#Etude : Le marché du bien virtuel

Résumé

Le marché du bien virtuel n’est pas nouveau. Il est apparu au milieu des années 2000 avec des applications comme Second Life.

Certains terrains à l’époque se vendaient quelques dizaines de milliers de dollars. La bulle s’est formée en 2021 pour exploser en mars / avril 2022.

Comme tous les cycles d’adoption des innovations, nous sommes probablement entré dans une phase de désillusion qui peut aboutir au plateau de productivité et créer des opportunités pour des nouveaux entrants sur le marché.

Article

The Virtual Economy | L'Atelier

Source de la capture: The Virtual Economy | L&apos

Just out of reach, behind a digital curtain, exists a galaxy of activity. A new economic frontier that may be the answer to the generational wealth gap.

Between December 2017 and January 2018, 34,356 parcels of land were sold in a single real estate auction in a single city to buyers from all over the world. The auction had a number of peculiar features. By far the most unusual was the fact that the real estate being sold did not exist in any traditional sense. It was virtual. These plots were being sold in a yet-to-be-created digital city accessible only through a browser, enhanced by a sophisticated marketplace and a proprietary cryptocurrency. Tens of millions of dollars have flowed through the marketplace since its auction launch.

But it is not unique. In 2010, a nightclub within the game Entropia Universe was sold for $635,000. A digital equivalent of Amsterdam was sold in Second Life for $50,000 in 2007. The same year, an elf called Zeuzo was sold in World of Warcraft for $9,500.

> In September 2018, a digital kitten was sold for $170,000.

Elsewhere, a 17-year-old just earned $500 for designing a gun that can't shoot anyone. A 21-year-old earned $125 for controlling someone's identity for an hour, and a 16-year-old just won $3 million in prize money for eliminating everyone on a virtual island in front of millions of people.

This is the Virtual Economy. An agglomeration of sophisticated platforms, fledgling and often dubious marketplaces, skilled nixers, volatile assets, and ambitious pioneers that exist or operate uniquely in virtual environments. It sits just out of reach, behind a digital curtain, invisible to most of us. Within it, there is a galaxy of activity and opportunity. A new economic frontier that may just be the answer to the generational wealth gap.

It is a place frequented, with varying degrees of immersion, by some 2.5 billion people through phones, consoles, laptops, desktops, and headsets. It is an environment native to the tech savvy, a dual citizenship of sorts for the technically fluent. It is a place where people go to socialise, to play, to create, to work, to fantasise, to deceive, and to prosper. An emerging habitat exhibiting the capacity of emerging technologies like distributed ledgers, virtual reality (VR), computer vision, real-time ray tracing, cryptocurrencies and non-fungible tokens (NFTs).

> This is the intersection of technology and societal change, and we believe it's the future.

System Reloaded: Social Mobility's New Frontier

Over the last century, the developed world has built economies based on principles of rationality, efficient markets, and crucially, a merit-based system of social mobility. These systems imbued a sense of fairness and opportunity that generally placated and incentivised the masses. People were promised that hard work, education and adherence to social convention would be rewarded with prosperity, comfort, and financial stability.

Workers in the post-WW2 world understood that to obey these principles almost guaranteed that their children would be better off than they were. This idea was propagandised colloquially as "The American Dream," but the core tenets were similarly

present across much of northern Europe, Australasia, Canada, and South Korea as a social philosophy of abide and prosper.

This system of fair exchange drove extraordinary improvements in global equality, poverty and innovation over decades. But since the early 1990s, social mobility has slowed considerably. According to the OECD, it now takes at least five generations for a child born into a low-income French, German, Korean, British or American family to reach average income. This is evidence that as economies mature and growth slows, social mobility becomes increasingly difficult.

The Virtual Economy is an opportunity to short-circuit that system failure. It is an environment where entrepreneurs, prospectors and skilled agents can generate significant wealth very quickly without the need for startup capital. Esports players, streamers, skin designers, level boosters are just some examples of the creative new ways that people are generating wealth in this new economy.

What if a 21-year-old college graduate could use the €250,000 of virtual assets they have accrued as collateral for a mortgage? What if a single mother could use the income that she earns from renting digital real estate to buy groceries? What if a retiree could supplement their pension with the fees that they receive from being the celebrant for virtual weddings?

The Virtual Economy will provide an opportunity for people to smooth or augment their real-world income through a non-native economic system. This has profound implications for global wealth and income inequality. Participants in the Virtual Economy can circumvent the barriers preventing financial equivalence in the real world.

The promise of extraordinary opportunity is magnetic to those in a position to take advantage of it. But historically opportunity tended to discriminate against all but a select few. Those who have the means, the profile, the heritage or the good fortune to access it.

The anonymity afforded by the Virtual Economy obviates the traditional characteristics that would preclude the unprivileged from accessing the opportunities presented by great industrial change. The Virtual Economy is notably distinctive in that it is possible for almost anyone, young or old, rich or poor, regardless of gender, ethnicity, religion, location, heritage or social status, to succeed as long as they have the intellect, decisiveness and the technical capacity to see the opportunities emerging within it.

The Early Days of Virtual

The Virtual Economy's trajectory follows the evolution of tech-enabled expression, social interaction and exchange across platforms in gaming and beyond.

The Virtual Technology Stack

The past, present and future of the Virtual Economy is rooted in four key technologies blending the interactive with the immersive.

Post-Viral Virtual: The Impact of the Pandemic

The efficacy with which a virus has shut down global transport and trade is startling to most. The contemporary systems of travel, economics and communication make the spread of ideas, knowledge, shocks and indeed viruses inevitable. We have witnessed billions of people retreat to their homes, relying on digital platforms and environments for socialisation and competition. We have seen an immediate and significant rise in streaming viewership, gaming participation and virtual spend.

What the global pandemic has demonstrated is both the opportunity and necessity presented by the Virtual Economy. The participants active within it are still earning, largely unaffected by outside events, illustrating the value of supplemental virtual incomes.

> Virtual incomes are an asymmetric hedge against real-world events. When things go well, so too does the Virtual Economy.

But when things go badly, it can excel as a destination for education, entertainment, community, utility and sports, unperturbed by social distancing and diminishing reserves of hand sanitisers.

We will emerge from this global quarantine to see new icons, influencers and entrepreneurs within virtual worlds. They will come to prominence at a time when people question the fundamental usefulness of traditional institutions, protocols, and the social contract. The virus is underlining the inequity of and unfairness of some of our civil systems. The Virtual Economy is emerging as natural ventilation to the pressure chamber of a now fragile and fractured social order.

Much of the Virtual Economy lives on and and thrives off massive multi-participant platforms in gaming and beyond. Many of those were designed to have or subsequently

developed internal markets and economies, with proprietary currencies that players use to buy and sell virtual goods and services.

These platforms are the nerve centers of the Virtual Economy. They are simultaneously places for entertainment, content creation, social interaction and, ever so often, economic production and exchange.

These platforms are growing at an extraordinary pace. Global virtual multi-player gaming and virtual simulation platforms and interactive media revenue reached around $109 billion in 2019, up from $62 billion in 2015, and is projected to hit almost $129 billion by 2021, according to research house SuperData. This is higher than the film industry, which reached $96.8 billion in revenues in 2018, according to the Motion Picture Association.

Growth in Digital Game Spending ($US Revenue)

2015

$62 BILLION

2019

$109 BILLION

2021*

$129 BILLION

*Projected by SuperData

About 85% of the revenue of these virtual marketplaces is dominated by spending inside the platforms in the form of repeated purchases of virtual goods, known as microtransactions. The rest comes from related activities such as retail and digital sales, downloadable content, and advertising.

The success of virtual platforms has also spawned a wild multibillion-dollar world of online grey and black trading of in-game currencies and goods, casino gambling, money laundering, and online piracy.

Part 1

Closed Centralised Marketplaces

Most of the marketplaces in the Virtual Economy are owned by a gaming publisher that sets the rules of the virtual world, oversees its economy and facilitates the creation of virtual assets. Game publishers and developers typically determine or manage every aspect of their economy - from the supply of resources, through pricing, to capital controls. Within these worlds, users - sometimes in the tens of millions - can build, earn, buy or sell virtual goods and services, often using one or more in-game currencies. Inflation, deflation, bubbles and even recessions can occur.

Virtual assets vary in nature - from weapons, cars and real estate, to skins, clothing, characters, accessories, currencies, and more. These goods can be created either directly by game publishers within the game, by a third-party vendor, or in some cases, by players themselves.

As the ultimate owner of everything created on the platform, the publisher typically does not permit the external sale or transfer of those assets beyond the gaming environment. This makes it difficult to commercialise them for real money, save for the illicit trade of virtual goods on grey and black markets.

Closed centralised Marketplaces

Case Study

Fortnite

If you have a teenager at home, you may have heard them call a friend - or a nemesis - ‘Default’. This is a schoolyard insult for Fortnite players using free skins, the very synonym of uncool.

Released without much fanfare in 2017, Fortnite quickly turned into a cultural phenomenon with 350 million registered accounts as of May 2020 - up by 100 million since March 2019 - and more than 57 million active players in 2019. The third-person shooter game generated more than $1.2 billion in revenue in its first 10 months, becoming the first free-to-play game to reach that mark in its first year. At launch in 2018, its mobile app was generating $2 million a day.

350 MIL

Registered accounts as of May 2020

57 MIL

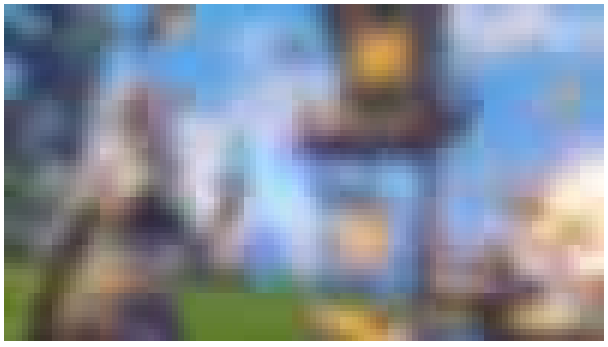
Active players in 2019

$1.2 BIL

Revenue in first 10 months

SOURCE: Data from Epic Games, SuperData

Fortnite is a third-person shooterBattle Royale game. Players are dropped into an island to fight up to 99 other players until only one person remains. But over time, it has evolved beyond a traditional game - it’s simultaneously a play arena, a place for mass social gatherings, and an opportunity for global brands to put their name in front of a new digital audience.



