

How JPMorgan Chase Leverages Blockchain Technology to Modernize Financial Services

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Abstract

According to Bataev et al. (2020) and J.P. Morgan (2017), many of the world's leading financial institutions are steadily recognizing the potential of blockchain technology to reshape the structure of global payments in the twenty-first century. Although blockchain ledger networks and modular solutions have yet to be implemented in the financial industry, JPMorgan Chase (Chase) has been exploring their potential for the past five years. With nearly \$3T in assets under management, Chase recognizes the opportunity for banks to streamline their cost structures by digitizing manual processes. Chase's Online Corporate Finance Team and Blockchain Center of Excellence point to the strong vision of the industry and the ramifications of the fast-changing interplay between investment and blockchain technology. Chase launched an approved version of the Ethereum blockchain, the Interbank Knowledge Network, operated by Quorum. It assists member banks in sharing real-time details as a method of confirming acceptance of payment. Chase centered on blockchain technology by testing JPM Coin to allow for the simultaneous transmission of transactions among financial institutions. This case study will examine Chase's use of blockchain technology to identify the standardized methods adopted by financial institutions. The case study will evaluate the possibility of transactions made with a fraction of the cost using blockchain technology, with the transaction process completed in hours compared to the current process that takes days. The blockchain ledger will also ease the financial institutions' ability to comply with the regulations because of the standardization of the blockchain network's rules and regulations.

Keywords: blockchain, decentralization, global finance, JP Morgan, financial institutions

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According to Ginsberg (2019), the Educational Technology Librarian at the Chicago Kent College of Law Library, and a leading figure in defining blockchain technology and its potential uses, described a blockchain as “a chain of blocks, cool!” The lack of a workable definition that is both concise and precise is primarily what makes blockchain technology seem complicated. However, the basic principle of a blockchain is clear. A repository is a list of records processed electronically on a file server. Data, or details, are usually arranged in table format in these repositories to make scanning and filtering for relevant information more efficient. While this is not dissimilar to a spreadsheet, significant differences distinguish blockchains and a typical Excel spreadsheet.

Ginsberg (2019) argues that spreadsheets are structured to store and view restricted volumes of information for one person or a group of persons. On the other side, a repository is built to hold considerably larger volumes of information to be viewed, filtered, and manipulated efficiently and conveniently simultaneously. Massive repositories accomplish these functions by housing data on servers constructed of strong processors. To provide the processing resources and storage space required for multiple people to access the repository concurrently, these servers are often created utilizing hundreds or thousands of processors. Although any number of entities can access a spreadsheet or directory, it is operated mainly by a corporation and controlled by an appointed person who has complete influence over how the details and operation run. Ginsberg argues, “Blockchain and its related databases are known as distributed ledger technologies” that provide “decentralized, secure databases.”

Unsurprisingly, the financial sector was the first to explore and adopt blockchain's technical efficiencies after the paradigm-altering emergence of Bitcoin in 2009. The curiosity for

decentralized currencies primarily led the major financial corporations to cooperate on conceptual and test ventures with leading hardware providers and small fintech companies (Kokina et al., 2017). The Chase global investment firm has had a cooperative partnership with Bitcoin and other cryptocurrencies over the years. However, blockchain technology has been tested, and Quorum, a licensed blockchain framework based on an Ethereum protocol, has been created as an alternative to the Bitcoin Blockchain. Chase is now a key partner of the Ethereum Partnership Corporation (EEA) (Guo & Liang, 2016).

