ALPHA SIGMA CAPITAL RESEARCH

Web 3.0 Primer

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ALPHA TRANSFORM HOLDINGS

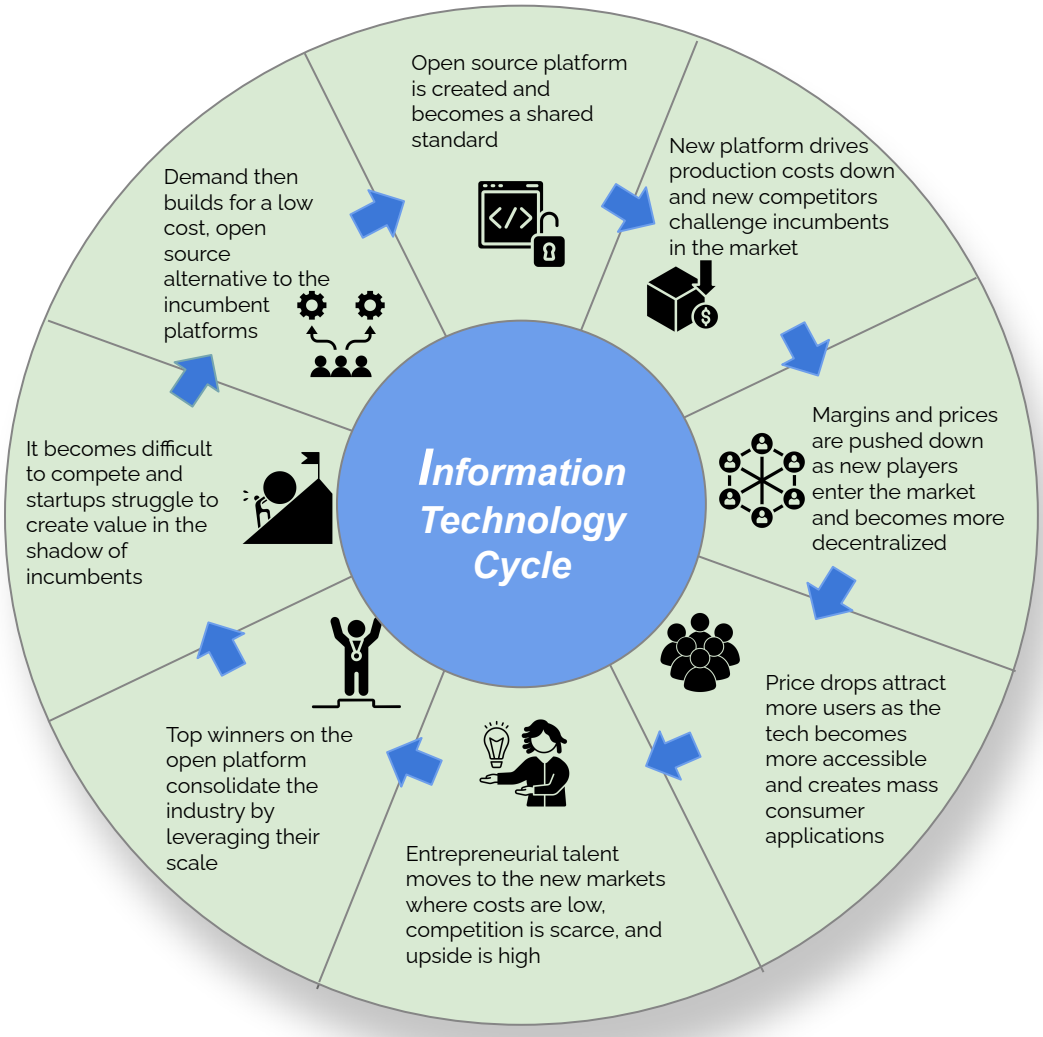
Web 3.0 Primer

RESEARCH REPORT May 2023

Information Technology Cycle

In the past, advancements in Information technology have followed a recurring multi-decade cycle: expansion, decentralization, and consolidation. Web 3.0 is another iteration of the information technology cycle.

