

A Statistical Study Based on the Top 50 Blockchain Companies Analyzing the Current Development of Blockchain Applications

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Abstract. Nowadays, because of the Bitcoin and meta universe, blockchain wins a lot of attention from both the public and researchers, more and more people have started to work hard in this new area which has led the quick updates of the latest research progress and applications. This article tries to help other researchers have a clearer understanding of the current situation of blockchain applications. Chapter One first gives the historical background of blockchain's applications. It then comes out the research on the top popular applications in the blockchain field, how they become popular, and what improvements they can have. On the one hand, it aims to help researchers and entrepreneurs understand the market distribution and blockchain application development trends. On the other hand, it provides some ideas about existing problems of blockchain applications.

Keywords: Blockchain application, Cryptocurrency trading, Decentralized finance, Blockchain game.

1. Introduction

1.1. Background

Blockchain is the underpinning technology of Bitcoin, which was launched in 2008 by Satoshi Nakamoto. It is a peer-to-peer network that uses the proof-of-work system to record public transaction history. Aiming to achieve an electronic transaction system that does not rely on third-party trust [1].

Since the creation and popularity of Bitcoin, researchers and practitioners have realized that the potential of blockchain technology is unpredictable [2]. As blockchain has the characteristics of eliminating intermediaries, transparency, immutability, and so on, it solves the problem of information authenticity in the digital virtual world [3].

Also, the emergence of blockchain greatly promoted the development of the Internet, which accelerated the speed at which the Internet shifted from Web 2.0 to Web 3.0. Blockchain is the underlying logic of Web 3.0. In these years, every time the Internet breakthroughs, the Internet market will be redistributed, which will bring a lot of new opportunities for entrepreneurs. Today, the introduction of Web 3.0 is another market reshuffle, work as the underlying technology of Web 3.0, blockchain will be the new direction of the market. Many entrepreneurs, investors, and even the general public want to participate in this field. From the perspective of blockchain practitioners, this paper calculates the proportion of application functions developed by the top 50 companies in blockchain 2022, aiming to help practitioners or prospective practitioners understand the product content and hot market conditions of the head industry at this stage, and help non-practitioners to understand which blockchain functions may be popularized the fastest.

1.2. Related research

Zhang, J et al. considered that the development of blockchain-based applications can be divided into three main stages, blockchain 1.0 to 3.0. Blockchain technology was originally proposed to support cryptocurrencies like Bitcoin, so we called the cryptocurrency and its associated applications of blockchain as blockchain 1.0. Blockchain 2.0 introduces smart contracts to enable decentralized applications, decentralized autonomous organizations, and so on, combining smart contracts with digital currencies. Blockchain 3.0 breaks through the world of finance as an implementation of the broader concept of distributed ledger technology, which can contain any information, such as government, education, and health decentralized programs (DAPPs). These non-cryptocurrency-

related distributed ledger uses are often referred to as blockchain 3.0 applications [4]. In Efanov's article, Bitcoin represents the application of the first generation of blockchain technology, and the special feature of Bitcoin is that its application is ahead of the theory. This paper also analyzes some characteristics of digital currency summarized from Bitcoin, which is the advantage brought by the application of blockchain 1.0. (1) Reduced online transaction fees. (2) Better anonymity to protect the privacy of users. (3) Unlike traditional money, which relies on bank regulation, digital money ensures a relatively stable money supply based on cryptography and allows regular growth [5]. Haller considered blockchain 2.0 as a term that distinguishes cryptocurrencies as assets from the more general "blockchain as a programmable distributed trust infrastructure," which is similar to shared services such as browsers. Smart contracts, on the other hand, are executable computer code that relies on the immutable and forgery-free nature of the blockchain to partially or fully self-implement while being trusted by people [6].

