BINANCE RESEARCH

The Future of Web3 Wallets

DECEMBER 2024

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01 / Key Takeaways

- The blockchain industry, a leading force in the open-source movement, is revolutionizing traditional software business models. Unlike walled garden platforms, blockchains enable more open systems, fostering a new era of interoperability for the Internet.
- Wallets are crucial in the emerging era of open-source software, serving as the human-readable interface for interacting with the decentralized digital world. As non-financial decentralized applications continue to proliferate, crypto wallets may evolve to resemble internet browsers for the decentralized web.
- Web2 platforms derived value from their users by keeping them within enclosed ecosystems. In contrast, crypto wallets, as gateways to the open blockchain ecosystem, may find new, sustainable monetization methods. The blockchain's ability for users to own and move their digital assets freely may drive competition among wallets and decentralized applications, leading to more refined user experiences.
- Web3's open-source nature reduces the moat for protocols and applications, making users highly fee-sensitive and able to switch easily to cheaper options. As fees decrease, the majority of value capture may shift to those who cater to the end users (the "Fat Wallet Thesis").
- As the Internet of Things and AI agent phenomena continue to develop, future crypto wallet software may likely also cater to non-human machines and artificial intelligences.

02 / Introduction

A new era for digital technology is emerging, amongst the dominance of the Web2 Internet giants. Blockchains provide a new infrastructure for building open systems, enhancing interoperability. **Wallets are crucial in this open-source era, serving as the user interface for the decentralized digital world.**

While Web2 fintechs and neobanks monetize wallets through closed ecosystems, crypto wallets act as gateways to the decentralized blockchain ecosystem. **In a truly open ecosystem, users may be freer than ever before to choose which wallets, decentralized applications ("dapps"), and decentralized services they interact with.** For a platform such as a crypto wallet to retain users in such an open environment, they may need to continuously innovate, optimize user experience, build trust, ensure interoperability with various dapps, all while maintaining competitive fees.

This report looks at crypto wallets as a new form of open source, digital platform. For a technically in-depth explanation of how the different types of crypto wallets function, please refer to our January 2023 report **Wallets: A Deep Dive into Crypto Custody**.

2.1 What is a Crypto Wallet?

Crypto wallets are digital wallets designed to interact with blockchain networks and dapps, enabling users to manage their digital assets, such as cryptocurrencies and non-fungible tokens ("NFTs"). Unlike traditional fintech wallets, which primarily facilitate transactions and store fiat currencies, **crypto wallets are built to facilitate users' interaction with a wide range of blockchain applications**, including decentralized finance ("DeFi"), decentralized social networks ("DeSoc"), and other emerging decentralized services.

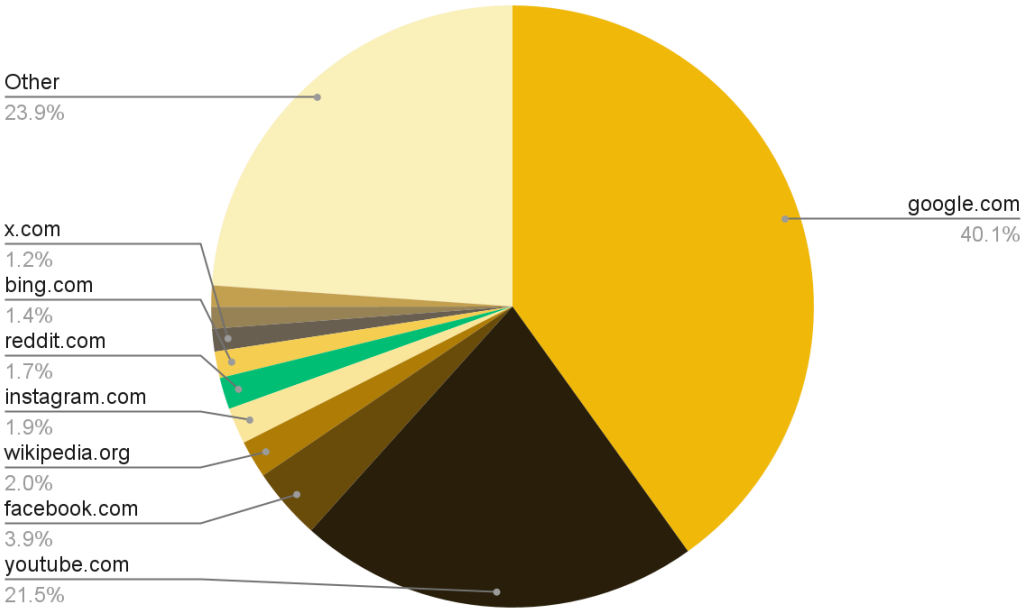
Many crypto wallets currently share functionalities with fintech wallets, such as secure storage, transaction management, and user-friendly interfaces. However, they are poised to evolve into something much larger by integrating a wide range of decentralized financial and non-financial services. Unlike the closed ecosystems provided by Web2 fintech wallets, crypto wallets serve as a gateway to the open world of decentralized applications, social networks, and platforms. As blockchain technology expands beyond financial activities, **crypto wallets may transform into comprehensive tools for managing various digital services, perhaps more akin to browsers than just financial tools**. Developments in this direction may herald the eventual **Coming of the Crypto Superapps**.

In this report, we explore the current landscape of digital wallets, the emerging trends in crypto wallet development, and the ways open platforms could revolutionize how we interact with the digital world.

03 / Closed Web2 Platforms

To discuss the transformative impact of blockchain technology and crypto wallets as new consumer-facing digital platforms, we first examine the nature of the Web2 internet. **The digital landscape, over the past few decades, has evolved into one dominated by technology giants**.

