as cultural capital by the traditional art market, Schachter firmly believes that it is, and is affirmed on that front within the actor-network he traverses in. The NFTism watches are physical embodiments of this belief, and become objectified cultural capital and part of the interessement process, representing the shifting and increasingly converging boundaries between digital and physical, which appeals specifically to actors viewing digital values becoming more relevant than real or physical values (Participant 8). Whenever speaking of embodiment and objectification it is not far off to consider that NFTs in this sense possess agency and act as vessels transporting the politics of a collective (Sayes, 2014). We can observe a shift in the market here, as previously galleries were being careful to not appear greedy or too focused on closing deals; even at art fairs booths were curated carefully to display integrity and a high-degree of conviction towards the arts.



Inside the Metaverse: Nagel Draxler's NFT booth

In this instance NFTs also serve as an entry point to the Metaverse, which provides the gallery with a very practical solution to physical limitations of art fair booths: there are simply no constraints regarding room and wall size to show and present works. Pursuing projects incorporating NFTs seems to follow along the tangent of the gallery possessing large quantities of social capital through which they can diffuse NFTs in their networks, on

one hand for conversion to economic capital, but also to hope to contribute building the canon of cultural capital within the traditional art world, as to their mission of finding creative ways to work with NFTs.

Following the lens of networks, more gallerists have taken the concept of the Metaverse further, and placed a more permanent emphasis on it. Gallerist Johann König announced that he opened his fifth gallery outpost in Decentraland. The upside for this is that there are no opening hours: I visited the gallery on a random Monday at 1:30 in the morning. Here we can see the agency of blockchain and NFTs in full effect, there are no sales staff or registrars required to facilitate transactions, unlike the lengthy transaction process that galleries have (Participant 8). These transactions further attract a different group of clients like Crypto-investors, who finally see a use case for their funds (Participant 8). Traditional investors are also enticed by fast processes and bypassing know-your-client, anti-money-laundering, and other vetting checks (Participant 7). When asked about his plans with NFTs, König stated that he wanted to become like Amazon (Schachter, 2021), coinciding with fears of art market participants that see the focus of NFTs on the side of the transaction (Participant 3).



The sun never sets in Decentraland: Galerie König in the Metaverse

In this scenario, the intention to become a marketplace like Amazon is translated in the problematisation to a focus around easy and instant access to NFTs, which as previously described, is often a lengthy and difficult process in the traditional art market. Interesement is omni-present; marketplaces and Metaverse galleries have no geographical boundaries and are free to be visited by anyone. The enrollment and mobilisation of actors is promising for them, as NFTs present an opportunity to invest in a new type of cultural capital for which it is not necessary to possess the embodied cultural capital of the art world. NFTs here present a type of non-human agency centering around the gathering of actors from other

times and spaces through constant rapport and interaction (Sayes, 2014). In this sense it also provides more access to new actors: Bourdieu conceptualises local settings of the social-space as physical (Prior, 2005): access therefore requires geographic proximity to institutions, through which we can understand the Metaverse enabling access to individuals not located in art centres. We can furthermore understand this shift as an attempt to activate attitudes and habits, which ultimately serve to generate new patterns to legitimise cultural capital (Prior, 2005). This marks a shift from the gallery as an institution and actor focused on cultural production that carefully picks out and vets collectors, towards the gallery becoming a sort of marketplace actor simply focused on closing deals.

If art and NFTs will increasingly be viewed through the Metaverse, how are we to understand the implications for their display and the absence of their physical presence? This is bound to shift the actor-network from what was previously in place for physical works in which traditional elements like canvases, paper, sculptural media were assembled for display with nail and hammer, to square displays; already the NFT surge has led to shortages of the popular Samsung frame model (NFT Culture, 2021), as well as more standard square displays (van den Dorpel, 2021). This may potentially also shift actors who were previously at the core of the actor-network such as fine art shippers and logistics providers to the periphery, as they will no longer be needed; any display can display any NFT.

The whole shift of the network repels certain actors who previously were sharing the actor-network with galleries such as König, but may now see conflicting values in their embodied cultural capital: when not contextualised NFTs are just a silly hobby for uber-rich people (Participant 1), and lack discussion, depth and thoughtfulness (Participant 2). Furthermore has this shift in the network led to the disappearance of humans from transactions, further alienating actors with differing ideas of cultural capital, as participant 2 criticises the rampant anonymity in the market and lack of a figure standing behind projects. This posits that in order to facilitate sales, for some actors a degree of social capital is required, that may assuage doubts or anxiety during the transaction process. The adoption of the technological infrastructure may also be a hindrance to certain actors, as the art world is slow to digitise (Participant 3). This could lead to the establishment of harder boundaries between different actor-networks that differ in their utilisation of technology; networks depend on actors being able to traverse boundaries, but if nodes are incompatible such traversing will not be possible.

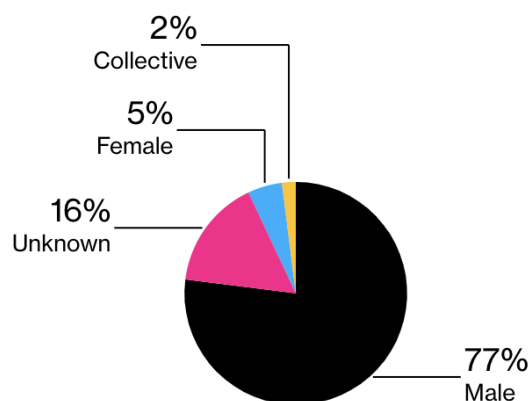
Another consequence of this shift has been on digital and net artists that do not want to work with the blockchain, NFTs, or the Metaverse arguing that NFTs are not the only way for media art to enter institutions (Participant 9). Artists have been making digital art for years and built up social capital, by receiving followers and attention and recognition for their

work. By making digital art financially tangible and ownable, the network creates an actor out of the NFT that is pushed to the centre of the network, and makes it possible to convert the social capital into economic capital. Artists that do not see their work turned into NFTs are therefore pushed to the periphery and increasingly excluded from the community (Participant 9), leading to the creation of a strong new actor-network for participants of NFTs with a financial support structure, and the gradual disassemblment of the actor-network for artists not working with NFTs. This points to the idea that objectified cultural capital that is firmly rooted in a capacity for economic conversion receives more attention and value than the inverse, regardless of how valuable a specific work may be in terms of its purely cultural value.