Engineers play a crucial role in developing and implementing diverse blockchain technologies. They have created a range of solutions for companies across a variety of industries as various blockchains have emerged. The original blockchain technology has demonstrated success in the modern world and has formed the foundation for many cryptocurrency operations worldwide. In the mid-2010s, bank managers and other financial services executives encouraged their internal IT teams to explore innovative possibilities. In early 2016, Chase and Citigroup launched credit default trading blockchain networks, as the Multinational Data Community reported. These experiments were promising and contributed to the growth of technology-based ventures. The experiments were characterized using smart contracts, which are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code. These smart contracts enabled the automation of the CDS trading process, reducing the need for intermediaries, and increasing the speed and transparency of the transactions. The use of blockchain technology also improved the ability to track and record the ownership of the CDS, making the process more secure and reducing the risk of fraud (Jayasuriya Daluwathumullagamage, D., & Sims, A., 2021).

Chase's Digital Investment Banking Unit and Core of Excellence in Blockchain inform the business ramifications of the quickly emerging financial/blockchain interplay. Although blockchain usage in organizations appears experimental, CFOs and financial managers strive to review the blockchain's new advances regularly. It is not challenging to see how the broader use of distributed ledger technologies could affect corporate finances, even in the early stages. Blockchain, as the innovation in technology, would need the complete C-suite to understand while business structures and industries adapt to a decentralized financial structure (Guo & Liang, 2016; Unni & Rudresh, 2022). Developing and financing the structure now, however, is crucial if cryptocurrencies are to become a predominant means of exchange later.

To this end, Chase, a pioneer in blockchain technologies, has a worldwide-focused team that investigates potential implementations around a business, emphasizing delivering creative strategies for customers. The team was formed in 2016 due to the considerable involvement of internal teams, customers, and all counterparties in learning about the functionality, weaknesses, sophistication, and implementations of blockchain technology. Comprised of a rather diverse collection of subject-wise specialists in technologies, financial instruments, industries, and processes, the Butte County Office of Education (BCOE) works with Chase firms to identify strategic prospects, prototype technical innovations, and assess industry ROI and consumer penetration viability. They also manage internal and external criteria to involve optimization solutions (Salah et al., 2019; Lewis et al., 2017).

According to Son (2020), Chase is banking on blockchain technologies' scalability and unique functions to introduce them into actual trading. The company knows that blockchain technology helps manage the entity. There is also a high speed involved in processing transactions. In addition, governance is quickly adhered to in the consortium-based blockchain,

especially if all consortium members agree to have the rules changed. Chase is further relying on the security features of the system. Maintaining the organization's internal controls is easy because of the ease of providing authentication services. Each transaction is authenticated by being assigned a security code, ensuring that no money in the organization is lost by duplicating transactions (Son, 2020; Unni & Rudresh, 2022).

Blockchain Technology at Chase

Chase used the Ethereum network to build the Quorum project, its pioneer digital currency product. The company applied this project to run the interbank system used to facilitate the transfer of payments to over 300 banks (Irrera, 2020). The Interbank Information Network of Chase was created not as a standalone product but to provide service to over 300 banks. This interconnectedness ensures a swifter transfer of funds from one bank to another (Stulz, 2019).

Irrera (2020) states that the Quorum project uses the JPM Coin to process immediate payments. This instancy in payments means that once the payment has been made to another bank account belonging to an individual - in an instant - the money has already been reflected in that person's understanding. This system creates flexibility, enhancing the speed at which most business transactions can now be carried out. Research on the Quorum project has been ongoing for the last few years, and there have been talks that the company wants to spin it off to create what it refers to as the open-source foundation. In October 2020, Chase implemented a transaction system where one of its largest clients, a specialist in carrying out several international businesses, was using blockchain technology for an international money transfer. The specific digital currency used to affect these transactions is the JPM Coin, which has been developing for quite some time.

Blockchain Technology in the Financial Market

The pull of blockchain technology in the financial markets has been inspired by many financial institutions, not just Chase. Financial institutions are looking at ways to develop digital technologies that will enhance the security of their payments while being readily accepted by regulatory agencies. Compliance is vital to the banks, and most banks are heavily regulated by the central banks, which are financial government agencies (Liu et al., 2022).