The process begins when a new and innovative platform is created, breaking the economic moat of incumbent industry leaders and giving smaller players a chance to compete. As new competitors flood the market, prices decrease and more users access the technology. Eventually, the space matures; the new incumbents emerge, and the industry consolidates. Consolidation makes it tough for new competition, which drives demand for new low-cost solutions. The cycle repeats.



Source: Placeholder September 2017 Thesis

Some Previous Information Technology Cycles, 1950-2010

Examples of this cycle include the introduction of the **transistor** in the 1950s. This new platform replaced the expensive vacuum tubes used in computers with smaller, cheaper and more reliable switches. The transistor created cost savings in production, and created the modern computer industry that eventually consolidated around IBM.

In the 1970's the cycle recurred with the introduction of the **microprocessor**. This new platform decreased the production cost of computers by utilizing a single, small general-purpose processor that was easy to mass produce. New players used the microprocessor to compete with IBM.

As the computer hardware layer became more competitive, new value creation moved to the software layer. The decline in computer hardware prices increased platform sales and led to increased demand for software. Microsoft took advantage of this and built its business around the **operating system**, eventually consolidating power with MS-DOS and Windows. Microsoft also gained market share through its Microsoft Office Suite of products.

While Microsoft gained dominance in the PC era, it faced a competitor in web 1.0 with the emergence of the **browser** and Netscape, and in web 2.0 with the growth of **consumer mobile.**. Challengers here included the enterprise growth of BlackBerry, the much-anticipated iPhone launch in 2007, and a range of affordable mobile devices from Nokia, Motorola and Samsung,

As the cost of mobile devices dropped, demand for mobile applications rose. Apple opened the floodgates with its release of the App Store. This threw gasoline on the rise of mobile compute, and helped Apple become the #1 market cap company in America. Google followed suit with its acquisition of Android and the launch of the Android Marketplace.

Apple and Google become the new incumbents. The spread of iOS and Android enabled growth in other web. 2.0 sectors: social media, streaming media, and app-based commerce. Eventually these web 2.0 winners became collectively known as the market's "FAANG" juggernaut: Facebook, Apple, Amazon, Netflix, and Google.

The power of these new leaders (FAANG minus Netflix, which has ample competition) has prompted increasing regulatory scrutiny across both antitrust and privacy concerns. The passage of GPDR in the EU, for example, is a response to how the data of billions of citizens is being used by FAANG and their cohort.

While history does not always repeat, it usually rhymes. The IT cycle will shift power again – this time to some constellation of web 3.0 capabilities.

Web 1.0, 2.0 and 3.0

1991 — Berners-Lee released World Wide Web
Berners-Lee announces WWW program, including the 'line-mode' browser, web server software, and developer library

1993 — First version of HTML is written
Berners-Lee writes the first Hypertext Markup Language to be used for developers creating web pages

1994 — Netscape web browser released
Netscape Navigator becomes the dominant Web browser as it is optimized for home users browsing at the slow speeds of dial-up modems

2000 — Tech Bubble Crash
Bubble peaks at around $3 trillion before crashing to $1.2 trillion in 2000

2004 — Google IPO
Google goes public and raises $1.67 billion at a $23 billion valuation— proving the feasibility of an internet business model post tech bubble skepticism

2006 — Amazon launches AWS
Amazon begins offering IT infrastructure services to businesses in the form of web services -- now known as cloud computing

2007 — Apple releases first generation iPhone
Steve Jobs launches Apple's first phone, beginning the smartphone and mobile application era

2008 — Great Recession
Subprime mortgage loans lead to an overall downturn in the stock market, tanking most technology-related and risk-on assets

2009 — Bitcoin created
Bitcoin white paper gives birth to the viability of blockchain

2013 — Ethereum created
Vitalik Buterin produces the first decentralized blockchain with smart contract functionality, allowing for multitudes of decentralized applications

2014 — First non-fungible token
The first known NFT, Quantum, is created by Kevin McCoy and Anil Dash

Web 1.0

- Designed primarily for corporations and agencies
- Static web pages and content
- Users are passive; do not contribute content
- Poor user interface
- Difficult to track user data
- Built on open source HTML code

Major Players

AOL, Netscape, Linux, YAHOO!