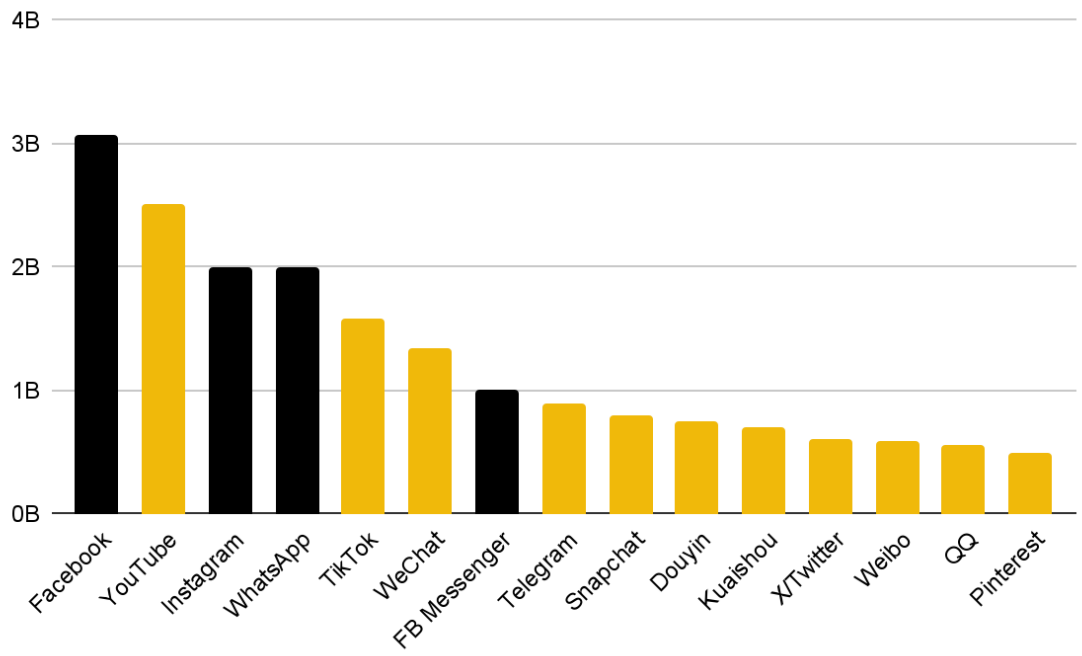
Figure 1: Out of the top 100 websites, Google-owned sites dominate over 60% of internet traffic



Source: Backlinko, Binance Research, as of November 2024

Where Google dominates the internet traffic, Facebook dominates the social media space. Meta owns 4 of the 15 most popular social networks, accounting for ~42% of the total users on the top social networks.

Figure 2: Amongst the top 15 social networks, Meta-owned platforms account for 42% of the total users



Source: Statista, Binance Research, as of July 2024

Tech giant-owned platforms, such as social media networks, e-commerce sites, and fintech applications, look to attract vast user bases by offering convenient and user-friendly services. As they grow, these companies often develop or acquire new products and businesses to expand their ecosystems and retain users. However, this centralization of power can result in exploitative practices and raise concerns around user autonomy. "Enshittification", Macquarie Dictionary's 2024 word of the year, was coined by Cory Doctorow to describe how **these platforms often prioritize profit maximization.** This may in certain instances result in intrusive advertisements, data privacy concerns, and the utilisation of user data for commercial gain.

Certain centralized platforms, such as social media networks or fintech Superapps, may **extract value by creating ecosystems where end users and business customers face high barriers to exit**. Users on such platforms may face significant challenges in transitioning to alternatives. To draw inferences, leaving Facebook may often mean losing access to the network of connections ('Facebook Friends') built over years. Similarly, creators on YouTube cannot easily transfer their subscriber base to another platform, and drivers on Uber or Grab have limited ability to carry their ratings and history to competing services.

Certain centralized platforms often rely on their vast ecosystems and user dependencies to maintain dominance, which may limit user choice and flexibility. This structure allows

such platforms to extract significant value, which sometimes may be at the expense of user autonomy.

When companies (be they wallet providers, DeFi apps, or DeSoc apps) choose to build on decentralized blockchain infrastructure, they turn this old model Web2 on its head. **One of the core functionalities of public blockchains is that they grant the end user full control and custody over their on-chain assets and data**. This means users are granted the freedom to move their data and assets from one platform to another as they see fit. As long as this holds true, **the only way to retain users in Web3 may be to consistently innovate** in order to provide a better user experience and foster greater user trust than the competitors.