An increased level of scrutiny happens because the banks, in most cases, are in business with the government. However, it has been discovered that blockchain technology is an enhancer of regulatory reporting, especially in dealing with the AML. The data on the blockchain transaction file's ledgers can be obtained easily instead of going through many security protocols. This access can be granted to risk analysts and regulators; they will inspect and provide their go-ahead in real-time so that the data can be accepted by wide-ranging users and applications (Patel, 2018).

A company's internal control system can monitor account opening and lending practices in real-time. This is vital for businesses that seek more control over onboarding a new customer into the system. The ease of monitoring the system enables all the information to be uniquely verified during the KYC (Know Your Customer). The bank officer doing the registration process does not even have any room where they can make mistakes because of the real-time monitoring and reporting. Any errors are reported in real-time and rectified as soon as possible. An example of how blockchain technology can enable a company's internal control system to monitor account opening and lending practices in real-time is with smart contracts. Smart contracts are self-executing contracts with the terms of the agreement between the lender and borrower written into lines of code. These smart contracts can be programmed to automatically verify the identity and creditworthiness of the borrower in real-time and execute the loan disbursement and

repayment process automatically. This eliminates the need for manual verification and reduces the risk of errors or fraud. Additionally, smart contracts can also be programmed to automatically comply with regulatory requirements, such as Anti-Money Laundering (AML) and Know Your Customer (KYC) rules, allowing for real-time monitoring and reporting to regulatory agencies. This streamlines the process and reduces the need for intermediaries, increasing the speed and transparency of the transactions (Liu et al., 2022; Patel, 2018).

Blockchain continues to be marketed in most financial institutions along the following lines: it is a system that enhances transparency in financial operations. It is an enabling trust system (Liu et al., 2022; Pfleeger, 2014). Yermack & Fingerhut (2019) argue that when the network is down in most organizations, it is hard for the banking functions to be carried out efficiently. ATMs that are neither operational nor user-friendly limit customer transactions. Further, banking utilities such as ATMs experience downtime, discouraging future use. ATM outages due to repairs or refilling inconveniences customers and reduces the number of potential banking clients. However, a benefit of blockchain technology is that it is a reliable system. The downturn or going down of a network node found on the blockchain does not affect the entire system's performance. Unlike the current methods that can only be accessed through one approach, blockchain technology can be accessed through multiple network channels whose strength and speed are independent.

Consumer Data in the Financial Industry and Implementation of Blockchain Technology

The industry is facing many problems with how consumer data is stored. There have been accusations and counteraccusations in certain quarters, alleging that the current system does not ensure the consumer's privacy is respected. However, blockchain technology has a pseudo feature that allows individuals to store their knowledge in a cryptically protected component

through their digital wallets (Taskinsoy, 2019; Yermack & Fingerhut, 2019). They can save their private data as they deem fit, especially risky information such as account numbers, birth dates, social security numbers, and place of residence (Reena & Stephen, 2018).

According to Mappo (2019), industry-wide, many banks have begun to adopt blockchain technology. These include the ALFA bank, originating in the Russian Federation, and the United Overseas Bank. The United Overseas Bank is based in what has been described as one of the world's eminent financial technology cities: Singapore. The Standard Charter Bank has entered a partnership with Kotak bank to continue creating one of the world's most robust blockchain networks.

Blockchain adoption is increasingly growing as more organizations and economic powerbrokers are researching its use in their ecosystems. Still, it is far from being considered popular (Lewis et al., 2017). Kokina et al. (2017) also state that distributed ledger technology (DLT) would change conventional banks' business models by providing more efficient innovations, safer storage, and more secure transactions in the future. Nonetheless, all this advancement depends upon how the legal and regulatory obstacles are addressed, specifically regarding cross-platform incorporation. The initiative has captured the interest of the broader geopolitical world, including governments and central banks. It is understood that private capital can take over the planet, much as some fiat money today. Despite the potential, a lack of widespread adoption has stifled such a takeover.