4.3 Implications of NFT diffusion

After understanding how NFTs are conceptualised from different actors in both markets and observing how they are sold, there were several implications that arose from the diffusion of NFTs. Having employed lenses to observe statements, actors, and networks, these eventually culminate into cosmoses, in which beliefs and views about an actor's ideal world are held (Venturini, 2010).

For a long time the art market has been trying to address its diversity problem, and in recent years seen a push for increased representation for the work of female, LGBTQIA+, and BAME artists (Brown, 2020) in an effort to curtail its patriarchal dominance (Higgie, 2021). Although still having ways to go - there are only two African-American gallery owners in the Art Dealers Association of America with 176 members - slow progress is felt, as 51% of artists who received gallery representation in North America were non-white, 52% identified as female (Brown, 2020). The NFT and Crypto-market present a type of reversal to this, as the majority of artists and collectors are predominantly white men. This is in part no



Source: Art Tactic NFT Art Market Report 2021

surprise, as the NFT market is a convergence of two historical white and male dominated industries, visual arts and Crypto (Maltby, 2022). While 77% of sales go to male creators, 5% go to women (Art Tactic, 2021). 90% of total value rests in the NFTs of the top 25% of artists who are predominantly white men from the global north (Art Tactic, 2021). This seems to have materialised on the demand-side as well: NFTs with female portraits are likely to be less valuable than their counterparts with male portraits (Maltby, 2022). This divide is not set to slow down, as the bigger the market becomes, the higher inequality becomes among both buyers and sellers (Participant 6).

In this instance there is a clash of cosmoeses in the controversy that centres around the belief for inclusivity and diversity in the art market (although little has been done to show it), and claims of the NFT market to liberate all artists, achieve democratisation, and be accessible to anyone without having to be in geographic proximity to global art centres. The problematisation is posed by the art market, arguing that its market is the one striving for inclusion, while the NFT side argues that institutional gatekeepers are the structural cause for the exclusion of certain groups. Some argue that there will always be exclusion, as NFTs are lowering the barriers for participation in the market: it is a lot easier to mint NFTs than to get paintings into a commercial art gallery (van den Dorpel, 2021). Interessement is provided through persuasion of economic profit on both sides; however, only in the art market enrolment actually provides evidence for the increased representation. The agency of both traditional art and NFTs is situated in being vessels transporting morality and politics of a collective (Sayes, 2014). By involving morality, the vessels are weaponised to serve in what Bourdieu views as the class struggle for culture, and appeal to the attitudes of the separate audiences which are ultimately to be used to legitimise the respective markets in their notions of cultural capital. Seeing the increased participation of galleries with NFTs and marketplaces, this could mean a shift back to undoing some of the progress the art market has seen.

The act of weaponising morality can be observed again in the debate surrounding sustainability: especially participant 3 highlighted their reluctance to consider working with NFTs due to the excessive energy consumption of the ETH blockchain. This debate has also long been discussed in the art market, with calls to reduce carbon emissions specifically targeted towards galleries and art fairs (Participant 3), which eventually resulted in the establishment of the Gallery Climate Coalition dedicated to tackling this issue. However, there is a lot of resistance arguing against the sustainability concerns for the Crypto-industry, either arguing that it is overblown (Lee, 2022) or stating that if one considers the sustainability side of the Crypto-market one is automatically saying that Cryptocurrencies are a money laundering scheme and negating tens of millions of people that use it as a tool to escape monetary repression, inflation or capital controls (Carter, 2021).

While art can hang on a wall without having to consume energy, NFTs are inherently bound to this consumption: their creation requires energy for minting, their transaction requires energy for processing proof-of-work mechanisms (at least on ETH), their storage requires powering servers, IPFS, or other alternatives, and their display on screens requires to be plugged into sockets or charging devices, tracing an actor-network with a support structure firmly centred around energy. This has led to the emergence of more sustainable blockchains on which NFTs can be minted and traded, such as Tezos or EOSIO, that use the proof-of-stake mechanism for their consensus algorithm. In this instance the agency of the NFT is pushed to the periphery of the network, and the main actant is the blockchain; it is the subject of the main concern for actors concerned within the cosmos of a sustainable world.

One reason actors pursue this shift is observable when following along the tangent of consumption attitudes of different audiences. Sustainable blockchains have long been wanted by actors in the market (van den Dorpel, 2021; Nagel, 2021), and rewarding their attitudes may see an increase in economic capital, as more artists and consumers are willing to mint and facilitate transactions through greener blockchains and marketplaces. Conversely, the aggregate social capital of actors in the network demanding a shift from proof-of-work to proof-of-stake mechanisms may have had a bigger impact than the promise of increased economic capital, as these actors' cosmoses see networks operating at near zero energy consumption levels (Calma, 2021). The NFT is only a side-line actor in this case, and the blockchain infrastructure possesses the central agency to not only host different types of applications and power their deployment, but stand in for the realisation of the vision of actors. Non-human agency is displayed in the first instance as providing the possibility of a (future) society, and, because this is being observed through the lens of cosmoses, as a vehicle for moral and political beliefs that are ingrained into and by the actors of the network.