3.1 Open platforms force innovation

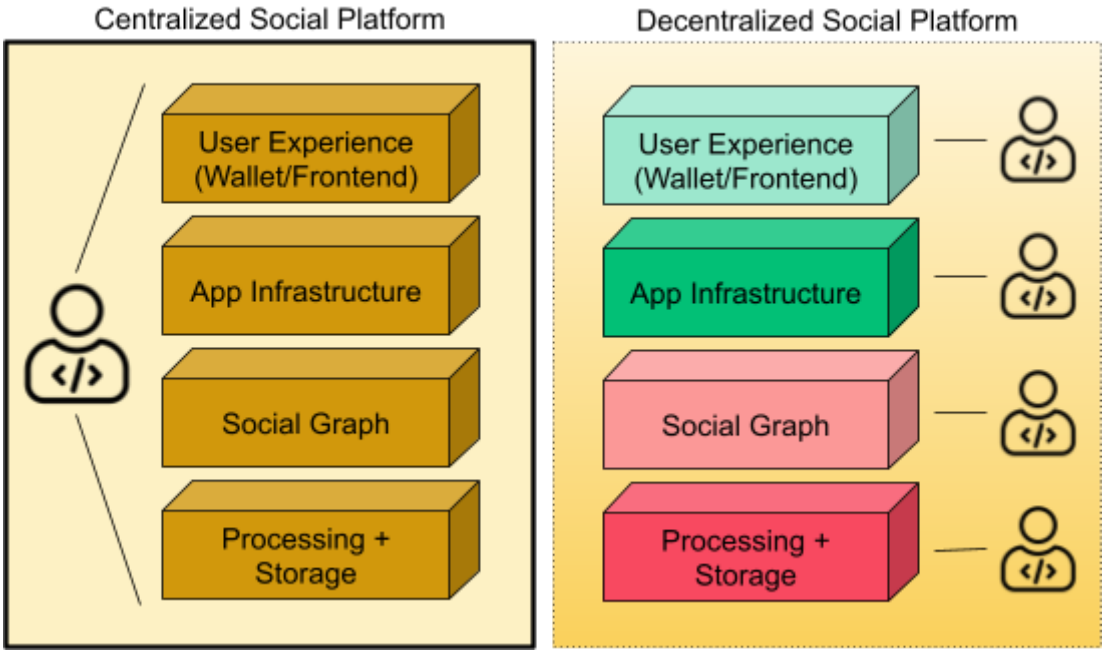
Certain social media platforms create 'walled gardens' by building large, hard-to-transfer user networks. Similarly, certain superapps integrate multiple daily functions, encouraging user retention despite higher fees.

Certain Web2 giants may gradually prioritize revenue generation over user experience as their centralized models grant them control over customer data, digital networks, and monetary deposits. This centralized control creates significant friction for users seeking to transition to alternative platforms, limiting their flexibility and choice. When these platforms were created, decentralized protocols for data and value storage didn't exist; now they do.

In the decentralized, permissionless Web3 world, creating walled gardens is much harder. Contrarily, the overarching ethos of Web3 (at least for now, and hopefully well into the future) is to build open and permissionless systems that prevent such barriers. **Distributed ledgers give users full custody and control over their data and assets, allowing them to choose from a variety of wallets, decentralized applications, and services freely.** In an open system, users can easily connect their crypto wallets to new decentralized applications without waiting for centralized platforms to adopt new technologies.

A decentralized, multi-party ecosystem can also increase efficiency and rate of innovation. The degree of composability facilitated by building on a unified blockchain infrastructure layer makes coordination between different teams more feasible than ever before. The principle of '**DeFi money legos**', can potentially be extended to a wide range of applications, including DeSoc applications for example.

Figure 3: Open systems can create much more surface area for innovation by a wider range of teams



Source: Binance Research, adapted from Messari

In an open-source 'lego blocks' system, any team can utilize or replace components within the stack. This philosophy is embodied by DeSoc projects like Lens Protocol and Farcaster. These teams have built protocols which are designed for interoperability, allowing future third party teams to build different applications and front-ends while using the same infrastructure.

Distributed ledgers act as the cryptographically-backed, trustless coordination layer enabling this system. For the average user, the main advantage is retaining full control and custody over their on-chain funds and data. Historically, self-custody has been a barrier to mass adoption, but significant progress is being made towards creating a seamless, Web2 fintech-like experience fully on-chain. Projects like Infinex are integrating the complex world of DeFi into a single interface while maintaining self-custody, aiming to replace centralized exchanges. Meanwhile, Binance is advancing mobile wallet technology with the newly upgraded Binance Wallet, designed to provide users with a **seamless journey into Web3**.

04 / The Modern Wallet Landscape

The crypto wallet space has evolved significantly since the early days of Bitcoin Core and 'paper wallets' in 2009. In recent years, competition has intensified, with centralized exchanges, established DeFi and NFT marketplaces, Web2 fintechs, and even Web2 messaging applications entering the crypto wallet market. These entities are all vying to win over the end crypto user.

The modern wallet landscape can be broadly characterized into 6 different types, in terms of the types of companies involving themselves in the wallet business:

1. **Crypto-native wallets:** Wallets that originated as ways to store crypto and interact with blockchains. We've seen established projects like Uniswap, Jupiter, and most recently Magic Eden with their airdrop campaign, expand their product line to encompass wallets.

2. **Centralised Exchange ("CEX") hybrid wallets:** Binance, OKX, and ByBit have integrated self-custodial crypto wallets within their centralized exchange applications. This makes it seamless for users who are already using the exchange to also access self-custodial, on-chain functionality.

