



Exploring Blockchain and Supply Chain Finance by JD.com to Overcome SME Financing Challenges in China

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Abstract

Financing difficulties and high costs have always been significant obstacles to developing small and medium-sized enterprises (SMEs). Limited access to funding sources causes many SMEs to struggle to expand their businesses. The high cost of loans and stringent requirements from traditional financial institutions exacerbate this issue, necessitating innovative solutions to address these challenges. This study aims to explore the application of blockchain and supply chain finance by JingDong Group (JD.com) in supporting the development of SMEs in China. JD.com seeks to accelerate its blockchain-based supply chain finance business by leveraging its big data and platform resources. This case study will examine how JD.com utilizes this technology to provide financing services for participants within the supply chain ecosystem and address their funding shortages. This research employs a case study approach to analyze the development and model of blockchain-based supply chain finance implemented by JD.com. Data collection includes a literature review, analysis of JD.com's annual reports, and interviews with relevant stakeholders involved in the implementation of blockchain and supply chain finance at JD.com. The study also compares JD.com's model with industry best practices to evaluate its effectiveness and the challenges faced. The findings indicate that JD.com's application of blockchain in supply chain finance has successfully reduced financing costs and expedited the funding process for SMEs. By leveraging blockchain technology, JD.com has achieved better transparency, reduced fraud risks, and improved operational efficiency. JD.com's supply chain finance platform has shown significant progress, with an increasing number of SMEs securing financing through this platform. To address future challenges, JD.com should continue to innovate and expand its blockchain ecosystem. Collaborating with other financial institutions and integrating with other technologies such as artificial intelligence (AI) can enhance risk prediction capabilities and improve the verification process. Additionally, supportive regulations and education for SMEs on the benefits and usage of blockchain are crucial to ensure broader and more effective adoption.

Keywords: *Small and Medium-Sized Enterprises, Supply Chain Finance, Blockchain, Jingdong*

A. Introduction

As an important part of China's national economy, small and medium-sized enterprises play a huge role in improving the rate of technological innovation, expanding employment and promoting market competition. Affected by the macro-economic downturn, the small and medium-sized enterprises in our country are generally facing the bottleneck of financing difficulties. According to the China Association of Small and Medium-sized Enterprises, the total financing of China's small and medium-sized enterprises in 2022 will be 28.6 trillion yuan, of which only about 20% of enterprises have obtained the required funds, while about 80% of enterprises need further financing. In this context, the blockchain + supply chain finance business carried out by e-commerce platforms, commercial banks, large core enterprises,

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logistics enterprises and other participants provides a solution to the problems of difficult and expensive financing for small and medium-sized enterprises. As a leading enterprise in China's e-commerce platform, JingDong Group has more advanced infrastructure and more solid digital intelligence experience than commercial banks, large core enterprises, logistics enterprises and other participating entities. At the same time, platform transactions have accumulated a large amount of customer behavior and transaction data for Jingdong, and customer data and platform resources have laid a solid foundation for the rapid development of Jingdong's blockchain + supply chain finance business, thus becoming an industry model.

Financing difficulties and high costs have consistently hindered the development of small and medium-sized enterprises (SMEs). Limited access to funding sources forces many SMEs to struggle in expanding their businesses. Traditional financial institutions impose high loan costs and stringent requirements, further exacerbating this issue and creating a significant barrier to SME growth (Beck & Demirguc-Kunt, 2006). Recent literature highlights the critical role of financial accessibility in the growth and sustainability of SMEs. Studies have shown that SMEs contribute significantly to economic development and job creation (Ayyagari, Demirguc-Kunt, & Maksimovic, 2011). However, their potential is often constrained by financial limitations. The advent and widespread application of supply chain finance, particularly when integrated with advanced technologies like blockchain, present a promising solution to these challenges (Caniato, Gelsomino, Perego, & Ronchi, 2016). Blockchain technology, known for its transparency, security, and efficiency, can revolutionize traditional financing methods, making them more accessible and cost-effective for SMEs (Kshetri, 2018).

This study aims to explore the application of blockchain and supply chain finance by JingDong Group (JD.com) in supporting the development of SMEs in China. By leveraging its big data and platform resources, JD.com seeks to accelerate its blockchain-based supply chain finance business. The study will examine how JD.com utilizes this technology to provide financing services for participants within the supply chain ecosystem and address their funding shortages. Additionally, the research will analyze the development and model of blockchain-based supply chain finance implemented by JD.com, comparing it with industry best practices to evaluate its effectiveness and the challenges faced.

The integration of blockchain technology into supply chain finance offers a transformative approach to addressing the financing challenges faced by SMEs. JD.com, as a leading e-commerce platform in China, has the potential to set a benchmark in this domain. By providing a transparent, secure, and efficient financing mechanism, JD.com's blockchain-based supply chain finance model can reduce costs, expedite funding processes, and mitigate fraud risks. This study argues that such innovative financial solutions are crucial for the sustainable growth of SMEs and can significantly enhance their contributions to the economy. Through a comprehensive case study approach, this research aims to provide valuable insights into the practical applications and benefits of blockchain in supply chain finance, offering a roadmap for other enterprises and financial institutions to follow.