5. Discussion

Having performed observations and presentation of the different data, this section focuses on the discussion of findings in the analysis.

It is indeed the case that NFTs are shifting the art market, or at the very least are having a transitory effect for the market boundaries of the markets. While some traditional art market actors already have projects and efforts underway to capitalise and work with the current hype, it seems that the NFT market only needs the traditional market to a certain extent. This was especially visible when observing the community aspects surrounding individual artists and marketplaces, and how close artists and collectors are working together to grow and circulate a practice, work that would traditionally be performed by a gallery in a sense. Conversely to the art market where the mention of speculation and investment into

art is seen as an affront, the NFT market embraces this and capitalises on its capacity to ensure profitability for both artists and collectors. Traditionally, this would point to the notion of what the art historian Wolfgang Ulrich termed “Siegerkunst” (German for “victory art”) (2016): art that reaches astronomical prices is used as a status symbol to display wealth and success. While this may also be the case for some actors in the NFT market, the actors I observed in the controversy saw this as a way to support artists and educate themselves and others through a community effort. This may stem from a felt alienation from the traditional art market; NFT collectors certainly have the financial means to participate, but often lack the required embodied cultural capital. This points to a distinction on two fronts. The first is that barriers of entry are not always to be understood in economic terms. The second is that there is also no such thing as a distinct, global set of values that define cultural capital; instead the NFT market seems to be in the process of developing its own definition of roles, processes, and content they deem as culturally valuable. Some of these values are also shifting old-held notions about secondary sales and the market, making it unviable for traditional art market participants to simply ignore the technological benefits NFTs can have for droit de suite and certificates of authenticity. This led to another interesting point, which I had not anticipated prior. When I approached the controversy I was expecting debates between markets, not within them. However, there were disagreements between NFT artists and their marketplaces, as well as disagreements between galleries as to how to embrace the NFT world.

The distinctions about beliefs and values was mostly observed in the way NFTs as actors displayed their non-human agency: aside from the regulating agency that smart contracts contain, most of the time they were performing a role as vehicles for morality and politics, and represented the cosmic beliefs of the networks. While Sayes (2014) argued that there are four distinct categories for non-human agency, it seems that they are connected and influence one another. For example, if non-human agency is present as a condition for a society to exist, that society must have a set of values, morally and politically, it rests upon. These are inherently connected then to the vessels that Sayes discusses. When these vessels are then further the subject of facilitating the gathering of actors from other times and spaces through interaction, their performativity serves to reinforce the communal ties that make up a society. When viewing this from the perspective of ANT being able to not only observe markets at the existing stage, it is possible to link this to Halsall’s description of how systems of display and distribution are interdependent (2016), where it seems that non-human agency is interdependent and required for the formulation of a market that rests upon technological processes to exist.

The interdependence of non-human agency further linked to the interdependence of Bourdieu’s conception of the three different forms of capital. Any action within actor-networks

that I observed were pursued to convert one type of capital to another. The NFT market primarily sought to convert its vast economic capital in the form of Cryptocurrencies through making digital assets financially tangible and converting them to objectified cultural capital to legitimise this product diversification. However, it is not only economic capital that entices actors, but also the force of aggregate social capital, as for example observed in NFT communities. Adorno and Horkheimer (2016) addressed this when describing how the culture industry will be appropriated for mass consumption and reproduction, and there are some parallels that can be drawn here. Their term culture industry incorporates the Marxist definition of cultural forms such as paintings to be equated with conventional consumer products, and it is therefore not an abstract body but instead the result of social and economic conditions in society (Mambrol, 2016). Given that with a bit of knowledge and tokens NFTs are bought and transacted with ease and separated from the lengthy and vetting buying process of traditional art, NFTs become just another consumer product that is easily bought in a store. This is especially relevant, because the easier it becomes to buy a good the more likely it is for consumers to follow through with the transaction (Anwar et al., 2021). When following this idea it is possible to view the efforts of the NFT and Crypto-market as attempts to use cultural capital for diffusion of innovation and ultimately gain wide-spread adoption of blockchain technologies. This is described in Roger's account of how culture is used to spread innovation through human society, by communicating uptake through social contacts and networks (Ali & Miraz, 2015). Linking back to Bourdieu we can therefore see how aggregate social capital is used to enrol actors into NFT networks in order to diffuse notions and values about blockchain technology and accelerate its adoption.

6. Conclusion

This thesis concerned itself with tracing how NFTs are possibly shifting the art market, and to inquire why these shifts are taking place through understanding them by following the conversion of different forms of capital as evidence for actor motivation. NFTs may not be considered incredibly novel anymore, but their existence was only registered by the art market in March 2021, which marked the beginning of the controversy on how to possibly reconcile these two seemingly disparate markets. This thesis is therefore a first attempt at observing the controversy surrounding these markets, and found that NFTs shift the art market in several ways, affecting notions and ideas regarding proximity between artists and collectors, and their roles in facilitating and participating in the secondary market, providing solutions for problems the art market has had no answer for. Furthermore, some gallery actors are observed to shift away from cultural agencies to more profit-oriented marketplaces. Achieving the financialisation of digital assets, artists active in digital and net

art that do not want to work with NFTs are seeing their communities dissipate. Lastly are NFTs responsible for clashes between belief systems around diversity, inclusion, and sustainability: while the NFT market marks a reverse shift to art market efforts for diversity, the art market may possibly accelerate the urgency to shift to developing and implementing greener blockchains to more sustainable minting and hosting practices. While NFT actors are observed to mainly attempt converting their vast Crypto-economic capital into cultural and social capital to accelerate wide-spread adoption of the blockchain through cultural diffusion, the art market is seen to leverage its cultural and social capital for more economic capital.