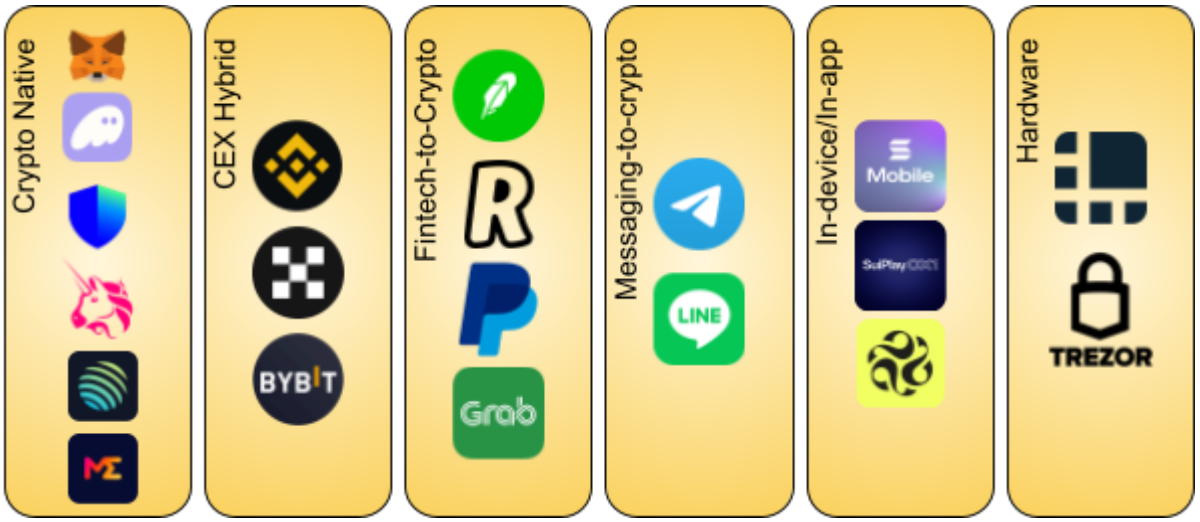
3. **Fintech-to-crypto wallets:** Web2 fintech companies have begun to branch into providing crypto wallet products in addition to their existing businesses. So far, the fintech crypto wallets offer limited Web3 functionality, mainly limited to purchase, sale, custody, deposits, and transfers.

4. **Messaging-to-crypto wallets:** Telegram and LINE have both integrated blockchain wallet and application functionality into their messaging applications, mainly supporting their respective TON and LINE blockchains.

5. **In-app/in-device wallets:** In the wake of the Solana Saga Phone's success, there seems to be an influx of hardware-based blockchain products such as the Sui-based SuiPlay and Solana-based Shaga handheld gaming devices. The Saga phone, alongside these newer to-be-launched devices feature in-built crypto wallets. Especially if the Internet/Economy of Things phenomenon catches fire, we may see more wallets like these which fulfil specific use cases for humans or perhaps even fuel the future **Machine Economy**.

6. **Hardware wallets:** While appealing to the die-hard crypto native, the reality is that most crypto end users may likely not make use of hardware wallets. According to a **July 2024 Forbes article,** only 2% of crypto users currently make use of these devices. It is probable that the majority of end users may value convenience over maximum security, possibly favoring **passkeys** over hardware wallet devices as a more user-friendly form of security.

Figure 4: Centralized exchanges, Web2 fintechs, and Web2 messaging applications have begun to battle for the end user in the crypto wallet arena



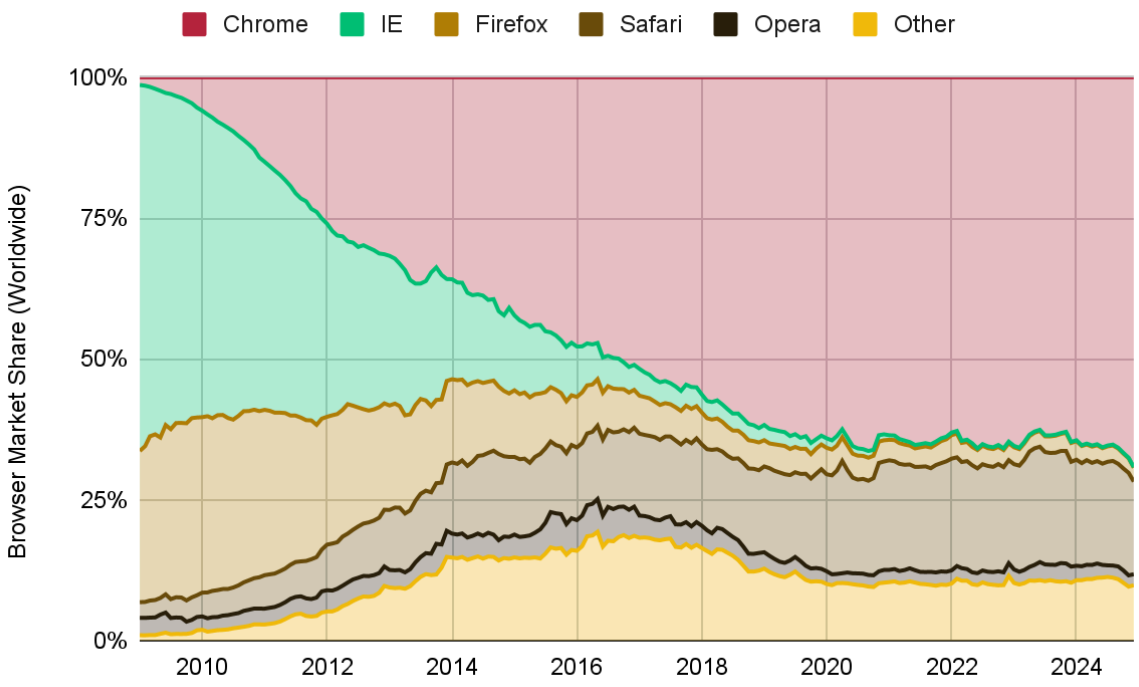
Source: Binance Research

4.1 Why Build Wallets?

Over the past year, we've seen established crypto-native projects like Uniswap and Magic Eden expand their product lines to encompass both browser and mobile crypto wallets. Major centralized crypto exchanges, as well as major Web2 fintechs have also begun to branch into offering digital wallets for crypto. Even messaging apps like Telegram and Line have begun to integrate crypto wallet functionality, purportedly in bids to emulate Wechat's rise to Superapp status. **There's no doubt that the competition to acquire the crypto end user is well underfoot.**

As more players begin to compete in the wallet space, we may look back upon the present developments as being the first innings of an escalating 'War of the Wallets', reminiscent of the **Browser Wars** which occurred during the early days of the Internet.