Web 2.0

- Designed primarily for communities
- Interactive web pages and content
- Users can contribute content
- Optimized user interface
- Easy to track user data on centralized database
- New technologies: APIs, mobile devices, cloud computing

Major Players

Web 3.0

- Designed primarily for individuals
- Decentralized web applications
- Incentivized user content creation
- Customized user interfaces
- Individuals can own user data
- Built on open source languages such as Solidity and Rust

Major Players

ChatGPT, CIRCLE, EPIC GAMES

What is a Blockchain?

A blockchain is a digital ledger of transactions that is accessed from and freely distributed across a large network of computers and participants. Unlike on a centralized database each data instance may be recorded as a separate record, each transaction is submitted into a pool of transactions, which the network groups together and stores on a "block" or segment of pooled data. Once each block is created, it is attached to the preceding block and followed by the next block —thus creating that "blockchain." A blockchain itself is essentially a chain of these blocks, with each block verified and recorded in a way that makes it highly resistant to be hacked or altered. Data recorded on chain can include transaction details such as what was sent, the address to which it was delivered or received, and the time of the transaction, or specific variables relevant to that use case. The data is often processed by self-contained operations called "smart contracts", which process on-chain data to perform functions without the need for human operators. The first blockchain was bitcoin, which was first posited in a white paper released on October 31, 2008, during the financial crisis. Smart contracts were a key component of the launch of Ethereum, which was the second blockchain after bitcoin and which remains the #2 chain by market cap.

Similar to other technological innovations, blockchain comes with a whole suite of new jargon and components that is helpful to learn; as understanding these concepts make the overall blockchain ecosystem more clear. For more in-depth look at Blockchain, read our report here.

What are "Layer 1" and "Layer 2" Blockchains?

As in past internet models, Web 3.0 utilizes a system of "layers" built on top of one another. Each layer has a distinct task within the whole to facilitate the objectives of the network.

Layer 1: the "base layer" is made up of the blockchain networks such as bitcoin and ethereum. The primary tasks of layer 1 are to provide network security, consensus, and immutability in a decentralized fashion. A large number of participants must be involved to ensure that one entity cannot dominate the network. These participants each manage "nodes," which run and confirm the data in each "block" of the blockchain to make sure that everything is functioning correctly and that no earlier data on the chain has been altered. The participants running the nodes are compensated via tokens and network fees, which are the "reward" for maintaining the network and its security. There is a positive correlation between the number of nodes in the network and the degree of decentralization in the network.

Layer 2: the "scalability layer" is comprised of blockchain networks that sit on top of layer 1 blockchains to improve performance and cost. While these chains do not have the same security and decentralization tasks as layer 1, they serve as a way for multiple transactions to be processed on the network. This is achieved by compiling a group of transactions on the layer 2 chain and submitting them as a single transaction to the main layer 1 chain. The data is compiled on layer 2 to decrease the traffic on the layer 1 network; this increases the speed of the overall system. As an analogy, think of how one zip file containing multiple files can reduce congestion on an email network; layer 2 chains do similar work for layer 1.

What are "Wallets"?