Fortnite has become a cultural juggernaut, with more than 350 million registered players. The game is free to play, but players invest in digital goods such as skins and emotes. Image credit: Epic Games

Much of the game’s monetary success lies in its emerging sub-economy, which allows "players" to build their own identities, games, and worlds. Fortnite’s marketplace features a constantly rotating set of skins, dance moves and other cosmetic items to encourage repeat purchases. The in-game culture awards status and recognition to those with the most recent, coveted, and higher-cost items. Most in-game purchases rely on microtransactions. For example, Fortnite skins cost players anywhere between $8 and $20. The average paying user spends around $20 a month in microtransactions.

Its in-game currency, V-Bucks, can be purchased with real money. It can’t be used outside the game and serves solely to buy cosmetic items and game-play passes,

which give access to gear, emojis, and other benefits.

> The Fortnite marketplace does not allow the trading of items between players inside or outside the game. In other words, money can go in, but cannot go out.

Third-party marketplaces have popped up to fill this need - Fortnite skins and V-Bucks reloads are trending on multiple peer-to-peer exchanges. However, there is a distinct lack of oversight, governance, and transparency, making using these sites risky for players who have accumulated valuable items.

Part 2

Open Centralised Marketplaces

There are also a number of more open, and often more sophisticated, marketplaces within games or other virtual worlds that bear many similarities to closed in-game marketplaces but allow the purchase or sale of assets within the platform or externally. For example, users can sell game assets for money, or exchange game currency for real-world currency.

Most of these transactions are made inside the platforms themselves. This means the transactions occur on a marketplace that is owned and operated by a publisher. This is the easiest and most secure way to purchase assets, and more gaming companies are recognising the additional monetisation benefits from creating a sanctioned marketplace.

This explosive growth of virtual transactions, combined with the ease of online payments and the rise of mobile and console gaming, has propelled virtual goods into a new digital asset class and an area of interest for financial institutions.

Users are becoming increasingly comfortable with purchasing virtual goods. The virtual goods ecosystem ranges from individual gamers looking to exchange or sell an item, to “commercial” vendors who specialise in acquiring coveted items specifically for resale.

Virtual goods exist at every price point. Most in-game purchases rely on microtransactions as a continued source of revenue. The business model has been controversial with many gaming communities, yet has grown immensely since the early 2010s through the introduction of in-game currencies, ever-growing collections of rare in-game items, lucrative packs of random chance purchases, and the setting of expiration to encourage users to purchase to continue playing.

Gaming company Valve has been a leader in this space since 2011 through the creation of new developer and community tools that enable outside creators to earn money on Steam, the company's digital distribution platform, allowing creators to sell and trade virtual goods. Notably, Valve expanded their tools for third-party games, enabling their community to create items for games the company doesn't own.

Open centralised marketplaces

Case Study

Minecraft

Ask the occasional gamer about the best-selling video game of all time, and chances are they would guess Pokémon or Super Mario, or even Tetris. In fact, the title goes to Minecraft, a game without flashy graphics, an intricate storyline, or even an endgame.

> With over 180 million copies sold, Minecraft has outsold the second-best selling game, Tetris, by 10 million even though it is three decades younger. Despite breaking with gaming conventions, Minecraft has become a smash hit that is played by more than 112 million gamers around the world - on computers, smartphones, and consoles.

Minecraft is a creative 3D block-building game that is completely open ended. At its core, it is a form of virtual Lego set in a private randomly generated world, where everything is mineable or modifiable. With no set objectives, players are dropped into a pixelised environment to explore and extract materials, or build and rebuild objects in an infinite world. Depending on the game mode, they may face exploding zombies and other foes. This forces players to learn how to build shelters to survive the night through trial and error. Many would also spend hundreds of hours creating new environments with pixelated ladders and building blocks.

More than a fun game, Minecraft is a real example of a market created to facilitate demand. It allows users to own servers, enabling them to create their own games within the game. Players who manage their own private server can decide what type of gameplay exists, what type of weapons can be used, or the look of the environment.

Entire mini-economies have emerged around Minecraft private servers thanks to the power of the base code and the size and fanaticism of its playerbase. The Minecraft homebrew community creates everything from fighting games, to adventure games, to Bitcoin treasure hunts.

These platforms attract millions of users and can generate significant revenue from a variety of sources, such as donations, subscriptions, advertisements, and microtransactions for cosmetic in-game items. Pay-to-win items are forbidden by Minecraft's owner, Microsoft, ensuring a level of gameplay fairness. Some servers find unique ways to generate revenue - SatochiQuest, for example, charges a small access fee that is then pooled into a 1 Bitcoin prize for the winner of a Minecraft scavenger hunt.

More than a fun game, Minecraft is a real example of a market created to facilitate demand. Image credit: Minecraft

Minecraft also has its own Marketplace, featuring content from handpicked community developers - from skins and textures to hand-crafted worlds, and epic adventures. Payments are made with the game’s proprietary currency, Minecraft Coins, which can only be obtained in bundles bought with real money. The Coins can then be used to purchase professionally made lands to explore and play in. Players, however, cannot exchange that secondary currency for real money or mine any assets for real money directly in the game.

This open-ended model has generated more than $1 billion in revenues since the launch of the Marketplace in 2017. Yet Minecraft’s monetisation remains at odds with a market flooded by free-to-play apps relying on microtransactions for revenue generation. The top 50 highest-grossing apps on iOS in 2019 are all free to play except for Minecraft, which charges $7 per download. Around 17% of users purchased items from the Marketplace, spending an average of $12 a month on console and $5 on mobile.

The revenue-sharing model for partners in the Marketplace is not public. However, Microsoft says that over 50% of revenues are paid out to developers after platform fees. In the first 14 months of the marketplace, over $45 million were distributed to publishers.

Many hobbyists formalised the operations and applied for the developer program, enabling young people to pay for college or even to create 40-people-strong design studios.

By any measure, conventional or otherwise, the volume of microtransactions shows that the significance gamers attach to their virtual items and achievements can be a real source of economic value.

Yet most in-game marketplaces currently lack transparent and legitimate in-game or out-of-the-game secondary markets for all the items that have value in game. Gamers currently go to great lengths to exchange the assets on black and grey markets - such as Reddit forums, or peer-to-peer online exchanges - risking being scammed, getting locked out of games or having their PayPal accounts frozen.

And in most cases, even when purchased in the game platform legally, in-game items ultimately belong to the game publisher, which determines how the user can access, modify or transfer the assets. If the game or virtual world shuts down, the item disappears and its value vanishes. So does the time and money spent to acquire it. This means a lot of sunk costs in terms of money, effort, and time.

> The need for transparent and legitimate ways to exchange virtual assets has prompted entrepreneurs to seek alternative options, away from the walled gardens of game publishers.

Distributed ledgers presented exactly this opportunity. Blockchain technology enables instant secondary marketplaces that can operate outside of games and in-game economies. Multiple platforms, marketplaces and exchanges for virtual assets have been created since Ethereum was launched in 2015, with new projects springing up every few weeks or months.

Part 3

Distributed Open Markets

Distributed open markets are typically based on decentralised infrastructure and are not owned by any single entity. They allow the creation of unique virtual assets that only exist in a virtual space. These assets are created, bought, licensed, rented and sold in decentralised markets.

These decentralised exchanges are currently a fairly small slice of the Virtual Economy but present some of the most promising use cases for the creation and exchange of virtual assets.

The CryptoKitties craze of 2017 - the primitive blockchain game that allowed users to breed digital cats to produce new virtual cats of varying rarity - was a run-up to the emerging interest in creating and trading of virtual assets represented as tokens, especially in online social games built on the blockchain.

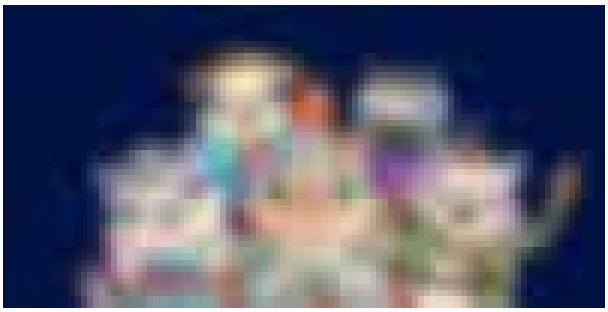
> A token could represent any asset - such as a painting or a digital skin - or a utility, such as a token that gives you access to 10 hours of streaming on a video streaming service.

Tokens represent a new way to own digital goods and services. Unlike traditional physical assets or money, tokens can be programmed, which gives them more flexibility and variety than physical assets. For example, they can be programmed to reduce in value over time. Developers can also cap the supply of certain tokens, making them a scarce resource.

Non-fungible tokens (NFTs), in particular, represent unique digital items on the Ethereum blockchain. NFTs could be collectibles; game items such as weapons and skins; digital art; virtual real estate; event tickets; social network handles and even ownership records for physical assets. Unlike other tokens like cryptocurrencies, NFTs are not interchangeable - they can’t replace or be replaced by another identical item.

NFTs also have a clear trace of ownership that is preserved on the blockchain. Since they are standardised in their programming, they can easily be exchanged on open markets. And unlike a lot of virtual goods on centralised gaming platforms, NFTs can be liquidated for real-world value without breaching the terms of service or the law. From land worth hundreds of thousands of dollars, to trading cards, to shoes that look like fish, NFTs offer an infinite market of goods that can be scaled at no cost.

As tokenised virtual assets increase in value, they can be traded, insured, and securitised. In the right circumstances, users might also be able to obtain loans from their NFTs and to lease their NFTs if they don’t use them often. And if NFTs and other virtual assets are in high demand, users would want to buy and sell them on trusted platforms for other virtual assets, cryptocurrencies, or real money.



CryptoKitties was a run-up to the growing interest in creating and trading of unique virtual assets such as NFTs. Image credit: CryptoKitties

CryptoKitties launched NFTs into the mainstream and were a massive attraction point for investors in the space, giving rise to an evolving ecosystem of NFT projects in gaming, art, virtual real estate and gambling, among others.