Mukherjee et al. think the inextensibility of Blockchain 1.0 and 2.0 led to Blockchain 3.0, in which transactions can be verified and validated without the use of miners, improving interoperability, privacy, and sustainability. At the same time, blockchain 3.0 paves the way for multiple platforms, bringing blockchain closer to everyday life. Its advantages include no single point of failure, no specific IP address, and so on [7]. In Tanwar's paper, to meet the industrial automation demand of achieving Industry 4.0, blockchain was pushed to enter the new era of 4.0. In Blockchain 4.0, the blockchain becomes more intelligent and will be applied in combination with artificial intelligence, big data, and other technologies. It helps businesses to provide a more secure, private, transparent, and data-integrated product. At the same time, interoperable blockchains are supported, which means that one or more blockchain platforms can communicate with each other, known as cross-chain transactions. [8, 9]. Maesa et al. found that over the past few years, new ideas for blockchain 3.0 applications have been proposed almost every day. By analyzing six novel blockchain 3.0 applications such as medical management records, identity management, and intellectual property protection, the paper concludes that blockchain 3.0 applications do exist in large numbers and have great practical value, which means that blockchain is still very attractive after so many years of creation, which makes them dare to assume that the public's interest in blockchain will further grow [10]. However, Gartner Inc.'s 2019 Hype Cycle for Blockchain Technologies points out that although many related applications have been proposed in the blockchain field in recent years, the realization rate is very low. And most enterprise blockchain projects only stay in the experimental stage. They predict that technological advances in blockchain will bring us closer to Web 3.0 over time, but that it will take until at least 2028 for blockchain to revolutionize digital commerce [11].

1.3. Objective

This article does some related research based on the blockchain application directions which are the most popular and most likely to bring blockchain into public daily lives at the fastest speed. Chapter two first explains the data integration and research method of this paper, which is how the paper calculates and finds the application fields with the highest popularity and most likely to enter the life of the masses. After getting a brief introduction to the result, this paper mainly analyzed the top three directions of applications, which first explain the definition and situation, then list the possible reasons why the top three areas could stand such a big percentage from several aspects. Based on analysis, Chapter Three comes out with some ideas about the improvement aspect, the existing problems, and the prediction of future trends. Finally, chapter four gives a summary of the research, and proposes some directions for further research.

2. Research and analysis of blockchain's application

To have a deeper understanding of the application development degree of blockchain technology by current blockchain companies, this paper makes an investigation according to CB insights of the top 50 blockchain companies in the current market. After collecting all the functions of the company's

products, which mainly get from the homepage of the company's products, the paper categorized these functions into broader categories based on their similarities, for example, grouping "Cryptocurrency Trading," "Decentralized Exchange," and "Trading Platform" under the "Cryptocurrency Trading" category. Second, counted how many times a specific category appeared in the list of companies' functions, for example, if multiple companies mentioned "Cryptocurrency Trading," paper tallied them up. Thirdly, using the total number of occurrences of each category to estimate their distribution as a percentage of the total. For example, if there were 10 instances of "Cryptocurrency Trading" out of a total of 50 instances across all companies, the paper estimated it as 20% ($10/50 * 100$).

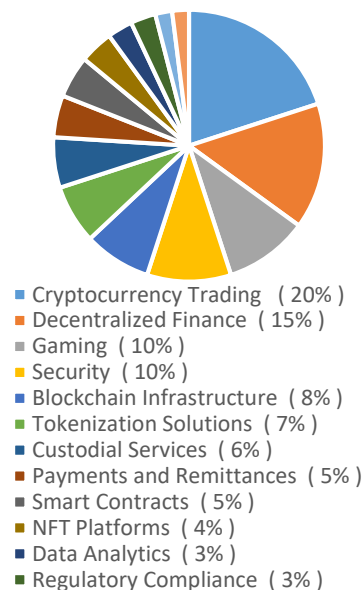


Figure 1. The proportion of each application field

As shown in Figure 1, it can see that, the main applications of blockchain offered by the top 50 blockchain companies are Cryptocurrency Trading, Decentralized Finance, Gaming, Security, Blockchain Infrastructure, Tokenization Solutions, Custodial Services, Payments and Remittances, Smart Contracts, NFT platforms, Data Analytics, Regulatory Compliance, Stablecoins and so on. This paper will focus on the top three fields, which are cryptocurrency trading, decentralized finance, and blockchain gaming.

2.1. Cryptocurrency trading

A cryptocurrency exchange is a platform for users to trade cryptocurrencies. And Cryptocurrency Trading is a digital currency exchange between traders. It is an action aimed at making a profit out of fluctuations in cryptocurrency market value. Through analysis, as the largest blockchain application field among the top 50 companies in the blockchain direction, cryptocurrency exchanges have the following characteristics to attract entrepreneurs to continue to join in.

First of all, the user base in this field is large. As per the definition of cryptocurrency trading above, people can earn money from trading. It has been proven by a May 2023 CoinGecko report as follows that this is the main reason why people buy and trade cryptocurrency. From this perspective, cryptocurrency trading has a certain similarity to the stock market, and using analogical reasoning, it is easy to conclude that the cryptocurrency trading market is as attractive as the stock market. Besides, the cryptocurrency market is open 24 hours a day, 7 days a week for trading. This attracts investors from all over the world, creating opportunities for investors to trade anytime, anywhere.