Instead of observing the whole controversy surrounding these two markets, further research could focus on observing and analysing single blockchains and their actor-networks to determine just how exactly actors come to their positions, and follow singular chains of translation to elicit a clearer understanding of actor-networks operating within the market. Furthermore, future research could look into the connection between ANT and Bourdieu's capital. Specifically, research into the boundaries of what is determined as cultural capital and how social capital can be leveraged in certain networks more than others would be interesting, as there seem to be multiple enclaves as actor-networks in which these types of capital have a more dominating role than others.

7. References

- Adorno, T.W. & Horkheimer, M. (2016) *Dialectic of Enlightenment*, London: Verso Books.
- Akrich, M. (1992) The De-scription of Technical Objects, In: Bijker, W. E. and Law, J. (Eds.) *Shaping Technology / Building Society*, MIT Press: Cambridge, MA, 205-224.
- Akrich, M., Callon, M., Latour, B., & Monaghan, A. (2002). The key to success in innovation part I: the art of intersement. *International Journal of Innovation Management*, 6(2), 187–206.
- Alexander, J.C. (2020) The performativity of objects. *Sociologisk Forskning*, 57(3–4).
- Ali, M. & Miraz, M. (2016) The cultural impact of diffusion of IT innovation in World Society. *Proceedings of the 2015 International Conference on Recent Advances in Computer Systems*.
- Anoica, Andra & Levard, Hugo (2018) Quantitative Description of Internal Activity on the Ethereum Public Blockchain. 1-5. 10.1109/NTMS.2018.8328741.
- Anwar, U. et al. (2021) Benefits and risks of online shopping with consumer's perspective: A case study of pakistan. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 11(1).
- Archer, A. (2018) Genesis of an Auction Sale Category: Sotheby's Inaugural Auction of "Contemporary Chinese Art." *Journal for Art Market Studies*, 3.
- Arias, M.P. (2021) *Social Media and Museum brands as networks: An actor-network theory study of the Manchester Art Gallery*. dissertation.
- Art Tactic (2022) NFT Art Market Report – November 2021. *ArtTactic*. Available at: <https://arttactic.com/product/nft-art-market-report-november-2021/> [Accessed May 15, 2022].
- Ausch, R. (2000) Book Review: 'Pandora's Hope: Essays on the Reality of Science Studies'. *Mind, Culture, and Activity*. [Online] 7 (4), 312–319. [online]. Available from: https://doi.org/10.1207/S15327884MCA0704_05

Baek, C. & Elbeck, M. (2014) Bitcoins as an investment or speculative vehicle? A first look. *Applied Economics Letters*, 22(1), pp.30–34.

Baia Curioni, S., Equi Pierazzini, M. & Forti, L. (2020) Philosophic money. the contemporary art system as a market and cultural agent. *Arts*, 9(4), p.110.

Bauman, A., Chang, J. & Chakrabarti, M. (2021) How non-fungible tokens are digitally disrupting the future of Art . *How Non-Fungible Tokens Are Digitally Disrupting The Future Of Art | On Point*. Available at: <https://www.wbur.org/onpoint/2021/03/16/how-non-fungible-tokens-could-alter-the-future-of-digital-art> [Accessed May 15, 2022].

Becker, H. S. (1982) *Art Worlds*. Berkeley: University of California Press.

Bevan, R. (2022) \$1.7 million worth of nfts have been stolen from OpenSea users. *TheGamer*. Available at: <https://www.thegamer.com/nft-stolen-scam-opensea/> [Accessed May 15, 2022].

Biernacki, R. (2012) *Reinventing evidence in Social Inquiry: Decoding facts and variables*, New York: Palgrave Macmillan.

Bijker, W.E. & Law, J. (1992) *Shaping Technology, Building Society: Studies in Sociotechnical Change*, Cambridge, Mass. u.a.: MIT Press.

Blanchet, V., & Depeyre, C. (2015) Exploring the shaping of markets through controversies: Methodological propositions for macromarketing studies. *Journal of Macromarketing*, 36(1), 41–53.

Boucher, B. (2021) A group of financial traders torched a \$95,000 Banksy on camera to transform it into a (maybe) more valuable nft artwork. *Artnet News*. Available at: <https://news.artnet.com/art-world/financial-traders-burned-banksy-nft-1948855> [Accessed May 15, 2022].

Bourdieu, P. (1983) The Field of Cultural Production, or: The Economic World Reversed. *Poetics*, 12 (4–5): 311–56.

Bourdieu, P. (1984) *Distinction: A social critique of the judgement of taste*. London: Routledge & Kegan Paul.

Bourdieu, P. (1985) The Market of Symbolic Goods. *Poetics*, 14(1–2): 13–44.

Bourdieu, P. (1986) The forms of capital. In J. Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education* (New York, Greenwood)

Bourriaud, N. (2021) *Relational aesthetics*, S.I.: Sternberg PR.

Brandom, R. (2022) How one company took over the NFT trade. *The Verge*. Available at:
<https://www.theverge.com/2022/2/2/22914081/open-sea-nft-marketplace-web3-fundraising-finzer-a16z> [Accessed May 15, 2022].

Brinckmann J, Salomo S and Gemuenden HG (2011) Financial Management Competence of Founding Teams and Growth of New Technology-Based Firms. *Entrepreneurship Theory and Practice* 35 (2): 217-243.

Brown, K. (2020) Dealers say they want to diversify their rosters. A look at their newly signed artists shows progress-up to a point. *Artnet News*. Available at:
<https://news.artnet.com/market/artist-representation-equity-1919328> [Accessed May 15, 2022].

Bryman, A. & Bell, E. (2011) *Business research methods*, Oxford: Oxford Univ. Press.