The early NFT market was kept afloat by the emergence of viral “hot potato” games involving the fast exchange of NFTs. The rules were simple. A new NFT would be minted, then traded and passed among users at an increasingly high price, some increment of the previous price. The last person holding the NFT loses all their money and is stuck with a no-value NFT.

> In 2018, an NFT of Donald Trump in the game Cryptocelebrities sold for 123 ETH - or $137,000 at the time.

Though the equivalent of $18M was traded between the launch in January and shutdown in March 2018, 6% of every transaction went to the eight anonymous developers. Users are now left with unique but useless NFTs.

Though speculative, the hot potato phenomenon showed that a specific NFT can see incredible growth in value in a matter of days. It also ushered in experimentation with pricing and auctions in the budding NFT space.

The Cryptokitties bubble over time

Date

2018-12-03

Trade Volume

1000.43 ETH

Users

143

Source: Data from nonfungible.com

After the CryptoKitties bubble, the number of unique accounts interacting with NFTs has grown slowly but steadily on OpenSea, the largest NFT marketplace, from around 8,500 accounts in February 2018 to more than 20,000 accounts in December 2019. For reference, the Ethereum blockchain as a whole has nearly 92 million registered accounts as of early 2020.

Moreover, developers are building more NFTs on the Ethereum network, increasing the likelihood of finding more attractive NFTs that can generate momentum.

NFT Contracts

Growth in the number of NFT contracts on the Ethereum network

January 2018 - December 2019

SOURCE: Data from OpenSea

Overall, the market for NFTs is still small, fickle and harder to size than the cryptocurrency market, given the prices for assets.

The closest proxy indicator, the secondary trading volume - or peer-to-peer sales of NFTs - is roughly $2 – $3 million in volume per month currently, according to OpenSea.

Overall, while the number of OpenSea users and contracts based on the NFT standard is increasing, the volume of trade seems to be steady or decreasing.

The NFT market remains volatile. It is highly sensitive to fluctuations in the Ethereum price and to the actions of a small number of power users. Variation can happen quickly through the actions of a small number of players, either wittingly or unwittingly acting as a cartel.

OpenSea data shows a small number of NFT sellers capturing high volumes and a small number of NFT buyers buying high volumes. On OpenSea, as of early 2020, the median seller has sold $71.96 worth of NFTs, whereas the average seller has sold $1,178 worth of items. At the same time, the average buyer has purchased $943.81 worth of items compared to the median buyer with $42.72 worth of NFTs.

OpenSea Median vs. Average Sales

SOURCE: Data from OpenSea

The trading volume on the NFT market is also highly sensitive to fluctuations of cryptocurrencies. For example, contrary to what people might expect, a noticeable bump in trading volume on February 7, 2020 does not seem to indicate increased interest in NFTs since the number of active users did not change much on or around that day. In reality, a small jump in Ethereum prices that day jolted one or a few big players (buyers or sellers) to liquidate their assets.

While the indicators of the future growth of the NFT market are inconclusive, it’s clear that that variation can happen quickly through the actions of a small number of players.

> Historically, single but significant new types of NFTs can lead to a knock-on effect on other NFTs, lifting the entire market.

The first wave of knock-on effects in 2017-2018 was in a small immature market incapable of handling both user expectations (Cryptocelebrities) and the number of

transactions (CryptoKitties) needed to sustain growth.

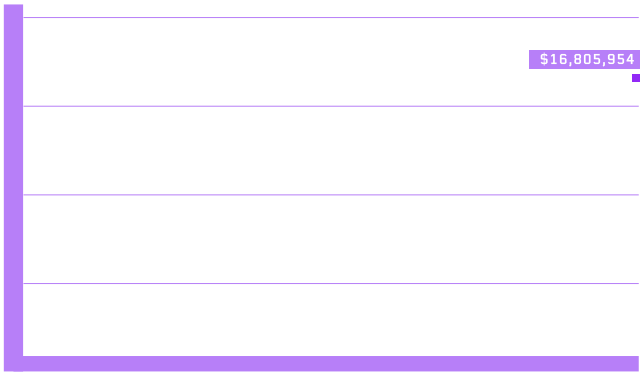
By the same logic, the NFT market has the potential to skyrocket if a small number of blockchain-based apps can reach mainstream status and have a potential knock-on effect for other NFT assets.

NFTs are also showing signals of a maturing market ready for growth. While collectibles were a straightforward application of NFTs, there are signs that users are starting to gravitate towards more complex games that expand on the NFT capabilities.

Decentraland Growth

Cumulative trade value in Decentraland since launch

March 2018 - March 2020



SOURCE: Data from Decentraland

More complex platforms such as Decentraland and MyCryptoHeroes are using NFTs that provide more utility and therefore value to NFT assets. They also exhibit a seemingly more durable growth pattern of users and volume. New platforms like these are likely to increase the NFT user base and broaden the number of significant actors, reducing the impact of cartel-like or speculative behaviour.

MyCryptoHeroes is a Japanese RPG that allows users to purchase and trade heroes that can fight each other. Each Hero is a token that can be customised and traded on any marketplace. Its popularity comes from a group of PC gamers who are pushing for a cross-game currency. As of March 2020, the smallest buy-in to purchase in-game currency is the equivalent of $6.92 (0.06 ETH). While it is experiencing a high number of players and spending in the game, the secondary market to resell the assets is still

weak and has low levels of liquidity. Gaming NFTs could start to see more activity once gaming companies allow assets to trade freely across different ecosystems.

Notably, there is increased activity with the recent public launch of the Decentraland metaverse and the development of an ecosystem of startups enabling the scaling of blockchain-based apps. New technology such as standardised NFTs and new infrastructure are now smoothing scaling and transactions across platforms, reducing the risk of blockchain clogs and uncertain transaction fees.

Distributed open marketplaces

Case Study

Decentraland

It was a 25x return on a six-figure investment. By any measure, it was a solid deal. In 2017, Miles Anthony bought into a $26 million token sale distributing an in-game currency in Decentraland, a virtual reality platform allocating ownership of digital real estate on the Ethereum blockchain.

Encouraged by the return, in 2018 he re-invested some of the coins to buy virtual land in an auction on Decentraland. He used some of the land to build a mega casino in the virtual world, which he is now leasing in parcels to willing buyers. Investors were quick to join the venture, renting out floors in the casino in a profit-sharing arrangement.

> Described as a “human experiment with large economic impact,” Decentraland is at its essence a utopia of free trade.

It is a virtual world that is designed by its users and where landowners have the freedom to build whatever content and experiences they want in a 3D virtual world. Some 90,000 lands have been released since Decentraland’s first auction in late 2017 and many are now traded in an open market for MANA, the proprietary in-universe currency used for land purchase and transactions on the platform.

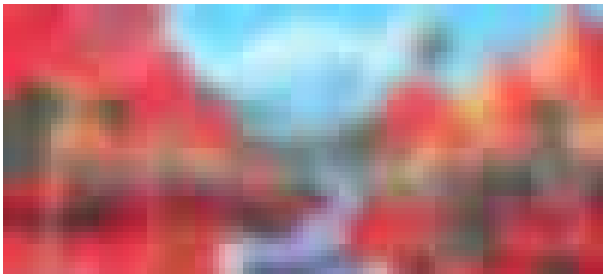
Most Decentraland investors focus on flipping virtual land. Others like Anthony are betting on building experiences on their virtual property as a “quicker route to monetisation.” Some plan to lease parcels to users wishing to build on them - anything imaginable, from art galleries, through games, to billboards.

The land comes in the form of NFTs, an emerging asset class in the Virtual Economy that is aiming to change virtual ownership and is seeing a flurry of new projects and

experiments, from crypto games and marketplaces, to new infrastructure solutions. Decentraland, in particular, aims to allow the creation and exchange of truly unique virtual assets and experiences outside the walled gardens of centralised virtual gaming environments.

> “At a certain point, users are not going to be OK with virtual goods as sunk cost. Eventually, they’re going to want to have ownership and be able to trade and resell their items, which is not allowed today in most games,” said Ari Meilich, co-founder and project lead of Decentraland.

The platform officially launched in February 2020 after a long beta period. Users can now explore the virtual world for free through their browsers. New content is being added by the day. The decentralised nature of the world will allow users to move and trade inside the universe with no restrictions. While the world still feels young and incomplete, its premise is tantalising.



By creating an open developer platform, in combination with a free market-based economic system and a high number of users, Decentraland can provide substantial incomes to investors and potentially entrepreneurs within the platform, first through real estate transactions, and subsequently through virtual goods. Image credit: Decentraland

All major decisions in Decentraland are made by the landowners through its voting platform, Agora, allowing the emergence of organised districts and proto-governments. This level of control by users is unusual in traditional virtual platforms and makes Decentraland attractive to virtual land developers. The Dragon City district, for example, will include nearly 6,500 parcels and showcase a mixture of ancient Chinese and Western culture. Other initiatives include a fashion district and a casino strip modeled after Las Vegas.

While the world is built around decentralised free-market ideals, analog real estate conventions still apply. Land around Genesis Plaza, the launch point of all users, is worth a premium, with locations closest to the center of the universe auctioning for

$270,000, enough to purchase a home in many cities. Land at the edge of the world or with no road access is trading for around $700. Since launch, over $50 million worth of transactions have taken place, according to Meilich.

These investments put a lot of pressure on landowners to monetise their land, creating concerns that real estate speculation would remain the driver of value in Decentraland. Meilich hopes that eventually billion-dollar companies could be creating content for the platform. Though they may not be seeking direct monetisation, corporations could see an opportunity to reach tech-savvy crypto enthusiasts. Design contests have also been organised to incentivise the creation of new content on the platform.

> The founders of Decentraland want to eventually pull out of the project and leave it in the hands of the community. In theory, this will allow the creation of new economies, where art, clothing, pets, collectibles, education, and an infinity of other goods and services could be traded or exchanged for MANA.

It is, however, hard to imagine that sin stocks or exit scams for crypto will not play a role in the economic development of Decentraland. A red light district is already planned at the border of virtual Vegas. Grey and black market players could exploit the platform to expand their trade. Extremist groups could also infiltrate Decentraland to recruit young people or spread propaganda.