Organizational Structures, Encryption, and Blockchain Technology

Ginsberg's (2019) "The Building Blocks of Blockchain" asserts that Chase's Commercial Bank Intelligence Service is the first scalable, peer-to-peer network operated by blockchain technology. The service is structured to overcome the interbank exchange's longstanding

complexities, minimizing the bridge transaction phase uncertainty while allowing transfers to meet recipients more quickly. The network helps financial institutions to share the details required for the execution of transactions in virtual environments. More than 299 institutions have registered written agreements to engage in intelligence services. They are utilizing this quickly growing technology to promote global cross-border transactions in all major markets, including Western Europe, Korea, Germany, Africa, and the Middle East. In many instances, these are positive developments, but challenges and issues have arisen. This sharing of knowledge across the different platforms is just one example of how blockchain users take advantage of the cost-saving benefits and ensure shared infrastructure (Broome, 2019; Cocco et al., 2017; Unni & Rudresh, 2022).

In an era when fraud in banks and other institutions has risen, the company wants to introduce a system into which it would be foolhardy to enter and commit the theft of millions of dollars (Lewis et al., 2017). The encryption that comes with blockchain technology is attractive, and enhanced security is possible because the blockchain encrypts all transactions currently being carried out in their database. Security is further enhanced because of the so-called electronic fingerprints, which must be verified because a transaction cannot be completed by one party (Reena & Stephen, 2018; Unni & Rudresh, 2022).

According to Leising (2020), the company has gone even further in its use of blockchain technology, as it is now being applied in financial investments and enhancement of shareholding. In 2020, Chase was reported as using its customized blockchain technology to ensure that it carries out the repurchase of its agreements. The shareholding expected to come back to the company in transactions would hit hundreds of millions of dollars. Blockchain technology has created a new digital market that works in the same way as the conventional stock exchange.

Chase anticipates that Goldman Sachs will find the technology useful enough to partner with and bring this new market to the industry and the world. The company is also relying on the new system's acceptability by other existing banking institutions. Blockchain technology trading is intra-institutional, taking place within a single organization. In this case, the Bank of New York Mellon acts as a third-party dealer, facilitating trades between the broker, dealers, and existing banking units. This has allowed for enhanced business with Goldman Sachs, though it should be noted that enterprise blockchain technology is still largely untested and underdeveloped. No organization is fully equipped and ready to take on the role of the industry leader in introducing this technology to the market.

This information suggests that blockchain technology is being widely adopted by financial institutions such as Chase to improve the efficiency and security of financial transactions and allow for faster and more secure cross-border transactions. The sharing of information across different platforms leads to cost-saving benefits. The enhanced encryption and electronic fingerprints that come with blockchain technology provide an added layer of security, making it less likely to be fraud-prone. Blockchain technology is also applied in financial investments and enhancement of shareholding, and Chase expects other financial institutions to adopt this technology. However, it is also noted that enterprise blockchain technology is still largely untested and underdeveloped and no organization is fully equipped and ready to take on the role of the industry leader in introducing this technology to the market. (Leising, 2020; Lewis et al., 2017).

Technical Hurdles Preventing Mainstream Adoption

Although blockchain is advancing quickly, technical hurdles such as scalability, data privacy, and technological standardization are preventing, or at least stunting, widespread

adoption (Banerjee, 2022). Moreover, blockchain requires a need for market-wide understanding of specialized applications within the current existing regulatory framework. Poor comprehension of cryptocurrencies contributes to the lack of trust in the market, which then slows down the adoption rate (Banerjee, 2022; Unni & Rudresh, 2022). Additionally, there are technical challenges related to security. To date, security breaches have been associated with user and human error rather than the core technology, and these vulnerabilities must be addressed (Banerjee, 2022). Yadav et al. (2021) claim that developing the right tools and managing these limitations will take time. However, continued investment in blockchain technology will likely address many problems and burdens like previous technology revolutions. Possibly thirty years from now, much like the internet, blockchain will be a commonplace technology integral to daily life. The negative consequences of the past ten to fifteen years have conditioned the public financial institution's approach to the future.