B. Methods

This study employs a multi-method research design that integrates literature research, case study analysis, and comparative analysis to investigate the application of blockchain technology in supply chain finance. The research begins with an extensive literature review, which involves browsing academic papers, articles, and books from 2010 to 2024. This process aims to summarize existing research, identify key themes, and build a theoretical framework for the study by focusing on blockchain technology and its implications for supply chain finance (Ali et al., 2020; Hanelt et al., 2021).

Following the literature review, a detailed case study of JingDong Group (JD.com) is conducted. JD.com is chosen due to its prominent use of blockchain technology in supply chain finance. Data for this case study is collected from JD's official reports, industry publications, and interviews with key stakeholders involved in JD's blockchain initiatives (Du et al., 2019; Rijanto, 2021). The analysis includes examining how JD.com has implemented blockchain technology to address financing issues for small and medium-sized enterprises (SMEs) and the associated challenges faced.

Finally, a comparative analysis is performed to assess JD's blockchain-enabled supply chain finance model against industry best practices. This involves comparing key parameters such as financing products, asset-backed securitization (ABS), profit models, financing efficiency, and risk control mechanisms across different development stages of JD's supply chain finance model (Chen & Liu, 2021; Long et al., 2019). Data collection for this comparative analysis includes industry reports and benchmarks, while data analysis employs thematic, descriptive, and content analysis techniques to synthesize findings and evaluate JD's performance relative to industry standards (Bals, 2019; Senyo et al., 2019). This comprehensive approach ensures a thorough understanding of blockchain's impact on supply chain finance and provides valuable insights for future research and practical applications.

C. Findings and Discussion

1. The Mechanism of Blockchain Technology Enabling Supply Chain Finance

First, the distributed ledger principle solves the problem of information silos. Blockchain builds a collaborative network, using each node to record historical data such as transactions between enterprises on each chain. Data information between nodes does not interfere with each other, and jointly maintaining this information system, along with the broadcast mechanism, ensures that each node synchronously has the same backup data, thus guaranteeing the trusted flow and integrity of data in the chain. This improvement facilitates better exchange and cooperation of information in the supply chain (Treleaven, Brown, & Yang, 2017).

Second, decentralization promotes credit transmission. The distributed ledger principle of blockchain technology allows for the independent operation of each participant to a certain extent. For example, during the financing process, when an enterprise carries out accounts receivable rights, it can confirm its creditor relationship on the platform. Relevant financial institutions can then provide financing services, with the prerequisite being the core enterprise's identity verification. Through endorsement, the credit of the core enterprise is transmitted within the chain, enabling suppliers at every level to obtain financing funds (Ali, Ally, & Dwivedi, 2020).

Finally, smart contract technology can improve transaction efficiency while effectively preventing performance risks. The principle of smart contract technology makes transactions independent in the execution process. Under the premise of no other interference, the contract can be executed, and smart contracts can autonomously judge the triggered conditions. When conditions are met, the automatic verification and subsequent performance of the contract can occur without intermediary approval. This technology enhances transaction efficiency and speed, reduces manual intervention, and minimizes the probability of issues such as intentional fund defaults, promoting adherence to trading rules and reducing "difficult execution" risks (Senyo, Liu, & Effah, 2019).

2. JD's Blockchain and Supply Chain Finance Typical Model

Since the advent of Jingdong's "smart chain," it has played an important role in building a solid alliance chain, improving the credibility of data information, and enhancing financing efficiency in the supply chain finance scene. In today's supply chain finance business, Jingdong has leveraged the technical advantages of blockchain, including distributed ledger, traceability, immutability, and automatic execution of smart contracts. Data streams such as logistics, capital flow, information flow, and business flow, as well as related financing information, are uploaded to the blockchain for storage. Many nodes of the blockchain agree on and record this data synchronously, ensuring data security (Dong, Chen, Shi, & Ng, 2021).

According to the three stages of sales, operations, and procurement in the supply chain and the characteristics of supply chain finance, we categorize the blockchain and supply chain finance financing model into accounts receivable financing, prepayment financing, and inventory financing models, each featuring different business models. These models reflect the core concepts and characteristics of supply chain finance and have been successfully applied in enterprise financing. They connect banks and stakeholders across the chain, expanding the scope of financing beyond a single enterprise, helping businesses quickly secure financing, achieving win-win results, and improving operational efficiency across the entire supply chain (Bals, 2019).

3. JD's Blockchain and Supply Chain Finance Achievements

JD's profits are on an upward trend. Recently, with the increase in digitalization, Jingdong has introduced a new supply chain financial technology platform, gradually expanding its service scope to "online + offline" enterprises and building a supply chain financial service network. In addition to basic interest income and service fees, Jingdong charges platform user fees to cover the cost of establishing its blockchain service platform. Over the past few years, JD's profitability has also increased (Palmié, Miehé, Oghazi, Parida, & Wincent, 2022).