Figure 5: The rapid growth of Chrome, and other competitors to Internet Explorer's 2009 dominance displays the dynamism of the Browser Wars



Source: Statcounter, Binance Research, as of November 2024

In 2009, Internet Explorer was by far the most dominant Internet browser, claiming ~65% of the total market share. Over the next 14 years, we saw the upstart Chrome rise from a measly ~1% to ~70%, where it sits today.

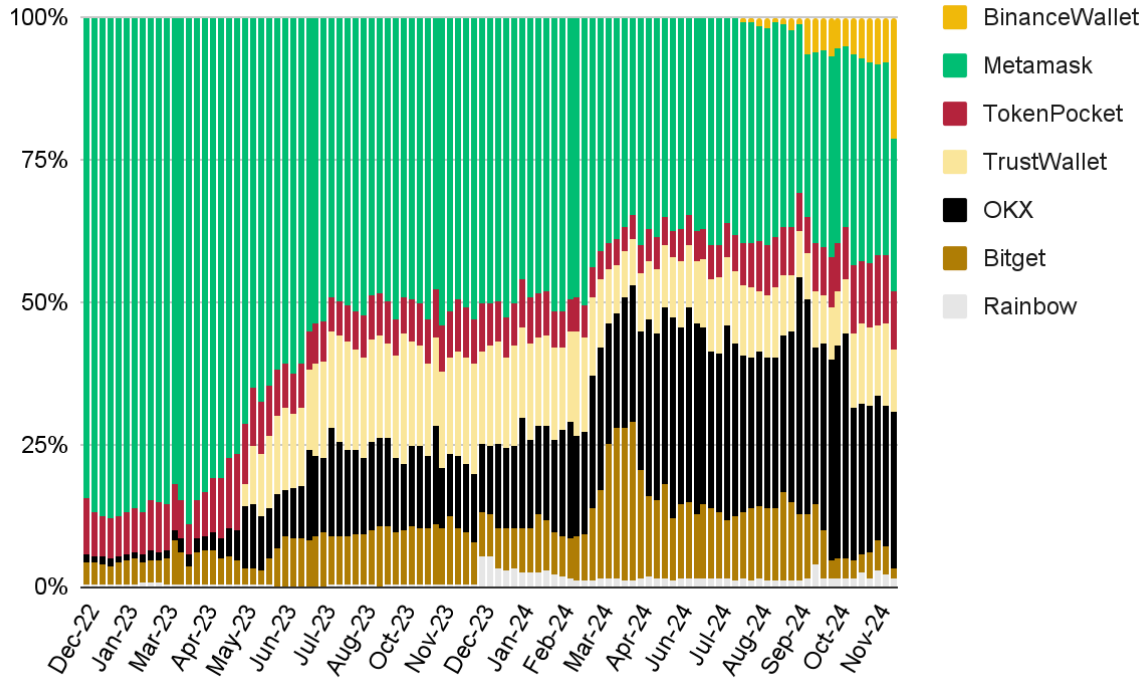
The victory of Chrome over the incumbent Internet Explorer is a notable case study. Chrome's open-source nature through the **Chromium Project**, combined with its speed, stability, programmability, and interoperability, fostered a strong developer and user community, driving rapid growth. **The long-lasting and perhaps somewhat unpredictable benefits of building open source technology are evident** as well as topic-relevant. Using crypto today without Google Chrome extensions would likely be significantly more cumbersome.

Reflecting on the Web3 wallet landscape, parallels can be drawn with the early developments in the Internet Browser industry. Similar to the initial dominance of Internet Explorer, Metamask, as an early entrant, has maintained a significant market share since its inception in 2016. **As of December 2022, Metamask held over 80% of the total wallet market share** in terms of weekly active traders. However, we've begun to see notable growth among competitor wallets. Notably, Binance Wallet has experienced the most significant growth over the past year, gaining 21% in market share against other major wallets.

The rapid growth of Binance Wallet over the past year may be an indication that companies with large existing customer bases, including the Web2 fintechs such as

Robinhood, have a shot at claiming significant market share in the crypto wallet space in the years to come.

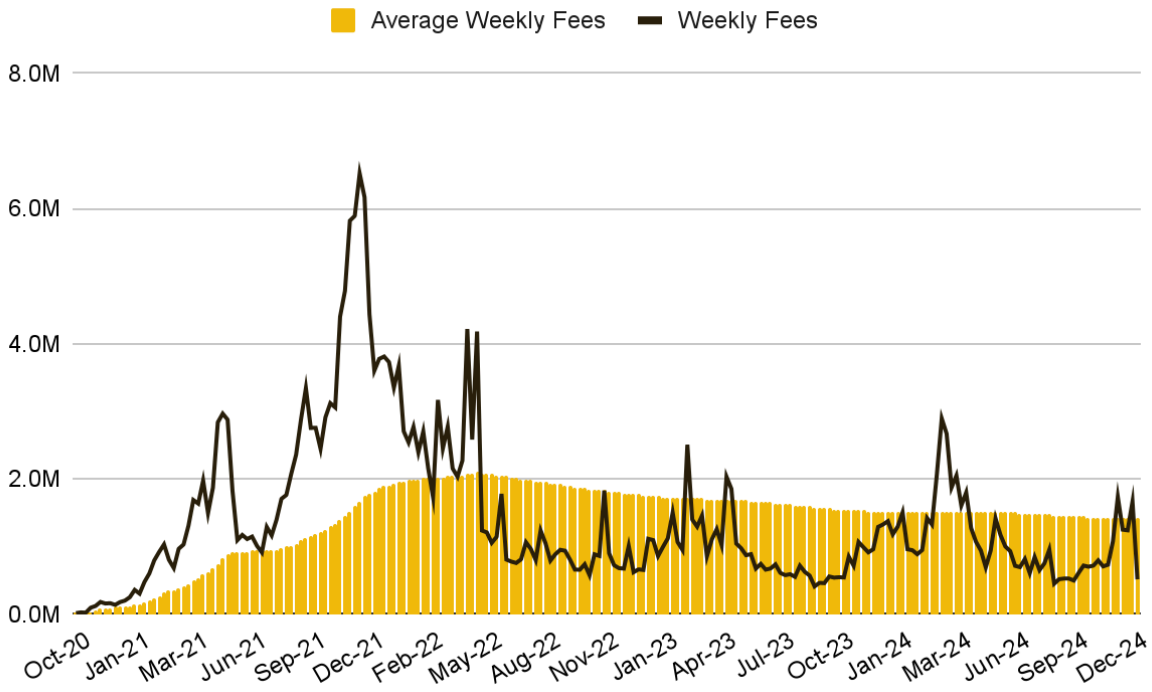
Figure 6: Competitors seem to be eating into Metamask wallet's market share, causing its dominance to fall from over 80% to ~27% over the past two years.