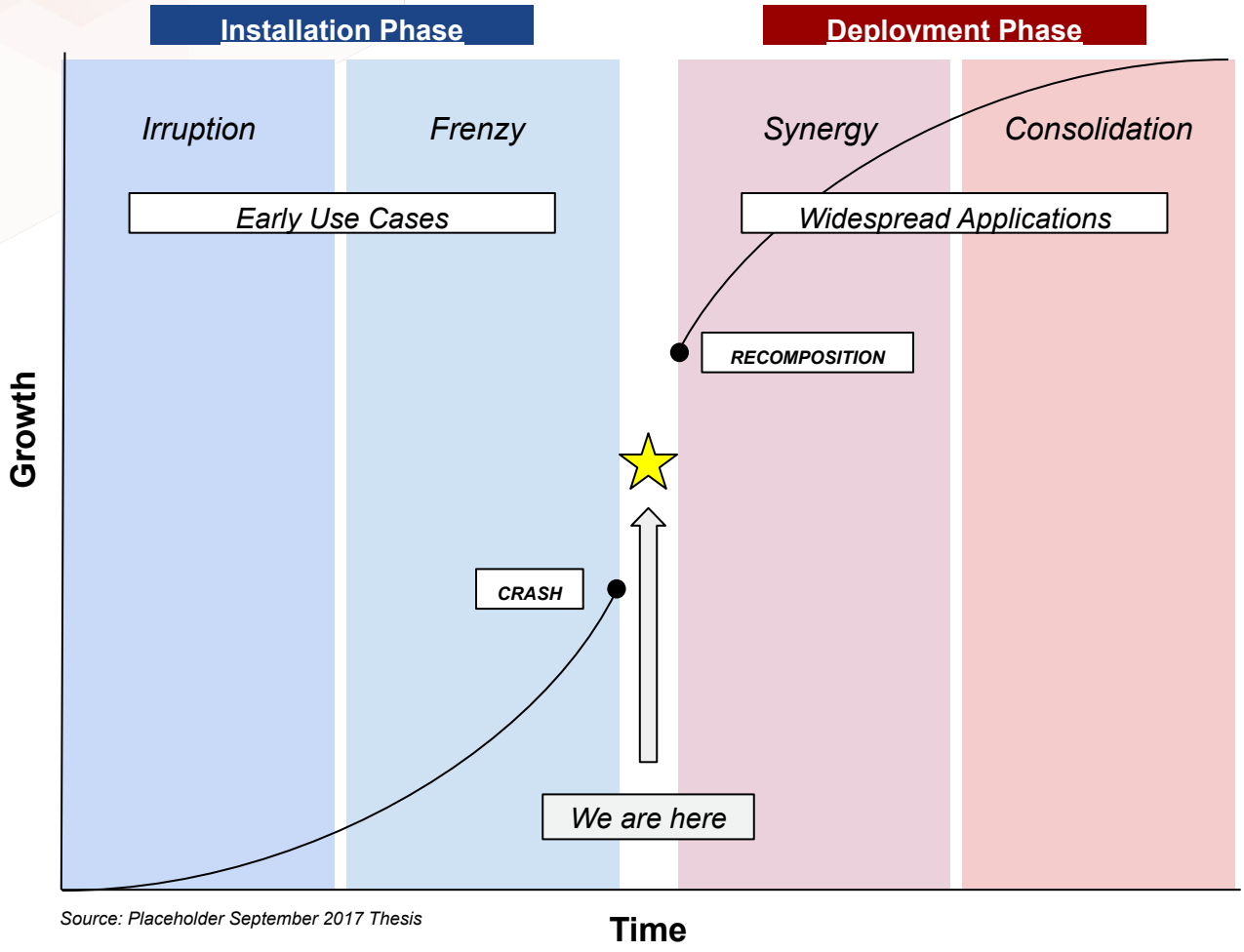
Since assets in Web 3.0 are usually digital rather than physical, assets are viewed from a virtual "wallet". From here, they can be stored and managed across one or more networks. These wallets do not actually hold the assets themselves; they store the public and private keys that give the holder ownership of the assets and are used to show the addresses where those assets reside, on the relevant public ledger. A public key shows a chain of transactions and is public to anyone in the ecosystem. The private key proves a user's ownership of his or her's respective public key and should always be kept secret. While a public key is like a bank account number and can be shared widely, the private key is like a bank account password or PIN. Together, the public and private keys are used to encrypt and decrypt data.