Butovich, Z. (2021) Are nfts the next wave of Collector's items? most still unsure what they are. *CivicScience*. Available at:
<https://civicscience.com/are-nfts-the-next-wave-of-collectors-items-most-still-unsure-what-they-are/> [Accessed May 15, 2022].

Caliskan, K., & Callon, M. (2010) Economization, part 2: A research programme for the study of markets. *Economy and Society*, 39(1), 1–32.

Callon, M. & Law, J. (1997) After the Individual in Society: Lessons from Collectivity in Science, Technology and Society, *Canadian Journal of Sociology*, 22, 2: 165-182.

Callon, M. (1986) Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of Saint Brieuc Bay, In: Law, J. (Ed.) *Power, Action and Belief: A New Sociology of Knowledge?*. Sociological Review Monograph / Routledge and Kegan Paul: London, 196-233.

Callon, M., & Law, J. (1982) On interests and their transformation: enrolment and counter-enrolment. *Social Studies of Science*, 12(4), 615–625.

Callon, M. (1991) Techno-economic networks and irreversibility. *The Sociological Review*, 38(1_suppl), pp.132–161.

Calma, J. (2021) The climate controversy swirling around nfts. *The Verge*. Available at: <https://www.theverge.com/2021/3/15/22328203/nft-cryptoart-ethereum-blockchain-climate-change> [Accessed May 15, 2022].

Cao, B. et al. (2020) Performance analysis and comparison of POW, POS and Dag based blockchains. *Digital Communications and Networks*, 6(4), pp.480–485.

Carr, A. & Downs, A. (2004) Transitional and Quasi-Objects in Organisation Studies, *Journal of Organisational Change Management*, 17, 4: 352-364.

Carter, N. (2021) How much energy does Bitcoin actually consume? *Harvard Business Review*. Available at: <https://hbr.org/2021/05/how-much-energy-does-bitcoin-actually-consume> [Accessed May 15, 2022].

Caves, R. E. (2000) *Creative Industries: Contracts between Art and Commerce*. Cambridge: Harvard University Press.

Chalmers, R. (2022) Footprint analytics: Will looksrare overtake OpenSea? *Yahoo! Finance*. Available at: <https://finance.yahoo.com/news/footprint-analytics-looksrare-overtake-opensea-100004405.html> [Accessed May 15, 2022].

Chimenti, G. (2021) *Performing Ambiguity? Following Multiplicity in Shared Mobility Markets*. dissertation.

Chow, A.R. (2022) Ethereum's Vitalik Buterin is worried about Crypto's future. *Time*. Available at: <https://time.com/6158182/vitalik-buterin-ethereum-profile/> [Accessed May 15, 2022].

Christie's (2021) Results: Beeple's purely digital NFT-based work of art achieves \$69.3 million at Christie's. *Christie's Auctions & Private Sales*. Available at: <https://www.christies.com/about-us/press-archive/details?PressReleaseID=9970&lid=1> [Accessed May 15, 2022].

Clifford, L. & Mathews, J. (2022) OpenSea illustrates the perils of growing too fast. *Fortune*. Available at:

<https://fortune.com/2022/02/11/opensea-nft-growth-customer-demand-obstacle/>
[Accessed May 15, 2022].

Cordella, A. & Shaikh, M. (2006) From Epistemology to Ontology: Challenging the Constructed “Truth” of ANT, Working Paper Series, Department of Information Systems, London School of Economics and Political Science: London.

Czarniawska, B. (2008) Organizing: How to study it and how to write about it. *Qualitative Research in Organizations and Management: An International Journal*. 3(1), 4–20

Das, D. et al. (2022) Understanding Security Issues in the NFT Ecosystem. *Proceedings of ACM Conference on Computer and Communications Security (CCS '22)*.

de Best, R. (2022) Bitcoin energy consumption 2022. *Statista*. Available at: <https://www.statista.com/statistics/881541/bitcoin-energy-consumption-transaction-comparison-visa/> [Accessed May 15, 2022].

de Duve, T. (1998) *Kant after Duchamp*, Cambridge: The MIT Press.

DeNorch, D. (2021) *Conversations | NFTs in the Art World: Beyond the Hype*, Art Basel. Available at: https://www.youtube.com/watch?v=KD6_har3g-M&ab_channel=ArtBasel [Accessed May 15, 2022].

Denzin, Norman K. (1989) *Interpretive Biography*. Newbury Park, CA: S

Dubois, A. & Gadde, L.-E. (2002) Systematic combining: An abductive approach to case research. *Journal of Business Research*, 55(7), pp.553–560.

Egkolfopoulou, M. & Gardner, A. (2021) Even in the Metaverse, Not All Identities Are Created Equal. *Bloomberg.com*. Available at: <https://www.bloomberg.com/news/features/2021-12-06/cryptopunk-nft-prices-suggest-a-diversity-problem-in-the-metaverse> [Accessed May 15, 2022].

Fenwick, T. & Nimmo, G.R. (2015) Making visible what matters: Sociomaterial approaches for research and practice in healthcare education. *Researching Medical Education*, pp.67–80.

Fox, S. (2000) Communities of Practice, Foucault and Actor-Network Theory, *Journal of Management Studies*, 37, 6: 853-867.

Gottsegen, W. (2021) OpenSea scandal shows need for more NFT regulation. *CoinDesk Latest Headlines RSS*. Available at: <https://www.coindesk.com/policy/2021/09/20/opensea-scandal-shows-need-for-more-nft-regulation/> [Accessed May 15, 2022].

Gubrium, J.F. & Holstein, J.A. (1998) Narrative practice and the coherence of personal stories. *The Sociological Quarterly*, 39(1), pp.163–187.

Gudgeon, L. et al. (2020) The decentralized financial crisis. *2020 Crypto Valley Conference on Blockchain Technology (CVCBT)*.