Source: Dune Analytics (@lz_web3), Binance Research, as of November 2024

As the long-reigning Web3 wallet, looking at the revenue statistics for Metamask sheds some light on the potential profitability of running crypto wallets, and why Web3 and Web2 companies alike might be chomping at the bit to enter the wallet business.

Figure 7: Metamask Swap has earned Consensys US$310M since its launch in 2020



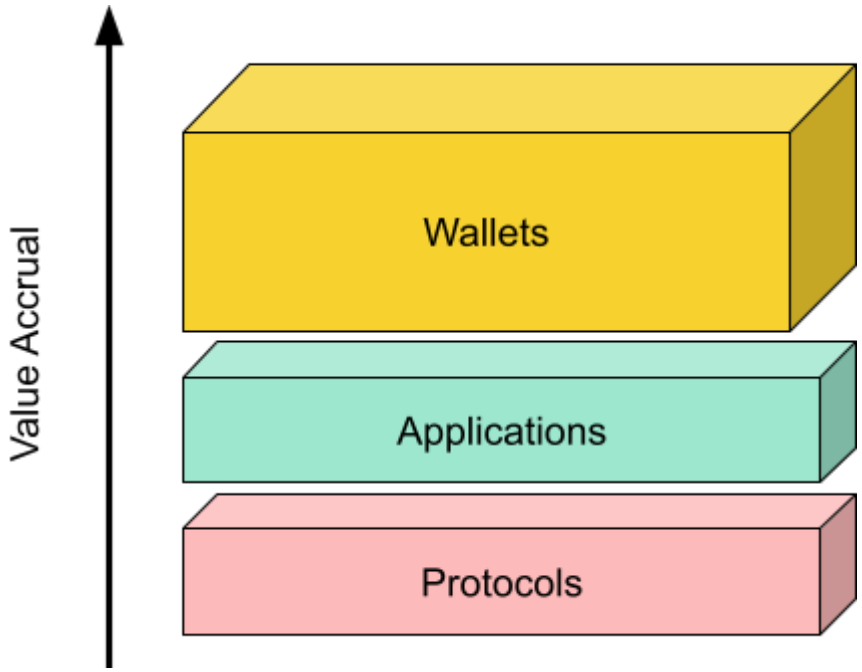
Source: Dune Analytics (@j1002), Binance Research, as of December 2024

Since its launch in October 2020, **the Metamask Swap feature has generated cumulative fees of $310M, averaging $1.4M per week as of December 2024**. The average Metamask user demonstrates a willingness to pay a 0.875% fee for the convenience of in-extension swaps (worth noting that this could possibly be influenced by speculation of a future token airdrop). This revenue is solely from the Swap feature. Wallets have the clear potential to generate additional income from features like bridging, automated trading strategies, and yield strategies.

Beyond simply revenue, **crypto wallets may also provide access to behaviour data**. As the decentralized web expands beyond finance, crypto wallets may act more like browsers, with data on online shopping, social media engagement, and more. This data may enable wallet providers to train AI models and assistants tailored to individual customer behaviors and preferences. Companies with the most data may train the best AI assistants, enhancing customer experience and retention.

In **his October 2024 article**, Delphi Digital's Robbie Peterson takes this a step further in his presentation of the "Fat Wallet Thesis", arguing that the majority of value in crypto will accrue to companies that cater to the end user. As protocols and applications compete to lower fees, this trend could become evident, especially as user interfaces and AI agents increasingly abstract these applications from the end user.

Figure 8: As the crypto space continues to mature, we may see value increasingly begin to accrue to whichever companies cater to the end user



Source: Delphi Digital, Binance Research

If it indeed turns out that in an open sourced blockchain-enabled web, value capture begins to concentrate with whichever companies cater to the end user, The "Wallet Wars" in crypto are likely to be even more dynamic than the "Browser Wars." In the crypto space, open-source technology is almost a given. Consequently, today's wallets, which are largely built on open-source technology, must continuously innovate in UI/UX, interoperability, speed, and cost to retain and attract users. As more teams enter the fray, competition to acquire the end user will only intensify further.