To counter destructive behaviours, filters could be applied by the portal used to access the world, blocking offensive content, or modifying others. Meilich compares these yet-to-be-developed third-party filters to community-driven modding software used to alter games. Filters are, however, not yet a reality as the source code required for development remains closed source for now. The official client at decentraland.org currently serves raw, uncensored content. It is still unclear what impact filters will have on this brave new world.

Meilich hopes for a multi-billion economy to develop on Decentraland in the next decade. For now, the low-poly aesthetics of Decentraland are closer to a modernised user-generated Farmville than a futuristic Blade Runner.

In more than one way, the NFT market resembles the days of the dot.com bubble, which ultimately shifted the Internet tech industry towards more sustainable growth models.

The Bitcoin bubble led to investors throwing liquidity at NFTs at any valuation in 2017 and 2018. This has allowed objectively poor-quality NFTs, such as Cryptocelebrities, to turn big profits. Much hyped NFTs failed to deliver on their promise. Blockchain

transactions were slow. Transaction fees ballooned. Games failed. A number of ICO creators profiteered and ran. The bubble burst in 2018, resulting in capital withdrawals and plummeting values.

The surviving players remained due to a process akin to natural selection. They consolidated their place in the market despite lower valuations. Many were flush with cash from the bubble, others lost it all.

Secondary players also saw the bubble as a stress test that showed the limitations of the infrastructure. This led to a period of standardisation and the early build of scalable technologies.

> Amid continuing volatility, NFTs now resemble more a young stock market than a free-for-all cash-burning machine.

A potential future CryptoKitties-like knock-on effect in a more mature market could lead to a Bitcoin-like exponential growth that can be sustained by the new-found utility of NFTs and a more streamlined and scaleable trading experience.

It is difficult, due to anonymity, illicit activity and lack of data, to establish a reasonable approximation for the active population of the Virtual Economy. We can, however, estimate with reasonable confidence that the population of the gaming platforms that supply much of the Virtual Economy has reached around 2.5 billion active accounts. This number contains the entirety of the Virtual Economy, in addition to a large population of people who contribute to it by virtue of buying virtual goods but are not active within it.

The Virtual Economy does not have 2.5 billion participants yet. Its constituents are primarily designers and developers creating assets for publisher-owned marketplaces, active asset creators and investors in distributed open marketplaces, and illicit traders in gaming environments. This population is likely in the hundreds of thousands rather than the millions or billions.

Yet 2.5 billion is a useful measure of the number of people who stand to benefit from open Virtual Economies or have the capacity to engage with the Virtual Economy. It shows that there are up to 2.5 billion people actively accruing and storing virtual assets. They invest their time and money acquiring assets that are useful to them and millions of others within specific virtual domains.

Pirates, Producers and Pioneers

The constituents of any emerging market opportunity tend to be a potent constellation of idiosyncratic characters and entrepreneurs. It takes time for the rules to be defined and for the institutions to be created, for best practices to emerge and for reputations to develop.

Until that time, these markets are a figurative Wild West. In the case of Virtual Economies, this is exacerbated by the speed at which contemporary technology allows these markets to develop and the invisible nature of the virtual marketplace.

L'Atelier identified three different categories of marketplaces that are typical within the Virtual Economy. Each of these marketplaces has different core participants. They can broadly be described as 'Pirates,' 'Producers,' and 'Pioneers.' They exhibit different motivations, incentives and handicaps, depending on the circumstances of the real person behind the avatar.

Pirates are active within massive multi-player gaming platforms. They find ways to sell rare items such as avatars and access keys to other players for real-world currency in breach of the terms of service agreements. If caught, these players are kicked off the platform. Sometimes their activities extend past the terms of service and fall foul of anti-money laundering, counterfeiting and wire fraud laws.

Producers create virtual assets to be sold legitimately within large multi-participant platforms. They are third-party sellers who effectively lease shop fronts on the platform to sell their goods. These sellers can make enormous sums of money selling customised costumes, weapons, skins, and other modifications.

Pioneers are highly technical creators of a wide variety of virtual assets, typically sold through open distributed marketplaces. These entrepreneurs are building new virtual worlds and new categories of assets.

The rest of the Virtual Economy is made of the people who purchase these virtual goods. They are gamers, speculators and entrepreneurs seeking to better their social or commercial reality. People seizing an opportunity to craft a different or alternative reality, to express themselves in new ways, or to invest in their future.

A New Beginning

The roles that people play within the Virtual Economy are often different from how they represent themselves in the real world. New community constructs facilitate the creation of new roles. Technology provides the infrastructure for new systems, and anonymity

allows people to express themselves in new and unique ways. Gender, race, age, disability and even physics are no longer the limitations they are in the real world.

This unlimited capacity for self-expression has resulted in extraordinary digital diversity. People tend to express themselves in far more radical forms, whether that’s their appearance, their abilities, their communication, or their communities.

> These new points of interaction create opportunities for value creation unique to virtual worlds. The extravagant can become mundane, and the mundane extravagant, depending on the social dynamics.

To understand the reasons and motivations for existing in the Virtual Economy, L'Atelier talked to dozens of its participants. They expressed the same drivers that steer actions in the real world. Their motivations are distinctly human, common and ancient, ranging from the simple to the complex, from the righteous to the nefarious. They often include a desire for wealth, a need to belong, a desire to play, a need to express oneself, and a desire to exert influence.

For many, it is a new beginning, an opportunity to reorientate themselves, to redeem themselves and to throw off the shackles of outdated perceptions. To be the person you are, rather than the person others know you to be.

For some, it is the only opportunity to escape an unfulfilling economic reality, a way to accumulate wealth, power and reputation amongst an audience of millions, regardless of your beginnings.

For others, it is the opportunity to play god, to create a world of their own design. To build empires and planets, and worlds that obey their command.

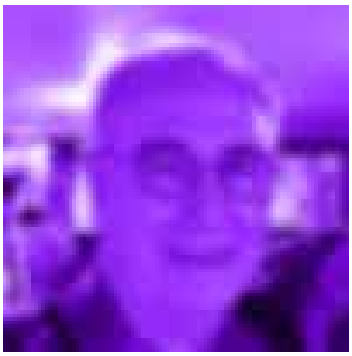
For many, the Virtual Economy augments real-world needs and desires, filling the gap created by geography, disability, wealth, or personality.

Virtual environments offer a solution to many of these needs and desires in a way that costs less, is easier to attain, and requires less emotional or reputational commitment.

Grandpa Gaming

IRL:

GrndpaGaming, retired U.S. Navy veteran



In-game:

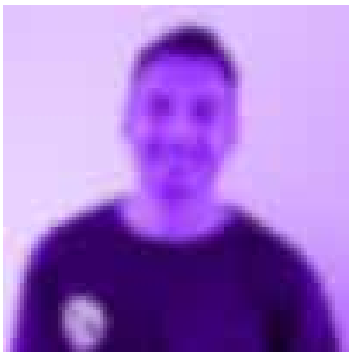
GrndpaGamingTV in Apex Legends

GrandpaGaming, 67, is a retired U.S. Navy veteran and a popular Twitch video game streamer.

Matty

IRL:

Matty, Founder of DCLBlogger, NFT Trader



In-game:

Matty in Decentraland

Matty, 30, trades cryptocurrencies, virtual land, and digital collectibles for a living.

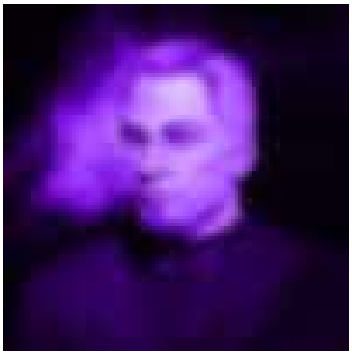
The Mittani

IRL:

Alexander Gianturco, Goonswarm Federation CEO, Lawyer

In-game:

The Mittani in EVE Online

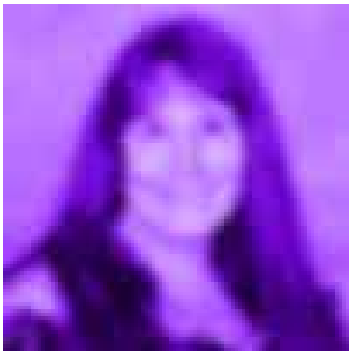


Alexander Gianturco, 41, leads a 30,000-member alliance in the MMORPG EVE Online.

Estelle Foxtrot

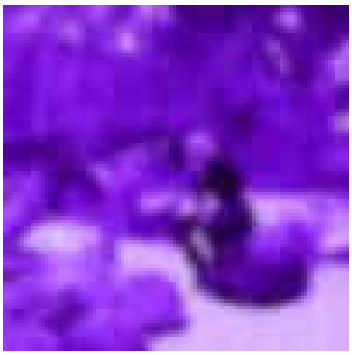
IRL:

Dr Estelle Codier, author of Teaching Health Care in Virtual Space



In-game:

Estelle Foxtrot in Second Life



Dr Estelle Codier, 65, is a retired professor and a former critical care nurse who uses virtual simulation platforms to teach health care.

Eltetra

IRL:

Théo Jordan, Entrepreneur, President of handi-esports team Rebird

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In-game:

Eltetra in Red Dead Online

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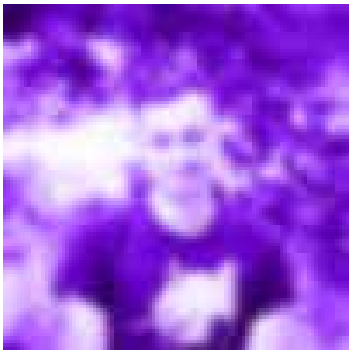
Théo Jordan, 25, leads French handi-esports team, Rebird, and a boutique manufacturer that builds joysticks for handi-players.

Sikander

IRL:

Alex Dobro, Entrepreneur, Journalist, LGBT Activist



In-game:

Sikander in World of Warcraft or Final Fantasy XIV

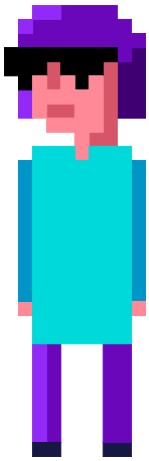
Alex Dobro, 29, is the founder of Next Gaymer, a non-profit that convenes and supports French-speaking LGBT+ gamers.