Halsall, F. (2016) Actor-network aesthetics: The conceptual rhymes of Bruno Latour and Contemporary Art. *New Literary History*, 47(2-3), pp.439–461.

Harm, J., Obregon, J. & Stubbendick, J. (2020) Ethereum vs. Bitcoin. *Creighton University*.

Harman, G. (2010) *Towards speculative realism: Essays and lectures*, Winchester: Zero Books.

Heidorn, C. (2022) OpenSea refunds: What can you do? *Tokenized*. Available at: <https://tokenizedhq.com/opensea-refund/> [Accessed May 15, 2022].

Herian, R. et al. (2021) NFT – Legal Token Classification. *EU Blockchain Observatory & Forum*.

Higgle, J. (2021) The real story - women artists and the art market. *CHART*. Available at: <https://chartartfair.com/journal/perspective/the-real-story-women-artists-and-the-art-market> [Accessed May 15, 2022].

Howcroft, E. (2022) NFT sales hit \$25 billion in 2021, but growth shows signs of slowing. *Reuters*. Available at: <https://www.reuters.com/markets/europe/nft-sales-hit-25-billion-2021-growth-shows-signs-slowing-2022-01-10/> [Accessed May 15, 2022].

Jackson, S. (2015) 'Toward an analytical and methodological understanding of actor-network theory', *Journal of Arts and Humanities*, vol. 4, no. 2, pp. 29-44.

Kaiser, B., Jurado, M. and Ledger, A. (2018) The looming threat of china: An analysis of Chinese influence on bitcoin. arXiv preprint arXiv:1810.02466.

Kirkegaard, J. K. (2015) Ambiguous winds of change—Or fighting against windmills in Chinese wind power. [Doctoral dissertation, Copenhagen Business School].

Kozinets, R.V. (2010) Netnography: Doing ethnographic research online.

Kung, S.-W. (2015) Bourdieu's capital and Latour's actor-network theory as conceptual tools in Translation Research. *Translation and Cross-Cultural Communication Studies in the Asia Pacific*, pp.389–406.

L., K. (2019) The blockchain scalability problem & the race for visa-like transaction speed. *Medium*. Available at: <https://towardsdatascience.com/the-blockchain-scalability-problem-the-race-for-visa-like-transaction-speed-5cce48f9d44> [Accessed May 15, 2022].

Lang, F. (2019) Bourdieu, Latour and Rasha Abbas: The uses of actor-network theory for studying the field(s) of cultural production in the Middle East and North Africa. *Cultural Sociology*, 13(4), pp.428–443.

Larva Labs, Cryptopunks. *Larva Labs*. Available at: <https://www.larvalabs.com/cryptopunks> [Accessed May 15, 2022].

Latour, B. (1986) The Powers of Association, In: Law, J. (Ed.) Power, Action and Belief: A New Sociology of Knowledge?, Sociological Review Monograph / Routledge and Kegan Paul: London, 264-280.

Latour, B. (1988) The Pasteurisation of France, Harvard University Press: London.

Latour, B. (1993) We Have Never Been Modern, Harvester Wheatsheaf: London.

Latour, B. (2005) Reassembling the social: An introduction to social life. Oxford University Press

Latour, B. as Johnson, J. (1988) Mixing humans with non-humans: Sociology of a door opener. *Social Problems*, 35, 298-310.

Latour, B., & Woolgar, S. (1979) Laboratory life. Sage Publications.

- Latour, B. (2004) Whose cosmos, which cosmopolitics? *Common Knowledge*, 10(3), pp.450–462.
- Law, J. & Callon, M. (1992) The Life and Death of an Aircraft: A Network Analysis of Technical Change, In: *Shaping Technology / Building Society: Studies in Sociotechnical Change*, Bijker, W. E. and Law, J. (Eds.) the MIT Press: Cambridge, Mass, 21-52.
- Law, J. (1991) Introduction: Monsters, Machines and Sociotechnical Relations, In: Law, J. (Ed.) *A Sociology of Monsters: Essays on Power, Technology and Domination*, Routledge: London, 1-23.
- Law, J. (1992) Notes on the theory of the actor-network: Ordering, strategy, and heterogeneity. *Systems Practice*, 5(4), pp.379–393.
- Lee, B. (2022) Bitcoin's 'Energy Problem' is overblown. *Nasdaq*. Available at: <https://www.nasdaq.com/articles/bitcoins-energy-problem-is-overblown> [Accessed May 15, 2022].
- Leidner, R. (1993) *Fast Food, Fast Talk: Service Work and the Routinization of Everyday Life*. Berkeley and Los Angeles: University of California Press.
- Levey, M. (2021) A Fascinating, Sexy, Intellectually Compelling, Unregulated Global Market. , *Freakonomics(The Hidden Side of the Art Market)*.
- Li Puma, E. (1993) Culture and the concept of culture in a theory of practice, in: C. Calhoun, E. Li Puma & M. Postone (Eds) *Bourdieu: critical perspectives* (Cambridge, Polity Pr
- Losey, J. E., Rayor, L. S. and Carter, M. E. (1999) "Transgenic Pollen Harms Monarch Larvae," *Nature* 399: 214.
- Lund, J., *Jonas Lund Token (JLT)*. Available at: <https://jlt.ltd/> [Accessed May 15, 2022].
- Lustig, C. (2022) Algorithmic authority: The case of bitcoin. *2015 48th Hawaii International Conference on System Sciences*.
- MacLeod, A. et al. (2019) Actor-network theory and ethnography: Sociomaterial approaches to researching medical education. *Perspectives on Medical Education*, 8(3), pp.177–186.

Maltby, J. (2022) The metaverse already has a diversity problem: Where are the female NFT investors and creators? *Medium*. Available at: <https://jvmaltby.medium.com/the-metaverse-already-has-a-diversity-problem-where-are-the-female-nft-investors-and-creators-cc96a2f00680> [Accessed May 15, 2022].