05 / Wallets of the Future

5.1 The Coming of the Crypto SuperApps

Many of the largest software platforms have demonstrated a drive to expand their functionalities and capture greater market share. Uber and Grab, initially ride-hailing apps, have ventured into food delivery and travel planning, with Grab also **securing a banking license** from the Monetary Authority of Singapore in 2020 to offer financial services. Facebook evolved from a social media platform to include services like Facebook Marketplace and Messenger. In 2023, Elon Musk announced plans to transform X into an 'Everything App,' **securing money transmitter licenses** to support this vision. The ultimate superapp, WeChat, started as a messaging platform and now encompasses social media, finance, and gaming.

Following this pattern, the most successful crypto wallets, as the user-facing interface to the multi-party decentralized web, may likely be the ones that are most seamlessly able to grant users access to the multitude of decentralized applications and services that will

exist in Web3. The most popular crypto wallets of the future may likely optimize for greatest interoperability with 3rd party decentralized applications, highest degree of user friendliness, and the best distribution channels - providing users access to the apps then want when they want it for the lowest fees possible.

Unlike Web2 superapps, where users may often be locked into centralized ecosystems, future crypto wallets - if they remain self-custodial - may empower users with the ability to seamlessly transfer their assets and data between platforms provided Web3 remains sufficiently decentralized. As long as wallets remain truly self-custodial, users can easily link a new wallet interface to their existing blockchain address, or permissionlessly transfer their assets to a new wallet. This portability allows users to maintain control of their digital assets and identities, reducing dependency on any single wallet provider and enabling greater flexibility in choosing the best available services.

5.2 Wallets for Non-Humans

With the recent surge in AI development, it is increasingly likely that a subset of blockchain users will be non-human, such as artificial intelligences and machines. Future crypto wallets and wallet software will need to cater to these non-human users. While consumer-focused companies compete for human users in the Wallet Wars, there is a parallel effort to build infrastructure for non-human users. **The Superapps will optimize for a seamless and convenient human experience, whereas wallets for non-humans will prioritize cost, programmability, and interoperability.**

5.2.1 Wallets for the Machine Economy

Looking towards the future, projects like IOTA or the newly-launched Peaq are integrating machines into the blockchain, creating decentralized physical infrastructure networks, or "DePIN." This development envisions a world where internet-connected and AI-powered machines are equipped with self-custody wallets, enabling them to perform automated financial transactions autonomously. For instance, your electric vehicle could seamlessly pay its charging bill directly to the charging station after a long day of providing automated taxi services, with minimal human intervention.

"The Economy of Things is a decentralized network-economy built and owned by the people and machines that use it. In the Economy of Things, connected things monetize the value they create, becoming increasingly autonomous and economically independent."

– Peaq Network (**blog post**)

By leveraging decentralized blockchain technology, this infrastructure ensures that the end human user retains ownership over the machine's wallet contents, safeguarding their assets and data. This shift introduces the "Economy of Things," a decentralized network-economy built and owned by the people and machines that utilize it. In this new

economy, connected devices can monetize the value they generate, becoming increasingly autonomous and economically independent.

The implications are significant. Machines will not only interact with each other but will also engage in economic activities, creating a dynamic and self-sustaining ecosystem. This evolution promises to enhance efficiency and unlock new economic opportunities, all while maintaining a balanced and secure framework that prioritizes user ownership and control.

5.2.2 Wallets for Artificial Intelligences

With user consent, crypto wallet providers could leverage application usage data to create more personalized and user-friendly experiences, such as tailored product recommendations and services. The integration of in-wallet AI assistants, trained on extensive user data, is expected to become commonplace. Ideally, these AI assistants and agents will be decentralized. Wallets that are truly committed to building open ecosystems and providing the best user experience should choose to share user behavior data with third-party agents, allowing any agent to operate within any wallet of the user's choosing.

Extending this concept further, we may envision a future where AI agents are instructed — or even autonomously decide — to create their own crypto wallets. It is increasingly speculated within the crypto industry that AI agents could constitute a significant, if not the majority, of blockchain users in the future. For a detailed analysis of the recent rise of the AI agent phenomenon, refer to our recent article, "**Exploring the Future of AI Agents in Crypto**."

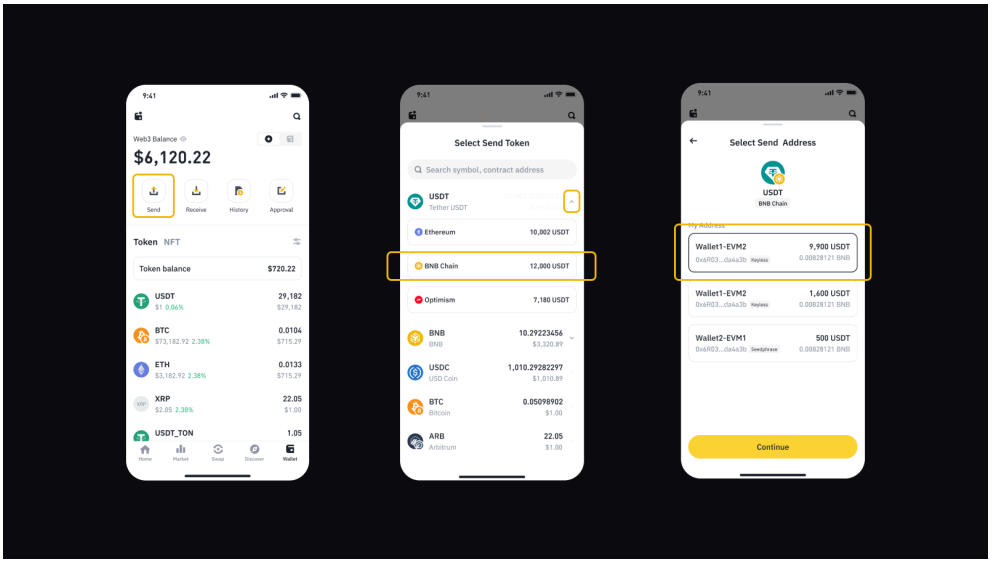
06 / The New Binance Wallet

Binance has recently relaunched its Binance Wallet, formerly known as the Binance Web3 Wallet. This relaunch is driven by a commitment to simplicity and user-friendliness, encapsulated in the 'Less Is More' philosophy. The series of updates introduced are designed to remove barriers and make exploring Web3 effortless for users.