Emerging technology has always created a need for new jobs. Printers, engineers, astronauts, radiographers, and more recently coders, are all examples of these tech-instigated jobs. This form of emerging labour is familiar to us. These jobs respond to existing needs through improved solutions.

Far less frequently do we see a conflux of technologies spawning an entirely new market with entirely new needs. Internet search, social media, ecommerce and cloud computing all resulted from multiple technologies intersecting with overwhelming social

change. Social media influencers and search engine optimisers, for example, emerged to meet the new demands by these industries.

The Virtual Economy is the newest example of many technologies converging to facilitate the emergence of a new labour market. Young people, unable or unwilling to access the upper echelons of traditional careers, are finding ways to earn income and build a reputation through novel activities unique to virtual spaces. From builders to entertainers, athletes to investors, a whole new spectrum of labour is emerging, virtually.



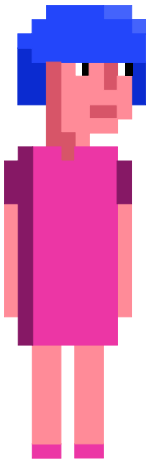
Esports Pro Player

Population Size

~100,000

Income Range

$25,000-$3,000,000



Modder

Population Size

~100,000

Income Range

$17,000-$40,000

Events Coordinator

Population Size

~150,000

Income Range

$30,000-$75,000

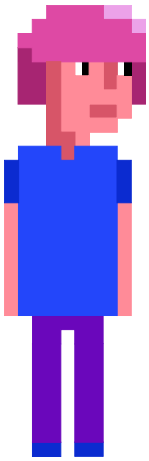
Indie Game Developer

Population Size

~40,000

Income Range

$7,000-$100,000



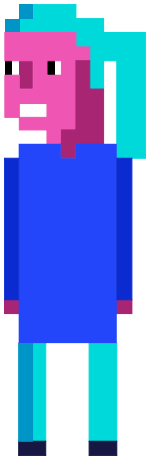
Influencer Talent Manager

Population Size

~10,000

Income Range

$28,000- $94,000



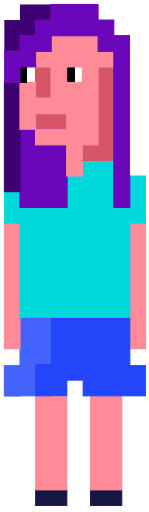
Digital Asset Creator

Population Size

~40,000

Income Range

$17,500- $122,000



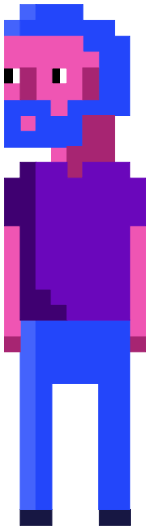
Esports Partnership Manager

Population Size

~800

Income Range

$54,000-$138,000



Esports Coach

Population Size

~2,000

Income Range

$22,000-$140,000

Workers

The Modder

James Delaney — Founder of Blockworks & Professional Minecraft Architect

James Delaney, 24, became a modder “by accident.” When he was 14, his love for Lego drew him to Minecraft, the now hugely popular game in which players explore, build and destroy Lego-like virtual worlds made of 3D blocks.

He came for the fun but stayed for the creative and professional opportunities. For a year or so, he worked with a small group of fellow Minecrafters on building commissioned custom worlds in the game, known as maps. The side gig quickly turned into a main project. In 2013, Delaney started Blockworks, a collective of designers, artists and developers around the world that use Minecraft as a design and marketing tool to create experiences, brand promotions and custom builds for corporate clients - from film studios, to marketing firms, and educational institutions.

The group has built environments ranging from a Minecraft map commemorating the Great Fire of London of 1666, to a Minecraft city filled with real-world climate initiatives and technologies. An architect by training, Delaney is currently pursuing a degree in urban design and is working to expand the scope of Blockworks projects to real-world urban planning and construction.

The Great Fire of London recreated in Minecraft by Blockworks. Image credit: Museum of London.

Delaney is part of a growing number of professional modders, people who create modifications for existing games and virtual worlds in the form of characters, skins, model reworks, map upgrades, or changes in game balances, among others.

Modification and custom in-game work has been a staple of gaming and online interactions since the early days. From designing skins or maps, to creating smaller games from the ground up, virtual worlds offer the perfect canvas for artists and graphic designers to experiment, improve their skills and even make money.

As with Delaney, more often than not, modding or development starts as a labour of love. Projects are done out of an urge to improve a game or to share creative works with a like-minded community. Those good and passionate enough are increasingly turning modding into a part-time job.

Recent years have seen further monetisation of these activities - a gig economy has emerged for artists, graphic designers and the like to make or contribute to the steady stream of in-game items that drive microtransactions across games. Whether through channels like the Steam workshop, specialist distribution sites like NexusMods, or virtual worlds like Second Life or Decentraland, the creation of new and custom assets for games remains a staple of online interaction. Some modders have gone on to launch careers in independent game development.

The exact number of modders globally is hard to pin down. NexusMods alone has close to 99,000 Mod Authors. Incomes for solo modders not directly employed by game development studios or publishers vary as much as the types of modders around - as low as $500 and up to about $50,000 annually.

Mods for games have historically been mostly free. This means that many freelance mod makers earn a living via direct support from communities or by pursuing other gig-based work.

Blockworks didn’t need this kind of support as they built a name early on. When Microsoft bought Minecraft in 2014, and new guidelines prevented brands from doing in-game ads, Delaney and his team were able to pivot to doing work with Microsoft directly. Blockworks was also among the first wave of partnered creators when Microsoft launched a dedicated Marketplace for partners and vetted sellers to sell maps, skins, add-ons and other content for in-game currency.

Not too dissimilar to Blockworks, collaborations between modders, developers and other artists are becoming more common. An artist may hire or collaborate with a 3D modeler to convert their skin or asset design to a usable model in game. This creates a heavily embedded social network within given subgroups or modding scenes.

The Esports Pro

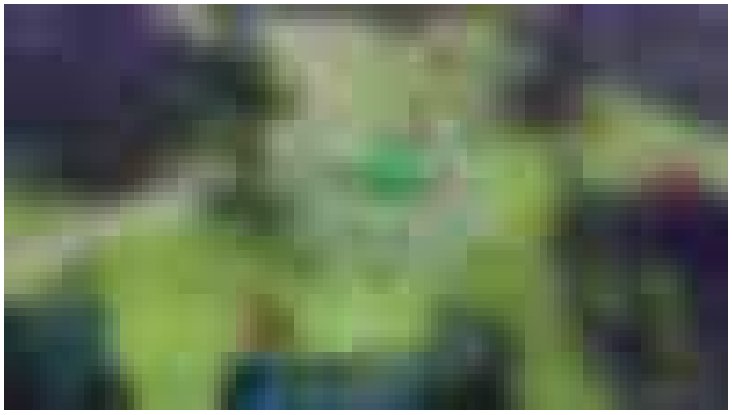
Maroun 'GH' Merhej — Professional DOTA 2 Player

Maroun ‘GH’ Merhej, 25, plays DOTA 2 8-13 hours a day, seven days a week. On most days he would wake up, work out, play three games, rest, play another five games.

Each game takes 20 minutes to prepare for and 30-40 minutes to play. His routine ramps up in the couple of weeks before a major tournament: wake up, work out for two hours, play alone for 3-4 hours, practice with the team for eight hours, play alone for two more hours, go to sleep. Repeat.

Merhej is a professional esports player in DOTA 2, a multi-player online battle arena video game pitting two teams of five players, with each team occupying and defending their own separate base on the map. The fast-paced game is a cultural juggernaut among gamers, with around 10 million monthly active players.

It has also spawned one of biggest leagues in esports, the fast-growing business of competitive gaming. The upstart industry generated more than $1 billion in revenues in 2019 from prize pools, sponsorships, merchandise and ads, and attracts hundreds of millions of spectators, cheering superstar teams competing in large sports arenas.



DOTA and its successor DOTA 2 started as a fan "mod" project in the 2000s and grew to be one of the biggest brands in esports. Image credit: Valve Corporation (Steam)

Merhej has been playing DOTA 2 for 12 years, first as a hobby in his native Lebanon and then as part of Lebanese team E-Lab. In 2017, having quit law school to focus on esports full time, he joined Team Liquid and went on to win, among others, the 2017 International and 4 LANs in a row, an achievement that elevated him to the top DOTA 2 players globally. Since 2019, he has been playing for Team Nigma, a European esports organisation founded by former Team Liquid members.

It’s tempting to view Merhej as a whiz kid with genius in his hands, weaned from the net cafes in Beirut to become a global esports celebrity. The reality is a mixture of talent, discipline, grit, luck and what he calls a “burning passion in your body.” In the budding esports industry, self-made talent is still the norm, the result of tens of thousands of

hours of playing video games as a kid. Like many esports pros, Merhej still blurs the lines between a hobby and a career.

The growing popularity and emerging business models around esports have turned competitive gaming into a viable career for many. Image credit: Valve Corporation (Dota 2)

The top professional esports leagues have soared in global reach in recent years, both in filling out their rosters and in growing their fan bases. There are about 20,000 esports pro players globally - mostly in their teens and 20s - excluding China, where accurate numbers are hard to come by.

These players compete in either franchised structured leagues in the game of their choice, or in the more open tournament circuit style that has defined esports for most of its existence. In almost all cases, esports players are contracted to a team or an organisation, and may receive a base salary, as well as a cut of tournament winnings and sponsorships.

Incomes vary a lot depending on the league, team, and the player’s success and celebrity. Franchised players could earn between $70,000 and $300,000 annually on average from prize pools, salaries, bonuses, sponsorships or secondary jobs like streaming. Top players in top leagues are reported to earn in the millions, but are still mostly outliers.

A recent report by sports betting network OLBG also points to a large disparity in earnings between men and women in esports, with a difference of $189.6 million

between the earnings of the top 10 highest-paid male and female players. According to the study, there are no female gamers in the top 100 richest players in the world.

Unsurprisingly, the growth of esports has spurred a whole ecosystem of support services and jobs aiming to give teams an edge and prevent players from overheating - from physical trainers and psychologists, to specialist lawyers. This is likely to increase the longevity of esports careers, currently oscillating between three and 15 years on average.