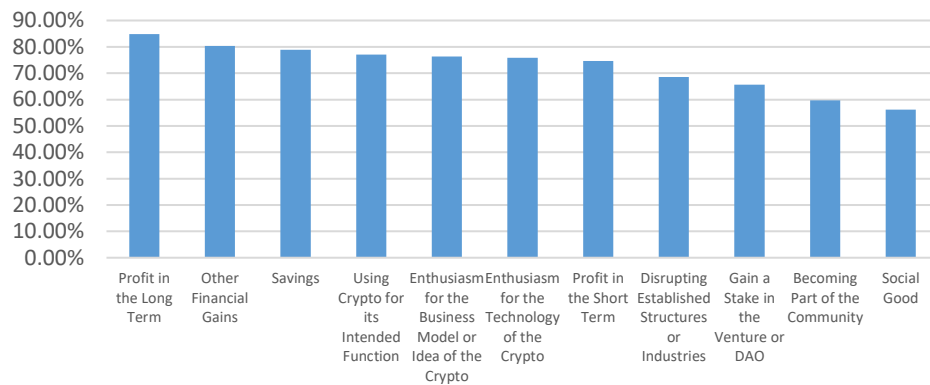


Figure 2. Rate of Importance

Second, cryptocurrency trading is an emerging but promising field, many entrepreneurs want to join in the early stages and try to get a piece of the action. Cryptocurrency has the potential to be an accepted form of payment like cash or credit card, and if this goal comes true, the cryptocurrency market will expand globally. It may even cannibalize the market for cash and cards in the future as it has greater privacy protection. Also because of the decentralized characteristic of cryptocurrency, it is impossible to manage cryptocurrencies like the central bank controlling cash currencies, so the revenue of various platforms as exchanges will not be throttled by the government, and then they can get more profits.

Third, many people might think that there are too many competitors in this field, and compared with more mature companies, we are not competitive at all. But the fact was fierce competition is a good thing at this stage. Because as a new technology, though the competition is fierce, for start-ups there are still many opportunities, and lots of new ways to innovate. And also, fierce competition is conducive to market stability. With so many cryptocurrency exchanges offering the same tools in undeveloped markets, the most advanced areas can exist within one firm or between several different enterprises. So, the more competitors at the same level check each other, the stronger the overall interconnection and liquidity will be enhanced. This will eventually drive the overall market and reduce its volatility. Competition among exchanges leads to technological advances and lower commission rates, which in turn attract customers, further expand the market, or maintain customer stability. In addition, the increase in market participants makes cryptocurrencies less susceptible to manipulation by individuals. Because in the early days, we could put a lot of assets in one exchange to bring the overall market price down significantly, but now the exchanges are closely linked, making this more difficult.

2.2. Decentralized Finance

Decentralized Finance (DeFi) is a technology that redefines traditional financial services such as banking, loans, custody, and investment through decentralized applications and cryptography. It has created a revolutionary financial ecosystem in a decentralized manner, providing global, efficient, trusted, and secure financial services. DeFi applications are built on the blockchain. This means that with DeFi, everyone can conduct financial transactions as a participant through a secure distributed network.

A smart contract is the most critical element of DeFi. It is a writable, self-executing instruction running on the blockchain for cryptocurrency transportation or financial transaction execution. These smart contracts not only help ensure the security, reliability, and process automation of transactions but can also assist users with performing data analysis, and calculations, predicting risks, and dealing with market liquidity issues. Moreover, DeFi can also use stable currencies to help investors to avoid the price volatility of cryptocurrencies. Stablecoins track cryptocurrencies above mainstream currencies at a fixed exchange rate, thus ensuring the stability of their value. In addition, DeFi can also provide decentralized financing services, through the network of issuing companies, investors can get wider and secure rights and interests. DeFi can also be used to improve financial entry, as

users can access the channels for trading and lending online from anywhere. In summary, DeFi technology provides more efficient, secure, and reliable financial services to investors and also facilitates a series of changes that make it easier for personal finance to obtain security through Internet platforms.