Key updates include:

- **Unified Wallet for Seamless Asset Management:** The Binance Wallet now offers a unified view of assets from multiple wallets, allowing users to manage all their holdings effortlessly without the need to juggle different wallets or chains. This integration simplifies asset management and enhances the user experience by providing a consolidated view of all assets.
- **Revamped Airdrop Zone for Seamless Rewards:** The upgraded Airdrop Zone and Reward Center provide users with easy access to exclusive airdrops. This revamp ensures that users can effortlessly claim rewards, enhancing their overall experience and engagement with the platform.
- **Sleek New Design for Seamless Navigation:** The Binance Wallet now features a modern, user-friendly interface that enhances the Web3 experience. The sleek new design ensures that users can navigate the wallet with ease, making it more accessible to both new and experienced users

Figure 9: The new Unified Wallet provides comprehensive portfolio tracking and simpler, more intuitive transactions



Source: Binance

Binance has announced that more updates are expected in the coming months. Users can explore the **first in a series of upcoming updates** to the new and improved Binance Wallet to see these developments firsthand.

07 / References

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https://www.wired.com/story/tiktok-platforms-cory-doctorow/

https://x.com/

08 / New Binance Research Reports

The ETH Value Debate Link
An in-depth analysis of Ethereum's value accrual dynamics

Monthly Market Insights - December 2024 Link
A summary of the most important market developments, interesting charts and upcoming events

About Binance Research

Binance Research is the research arm of Binance, the world's leading cryptocurrency exchange. The team is committed to delivering objective, independent, and comprehensive analysis and aims to be the thought leader in the crypto space. Our analysts publish insightful thought pieces regularly on topics related but not limited to, the crypto ecosystem, blockchain technologies, and the latest market themes.

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Joshua is currently working for Binance as a Macro Researcher. He has been involved in the cryptocurrency space since 2019. Prior to joining Binance, he worked as a product manager at a Web3 fintech startup, and a market analyst at a DeFi startup. He holds a Bachelor of Laws (LLB) from Durham University.

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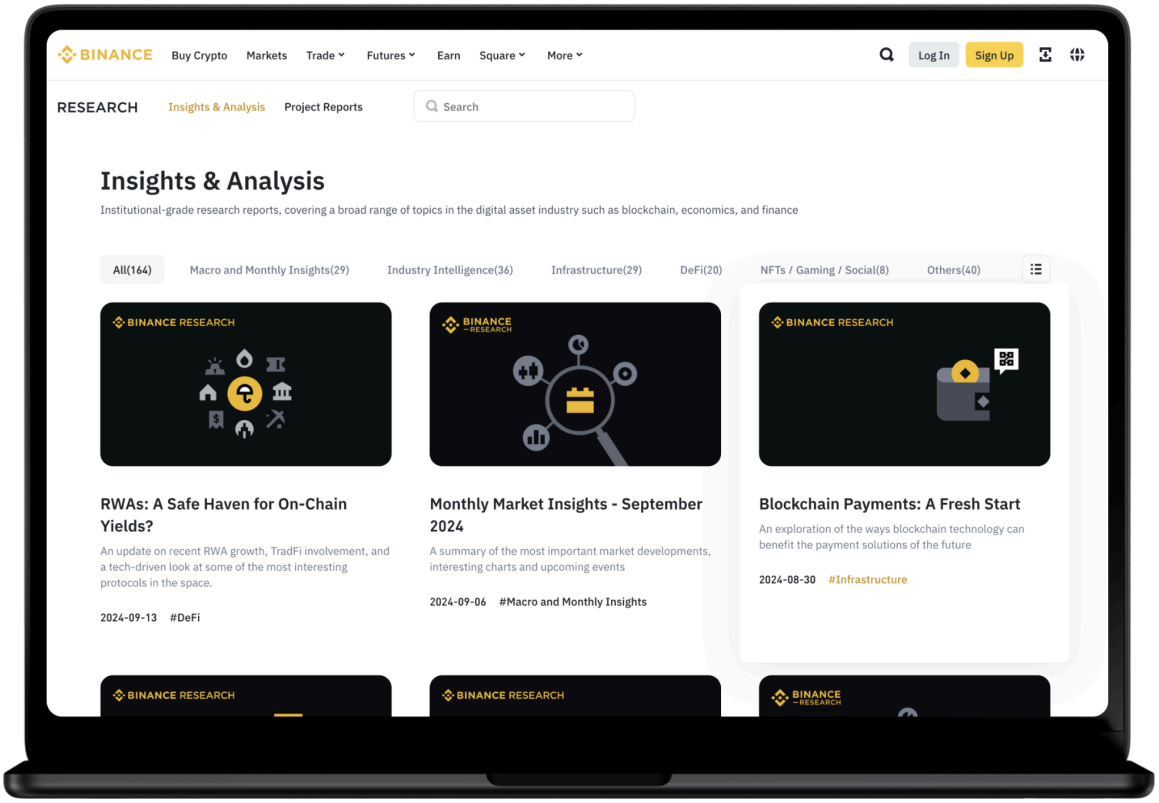

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