Save for a few big names like DOTA 2, CS:GO and League of Legends, esports titles also still tend to rise and fall, occasionally cutting careers short or forcing players to migrate to other games.

Three years into the top esports circuit, Marhej prefers to soak up the present rather than think about the future. After all, he has an almost life-long career of just playing for the love of the game.

The Streamer

LittleBigWhale — Twitch Video Game Streamer & YouTuber

LittleBigWhale, 25, has been a gamer ever since she played shooter game Duke Nukem with her father and brother when she was 5. The French professional video game streamer is obsessed with first-person shooters, having played extensively throughout middle and high school. She took a brief hiatus during business school to finish a degree in management and international trade.

After graduating in 2017, she was prompted by friends to play PlayerUnknown’s Battlegrounds and ended up streaming on Twitch, the video live streaming service popular among gamers. Like most streamers, at first she saw Twitch as a harmless distraction, a way to collect memorabilia of fun moments with friends. By April 2018, however, viewership on her channel had shot up. She decided to become a full-time video game streamer.

LittleBigWhale is among a host of streamers who have leveraged the growth of video gaming content into a viable job through platforms like Twitch, Mixer and YouTube. At close to 1 billion unique viewers around the world, video game streaming has quickly become the most important new media platform since social media. More people watch gaming video content than HBO, Netflix, ESPN and Hulu combined, according to research house SuperData.

The popularity of gaming and the platforms it spawned have launched professional streaming careers averaging $50,000-90,000 in annual income in North America and Europe, allowing many gamers to translate their virtual reputation into real-world celebrity and wealth. A select few of the most popular streamers are currently boasting tens of millions of followers and revenues of tens of millions of dollars, primarily from direct subscriptions, fan donations, and sponsorship deals.

The exact number of streamers is hard to come by. Twitch alone has about 177,000 users who derive part- or full-time income from streaming.

For streamers, going full time usually means reaching the point where streaming can cover basic expenses. Yet the decision to become a freelancer in that line of work can also come from the rising number of subscribers and growing popularity.

For LittleBigWhale, popularity came before financial independence - she relied on family support for a while before becoming self-sustaining. Most of her revenue now comes from the almost 100,000 subscribers to her Twitch channel, as well as fan donations and paid appearances at events.

It’s not uncommon for streamers to also supplement their income with ad revenue, sponsorships and running subscriber content on member platforms like Patreon. Many streamers also juggle multiple other online jobs - as brand influencers or podcast hosts, for example.

Unlike other video streaming platforms such as YouTube and Mixer, Twitch separates streamers who can monetise their content into two categories: Affiliates and Partners. To become an Affiliate, a streamer needs to have at least 50 followers over 30 days, have broadcast for at least 500 minutes, and have streamed on at least seven unique broadcast days with an average of three or more concurrent viewers. An Affiliate status gives access to advertisements, subscriptions, and donations within their stream.

To become Partners, Twitch streamers need to meet a lengthy list of ever-changing criteria designed to demonstrate audience growth and engagement. A Partner status brings more robust monetisation options and priority tech support.

Being full time, however, can be gruelling. LittleBigWhale streams for eight hours every day, seven days a week. When she is not streaming, she usually does “back-office” work: creating content for her YouTube channel, growing her community, arranging potential partnerships, and training. Days off and vacations are rare.

Mental fatigue and poor work-life balance are not uncommon among streamers, contributing to overwork and, in some cases, burnouts and periods of inactivity. The current lifespan of streaming careers varies between five and 10 years on average.

LittleBigWhale is not naive about the need to diversify and plan for the future in a career that lives off people’s hunger for content, community and entertainment. Even changing the type of content on her channel might mean losing some of her subscribers.

But she says she is focusing on fully embracing her time as a streamer while it lasts. Beyond the passion for gaming, she values the interaction with her followers and the fun moments. After all, streaming without the community would be just another regular job.

The sale is scheduled to take place at Charleston Station, in the heart of Appalachia, a sensible choice given the nature of the transaction. The station is well populated and secure, and most people are rushing to their destinations. It’s easy to blend in. It’s the perfect spot to pick up a highly coveted weapon: the Two Shot Explosive Light Machine Gun, a necessity for survival in the wastelands of post-apocalyptic West Virginia. The total cost for this new state-of the-art weapon? Just under 10 euros. This is what it costs to own one of the rarest items in the game Fallout 76.

The sale of virtual gaming goods on grey market platforms has spawned a wide variety of digitised black-market occupations. Some are digital gun runners, counterfeiters and thieves who use the vast and largely unregulated gaming universe as cover for their illicit activities. They are earning large sums of real-world money.

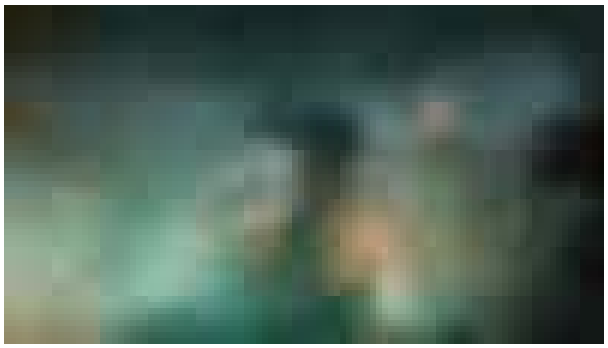
Most illicit online activities boil down to three major motivations: the lack of legal alternatives for player needs, the opportunity to create new revenue streams, and the lack of oversight.

The three motivations are all present in the above example from Fallout 76. First, the seller seeks an in-game item that can only be secured by grinding and isn't available for sale through official or sanctioned channels. The seller uses online sites such as eBay, Reddit and Discord to list their items, collect payment, and coordinate the exchange details. In this particular case, the seller is selling a duped item.

Online platforms make listings of illicit virtual gaming goods easy to find. Once the buyer makes the purchase, they are contacted by the seller to coordinate an in-game location for the trade. In this scenario, the buyer assumes all the risk. They have already purchased the item. There’s a chance the duped item will be removed in the ongoing

updates by the game publisher or that the seller won’t show. There is also the chance that even after the exchange, the item might not be as described.

While the seller risks having their account banned, they can easily create new accounts across these platforms to evade detection.



The success of games like Fallout 76 has resulted in a wild multibillion-dollar world of online grey and black trading of in-game currencies and virtual goods, casino gambling, money laundering, and online piracy. Image credit: Bethesda

In the case of Fallout 76, game publisher Bethesda rolled out a massive update to the game in February 2019, specifically targeting duped items and players that have multiple copies of rare in-game assets.

“These removals are highly targeted at a specific list of items,” the official statement said. “Players who used an exploit to dupe items or acquired duped items from other players may find those items removed from their accounts once maintenance is complete.” This means that if you own one duped gun, you get to keep it. But if you were a gunrunner with hundreds of copies of the same gun, you might log in and find your inventory depleted.

The developers also announced restrictions to the amount of weight a character can carry to prevent players from hoarding thousands of pounds of powerful weapons that unbalance the game’s economy and negatively impact overall game play. In response, dupers have created multiple extra characters - dubbed “mules” - for the sole purpose of loading up on the contraband items.

As one player stated on the Fallout 76 subreddit, it made their experience of being a trader - a legitimate occupation within the game - no longer feasible. “When I learned we could trade in 76, I was ecstatic,” he wrote. “The thought of wandering the

wastelands buying and selling, making friends and experiencing the wasteland in another light was too great to pass up."

It was fun – until the duping started. "No longer were folks interested in anything other than the highest items, why should they be with so many available and the prices falling lower and lower by the day. This killed the trade for legitimate traders and brought about consequences to all." He ends the post stating that "a few players made fortunes selling these duped items while the rest of us silently paid and continue to pay for these actions. I have begun to abandon the idea of being a trader."

Other players have taken a more aggressive approach to address this issue, forming bands of online vigilantes that hunt down and kill suspected dupers, though several innocent players have been caught up in the crossfire.

"I collected a bounty on a duper, and after realising he had dropped thousands of his mats, I dumped it all in the river," read one post. "I hope he enjoyed wasting hours of his time." Someone even published a (now deleted) guide entitled *How to Hunt Dupers for Fun*, unsurprisingly identifying sites like Charleston Station as a prime location to spot dupers.

The Virtual Gaming Goods Ecosystem

People access markets for virtual gaming goods for many reasons. According to Vili Lehdonvirta, a digital economies specialist from the Oxford Internet Institute, users typically buy digital goods for the same reasons they purchase physical goods: status, recognition, and affiliation to specific subgroups and communities.

Functional gaming goods are often purchased for similar reasons, though improved game play is a frequent motivator. Players also seek legendary or hard-to-secure items for credibility and social status within the game without putting in the time to acquire them legitimately.

Economic factors also play a big part. These include players who have received duplicate items they want to sell, players seeking rare items, or players who have decided to stop playing a game and are seeking to recoup some of the costs they've incurred.

> Whether through legal or illegal means, these online grey markets have become lucrative sources of earning real-world income, a new digitised underground extension of the gig economy.

The rise of these activities is also directly proportional to the increasing popularity of microtransactions as a business model for video games, especially when players are required to purchase in-game currency with real-world money. This creates an instant consumer demand for cheaper prices, resulting in underground marketplaces specialising in selling in-game currencies at a vastly discounted price.

Lack of Legal Alternatives

Historically, grey markets emerged to meet a need that was not supported by game publishers - for example, the sale or exchange of in-game items or currency, or other transactions that are not allowed within the game.

Grey markets are risky for gamers as the game publishers don't offer any support for transactions that have gone wrong, especially in the case of a scam. If a buyer purchases an item by mistake, receives the wrong product, or runs into any other issue, they must use the marketplace's support services. This makes it more complicated than using white markets, where the game publisher can issue refunds or address any technical problems directly.

Most of these markets, such as Lootmarket.com, trade in-game items for real-world cash. Additionally, markets are at the whim of game publishers. This was the case with LootMarket when Valve blocked all of the accounts associated with the marketplace, preventing users from fulfilling trades. As of April 2020, this issue remains unresolved, leaving the fate of the marketplace unclear.

Grey markets are controversial within some gaming communities. Some players believe that purchasing legendary or hard-to-acquire items compromises the gaming experience for those players that invested the time and energy to gain these items honestly. This is especially true for marketplaces that sell high-level characters as players take pride in achieving in-game status markers and winning gear through hard work.