There are many different types of Web 3.0 wallets used, including hot, cold, custodial and non-custodial wallets. Each type of wallet has pros and cons. The best choice for the user depends on the use case. Organizations should always take wallet choices extremely seriously, as there are major consequences in security, ease of use, and customer experience.

 **Hot Wallets**	 **Cold Wallets**	 **Custodial Wallets**	 **Non-custodial Wallets**
Hot wallets are connected to the internet	Cold wallets are kept offline	A custodian or third party has control of the private keys	Users have complete control of their private keys and funds
Examples include web-based, mobile, and desktop wallets	Examples include paper and hardware wallets	Less secure, as funds are stored online and therefore vulnerable to hackers	More secure, as users hold their private keys offline
Vulnerable to hacking and online attacks	Reduced threat from hacking and online attacks	Less personal responsibility but requires trust in the custodian that holds user funds	Users are wholly responsible for keeping their funds and private keys secure
Easy and convenient to use	Less convenient and more expensive	Backups in place, so if users lose their private key, they can regain access to wallet	If users lose their private keys or recovery passwords, then they lose access to their funds irrevocably
Best suited to beginners, or regular traders who make online payments or frequent transactions	Best suited to those with higher security requirements, or those storing assets for longer periods	Can be much more user-friendly and are well suited to beginners	Less user-friendly and best suited to users who want to retain full control of their assets

Source: crypto.com

Adoption Cycle



Source: Placeholder September 2017 Thesis

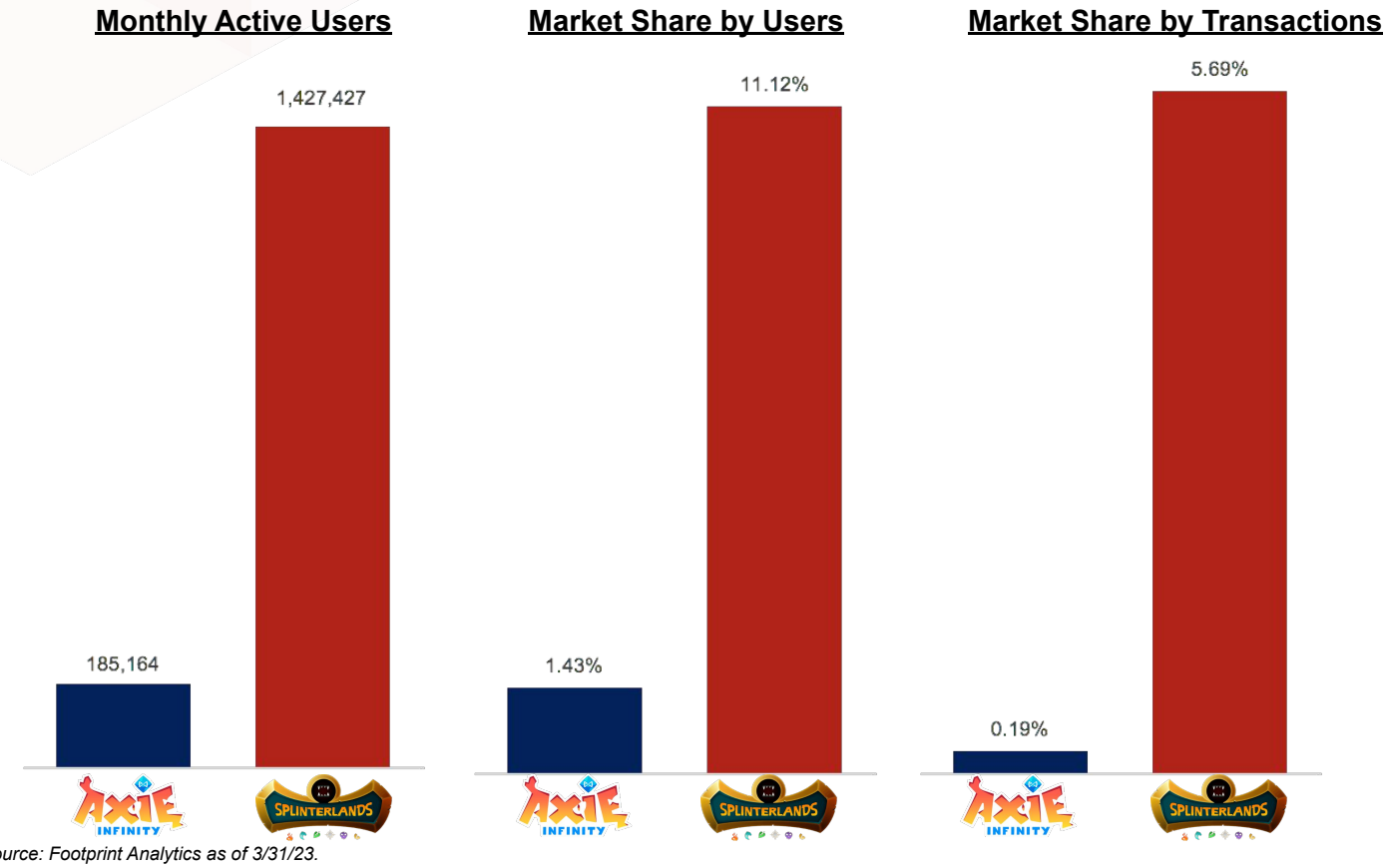
As we chart the IT cycle to navigate market changes, it's useful to zoom in on how new platforms are adopted and disrupt markets. This Adoption Cycle follows a standard S-curve, with growth and time as the axes.