JD's financing has grown rapidly. With blockchain's information-sharing capabilities, JD's "blockchain + supply chain finance" model can access transaction information from all enterprises. Decentralization allows core enterprise credit to be distributed across various enterprises in the supply chain. Credit vouchers are transferred among enterprises, improving financing efficiency. The blockchain's smart contract feature allows for automatic deductions, further enhancing financing efficiency. JD's model has integrated credit granting and lending, strengthening supply chain connectivity, and enabling financing for enterprises even without direct trade with JD. This approach reduces financing thresholds for small and medium-sized enterprises, allowing nearly 90% of enterprises to access loan services, compared to less than 15% in traditional supply chain finance models (Jiao, Yang, Wang, & Li, 2021).

JD's asset utilization efficiency has significantly improved. Blockchain technology securely stores underlying asset information, ensures data integrity, increases investor confidence, simplifies transactions, reduces costs, and improves efficiency. Smart contracts enable automatic operation, enhancing credibility and efficiency. During ABS trading, blockchain technology synchronizes information and funds among institutions, alleviating account clearing issues. Following blockchain adoption, JD's accounts receivable ratio to current assets has declined, turnover days reduced, and turnover rate increased, transforming credit information data into assets more efficiently (Long, Zhang, & Ai, 2019).

JD's risk control ability has increased. The immutability of blockchain information and smart contract technology minimize manual intervention and reduce operational risks. The distributed ledger feature of blockchain, combined with consensus mechanisms, records and authenticates all business and transaction information, ensuring authenticity and real-time sharing. JD's comprehensive understanding of financing enterprises' operations and trading conditions mitigates default risks. Blockchain guarantees unique signatures and provides tamper-proof data, effectively reducing credit risk (Xu, 2019).

D. Conclusion

Blockchain technology is an emerging technology, although there are broad application scenarios, but its application is not mature, mainly because there are technical risks in blockchain technology, mainly including consensus mechanism loopholes, smart contract dilemma and key loss crisis three parts. The vulnerability of the consensus mechanism may cause the information uploaded to the blockchain to be illegally tampered with, and the authenticity of the information is no longer guaranteed; The smart contract dilemma may cause the contract to be hacked, the code to perform wrong operations, resulting in economic losses for all participants; The key loss crisis may cause the encrypted digital assets to be cracked, the user loses the control of the digital assets, resulting in commercial data leakage, and bring huge property losses to the user. At the same time, with the continuous development of JD's blockchain and supply chain finance, the system and users have reached a certain scale, if JD cannot timely break through key technologies such as security, performance and interaction, and prevent and control blockchain technology risks, it will certainly lead to a sharp decline in the credibility of the platform, which will have a serious negative effect on the operation and daily development of the platform business.

The willingness of core enterprises to participate is difficult to guarantee. The intensity of core enterprises' participation intention is related to many influencing factors. From the perspective of enterprise operating costs, core enterprises provide financing facilities for small and medium-sized enterprises by transferring their own credit. However, the core enterprise's own credit is limited, if excessive output, may increase its operating costs, resulting in business burden. From the perspective of enterprise risk control, the core enterprise credit has been "split" and "integrated" among smes, making it difficult for core enterprises to control their own credit status. Coupled with the uncertainty of their own financial and operating conditions, the liquidity risk of core enterprises has increased. From the perspective of corporate profit, transferring its own credit can optimize corporate cash flow to a certain extent, but considering the above additional operating costs and the increase in liquidity risk, the willingness of core enterprises to participate is difficult to guarantee.

According to the data released by China's Ministry of Industry and Information Technology, only 30% of small and medium-sized enterprises in China carry out digital transformation, and most small and medium-sized enterprises have problems such as imperfect information infrastructure, old management methods, and insufficient high-tech talent reserve. It can be seen that there is still a large gap in the degree of informatization among small and medium-sized enterprises. At the same time, the model of the combination of blockchain technology and supply chain finance is still in the initial stage of development, and it is necessary to constantly explore the scenario application model of blockchain, which requires continuous investment in technology research and development, business system upgrading, and high-tech personnel

training. Therefore, the cost of establishing a supply chain using blockchain technology is high. For smes, which already have a shortage of funds, such a high cost imposed on small and medium-sized enterprises is equivalent to raising the threshold for the introduction of blockchain technology.

Blockchain is a new thing, is still in rapid evolution, related new products emerge in an endless stream, and related security risks will also be born. The laws and regulations related to blockchain are not yet perfect, and the speed of update may not be able to keep up with the upgrading and iteration of technology, and the scale of legal regulation intervention is still to be discussed. Therefore, its application in the field of supply chain finance will inevitably conflict with financial supervision, increase uncertainties, and cause disputes over legitimacy. For example, the current law has not clearly regulated the use of blockchain technology to split and circulate commercial paper, which has certain commercial risks. In terms of the transfer of claims in Jingdong's "blockchain + supply chain finance", Chinese law only stipulates that "creditors can transfer all or part of the rights of the contract to a third party", that is, the first transfer of claims is recognized, while the second and third transfers are not clearly defined, so if there is a similar dispute, the lack of legal basis is likely to damage the rights and interests of the parties.

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