The government's regulatory power of blockchain technology remains limited. While this can be viewed as an advantage, putting a lot of trading power on the consumers could be risky (Banerjee, 2022). Risk happens when this power falls into the wrong hands. In the current system, the government plays a unique role in ensuring that people follow the set trading regulations (Banerjee, 2022; Unni & Rudresh, 2022). In all block applications, the issue of energy use poses another ongoing problem. Innovations that consume a lot of energy will always be problematic, not only for those involved in conserving the environment (Banerjee, 2022; Yermack & Fingerhut, 2019). Yermack and Fingerhut (2019) describe bitcoin mining as an energy-intensive process. Even though the technology is touted as a completely secure system, evidence suggests that blockchain may not be as secure as its proponents claim.

Lessons Learned

Dimitrov (2020) claims that Chase's latest study addressed the possibilities and threats surrounding cryptocurrency, digital currency, and blockchain technologies. Chase is a clearinghouse for the most prominent current digital currencies: cryptocurrency, DC/EP and Cashless Transfers, blockchain efforts, Facebook's Libra, and Stablecoins. Arguably, Chase is the most influential financial services firm seeking to embed blockchain innovations in the financial system. Over the last four years, they have cloned the Ethereum protocol as a company offering, named Quorum, and begun some significant initiatives in this field, including the JPM Coin and Interbank Information Network (IIN).

In payment and commercial lending applications, Chase enjoys the most benefit from blockchain and DLT. This is a valuation of the efforts made in cross-border and wholesale transfers by the global central banks experimenting with digital currencies. Chase's Research Group has found this nuanced yet rational observation to be a potential shield from inventories and shares in cryptocurrencies like Bitcoin, Ethereum, and Ripple. Dimitrov has suggested that the inference here is that even one percent of the exposure to cryptocurrencies is fascinating but a perilous and inefficient attempt due to the lack of legal tender (Dimitrov, 2020). The initial slogan in the cryptocurrency ecosystem was that they are unconnected commodities and can even be mixed as haven assets with gold and Japanese yen. However, Chase argues that excessive uncertainty and the thin stocks usually vulnerable to single-player abuse can be bolstered by digital and cryptocurrencies such as JPM Coin (Lewis et al., 2017).

Foss (2017), a certified financial planner and certified wealth manager, argues that investors should not try to outsmart the market. The systematic risk of the market is too large and uncontrollable to win against it; the only clear path is to have an investment plan and stick to it. Portfolio diversification is an unavoidable strategy to minimize the risk of investment. Foss

argues that diversification is not simple as it requires studying not only the market segment but also the seasonality and age of stock to minimize concentration risk. A good financial advisor and wealth manager can get their clients to see the comparisons. Warren Buffett's "Long Bets," for example, can be used while teaching them knowledge of establishing a strategy, diversifying appropriately, and then letting the markets do what they do most effectively over an extended period of time.

Conclusion

Nofer et al. (2017) claim that blockchain technology's introduction and development have been rapid. Chase is leading the financial industry by introducing and implementing relevant technology. Research in technologies cannot go on forever and introduce commercialization. Yet, it is vital to the continued growth of technology for consumers and banks to exhibit transparency in banking institutions. Transparency in financial institutions is mandatory because of the longstanding susceptibility to potential theft and fraud. Efficiency is equally crucial to security (Liu et al., 2022; Unni & Rudresh, 2022). Speed is everything in finance; it reveals why blockchain technologies are being touted as one of the best to reach the financial system in years (Nofer et al., 2017; Unni & Rudresh, 2022). Chase began implementing this critical technology and showcased blockchain technologies' revolutionary and transformational nature to the broader industry and world.

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