The critical point in between the Installation Phase and the Deployment Phase is right after the crash. This point represents negative sentiment for the new technology and the "trough of disillusionment". During the Frenzy Phase, many investors are in fear of missing out on the next big thing—leading to inflated valuations for companies without sustainable business models. During the "Frenzy Crash", the market washes these unsustainable businesses out. The more profitable organizations deploying new technology survive into the Deployment Phase. Examples include Amazon and Google after the 2001 Tech Bubble and Facebook and Netflix after the 2008 Great Recession.

While it's difficult to plot exactly where we sit, it's likely we are between the Crash and Recomposition stages. In the Installation Phase, many new announcements and advancements in digital asset, AI and the "metaverse" occurred. This was followed by market skepticism when Facebook rebranded to Meta, and a "Frenzy Crash" occurred when FTX, Celsius, and BlockFi were washed out and high-profile metaverse projects were postponed or canceled As we enter the Deployment Phase, surviving Web 3 organizations and technology will find new traction, paving the way for the wider applications that will emerge in the Synergy phase.

Case Study - Web 3.0 Gaming

Web 3.0 technology has dramatically changed the gaming industry as it provides a mechanism for digital assets to be verifiable, interoperable, and easy to use. While some organizations deployed the technology successfully, others offered "pump-and-dump" market dynamics and unsustainable business models.



Source: Footprint Analytics as of 3/31/23.

The Web 3.0 gaming projects above illustrate how the customer acquisition strategy can determine success or failure. **Axie Infinity** is a popular "play-to-earn" NFT-based game with Web 3.0 technology integrated into the gameplay. At first, the financial incentives to play were very compelling, driving many new players to the game and increasing the value of its in-game currency AXS. As financial rewards became apparent, many players outsourced the gameplay to less expensive labor in the Philippines. This was a profitable strategy for a time. But, eventually, the lack of compelling gameplay and graphics caught up with the project: players came to the project to "earn" and merely endured the "play" component of the offering, which made it difficult to retain new players. Since the economic incentives relied upon new players joining the game, the profitability decreased once new players stopped joining. This created a negative flywheel effect, damaged the ecosystem of the game, and interest in Axie Infinity diminished.