> A major reason this market is underserved is the lack of trusted, secure, and transparent infrastructure to facilitate the exchange of virtual goods. Available platforms are still inefficient and vulnerable to exploitation.

Consumer pain points include the legality of ownership, the limitations on exchanges and sales of items as outlined in the terms of service of many games, and the lack of cross-platform exchange enabling gamers to trade items from different games with each

other. While third-party marketplaces, forums and social online communities have popped up to fill this need, the lack of oversight, transparency and security make using these options risky for players who have accumulated valuable items.

New Business Revenues

Video gaming has spawned multiple ways to earn money through the sale of virtual assets. Black markets, for example, have emerged to facilitate the transaction of in-game currencies that could be purchased with real-world money. Vendors can earn money by selling various digital goods, including virtual gaming items, in-game currency at a discount, game keys, and even fully leveled accounts. For every item a gamer wishes to acquire, there is a vast and complex ecosystem of suppliers waiting to meet that demand.

Generating revenue is also facilitated by the scores of online platforms available for making these transactions. In addition to dedicated marketplaces for virtual gaming items, such G2A and Loot.Farm, many transactions happen across social media platforms on sites like Discord, Reddit, Instagram, eBay, and various online chat forums. This makes it difficult for gaming companies to shut down sources of illicit trading activity as they are so widespread and difficult to track.

Finally, the relative ease of selling digital goods has made selling virtual assets a viable way to supplement income for many people. It can be done outside normal business hours - including in between gig job shifts - at night, or on weekends.

> In one interview, an eBay Fallout 76 reseller explained his motivations saying, “I noticed a demand for items and a market I can invest my time in, so I took advantage of it.”

In addition to promoting and managing the eBay store, they described having to manage 70 different game characters over 12 different PlayStation accounts. This allowed them to slowly build up a reputation leading to steady business, claiming earned revenues of $55,000 in 10 months.

Finally, from a geopolitical perspective, these online economies are becoming essential revenue streams for survival. In crisis-stricken Venezuela, citizens are turning to virtual economies in order to generate income. They play RuneScape and farm the in-game currency, which they then sell to other players for real money, enabling them to earn more than through a regular job. Players earn $40 a month when the average minimum

wage is $7.50 a month. This is also present in WoW Gold, an in-game currency in World of Warcraft.

Illicit Activities

Illicit activities are any transactions that are in direct violation of both the gaming terms of service and gaming culture generally. This includes the creation of counterfeit virtual goods, in-game currency or character framing, and selling cheat codes. Illicit gaming activities represent a growing threat for the industry as incidents of fraud, hacking and other malicious activities target gamers seeking to buy or sell virtual gaming items.

Many illicit activities require users to give the seller access to confidential account information in order to complete the unsanctioned transaction. Not only can players have their current virtual assets stolen, but scam artists have also been known to use this method to access credit cards and other sensitive account information.

Money-Laundering and other scams on Fortnite

Criminals are using Fortnite’s in-game currency, V-Bucks, to launder money. V-Bucks are typically purchased with stolen credit cards or prepaid cards and then sold at a discounted price on a variety of platforms, both on the deep web and across social media platforms.

Payments made with cryptocurrencies are particularly difficult to trace. Total profits are hard to estimate, but security firm Sixgill tracked the sale of $250,000 Fortnite items on eBay during a two-month period in 2019.

IT security firm ZeroFOX identified 53,000 different online scams related to Fortnite during a one-month period in 2018, including phishing websites that were made to look like the real game. This included fake “V-Buck generators” designed to lure unsuspecting players into entering their login information and credit card details.

Money laundering has become an industry-wide issue, with game publishers and law enforcement agencies struggling to contain the risk. In late 2019, Valve announced that Counter Strike: Global Offensive (CS:GO) players would no longer be able to trade container keys - in-game loot boxes with virtual goods that could be purchased from Valve and sold to other players for real money - due to high instances of fraud.

“Worldwide fraud networks have recently shifted to using CS:GO keys to liquidate their gains,” the publisher wrote in a post. “At this point, nearly all purchases that end up being traded or sold on the marketplace are believed to be fraud-sourced.” Players can still purchase container keys but can’t sell them to other players.

Hacking FIFA Coins

In game speak, *hacking*is when players use third-party bots or other software to gain an unfair advantage during game play, such as giving a character increased speed, fire power, or information to complete a mission.

In 2016, Anthony Clark, member of hacking group Rane Developments, was found guilty of conspiracy to commit wire fraud for using a bot to mine FIFA Coins and then sell them on a secondary grey market. According to the FBI, Clark and his fellow hackers generated between $15 and $18 million from the scam.

FIFA Coins are an in-game currency that can either be purchased for real-world dollars, or earned through various online actions, such as playing matches. Clark and his friends built a tool that tricked the game's servers into thinking that he was competing in matches, generating a large amount of in game-currency quickly.

> Despite efforts to combat illicit market activities, players, vendors, and criminals continue finding ever more creative ways to adapt to evolving technology and evade restrictions. They find new loopholes to exploit and continue to profit from emerging unmet needs.

Whether it's the desire to pay below-market prices, to secure rare or coveted gear, or to find anonymous channels to cover illicit activities, the gaming ecosystem provides endless ways to implement new business models and find new revenue sources. As the video game industry continues to grow, so is the sophistication, ingenuity, and reach of the markets that thrive within its shadow.

New frontiers have always attracted colourful characters. Resourceful, intelligent, intrepid, idiosyncratic and often iconoclastic misfits in search of something new or something greater. Those content with their lot rarely set forth in search of grand adventure, regardless of the domain.

Digital domains are no different. They have captivated the attention of restless youth for decades. The combination of entertainment, geek culture and social interaction with peers holds a distinctive and contemporary allure.

Like the discovery of gold in the old American West, the emergence of the Virtual Economy has only increased the migration to virtual spaces. The opportunity to excel and to make a name for yourself outside of the strict, unmoving confines of traditional social parameters is too attractive to ignore for many.

From Second Life to Entropia Universe, World of Warcraft to Decentraland, thousands of these pioneers have emerged. Entrepreneurs, administrators, criminals, academics, engineers and investors have found their fortune and made a name for themselves within this new universe.

Fifteen years into the mass adoption of virtual gaming and simulation environments, the Virtual Economy is still largely based on stand-alone marketplaces - closed worlds, where data and content are centrally owned, stored and managed.

> Yet a host of pioneers are building for the Virtual Economy what computer scientists built for the early Internet - new infrastructure that links disparate platforms, or in some cases, a brand-new operating system with decentralisation at its core.

Unlocking a New Asset Class

In 2015, American Ethereum enthusiast Tyler Smith presented at DEVCON1 in London a novel idea to port game assets into the blockchain. The aptly named FreeMyVunk proposed to use blockchain technology to create a secondary market for people’s "vunk." The platform aimed to give gamers a way to trade their virtual assets directly from digital wallets, both in game and across games.

A former oil and gas exploration geophysicist and the co-author of papers about the Antarctic Ice Sheet evolution, Smith knows the potential of untapped resources to become the raw material for a new industry. FreeMyVunk was born from the notion that a new asset class of virtual objects trapped within virtual game worlds constituted a valuable stagnant resource. What the world needed was the right technology and infrastructure to access it.

FreeMyVunk set out to unlock this promise by giving video game developers the tools to easily deploy their in-game virtual assets on the blockchain. Virtual goods, when turned into tokens and put on a distributed ledger, could travel easily and securely between users, and even across games. A Counter Strike gun skin, for example, could be used to decorate a gun in League of Legends. A house built in Minecraft could be sold and resold at a profit.

FreeMyVunk was one of the first Ethereum applications and one of the earliest attempts to create a legitimate and decentralised trading platform for virtual assets. While most of

the blockchain community obsessed over cryptocurrencies, Smith saw more promising use cases in community applications like games.

The Ethereum blockchain made it easy and cheap to issue a token and create services with just a few lines of code, without the need for users to build their own infrastructure. This facilitated a significant evolution in the nature of virtual goods, allowing the creation of new types of virtual assets that could be identified, traced and unique. It allowed transacting for purely virtual items for purely virtual activities via purely virtual platforms.

The FreeMyVunk marketplace used proprietary VUNK tokens to post trade offers and Ethereum escrow contracts to trade. These native tokens were added to people’s digital wallets in exchange for spreading the word about the project. Social media bots tracked every time a registered FreeMyVunk user posted about the project with the designated hashtag.

People who had accumulated VUNK were able to trade for free. Those who joined later had to buy VUNK to participate. VUNK tokens also gave their holders the right to vote on decisions within FreeMyVunk’s decentralised governance platform.

To grow the ecosystem of compatible gaming environments, FreeMyVunk collaborated with video game developers to enable asset issuance and registry, and provide in-game connections to Ethereum wallets. When a player signed up, they would get a digital wallet designed to receive and store any new type of asset created by the developer. The players could then send their game tokens to each other, provided they both had a token-enabled wallet.

The Ethereum blockchain served as an expandable multi-game database - it would log in all new assets as tokens, track who owns them, and securely store them. Tokenising the assets established their value and scarcity. Placing them on the Ethereum network also allowed everyone to verify transactions.

FreeMyVunk picked up respectably, at first, attracting more than 2,000 token holders and one of the largest Ethereum communities at the time, who packed up in Slack channels to discuss how the project should work. Ads for FreeMyVunk featured in games like Entropia Universe.

But Smith admits the idea was some years ahead of the market’s capacity to adopt it. Like most pioneering projects, it lived off a mixture of “hubris and enthusiasm.” Somewhere in the FreeMyVunk vision was a more humble reality. One that had the same story, but was written for the future. The still rudimentary Ethereum

blockchain of 2016 lacked some of the technical capacity to fully support the premise in practice.

Despite the initial momentum, Smith dropped FreeMyVunk in 2016 to pursue another blockchain project for his then-employer, mining giant BHP Group. He has since become a full-time blockchain consultant.

The desire to push the virtual token economy into the mainstream has spawned a host of projects looking to build new assets and ways to price and exchange them. Platforms like OpenSea and Enjin Coin - a blockchain gaming development platform that allows users to create tokenised assets - have emerged to fill the void left by FreeMyVunk.