The reason why decentralized finance can reach 15% shares of blockchain applications not only is that people are attracted by its critical elements but also because the realistic power drives decentralized finance's development. In the traditional financial system, financial activities are realized by participants through establishing connections with centralized institutions such as banks, brokerages, and fund companies. In the past economic activities, centralized financial institutions acted as third-party organizations to eliminate distrust between users. However, since the financial crisis in 2008 and the uncontrolled implementation of monetary quantitative easing policies by central banks around the world, the credit of traditional centralized financial institutions has been greatly weakened. The returns they can bring to users have been reduced, while the risks have been invisibly increased. Based on this, the trend of financial activities is shifting from centralized finance to decentralized finance, which means the market opportunity is gradually flowing to the decentralized financial market, entrepreneurs observe this trend, smell an opportunity, and rush into the market to try to get a chance to make it big.

2.3. Blockchain Gaming

Blockchain games are games that utilize blockchain technology to enhance or reinvigorate traditional video games, pleasuring while incorporating tokenization. It also works through blockchain technology to tap into the benefits of Web3.

As the third place of blockchain companies' function, blockchain games have unique attractiveness from many aspects.

First, there are many novel tools for developing blockchain games, including but not limited to blockchain wallets, smart contracts, and tokens. The wallet can simplify the login system which means that you can just create one blockchain wallet to access all games in that chain. While smart contract not only gives a trust-minimized guarantee to gamers to promise these contracts will automatically execute in a deterministic manner but also helps accelerate the process of creating and moving in-game items and currencies. Tokens in blockchain games have two main uses, one is a digital item and currency, another is a medium for player governance. Blockchain tokens help in-game assets set new standards. When an in-game item that a gamer owns is an NFT, taking it away or erasing it is not possible. Gamers have all the ownership of the NFT they can sell it, and trade it without the game developer's permission. Also, tokens can be used as a kind of governance rights given to gamers. Gamers use these tokens to vote on proposals, by having a say in the game's direction, players can inspire player evangelism and push forward correct game design decisions. However, all these novel tools are being used in blockchain games for the same purpose to transform the relationship between players and game creators into a fairer and more transparent one.

Second, the market for blockchain games is huge. According to an April 2022 DappRadar report, the use of blockchain games has increased by over 2,000% since Q1 2021, and 52% of blockchain activity is now related to gaming. During COVID-19, the chances to communicate offline have reduced rapidly, and lots of people chose games for social interactions. This causes the size of the game market to spread dramatically, and the trend doesn't stop with the pandemic restrictions dying down. As a fresh concept, blockchain game has attracted the attention of the majority of players with the explosion of the meta-universe and virtual world. Innovation is the main reason why customers flow into this market. Some other reasons are safety and privacy protection. Game developers have found a market opportunity here so jumped in.

Third, this market has a lot of investment. From an investor's aspect, the metaverse gaming sector is expanding rapidly and paying out substantial return-on-investments. For instance, the current IEO ROI for Axie Infinity, a blockchain-based P2E game, is 81.64x. The number of ROI opportunities

will increase as more and more people use the metaverse. As there are many investors in this market, many entrepreneurs will enter too.

3. Problems and challenges in application development

3.1. Cryptocurrency exchange

With the rapid development of the cryptocurrency market, people have begun to pay more attention to its risks and challenges. Although cryptocurrencies have great potential as an emerging financial instrument, their complexity, and uncertainty also bring a series of risks and challenges that require vigilance and in-depth study by investors and market participants.

First, the uncertainty of the regulatory environment is one of the important challenges for cryptocurrency exchanges. Different countries and regions have different regulatory policies for cryptocurrencies, some countries encourage innovation and development, while others have reservations and even strict restrictions on cryptocurrencies. This uncertainty can make it difficult for investors to predict the impact of policy changes on the market, thus increasing the risk of investment. At the same time, insufficient supervision may also lead to fraud, manipulation, and other illegal acts in the market, damaging the interests of investors.

Second, security. Despite the blockchain technology itself having high security, there are still many cases of the cryptocurrency market being hacked, such as exchanges, wallets, smart contracts, and other links. This results in the theft of users' funds. The security risk is an issue that cannot be ignored by investors, so continuous innovation in security is essential for enterprises.

Third, scalability and transaction speed. Scalability remains a significant challenge for many cryptocurrencies. As the number of users and transactions increases, networks may become congested, resulting in slower transaction speeds and higher fees, this seriously affects the user's sense of experience, and then causes user loss. Scaling solutions and network upgrades are being developed to address these challenges, but widespread implementation is still a work in progress.

Fourth, the energy consumption. Proof-of-Work (PoW) consensus algorithms, used by cryptocurrencies such as Bitcoin and Ethereum, require substantial computational power and energy consumption. The mining process, which validates transactions and adds them to the blockchain, requires extensive computing resources, contributing to environmental concerns. Critics argue that the energy consumption associated with cryptocurrencies is unsustainable and incompatible with broader efforts to combat climate change. Although there have been worked out proof-of-stack and PoA consensus algorithms, their application share is still very small.