Splinterlands is an online collectible card game using blockchain technology. This project took a more sustainable approach by focusing on entertaining gameplay, rather than financial incentives. Splinterlands was therefore able to retain its user base during the "crash" of the token economy downturn. Most players were actually participating in the game, rather than outsourcing it to low-cost labor, enabling the project to avoid the pump-and-dump cycle that plagued Axie Infinity.

This dynamic illustrates that while Web 3.0 technology can enhance the experiences of consumers, a product's value proposition cannot rely on gimmicks. Organizations must produce products that people actually want to use, rather than exploiting unsustainable financial incentives or other flash-in-the-pan tactics.

Case Study - Metaverse

The metaverse has been a major talking point since the phrase was coined by Neil Stephenson in *Snow Crash* in 1992. Many organizations have tried to capitalize on this trend; most have failed to execute it successfully. The best projects have offered high-utility builds inside of existing environments, rather than building new environments from whole cloth.

J.P.Morgan

Description

J.P. Morgan collaborated with Decentraland to create a virtual lounge where visitors are greeted by a digital tiger and a portrait of CEO Jamie Dimon

"Make it fun. Don't build a bloody bank branch with a poorly animated tiger and expect people to engage it in"

- **Theo Priestly,** *CEO of Metanomic*

VANS

Description

Vans partnered with the Roblox to create an immersive skate park where users can virtually skate with each other while donning customizable avatars and digital wearables

"We didn't build this to be there for two weeks…We plan on building and learning from the community and updating it and creating a true, unique experience that evolves with what we hear from the community"

- **Julie Patkowski,** *Vans Digital Marketing*

Sources: Marketsthatmatter.com and analyticsindiamag.com

Vans created a successful metaverse project that delivered great satisfaction and increased brand awareness. The company did this by offering a digital experience that players actually wanted to interact with. The Vans Roblox skate park has been visited by over 90 million users and generated over 12 million hours of gameplay. Users gave the experience an impressive 94% User Experience Rating.

On the other hand, J.P. Morgan didn't put much thought into creating its digital lounge and made zero effort to iterate on it after the initial feedback it received. Many users felt that the campaign was just a "digital billboard" and wasn't fun to interact with. J.P. Morgan didn't take into account its target audience, as most of its customers differ from Decentraland's main demographic of gamers and tech-enabled participants. This case proves that a Metaverse strategy requires a significant amount of time and investment, and isn't worth pursuing if it doesn't align with the organization's main goals and audiences.

Early *Play-to-Earn Gaming*	Gaming studios should avoid unsustainable financial incentives and focus on more enjoyable gameplay via web 3.0 tech: digital ownership, community building, interoperability, etc.	**Optimal** *Web 3.0 Gaming*
Early *Greenfield Metaverse Opportunism*	Many companies have created metaverse projects with zero compelling reasons to visit. Call it the Mall Effect: humans build community around places that offer them utility. There is little point spinning up an environment for a non-existent community.	**Optimal** *Brownfield Strategic Metaverse*
Early *Network Control of Personal Data*	Blockchain technology can facilitate the movement to plow-friction, permission-based methods controlling the sharing of personal data.	**Optimal** *Individual Control of Personal Data*
Early *Web Applications*	Advances in AI and Machine Learning are facilitating new smart applications such as virtual personal assistants, preventative health insights, tailored education programs, curated news feeds, and many more.	**Optimal** *Smart Applications*
Early *PFP NFTs*	Attention has shifted away from the highly volatile JPEG NFTs and towards projects that offer physical utility to holders. These assets control access to scarce physical goods or experiences and have been deployed by companies including Adidas and Tiffany.	**Optimal** *Virtual-to-Physical Utility NFTs*
Early *Closed Loyalty Programs*	Web 3.0 technology will revamp loyalty programs by adding a variety of new offerings, as well as interoperability and the movement of points into other currencies.	**Optimal** *More use cases for loyalty programs*