> They bank on the premise that an open, liquid marketplace that lists a critical mass of assets could power a new Virtual Economy around emerging asset classes like NFTs.

Save for a few experiments, mainstream game publishers have so far shied away from adopting tokenised ecosystems for their game economies, citing - among others - technological limitations, frictions to the user experience, and a fear of losing control over users, content, assets, and revenue.

“What we need is a standard plug-in that people put into their game and can immediately access a marketplace in the game,” Smith said.

In this scenario, game developers would still have the power to define what traits they want to facilitate within the game and which assets could be traded on which marketplaces. This would allow players to exchange assets across the ecosystem of the same game publisher - therefore, incentivising users to stay engaged for longer - or across the games of different publishers. The vunk could finally get free.

Building Scale

It’s one question to free new assets, it’s another to be able to exchange them at scale. If there is a problem worthy of a pioneering solution, it’s the scalability of distributed ledger technology.

Blockchains face a near-impossible trilemma: a trade-off between the need for decentralisation, security, and the number of transactions they can process per second, otherwise known as “scalability.” Decentralisation is the central premise of distributed networks, but it comes at a cost. The need to verify transactions by distributed consensus makes the network safe, but slow. Balancing these three features might be

the holy grail of distributed technology. And it has become an obsession for many in the Ethereum community.

Sandeep Nailwal, a 33-year-old civil entrepreneur in India, jokes that scalability is his “only passion.” His previous startup - an Indian Alibaba of sorts - was doing well, but wasn’t scaling as quickly as it needed to. To grow his business, he turned to emerging technologies, notably machine learning and blockchain. Finding the blockchain holy grail was the red pill, and down the rabbit hole he went.

In 2017-2018, he co-founded Matic Network, a blockchain scalability platform. To enable faster transactions, Matic creates a network of new blockchains - called sidechains - attached to the main Ethereum blockchain. This allows the majority of the transactions to be offloaded on the sidechains and then batched into the Ethereum main chain. Bundling transactions then reduces congestion and costs.

If real-world commerce and games were to port their assets to the blockchain, the faster transaction speeds could one day power near-instant cross-border payments, virtual loans, or the transfer of in-game assets like NFTs. The new type of ownership allowed by NFTs, in particular, would require immense bandwidth and flexibility.

While Ethereum can handle between 15 and 20 transactions per second (TPS), Matic can theoretically allow up to 65,000 TPS on a single sidechain. By contrast, VISA can handle 24,000 TPS. Alternatives to Matic’s framework known as “rollups” are also being developed, claiming a capacity of 50,000-100,000 TPS. This is currently enough to service the volume and frequency of transactions in more sophisticated games.

> Even simple games have hundreds of transactions a day. In 2017, the cat-collectible NFT game CryptoKitties generated $2.7 million in transactions in its first week.

The game alone accounted for 15% of the traffic on the Ethereum network, causing delays in transactions and forcing the developer to increase transaction costs to reduce demand and ease congestion.

Indeed, as the network gets more congested, transaction fees balloon. While they range between 10 to 30 cents on a normal day, they can rise up to $5 to $10 in the busiest times. This destroys both the pricing consistency for the end user and profitability for developers.

Moreover, the current user experience on blockchain tends to be clunky, forcing users to install browser extensions or go through multiple sign-ups. It also requires confirmation

pop-up screens at every step. It’s only natural to see projects like Matic that focus on streamlining purchases and the user experience.

Nailwal estimates the average daily number of people interacting with blockchains, including cryptocurrencies, to be between 100,000 and 500,000 currently. This level of demand would not necessarily justify the need for exponential scaling of TPS. In fact, both Bitcoin and Ethereum blockchains fees and waiting times normalised quickly after the 2017-2018 bubble.

Yet he believes that blockchain gaming will play a big role in mainstreaming and growing crypto-based ecosystems. Even if one major game adopts the technology, it could mean an influx of millions or tens of millions of users. Assuming that most games don’t want to implant every user action in cryptographic security, blockchain technology under development is nearing the point where it could facilitate financial transactions in virtual worlds.

> The Virtual Economy was inevitable. It’s been forged by technological capacity, creative curiosity, and the opportunity to design worlds that allow for new and greater forms of self-expression.

But the Virtual Economy in its emergent form is a direct consequence of the social, economic and political stresses of our time.

Wealth and income inequality are profound societal problems and the defining issues of the last decade. They are the seed from which civil strife, political upheaval, economic malaise, and industrial renewal have sprouted. This has created a bulwark of climate action resistance, institutional distrust, and a systemic indebted class for whom social mobility is almost impossible.

A world of limited resources only has so much to offer; and what it does have is owned and controlled by a small proportion of society. Wide acceptance of this idea by the pioneers of the broader metaverse is shaping the Virtual Economy we see today - a world of new opportunities for income, relationships, ideas, and purpose.

These worlds tend to be entirely virtual, designed to be enjoyed either through proxy avatars, or personal immersion in VR. It is within these worlds that we see the emerging demand for assets and services in what we have introduced as the Virtual Economy.

> But it is only the beginning. The Virtual Economy is on the cusp of a massive, rapid and pervasive expansion into our day-to-day existence.

Augmented reality contact lenses, audio implants, connected infrastructure, improvements to cloud efficacy and Internet speeds will give birth to new layers of reality that exist between the natural world and the fully immersed environments of VR and gaming.

Within the decade, we will see the preliminary use of sophisticated bio augmentations. Audio implants will improve hearing, dull unwanted sounds, translate language, register music you enjoyed and conversations you had. Olfactory implants will use gentle electrical stimulus to improve sensorial experiences or alert people to dangers like gas leaks, smoke, or burning food. We will alter our understanding and expectation of sensorial stimulus through bio-integrated technologies.

The practice of biological augmentation is already common. Cosmetic surgery has become societally normalised. Connected device augmentation is just the next iteration of the human desire for sensorial maintenance and greater capacity. It will emerge within a connected world, where people, devices, infrastructure, and the environment are all connected through networked IoT architecture, and where Internet speeds make real-time, zero-lag interactions the standard.

The most extraordinary impact of bio-augmentation will be visual. Mixed reality contact lenses, a precursor to optical biohacking and augmentation, will, at a basic level, radically change social interactions. Optics technology will first augment traditional vision, dynamically adjusting for myopia and hyperopia, enriching the vibrancy of natural luminescence, and adding safety features that use subtle colour indicators to highlight risks.

But as visual augmentation evolves, the utility of the technology will expand beyond the mundane, frivolous and functional accessories enjoyed by early adopters into essential social and professional tools, as well as extensions of personal identity.

Purchases would be made easy through visual interactions. Premium apps and memberships will be offered to synchronise your social accounts to your lenses through hand-held, cloud-connected console devices. This will provide users with immediate recognition and visual information of people, places, and things in your environment.

You will never forget a face again. You will be able to see the equivalent of someone's Linkedin, Facebook, and Twitter profile hanging just above their heads - who are they, what's their job, what’s their relationship status, where did they go to school, what music do they like, and who or what do you have in common.

You will be able to connect to public APIs or buy access to private databases to get even more information and analysis on everything you can see. It will create an entirely new field of vision, located between the interaction and the Internet. It is within this new domain of reality that the Virtual Economy will thrive.

New visual capacity will also allow for new forms of engagement - non-verbal interactions; virtual tattoos and symbols; digitally altered clothing, digital assistants and virtual entourages that follow you around; virtual pets capable of interacting with the world, people and the characters around it; custom-tailored advertising on virtual billboards. To see someone within this virtual world is to see an entirely different aspect of them. A virtual multi-verse of artifacts and inhabitants sitting on top of our natural spectrum of awareness.

Fully virtual environments will continue to exist. Centralised and decentralised platforms for gamers and VR enthusiasts, educators and therapists, world builders and virtual adventurers will become ubiquitous, familiar to all.

> But the future of the Virtual Economy will expand out of platforms into highly connected, augmented physical environments.

The new jobs and assets of the Virtual Economy will manifest within the layers of new reality that exist within our field of vision.

Depending on the parameters that you have set or subscribed to, this new virtually augmented crypto-world may appear foreign and peculiar. Cities will create easily modified virtual overlays to improve urban aesthetics. Amended architecture that alters the physical environment around us will change the structure and colour of buildings, and make it possible to interact with them. New flora and fauna will appear in the skies above us. Strange new creatures and plants will appear everywhere.

Companies will design virtual interiors with new integrated tools to improve work ambiance and productivity. Virtual furnishings and ornaments will become common in people's homes. Flowers and trees will appear to bloom in winter. Unique offers will appear to you based on your profile. Large events will occur, invisible to those without the technology to see them.

Communities will adapt these environments according to their own specifications. Depending on your associations and seniority, you may see and access virtual features unavailable to others. Myriad worlds, changing constantly, distinctly particular to the

viewer based on their preferences, subscriptions and merit, will undermine social consensus and challenge the philosophy of perception.

It is clear that a technological shift this significant will, whilst providing new opportunity, also create new disparities, and give rise to new forms of friction and conflict within society. New forms of protest, dissent and illegality will be born without the necessary legislative maturity to manage it. It is clear that this new reality will constitute too much change for many people to willfully incorporate into their lives. It is uncomfortably different. Too big to consider, too much to comprehend for those not native to it.

The Virtual Economy is equal parts enterprise and rebellion.

It is an extraordinary application of labour and capital to cultivate a new form of economic land whilst simultaneously challenging the systems of contemporary neoliberal economics that structurally resist social mobility. It is an elegant manifestation of social need, a demand without violence, a solution designed by the questioner under the nose of the respondent.

It is the great economic opportunity of a generation because of its low barriers to entry and the looming significance of augmented environments. It is the consequence of the exponential speed of change.

The far future has never been closer. What once happened in a decade now happens in a year. And within this contraction of time, a gulf has revealed itself. A gap of knowledge between those who exist on the fringes of society and those who don’t. It is within this gap that the Virtual Economy will exist. It is within this gap that the future is being brought to life.

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The Virtual Economy is the first in-depth exploration of the ‘virtual economy’ - the system of exclusively online marketplaces, jobs, assets, and traders that has emerged across a range of multi-participant gaming platforms and non-gaming virtual worlds.

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