3.2. Decentralized Finance

As long as DeFi's development, a paradox has emerged: a decentralized financial ecosystem built on the centralized management of real-world assets. This centralization problem challenges the core tenets of DeFi in the following aspects.

First, counterparty Risk and dependence. In the decentralized world, removing intermediaries reduces counterparty risk as users interact directly with each other or with the smart contracts on a blockchain. However, in the real world, because of the management of the Risk Weight Assets (RWA) intermediaries are still necessary. This reliance on a central administrator is also at odds with the self-executing and autonomous nature of DeFi, where third-party organizations are distrusted. So, in the future, we need to fight in this area.

Second, is inequality. DeFi also promised financial inclusion, making financial services accessible to all. But in the real world, the tokenization assets can lead to a democratization of investment opportunities, is because the tokenization of RWA gives retail investors access to expensive assets. However, the central administrator of the RWA can also restrict this access, making real-world Defi inequality.

Third, transparency and accountability. The key pillars of DeFi are transparency and verifiability, as users can view and verify all transactions. This transparency can be influenced by the centralized

service provider that manages the RWA. Users need to trust these providers to provide accurate information about asset ownership, value, and performance in a transparent manner. This centralization raises concerns about possible manipulation of information, leading to a lack of trust in the system as a whole.

3.3. Blockchain gaming

Blockchain is a hot topic, attracting many game players to play blockchain games instead of normal video games. However, if entrepreneurs do not calm down to seriously solve existing problems, once the freshness of gamers has passed, the market will be greatly reduced and eventually cause irreparable losses.

First, there is the complexity problem of game login. The ease of logging in to blockchain games should have been a big selling point for them, but due to current connectivity issues that exist between multiple blockchain ecosystems, the universal pass model has limitations. To begin playing, gamers must establish a third-party wallet and fund it with enough tokens to pay transaction fees based on the underlying blockchain infrastructure. All in-game mechanisms require players to sign transactions separately, which breaks gameplay immersion. Especially at a time when all kinds of games are advocating achieving seamless user experience, this problem introduces small but detrimental barriers. The fundamental problem is even though blockchains are a universal and shared backbone for all the games that are built on them, there is still a disconnect that exists such as an Ethereum game and a Solana game. We need robust cross-chain infrastructure, to solve this question.

Second, the scalability limitations problem of blockchain. In other words, game lag question. These are the questions related to smart contracts. Although the end goal for blockchain games is to have all game logic run through smart contracts. Due to speed and scalability limitations, today's blockchain games typically work through a hybrid architecture that incorporates both on-chain code (smart contracts) and off-chain code. And because video games frequently require computation and latency requirements that blockchains cannot meet today. Most gamers would experience game lag if a computation-intensive blockchain game were built entirely on a blockchain now, which is considered one of the most frustrating problems for gamers.

Moreover, there are places where we can highly improve. Such smart contracts mainly assist in the process of creating and moving in-game items and currencies in blockchain games today. Nonetheless, they can be utilized to safeguard vital in-game functions, such as determining the outcome of a particular round or match of a game. Also, the design space of game governance through tokens hasn't been fully explored, which means there's unbridled potential for innovation. It is important for game publishers or entrepreneurs to make use of this emerging technology to allow players to shape the outcomes of the games they care about.

4. Conclusion

In summary, based on the application research of the blockchain era division, this paper expands and studies the actual landing of the current blockchain application. This study calculates the application aspects of blockchain in the products developed by the top 50 companies in the blockchain field and calculates the proportion of each application direction. It is found that cryptocurrency trading, decentralized finance, and blockchain gaming are the three most widely used directions. Although more than a decade has passed since the introduction of blockchain 1.0, theoretical research has now reached the stage of blockchain 5.0. At present, among the blockchain companies, the best development, the most widely used, and the most popular is still the research on finance in blockchain 1.0 and 2.0. At the same time, blockchain games are also a market not to be underestimated. After analyzing the reasons that support them to go to the public, this paper also puts forward some constructive suggestions in these three directions.

After reading this paper, we can roughly understand that the period between the introduction of new ideas in the direction of blockchain and the relatively large number of applications is about ten

years. Based on giving readers an in-depth understanding of the current blockchain market situation, it is understood that the application of blockchain is far more than in the financial field so people with entrepreneurial ideas have a general idea and stick to it.

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