Mambrol, N. (2016) Culture industry. *Literary Theory and Criticism*. Available at: <https://literariness.org/2016/04/15/culture-industry/> [Accessed May 15, 2022].

McAndrew, C. (2022) The Art Market 2022. *Arts Economics*.

Mckinnon, A. (2017) Religion and social class: Theory and method after Bourdieu. *Sociological Research Online*, 22(1), pp.161–173.

Meier, A. (2021) Ist das Kunst Oder sind das Nfts? *www.kunstforum.de*. Available at: <https://www.kunstforum.de/artikel/ist-das-kunst-oder-sind-das-nfts/> [Accessed May 15, 2022].

Michael, M. (1996) *Constructing Identities: The Social, the Nonhuman and Change*, Sage: London.

Minniti, A. (2015) *The evolution of the art market: from 15th century Florence to the Sotheby's-eBay agreement*. thesis. Rome: LUISS Guido Carli.

Mohanta, Bhabendu & Panda, Soumyashree & Jena, Debasish. (2018) An Overview of Smart Contract and Use Cases in Blockchain Technology. 10.1109/ICCCNT.2018.8494045.

Morris, K. (2022) Marina Abramović: 'I don't want to have my life in control'. *The Guardian*. Available at: <https://www.theguardian.com/artanddesign/2022/feb/12/marina-abramovic-i-dont-want-to-have-my-life-in-control> [Accessed May 15, 2022].

Musan, D.I. (2020) NFT.finance Leveraging Non-Fungible Tokens. *Imperial College London Department of Computing*.

Nadini, M. et al. (2021) Mapping the NFT revolution: Market trends, Trade Networks, and visual features. *Scientific Reports*, 11(1).

Nagel Draxler (2021) Art basel Miami Beach - art basel Miami Beach 2021 - Galerie Nagel Draxler - art. *Galerie Nagel Draxler*. Available at: <https://nagel-draxler.de/exhibition/art-basel-miami-beach/> [Accessed May 15, 2022].

Naidoo, R. (2004) Fields and institutional strategy: Bourdieu on the relationship between Higher Education, inequality and Society. *British Journal of Sociology of Education*, 25(4), pp.457–471.

Nakamoto, S. (2008) Bitcoin: A peer-to-peer electronic cash system. *SSRN Electronic Journal*.

Nelson, L.C. (2014) *Bourdieu and Latour in STS: "let's leave aside all the facts for a while."*. dissertation. Vancouver: University of British Columbia.

NFT Culture (2021) NFT display: Qonos Digital Art Frame Preview: NFT culture: NFT News: Interviews and more. *NFT CULTURE*. Available at: <https://www.nftculture.com/nft-displays/nft-display-qonos-digital-art-frame-preview/> [Accessed May 15, 2022].

NFT Tech (2021) A deep-dive on NFT marketplaces - NFT tech insights. *NFT Tech*. Available at: <https://www.nfttech.com/insights/a-deep-dive-on-nft-marketplaces> [Accessed May 15, 2022].

Nimmo, R. (2011) Actor-network theory and methodology: Social research in a more-than-human world. *Methodological Innovations Online*, 6(3), pp.108–119.

Olson, D. (2022) *Line Goes Up – The Problem With NFTs*, Folding Ideas. Available at: https://www.youtube.com/watch?v=YQ_xWvX1n9g&ab_channel=FoldingIdeas [Accessed May 15, 2022].

Paula, M. (2021) Conversations | NFTs in the Art World: Beyond the Hype, Art Basel. Available at: https://www.youtube.com/watch?v=KD6_har3g-M&ab_channel=ArtBasel [Accessed May 15, 2022].

Pearson, J. (2022) More than 80% of nfts created for free on OpenSea are fraud or spam, Company says. *VICE*. Available at: <https://www.vice.com/en/article/wxdzb5/more-than-80-of-nfts-created-for-free-on-opensea-are-fraud-or-spam-company-says> [Accessed May 15, 2022].

Pellandini-Simanyi, L. (2016) Everyday consumption norms as discourses of the good life in pre-socialist and socialist Hungary. *Journal of Consumer Culture*, 16(3), 699–717.

Pret, T., Shaw, E. & Drakopoulou Dodd, S. (2016) Painting the full picture: The conversion of economic, cultural, social and symbolic capital. *International Small Business Journal: Researching Entrepreneurship*, 34(8), pp.1004–1027.

Prior, N. (2005) A question of perception: Bourdieu, art and the postmodern. *The British Journal of Sociology*, 56(1), pp.123–139.

Prior, N. (2008) Putting a glitch in the field: Bourdieu, actor network theory and Contemporary Music. *Cultural Sociology*, 2(3), pp.301–319.

Prout, A. (2000) Childhood Bodies: Construction, Agency and Hybridity, In: Prout, A. (Ed) *The Body, Childhood and Society*, Macmillan: London, 1-18.

Rennie, E., Potts, J. & Pochesneva, A. (2019) Blockchain and the Creative Industries. *Australia Council for the Arts, Screen Australia and the Australian Film, Television and Radio School*.

Resch, M. (2011) *Management of art galleries: Business models*. dissertation. St. Gallen: Borsdorf.

Resch, M. (2014) Will market aversion affect German galleries? *Artnet News*. Available at:
<https://news.artnet.com/market/will-market-aversion-snuff-out-german-galleries-139060>
 [Accessed May 15, 2022].

Riessman, C.K. (2002) *Narrative analysis*, Newbury Park, Calif: Sage.

Sayes, E. (2014) Actor–network theory and methodology: Just what does it mean to say that nonhumans have agency? *Social Studies of Science*, 44(1), pp.134–149.

Schachter, K. (2021) Are nfts a shrinking market... or the next Amazon? Kenny Schachter wages war with crypto-cynics and one incomprehensible NFT terrorist. *Kenny Schachter*. Available at:
<https://www.kennyschachter.art/2021/05/are-nfts-a-shrinking-market-or-the-next-amazon-kenny-schachter-wages-war-with-crypto-cynics-and-one-incomprehensible-nft-terrorist/>
 [Accessed May 15, 2022].

Schachter, K. (2021) Is the NFT moment over? far from it. Kenny Schachter surveys an art world remade by nfts (and Damien Hirst's elusive new money man). *Kenny Schachter*. Available at:

<https://www.kennyschachter.art/2021/06/is-the-nft-moment-over-far-from-it-kenny-schachter-surveys-an-art-world-remade-by-nfts-and-damien-hirsts-elusive-new-money-man/> [Accessed May 16, 2022].

Schär, F. (2021) Decentralized finance: On blockchain- and Smart Contract-based Financial Markets. *Review*, 103(2).

Selgin, G. (2015) Synthetic Commodity Money. *Journal of Financial Stability*, 17, pp.92–99.

Serres, M. (1982) *The Parasite*, John Hopkins University Press, Baltimore; London.

Shiga, J. (2007) Translations: Artifacts from an actor-network perspective. *Artifact*, 1(1), pp.40–55.

Silverman, A. (2022) Millennials, not Gen Zers, are driving the recent physical and Digital Collectibles Boom. *Morning Consult*. Available at: <https://morningconsult.com/2021/04/05/millennials-nfts-collectibles/> [Accessed May 15, 2022].

Soares, M. (2021) *Conversations | Navigating the NFT Art Market*, Art Basel. Available at: https://www.youtube.com/watch?v=iaCVuhd7hGw&ab_channel=ArtBasel [Accessed May 15, 2022].

Stake, R. E. (1995) *The Art of Case Study Research*. Thousand Oaks, CA: Sage.

Stevens, G. (2020) Web 2.0 and feminism: Is Social Media making US complacent?, debating communities and networks 11. *Debating Communities and Networks* 11. Available at: <https://networkconference.netstudies.org/2020OUA/2020/04/27/web-2-0-and-feminism-is-social-media-making-us-complacent/> [Accessed May 15, 2022].

Steyerl, H. (2021) *STUDIO BONN – Exchange Values – Krypto-Kapitalismus*, Bundeskunsthalle. Available at: https://www.youtube.com/watch?v=btQRji5fU_8&ab_channel=Bundeskunsthalle [Accessed May 15, 2022].

Trautman, L.J. (2014) Virtual currencies: Bitcoin & what now after Liberty Reserve and silk road? *SSRN Electronic Journal*.

Trend Micro (2022) Scam alert: OpenSea phishing emails. *Trend Micro News*. Available at: <https://news.trendmicro.com/2022/03/12/scam-alert-opensea-phishing-emails/> [Accessed May 15, 2022].

Tuwiner, J. (2022) Bitcoin mining pools. *9 Best Bitcoin Mining Pools: Legit Sites (2022 Companies)*. Available at: <https://www.buybitcoinworldwide.com/mining/pools/> [Accessed May 15, 2022].

Ullrich, W. (2016) Stellungnahme zu „siegerkunst“. *ideenfreiheit.wordpress.com*. Available at: <https://ideenfreiheit.wordpress.com/2016/01/27/stellungnahme-zu-siegerkunst/> [Accessed May 15, 2022].

Urquhart, A. (2016) The inefficiency of Bitcoin. *SSRN Electronic Journal*.

Valentine, G. (2002) In-corporations: Food, Bodies and Organisations, *Body and Society*, 8, 2: 1-20.

van den Dorpel, H. (2021) Conversations | Navigating the NFT Art Market, Art Basel. Available at: https://www.youtube.com/watch?v=iaCVuhd7hGw&ab_channel=ArtBasel [Accessed May 15, 2022].

Velthuis, O. (2008) Symbolic meanings of prices: Constructing the value of Contemporary Art in Amsterdam and New York Galleries. *Journal of Economic Sociology*, 9(3), pp.33–59.

Velthuis, O., Curioni, B.S. & Khaire, M. (2015) Art Without Borders? Online Firms and the Global Art Market. In *Cosmopolitan canvases: The globalization of markets for Contemporary Art*. Oxford: Oxford University Press, pp. 1–29.

Velthuis, O., Curioni, B.S. & Velthuis, O. (2015) Making Markets Global. In *Cosmopolitan canvases: The globalization of markets for Contemporary Art*. Oxford: Oxford University Press, pp. 1–29.

Venturini, T. (2010) Diving in magma: How to explore controversies with actor-network theory. *Public Understanding of Science*, 19(3), 258–273.

Venturini, T. (2012) Building on faults: How to represent controversies with Digital Methods. *Public Understanding of Science*, 21(7), pp.796–812.

Wang, Q. et al. (2021) Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges. *Tech Report V2*.

Wilson, K.B., Karg, A. & Ghaderi, H. (2021) Prospecting non-fungible tokens in the Digital Economy: Stakeholders and ecosystem, risk and opportunity. *Business Horizons*.

Winborg, J. and Landström H. (2001) Financial bootstrapping in small businesses: Examining small business managers' resource acquisition behaviors. *Journal of Business Venturing* 16 (3): 235-254.

Yin, R. K. (1984). *Case Study Research: Design and Methods*. Beverly Hills, CA: Sage.

Zarobell, J. (2021) Arts special issue "the contemporary art market." *Arts*, 10(3), p.43.

Zell, M. (2011) Rembrandt's gifts: A case study of actor-network-theory. *Journal of Historians of Netherlandish Art*, 3(2).